Appendix 7

Biodiversity Development Assessment Report

prepared by

OzArk Environment and Heritage Management Pty Ltd

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View of the subject land.

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Western Riverina Quarry

CARRATHOOL SHIRE COUNCIL LOCAL GOVERNMENT AREA

June 2024

Report prepared by

OzArk Environment & Heritage

for R.W. Corkery & Co Pty Limited

on behalf of Rockwoods Investment Group Pty Ltd.

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Acknowledgement

OzArk acknowledge Traditional Owners of the area to which this report applies and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

Document Control

Proponent	Rockwoods Investment Group Pty Ltd.		
Client	R. W. Corkery & Co Pty Limited		
Purchase order number			
Document description	Biodiversity Development Assessment Report (BDAR)		
	Name	Signed	Date
Clients reviewing officer			
Clients representative managing this document	OzArk representatives managing this document		
Caiden O'Connor (CO)	Dr Crystal Graham (CG)		
Location	OzArk job number		
S:\OzArk EHM Data\Clients\R.W. Corkery\Milbrae Quarries Eco and Arch July 2019\Western Riverina Quarry\Biodiversity	#2812		
Document status: **FINAL V3.6**	Version	Date	Action
Internal Draft Series	V1.0 V1.1	30/09/21 01/10/21	MW to CG CG to MW
First Draft for Client Review	V2.0 V2.1 V2.2 V2.3 V2.4 V2.5	01/10/21 18/10/21 09/11/21 07/12/21 12/12/21 11/02/22	MW to CO CO to CG DO to CO DO to MW MW to DO CG to DO
Final Report for Client	V3.0 V3.1 V3.2 V3.3 V3.4 V3.5 V3.6	14/02/22 24/02/22 09/06/22 21/06/22 13/10/23 25/10/23 20/06/24	CG to Client CG to Client CG to Client DO to Client CG to Client DO to Client Footprint Update
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CERTIFICATION

I certify that I have prepared the contents of this BDAR and, to the best of my knowledge, it is in accordance with the *NSW Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method 2020 (BAM). The information it contains is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect biodiversity as a result of the proposed activity. This BDAR has been reviewed and advised by a BAM Accredited Assessor.

BDAR prepared by	**Madeline Walsh**
Signed	
Date	12/12/2021
Organisation	OzArk Environment & Heritage
Position	Ecologist
Qualification	Bachelor of Environmental Biology (Hons)
Accreditation number	BAAS21010

I certify that I have reviewed and updated the contents of this BDAR and, to the best of my knowledge, it is in accordance with the *NSW Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method 2020 (BAM 2020). The information it contains is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect biodiversity as a result of the proposed activity. This BDAR has been reviewed and advised by a BAM Accredited Assessor.

BDAR reviewed and updated by	**Dr David Orchard**	**Dr Crystal Graham**
Signed		
Date	20/06/2024	20/06/2024
Organisation	OzArk Environment & Heritage	OzArk Environment & Heritage
Position	Ecologist	Senior Ecologist
Qualification	PhD (Biology)	PhD (Biology)
Accreditation number	BAAS21028	BAAS22024

Executive Summary

Rockwoods Investment Group Pty Ltd. (the proponent) proposes to extend an existing quarry within Lot 1 DP 821515, approximately 55.5 kilometres (km) north of Griffith, and 17 km northwest of Rankins Springs, within the Carrathool Local Government Area. OzArk Environment & Heritage (OzArk) was engaged by R. W Corkery & Co Pty Ltd. (RWC), on behalf of the proponent, to prepare the biodiversity assessment for the proposal.

The proposal will clear up to 4.23 ha of native vegetation to extend quarry operations, which includes an extraction area, processing and product stockpiling area, ancillary components area and operational disturbance area.

As the proposal will clear more than 1 ha of native vegetation, a Biodiversity Development Assessment Report (BDAR) is required to assess the impacts of the proposal on biodiversity and the proponent's offset obligations under the NSW Biodiversity Offsets Scheme (BOS).

The native vegetation consists of four Plant Community Types (PCTs):

- PCT 70 - White Cypress Pine woodland on sandy loams in central NSW wheatbelt.
- PCT 72 - White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion.
- PCT 185 - Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion.
- PCT 186 - Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion.

PCT 186 is associated with the following Threatened Ecological Community (TEC):

- *Biodiversity Conservation Act* 2016 (BC Act)-listed, Endangered Ecological Community (EEC), Mallee and Mallee-Broombush dominated woodland and shrubland, lacking *Triodia*, in the NSW South Western Slopes Bioregion.

Based on the results of the field survey, the occurrence of this PCT within the subject land did not meet the composition criteria to be considered an example of this TEC. Therefore, no TECs occur within the subject land.

In total, 29 Ecosystem Credit Species were generated by the Biodiversity Assessment Method Calculator (BAM-C). Three species were removed from the list due to habitat constraints, two species was detected on site, and 24 further species are assumed present on the subject land, generating a total of 62 Ecosystem Credits. In addition, 17 Species Credit Species were generated by the BAM-C. Of these, six species were removed due to habitat constraints. The remaining species were surveyed for following relevant and approved BAM survey methodologies; these species were not detected on the subject land. However, three candidate flora species were not able to be fully surveyed across the entire subject land as a small area (0.12 ha) of PCT 70_poor had already been disturbed prior to targeted surveys being conducted.

As such, presence has been assumed for these three flora species in this area generating a total of six Species Credits.

Offsetting is required for 62 Ecosystem Credits and six (6) Species Credits. The proponent intends to satisfy their Ecosystem and Species Credit obligations by buying and retiring the necessary credits from the open market or by paying directly into the Biodiversity Conservation Fund.

The significance of the proposed impact to *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act)-listed entities predicted to occur within a 10 km search area was assessed. No significant impact to a wetland, TEC, threatened, migratory, or marine species is expected as a result of this proposal. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended. Therefore, a referral of the proposal to the Federal Department of Climate Change, Energy the Environment and Water for these matters is not required.

This assessment covers the current form of the proposal, any change to the scope of work may require re-assessment.

Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Background

OzArk Environment & Heritage (OzArk) has been engaged by R.W. Corkery (the client), on behalf of Rockwoods Investment Group Pty Ltd. (the proponent) to complete a Biodiversity Development Assessment Report (BDAR) for the proposed extension of operations at the Western Riverina Quarry (WRQ, the proposal). The proposal is located on Lot 1 DP821515 near Wiltshire Road, approximately 55.5 kilometres (km) north of Griffith, and 17 km northwest of Rankins Springs, within the Carrathool Local Government Area (LGA; **Figure 1-1**). The development footprint (subject land) abuts the Lachlan Range State Forest at its southwestern limit and is c. 14.7 km from Jimberoo National Park, the nearest conservation reserve (**Figure 1-1**).

The minimum lot size associated with the proposal is 40 ha, therefore the clearing threshold for this proposal is 1 ha. Since the proposal will require the clearing of 4.23 ha of native vegetation it triggers entry into the NSW Biodiversity Offsets Scheme (BOS), therefore, a BDAR is required under the NSW *Biodiversity Conservation Act* 2016 (BC Act). This report documents the assessment, which has been completed in accordance with the Biodiversity Assessment Method 2020 (BAM) and details the proponent's biodiversity offset requirement (number of ecosystem and species credits).

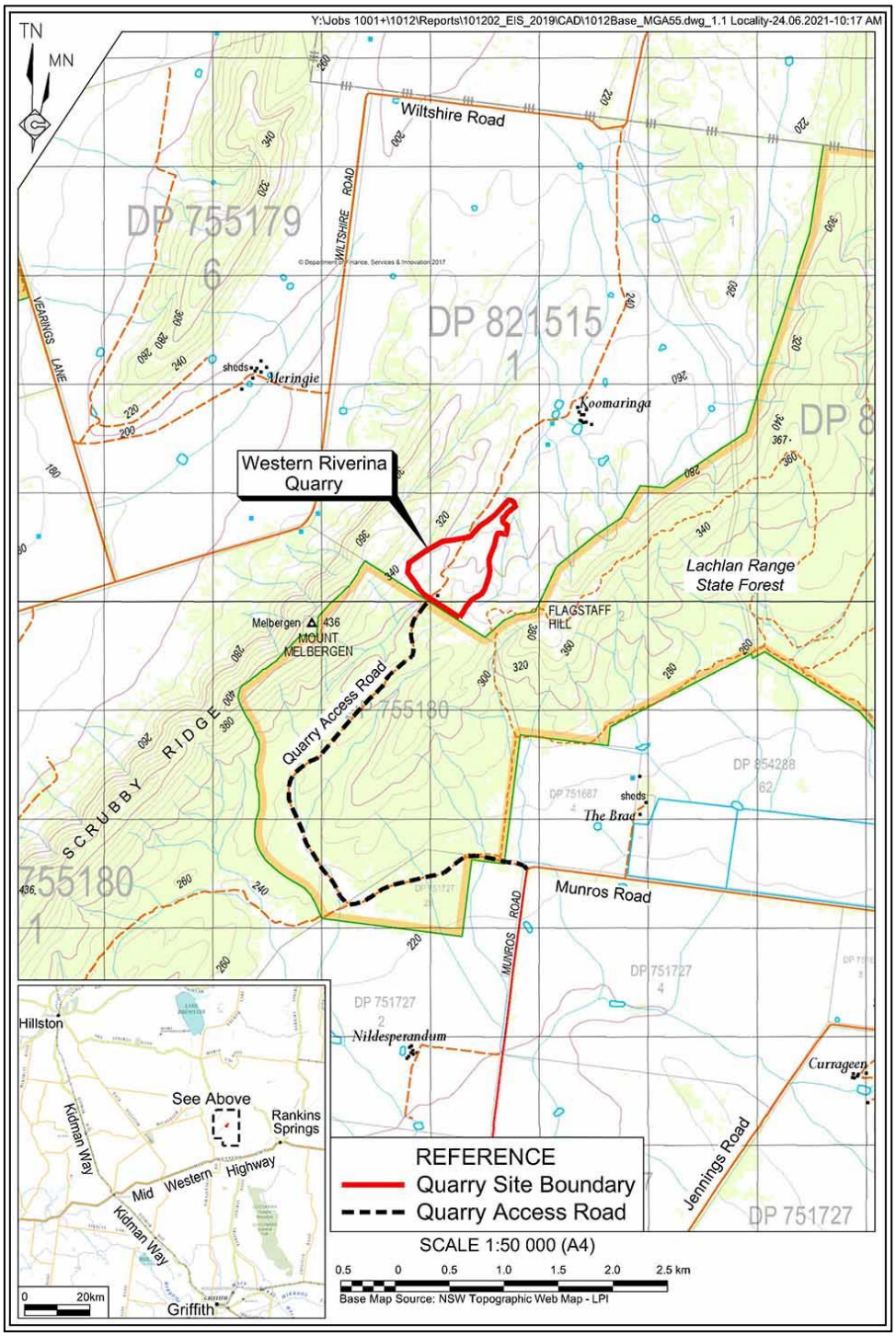

Figure 1-1. Map showing the location of the proposal.

1.2 Proposed development

WRQ currently has consent to extract 5,000 metres cubed (m^3), approximately 13,000 tonnes (t) of basalt per year although it is noted that annual production has exceeded this limit in recent years. Basalt material is extracted from the extraction area using drill and blast techniques with approximately six blasts undertaken per year. The fragmented basalt is loaded and hauled to a fixed crushing and screening plant for processing prior to stockpiling

and product despatch. It is noted that some aggregates are pre-coated within the processing area prior to despatch.

Rockwoods Investment Group Pty Ltd. has identified a further 4.9 million tonnes of resource adjacent to and beneath the current approved extraction area which they propose to extract (the proposal). The activities for which the proponent is seeking development consent would involve the following:

- Extraction of basalt and quartzite from within the proposed extraction area to produce up to 250,000 tpa of Quarry products.
- Importation of up to 1,500 tpa of concrete washout and other construction materials for recycling and incorporation in products produced within the Quarry.
- Crushing and screening of fragmented rock and imported materials on site using a fixed processing plant.
- Pre-coating of up to 20,000 tpa of aggregates.
- Transportation of up to 250,000 tpa Quarry products to end points of use within the Carrathool LGA and the broader Riverina Region.
- Ongoing employment of local personnel.
- Progressive and final rehabilitation of the Quarry to develop a final landform suitable for grazing and passive biodiversity conservation.

Figure 1-2 shows the proposed work and impact footprint, which includes the following existing and proposed components within WRQ:

- Extraction Area: the extraction area would be centred on the targeted hard rock resource
- Processing and Product Stockpiling Area: this area would include the fixed processing and screening plant, pre-coat plant, pugmill and dedicated areas for stockpiling Quarry products and imported material.
- Ancillary Components Area: this area would be located to the west of the processing and product stockpiling area and would comprise the Quarry office, amenities, light vehicle parking, weighbridge, and workshop.
- “No-go” Area: Designated “no-go” areas would be retained within the northern and southeastern extents of the Quarry Site to preserve Aboriginal heritage sites. The areas would be clearly marked to prevent inadvertent access.
- Rehabilitation Areas: designated areas would be progressively rehabilitated throughout the life of the proposal
- Operational Disturbance Area (35.52 ha – inclusive of all Quarry components and associated areas of disturbance): areas would be cleared of vegetation around the extraction area and other Quarry components to allow for the construction of safety bunds, internal roads / tracks and erosion and sediment control infrastructure.

- Quarry Access Road (5.2 km): the existing Quarry Access Road, which extends from Munros Road to the Quarry Site, would be retained to provide ongoing access to the Quarry Site for both heavy and light vehicles.

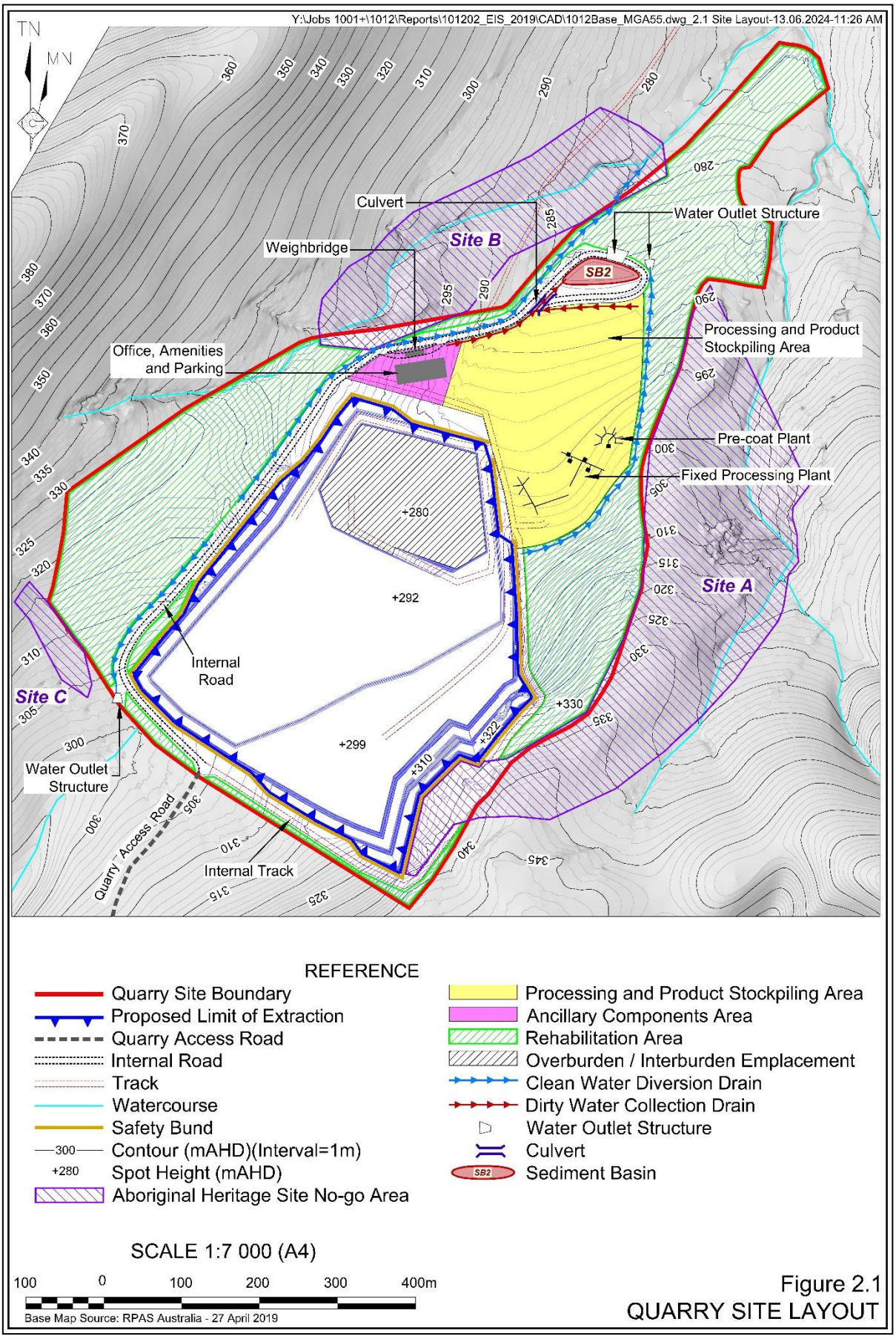

Figure 1-2. Proposed final site layout.

1.3 Relevant Terms

Three terms are used within the report to contextualise the proposal's location:

Subject land – The subject land includes the area directly affected by the proposal. The subject land is shown on **Figure 1-1** to **Figure 1-3**.

Study area (1500 m buffer) – To contextualise the landscape of the subject land, a 1500 m buffer has been applied to the subject land. Referred to as the study area throughout this report, it has been used to determine aspects of the site such as habitat connectivity and the predicted Plant Community Types (PCTs). The study area is shown on **Figure 1-4**.

10 km search area – The area within 10 km of the subject land. The 10 km search area has been used to carry out database searches to determine known records of threatened species or those predicted to occur within the study area and development site.

1.4 Site Identification

The site is identified under the Carrathool Shire Council Local Environment Plan 2013 (Carrathool Shire Council LEP) and on the NSW Planning Portal as follows.

- **Lot/Section/Plan No:** Lot 1/-/DP821515
- **Land Zoning:** RU1 Primary Production
- **Minimum Lot Size:** 40 ha
- **Terrestrial Biodiversity:** Biodiversity Value (Carrathool Shire Council LEP)

The location of the proposal is shown on the site map (**Figure 1-3**) and the location map (**Figure 1-4**).

1.5 Regulatory Context

The Proposal does not constitute a State Significant Development (SSD) and consequently entry into the BOS is not automatic. It has been determined that the BOS applies to this proposal as the clearing of 4.23 ha of native vegetation would exceed the clearing threshold for the relevant lot (**Table 1-1**).

The subject land was identified as occurring on bushfire prone land, according to mapping provided by the NSW Rural Fire Service, and as such, under Section 4.15 of the EP&A Act, the proponent will be required to address the relevant bushfire protection requirements of the Rural Fire Service Document *Planning for Bush Fire Protection*. It is assumed that all required asset protection zones are included in the assessed impact footprint.

Table 1-1. Clearing thresholds for entry into the Biodiversity Offsets Scheme (BOS)

Minimum lot size associated with the property	Clearing threshold, beyond which the BAM applies
<1 ha	0.25 ha or more
1 ha to <40 ha	0.50 ha or more
40 ha to <1000 ha	**1.00 ha or more**
1000 ha or more	2.00 ha or more

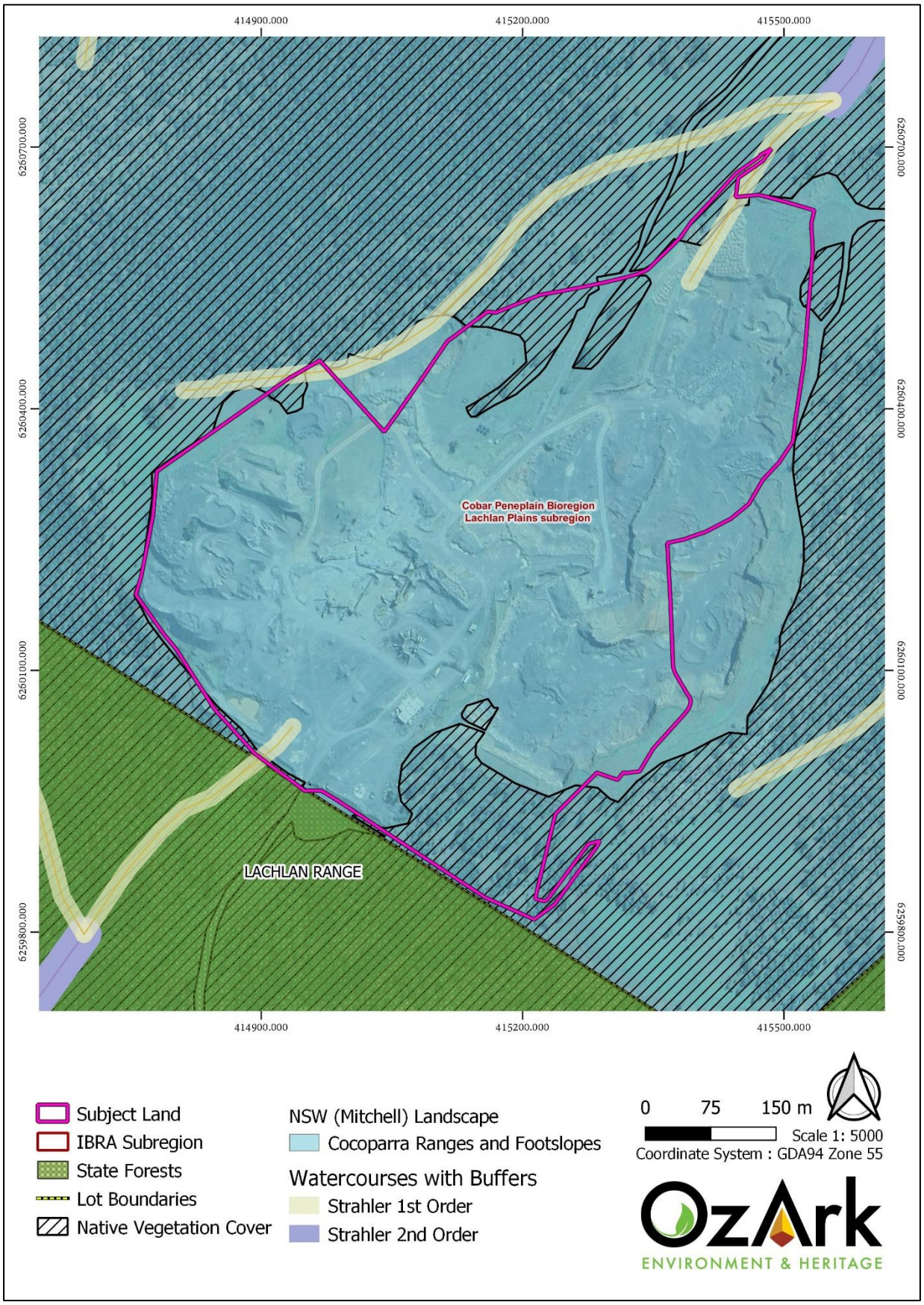

Figure 1-3. Site Map of the Proposal and Subject Land.

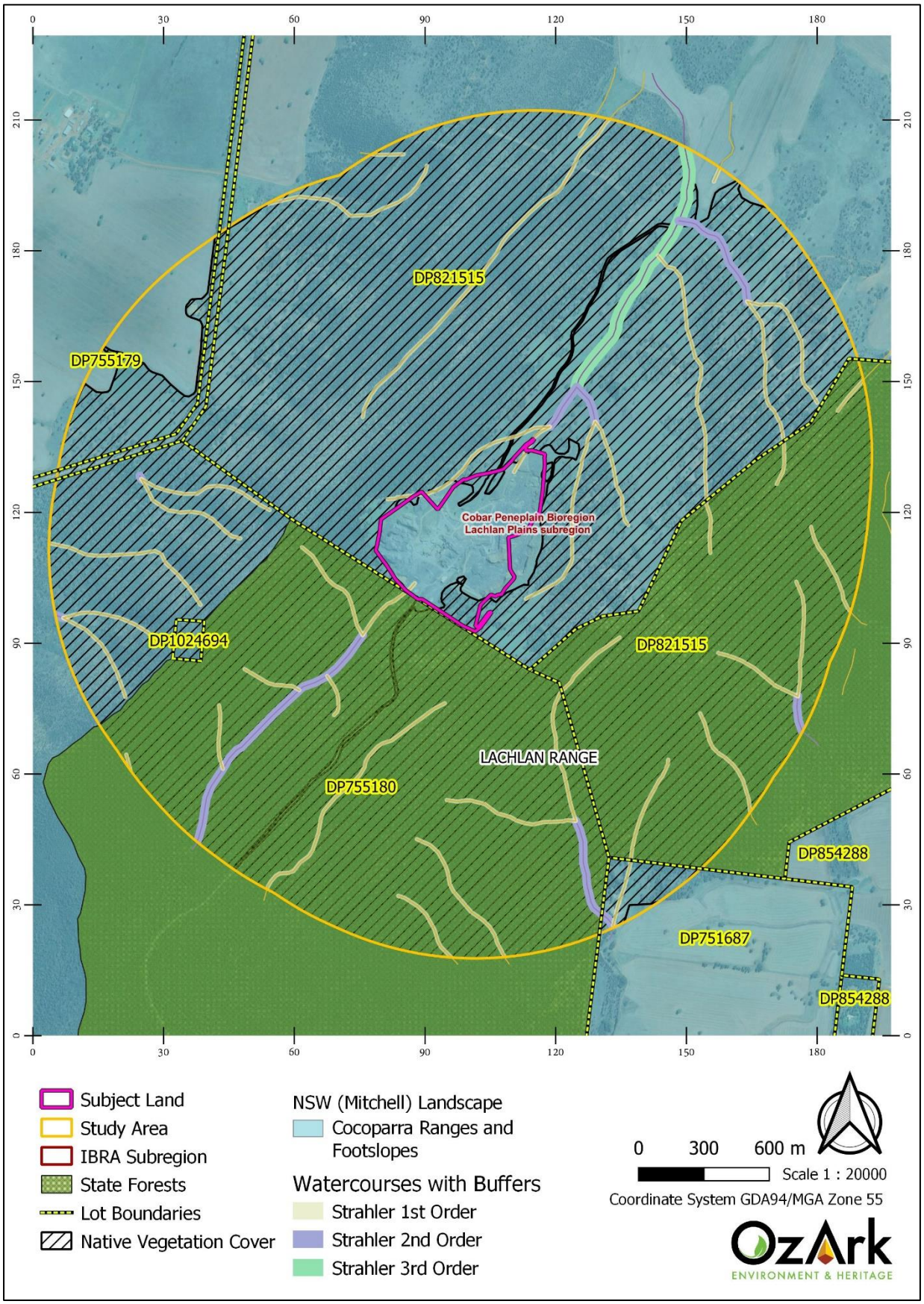

Figure 1-4. Location Map of the Subject Land Within the Study Area.

1.6 Purpose

The purpose of the BDAR is to determine the biodiversity assets, including flora, fauna, threatened species, threatened communities and habitat values, of the subject land. The BDAR calculates the credits required to be offset under the BC Act as mitigation for the biodiversity values that will be impacted after avoidance and minimisation measures have been incorporated into the development design. The BDAR also identifies any constraints on the proposal according to relevant federal and NSW environmental legislation and includes the calculation of Biodiversity Credits requiring offset.

2 Legislation

2.1 International Legislation

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)
- Ramsar Convention on Wetlands (Ramsar).

2.2 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), including EPBC Act Environmental Offsets Policy and Significant Impact Guidelines Version 1.1, 2013.

2.3 NSW Legislation

2.3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act provides the legal framework for the assessment and approval of the proposed activities. Part 4 of the EP&A Act requires the proponent to examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

2.3.2 Biodiversity Conservation Act 2016 (BC Act)

Under the BC Act, the proponent has an obligation to consider impacts to all threatened species, populations and ecological communities listed in NSW, as well as ensuring the proposal does not exacerbate a Key Threatening Process (KTP). Entry to the BOS is triggered if the proposal constitutes a State Significant Development (SSD), if a significant impact to a threatened entity is expected, if the proposal takes place on land mapped on the Biodiversity Values Map, or if the proposal exceeds the allowable clearing threshold (see **Section 1.5**).

2.3.3 Biodiversity Conservation Regulation 2017 (BCR)

The BCR defines the triggers and entry thresholds for the BOS. It also provides the rules for meeting offset obligations, triggers for authorities to refuse development applications and compliance provisions.

2.3.4 Biosecurity Act 2015

From 1 July 2017, the *Biosecurity Act 2015* and its subordinate legislation has commenced. The *Noxious Weeds Act 1993* and part of the *Local Land Services Act 2013* (Part 10 Pests), among other acts, have been repealed under the new *Biosecurity Act 2015*. Schedule 1 of the

Biosecurity Act 2015 contains the special provisions relating to weeds and duty to control weeds which pose a biosecurity risk.

The Department of Primary Industries (DPI) maintains a list of 'Priority Weeds' (previously referred to as noxious weeds) in NSW for the state and each region which imply an obligation on landholders to prevent, eliminate or minimise, so far as is reasonably practicable, any biosecurity risk they may pose. In addition, Local Government Areas may include their own priority weeds.

2.3.5 Fisheries Management Act 1994 (FM Act)

The objects of the FM Act are to:

- Conserve fish stocks and key fish habitats.
- Conserve threatened species, populations and ecological communities of fish and marine vegetation.
- Promote ecologically sustainable development, including the conservation of biological diversity.

Section 201 of the FM Act states that a person other than a government authority must seek a permit from NSW DPI – Fisheries for dredging or reclamation in a waterway. Dredging work means any work that involves excavating water land. Reclamation work means any work that involves depositing any material on water land. Matters relevant to the FM Act are explored in **Section 4.2** and **4.3**.

2.3.6 Water Management Act 2000 (WM Act)

The WM Act aims to provide for the 'sustainable and integrated management of the water sources of the state for the benefit of both present and future generations.'

The WM Act provides for the granting of various licenses and approvals, including for the use of water and water supply work. Additionally, the WM Act identifies provisions relating to 'controlled activities' which includes (among other definitions):

- The erection of a building or the carrying out of a work (within the meaning of the EPA Act)
- The removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise.
- It includes laying pipes and cables.

Approval (via a 'controlled activity' approval) is required from the Minister for Primary Industries under the WM Act if it is on 'waterfront land'. '*Waterfront land*' means the bed of any river, lake or estuary, and the land within 40 m of the riverbanks, lake shore or estuary mean high water

mark. There is no waterfront land within the subject land, or within 40 m, therefore a controlled activity approval will not be required for this proposal.

2.3.7 *State Environmental Planning Policy (Biodiversity and Conservation)* 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (*Biodiversity and Conservation SEPP*) consolidates, transfers and repeals provisions of 11 SEPPs, the following of which are relevant to the current assessment:

- Former SEPP (Koala Habitat Protection) 2020
- Former SEPP (Koala Habitat Protection) 2021

These individual SEPPs are no longer current; however, their provisions are incorporated into the *Biodiversity and Conservation SEPP.* Through the principles contained in these amalgamated SEPPs, the *Biodiversity and Conservation SEPP* aims to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'.

While the subject land is zoned RU1, the Carrathool Shire LGA is not listed under Schedule 1. For this reason, the proposal is not assessed under the *Biodiversity and Conservation SEPP*.

A separate assessment of impacts to the Koala under the EPBC Act guidelines has also been conducted (**Appendix F, G**).

3 Methodology

This BDAR has been prepared in accordance with the NSW Biodiversity Assessment Method 2020 (BAM) (NSW Department of Planning, Industry and Environment, 2020).

The ecological assessment was carried out in three stages:

1. Desktop searches and review of ecological databases and information to identify threatened species, populations or ecological communities listed in the BC Act, FM Act or the EPBC Act that have the potential to occur in the study area.
2. Field survey of the subject land to conduct BAM plots and collate species lists for the purposes of identifying the vegetation communities present and target predicted threatened species and ecological communities. Where a threatened species or community or habitat feature is identified, document the nature and extent of the protected matter and describe its 'viable local population' or occurrence through targeted surveys.
3. Preparation of a BDAR that describes the impacts of the proposed activity on native vegetation and threatened species, populations and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts. The BDAR also includes a biodiversity credit summary that identifies the number of ecosystem credits and species credits required to offset the development.

3.1 Personnel

OzArk operates under NSW Scientific Research License 101908, and NSW Department of Primary Industries (DPI) Accreditation of a corporation as an animal research establishment Ref No. AW2017/012. The role and key details of personnel involved in the proposal are provided in **Table 3-1**.

The primary field survey and BAM plots were completed by Senior Ecologist and Accredited Assessor Jesse Carpenter on 28th August 2019. Accredited Assessor Dr Emma Gray conducted targeted flora surveys on 20th September 2019. Accredited Assessor Dr Emma Gray and Ecologist Coral Pearce conducted targeted fauna surveys on 31st October 2019 and 1st November 2019. Accredited Assessor Dr Crystal Graham visited the subject land on 20 May 2022 to confirm Plant Community Type (PCTs), map hollow-bearing trees, conduct additional bird surveys, and record incidental fauna sightings. Accredited Assessor Dr David Orchard conducted targeted flora surveys in January 2023 and October 2023. The BDAR was originally written by Accredited Assessor Madeline Walsh and reviewed and updated by Accredited Assessors Dr Crystal Graham and Dr David Orchard.

Table 3-1. Summary of OzArk personnel qualifications.

Name	Position	Role	CV Details
Jesse Carpenter	Senior Ecologist	BAM Plots, PCT determination	• Accredited BAM assessor – Accreditation #BAAS18122 • Bachelor of Applied Science – Environmental Management – University of South Australia • 4WD Training • WH&S Induction Training for Construction Work
Dr Emma Gray	Ecologist	Targeted Surveys, GIS, initial BAM-C calculations	• Accredited BAM assessor – Accreditation #BAAS19069 • Doctor of Philosophy – Ecology – Queensland University of Technology • Bachelor of Applied Science – Ecology – Queensland University of Technology • WH&S Induction Training for Construction Work
Madeline Walsh	Ecologist	Subsequent BAM-C calculations, initial BDAR preparation	• Accredited BAM assessor – Accreditation # #BAAS21010 • Bachelor of Environmental Biology – University of Technology, Sydney • Honours in Ecology – UNSW, Sydney • WH&S Induction Training for Construction Work
Coral Pearce	Ecologist	Targeted surveys	• Master of Science – Ecology – Queensland University of Technology • Bachelor of Applied Science – Ecology – Queensland University of Technology • 4WD Training • WH&S Induction Training for Construction Work
Dr Crystal Graham	Senior Ecologist	Technical review and update of BDAR, revised PCT mapping, habitat tree survey	• Accredited BAM assessor – Accreditation # BAAS22024 • Doctor of Philosophy – Biology – University of Sydney • Honours 1 – Biology – University of Sydney • Bachelor of Advanced Science – University of Sydney • 4WD Training • WH&S Induction Training for Construction Work
Dr David Orchard	Ecologist	GIS, technical review, revised PCT determination, final BAM-C calculations, and BDAR update, targeted flora surveys	• Accredited BAM assessor – Accreditation # BAAS21028 • Doctor of Philosophy – Charles Sturt University • Graduate Diploma in Science (Botany) – University of New England • Bachelor of Arts – Australian National University • First aid training • WH&S Induction Training for Construction Work

3.2 Desktop Review

Existing information sources were reviewed to contextualise the study area, identify entities for targeted surveys, predict possible constraints, refine field survey methodology and assist with assessing the impacts of the proposal. Information sources consulted included:

- Aerial photographs and drone photographs
- Literature reviews to determine vegetation and species habitat(s) within the proposed study area
- NSW Government Web Map Service (WMS) layers for NSW Imagery (compiled imagery, NSW Property, NSW Base Map and NSW Topographic Map) (https://www.spatial.nsw.gov.au/products_and_services/aerial_and_historical_imagery).
- EPBC Protected Matters Search Tool (https://pmst.awe.gov.au/).
- State Vegetation Type Map: Central West/Lachlan Region Version v1.4 - VIS_ID 4468 (DPIE 2015).
- NSW DPI threatened fish indicative distribution maps (www.dpi.nsw.gov.au/fishing/species-protection/threatened-species-distributions-in-nsw/freshwater-threatened-species-distribution-maps).
- NSW BioNet Vegetation Classification Database (https://www.environment.nsw.gov.au/research/Visclassification.htm) .
- NSW BioNet Threatened Biodiversity Data Collection (www.bionet.nsw.gov.au/) .
- NSW BioNet Atlas (www.bionet.nsw.gov.au/).
- Register of Declared Areas of Outstanding Biodiversity Value (www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/critical-habitats).
- PlantNET, NSW Flora Online (www.plantnet.rbgsyd.nsw.gov.au/).
- Department of Environment and Planning *Biodiversity Values Map* (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap).
- Mapping of Vulnerable Lands – Steep and Highly Erodible (NSW Office of Environment and Heritage, 2011)
- Acid Sulphate Soils Risk mapping (NSW Office of Environment and Heritage, 1998)
- Directory of Important Wetlands of Australia (DIWA) (https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands).
- NSW wetlands mapping (NSW Office of Environment and Heritage, 2010)
- Important area mapping for Regent Honeyeater and Swift Parrot available from the Biodiversity Offsets and Agreement Management System (BOAMs).

All databases were searched in September 2021, December 2021, October 2023, and, where necessary, June 2024. Results of the database searches are provided in **Appendix A**.

3.3 Field survey

3.3.1 BAM Survey Methodology

Vegetation communities are identified in accordance with the online NSW Master Plant Community Type Classification (NSW Department of Planning, Industry and Environment, 2021b), which is the current state-wide vegetation classification system for Plant Community Types (PCTs). This classification system is used for vegetation mapping, development assessment and site planning purposes. It describes over 1,500 PCTs across the state, and groups the vegetation communities into vegetation Class and Formation / Sub-formation as per Keith (2004).

In this study, PCTs were identified on the basis of the following inputs:

- Regional Scale State Vegetation Map*:* Central West/Lachlan Region Version v1.4 - VIS_ID 4468 (DPIE, 2015) and State Vegetation Type Map C1.1.M1.1 (DPE, 2022), which provide predictive mapping of PCTs in and around the subject land. This mapping is indicative only. It is not necessarily accurate at a fine scale for the purposes of the current study.
- Professional ecological knowledge about locally occurring vegetation types and landscape, soil and topographic patterns, including transitions from one community to another and potential for intergrades between plant communities.
- Field survey results to confirm the flora species present, vegetation structure, landscape position and soil type at the subject land and the extent and condition of native vegetation.
- The BioNet Vegetation Classification database, this being used to identify the candidate vegetation communities likely to be present based on the site conditions (flora species present, vegetation structure, bioregion, and landscape position and soil type) and the relevant published PCT descriptions.

If any of the PCTs were identified as having potential to be part of a Threatened Ecological Community (TEC), the relevant identification guidelines (NSW Scientific Committee listing criteria and Commonwealth identification guides) were consulted to determine the status of the vegetation community present. These guidelines provide the identification criteria used to determine whether the community is part of a TEC. The criteria include location, species present, overstory species, weed cover, number and type of native species including whether certain ‘important’ native species are present.

Plant identification followed nomenclature in the Royal Botanic Gardens PlantNET online database (Royal Botanic Gardens and Domain Trust, 2024).

Vegetation Integrity was surveyed according to the BAM as follows:

- The survey plots consisted of nested 20m x 50m and 20m x 20m plots
- Species composition and structure (species and percent cover) data collected from within 20m x 20m plot
- Vegetation function data (size and number of trees, presence of hollow-bearing trees and woody debris) collected from within 20m x 50m plot
- Percent of litter cover data collected within five 1m x 1m squares positioned at 5m, 15m, 25m, 35m and 45m points of the 50m transect
- The plots were positioned within the subject land and their GPS locations were recorded (GDA 94 / MGA Zone 55).

The plot locations were randomly selected whilst ensuring adequate survey effort within each vegetation zone (**Table 3-2**). Thirteen BAM plots (WRQ01-WRQ13) were conducted in the initial field survey by Jesse Carpenter in August 2019. Two BAM Plots (WQ08 and WQ09) were not used in the assessment as the vegetation zone associated with the plots was not present within the final subject land. The location of all BAM plots is depicted in **Figure 5-1** and **Figure 5-2**. All plot data is provided in **Appendix C**.

Table 3-2. Minimum number of plots and transects required per zone area (NSW Department of Planning, Industry and Environment, 2020).

Vegetation zone area (ha)	Minimum number of plots/transects
<2	1 plot/transect
>2 – 5	**2 plots/transects**
>5 – 20	3 plots/transects
>20 – 50	4 plots/transects
>50 – 100	5 plots/transects
>100 – 250	6 plots/transects
>250 – 1000	7 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots/transects; more plots may be needed if the condition of the vegetation is variable across the zone

3.3.2 Incidental Fauna Sightings

Incidental fauna sightings were recorded while undertaking the BAM plots and searching the subject land for hollow-bearing trees and other potential habitat features. Potential habitat such as rock outcrops, loose bark and course woody debris was recorded and examined for signs of cryptic species. Tracks and other areas of suitable substrate were searched for animal

tracks. Other evidence of fauna presence on the subject land, such as scats, feathers and sloughed skins were also recorded.

3.3.3 Targeted Surveys for Threatened Species Credit Species

Targeted surveys were carried out to confirm the presence/absence of a number of threatened species credit species identified by the BAM calculator ([BAM-C], see **Section 6**). Targeted surveys were conducted prior to the finalisation of the impact footprint. Therefore, flora and fauna targeted surveys were completed outside the subject land in addition to inside the subject land (**Figure 3-2**). Targeted surveys were conducted on the 28th August 2019, 20th of September 2019, 31st of October 2019, 1st of November 2019, 20th of May 2022, 30th of January 2023, and 5th of October 2023. Survey periods prescribed by the BAM are given in **Table 3-3**, along with the dates of the actual surveys and the associated vegetation zones for each species. Candidate species credit species were surveyed following the methodology outlined in the appropriate survey guidelines (see below).

Table 3-3. Prescribed and actual survey timing for threatened species.

Common Name	Scientific Name	BAM Survey Period	Field Survey Timing	Associated Vegetation Zones
Curly-bark Wattle	*Acacia curranii*	All year	September 20, 2019 and January 30, 2023	72_Poor
A speargrass	*Austrostipa metatoris*	October-November	October 5, 2023	70_Poor, 72_Poor
Pine Donkey Orchid	*Diuris tricolor*	September-October	September 20, 2019 and October 5, 2023	70_Poor, 72_Poor
Holly-leaf Grevillea	*Grevillea ilicifolia* subsp. *ilicifolia*	All year	September 20, 2019	186_Poor
Silky Swainson-pea	*Swainsona sericea*	September-November	September 20, 2019 and October 5, 2023	70_Poor, 72_Poor
Bush Stone-curlew	*Burhinus grallarius*	All year	August 28, 2019, October 31, 2019-November 1, 2019, May 20, 2022	72_Poor
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	January-September*	August 28, 2019, October 31, 2019-November 1, 2019 and May 20, 2022.	72_Poor, 185_Poor, 186_Mod
White-browed Treecreeper – endangered population	*Climacteris affinis*	All year	August 28, 2019, October 31, 2019-November 1, 2019, May 20, 2022	72_Poor

Common Name	Scientific Name	BAM Survey Period	Field Survey Timing	Associated Vegetation Zones
Little Eagle (Breeding)	*Hieraaetus morphnoides*	August-October	August 28, 2019, October 31, 2019-November 1, 2019	70_Poor, 72_Poor, 185_Poor, 186_Moderate
Major Mitchell's Cockatoo (Breeding)	*Lophochroa leadbeateri*	September-December	October 31, 2019-November 1, 2019	70_Poor, 72_Poor, 185_Poor, 186_Moderate
Square-tailed Kite (Breeding)	*Lophoictinia isura*	September-January	October 31, 2019-November 1, 2019	70_Poor, 72_Poor

*At the time of the initial survey, the Riverina population of this species could be surveyed at any time of the year. This population has now been merged with the listing for the species generally and the survey window altered.

Threatened flora

The BAM-C returned five threatened flora species credit species that could not be excluded due to habitat constraints. Targeted surveys were undertaken for all five flora species and consisted of parallel transects, at approximately 10 m separation widths, undertaken on 20th of September 2019, 30th of January 2023, and 5th of October 2023 (**Figure 3-2**). This area was classified as open vegetation, so the survey methodology was adequate, according to the methods outlined in *Surveying threatened plants and their habitats* (DPIE 2020). However, three candidate flora species were not able to be fully surveyed across the entire subject land as a small area (0.12 ha) of PCT 70_poor had already been disturbed prior to targeted surveys being conducted. As such, presence has been assumed for these three flora species in this area (see **Section 6.2**).

Threatened fauna

No large hollows were recorded within the subject land, and only one large hollow was recorded within 100 m (**Figure 3-1**) of the subject land boundary, however, this was not located within 100 m of an appropriate PCT for any species dependent on large hollows. Therefore, fauna species dependent on large hollows were excluded from survey requirements.

Six threatened fauna species credit species generated by the BAM-C could not be excluded due to habitat constraints:

- Bush Stone-curlew (*Burhinus grallarius*)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- White-browed Treecreeper (*Climacteris affinis*)
- Little Eagle (*Hieraatus morphnoides*)

- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)
- Square-tailed Kite (*Lophoictinia isura*)

Incidental bird surveys were undertaken during the initial BAM vegetation survey in August 2019 (07:00-17:00) and follow up survey in May 2022 (11:30-13:50). Targeted fauna surveys were conducted over a two-day period between the 31st of October and the 1st of November 2019. Diurnal and nocturnal survey effort was required, including:

- Diurnal bird surveys were conducted at the site by repeating three 20-minute point-surveys over two days, detecting birds by call and sight. Birds were surveyed within the full extent of the associated PCTs. A Song Meter (SM4 model) was also deployed in PCT 70 on 31st of October 2019 (**Figure 3-2**) for 21 days to ensure woodland birds were sampled. The song meter was programmed to record the dawn (05:30-07:30) and dusk (19:30-21:30) chorus. Habitat searches were undertaken to detect evidence of breeding activity and flushes were also carried out to detect any Bush Stone-curlews that may have been utilising the groundcover as habitat.
- Nocturnal bird surveys were conducted by performing call playbacks (31 October 2019) to determine whether the Bush Stone Curlew (*Burhinus grallarius*) was present. Spotlighting between call playbacks was also undertaken for the Bush Stone-curlew. A Song Meter programmed to capture nocturnal bird calls (23:30-01:30 h) was deployed for 21 days to determine whether the species makes any use of the subject land.

Survey conditions during targeted fauna surveys in October-November were hot and fine (**Section 4.10**). Surveys followed the TBDC, Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (working draft) (NSW Department of Planning, Industry and Environment, 2004) and the Survey Guidelines for Australia's Threatened Birds (Department of the Environment Water, Heritage and the Arts 2010). A summary of the methods employed to target each species, and the effort accumulated, is presented in **Table 3-4**.

Table 3-4. Summary of targeted survey effort for threatened fauna species.

Common Name	Scientific Name	Diurnal searches for physical presence, auditory or physical signs	Spotlighting	Call playback	SM4 Recorder
Bush Stone-curlew	*Burhinus grallarius*	✓	✓	✓	✓
South-eastern Glossy Black-Cockatoo	*Calyptorhynchus lathami*	✓			✓
White-browed Treecreeper	*Climacteris affinis*	✓			✓
Little Eagle (Breeding)	*Hieraaetus morphnoides*	✓			✓
Major Mitchell's Cockatoo (Breeding)	*Lophochroa leadbeateri*	✓			✓
Square-tailed Kite (Breeding)	*Lophoictinia isura*	✓			✓
PERSON HOURS		22.5 hrs (over 4 days)	1 hr (1 night)	4 hrs (1 night)	126 hrs of call recording (over 21 days)

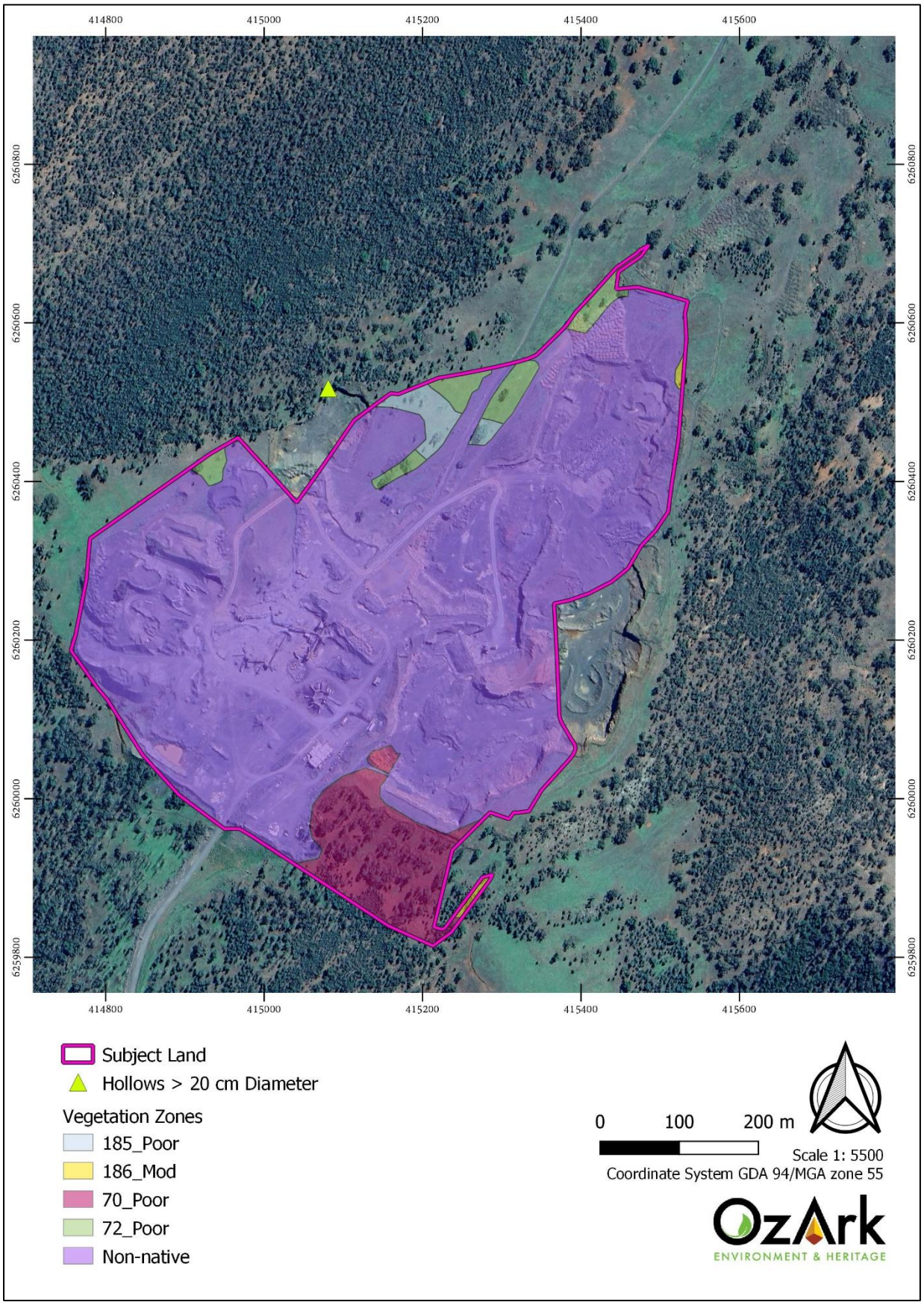

Figure 3-1. Location of large hollows (>20 cm diameter) within 100 m of subject land.

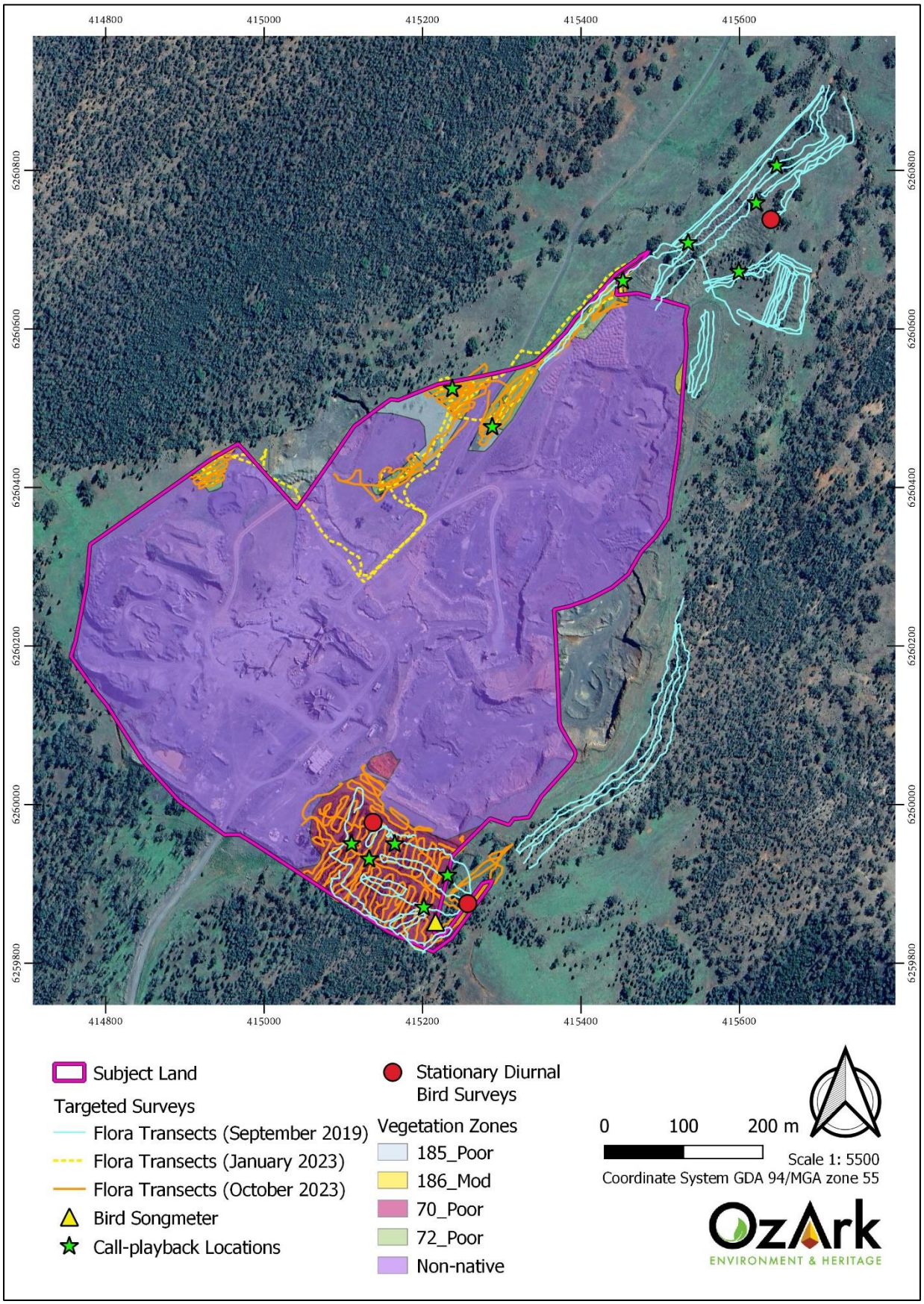

Figure 3-2. Targeted Survey Effort for Candidate Species.

3.3.4 Survey Limitations

This study is based upon the species data available at the time of the field investigation, and the environmental conditions, season, and time constraints imposed by the proposal for the field survey. Specific limitations on this study include the following:

- The BAM vegetation field survey was mostly completed over a single day in August 2019, as such, the diversity of plant species observed in the BAM plots may not have been wholly representative.
- Prevailing climatic conditions at the time of the BAM vegetation field survey were extremely dry, which undoubtedly caused some species to be temporarily absent or difficult to detect (**Section 4.10**). This may affect calculations of vegetation integrity.
- A small area (0.12 ha) of PCT70 was disturbed prior to completion of targeted flora surveys. In these areas, species have been assumed present.

To overcome some of these limitations, a 'precautionary approach' for species presence has been adopted where required. For example, if suitable habitat for a particular threatened species is present on the site and the conditions for targeted survey are not able to be met (due to footprint changes or habitat disturbance) then the species is assumed to be present.

The above-mentioned constraints were also considered when preparing the recommendations of avoiding, minimising and mitigating potential impacts.

4 Landscape Features

4.1 Bioregions and NSW Landscapes

The subject land is situated in the Lachlan Plains subregion, within the Cobar Peneplain Bioregion, as per the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway & Cresswell, 1995). The Lachlan Plains subregion is characterised by geology, landforms, soil types and vegetation as described in **Table 4-1**.

Table 4-1. Description of the Lachlan Plains Subregion (NSW National Parks and Wildlife Service, 2003).

Cobar Peneplain Bioregion				
Subregion	**Geology**	**Landform**	**Soils**	**Vegetation**
Lachlan Plains	Devonian quartz sandstone and conglomerate, small areas of granite, and Quaternary colluvial slope mantles and alluvium.	Strike ridges of resistant rocks often following fold patterns. Low rounded hills of granite with sparse outcrop. Wide short valleys connecting to Lachlan floodplains.	Shallow stony or gritty red earths on crests and slopes, thickening downslope as rubbly mantles often with a texture contrast. Deep sandy alluvial soils in valleys with small areas of grey clay in swamps.	Dense currawang, Dwyer's mallee gum and white cypress pine on rocky crests. Same with red ironbark, mallee broombush, hill tea-tree and poplar box on slopes. Poplar box, white cypress pine, mallee, kurrajong, yarran and wilga in valleys. Poplar box and black box in minor swamps.

In 2002, landscapes within NSW were mapped to provide a framework for reporting reserve establishment and for determining over-cleared landscapes. These landscapes broadly describe areas of similar topography, geology, soils and vegetation and are termed NSW (Mitchell) Landscapes.

The Cocoparra Ranges and Footslopes landscape occurs within the study area (**Figure 1-3**, **Figure 1-4**). The characteristics of this landscape are described in **Table 4-2**.

Table 4-2. NSW Landscapes of the study area (Mitchell, 2002).

Mitchell Landscape	Geology and soils	Landform	Vegetation
Cocoparra Ranges and Footslopes	Footslopes of Quaternary colluvium with outcrops of upper Devonian sandstone, conglomerate and siltstones. Extensive rock outcrop, shallow sandy lithosols, acid, neutral and calcareous	Steep crested ranges, ridges, hills and associated footslopes. Cliff faces to 30 m, bouldery hill slopes with overall relief to 260 m.	On ranges; scattered white cypress pine (*Callitris glaucophylla*), currawang (*Acacia doratoxylon),* Dwyer's mallee gum (*Eucalyptus dwyeri*), and red ironbark (*Eucalyptus sideroxylon*); locally dense broombush (*Melaleuca uncinata*), hill tea-tree (*Leptospermum divaricatum),* urn

	red earths on slopes and deep sandy alluvium in creek lines.	heath (*Melichrus urceolatus*), wedge-leaf hopbush (*Dodonaea viscosa*), punty bush (*Senna eremophila*), cough bush (*Cassinia laevis*), sugarwood (*Myoporum platycarpum*), grey box (*Eucalyptus microcarpa*), wilga (*Geijera parviflora*), and Deane's wattle (*Acacia deanei*); rock fern (*Cheilanthes sieberi*), wire grass (*Aristida* sp.), mulga grass (*Thyridolepis mitchelliana*), short grasses and forbs. On lower slopes bimble box (*Eucalyptus populnea),* white cypress pine, mallees, yarran (*Acacia homalophylla*), wilga, emu bush (*Eremophila longifolia*) and various acacias with grasses and forbs.

4.2 Watercourses and Key Fish Habitat

Forty-five watercourses are present within the Study area. Three Strahler 1st order, unnamed, minor, non-perennial watercourses occur within the subject land. The study area contains the following watercourses (**Figure 4-1**):

- Thirty-six 1st order, unnamed, minor, non-perennial watercourses
- Eight 2nd order, unnamed, minor, non-perennial watercourses
- One 3rd order, unnamed, minor, non-perennial watercourse

There are no waterways mapped as Key Fish Habitat (KFH) by the Department of Primary Industries - Fisheries (DPI Fisheries) within the subject land, nor is there any Protected Riparian Land mapped by the Department of Planning and Environment (DPE). Therefore, no permits will be required under the FM Act.

Sediment runoff (caused by ground disturbance/vegetation removal by the proposal) may flow into watercourses within the study area and impact steams. However, if standard mitigation measures are implemented, the likelihood of this occurring is low.

4.3 Wetlands

The directory of Important Wetlands of Australia indicates that there are no nationally important wetlands in or in close proximity downstream of the study area. The closest nationally important wetland is Lake Brewster, over 30 km to the north (Department of the Environment, 2010). Additionally, the closest Ramsar wetland is Fivebough and Tuckerbil Swamp over 80 km to the south.

4.4 Groundwater Dependent Ecosystems

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment.

The degree of groundwater dependence of ecosystems in terms of three broad categories:

- Non-dependent ecosystems that occur mostly in recharge areas and have no connection with groundwater
- Facultative GDEs that require groundwater in some locations but not in others, particularly where an alternative source of water can be accessed to maintain ecological function. Minor changes to the groundwater regime in facultative GDEs with proportional or opportunistic groundwater dependence may not have any adverse impacts but these ecosystems can be damaged or destroyed if a lack of access to groundwater is prolonged
- Obligate GDEs that are restricted to locations of groundwater discharge and ecosystems located within aquifers (e.g. subterranean cave and stygofauna communities (Kuginis *et al*. 2012). Aquifer ecosystems are inherently groundwater dependent (Queensland Government, 2017).

The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems (GDEs) identified areas of low potential terrestrial GDEs within the subject land and areas of moderate potential terrestrial GDEs within the surrounding study area (**Figure 4-1;** Bureau of Meteorology, 2017). No Aquatic GDEs were identified within the study area.

The proposal does not include the extraction of groundwater; however, contamination from construction operations, could impact on the quality of groundwater if adequate mitigation measures are not taken. See **Section 7.2** for recommended mitigation measures regarding GDEs.

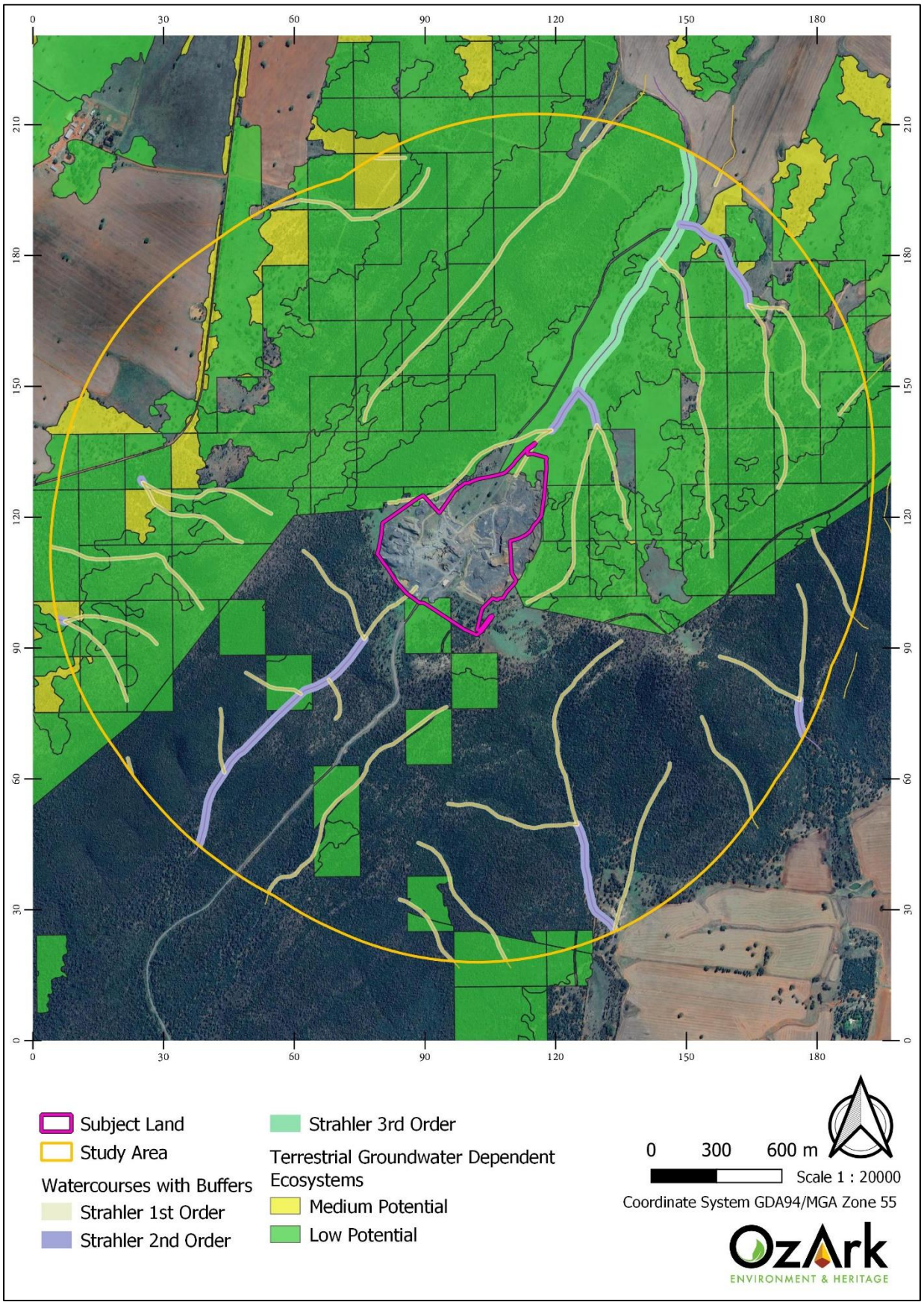

Figure 4-1. Groundwater Dependent Ecosystems and Watercourses within the Study Area.

4.5 Karst, Caves, Crevices, Cliffs and Areas of Geological Significance

The underlying geology and soil typical of the study area has been described in **Table 4-1** and **Table 4-2**. Rocky outcrops were recorded in close proximity to the subject land boundary (**Figure 7-1**), additionally, as the site is a quarry, considerable loose rock is present. No caves or karst formations were detected on the subject land, or within the section of the property that was assessed, though there is an extraction pit rocky wall creating an artificial rock face.

4.6 Areas of Outstanding Biodiversity Value

There are no areas of outstanding biodiversity value listed under the BC Act in the subject land, or study area.

4.7 State Environmental Planning Policy (SEPP) - Koala Habitat Protection

The SEPP 2020 applies to land zoned RU1 – Primary Production in Local Government Areas listed under Schedule 1 of the Policy. While the subject land is zoned RU1, the Carrathool Shire LGA is not listed under Schedule 1. For this reason, the proposal is not assessed under the SEPP.

For reference, the closest Koala records are over 12.5 km to the south-west.

4.8 Native Vegetation Cover

Native vegetation cover was assessed within the study area and the subject land and estimated as the amount of native vegetation (woody and non-woody vegetation, including regrowth and plantations comprised of plants native to NSW; see **Figure 1-4**). A summary of the vegetation cover estimate is provided in **Table 4-3**. For the purposes of the BAM, the native vegetation cover class has been determined as >70%.

Table 4-3. Native vegetation cover estimate in the study area.

Vegetation Cover Type	Description	Area Within Study Area (ha)	Total area of Study Area (ha)	% of Study Area native vegetation
Native woody and non-woody	Regrowth and remnant native vegetation	1145.57	1239.27	92.44

4.9 Landscape Connectivity

The subject land, a working quarry, is situated amongst agricultural land used for primary production and backs onto the Lachlan Range State Forest (**Figure 1-3** and **Figure 1-4**). According to the State Forest mapping (Forestry Corporation of NSW 2023), the subject land encompasses 10 m^2 of the Lachlan Range State Forest. However, updated cadastral boundary mapping confirmed that the subject land does not encroach within the state forest boundary.

The subject land is owned by Kalrag Pty Ltd and is leased to the applicant under an agreement which expires on 30 June 2060, including 2 x 15-year options.

4.10 Climate

The nearest weather station to the subject land is 34.8 km away at Weethalle (Station ID 75072), however this weather station records rainfall data only (**Figure 4-2**). The nearest weather station recording temperature data is the Griffith Airport (Station ID 75041) approximately 49.2 km from the subject land (**Figure 4-3**).

The vegetation field assessment was undertaken on 28 August 2019. Weather conditions at the time of the survey were cool, reaching a maximum temperature of 17.5°C. There was no rainfall recorded on the day of the survey, nor was there for 15 days previous. There was below average rainfall recorded for the month of August with a total of 5.4 mm, indicative of overall long-term climatic conditions being much drier than average (**Figure 4-2**).

The initial targeted flora surveys were undertaken on the 20th of September 2019. Weather conditions at the time of the survey were warm during the day (29.6°C) and cool-warm overnight (minimum of 16.7°C). Rainfall for the month of September 2019 was 8 mm, well below average.

The targeted fauna surveys were undertaken on 31st October 2019 and 1st November 2019. Weather conditions at the time of the survey were hot during the day (34.5°C on 31st October and 36°C on 1st November) and mild overnight (minimum of 13.6°C and 15.6°C on the respective days). There was no rainfall recorded on the survey days. The most recent rain was 1.6 mm recorded on 14th October.

Additional surveys took place on May 20, 2022. In the 15 days prior to the survey, the Griffith Airport weather station recorded 39.2 mm of rain. Conditions during the survey were cool, with a maximum temperature of 16.5°C recorded on the day.

Follow up targeted flora surveys were undertaken on 30 January 2023 and the 5th of October 2023. The January field survey was warm, reaching 27.6°C; there had been 11.6 mm of rain in the 15 days prior to the field survey. The October field survey was cool, reaching 18.6°C; no rain had been recorded in the 15 days prior to the survey, with the most recent rainfall comprising 1.8 mm that fell on the 8th of September.

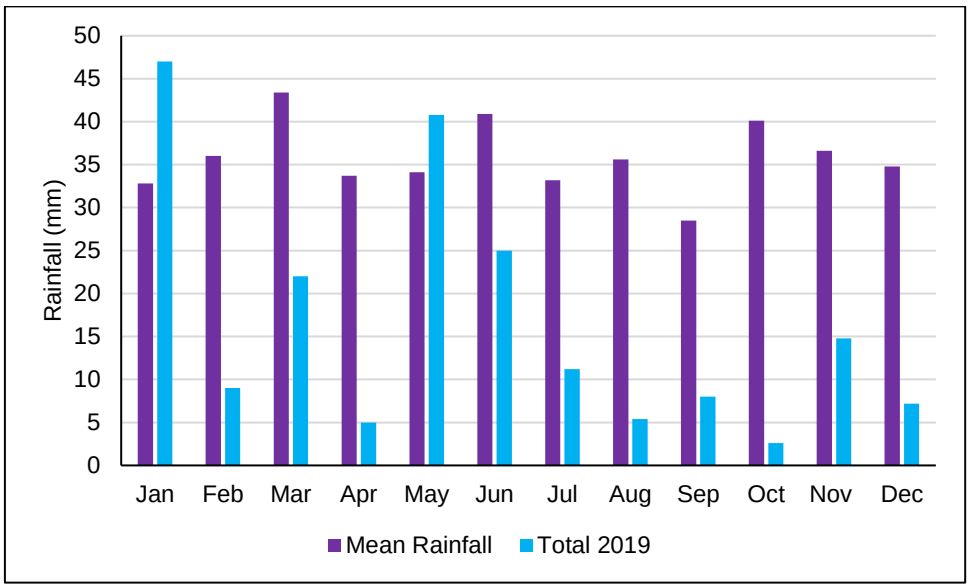

Figure 4-2. Rainfall data for nearby Weethalle, NSW showing mean monthly rainfall over the past 91 years, and total monthly rainfall in 2019 (Bureau of Meteorology, 2021).

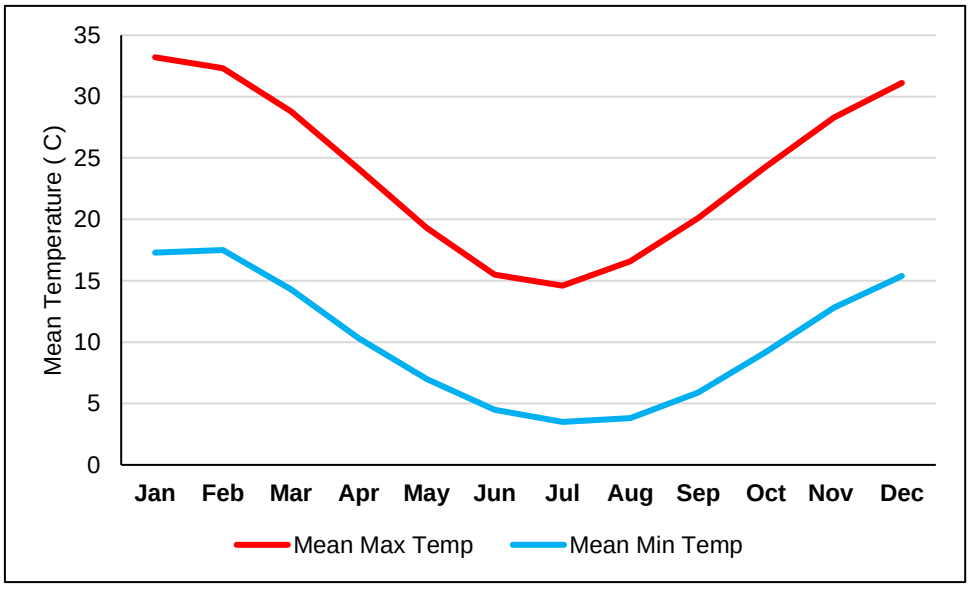

Figure 4-3. Temperature data for nearby Griffith, showing mean minimum and maximum monthly temperatures over the past 51 years (Bureau of Meteorology, 2021).

5 Native vegetation

5.1 Plant Community Types

Plant Community Types (PCTs) were identified by reviewing existing vegetation mapping of the study area (DPE 2022; see **Appendix I**) and taking the BAM plot data collected in the field (**Appendix B, Appendix C**) and comparing it to dominant upper, mid and ground layer species given in the online Vegetation Information System (VIS) descriptions of PCTs (DPE 2023).

Fifty-four native and nineteen exotic plant species were recorded during the field survey (**Appendix C**). The presence of characteristic upper, mid and ground layer species (where present) was important in identifying PCTs. Boundaries between the PCTs was detected by traversing the entire subject land on foot and interpreting aerial imagery.

Most of the 35.52 ha proposal footprint is occupied by an active quarry and hence lacks a covering of vegetation (**Figure 5-1**). Surviving native vegetation (4.23 ha) is confined to the periphery of the subject land, where it typically exists in a degraded condition. On the basis of existing mapping (DPE 2022) and the present fieldwork, this vegetation was identified as belonging to four PCTs:

- PCT 70 - White Cypress Pine woodland on sandy loams in central NSW wheatbelt. This PCT occupies the southern corner of the subject land and extends into the surrounding wooded areas.
- PCT 72 - White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion. Occurs in patches towards the northern limit of the subject land, mainly on lower slopes.
- PCT 185 - Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion. Occurs towards the northern limit of the subject land and extends outside the subject land on rocky slopes.
- PCT 186 - Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion. Occurs in small fragments at the southern and eastern limits of the subject land.

These PCTs were each assigned to a single condition class (**Figure 5-1**). PCTs are described and PCT determination justified in **Table 5-1.** The extent of each PCT is mapped in **Figure 5-1** and summarised in **Table 5-2**. Additional information, in the form of site photographs and datasheets completed in the field, is provided in **Appendix B** and **Appendix C**.

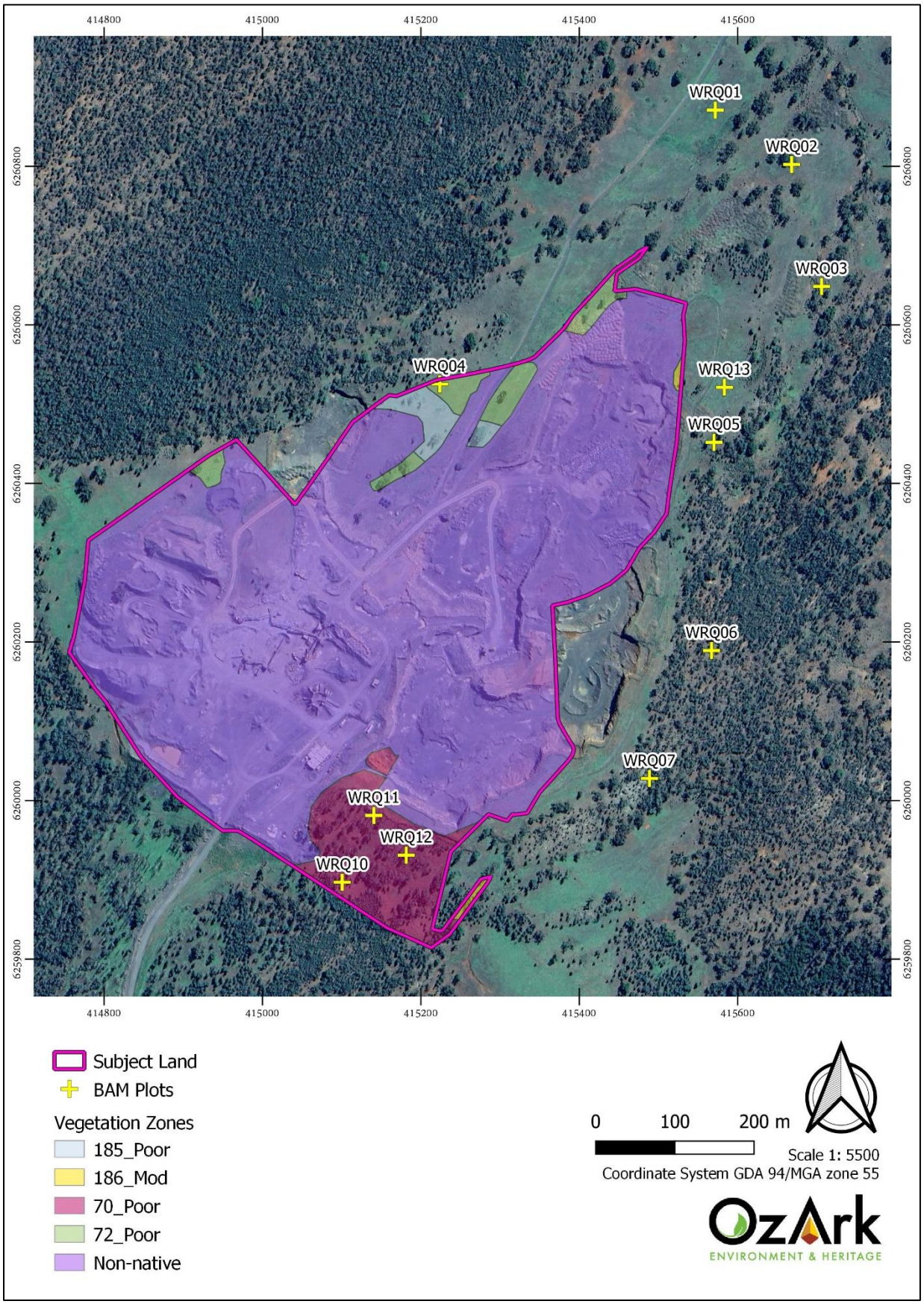

Figure 5-1. Vegetation Zones on the Subject Land and Locations of BAM Plots.

Table 5-1. Determination of Plant Community Types Present on the Subject Land.

PCT ID	PCT Name	Vegetation Formation	TEC Status	Justification of Identification	Current NSW Extent (ha)
70	White Cypress Pine woodland on sandy loams in central NSW wheatbelt	Grassy Woodlands	Not a TEC	• Canopy dominated by White Cypress-pine (*Callitris glaucophylla*). • Upper stratum contained a higher proportion of *C. glaucophylla* than areas mapped as PCT 72. *Eucalyptus populnea* subsp. *bimbil* was present but not dominant or co-dominant. • Shrubs were generally absent. • Groundcover, while weedy, included the associated species *Calotis cuneifolia, Oxalis perennans,* and *Cheilanthes sieberi* • PCT 70 is mapped close to the subject land, according to state predictive vegetation mapping. • Filtering the NSW Vegetation Classification Database by the relevant subregion and the dominant canopy species returns 17 perfect (3/3) matches. The depauperate condition of the PCT provides limited opportunities for further filtering of the database by species. However, of the 17 perfect matches, only two are typically dominated by *C. glaucophylla*: PCT 70 and PCT 72. Both PCTs may contain *E. populnea* subsp. *bimbil* but PCT 70, in which *C. glaucophylla* may account for more than 90% of the canopy, was judged to be the most suitable PCT for areas with a greater proportion of *C. glaucophylla*.	70,000
Description Tall or mid-high woodland to about 18 m high dominated by White Cypress Pine (*Callitris glaucophylla*) that may occupy >90% of the canopy cover. The canopy structure alters depending on degree of clearing, thinning or regrowth. Various box eucalypts may be present including Poplar Box (*Eucalyptus populnea*) and Western Grey Box (*Eucalyptus microcarpa*). Small trees may include Buloke (*Allocasuarina luehmannii*) or Belah (*Casuarina cristata*). Shrubs are sparse and include Deane's Wattle (*Acacia deanei subsp. deanei*), Wilga (*Geijera parviflora*), hopbush (*Dodonaea viscosa), Maireana enchylaenoides*, Thorny Saltbush (*Rhagodia spinescens*) and *Senna spp*. The ground cover is sparse dominated by grasses such as *Austrostipa scabra subsp. scabra, Enteropogon acicularis, Thyridolepis mitchellii, Austrodanthonia eriantha, Austrodanthonia setacea, Enteropogon acicularis* and *Eragrostis lacunaria*. Forb species include *Calotis cuneifolia, Sida cunninghamii, Oxalis perennans, Goodenia cycloptera, Xerochrysum bracteatum* and *Chrysocephalum apiculatum.* The rock fern *Cheilanthes sieberi subsp. sieberi* is often present. In dry times the ground may be nearly bare. Occurs on red, brown or yellow sandy or loamy soils on flats and rises on alluvial plains. Vegetation structure varies depending on the history of disturbance including logging. Dense regrowth of young Pines may be present. Distributed in central NSW, generally with annual rainfall between 400 and 600 mm. Mainly in the NSW South-western Slopes and Darling Riverine Plain Bioregions. A significant proportion of this community has been cleared as it occurs in the wheatbelt. Remnants occur in state forests, other public lands and on leasehold and private land. This community grades into Poplar Box or Western Grey Box woodlands in the mid-central and south and Poplar Box and Coolabah woodlands in the north that occur on finer texture soils. Grades into White Cypress Pine-Poplar Box community (ID72) in the Cobar Peneplain Bioregion.					

PCT ID	PCT Name	Vegetation Formation	TEC Status	Justification of Identification	Current NSW Extent (ha)
72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion. Occurs in patches towards the northern limit of the subject land, mainly on lower slopes	Grassy Woodlands	Not a TEC	• Upper stratum variably dominated by *Eucalyptus populnea* subsp. *bimbil* and *Callitris glaucophylla*. • Shrubs were generally absent. • Occurred mainly on footslopes, below or intergrading with PCT 185. • Native groundcover depauperate, but associated species *Calotis cuneifolia, Austrostipa scabra,* and *Rytidosperma* (syn. *Austrodanthonia*) spp. • State vegetation mapping does not map PCT 72 within the 1500 m study area, instead mapping these areas largely to PCT 82. However, PCT 72 does occur within the 10 km search area. • Filtering the NSW Vegetation Classification Database by the relevant subregion and the dominant canopy species returns 17 perfect (3/3) matches. As with PCT 70, the depauperate condition of the PCT provides limited opportunities for further filtering of the database by species. PCTs 54, 57, 70, 74, 77, 134, 176, 185, 193, 201, and 250 were removed from consideration as they do not reflect the prominence of Poplar Box within this community. PCTs 56, 105, and 244 were also eliminated as these communities are typically associated with alluvial flats. PCT 103 was also removed from consideration as Gum Coolabah (*Eucalyptus intertexta*) was not detected on site and as that PCT is typically a shrubby woodland and shrubs were largely absent from the subject land. • Of the two remaining PCTs – PCT 72 and PCT 82 – PCT 72 was preferred, as PCT 82 is characteristically dominated by Grey Box (*Eucalyptus microcarpa*) and no evidence of this species was noted within the subject land. Minor occurrences of Grey Box were noted along the access trail into the site, but not within close proximity to this vegetation zone.	120,000

Description

Tall to mid-high woodland to 14 m high dominated by White Cypress Pine (*Callitris glaucophylla*) with Poplar Box (*Eucalyptus populnea* subsp. *bimbil*) and more rarely Western Grey Box (*Eucalyptus microcarpa*). A shorter stratum of young *Callitris glaucophylla* regrowth is often present. The understorey contains a sparse cover of shrubs including Deane's Wattle (*Acacia deanei*), Budda (*Eremophila mitchellii*), Silver Cassia (*Senna* form taxon *'artemisioides'*), cough bush (*Cassinia laevis*) and hopbush (*Dodonaea viscosa*). The ground cover is mid-dense to sparse and is dominated by grass species such as *Austrostipa scabra* subsp. *scabra* and *Austrodanthonia* spp. and forbs such as *Sida cunninghamii*, *Chenopodium desertorum*, *Calotis cuneifolia* and *Chrysocephalum semipapposum*/*apiculatum*. The rock fern *Cheilanthes sieberi* may be present. Low shrubs include Galvanised Burr (*Sclerolaena birchii*), Grey Copperburr (*Sclerolaena diacantha*) and Ruby Saltbush (*Enchylaena tomentosa*). Occurs on red and brown loam soils that may be colluvial, on footslopes or flats on low hills or alluvial terraces. Distributed in central NSW in the 500-350 mm rainfall zone mainly in the eastern

half of Cobar Peneplain Bioregion. This community often occurs between Poplar Box and Western Grey Box grassy woodland on finer texture soils on the plains and Dwyer's Red Gum low open woodland on shallow, siliceous soils on hills. Grades into White Cypress Pine (ID70) on alluvium mainly to the east. Some areas cleared in the NSW wheatbelt with larger areas remaining inland.

PCT ID	PCT Name	Vegetation Formation	TEC Status	Justification of Identification	Current NSW Extent (ha)
185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Not a TEC	• Upper stratum species dominated by *Eucalyptus dwyeri*, with White Cypress-pine (*Callitris glaucophylla*) as the sole *Callitris* species. Kurrajong (*Brachychiton populneus*) also occurs within this community. • Occurs on footslopes and stony ridges. • Shrubs largely absent. • Native groundcover depauperate but containing the associated species *Thyridolepis mitchelliana* and *Oxalis perennans*. • PCT 185 is not mapped within the 10 km search area; however, minor occurrences of this PCT occur in ridgelines connected to the subject land. PCT 186 is mapped nearby, as is PCT 184. • Filtering the NSW Vegetation Classification Database by the relevant subregion, the dominant canopy species, and the two main native grasses (*T. mitchelliana* and *Microlaena stipoides*) returns three close (5/6) matches. *Microlaena stipoides* is not listed as an associated species for any of the three communities. PCT 250, a derived grassland community, was removed from consideration as it is unsuitable for use in a BDAR, where the most likely parent community for any derived grassland should be identified. • The remaining two PCTs, PCT 184 and PCT 185, are poorly delineated and are said to intergrade in the south-eastern corner of the Cobar Peneplain, near the subject land. The recorded canopy species are shared by both communities. Only two minor differences relevant to the subject land were identified: (1) the understorey species *Oxalis perennans* is listed as an associated species for PCT 185 but not PCT 184 and was recorded from the subject land; and (2) PCT 184 is described as a community of “stony rises, rocky hills and hillslopes” but not footslopes, whereas PCT 185 is described as extending to the footslopes, where the occurrence of this community within the subject land was largely situated. For these two reasons, PCT 185 has been preferred here.	40,000

Description

Tall mallee open woodland dominated by Dwyer's Red Gum (*Eucalyptus dwyeri*), White Cypress Pine (*Callitris glaucophylla*) and/or Currawang (*Acacia doratoxylon*) occasionally with stands of Drooping She-oak (*Allocasuarina verticillata*), Poplar Box (*Eucalyptus populnea*) or Western Grey Box (*Eucalyptus microcarpa*). Grades into communities with Western Grey Box (*Eucalyptus microcarpa*) or Mugga Ironbark (*Eucalyptus sideroxylon*). Kurrajong (*Brachychiton populneus* subsp. *populneus*) occurs in

some locations. The understorey contains a sparse shrub layer that may include *Cassinia laevis*, *Grevillea floribunda*, *Acacia deanei* and in some areas *Leptospermum divaricatum*. Low shrubs species include *Melichrus urceolatus*, *Hibbertia obtusifolia* and thickets of *Platysace lanceolata*. The ground cover is sparse and is often covered in rocks. Species include forbs such as *Gonocarpus elatus*, *Calotis cuneifolia*, *Goodenia glabra* and *Hybanthus monopetalus* and grasses such as *Austrodanthonia setacea*, *Austrostipa scabra*, *Austrostipa densiflora, Austrodanthonia eriantha*, *Thyridolepis mitchelliana* and *Amphipogon caricinus*. The rock ferns (*Cheilanthes* spp.) are common. Occurs on shallow gravel, sandy or loamy soils derived from sandstone, conglomerate, chert, granite and volcanics on rocky hills, hill slopes and footslopes on isolated rocky ridges in the NSW South-western Slopes Bioregion extending into the eastern edge of the Cobar Peneplain and Riverina Bioregions. Mainly occurs in the temperate (hot summers) climate zone receiving between 400 and 600 mm of annual rainfall. Not threatened due to position in landscape (rocky ridges) but grazing by domestic stock and goats is adversely affecting some sites. The rare Glossy Black Cockatoo feeds on the fruit of the Drooping She-oak.

PCT ID	PCT Name	Vegetation Formation	TEC Status	Justification of Identification	Current NSW Extent (ha)
186	Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Not a TEC	• Upper stratum species included *Eucalyptus dwyeri* and *Callitris endlicheri,* • Minor occurrences of *Callitris glaucophylla* were noted, but areas with significant concentrations of this species were assigned to PCT 185. • Native groundcover depauperate but containing the associated species *Calotis cuneifolia*, *Stuartina muelleri* and *Cheilanthes sieberi*. • PCT 186 is mapped within and close to the subject land according to predictive vegetation mapping for the region • Filtering the NSW Vegetation Classification Database by the relevant subregion and the two dominant canopy species returns six perfect (3/3) matches. Of these, only two list *E. dwyeri* as a major species: PCT 186 and PCT 239. The remaining PCTs were variously dominated by mallee eucalypts (178), *Eucalyptus sideroxylon* and *E. microcarpa* (217), she-oak and heath vegetation (292), or *Eucalyptus dealbata* (1278). These vegetation types were not recorded within the subject land and consequently were removed from consideration. • Of the remaining two PCTs – 186 and 239 – 186 was preferred, as PCT 239 is typically dominated by *Eucalyptus macrorhyncha* and is considered to be confined to sheltered gullies.	50,000

Description

Woodland or mallee shrubland dominated by Dwyer's Red Gum (*Eucalyptus dwyeri*), Black Cypress Pine (*Callitris endlicheri*) with Currawang (*Acacia doratoxylon*) often present. Drooping She-oak (*Allocasuarina verticillata*) may be present in areas infrequently burnt. Mugga Ironbark (*Eucalyptus sideroxylon*) may be present on mid-lower slopes. Tumbledown Red Gum (*Eucalyptus dealbata*) may occur in eastern occurrences. The understorey contains a mid-dense to sparse shrub layer that includes *Calytrix tetragona, Cassinia laevis, Grevillea floribunda, Acacia linearifolia, Dodonaea viscosa subsp. spatulata, Dodonaea viscosa subsp. mucronata, Acacia paradoxa, Correa reflexa, Acacia lineata* and in some eastern location's patches of *Kunzea ambigua*. The ground cover is sparse and can be very sparse on rocky areas and rocks may compose 60% of a site. Small shrubs such as *Melichrus urceolatus, Astroloma humifusum, Platysace lanceolata, Brachyloma daphnoides* and *Hibbertia obtusifolia* may be present along with grasses such as *Austrodanthonia* spp*., Austrostipa densiflora, Austrostipa scabra, Austrostipa mollis, Aristida ramosa* and *Themeda australis*. The sedge *Lepidosperma laterale* is often abundant. Forbs include *Gonocarpus elatus, Calotis cuneifolia, Stuartina muelleri* and *Chrysocephalum semipapposum*. Rock Ferns (*Cheilanthes spp*.) are usually common. The rare plant *Senecio garlandii* occurs at several sites including The Rock Nature Reserve south of Wagga Wagga. The ground cover may form rock forblands in some areas and on a different scale this could be described as a community in itself. Occurs on skeletal or shallow lithosol soils derived from sandstones, granites or other siliceous substrates including quartzite and psammite. Generally present on steep upper slopes, ridgelines or steep gullies on rocky hills mainly

in the NSW South-western Slopes Bioregion but extending into the south-eastern edge of the Cobar Peneplain Bioregion. Due to its location on rocky ridges most of this community remains uncleared but grazing by stock or feral animals may threaten some locations. A broadly classified and widely distributed community that could be divided with floristic analyses.

Table 5-2. Extent of native vegetation on the subject land.

PCT ID	PCT Name	Area on Subject Land (ha)
PCT 70	White Cypress Pine woodland on sandy loams in central NSW wheatbelt.	2.66
PCT 72	White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	0.98
PCT 185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	0.49
PCT 186	Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion.	0.10
	Total native vegetation	**4.23**
0	Non-native / non-vegetated quarry land	31.29
Total		**35.52**

5.2 Vegetation Zones, Patch Size and Vegetation Integrity

To be assessed under the BAM, native vegetation within the subject land is required to be further stratified into broad condition states and patch size. To this end, native vegetation has been assigned a zone, based on its condition state and the patch to which it belongs.

Broad condition states have been determined by the presence or absence of the key structural elements of the respective PCT and the vegetation integrity (VI) score, calculated in the BAM-C using plot data. This method also compares data collected with the benchmarks for each PCT. The presence or absence of structural elements was assessed both by reviewing plot data and general observations made while carrying out field work. Results are shown in **Table 5-3** and depicted in **Figure 5-1.**

A number of the BAM plots are outside the subject land as the extent of the subject land footprint was reduced after the vegetation surveys were conducted. The original footprint and vegetation mapping is shown in **Figure 5-2.**

A patch is defined in the BAM (2020) as an area of native vegetation that occurs on the subject land and includes native vegetation that has a gap of less than 100 metres from the next area of native vegetation (or ≤30 m for non-woody ecosystems). The patch may extend onto land adjoining the subject land. The patch size should include derived communities (i.e. one or more of the structural components or strata layers is missing, modified or new) as these are likely to provide suitable habitat for at least some species.

Patch size is entered as a categorical rather than a continuous input (with the largest category being >100 ha). The subject land is connected to a large parcel of native vegetation that extends beyond 5000 ha, far exceeding the 100 ha category. The patch was not mapped

beyond 5000 ha. The patch size for the vegetation zones that were recorded on the subject land are provided in **Table 5-3** and depicted in **Figure 5-3**.

Vegetation zones were identified and delineated on the subject land in accordance with Section 5.3 of the BAM and are shown in **Figure 5-1** and **Figure 5-2**. The latter figure displays the full extent of the quarry site rather than the subject land. The mapping of vegetation zones was later refined to the subject land as the final disturbance footprint was identified.

Table 5-3. Vegetation Zones and Patch Size of Native Vegetation on the Subject Land.

PCT ID	Condition State	Condition Description	VI Score	Composition	Structure	Function	HBT	Area Impacted	Patch Number	Patch Size	BAM Patch Size Class	Vegetation Zone	BAM Plots
70	Poor	Remnant woodland with a predominantly non-native understory.	40.8	28.7	58.5	40.5	No	2.66	1	>5000 ha	>100 ha	70_Poor	WRQ10 WRQ11 WRQ12
72	Poor	Isolated patches of remnant trees with a predominantly non-native understory.	25.5	44.1	9.7	38.6	Yes	0.98	1	>5000 ha	>100 ha	72_Poor	WRQ01 WRQ02 WRQ03 WRQ04
185	Poor	Scattered trees, including regrowth, with a weedy understorey.	18.5	48.3	7.4	17.8	No	0.49	1	>5000 ha	>100 ha	185_Poor	WRQ13
186	Moderate	Remnant woodland with some native grasses and forb present.	73.4	75.2	62	84.7	Yes	0.10	1	>5000 ha	>100 ha	186_Moderate	WRQ05 WRQ06 WRQ07

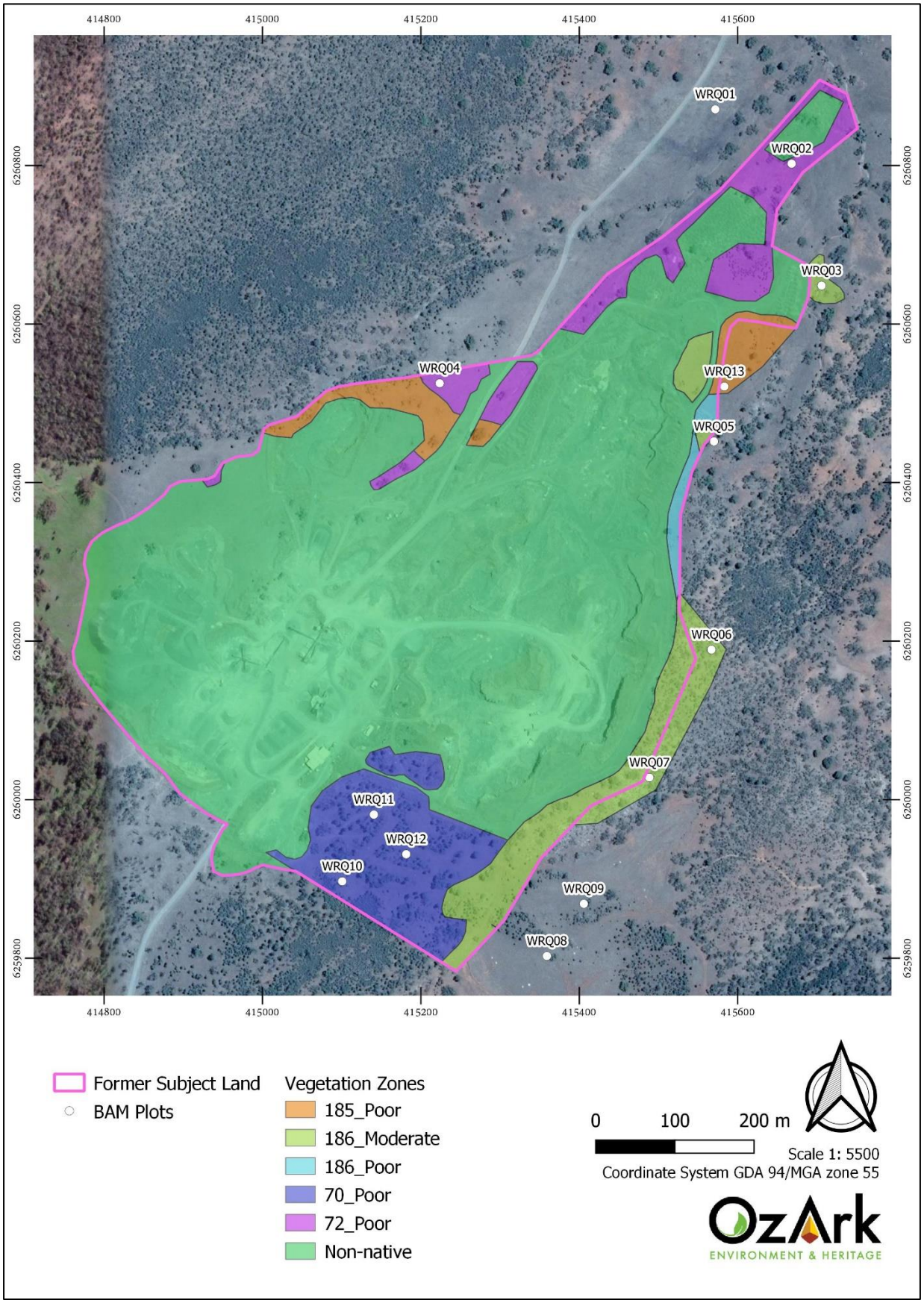

Figure 5-2. Original subject land boundary and vegetation mapping prior to footprint reduction.

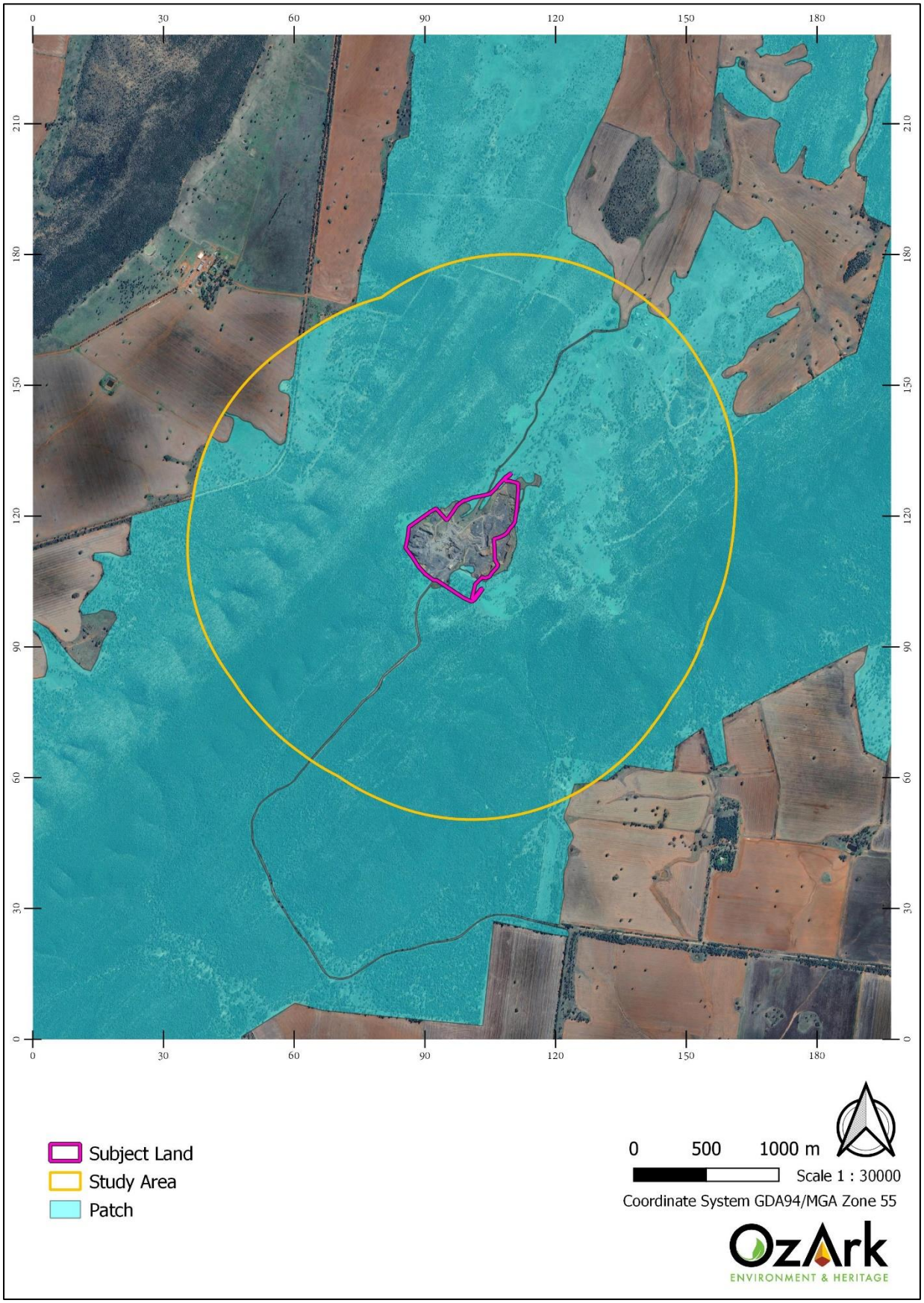

Figure 5-3. Intact Native Vegetation Patch.

5.3 Threatened Ecological Communities

The NSW Department of Climate, Change, Energy, the Environment and Water TEC listing determination descriptions were used to determine if the vegetation within the subject land should be classified as the below TECs. Only one of the four recorded PCTs – PCT 186 – is listed as having an associated TEC in the NSW Vegetation Classification database. PCT 186 is associated with the following TEC:

- BC Act-listed Critically Endangered Ecological Community (CEEC), Mallee and Mallee-Broombush dominated woodland and shrubland, lacking *Triodia*, in the NSW South Western Slopes Bioregion.

The NSW Scientific Committee – final determination document (OEH, 2010) was used to assess whether the listing is appropriate for the BC Act-listing. The occurrence of PCT 186 within the subject land did not meet the threshold conditions for the BC Act-listed CEEC for the following reasons:

- All NSW sites of the CEEC are contained within the NSW South Western Slopes Bioregion, whereas the subject land is within the Cobar Peneplain Bioregion.
- The canopy of the CEEC is dominated by mallee eucalypts. Dwyer's Red Gum (*Eucalyptus dwyeri*) may form part of this assemblage but is not the sole dominant canopy species.
- Where Dwyer's Red Gum does occur within this CEEC, it is typically co-dominant with or sub-dominant to Blue Mallee (*Eucalyptus polybractea*) and occurs with a layer of the shrub Broombush (*Melaleuca uncinata*). These species were not recorded within the subject site.

PCT 70, PCT 72, and PCT 185 are not associated with any TEC. Considering the above, no TEC will be affected by the proposal.

5.4 Weeds

Two high threat exotic weed species were recorded on the subject land, Mediterranean Turnip (*Brassica tournefortii*) and Bathurst Burr (*Xanthium spinosum*). These species have not been identified as Priority Weeds (PW) for the Riverina or as Weeds of National Significance (WoNs).

Actions to avoid, minimise and mitigate the impact from weeds have been suggested in **Section 7.2** of the BDAR.

6 Threatened species

For the purpose of credit calculations, these species are listed as either ecosystem credit species or species credit species, where:

- An ecosystem credit species is a species whose likelihood of occurrence can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. A targeted survey is not required for these species (DPIE, 2020).
- A species credit species is a species whose likelihood of occurrence cannot be predicted by vegetation surrogates and/or landscape features and can be reliably detected by survey. A targeted survey or expert report is required to confirm presence/absence of these species (DPIE, 2020).

The candidate ecosystem and species credit species generated by the BAM-C were reviewed in the context of information collected in the field surveys about the site context and presence / absence of habitat attributes. On this basis, candidate species were either assumed present, or considered absent due to habitat constraints (**Table 6-1, Table 6-2**, **Appendix E**). Assumed present species were then the subject of targeted surveys.

The likelihood of occurrence of ecosystem and species credit species was categorised as follows:

- 'Present' (surveyed) – the species was observed on the subject land during field surveys.
- 'Assumed Present' – the species was predicted to occur by the BAM-C and suitable habitat features occurred within the subject land for that species.
- 'Absent' (surveyed) – targeted survey during the species required survey timeframe did not detect the species.
- 'Absent' (habitat constraints) – habitat on-site and in the vicinity is unsuitable for the species
- EPBC listed fauna that were predicted to occur within 10 km of the subject land were also assessed for their likely presence or absence within the subject land according to habitat assessments (**Appendix F**).

6.1 Ecosystem Credit Species

In total, 29 ecosystem credit species were generated by the BAM-C (**Table 6-1**). The habitat suitability of the subject land for these species was assessed. Habitat features including but not limited to rock outcrops, caves and overhangs, hollow-bearing trees, wetlands including

dams, and watercourses were searched for on the subject land and recorded, if present. Hollow-bearing trees with both large (>20cm diameter) and small (<20 cm diameter) hollows in both horizontal and vertical orientations were also recorded. Numerous small hollows were recorded within the subject land. No large hollows occur within the impact area, but one was noted in a tree c. 50 m from the edge of the subject land (see **Figure 3-1**). Three species were removed from the list due to habitat constraints, two species was detected on site, and 24 further species are assumed present (**Table 6-1**). A habitat assessment summary for each species is detailed in **Appendix E**.

Table 6-1. Ecosystem credit species predicted to occur and their nature of presence within the subject land.

Common Name	Scientific Name	Presence
Antechinomys laniger	Kultarr	Assumed present
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Assumed present
Calyptorhynchus lathami	Glossy Black-Cockatoo	Absent (habitat constraints)*
Certhionyx variegatus	Pied Honeyeater	Assumed present
Chalinolobus picatus	Little Pied Bat	Assumed present
Chthonicola sagittata	Speckled Warbler	Present (surveyed)
Circus assimilis	Spotted Harrier	Assumed present
Daphoenositta chrysoptera	Varied Sittella	Assumed present
Falco hypoleucos	Grey Falcon	Assumed present
Falco subniger	Black Falcon	Assumed present
Grantiella picta	Painted Honeyeater	Absent (habitat constraints)*
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	Absent (habitat constraints)*
Hamirostra melanosternon	Black-breasted Buzzard (Foraging)	Assumed present
Hieraaetus morphnoides	Little Eagle (Foraging)	Assumed present
Hirundapus caudacutus	White-throated Needletail	Assumed present
Hylacola cautus	Shy Heathwren	Assumed present
Leipoa ocellata	Malleefowl	Assumed present
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Foraging)	Assumed present
Lophoictinia isura	Square-tailed Kite (Foraging)	Assumed present
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Assumed present
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Assumed present
Neophema pulchella	Turquoise Parrot	Assumed present
Nyctophilus corbeni	Corben's Long-eared Bat	Assumed present
Pachycephala inornata	Gilbert's Whistler	Assumed present
Petroica phoenicea	Flame Robin	Assumed present
Polytelis swainsonii	Superb Parrot (Foraging)	Assumed present

Common Name	Scientific Name	Presence
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Present (surveyed)
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Assumed present
Stagonopleura guttata	Diamond Firetail	Assumed present

* See **Appendix E** for justification

6.2 Species Credit Species

In total, 17 species credit species or populations were generated by the BAM-C (**Table 6-2**). The habitat suitability of the subject land for these species was assessed. According to the BAM, if suitable habitat for these species occurs on the subject land, they must be the subject of an expert report or targeted survey according to the recommended guidelines, or else assumed present. After consideration, six species could be immediately discounted due to unsuitable habitat (**Appendix E**). The remaining species were surveyed for following relevant and approved BAM survey methodologies (**Section 3.3.3**); these species were not detected on the subject land. However, three candidate flora species were not able to be fully surveyed across the entire subject land as a small area (0.12 ha) of PCT 70_poor had already been disturbed prior to targeted surveys being conducted. As such, presence has been assumed for these three flora species in this area. Species polygons for these species are provided in **Figure 6-1.** Species polygons have been created in accordance with the TBDC and related threatened species survey guidelines, justification for the species polygons are outlined in **Appendix E**.

Table 6-2. Species credit species predicted to occur and their nature of presence within the subject land.

Common Name	Scientific Name	Presence
Curly-bark Wattle	*Acacia curranii*	Absent (surveyed)
A spear-grass	*Austrostipa metatoris*	Assumed present (0.12 ha of PCT 70) Absent surveyed (PCT 72)
A spear-grass	*Austrostipa wakoolica*	Absent (constraint)*
Bush Stone-curlew	*Burhinus grallarius*	Absent (surveyed)
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	Absent (surveyed)
White-browed Treecreeper population in Carrathool LGA south of the Lachlan River and Griffith LGA	*Climacteris affinis* - endangered population	Absent (surveyed)
Pine Donkey Orchid	*Diuris tricolor*	Assumed present (0.12 ha of PCT 70) Absent (surveyed PCT 72)
Holly-leaf Grevillea	*Grevillea ilicifolia* subsp. *Ilicifolia*	Absent (surveyed)
White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	Absent (constraint)*
Black-breasted Buzzard (Breeding)	*Hamirostra melanosternon*	Absent (constraint)*
Little Eagle (Breeding)	*Hieraaetus morphnoides*	Absent (surveyed)
Major Mitchell's Cockatoo (Breeding)	*Lophochroa leadbeateri*	Absent (surveyed)
Square-tailed Kite (Breeding)	*Lophoictinia isura*	Absent (surveyed)
Barking Owl (Breeding)	*Ninox connivens*	Absent (constraint)*
Superb Parrot (Breeding)	*Polytelis swainsonii*	Absent (constraint)*
Silky Swainson-pea	*Swainsona sericea*	Assumed present (0.12 ha of PCT 70) Absent (surveyed PCT 72)
Masked Owl (Breeding)	*Tyto novaehollandiae*	Absent (constraint)*

*See **Appendix E** for justification

6.2.1 Species Credit Species Targeted Survey Results

None of the targeted threatened species were observed or heard. Fifteen species of fauna were observed directly during the field surveys (**Appendix C**). This includes fourteen bird species and a feral pig (*Sus scrofa*). Two species, the Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) and Speckled Warbler (*Chthonicola sagittata*), are listed as Vulnerable within NSW. Additionally, fifteen further species were detected through a SM4 Songmeter. This included twelve native birds, two mammals and one amphibian (**Appendix C**).

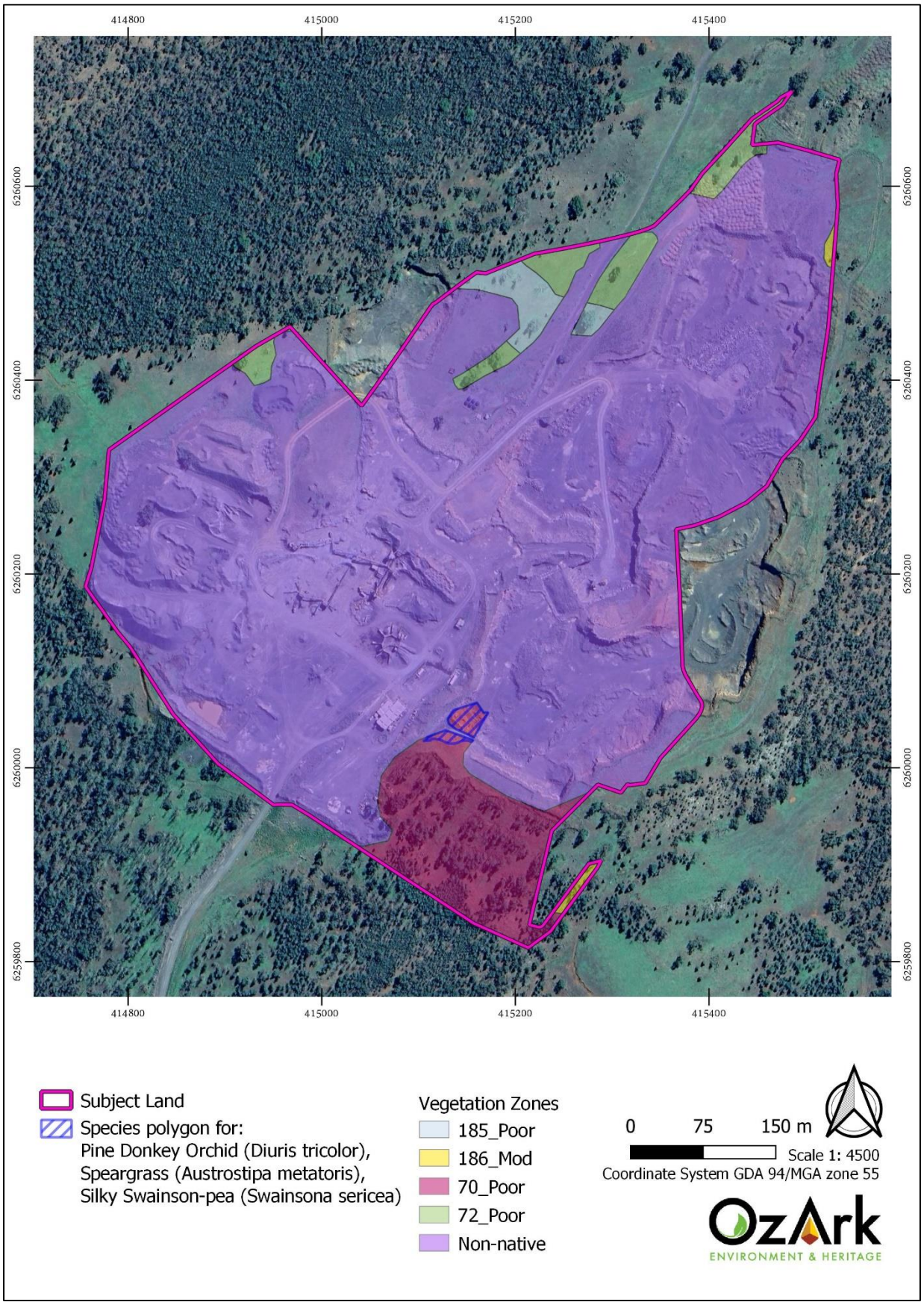

Figure 6-1. Species polygon for all species assumed present.

7 Impact Summary

7.1 Offset Scheme Threshold

The proposal will not impact land mapped on the Biodiversity Values Map. The proposal has been assessed against the relevant vegetation clearing thresholds under the NSW Biodiversity Offsets Scheme (BOS). The thresholds applicable to different lot size categories for the land zoning are provided in **Table 7-1** (DPIE, 2020). The subject land is currently zoned RU1 (primary production), with a minimum lot size of 40 ha. Clearing of 1 ha or more of native vegetation will require entry into the BOS. The proposal will clear up to 4.23 ha of native vegetation; thus, entry into the BOS is required.

Table 7-1. Area clearing thresholds for entry into the NSW Biodiversity Offsets Scheme.

LEP Minimum Lot Size	Threshold Area of Clearing
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	**0.5 ha or more**
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

7.2 Avoidance, Minimisation and Mitigation

The following avoidance measures have been integrated into the design and/or are suggested for the implementation of the proposal:

- The proposed impact footprint has been reduced and altered in the planning phase to minimise impact on biodiversity and heritage. The footprint has reduced in size by 12.30 ha, avoiding approximately 5.26 ha of native vegetation (**Figure 5-2**).
- In addition, the following minimisation methods have been or will be implemented:
    - Before starting work, erect a physical high visibility temporary boundary (e.g., with flagging tape) around the retained vegetation to prevent any accidental and unnecessary clearing
    - Vegetation will be removed in a manner that avoids damage to surrounding vegetation, ensuring disturbance to vegetation and soil is kept to a minimum.
- The proponent also intends to progressively rehabilitate areas of the subject land as they become available with a view to providing a low maintenance, geotechnically stable and safe landform with minimal erosion, and establishing native vegetation or pasture similar to that currently within and surrounding the Quarry Site. According to Section 2.14 of the Environmental Impact Statement, this would entail the following:

- Installation of silt-stop fencing downslope of areas under rehabilitation, if required.
- Removal of equipment and ripping of compacted areas with an excavator, where required.
- Backfilling of overburden, interburden and processing fines within nominated rehabilitation areas.
- Seeding of rehabilitation areas with suitable pasture crops.
- Use of overburden and/or interburden to form a substrate for the subsequent growth of trees and shrubs which would be planted either through direct seeding or tubestock.

Table 7-2 outlines further recommended environmental safeguards to reduce impacts on vegetation, soil, and biodiversity.

Table 7-2. Recommended environmental safeguards.

Impact	Environmental Safeguard	Timing
Clearing and prevention of over-clearing	• All personnel are to be inducted to be aware that disturbance of any stand of native vegetation outside the development footprint, or otherwise unauthorised disturbance, could have legislative consequences if done without approval. Evidence of all personnel receiving an induction would be kept on file (signed induction sheets). • Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation. • A pre-clearing process and unexpected threatened species finds procedure is recommended. Any fauna found during the disturbance are to be allowed (or assisted) to relocate into adjoining habitat. • Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation. • Where possible, vegetation to be removed will be mulched on-site and re-used to stabilise disturbed areas. • Areas will be progressively rehabilitated as they become available and are no longer required for operations.	Pre-disturbance Pre-disturbance Pre-disturbance During operations Ongoing Ongoing
Bushfire protection	• Ensure vegetation management for bushfire protection is consistent, as far as practicable, with biodiversity protection and remove only the necessary vegetation to achieve fuel reduction.	Ongoing
Soil management	• An erosion and sediment control plan will be developed to comply with Council requirements and/or Landcom's Managing Urban Stormwater, Soils & Construction Guidelines 'The Blue Book' (Landcom 2004)	Pre-disturbance

Damage to native vegetation outside of impact zone	• Stockpile and compound sites are to be located within the assessed subject land and preferentially according to the following criteria:
	  • At least 40 m away from the nearest waterway.
	  • In areas of low ecological conservation significance (i.e. previously disturbed land).
	  • On relatively level ground.
	  • Stockpiling of materials and equipment, and parking of vehicles, is to be avoided within the dripline (extent of foliage cover) of any tree.
		During operations

Introduction and spread of significant weeds and pathogens	• Inspection and control of environmental weeds in accordance with a site vegetation management plan and subject to requirements of Council. • Machinery (bulldozers, excavators, trucks, loaders and graders) would be clean, and soil- and weed-free, before entry to the work site. • Weed-free fill only to be used for on-site earthwork. • Any herbicide use is to be in accordance with the requirements on the label. Any person carrying out herbicide application would be appropriately trained and competent in its use.	During operations
Disturbance to fallen timber, dead wood and bush rock	• All bush rock encountered on site is to be relocated to the edge of the disturbance area to enhance habitat and regeneration. • If threatened bats are detected, stop work immediately and either leave the area undisturbed until the individuals have dispersed or engage suitably qualified personnel to attempt their removal.	Pre-disturbance During operations
Disturbance to human made structures	• If threatened bats are detected, stop work immediately and either leave the area undisturbed until the individuals have dispersed or engage suitably qualified personnel to attempt their removal.	Pre-disturbance During operations

Impact	Environmental Safeguard	Timing
Threatened species	• No new areas to be cleared without further assessment, as threatened flora species may occur in any unassessed impact area. • If the impact footprint changes from the current extent assessed in the study, re-assessment of the potential impact of the activity would be needed to ensure impacts to threatened species are not inadvertently caused, given that suitable habitat for threatened species occurs elsewhere on the property. • Operational activities to occur only during approved hours of operation to avoid indirect impacts on threatened fauna such as vehicle strikes. • Enforce 40 km/h speed limits on access roads to reduce the risk of vehicle strikes. • Enforce lower speed limits (<20km/h) within the boundaries of the quarry itself.	Pre-disturbance, during operations, ongoing

7.3 Impacts to Wetlands, Watercourses and Aquatic habitat

There are no wetlands on the subject land or within the study area. Any potential for indirect impact to nearby watercourses from erosion and sedimentation related to construction activities will be avoided and minimised by developing and implementing an erosion and sediment control plan.

7.4 Impacts to Native Vegetation

There are four PCTs within the subject land occurring in one condition class each (poor or moderate). A total of 4.23 ha of native vegetation across these four vegetation zones will be cleared. The development will mitigate these impacts through the offset costs calculated in this report.

7.5 Serious and Irreversible Impacts

The Guidance to assist a decision-maker to determine a serious and irreversible impact (DPIE, 2019) and the NSW threatened species data collection has been used to determine which threatened species require further assessment for Serious And Irreversible Impacts (SAII).

No threatened species present or assumed present on the subject land require SAII assessment.

7.6 Prescribed Impacts

The BAM 2020 lists prescribed impacts that must be avoided, minimised and mitigated. These prescribed impacts and their relevance to the proposal are described in **Table 7-3**. Point 8.3.2 has been separated into two parts for the sake of clarity.

Table 7-3. Potential prescribed impacts of the proposal.

BAM 2020	Prescribed Impacts	Site Assessment	Mitigation Measure
8.3.1	Impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs, rocks and other features of geological significance.	The subject land contains rock faces associated with actively quarried land. Impacts to these human-made rock faces will be continuous and unavoidable, given the nature of the proposal. No threatened entities likely to depend on rock faces for their lifecycle were generated by the BAM-C or identified during the site assessment. One ecosystem credit species, the Little Pied Bat (*Chalinolobus picatus*), is known to make use of outcrops and mine tunnels but not rock faces. Rock outcrops were noted in the surrounding landscape; however, the location of proposal activities avoids impacts to these areas. No natural karsts, caves, crevices, cliffs or other features of geological significance present on the subject land or within the study area.	None required.
8.3.2	Impacts of development on the habitat of threatened species or ecological communities associated with human-made structures.	Site plans indicate that the Quarry office may be relocated (**Figure 1-2**). Therefore, the existing office will be removed (**Figure 7-1**). This may result in the loss of habitat for species that make use of human-made structures. Only one threatened entity likely to make use of buildings was generated by the BAM-C: the Little Pied Bat (*Chalinolobus picatus*). The proposal will therefore result in minor, temporary disruption to potential habitat for this species. However, as the existing site office sees active use by workers, and as the site office will be reestablished nearby, the impact of this disruption is likely to be limited.	**Table 7-2**
8.3.2	Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	Non-native vegetation on the subject land is unlikely to provide habitat for any threatened entity as it is located within an active quarry.	None required
8.3.3	Impacts of development on the habitat connectivity.	The impacts of the proposal are largely confined to land that has already undergone extensive historical clearance. The proposal area is surrounded by remnant vegetation; consequently, no impacts to connectivity for any threatened entity are likely.	**Table 7-2**
8.3.4	Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.	Three minor non-perennial watercourses are within the subject land (**Figure 7-1**). None of these watercourses contained water at the time of the surveys. Two of the mapped watercourses are within the	**Table 7-2**

BAM 2020	Prescribed Impacts	Site Assessment	Mitigation Measure
		existing quarry, and one runs parallel to the subject land, briefly crossing it. It is unlikely that these waterbodies support threatened entities, given that they are non-perennial watercourses within an already cleared landscape. The BAM-C and field surveys did not identify any threatened entities dependent on watercourses, beyond a general requirement of all species for sources of water. Minor sedimentation may result to watercourses if a sediment control plan is not implemented. See **Table 7-2**, "Soil management."	
8.3.5	Impacts of wind turbine strikes on protected animals.	The proposal does not entail the installation of wind turbines and no prescribed impacts of this kind will result from proposal activities.	None required.
8.3.6	Impact of vehicle strikes on threatened species of animals or on animals that are part of a TEC.	The possibility of vehicle strikes on animals exists both during the construction and operational phases of the proposal (**Figure 7-1)**. These impacts are most likely along the existing access road, though impacts may also occur at any location within the quarry itself. This applies to all threatened animal species that may occur within the subject land. Vehicle usage rates within the proposed quarry are uncertain and no reliable data exists as to the rate of vehicle strike within these areas. For these reasons, it is not possible to reliably quantify the likely impacts of vehicle strike on threatened flora. Mitigation measures, including enforcing reduced speed limits, have been identified.	**Table 7-2**

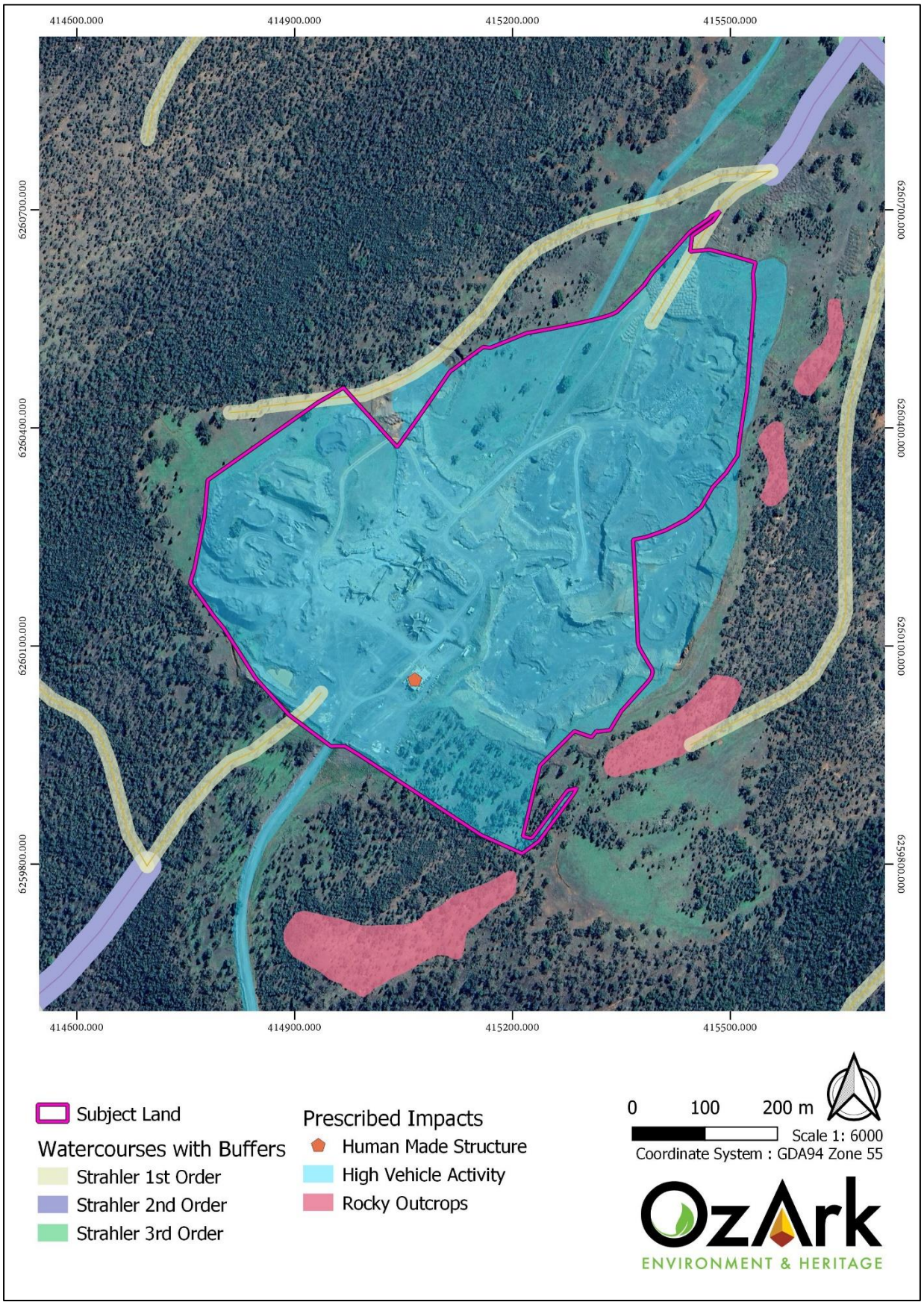

Figure 7-1. Prescribed impacts from the proposal.

7.7 Indirect Impacts

The main impacts of the proposal are expected to be contained within the subject land, provided there is adequate demarcation between operational areas and non-operational areas. Indirect impacts that have the potential to occur as a consequence of the proposal are listed within (**Table 7-4**). However, these indirect impacts will be minimised by following the environmental safeguards proposed in **Table 7-2**.

Table 7-4. Potential indirect impacts of the proposal

Nature of impact	Timing	Likelihood	Native species impacted	Impact on biodiversity
Inadvertent impacts on adjacent habitat or vegetation	During operations	Likely	• Native species surrounding the subject land • Threatened species assumed present and observed during fieldwork	Increased edge effects, loss of foraging habitat, potential injury or mortality to neighbouring fauna
Reduced viability of adjacent habitat due to edge effects	During operations	Likely	• Native vegetation surrounding the subject land • Threatened species assumed present and observed during fieldwork	Degradation of native vegetation and habitat for threatened flora and fauna
Reduce viability of adjacent habitat due to noise, dust or light spill	During operations	Likely	• Native species surrounding the subject land • Threatened species assumed present and observed during fieldwork	Minor foraging and breeding habitat for fauna may be altered or removed.
Transport of weeds and pathogens from the site to adjacent vegetation	During operations	Likely	• Native species surrounding the subject land	Degradation of native vegetation
Increased risk of starvation or exposure, and loss of shade or shelter	During operations	Unlikely	• Native species surrounding the subject land	Minor loss of foraging habitat
Loss of breeding habitat	During operations	Possible	• Native species surrounding the subject land • Threatened species assumed present and observed during fieldwork	Minor loss of potential breeding habitat
Trampling of threatened flora species	During operations	Unlikely	• Assumed present flora	Possible minor loss of threatened flora
Rubbish dumping or rubbish blowing off site	During operations	Likely	• Native species surrounding the subject land • Threatened species observed during fieldwork	Degradation of native vegetation and habitat for threatened species

7.8 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government DAWE.

The EPBC Act protected matters search has identified three TECs, 25 threatened species, and eight migratory species that are known or predicted to occur in the 10 km search area (**Appendix A**). Of these, eight threatened and three migratory or marine species may occur within the impact footprint, based on the identification of potential habitat present in the subject land (**Appendices C** and **F**). An assessment of impact significance has been undertaken for these threatened species following EPBC guidelines (**Appendix G**).

A summary of these matters and whether the proposal is likely to impact them is provided in **Table 7-5**. It is concluded that no MNES will be significantly impacted by the proposal.

Table 7-5. Impacts to Matters of National Environmental Significance.

Consideration	Potential impact?
Any impact on a listed threatened species or communities?	Yes (non-significant, **Appendix G**)
Any impacts on listed migratory species?	Yes (non-significant, **Appendix G**)
Any impacts on a Ramsar wetland of international importance?	No
Any impacts on a Commonwealth marine environment?	No
Any impacts on a World Heritage property?	No
Any impacts on a National Heritage place?	No
Any impacts on the Great Barrier Reef Marine Park?	No
Does the proposal involve a nuclear action (including uranium mining)?	No
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	No
Additionally, any impact (direct or indirect) on Commonwealth land?	No

8 Biodiversity Credit and Offset Report

8.1 Management Zones

The BAM considers future vegetation condition of different areas of the development footprint when calculating biodiversity credits and offsets. Due to the absence of detailed site plans, it has been assumed that all vegetation within the development footprint will be managed the same: i.e. cleared. Therefore, offset requirements have been assessed assuming only one management zone.

8.2 Vegetation Integrity Assessment

Vegetation integrity (VI) scores have been calculated for each vegetation zone based on patch size, area to be impacted, vegetation composition, structure and function, as defined below.

Patch size – Area in hectares of total vegetation zone patch (i.e. the connected woody and non-woody vegetation).

Area – Area within the property that will be subject to clearing, modification or other treatment by the proposal. There is only one management zone as described above.

Composition – Score calculated based on species richness, i.e. the number of native species present.

Structure – Score calculated based on the cover (%) of each native species growth form.

Function – Score calculated based on habitat features, i.e. presence of tree sizes, hollow trees, coarse woody debris, litter cover (%) and high threat weed cover (%).

Benchmark data for the PCTs is also used in this calculation.

Data required for the calculation was collected in the field using the BAM, as described above. The VI assessment for each vegetation zone including the loss of VI due to the proposal is shown in **Table 8-1**.

Table 8-1. Vegetation Integrity (VI) assessment.

Vegetation Zone	PCT	Area of Zone to be Impacted (ha)	Assessed VI Score	Management Zone	Future VI Score	Change in VI Score
1	72_Poor	0.98	25.5	Proposed development area	0	-25.5
2	186_Moderate	0.10	73.4	Proposed development area	0	-73.4
3	70_Poor	2.66	40.8	Proposed development area	0	-40.8
4	185_Poor	0.49	18.5	Proposed development area	0	-18.5

8.3 Ecosystem Credit Summary

The ecosystem credits required to be retired are summarised in **Table 8-2**. Based on the VI score, 62 Ecosystem credits are required to be offset.

The full Biodiversity Credit Report generated by the BAM calculator is appended to the BDAR as **Appendix D**.

Table 8-2. Ecosystem Credits Required to be retired – like for like.

Impacted PCT	Number of Ecosystem Credits	IBRA Subregion	PCTs that can be used to offset the impacts from the development
PCT 70 – White Cypress Pine woodland on sandy loams in central NSW wheatbelt	47	Lachlan Plains	Floodplain Transition Woodlands This includes PCT's: 56, 70, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628
PCT 72 – White Cypress Pine – Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion	9	Lachlan Plains	Western Peneplain Woodlands This includes PCT's: 72, 98, 103, 105, 108, 109, 134, 135, 145, 245, 246
PCT 185 – Dwyer's Red Gum – White Cypress Pine – Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	3	Lachlan Plains	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439
PCT 186 – Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion	3	Lachlan Plains	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439
TOTAL	62		

8.4 Species Credit Summary

The species credits required for the proposal are summarised in **Table 8-3**. Three species credit species were assumed present in a small area (0.12 ha) of PCT 70 that was not able to be surveyed, generating 6 species credits.

The full biodiversity credit summary report is provided in **Appendix D**.

Table 8-3. Species credits required to be retired – like for like.

Impacted Species Credit Species	Number of Species Credits	IBRA Subregion
Austrostipa metatoris / A spear-grass	2	Anywhere in NSW
Diuris tricolor / Pine Donkey Orchid	2	Anywhere in NSW
Swainsona sericea / Silky Swainson-pea	2	Anywhere in NSW

8.5 Offset Requirement

Offsetting is required for the 62 Ecosystem Credits and 6 Species Credits listed above and in **Appendix D**. The proponent intends to satisfy their Ecosystem and Species Credit obligations by buying and retiring the necessary credits from the open market or by paying directly into the Biodiversity Conservation Fund.

9 Summary and conclusions

The proposal will clear up to 4.23 ha of native vegetation to extend quarry operations, which includes an extraction area, processing and product stockpiling area, ancillary components area and operational disturbance area.

As the proposal will clear more than 1 ha of native vegetation, a BDAR is required to assess the impacts of the proposal on biodiversity and the proponent's offset obligations under the BOS.

The native vegetation consists of four PCTs:

- PCT 70 - White Cypress Pine woodland on sandy loams in central NSW wheatbelt.
- PCT 72 - White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion.
- PCT 185 - Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion.
- PCT 186 - Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion.

PCT 186 is associated with the following TEC:

- BC Act listed, EEC, Mallee and Mallee-Broombush dominated woodland and shrubland, lacking *Triodia*, in the NSW South Western Slopes Bioregion.

Based on the results of the field survey, the occurrence of this PCT within the subject land did not meet the composition criteria to be considered an example of this TEC. No TECs occur within the subject land.

In total, 29 Ecosystem Credit Species were generated by the BAM-C. Three species were removed from the list due to habitat constraints, two species were detected on site, and 24 further species are assumed present on the subject land, generating a total of 62 Ecosystem Credits. In addition, 17 Species Credit Species were generated by the BAM-C. Of these, six species were removed due to habitat constraints. The remaining species were surveyed for following relevant and approved BAM survey methodologies; these species were not detected on the subject land. However, three candidate flora species were not able to be fully surveyed across the entire subject land as a small area (0.12 ha) of PCT 70_poor had already been disturbed prior to targeted surveys being conducted. As such, presence has been assumed for these three flora species in this area generating a total of six Species Credits.

Offsetting is required for 62 Ecosystem Credits and 6 Species Credits. The proponent intends to satisfy their Ecosystem and Species Credit obligations by buying and retiring the necessary credits from the open market or by paying directly into the Biodiversity Conservation Fund.

The significance of the proposed impact to EPBC Act-listed entities predicted to occur within a 10 km search area was assessed. No significant impact to a wetland, TEC, threatened, migratory, or marine species is expected as a result of this proposal. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended. Therefore, a referral of the proposal to the Federal DCCEEW for these matters is not required.

This assessment covers the current form of the proposal, any change to the scope of work may require re-assessment.

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Appendix A: Database Search Results

Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Jun-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	25
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Banrock station wetland complex	500 - 600km upstream from Ramsar site
Hattah-kulkyne lakes	300 - 400km upstream from Ramsar site
Riverland	400 - 500km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	600 - 700km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Melanodryas cucullata cucullata		
South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysostoma		
Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area
Pedionomus torquatus		
Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii		
Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata		
Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
FISH		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROG		
Crinia sloanei		
Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area
MAMMAL		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area
PLANT		

Scientific Name	Threatened Category	Presence Text
Acacia curranii		
Curly-bark Wattle [3908]	Vulnerable	Species or species habitat likely to occur within area
Lepidium monoplocoides		
Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area
REPTILE		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis		
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata		
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Chalcites osculans as Chrysococcyx osculans		
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area
Neophema chrysostoma		
Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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BioNET Atlas search – threatened species predicted to occur within the Lachlan Plains subregion of the Cobar Peneplain Bioregion

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Amphibia	*Crinia sloanei*	Sloane's Froglet	E1,P	E	2
Amphibia	*Litoria raniformis*	Southern Bell Frog	E1,P	V	3
Reptilia	*Aprasia inaurita*	Mallee Worm-lizard	E1,P		2
Reptilia	*Tiliqua occipitalis*	Western Blue-tongued Lizard	V,P		3
Aves	*Leipoa ocellata*	Malleefowl	E1,P	V	95
Aves	*Anseranas semipalmata*	Magpie Goose	V,P		33
Aves	*Oxyura australis*	Blue-billed Duck	V,P		78
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		62
Aves	*Apus pacificus*	Fork-tailed Swift	P	C,J,K	2
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	3
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		1
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	26
Aves	*Circus assimilis*	Spotted Harrier	V,P		39
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		27
Aves	*^^Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		1
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		49
Aves	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		4
Aves	*^^Pandion cristatus*	Eastern Osprey	V,P,3		1
Aves	*^Falco hypoleucos*	Grey Falcon	V,P,2	V	3
Aves	*Falco subniger*	Black Falcon	V,P		7
Aves	*Grus rubicunda*	Brolga	V,P		11
Aves	*Ardeotis australis*	Australian Bustard	E1,P		6
Aves	*Burhinus grallarius*	Bush Stone-curlew	E1,P		3
Aves	*Pluvialis squatarola*	Grey Plover	P	C,J,K	1
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	4
Aves	*Actitis hypoleucos*	Common Sandpiper	P	C,J,K	3
Aves	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	63
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	17
Aves	*Calidris melanotos*	Pectoral Sandpiper	P	J,K	3
Aves	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	13
Aves	*Calidris subminuta*	Long-toed Stint	P	C,J,K	1
Aves	*Gallinago hardwickii*	Latham's Snipe	P	J,K	12
Aves	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	2
Aves	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	15
Aves	*Numenius minutus*	Little Curlew	P	C,J,K	1
Aves	*Tringa glareola*	Wood Sandpiper	P	C,J,K	12
Aves	*Tringa nebularia*	Common Greenshank	P	C,J,K	20
Aves	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	62
Aves	*Gelochelidon nilotica*	Gull-billed Tern	P	C	9
Aves	*Hydroprogne caspia*	Caspian Tern	P	J	14

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Aves	*^Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P,2	V	35
Aves	*^Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2	E	108
Aves	*Neophema chrysostoma*	Blue-winged Parrot	V,P	V	5
Aves	*^^Neophema pulchella*	Turquoise Parrot	V,P,3		30
Aves	*^^Polytelis swainsonii*	Superb Parrot	V,P,3	V	22
Aves	*^^Ninox connivens*	Barking Owl	V,P,3		9
Aves	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		1
Aves	*Climacteris affinis*	White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area	E2,P		20
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P	V	194
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		256
Aves	*Hylacola cautus*	Shy Heathwren	V,P		42
Aves	*Certhionyx variegatus*	Pied Honeyeater	V,P		6
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		57
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	60
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		2
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		120
Aves	*Cinclosoma castanotum*	Chestnut Quail-thrush	V,P		22
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		55
Aves	*Pachycephala inornata*	Gilbert's Whistler	V,P		22
Aves	*Pachycephala rufogularis*	Red-lored Whistler	E4A,P	V	9
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		54
Aves	*Drymodes brunneopygia*	Southern Scrub-robin	V,P		19
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P	E	135
Aves	*Petroica phoenicea*	Flame Robin	V,P		5
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		71
Mammalia	*Antechinomys laniger*	Kultarr	E1,P		1
Mammalia	*Ningaui yvonneae*	Southern Ningaui	V,P		K
Mammalia	*Sminthopsis macroura*	Stripe-faced Dunnart	V,P		1
Mammalia	*Phascolarctos cinereus*	Koala	E1,P	E	1
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		P
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		7
Mammalia	*Myotis macropus*	Southern Myotis	V,P		1
Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	6
Mammalia	*Vespadelus baverstocki*	Inland Forest Bat	V,P		2
Flora	*Brachyscome papillosa*	Mossgiel Daisy	V	V	1
Flora	*Kippistia suaedifolia*	Fleshy Minuria	E1		2

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Flora	*Lepidium monoplocoides*	Winged Peppercress	E1	E	4
Flora	*Threlkeldia inchoata*	Tall Bonefruit	E1		2
Flora	*Eleocharis obicis*	Spike-Rush	V	V	4
Flora	*Swainsona murrayana*	Slender Darling Pea	V	V	P
Flora	*Swainsona sericea*	Silky Swainson-pea	V		8
Flora	*Acacia curranii*	Curly-bark Wattle	V	V	53
Flora	*^Caladenia arenaria*	Sand-hill Spider Orchid	E1,P,2	E	1
Flora	*^Diuris tricolor*	Pine Donkey Orchid	V,P,2		1
Flora	*Austrostipa metatoris*	A spear-grass	V	V	4
Flora	*Austrostipa wakoolica*	A spear-grass	E1	E	9
Flora	*Distichlis distichophylla*	Australian Saltgrass	E1		6
Flora	*Grevillea ilicifolia subsp. ilicifolia*	Holly-leaf Grevillea	E4A		5
Flora	*Pomaderris cocoparrana*	Cocoparra Pomaderris	E1	E	282

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.
+ Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable.
- Number of Records: P = predicted to occur.

BioNET Atlas search – threatened ecological communities predicted to occur within the Lachlan Plains subregion of the Cobar Peneplain Bioregion

Community Name	*NSW status	+Comm. status	Records
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		E	K
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		E	K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3		K
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3		K
Poplar Box Grassy Woodland on Alluvial Plains		E	K
Weeping Myall Woodlands		E	K
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE	K

*NSW Status: P=Protected, P13=Protected native plant, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species. +Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable. - Number of Records: P = predicted to occur.

BioNET Atlas search – key threatening processes predicted to occur within the Lachlan Plains subregion of the Cobar Peneplain Bioregion

Key Threatening Process	NSW status	Comm. status	Records
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		P
Anthropogenic Climate Change	KTP	KTP	P
Bushrock removal	KTP		P
Clearing of native vegetation	KTP	KTP	P
Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)	KTP	KTP	P
Competition and habitat degradation by Feral Goats, *Capra hircus* Linnaeus 1758	KTP	KTP	P
Competition from feral honey bees, *Apis mellifera* L.	KTP		P
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		P
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758	KTP		P
Herbivory and environmental degradation caused by feral deer	KTP		P
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		P
Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972	KTP	KTP	P
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	P
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	P
Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	P
Introduction of the Large Earth Bumblebee *Bombus terrestris* (L.)	KTP		P
Invasion and establishment of exotic vines and scramblers	KTP		P
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		P
Invasion and establishment of the Cane Toad (*Bufo marinus*)	KTP	KTP	P
Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata* (Wall. ex G. Don) Cif.	KTP		P
Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		P
Invasion of native plant communities by exotic perennial grasses	KTP		P
Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* (Fr. Smith) into NSW	KTP		P
Invasion, establishment and spread of Lantana (*Lantana camara L. sens*. Lat)	KTP		P
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	P
Loss of Hollow-bearing Trees	KTP		P
Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		P
Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		P

Key Threatening Process	NSW status	Comm. status	Records
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		P
Predation by the European Red Fox *Vulpes Vulpes* (Linnaeus, 1758)	KTP	KTP	P
Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)	KTP	KTP	P
Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* Linnaeus 1758	KTP	KTP	P
Removal of dead wood and dead trees	KTP		P

Records: P = predicted to occur.

Biodiversity Values Map.

No areas mapped on the Biodiversity Values Map occur within the subject land (blue polygon).

NSW GOVERNMENT Department of Planning and Environment

Biodiversity Values Map and Threshold Report

This report is generated using the Biodiversity Values Map and Threshold (BMAT) tool. The BMAT tool is used by proponents to supply evidence to your local council to determine whether or not a Biodiversity Development Assessment Report (BDAR) is required under the Biodiversity Conservation Regulation 2017 (Cl. 7.2 & 7.3).

The report provides results for the proposed development footprint area identified by the user and displayed within the blue boundary on the map.

There are two pathways for determining whether a BDAR is required for the proposed development:

1. Is there Biodiversity Values Mapping?
2. Is the 'clearing of native vegetation area threshold' exceeded?

Biodiversity Values Map and Threshold Report

Date of Report Generation		19/06/2024 3:17 PM
1. Biodiversity Values (BV) Map - Results Summary (Biodiversity Conservation Regulation Section 7.3)		
1.1	**Does the development Footprint intersect with BV mapping?**	no
1.2	**Was ALL BV Mapping within the development footprinted added in the last 90 days?** (dark purple mapping only, no light purple mapping present)	no
1.3	**Date of expiry of dark purple 90 day mapping**	N/A
1.4	**Is the Biodiversity Values Map threshold exceeded?**	no
2. Area Clearing Threshold - Results Summary (Biodiversity Conservation Regulation Section 7.2)		
2.1	**Size of the development or clearing footprint**	392,835.7 sqm
2.2	**Native Vegetation Area Clearing Estimate (NVACE)** (within development/clearing footprint)	120,935.7 sqm
2.3	**Method for determining Minimum Lot Size**	LEP
2.4	**Minimum Lot Size** (10,000sqm = 1ha)	400,000 sqm
2.5	**Area Clearing Threshold** (10,000sqm = 1ha)	10,000 sqm
2.6	**Does the estimate exceed the Area Clearing Threshold?** (NVACE results are an estimate and can be reviewed using the Guidance)	yes
REPORT RESULT: Is the Biodiversity Offset Scheme (BOS) Threshold exceeded for the proposed development footprint area? (Your local council will determine if a BDAR is required)		**yes**

Page 1 of 4

NSW GOVERNMENT Department of Planning and Environment

What do I do with this report?

• If the result above indicates the BOS Threshold has been exceeded, your local council **may require** a Biodiversity Development Assessment Report with your development application. Seek further advice from Council. An accredited assessor can apply the Biodiversity Assessment Method and prepare a BDAR for you. For a list of accredited assessors go to: https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor.

• If the result above indicates the BOS Threshold has not been exceeded, you may not require a Biodiversity Development Assessment Report. This BMAT report can be provided to Council to support your development application. Council can advise how the area clearing threshold results should be considered. Council will review these results and make a determination if a BDAR is required. Council may ask you to review the area clearing threshold results. You may also be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in Section 7.3 of the *Biodiversity Conservation Act 2016*.

• If a BDAR is not required by Council, you may still require a permit to clear vegetation from your local council.

• If **all** Biodiversity Values mapping within your development footprint was less than 90 days old, i.e. areas are displayed as dark purple on the BV map, a BDAR may not be required if your Development Application is submitted within that 90 day period. Any BV mapping less than 90 days old on this report will expire on the date provided in Line item 1.3 above.

For more detailed advice about actions required, refer to the **Interpreting the evaluation report** section of the Biodiversity Values Map Threshold Tool User Guide .

Review Options:

• If you believe the Biodiversity Values mapping is incorrect please refer to our BV Map Review webpage for further information.

• If you or Council disagree with the area clearing threshold estimate results from the NVACE in Line Item 2.6 above (i.e. area of Native Vegetation within the Development footprint proposed to be cleared), review the results using the Guide for reviewing area clearing threshold results from the BMAT Tool.

Acknowledgement

I, as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature: _____ Date: _____

(Typing your name in the signature field will be considered as your signature for the purposes of this form)

19/06/2024 03:17 PM

Page 2 of 4

Department of Planning and Environment

Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The BV map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Scheme applies to a clearing or development proposal. You have used the Threshold Tool in the map viewer to generate this BV Threshold Report for your nominated area. This report calculates results for your proposed development footprint and indicates whether Council may require you to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

This report may be used as evidence for development applications submitted to councils. You may also use this report when considering native vegetation clearing under the State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

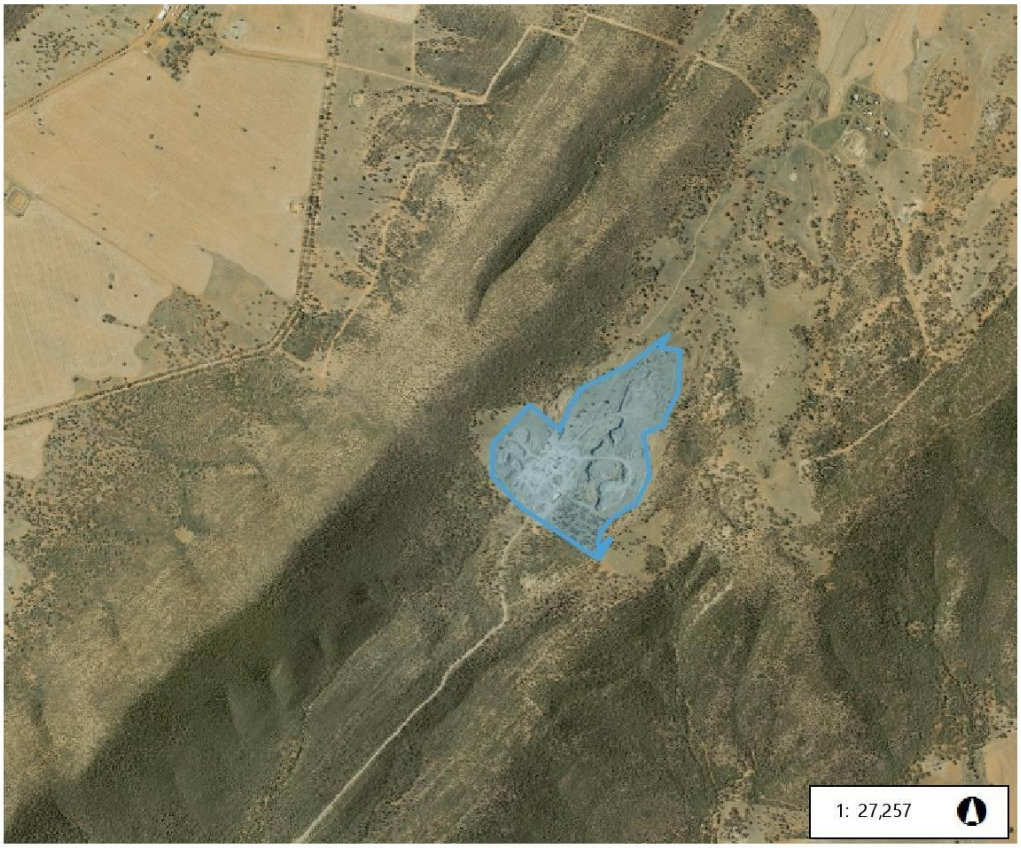
What's new? For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the Biodiversity Values Map webpage.

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the Biodiversity Values Map Review webpage.

If you need help using this map tool see our Biodiversity Values Map and Threshold Tool User Guide or contact the Map Review Team at map.review@environment.nsw.gov.au or on 1800 001 490.

Page 3 of 4

Biodiversity Values Map



1,384.6 0 692.32 1,384.6 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days
- Native Vegetation Area Clearing Estimate (NVACE)
- Development area selected by proponent

19/06/2024 03:17 PM

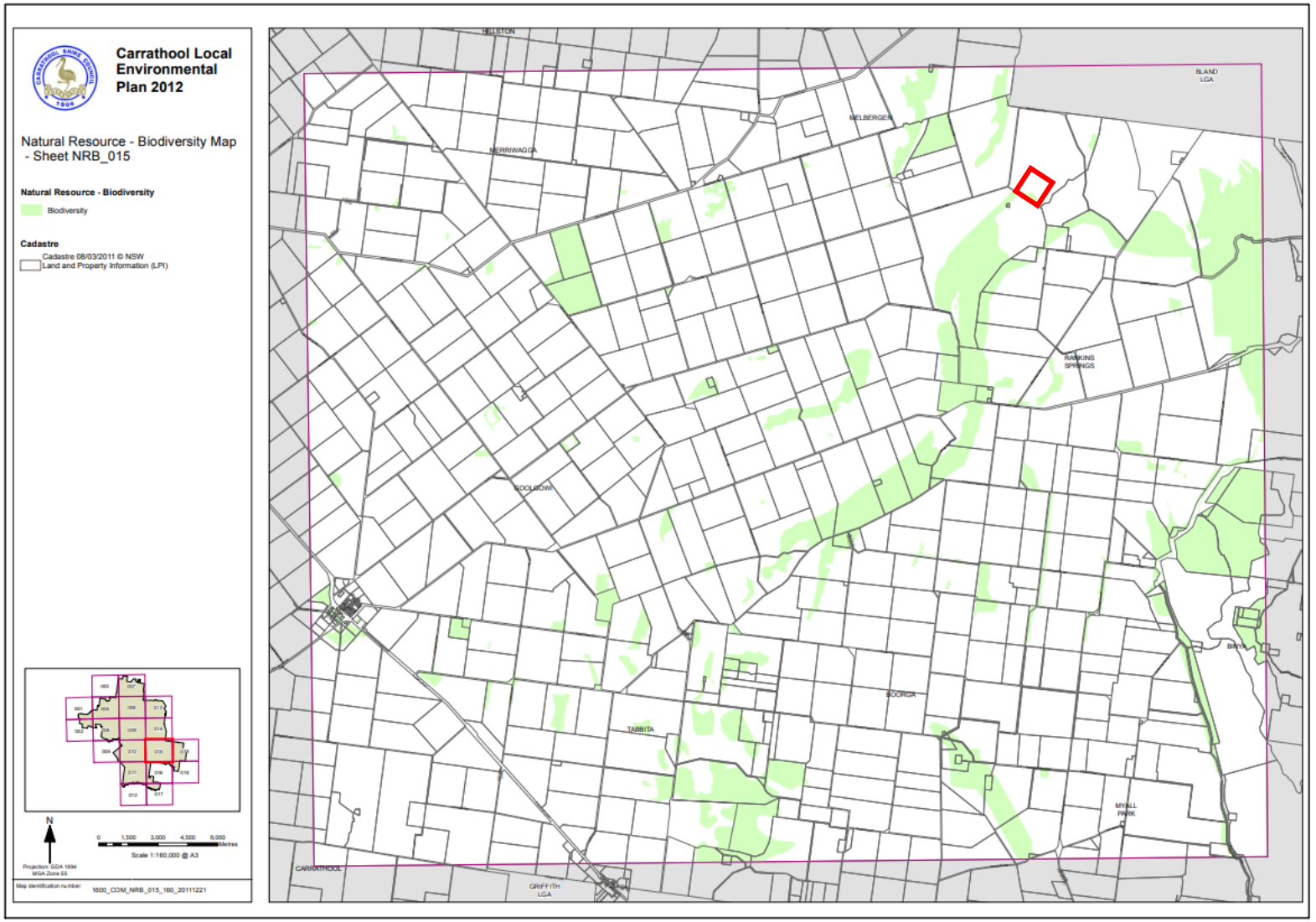
The results provided in this tool are generated using the best available mapping and knowledge of species habitat requirements.

This map is valid as at the date the report was generated. Checking the Biodiversity Values Map viewer for mapping updates is recommended.

Page 4 of 4

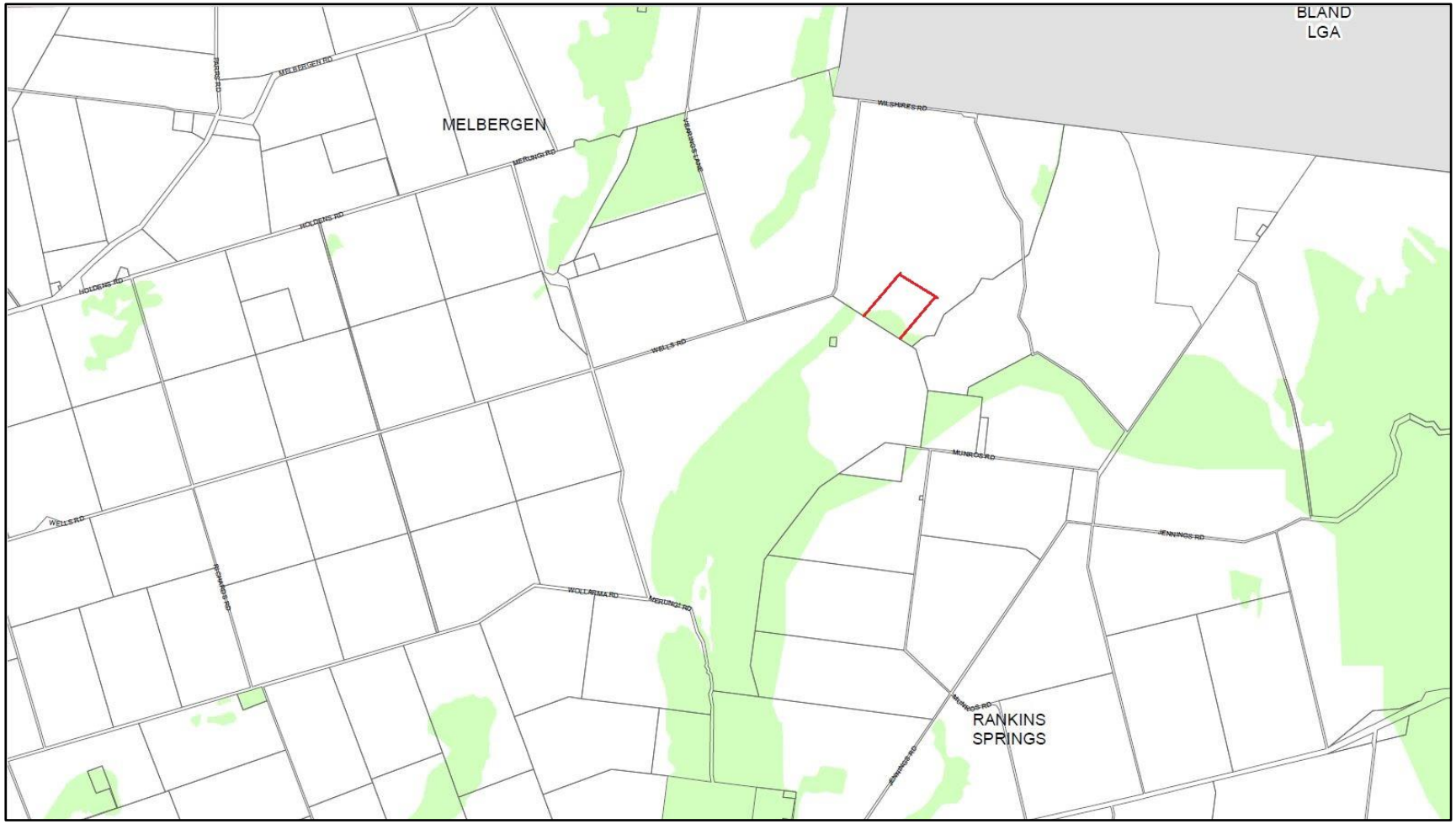
Carrathool Local Environmental Plan 2012 – Biodiversity Map.

Areas marked as green are areas of high biodiversity value. The red polygon indicates the approximate location of the subject land.



Carrathool Local Environmental Plan 2012 – Biodiversity Map (Magnified).

Areas marked as green are areas of high biodiversity value. The red polygon indicates the approximate location of the subject land.



Appendix B: Vegetation Plot Locations and Photographs

Plot Name	PCT	Easting (Zone 55)	Northing (Zone 55)	Photographs	
WRQ01	72	415571	6260870		

WRQ02	72	416658	6149912		

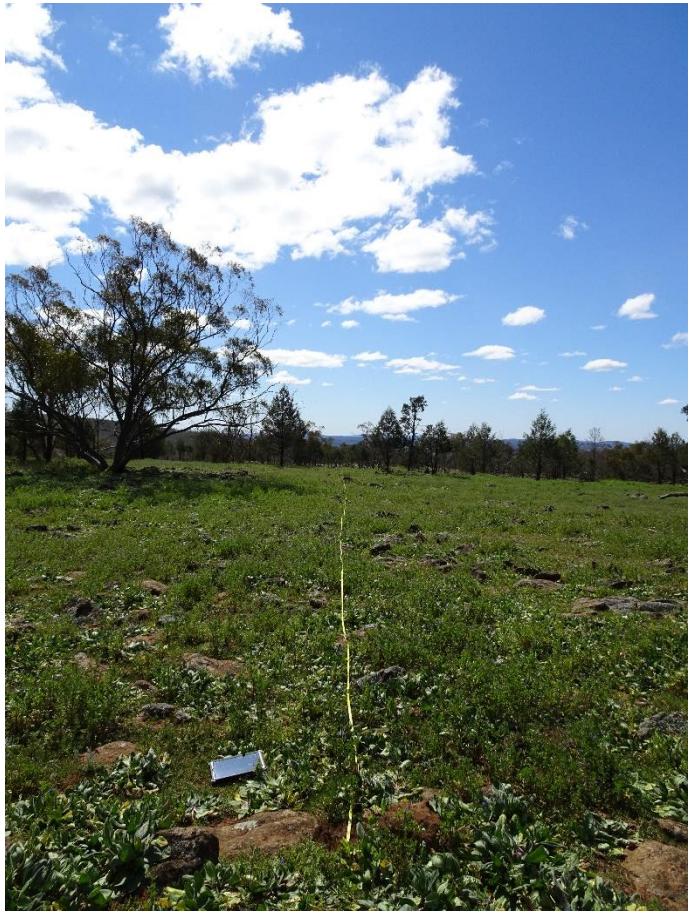
WRQ03	72	415705	6260650		

WRQ04	72	415223	6260526		

WRQ05	186	415570	6260452		

WRQ06	186	415565	6260190		

WRQ07	186	415490	6260029		

WRQ08	186	415358	6259804		
WRQ09	186	415406	6259869	No photographic record – plot data was not used in BDAR	No photographic record – plot data was not used in BDAR

WRQ10	70	415099	6259897		

WRQ11	70	415138	6260288		

WRQ12	70	415179	6259928		

WRQ13	186	415583	6260520		

Appendix C: Field Survey Results

Flora species list

The species listed below were identified on the subject land during the August 2019 field survey and the additional site visit in May 2022.

Growth Form: FG = Forb, GG = Grass and Grass-like, SG = Shrub, TG = Tree, EG = Fern, OG = Other

Status: N = Native, E = Exotic, HTE = High Threat Exotic

Growth form	Common name	Scientific name	Status
TG	Kurrajong	*Brachychiton populneus*	N
TG	Black Cypress-pine	*Callitris endlicheri*	N
TG	White Cypress-pine	*Callitris glaucophylla*	N
TG	Dwyer's Red Gum	*Eucalyptus dwyeri*	N
TG	Poplar Box	*Eucalyptus populnea*	N
SG	Urn Heath	*Melichrus urceolatus*	N
SG	Buckbush	*Salsola australis*	N
FG	Bristle Poppy	*Papaver aculeatum*	E
FG	Flannel Cudweed	*Actinobole uliginosum*	N
FG	Capeweed	*Arctotheca calendula*	E
FG	Mediterranean Turnip	*Brassica tournefortii*	HTE
FG	Bulbine Lily	*Bulbine alata*	N
FG	Purslane	*Calandrinia* sp.	N
FG	Purple Burr-daisy	*Calotis cuneifolia*	N
FG	Rough Burr-daisy	*Calotis hispidula*	N
FG	Maltese Cockspur	*Centaurea melitensis*	E
FG	Common Everlasting	*Chrysocephalum apiculatum*	N
FG	Darling Lily	*Crinum flaccidum*	N
FG	Native Carrot	*Daucus glochidiatus*	N
FG	Kidneyweed	*Dichondra repens*	N
FG	Sundew	*Drosera* sp.	N
FG	Goosefoot	*Dysphania* sp.	N
FG	Paterson's Curse	*Echium plantagineum*	E
FG	Climbing Saltbush	*Einadia nutans*	N
FG	Common Storksbill	*Erodium cicutarium*	E
FG	Blue Crowsfoot	*Erodium crinitum*	N
FG	Caustic Weed	*Euphorbia drummondii*	N
FG	Native Geranium	*Geranium solanderi*	N
FG	Hill Raspwort	*Gonocarpus elatus*	N
FG	Ivy Goodenia	*Goodenia hederacea*	N
FG	Goodenia	*Goodenia heteromera*	N
FG	Slender Violet-bush	*Hybanthus monopetalus*	N
FG	Smooth Catsear	*Hypochaeris glabra*	E
FG	African Peppercress	*Lepidium africanum*	E

Growth form	Common name	Scientific name	Status
FG	Horehound	*Marrubium vulgare*	E
FG	Burr Medic	*Medicago polymorpha*	E
FG	Medic	*Medicago* sp.	E
FG	Native Tobacco	*Nicotiana* sp.	N
FG	Native Oxalis	*Oxalis chnoodes*	N
FG	Native Oxalis	*Oxalis perennans*	N
FG	Native Oxalis	*Oxalis radicosa*	N
FG	Midget Greenhood	*Pterostylis mutica*	N
FG	Green Pussytails	*Ptilotus spathulatus*	N
FG	Brilliant Sunray	*Rhodanthe polygalifolia*	N
FG	Pigmy Sunray	*Rhodanthe pygmaea*	N
FG	Swamp Dock	*Rumex brownii*	N
FG	Bushy Groundsel	*Senecio cunninghamii*	N
FG	Cotton Fireweed	*Senecio quadridentatus*	N
FG	Groundsel	*Senecio* sp.	N
FG	Indian Hedge Mustard	*Sisymbrium orientale*	E
FG	Spoon Cudweed	*Stuartina muelleri*	N
FG	Dandelion	*Taraxacum officinale*	E
FG	White Clover	*Trifolium repens*	E
FG	Stinging Nettle	*Urtica incisa*	N
FG	New Holland Daisy	*Vittadinia cervicularis*	N
FG	Fuzzweed	*Vittadinia cuneata*	N
FG	Tall Bluebell	*Wahlenbergia communis*	N
FG	Bluebell	*Wahlenbergia* sp.	N
FG	Early Nancy	*Wurmbea dioica*	N
FG	Bathurst Burr	*Xanthium spinosum*	HTE
FG	Golden Everlasting	*Xerochrysum bracteatum*	N
GG	Rough Speargrass	*Austrostipa scabra*	N
GG	Wild Oat	*Avena fatua*	E
GG	Red Brome	*Bromus rubens*	E
GG	Brome	*Bromus* sp.	E
GG	Lovegrass	*Eragrostis* sp.	N
GG	Barley	*Hordeum vulgare*	E
GG	Weeping Grass	*Microlaena stipoides*	N
GG	Bandicoot Grass	*Monachather paradoxus*	N
GG	False Hairgrass	*Pentaschistis airoides*	E
GG	Wallaby Grass	*Rytidosperma* sp.	N
GG	Mulga Mitchell Grass	*Thyridolepis mitchelliana*	N
OG	Purple Coral-pea	*Hardenbergia violacea*	N
EG	Poison Rock Fern	*Cheilanthes sieberi*	N

Fauna species list

These species were identified on the site during the field surveys:

Species Name	Common Name	*BC Act	EPBC Act	Observation Type
Dacelo novaeguineae	Laughing Kookaburra			Seen/heard
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V		Seen/heard
Nymphicus hollandicus	Cockatiel			Seen/heard
Northiella haematogaster	Bluebonnet			Seen/heard
***Corvus* sp.**	Raven			Seen/heard
Manorina melanocephala	Noisy Miner			Seen/heard
Coracina novaehollandiae	Black-faced cuckooshrike			Seen/heard
Gymnorhina tibicen	Australian Magpie			Seen/heard
Acanthiza pusilla	Brown Thornbill			Seen/heard
Acanthiza apicalis	Inland Thornbill			Seen/heard
Chthonicola sagittata	Speckled Warbler	V		Seen/heard
Myiagra inquieta	Restless Flycatcher			Seen/heard
Lalage tricolor	White-winged Triller			Seen/heard
Psephotus haematonotus	Red-rumped Parrot			Seen/heard
Macropus giganteus	Eastern Grey Kangaroo			SM4
Phaps chalcoptera	Common Bronzewing			SM4
Ocyphaps lophotes	Crested Pigeon			SM4
Aegotheles cristatus	Australian Owlet-nightjar			SM4
Vanellus miles	Masked Lapwing			SM4
Eolophus roseicapillus	Galah			SM4
Pardalotus striatus	Striated Pardalote			SM4
Acanthagenys rufogularis	Spiny-cheeked Honeyeater			SM4
Lichenostomus virescens	Singing Honeyeater			SM4
Cracticus torquatus	Grey Butcherbird			SM4
Corvus coronoides	Australian Raven			SM4
Grallina cyanoleuca	Magpie-lark			SM4
Struthidea cinereal	Apostlebird			SM4
Limnodynastes peronii	Brown-striped Frog			SM4
+Capra hircus	Feral Goat			SM4
+Sus scrofa	Feral Pig			Seen/heard

*V = vulnerable. + = Non-native

BAM Plot survey data sheets

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 18/8/19	Survey Name MILBRAE		
Recorders L		Plot ID # WRQ01	Zone ID
Photo #		Plot dimensions 20 X 50	
Datum	Zone	Plot bearing along midline 108	
Easting	Northing	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Grey Box / Poplar Box PCT82	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) /	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) /	Record stems for living trees only, and for all species
30 - 49	(+/-) –	For multistemmed trees, record only the largest stem
20 - 29	(+/-) –	Presence of <5cm stems records regeneration
10 - 19	(+/-) –	Record # trees with hollows, not number of hollows
5 - 9	(+/-) –	Count as one stem where tree is multistemmed
< 5	(+/-) –	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		
/	<20cm /	Total # /
	>20cm** /	
Length of logs			Total (m) 25

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	20	10	10	80	80	
	Bare ground	0	70	60	–	10	
	Cryptogam	0	0	0	–	–	
	Rock	0	0	0	–	–	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	O	Microrelief
Cultivation	0		Slope Plain Lower slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture loam
Firewood removal	0		Soil colour Red-brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Isolated clumps of trees. Mid layer absent. Very weedy ground layer. No upper layer regen

EH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/19	Survey Name MLBR95				
Recorders		Plot ID # MRB01		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Erodium crinitum	25			
	Echium plantagineum	15		E	
	Arctotheca calendula	50		E	
	Salsola tragus	0.5	50		
	Medicago polymorpha	5		E	
	Chrysocephalum apiculatum	0.1	5		
	Austrostipa sp	0.5	100		
	Microlaena stipoides	0.5	100	E	
	Forb 1 Erodium circutarium	10		E	
	~~Herbaceous~~ Marrubium vulgare	5		E	
	~~Mongrass~~ Hordeum leporinum	5		E	
	Brassica tournefortii	~~2~~ 1		100	
	Oxalis perennans	0.5		200	
	Austrostipa scabra *	0.5		100	
	stuartina muelleri	0.5		200	
	Calotis hispidula	0.1		50	
	Calotis cuneifolia	0.1		10	

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

RH - Version 1.1 - Date 1/11/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name WILBRAE		
Recorders		Plot ID # WRQ02	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 160°	
Easting 146°05'20.5" E	Northing 33°47'22.5" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Grey box / Poplar Box PCT 82	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)		
Dimensions (circle applicable size) 20 x 20 m (circled) / 10 x 40 m		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)			
Dimensions (circle applicable size) 20 x 50 m (circled) / 10 x 100 m			
Tree stem DBH (cm)			Notes on function attributes:
>80	(#)	–	Stem size class records # large trees (cf. benchmark)
50 - 79	(#)	–	Record stems for living trees only, and for all species
30 - 49	(+/-)	1	For multistemmed trees, record only the largest stem
20 - 29	(+/-)	–	Presence of <5cm stems records regeneration
10 - 19	(+/-)	–	Record # trees with hollows, not number of hollows
5 - 9	(+/-)	–	Count as one stem where tree is multistemmed
< 5	(+/-)	✓	Hollow bearing stem may be a dead stem (incl. stag)
# Trees with hollows 0	<20cm	>20cm**	Total # 0
Length of logs (tally marks)			Total (m) 19

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

Sub-plot score (% cover)		1	2	3	4	5	Average
	Litter	10	10	20	10	10	
	Bare ground	30	50	60	20	50	
	Cryptogam	-	-	5	5	-	
	Rock	-	-	5	50	5	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform	
Clearing (incl. logging)	3	O	Microrelief	
Cultivation	0		Slope	Lower slope
Grazing (native / stock)	1	R	Aspect	
Soil erosion	0		Soil surface texture	loam
Firewood removal	0		Soil colour	red - brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage	run off
Storm damage	0		Distance to nearest water	
Weediness	3	R	Distance to nearest rock outcrop /cave	

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes: Notes; Isolated clumps of trees. No shrub layer. Very weedy ground layer.

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 23/8/19	Survey Name MILGRAE				
Recorders		Plot ID #AR002		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Eucalyptus populnea	5			
	Callitris glaucophylla	0.1	2		
	Echium plantagineum	25		E	
	Erodium cygnorum	25			
	Horehound Marrubium vulgare	0.5	10	E	
	Arctotheca calendula	10		E	
	Microlaena stipoides	0.5	100		
	Rumex brownii	0.1	20		
	Vittadinia cuneata	0.1	5		
	Chamaesyce drummondii	5			
	Austrostipa scabra	0.5	100		
	Oxalis perennans	0.1	50		
	Calotis hispidula	10	500		
	Senecio Senecio tragus	0.1	10		
	Oxalis perennans	1	200		
	Brassica tournefortii	1	100	E	

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 2.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name MILBRAE		
Recorders		Plot ID # WRQ03	Zone ID
Photo #		Plot dimensions 20 x 50	
Datum	Zone	Plot bearing along midline 4H	
Easting 146°05'22.0" E	Northing 33°47'27.4" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Grey Box / Poplar Box PCT 82	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) –	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) –	Record stems for living trees only, and for all species
30 - 49	(+/-) /	For multistemmed trees, record only the largest stem
20 - 29	(+/-) –	Presence of <5cm stems records regeneration
10 - 19	(+/-) –	Record # trees with hollows, not number of hollows
5 - 9	(+/-) –	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		
/	<20cm 2	Total # 2
	>20cm**	

Length of logs: HH III — Total (m):

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	20	20	10	20	10	
	Bare ground	0	0	40	10	60	
	Cryptogam	0	0	–	–	5	
	Rock	0	5	5	–	5	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	O	Microrelief
Cultivation	0		Slope lower slope
Grazing (native / stock)	2	R	Aspect
Soil erosion	0		Soil surface texture clay loam
Firewood removal	0		Soil colour red-brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes pics for WRQ01, 02.

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/17	Survey Name MILBRAE				
Recorders JC		Plot ID # MR03		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	E. populnea	5			
	C. glaucophylla	0.5	12		
	Callitris hugelii	5			
	Cheilanthes sieberi	0.5	100		
	Forb + Erodium cicutarium	5		E	
	Erodium crinitum	20			
	Arctotheca calendula	10		E	
	Echium plantagineum	30		E	
	Oxalis perennans	1	500		
	Medicago polymorpha	5		E	
	Sharlina muelleri	1	200		
	Microlaena stipoides	1	200		
	Austrostipa scabra	0.5	100		
	Brassica tournefortii	0.5	50	E	
	27/8 Forb 1 Rhodanthe pygmaea	0.1	100		
	Setaria	0.1	5		
	Trifolium repens	0.5	30		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name MIL BRAE		
Recorders JC		Plot ID # NRQ04	Zone ID
Photo #		Plot dimensions 20 x 50	
Datum	Zone	Plot bearing along midline 84°	
Easting 146°05'03.2" E	Northing 33°47'31.3"	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Grey Box / Pilliga Box PCT 82	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m / 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) -	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) -	Record stems for living trees only, and for all species
30 - 49	(+/-) -	For multistemmed trees, record only the largest stem
20 - 29	(+/-) -	Presence of <5cm stems records regeneration
10 - 19	(+/-) -	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) -	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		Total #
0	<20cm	0
	>20cm**	
Length of logs		Total (m) 0

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	10	30	30	20	20	
	Bare ground	30	20	20	5	20	
	Cryptogam	0	5	0	10	0	
	Rock	30	50	50	30	20	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	0	Microrelief
Cultivation	0		Slope Mid slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture Rocky clay-loam
Firewood removal	0		Soil colour Brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	2	R	Distance to nearest rock outcrop / cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Rocky mid slope.

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 23/8/19	Survey Name MILBRAE				
Recorders		Plot ID # WRQ 04		Zone ID	
GF code	**Genus species** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	Stratum
	C. glaucophylla	1	1		
	Vittadinia cuneata	25			
	Stuartina muelleri	10			
	Echium plantagineum	25		E	
	Arctotheca calendula	5		E	
	~~Er~~ Erodium cicutarium	5		E	
	Erodium crinitum	10			
	Medicago polymorpha	5		E	
	Calotis hispidula	5			
	Hypochaeris glabra	1	300	~~300~~ E	
	Brassica tournefortii	5		E	
	Oxalis perennans	1	300		
	Dysphania sp.	0.1	20		
	Microlaena stipoides	0.5	100		
	Senecio sp. (photo) quadridentatus ~~cunninghamii~~	0.1	10		
	Cheilanthes sieberi	0.5	100		
	Salsola tragus	0.1	10		
	Trifolium repens	0.5	100		
	Ptilotus (27/8) spathulatus	0.1	10		
	Sida ? prop	0.1	5		
	Wahlenbergia ~~sp~~ communis	0.1	20		
	~~Sonchus sp.~~ Taraxacum officinale	0.1	10	E	
	~~Daisy 1~~ Rhodanthe polygalifolia	0.1	5		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)

Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).

Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems

N=native, E=exotic, HTE=high threat exotic

All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc

Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name MCBRAE		
Recorders EC		Plot ID # WRQ85	Zone ID
Photo #		Plot dimensions 20 x 50	
Datum	Zone	Plot bearing along midline 109	
Easting 146°05'16.7" E	Northing 32°47'33.8" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Dwyers Red Gum PCT 186	Condition state Mod.

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size)

20 x 50 m 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#)	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) II	Record stems for living trees only, and for all species
30 - 49	(+/-) ✓	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		
IIII 4	<20cm IIII	Total # 5
	>20cm** I	

Length of logs	
IIII IIII IIII IIII IIII	Total (m) 25

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	10	30	30	20	60	
	Bare ground	60	60	0	0	0	
	Cryptogam	10	5	0	10	0	
	Rock	5	~~20~~ 5	70	70	5	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	1	O	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture
Firewood removal	0		Soil colour
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	2	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

Intact upper layer, but shrub layer absent. Weedy ground layer, but native species present.

XH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/17	Survey Name				
Recorders		Plot ID # WRQ 05		Zone ID	
GF code	**Genus species** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	Stratum
	Eucalyptus dwyeri	25			
	Callitris (~~black cypress~~) endlicheri	20			
	Arctotheca calendula	60		E	
	Brachychiton populneus	20			
	Forb 1 (27/8) Rhodanthe pygmaea	5			
	Echium plantagineum	15		E	
	~~Forb~~ Erodium cicutarium	0.5	100	~~100~~ E	
	~~bandicoot grass~~ Monachather paradoxa	0.1	50	~~50~~	
	Erodium crinitum	5			
	Calotis hispidula	5			
	Oxalis perennans	0.1	100		
	Goodenia hederacea	0.1	20		
	Early Nancy Wurmbea dioica	0.1	50		
	Calandrinia sp	0.1	100		
	Cheilanthes sieberi	0.5	100		
	Xerochrysum bracteatum	0.1	5		
	Microlaena stipoides	0.5	100		
	Austrostipa scabra	0.1	50		
	Daucus ~~sp~~ glochidiatus	0.1	50		
	Bulbine ~~sp~~ alata	0.1	100		
	Crinum flaccidum	0.1	10		
	Brassica tournefortii	0.5	50		
	Medicago polymorpha	0.5	100		
	Hypochaeris glabra	1	200		
	Bromus sp	0.1	20	E	
	~~Forb 2~~ Euphorbia drummondii	0.1	5		
	Vittadinia cuneata	0.1	10		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifiyer e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name MILGRATE		
Recorders JC		Plot ID # WRQOG	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 220°	
Easting 149°05'16.4" E	Northing 33°47'42.3"S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Dwyers Red PCT 18G	Condition state Mod.

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)		
Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)		
Dimensions (circle applicable size)		
20 x 50 m 10 x 100 m		
Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) /	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)
# Trees with hollows	<20cm /	Total # /
/	>20cm**	
Length of logs IIII IIII		Total (m) 13

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	5	50	50	5	50	
	Bare ground	90	30	~~35~~	90	20	
	Cryptogam	0	0	10	0	0	
	Rock	5	0	5	5	20	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	1	O	Microrelief
Cultivation	0		Slope Upper slope.
Grazing (native / stock)	2	R	Aspect
Soil erosion	0		Soil surface texture rocky clay - loam
Firewood removal	0		Soil colour red
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	2	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

H1 - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of (   )

Date 28/8/19	Survey Name MILBRAE			
Recorders JZ		Plot ID # WRQ06	Zone ID	

GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	E. dwyeri	50			
	Callitris endlicheri	10			
	Erodium crinitum	5			
	Arctotheca calendula	50		E	
	Microlaena stipoides	0.5	100		
	Calotis hispidula	5			
	Bandicoot grass Monachather paradoxus	0.1	100		
	Senecio ~~sp~~ cunninghamii	0.1	10		
	Forb 1 (27/8) Rhodanthe pygmaea	1	300		
	Gonocarpus elatus	0.1	100		
	Hypochaeris glabra	0.5	200	E	
	~~Dorsty (photo)~~ Actinobole uliginosum	0.1	150		
	Thyridolepis mitchelliana	0.1	50		
	Goodenia hederacea	0.1	20		
	Microlaena stipoides	0.5	100		
	Chrysocephalum apiculatum	0.1	10		
	~~Early Nancy~~ Wurmbea dioica	0.1	50		
	Cheilanthes sieberi	0.1	50		
	Eragrostis sp.	0.1	10		
	Austrostipa scabra	0.1	50		
	Nicotiana sp.	0.1	5		
	Echium plantagineum	0.5	20		
	Rumex brownii	0.1	5		
	Calandrinia sp.	0.1	~~50~~ 100		
	Dysphania sp.	0.1	200		
	Bulbine ~~sp~~ alata	0.1	30		
	Xerochrysum bracteatum	0.1	5		
	Einadia nutans	0.1	5		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions)   Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of 1

Date 28/8/19	Survey Name MILBRAE		
Recorders		Plot ID # MRQ07	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 65	
Easting 146°05'13.4" E	Northing 33°47'47.5" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type	Dwyers Rd. PCT 186 — Condition state Mod.

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size) 20 x 20 m (circled) / 10 x 40 m		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size) 20 x 50 m (circled) / 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) –	Record stems for living trees only, and for all species
30 - 49	(+/-) 𝍸 5	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		Total #
III	<20cm 𝍸	
	>20cm** II	
Length of logs		Total (m)

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	40	50	40	70	80	
	Bare ground	10	20	10	0	20	
	Cryptogam	10	10	10	0	0	
	Rock	40	20	40	10	0	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	
Clearing (incl. logging)	2	O	Landform
Cultivation	0		Microrelief
Grazing (native / stock)	1	R	Slope Upper slope
Soil erosion	0		Aspect
Firewood removal	0		Soil surface texture Rocky clay - 15cm
Fire (ground stratum, mid, canopy burnt?)	0		Soil colour red
Storm damage	0		Site drainage run off
Weediness	1	R	Distance to nearest water
			Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

EH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of (   )

Date 28/8/19	Survey Name MILBRAO				
Recorders		Plot ID # NRQ07		Zone ID	
GF code	**Genus species** (tick if photographed or sample taken)	**Cover %**	**Abund** (count)	**N, E, HTE**	Stratum
	Cheilanthes sieberi	5	~~200~~		
	Drosera sp.	0.5	200		
	Daucus ~~glo~~ glochidiatus	0.5	200		
	Arctotheca calendula	15		E	
	Hypochaeris glabra (check for native)	15		E	
	Geranium solanderi	0.1	5		
	Hybanthus monopetalus	0.1	5		
	Thyridolepis mitchelliana	0.5	50		
	Sclerolaena muelleri	1	200		
	Ptilotus (FTB) spathulatus	0.1	50		
	E. dwyeri	40			
	Callitris ~~endlicherii~~ endlicheri	5			
	Callitris glaucophylla	20			
	Dysphania sp.	1	200		
	Calotis hispidula	1	200		
	Bulbine ~~sp~~ alata	0.1	50		
	~~Early Nancy~~ Wurmbea dioica	0.1	50		
	Melichrus urceolatus	0.1	2		
	Pterostylis mutica	0.1	5		
	Hardenbergia sp.	0.1	50		
	~~Pterostylis~~	~~0.1~~	~~10~~		
	Millotia myosotidifolia	0.1	50		
	Austrostipa scabra	0.1	100		
	Erodium crinitum	1	100		
	Bandicoot grass Monachather paradoxus	0.1	100		
	Gonocarpus elatus	0.1	50		
	Calandrinia sp.	0.1	20		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifier e.g. *Genus* sp1, *Genus* sp2 etc
Identify top 3 dominants in each stratum (use ... own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

EH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 2/8/19	Survey Name MILBRAE		
Recorders JC		Plot ID # WRQ08	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 347°	
Easting 146°05'08.2" E	Northing 33°47'54.8 S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Dwyers RG PCT 186	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) –	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) /	Record stems for living trees only, and for all species
30 - 49	(+/-) /	For multistemmed trees, record only the largest stem
20 - 29	(+/-) –	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) –	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows		Total #
0	<20cm	0
	>20cm**	

Length of logs	Total (m)
447 111	8

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	5	5	20	10	12	
	Bare ground	10	10	20	10	10	
	Cryptogam	–	–	10	10	10	
	Rock	50	50	30	70	70	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	0	Microrelief
Cultivation	0		Slope Crest
Grazing (native / stock)	0		Aspect
Soil erosion	0		Soil surface texture Stony clay loam
Firewood removal	0		Soil colour red
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	a	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Sparse upper layer. Shrub layer absent and weedy ground layer.

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/19	Survey Name MILBRAE				
Recorders		Plot ID # WRQ08		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Echium plantagineum	25		E	
	Erodium arthiricum	50			
	Medicago polymorpha	50		E	
	Brachychiton populneus	5			
	Eucalyptus dwyeri	0.1	1		
	Microlaena stipoides	0.5	100		
	Actotheca calendula	10		E	
	Hypochaeris glabra	0.5	500	E	
	Thyridolepis mitchelliana	0.1	100		
	~~Erodium~~ Erodium circularium	~~5~~	~~100~~	E	
	Oxalis perennans	0.1	100		
	~~Stigmatella~~ Urtica incisa	0.1	50		
	Austrostipa scabra	0.1	50		
	Brassica tournefortii	2.5	100		
	Lepidium africanum	0.1	20	E	
	Hordeum vulgare	0.5	200	E	
	Senecio sp	0.1	5		
	Vittadinia cuneata	0.1	5		
	Dysphania sp				

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, .. 10, 20, 30, .. 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/19	Survey Name MILBRAE		
Recorders		Plot ID # WRQ09	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 16°	
Easting 460510.1"E	Northing 33°47'52.7"S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Derived RG PCT 186	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20x20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20x50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) 1	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 2

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	10	5	20	20	10	
	Bare ground	5	5	30	30	10	
	Cryptogam	10	10	5	0	0	
	Rock	50	50	30	20	20	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	0	Microrelief
Cultivation	0		Slope Upper slope
Grazing (native / stock)	1	R	Aspect
Soil erosion	0		Soil surface texture stony clay - loam
Firewood removal	0		Soil colour red
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/19	Survey Name MILDRAE				
Recorders SC		Plot ID # WRQ09		Zone ID	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Echium plantagineum	20		E	
	Arctotheca calendula	20		E	
	Medicago polymorpha	70		E	
	Erodium crinitum	30		E	
	Dysphania sp	0.5		200	
	Callitris glaucophylla	10			
	Cheilanthes sieberi	0.1	50		
	Stinging nettle Urtica incisa	0.5	20		
	Emex australis	0.1	5		
	Calotis hispidula	1	300		
	Hordeum vulgare	0.5	500	E	
	Eragrostis	0.1	50		
	Microlaena stipoides	0.1	50		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/14	Survey Name MILBEAT		
Recorders K		Plot ID # MKQ10	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 70	
Easting 146°09'58.2" E	Northing 33°47'51.7"S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type PCT 70	Condition state

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20x20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20x50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) ~	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) ~	Record stems for living trees only, and for all species
30 - 49	(+/-) ✓	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs 卌 卌 卌 卌 卌 //		Total (m) 27

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	5	10	5	5	15	
	Bare ground	0	5	20	20	0	
	Cryptogam	10	0	0	0	0	
	Rock	10	5	5	5	0	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	2	0	Microrelief
Cultivation	0		Slope Mid slope
Grazing (native / stock)	0		Aspect
Soil erosion	0		Soil surface texture Clay-loam
Firewood removal	0		Soil colour Brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/19	Survey Name MILBRAE				
Recorders		Plot ID # WRD10		Zone ID	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	E. populneus	10			
	Callitris glaucophylla	5			
	Vittadinea cuneata	0.5	50		
	~~Calendula~~ Arctotheca calendula	~~20~~		E	
	Erodium crinitum	10			
	Cakile mispiolata	10			
	Medicago polymorpha	50		E	
	Bromus sp.	0.5	200	E	
	Wahlenbergia sp.	0.1	50		
	Bomcarpus clatus	0.1	50		
	Echium plantagenium	20			
	Forb 1 (23/8) Rhodanthe pygmaea	0.1	100		
	Senecio ~~sp~~ quadridentatus	0.1	10		
	Microlaena stipoides	0.1	100		
	Brassica fourreftii	0.5	100	E	
	Cheilanthes sieberi	0.1	50		
	Oxalis perennans	0.1	50		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, .. 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

RH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 20/8/19	Survey Name		
Recorders		Plot ID # WRQ11	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 170°	
Easting 146°09'59.8"	Northing 33°47'39.0" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point), Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Cypress Pine PCT70	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)

>80	(#)	Stem size class records # large trees (cf. benchmark)
50 - 79	(#)	Record stems for living trees only, and for all species
30 - 49	(+/-) ✓	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-)	Record # trees with hollows, not number of hollows
5 - 9	(+/-) ✓	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

Notes on function attributes:

# Trees with hollows		Total #
0	<20cm	0
	>20cm**	

Length of logs — Total (m): 47

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots) Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	20	10	10	30	40	
	Bare ground	10	10	0	-	10	
	Cryptogam	-	-	-	-	-	
	Rock	10	10	5	0	-	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	0	Microrelief
Cultivation	0		Slope Mid slope
Grazing (native / stock)	0		Aspect
Soil erosion	0		Soil surface texture Rock sandy loam
Firewood removal	0		Soil colour red-brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage Com fl
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Upper layer of Callitris | Poplar box, with cleared areas. No shrub layer. Non-native ground layer (also WRQ10)

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Date 28/8/19	Survey Name MICBRAE				
Recorders JC		Plot ID # WRQ11		Zone ID	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Lolium perenne	30			
	Echium plantagineum	25		E	
	Brassica ~~sp (rapistrum)~~ tournefortii	50		E	
	Arctotheca calendula	5		E	
	Erodium cicutarium	5			
	~~Horehound~~ Marrubium vulgare	0.1	5	E	
	Medicago polymorpha	1	200	E	
	Cheilanthes sieberi	0.1	50		
	Geranium solanderi	0.1	50		
	Microlaena stipoides ?	0.1	100		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, ... 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of ( )

Date 28/8/17	Survey Name MILBRAE		
Recorders K		Plot ID # WRR12	Zone ID
Photo #		Plot dimensions 10 X 100	
Datum	Zone	Plot bearing along midline 101°	
Easting 146°05'01.3"	Northing 33°47'50.7" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Cypress pine PCT70	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m; 10 x ~~40~~ m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20 x 50 m; 10 x 100 m

Tree stem DBH (cm)

>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) ✓	For multistemmed trees, record only the largest stem
20 - 29	(+/-) ✓	Presence of <5cm stems records regeneration
10 - 19	(+/-) ✓	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) —	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) ~~75~~

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter	30	10	5	5	10	
	Bare ground	20	40	5	10	5	
	Cryptogam	5	0	0	5	5	
	Rock	30	20	10	~~5~~	~~15~~	

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	~~6~~ NR	Microrelief
Cultivation	0		Slope Upper slope
Grazing (native / stock)	0		Aspect
Soil erosion	0		Soil surface texture sandy loam
Firewood removal	0		Soil colour brown
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage run off
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 28/8/19	Survey Name MILBRAE				
Recorders		Plot ID # WRQ12		Zone ID	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Callitris glaucophylla	60			
	Brassica ~~mustard~~ hurnefelii	25		E	
	Echium plantagineum	25		E	
	Arctotheca calendula	25		E	
	Erodium cribrum	5			
	~~Stipa~~ Urtica incisa	0.1	20	N	
	Cheilanthes sieberi	0.1	50		
	Medicago polymorpha	10		E	
	~~Horehound~~ Marrubium vulgare	0.1	5	E	
	Oxalis ~~perennans~~ chnoodes	0.5	100		
	Dichondra repens	0.1	100		
	Calandrinia sp	0.1	10		
	Microlaena stipoides	0.1	50		
	Senecio sp	0.1	10		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, .. 10, 20, 30, .. 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 1 of 1

Date 28/8/17	Survey Name MILBRAE		
Recorders		Plot ID # WRQ13	Zone ID
Photo #		Plot dimensions 20x50	
Datum	Zone	Plot bearing along midline 18°	
Easting 196°05'17.2" E	Northing 35°47'31.6" S	Record magnetic bearing along midline from 0 m point	

Record easting, northing at plot marker (0 m point). Photos taken vertically and horizontally at 0m point and 50 m point, looking into plot

IBRA region	
Subregion	
Likely Vegetation Class	
Plant Community Type Dry PCT186	Condition state Poor

Floristics plot is centred on the midline, at 0 m point, 10 m either side

Function plot is an extention of floristics plot out to 50 m along midline (or equiv. area)

BAM Composition / Structure plot (400m²)

Dimensions (circle applicable size): 20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
Cover (sum of cover of natives species)	Trees	
	Shrubs	
	Grasses etc	
	Forbs	
	Ferns	
	Other	
High threat weed cover		

*These values summarise the floristic data for input into BAM calculator

BAM Function plot (1000m²)

Dimensions (circle applicable size): 20x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	(#) —	Stem size class records # large trees (cf. benchmark)
50 - 79	(#) —	Record stems for living trees only, and for all species
30 - 49	(+/-) —	For multistemmed trees, record only the largest stem
20 - 29	(+/-) —	Presence of <5cm stems records regeneration
10 - 19	(+/-) —	Record # trees with hollows, not number of hollows
5 - 9	(+/-) —	Count as one stem where tree is multistemmed
< 5	(+/-) ✓	Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	Total # 0
	>20cm**	
Length of logs		Total (m) 10

Measure length of logs >10cm, fully or partly in contact with the ground, and within the plot.

**Hollows of >20cm are recorded for habitat for some threatened species

BAM Litter/ Groundcover (1 x 1 m plots)

Litter cover is used for BAM, other attributes are useful for recording site condition in general

		1	2	3	4	5	Average
Sub-plot score (% cover)	Litter						
	Bare ground						
	Cryptogam						
	Rock						

Litter / groundcover plots are located at 5, 15, 25, 35, 45 m (alternating sides) along the midline of Function plot

Other plot information (not essential for BAM)

Disturbance	Severity	Timing	Landform
Clearing (incl. logging)	3	NR	Microrelief
Cultivation	0		Slope
Grazing (native / stock)	0		Aspect
Soil erosion	0		Soil surface texture
Firewood removal	0		Soil colour
Fire (ground stratum, mid, canopy burnt?)	0		Site drainage
Storm damage	0		Distance to nearest water
Weediness	3	R	Distance to nearest rock outcrop /cave

Severity code: 0=no evidence, 1=slight, 2=moderate, 3= severe

Timing code: R = recent (<3y), NR = not recent, O = old/historic

Notes Upper layer sparse - absent, but regenerating. No mid layer. Weedy ground layer.

KH - Version 1.1 - Date 1/12/2017

BAM Plot - Field Survey Sheet

Page 2 of ( )

Date 18/8/17	Survey Name MURRAY				
Recorders		Plot ID # NRA03		Zone ID	
GF code	Genus species (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum
	Callitris glaucophylla	0.1	5		
	Eucalyptus dwyeri	0.1	2		
	Echium plantagineum	30		E	
	Arctotheca calendula	40		E	
	Hordeum vulgare	1	200	E	
	Erodium crinitum	10			
	~~Forb~~ Erodium circularium	5		E	
	Carlotis hispidula	5			
	Medicago polymorpha	1	300	E	
	Minuartia stypoides	0.1	150		
	Thysanotopis mitchelliana	0.1	150		
	Lappulaeria glabra	0.1	200	E	
	Dysphania	0.1	200		
	Wahlenbergia	0.1	30		
	Vittadinea cuneata	0.5	50		
	Oxalis perennans	0.1	50		
	Minuartia muelleri	0.1	50		
	Goodenia (Smooth Flower) heteromera	0.1	20		

Growth Form (see BAM Appendix 4) - Tree (TG), Shrub (SG), Grass & grasslike (GG), Forb (FG), Fern (EG), Other (OG)
Cover: 0.1, 0.2, 0.3, ... 1, 2, 3, ...10, 15, 20, 25, ...100% (incl. leaf, branch, stem cover per species).
Abundance for each species with ≤5% cover: 1, 2, 3, 4, ... 10, 20, 30, .. 100, 500, 1000, 1500, 2000 stems
N=native, E=exotic, HTE=high threat exotic
All species in a plot must be recorded. If you can only ID to genus, separate different species by unique identifyer e.g. Genus sp1, Genus sp2 etc
Identify top 3 dominants in each stratum (use own stratum definitions) Cover area examples: 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% =2x2 m, 5%=4x5m, 25%=10x10m

XPI - Version 1.1 - Date 1/12/2017

Appendix D: BAM Calculator Credit Report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00017759/BAAS21028/19/00017760	Western Riverina - Milbrae Quarries	14/03/2024
Assessor Name	Report Created	BAM Data version *
Emma Gray	19/06/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS19069	Finalised	19/06/2024
Assessment Revision	Assessment Type	BOS entry trigger
10	Part 4 Developments (General)	BOS Threshold: Biodiversity Values Map

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

NSW GOVERNMENT

BAM Credit Summary Report

Dwyer's Red Gum - Black Cypress Pine - Currawang shrubby low woodland on rocky hills mainly in the NSW South Western Slopes Bioregion												
2	186_moderate	Not a TEC	73.4	73.4	0.1	PCT Cleared - 17%	High Sensitivity to Gain			1.50		3
											Subtotal	**3**
Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion												
4	185_poor	Not a TEC	18.5	18.5	0.49	PCT Cleared - 20%	High Sensitivity to Gain			1.50		3
											Subtotal	**3**
White Cypress Pine - Poplar Box woodland on footslopes and peneplains mainly in the Cobar Peneplain Bioregion												
1	72_poor	Not a TEC	25.5	25.5	0.98	PCT Cleared - 40%	High Sensitivity to Gain			1.50		9
											Subtotal	**9**
White Cypress Pine woodland on sandy loams in central NSW wheatbelt												
3	70_poor	Not a TEC	40.8	40.8	2.7	PCT Cleared - 65%	High Sensitivity to Gain			1.75		47
											Subtotal	**47**
											Total	**62**

Species credits for threatened species

NSW GOVERNMENT

BAM Credit Summary Report

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Austrostipa metatoris / A spear-grass (Flora)									
70_poor	40.8	40.8	0.12			Vulnerable	Vulnerable	False	2
								Subtotal	**2**
Diuris tricolor / Pine Donkey Orchid (Flora)									
70_poor	40.8	40.8	0.12			Vulnerable	Not Listed	False	2
								Subtotal	**2**
Swainsona sericea / Silky Swainson-pea (Flora)									
70_poor	40.8	40.8	0.12			Vulnerable	Not Listed	False	2
								Subtotal	**2**

Assessment Id
00017759/BAAS21028/19/00017760

Proposal Name
Western Riverina - Milbrae Quarries

Page 3 of 3

Appendix E: Habitat Suitability Assessment

The habitat suitability of the subject land for all of the ecosystem credit species and species credit species generated by the BAM-C were assessed.

Unless otherwise indicated, species background information has been sourced from NSW DCCEEW Threatened Biodiversity Profiles, available at https://www.environment.nsw.gov.au/threatenedSpeciesApp/

Ecosystem Credit Species

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
Antechinomys laniger	Kultarr	E	-	No	Widespread across arid and semi-arid NSW but present in very low numbers. Records typically derive from captures by domestic cats or are collected after falling into steep-sided holes. Recent records have come primarily from the Cobar and Brewarrina region. A terrestrial insectivore that inhabits open country, especially claypans among Acacia woodlands. **Suitable habitat, no habitat constraints or geographic limitations.**	Assumed present
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	No	Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understory of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. **Open woodlands present on subject land, no habitat constraints or geographic limitations**	Assumed present
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	No	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important food. **No *Allocasuarina* or *Casuarina* trees present, therefore no foraging habitat.**	Absent (constraint)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
Certhionyx variegatus	Pied Honeyeater	V	-	No	Widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. Inhabits wattle shrub, primarily Mulga (*Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila spp.*); also from mistletoes and various other shrubs (e.g. *Grevillea spp.*); also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times. **Semi-arid woodlands present on subject land, no habitat constraints or geographic limitations**	Assumed present
Chalinolobus picatus	Little Pied Bat	V	-	Yes	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. **Open woodlands present on subject land, records within 10km of subject land, no habitat constraints or geographic limitations**	Assumed present
Chthonicola sagittata	Speckled Warbler	V	-	Yes	The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understory, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger	Present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills. ***Eucalyptus* communities within subject land, records within 10km of subject land, no habitat constraints or geographic limitations, species detected just outside of the subject land during field surveys**	
Circus assimilis	Spotted Harrier	V	-	No	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Daphoenositta chrysoptera	Varied Sittella	V	-	No	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					Habitat broadly appropriate, no habitat constraints or geographic limitations	
Falco hypoleucos	Grey Falcon	E	-	No	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. **Marginal foraging habitat, no habitat constraints or geographic limitations**	Assumed present
Falco subniger	Black Falcon	V	-	No	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres. The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Grantiella picta	Painted Honeyeater	V	V	No	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping	Absent (habitat constraints)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. **No mistletoe was recorded within the subject land; consequently, the site was deemed unsuitable for use by this species.**	
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	V	-	No	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground. May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days. **No suitable waterbodies or watercourses occur within 1 km of the subject land; consequently, the land was deemed unsuitable for use by this species.**	Absent (habitat constraints)
Hamirostra melanosternon	Black-breasted Buzzard (Foraging)	V	-	No	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. Lives in a range of inland habitats, especially along timbered	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. **Sparsely timbered woodlands within subject land. No habitat constraints or geographic limitations.**	
Hieraaetus morphnoides	Little Eagle (Foraging)	V	-	No	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. **Open woodlands within subject land, no habitat constraints or geographic limitations**	Assumed present
Hirundapus caudacutus	White-throated Needletail	-	V	No	The White-throated Needletail is widespread in eastern and south-eastern. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Hylacola cautus	Shy Heathwren	V	-	No	Occurs across southern Australia extending from the wheatbelt in southern Western Australia east to central NSW, including Kangaroo Island. Two subspecies occur in NSW. The first (*macrorhyncha*) is confined to central NSW between Griffith, Roto, Nymagee and West Wyalong, with most records within OEH managed reserves (including Yathong, Nombinnie, Round Hill and The Charcoal Tank Nature Reserves and Cocoparra National Park). The nominate subspecies	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					(*cautus*) occurs in the far south west between Balranald and Trentham Cliffs (including Mallee Cliffs National Park), north into the Scotia Mallee (including Tarawi Nature Reserve and Scotia Sanctuary). This subspecies also occurs in north west Victoria and eastern South Australia (as far west as the Flinders Ranges). Inhabits mallee woodlands with a relatively dense understory of shrubs and heath plants. The central NSW population (for example in Cocoparra NP) also occurs at low densities in rocky hilltop vegetation with a thick shrub layer such as Broombush or Tea-tree. **Marginally suitable vegetation within subject land, no habitat constraints or geographic limitations**	
Leipoa ocellata	Malleefowl	E	V	Yes	The stronghold for this species in NSW is the mallee in the south west centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary and is part of a larger population north of the Murray River in South Australia. The population in central NSW has been significantly reduced through land clearance and fox predation and now occurs chiefly in Yathong, Nombinnie and Round Hill NRs and surrounding areas, though birds continue to survive in Loughnan NR. To the south of this area the species is probably locally extinct in such reserves as Pulletop NR (last recorded 1989), Ingalba NR (1982) and Buddigower NR (1990) and the intensely studied population at Yalgogrin was still known to have at least one active mound in 2017. Further east, a population continues to persist in the Goonoo forest near Dubbo, though the size of this population is unknown. Outside these areas, occasional records have been made in the Pilliga forests (most recently 1999), around Cobar (1991) and Goulburn River NP (1989) though the extent and status of populations in these areas are unknown. Predominantly inhabit mallee communities, preferring the tall, dense and floristically rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species.	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					Mallee woodlands within subject land, records within 10km of subject land, no habitat constraints or geographic limitations	
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Foraging)	V	-	Yes	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres. **Habitat broadly appropriate, records within 10km of subject land, no habitat constraints or geographic limitations**	Assumed present
Lophoictinia isura	Square-tailed Kite (Foraging)	V	-	No	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	No	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **Open woodlands near open areas within subject land, no habitat constraints or geographic limitations**	
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern	V	-	No	The Black-chinned Honeyeater has two subspecies, with only the nominate (gularis) occurring in NSW. The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
Neophema pulchella	Turquoise Parrot	V	-	No	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Ninox connivens	Barking Owl (Foraging)	V	-	No	The Barking Owl is found throughout continental Australia except for the central arid regions. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils. **Appropriate foraging habitat within subject land, no habitat constraints or geographic limitations**	Assumed present
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	No	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					Habitat broadly appropriate, no habitat constraints or geographic limitations	
Pachycephala inornata	Gilbert's Whistler	V	-	No	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt. The species was probably once distributed almost continuously across the woodlands and mallee of southern NSW, but this range has been greatly reduced. The Gilbert's Whistler occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests, though at this stage it is only known to use this habitat along the Murray, Edwards and Wakool Rivers. Within the mallee the species is often found in association with an understory of spinifex and low shrubs including wattles, hakeas, sennas and hop-bushes. In woodland habitats, the understory comprises dense patches of shrubs, particularly thickets of regrowth Callitris pine. Parasitic 'cherries' (*Exocarpus* species) appear to be an important habitat component in Belah and Red Gum communities, though in the latter case other dense shrubs, such as Lignum and wattles, are also utilised. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Petroica phoenicea	Flame Robin	V	-	No	The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. Prefers clearings or areas with open understoreys. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains), in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					Habitat broadly appropriate, no habitat constraints or geographic limitations	
Polytelis swainsonii	Superb Parrot (Foraging)	V	V	No	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. This species inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, and feed in trees and understory shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. **Appropriate foraging habitat within subject land, no habitat constraints or geographic limitations**	Assumed present
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	Yes	The eastern subspecies (temporalis) occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Lives in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen individuals. Feed on invertebrates and nests in several conspicuous, dome-shaped stick structures that are about the size of a football. A nest is used as a dormitory for	Present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
					roosting each night. Nests are maintained year-round, and old nests are often dismantled to build new ones. **The species was observed on two occasions during the fieldwork**	
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	No	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present
Stagonopleura guttata	Diamond Firetail	V	-	No	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. **Habitat broadly appropriate, no habitat constraints or geographic limitations**	Assumed present

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Habitat Assessment	Species presence
Tyto novaehollandiae	Masked Owl (Foraging)	V	-	No	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. **Appropriate foraging habitat within subject land, no habitat constraints or geographic limitations**	Assumed present

Species Credit Species

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
Acacia curranii	Curly-bark Wattle	V	V	No	The majority of the species distribution lies within the Mt. Hope - Lake Cargelligo - Hillston region, including populations in the conservation areas of Yathong National Park, Nombinnie State Conservation Area and Round Hill Nature Reserve. There are about 20 populations with fewer than 5000 individuals each and one population with an estimated 150,000 individuals. Also known in Qld from two populations totalling several hundred individuals near Gurulmundi. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)
Austrostipa metatoris	A spear-grass	V	V	No	Most records occur in the Murray Valley with sites including Cunninyeuk Station, Stony Crossing, Kyalite State Forest (now part of Murrumbidgee Valley Regional Park) and Lake Benanee. Scattered records also occur in central NSW including Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee. Otherwise only known from near Bordertown in south east South Australia, where it may be locally extinct. Grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. **No habitat constraints or geographic limitations. Targeted surveys were conducted for this species throughout all associated PCT except 0.12 ha of PCT 70 that was not accessible. The species has been assumed present in that area, otherwise the species is absent surveyed.**	Assumed present (0.12 ha of PCT70) Absent (surveyed, remainder of site).
Austrostipa wakoolica	A spear-grass	E	E	No	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest (now part of South West Woodland Nature Reserve). Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.	Absent (habitat constraints)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
					Subject land is not on an alluvial plain; consequently, the species can be ruled out	
Burhinus grallarius	Bush Stone-curlew	E	-	No	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)
Calyptorhynchus lathami lathami	Glossy Black-Cockatoo	E2	E	Yes	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. **No *Allocasuarina* or *Casuarina* present. Targeted surveys conducted for the species. Refer to Section 3.3 for targeted survey effort**	Absent (surveyed)
Calyptorhynchus lathami	Glossy Black-Cockatoo, Riverina Population	E2		Yes	The Riverina population of *Calyptorhynchus lathami* is largely restricted to hills and low ridges where suitable assemblages of its food plant Drooping She-Oak *Allocasuarina verticillata* remain within the Narrandera Range and to the north-west in the Brobenah Hills, McPhersons Range, Cocoparra Range, Lachlan Range and Jimberoo State Forests, and the Naradhan Range. This population now occurs west of longitude 146° 40' E, within Cobar, Carrathool, Narrandera and Leeton Local Government Areas. This line runs through an area which is extensively cleared and this cleared area now seems to isolate the western population. This population requires trees with suitable large hollows to breed, normally Grey Box Eucalyptus microcarpa or Dwyer's Gum *Eucalyptus dwyeri*, within close proximity to feeding habitat.	Absent (surveyed)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
					No *Allocasuarina* or *Casuarina* present. Targeted surveys conducted for the species. Refer to Section 3.3 for targeted survey effort.	
Climacteris affinis - endangered population	White-browed Treecreeper population in Carrathool lga south of the Lachlan River and Griffith lga	E2	-	No	In NSW, occupies a broad area of western NSW, west from a line from Balranald to Lake Cargelligo then Lightning Ridge. The species appears absent in the far north west of the state with no records occurring west of a line from Broughams Gate, 100km northwest of Broken Hill to Hungerford. A small population, now recognised as isolated, occurs in Carrathool local government area south of the Lachlan River and Griffith local government areas. Occurs in a range of semi-arid and arid tall shrublands and woodlands across the southern half of Australia. In NSW, the species occupies a variety of habitats including Mulga, Brigalow, Gidgee, Belah, Buloke and White Cypress. The species may also occur in habitats adjacent to those detailed above, including Coolibah, River Red Gum and Black Box. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)
Diuris tricolor	Pine Donkey Orchid	V	-	No	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon, and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA, Pilliga National Park and Bibblewindi State Forest in the north (and extending into Queensland) and Muswellbrook in the east. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. **No habitat constraints or geographic limitations. Targeted surveys were conducted for this species throughout all associated PCT except 0.12 ha of PCT 70 that was not accessible. The species has been assumed present in that area, otherwise the species is absent surveyed.**	Assumed present (0.12 ha of PCT70) Absent (surveyed, remainder of site).
Grevillea ilicifolia subsp. Ilicifolia	Holly-leaf Grevillea	CE	-	No	*Grevillea ilicifolia*, commonly known as holly grevillea, is a species of the plant genus *Grevillea*. It is a shrub of variable form, growing to between 0.3 and 2 metres in height and 3 metres wide. Typically, leaves are lobed and holly like, but may also be unlobed. The flowers have perianths that have a base that is cream to green grading to grey-mauve. Styles may be	Absent (surveyed)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
					pink, red, orange or yellow. The main flowering period in the species' native range is September to November. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort.**	
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	V	-	No	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground. May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young. Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days. **This species requires living or dead mature trees within 1 km of appropriately large waterbodies or watercourses. No substantial, perennial waterbodies occur within 1 km of the subject land. The only watercourses within this area are minor, non-perennial drainage lines, and, near the 1 km limit, a single small farm dam. These are highly unlikely to be sufficient for this species. Consequently, it has been removed from consideration.**	Absent (habitat constraint)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
Hamirostra melanosternon	Black-breasted Buzzard	V	-	No	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. **This species requires proximal waterbodies or land within 40 m of riparian woodland on inland watercourses. It may make use of waterholes containing dead or dying eucalypts. These landscape features do not occur on the subject land.**	Absent (habitat constraint)
Hieraaetus morphnoides	Little Eagle (Breeding)	V	-	No	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)
Lophochroa leadbeateri	Major Mitchell's Cockatoo (Breeding)	V	-	Yes	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
Lophoictinia isura	Square-tailed Kite	V	-	No	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. **Targeted surveys conducted for the species. Refer to Section 3.3.3 for targeted survey effort**	Absent (surveyed)
Ninox connivens	Barking Owl (Breeding)	V	-	No	The Barking Owl is found throughout continental Australia except for the central arid regions. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils. **The species requires hollows > 20 cm in diameter. The TBDC states that the species polygon should be established by providing a circular buffer with a 100 m radius around the nest tree. One large hollow was recorded within 100 m of the site boundary; however, the hollow fell within a PCT that is not known to be utilized by this species and the buffer likewise did not overlap any areas of vegetation associated with this species.**	Absent (constraint)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
Polytelis swainsonii	Superb Parrot (Breeding)	V	V	No	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. This species inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, and feed in trees and understory shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. **This species requires hollow-bearing trees of the following species: *Eucalyptus blakelyi*, *E. melliodora*, *E. albens*, *E. camaldulensis*, *E. microcarpa, E. polyanthemos*, *E. mannifera*, or *E. intertexta*. The hollows must be > 4 m from the ground and located in trees with a DBH of >30 cm. No trees meeting these requirements were recorded within the subject land.**	Absent (habitat constraint)
Swainsona sericea	Silky Swainson-pea	V	-	No	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. **No habitat constraints or geographic limitations. Targeted surveys were conducted for this species throughout all associated PCT except 0.12 ha of PCT 70 that was not accessible. The species has been assumed present in that area, otherwise the species is absent surveyed.**	Assumed present (0.12 ha of PCT70) Absent (surveyed, remainder of site).
Tyto novaehollandiae	Masked Owl (Breeding)	V	-	No	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW,	Absent (habitat constraints)

Scientific Name	Common Name	NSW status	Comm. status	Records within 10km	Assessment	Species presence
					excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. **The species requires hollows > 20 cm in diameter. The TBDC states that the species polygon should be established by providing a circular buffer with a 100 m radius around the nest tree. One large hollow was recorded within 100 m of the site boundary; however, the hollow fell within a PCT that is not known to be utilized by this species and the buffer likewise did not overlap any areas of vegetation associated with this species.**	

Appendix F: EPBC Act Habitat Assessment and Matters of National Environmental Significance

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Australian Government Department of Agriculture, Water and the Environment, 2013) forms the basis of determining if impact to protected matters is significant.

A Protected Matters Search identified three Endangered Ecological Communities, 25 threatened species and eight migratory species as potentially occurring within 10 km of the subject land (**Appendix A**).

The following tables give an overview of the assessments of these threatened entities and shows that the Proposed activity:

1. Is not likely to have a significant impact on a matter of national environmental significance. The matters of national environmental significance are:
    i. World heritage properties.
    ii. National heritage places.
    iii. Wetlands of international importance.
    iv. Threatened species and ecological communities.
    v. Migratory species.
    vi. Commonwealth marine areas.
    vii. The Great Barrier Reef Marine Park.
    viii. Nuclear actions (including uranium mines).
    ix. A water resource, in relation to coal seam gas development and large coal mining development.
2. Is not likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

Notes:

Important Population as determined by the *Environment Protection and Biodiversity Conservation Act 1999*, is one that for a vulnerable species:

a) is likely to be key source populations either for breeding or dispersal
b) is likely to be necessary for maintaining genetic diversity
c) is at or near the limit of the species range.

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity (Australian Government Department of Agriculture, Water and the Environment, 2013)

Wetlands of International Importance

Name	Proximity	Assessment of significance required (Yes / No)
Banrock Station Wetland complex	500 – 600 km	No, the proposal does not occur close to the wetland.
Hattah-kulkyne lakes	300 – 400 km	No, the proposal does not occur close to the wetland.
Riverland	400 – 500 km	No, the proposal does not occur close to the wetland.
The Coorong, and Lakes Alexandrina and Albert Wetland	600 – 700 km	No, the proposal does not occur close to the wetland.

Listed Threatened Ecological Communities

Name	Status	Significance of Impact
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	No, the community does not occur at the subject site.
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	No, the community does not occur at the subject site.
Weeping Myall Woodlands	Endangered	No, the community does not occur at the subject site.

Likelihood of occurrence table for EPBC Act listed threatened species and populations

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
AMPHIBIANS				
Crinia sloanei	Sloane's Froglet	E	Sloane's Froglet has been recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It has not been recorded recently in the northern part of its range and has only been recorded infrequently in the southern part of its range in NSW. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. **Low – There are no associated vegetation communities present or records from within 10 km.**	No
REPTILES				
Aprasia parapulchella	Pink-tailed Legless Lizard	V	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). **Low – There are no associated vegetation communities present or records from within 10 km.**	No
BIRDS				
Aphelocephala leucopsis	Southern Whiteface	V	The Southern Whiteface prefers the drier habitats of southern Australia. In Queensland they are found only as far north as Birdsville and east to Darling Downs, in NSW east to about Tenterfield and south-west to the shale areas in the Sydney region. In Victoria they occur mostly in the drier foothills north of the Divide, in SA south to Eyre Peninsula. They are also found in southern Northern Territory and southern WA except the far south-west corner. Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps. **Low – There are no associated vegetation communities present or records from within 10 km.**	No
Botaurus poiciloptilus	Australasian Bittern	E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Hides during the day amongst dense reeds or rushes and feeds mainly at night on frogs, fish, yabbies, spiders, insects, and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs in a clutch. **Low – The only potential waterbodies within the subject land are non-perennial creeks, not adequate habitat for the species. No records from within 10 km.**	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
Calidris acuminata	Sharp-tailed Sandpiper	V	The sharp-tailed sandpiper breeds in northern Siberia from the Lena River delta, east to the Chaun Gulf and the Kolyma River delta. The species is a passage migrant through eastern Mongolia, China, Korea, Japan, Micronesia, the Philippines, and southeast Asia. It also occurs less frequently as a passage migrant in the Malay Peninsula, Borneo, and Melanesia. Small numbers of individuals occur in North America, mainly in western Alaska and the Aleutian Islands, and occasionally further south along the Pacific coast. The species is a casual visitor elsewhere in North America, including a rare passage migrant in Hawaii, and is vagrant to Scandinavia, western Europe, India, Sri Lanka, Fiji, and Tristan da Cunha. During the non-breeding season, approximately 91 percent of the East Asian – Australasian population occurs in Australia and New Zealand. Sharp-tailed sandpipers occur within all states of Australia. They are found mostly in the south-east and are widespread in both inland and coastal locations. The species also occurs in both freshwater and saline habitats. The species utilises fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds. After rainfall events, the species may also feed on areas of agricultural pasture. **Low – The only potential waterbodies within the subject land are non-perennial creeks, not adequate habitat for the species. No records from within 10 km.**	No
Calidris ferruginea	Curlew Sandpiper	CE	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. In NSW, they are widespread east of the Great Divide, especially in coastal regions. They are occasionally recorded in the Tablelands and are widespread in the Riverina and south-west NSW, with scattered records elsewhere. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. **Low – The only potential waterbodies within the subject land are non-perennial creeks, not adequate habitat for the species. No records from within 10 km.**	No
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina.	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			Absent – Although associated vegetation communities were present (PCTs 70, 72, 185 and 186), the survey effort failed to encounter any individuals of this species.	
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	V	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo, and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper Climacteris picumnus picumnus which then occupies the remaining parts of the state. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares, that have been isolated or fragmented for more than 50 years. **Low – There are no associated vegetation communities present or records from within 10 km.**	
Falco hypoleucos	Grey Falcon	V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. **Moderate – Associated vegetation communities were present (PCTs 70, 72), although there are no records from within 10 km.**	Yes
Gallinago hardwickii	Latham's Snipe	V	Latham's snipes breed in Hokkaido and highland areas of Honshu in Japan, and in Sakhalin and the nearby Kuril Islands of far eastern Russia. During migration, the species passes through New Guinea. Latham's Snipes have also been recorded as vagrants in New Zealand. Latham's Snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia, including the Adelaide plains, Mount Lofty Ranges, and the Eyre Peninsula. The range extends inland over the eastern tablelands in south-eastern Queensland, and occasionally from Rockhampton in the north, and west of the Great Dividing Range in New South	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			Wales. The species is widespread in Tasmania and is found in all regions of Victoria except for the north-west. Most birds spend the non-breeding period at sites located south of the Richmond River in New South Wales. Latham's snipe feed in soft mudflats or shallow water typically at night, early morning, or evening. The species is omnivorous and feeds on seeds and other plant material (mainly from species in families such as Cyperaceae, Poaceae, Juncaceae, Polygonaceae, Ranunculaceae and Fabaceae), and on invertebrates including insects (mainly flies and beetles), earthworms, spiders, and occasionally molluscs, isopods, and centipedes. The species feeds by thrusting its long bill into mud with an up and down 'sewing machine' action. **Low – No mudflat or wet habitat occurs within the site. No records from within 10 km.**	
Grantiella picta	Painted Honeyeater	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. **Low – Although associated vegetation communities were present (PCTs 70, 72, 185, 186), in the few trees present within the subject land no mistletoe was recorded. There are no records within the 10 km search area. As the species is nomadic and occurs at low density, it is likely to be underrepresented in BioNet Atlas records.**	No
Lathamus discolor	Swift Parrot	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. **Low – Favoured feed trees not recorded within subject land. No records within the IBRA subregion.**	No
Leipoa ocellata	Malleefowl	V	The stronghold for this species in NSW is the mallee in the southwest centred on Mallee Cliffs NP and extending east to near Balranald and scattered records as far north as Mungo NP. West of the Darling River a population also occurs in the Scotia mallee including Tarawi NR and Scotia Sanctuary and is part of a larger population north of the Murray River in South Australia. The population in central NSW	Yes

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			has been significantly reduced through land clearance and fox predation and now occurs chiefly in Yathong, Nombinnie and Round Hill NRs and surrounding areas, though birds continue to survive in Loughnan NR. To the south of this area the species is probably locally extinct in such reserves as Pulletop NR (last recorded 1989), Ingalba NR (1982) and Buddigower NR (1990) and the intensely studied population at Yalgogrin was still known to have at least one active mound in 2017. Further east, a population continues to persist in the Goonoo forest near Dubbo, though the size of this population is unknown. Outside these areas, occasional records have been made in the Pilliga forests (most recently 1999), around Cobar (1991) and Goulburn River NP (1989) though the extent and status of populations in these areas are unknown. **High – Associated vegetation communities were present (PCTs 185, 186) and there are records (*n* = 3) within 10 km.**	
Lophochroa leadbeateri leadbeateri	Major Mitchell's Cockatoo	E	Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. **High – Associated vegetation communities were present (PCTs 70, 72, 185, 186) and there are records (*n* = 8) within 10 km.**	Yes
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*. Two other subspecies occur outside NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **Moderate – Associated vegetation communities were present (PCTs 70, 72, 185, 186), although there are no records from within 10 km.**	Yes
Neophema chrysostoma	Blue-winged Parrot	V	The main populations of Blue-winged Parrots are in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania. Sparser populations are found in western New South Wales and eastern South Australia, extending to south-west Queensland and occasionally into the Northern Territory **Low – There are no associated vegetation communities present or records from within 10 km.**	No
Pedionomus torquatus	Plains-wanderer	CE	The vast majority (>99%) of records of Plains-wanderers in NSW over the past 30 years come from an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south, and Urana in the east. Even	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			within its western Riverina stronghold, the Plains-wanderer has a very patchy distribution. Surveys in the 1990s across 5,000km2 of the western Riverina covering 37 properties found only 5% of the total area comprised suitable habitat. The amount of high-quality habitat in the Riverina drops to 1-2% during very wet or dry years when grasslands become too dense or are grazed too bare for Plains-wanderers. The Plains-wanderer has declined greatly since European settlement. Areas where the species was formerly common and is now so reduced in numbers that it is effectively extinct include eastern NSW, south-western Victoria, and south-eastern South Australia. Its current stronghold is the western Riverina of southern NSW. Areas of secondary importance include north-central Victoria and central-western Queensland. The bird was formerly fairly common until about 1920 on the Slopes and Tablelands, and there are two earlier records of birds near Sydney. The main reason for the decline in the numbers and distribution of Plains-wanderers in all eastern States has been the conversion of native grasslands to dense introduced pasture or croplands. If native grasslands are not overgrazed or cultivated then Plains-wanderers are largely sedentary, though there is some recent evidence to suggest that birds may not remain sedentary during prolonged drought conditions. **Low – There are no associated vegetation communities present or records from within 10 km.**	
Pezoporus occidentalis	Night Parrot	E	The distribution of the Night Parrot has not been well documented, but it is known to be restricted to arid and semi-arid Australia. Twenty-two museum specimens existed prior to 1990, all but one taken in the 19th century. Of the specimens, three were collected in north-west and north-central Western Australia (including the only 20th century specimen in 1912) and the remainder in South Australia. A specimen was apparently taken in south-west New South Wales in 1897 and a number of recent sightings, including a carcass by the roadside in 1990, came from north-western Queensland. Prior to the discovery of the 1990 specimen, the Night Parrot was widely considered to be extinct. **Low – There are no associated vegetation communities present or records from within 10 km.**	No
Polytelis swainsonii	Superb Parrot	V	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain. **Absent – Although associated vegetation communities were present (PCTs 70, 72), the survey effort failed to encounter any individuals of this species.**	
Rostratula australis	Australian Painted Snipe	E	The Australian Painted Snipe is restricted to Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks, or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally, occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mudflats and in shallow water. **Low – No permanent waterbodies or inundated areas within subject land. No records within 10km.**	No
Stagonopleura guttata	Diamond Firetail	V	The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley, and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. **Moderate – Associated vegetation communities were present (PCTs 70, 72, 185, 186), although there are no records from within 10 km.**	Yes
MAMMALS				
Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	V	Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Inhabits a variety of vegetation types, including mallee, Bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark.	Yes

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			Moderate – Associated vegetation communities were present (PCTs 70, 72, 185, 186), although there are no records from within 10 km.	
Phascolarctos cinereus	Koala	E	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species (Martin & Handasyde 1999). Koala habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands mostly dominated by *Eucalyptus* species. In coastal lowlands in Queensland and NSW, Koalas are also found in vegetation communities dominated by Melaleuca or Casuarina species (TSSC 2012p). On the western slopes, tablelands and plains in Queensland and NSW Koalas are found in sub-humid Eucalyptus-dominated forests and woodlands in riparian and non-riparian environments, and some Acacia-dominated forests and woodlands in non-riparian environments (Melzer et al. 2000). In the dry, subtropical to semi-arid environments in the western parts of the species' range, Koalas inhabit Eucalyptus-dominated forests and woodlands, particularly in the vicinity of riparian environments, and Acacia-dominated forests, woodlands and shrublands (Melzer et al. 2000; NSW DECC 2008; Sullivan et al. 2003a). Koalas are also known to occur in modified or regenerating native vegetation communities, as well as urban and rural landscapes where food trees or shelter trees may be highly scattered. There is a growing body of evidence that identifies the importance of shelter (non-food) trees to koalas. Crowther and colleagues (2013) expand on this and suggest that shelter trees are equally important as food trees and should be weighted as such when assessing habitat suitability. Shelter trees play an essential role in thermoregulation and are likely to be selected based on height, canopy cover and elevation (i.e. trees occurring in gullies are preferable) (Crowther et al. 2013). The difficulty in regards to shelter trees is that, unlike food trees, there is no identified sub-set of forest and woodland trees known to be shelter trees. The use of a particular tree species, or individual trees within a species is highly contextual and variable (Crowther et al. 2013). **Moderate – No associated vegetation communities present, or from within 10km. However, two Koala feed tree species within subject land.**	Yes
FISH				
Macquaria australasica	Macquarie Perch	E	The Macquarie Perch was once widespread through the cooler upper reaches of the southern tributaries of the Murray-Darling river system in Victoria and New South Wales, however its distribution did not usually extend to the sources of these rivers. Although it was considered rare	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			downstream in the Murray River, in Victoria the Macquarie Perch occurred in the Barmah Lakes area and tributaries such as Broken Creek. New South Wales, the species occurred in the upper reaches of the Macquarie River system. Macquarie Perch have declined considerably from their historical distribution within NSW and they are now considered isolated to the upper reaches of the Lachlan and Murrumbidgee Rivers in southern NSW. It is also found in low numbers in the Mongarlowe River, where the population is considered likely to be the result of a translocation from the Murray-Darling Basin. Other populations exist in Cataract Dam in the Nepean River catchment, as well as a 2008 record from Georges River near Campbelltown, the first record from the river since 1894. It persists in the Burrinjuck, Cotter (Murrumbidgee) and Wyangala impoundments (McDowall 1996). A breeding population in the Queanbeyan River upstream of the Googong Reservoir exists solely due to a translocation of individuals from the reservoir past a natural barrier. The Googong reservoir population is believed to be effectively extinct. Macquarie perch may occasionally become displaced downstream from the Queanbeyan River into Googong, but they do not form a population in the reservoir. **Absent – No perennial watercourses occur on the subject land.**	
FLORA				
Acacia curranii	Curly-bark Wattle	V	The majority of the species distribution lies within the Mt. Hope – Lake Cargelligo – Hillston region, including populations in the conservation areas of Yathong National Park, Nombinnie State Conservation Area and Round Hill Nature Reserve. There are about 20 populations with fewer than 5000 individuals each and one population with an estimated 150,000 individuals. Also known in Qld from two populations totalling several hundred individuals near Gurulmundi. **Absent – Although associated vegetation communities were present (PCT 72), the survey effort failed to encounter any individuals of this species.**	No
Swainsona murrayana	Slender Darling-pea	V	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. The species has been collected from clay-based soils, ranging from grey, red, and brown cracking clays to red-brown earths and loams. **Low – There are no associated vegetation communities present or records from within 10 km.**	No
MIGRATORY SPECIES				
Migratory Marine Birds				
Apus pacificus	Fork-tailed Swift	C,J,K	The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			Bulloo River and Thurloo Downs. The Fork-tailed Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. **Low – The species is almost exclusively aerial and does not breed in Australia.**	
Migratory Terrestrial Species				
Motacilla flava	Yellow Wagtail	M	Widespread wagtail, favouring wet meadows, marshland, grassy and muddy lakeshores. Occurs in fields and often near livestock during migration. Like other wagtails, walks on ground and pumps its long, white-sided tail up and down. Plumage highly variable, but breeding male wholly bright yellow below, with greenish back. Male head pattern varies regionally: in U.K. has greenish head with yellow eyebrow; in northern Europe head slaty grey overall; in central and southwest Europe head blue grey with white eyebrow. Individuals of several subspecies may winter together. Female and nonbreeding plumages drabber and paler, with ghosting of male patterns. Uncertainty exists regarding this species presence outside of northern Europe. **Low – The subject land is outside of the species geographical distribution and there are no records (BioNet and Atlas of Living Australia) within 10 km.**	No
Myiagra cyanoleuca	Satin Flycatcher	M	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is also found in New Guinea. The Satin Flycatcher is not a commonly seen species, especially in the far south of its range, where it is a summer breeding migrant. The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. The Satin Flycatcher takes insects on the wing, foraging actively from perches in the mid to upper canopy. After the breeding season, it may forage in loose groups, usually of adults and their newly-fledged young, in drier, more open forests. The Satin Flycatcher nests in loose colonies of two to five pairs nesting at intervals of about 20 m - 50 m apart. It builds a broad-based, cup-shaped nest of shredded bark and grass, coated with spider webs and decorated with lichen. **Low – Although the subject land is within the species known distribution, there are no records (BioNet and Atlas of Living Australia) within 10 km. Vegetation associations not recorded but preference for tall, wet forest in gullies suggests that the subject land is unlikely to be suitable.**	No
Migratory Wetlands Species				
Actitis hypoleucos	Common Sandpiper	C,J,K	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
			be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. **Low – Although the subject land is within the species known distribution, there are no records (BioNet and Atlas of Living Australia) within 10 km. As the species breeds in the Northern Hemisphere, subject land could only represent marginal foraging habitat (at best) .**	
Calidris acuminata	Sharp-tailed Sandpiper	V,C,J,K	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands. **Low – Although the subject land is within the species known distribution, there are no records (BioNet and Atlas of Living Australia) within 10 km. As the species breeds in the Northern Hemisphere, subject land could only represent marginal foraging habitat (at best).**	No
Calidris ferruginea	Curlew Sandpiper	CE	In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding one year old birds remain in Australia rather than migrating north. In NSW, they are widespread east of the Great Divide, especially in coastal regions. They are occasionally recorded in the Tablelands and are widespread in the Riverina and south-west NSW, with scattered records elsewhere. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. **Low – The only potential waterbodies within the subject land are non-perennial creeks, not adequate habitat for the species. No records from within 10 km.**	No

Species name	Common Name	Status	Habitat Assessment	Assessment of Significance required (Yes/No)
Calidris melanotos	Pectoral Sandpiper	J,K	The Pectoral Sandpiper breeds in northern Russia and North America. Within Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. In New South Wales (NSW), the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent, or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands. **Low – Although the subject land is within the species known distribution, there are no records (BioNet and Atlas of Living Australia) within 10 km. As the species breeds in the Northern Hemisphere, subject land could only represent marginal foraging habitat (at best).**	No
Gallinago hardwickii	Latham's Snipe	C,J,K	Latham's Snipe breeds mainly in Northern Japan, with smaller colonies in the eastern Russian mainland and Sakhalin. The entire population migrates and spends the non-winter breeding season principally in eastern Australia. **Low – Although the subject land is within the species known distribution, there are no records (BioNet and Atlas of Living Australia) within 10 km. As the species breeds in the Northern Hemisphere, subject land could only represent marginal foraging habitat (at best).**	No

Appendix G: EPBC Act Tests of Significance

EPBC Act-Listed Critically Endangered and Endangered Species

Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.23 ha of potential habitat for the Major Mitchell's Cockatoo. Requiring large hollows for reproduction, their absence from the subject site would preclude the species from being reproductively active. While there are eight records from the search area, given their age (all from 1990), it is doubtful whether this represents an active population. Given the conditions of the subject site, its habitat could only be used for transient foraging purposes. As such, the proposal will not induce a long-term decline in the size of this species' population.
Reduce the area of occupancy of the species	As indicated above, it is unlikely that an established population exists at the site. If it were to be active, the absence of suitable hollows would preclude it from being reproductively active. As such, the proposal will not significantly reduce the species area of occupancy.
Fragment an existing population into two or more populations	The proposal will not generate new fragments or exacerbate issues relating to existing fragments.
Adversely affect habitat critical to the survival of a species	As indicated above, it is unlikely that the 4.23 ha of associated habitat is of critical importance to the survival of the species given the absence of breeding habitat features.
Disrupt the breeding cycle of a population	No, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 4.23 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks would be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of key breeding and foraging habitat; climate change; and Psittacine circovirus disease (PCD); are the main threats to this species. Although the loss of one large hollow may be detrimental to the recovery of the species, given the lack of records from the search area, the impact will not be significant.
Conclusion	**Non-significant impact**

Hooded Robin, south-eastern form (*Melanodryas cucullata cucullata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 4.23 ha of potential habitat for the Hooded Robin. Although some areas of the subject site satisfy the conditional criteria for inhabitation (e.g., a structurally diverse environment), there are no records from within the search area and the study area is not within a priority management area. Considering the above, and the relatively small size of the impact footprint, relative to the quantity of vegetation that will continue to persist in the study area, it is very unlikely for the proposal to induce a long-term decline in the size of a population of this species.
Reduce the area of occupancy of the species	As indicated above, it is unlikely that the removal of 4.23 ha of potential habitat will significantly reduce the species' area of occupancy.
Fragment an existing population into two or more populations	The proposal will not generate new fragments or exacerbate issues relating to existing fragments.
Adversely affect habitat critical to the survival of a species	As indicated above, it is unlikely that the 4.23 ha of associated habitat is of critical importance to the survival of the species.
Disrupt the breeding cycle of a population	As indicated above, it is very unlikely that a population inhabits the subject site. If a hypothetical population were to persist, it is dubious whether it was reproductively active (as no cup-shaped nest was detected). Give the substantial amount of habitat that will continue to exist in the general area following the implementation of the proposal, the breeding cycle of the species will not be disrupted.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up 4.23 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Clearing of woodlands; modification and destruction of ground habitat; competition of Noisy Miners; and increasing drought conditions due to anthropogenic climate change are the main threats to this species. The proposal alone is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

Koala (*Phascolarctos cinereus*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The Koala is a highly selective browser, dependent on the presence of their food tree species. As per the Western Slopes and Plains Koala Management Area, no Primary Feed Tree species and two Secondary Feed Tree species (*E. dwyeri, E. populneus*) occurred at the subject site. However, no vegetation community at the subject site is associated with the species. Further, there are no records within the 10 km search area. While there is one record 12 km to the south, this is an isolated sighting (by up to 100 km) that is quite old (from 1971). As it appears unlikely that the Koala continues to inhabit the area, the proposal will not lead to long-term decline in the size of its population.
Reduce the area of occupancy of the species	As indicated above, it is unlikely that an established population exists at the site. As such, the proposal will not significantly reduce the species area of occupancy.
Fragment an existing population into two or more populations	The proposal will not generate new fragments or exacerbate issues relating to existing fragments.
Adversely affect habitat critical to the survival of a species	As indicated above, no Koala population is known from the area. While two Secondary Feed Tree species were present, no associated vegetation community was present. As such, the habitat present would not be critical to the survival of the Koala.
Disrupt the breeding cycle of a population	No, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify any known habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Habitat loss, modification, and fragmentation; vehicular strikes; predation by dogs; koala disease; anthropogenic climate change; and inadequate support for fauna rehabilitation are the main threats to this species. The proposal is unlikely to directly interfere with the recovery of the species within the region.
Conclusion	**No significant impact**

EPBC Act-listed Vulnerable Species

Malleefowl (*Leipoa ocellata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up 0.59 ha of potential habitat for the Malleefowl. Although the study area is not at the edge of the species known distribution, nor is the subject site within a priority management area, there are records (*n* = 3) within the 10 km search area. The species is dependent on a dense/diverse herb and shrub layer for foraging purposes, which the subject site lacked. Further, none of their conspicuous breeding mounds were detected. Therefore, is unlikely that the subject site contains an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely critical habitat for the species, see above.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 0.59 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of habitat through land clearing; inappropriate fire regimes; predation by foxes; and disturbance to their breeding mounds are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Grey Falcon (*Falco hypoleucos*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up 3.64 ha of potential habitat for the Grey Falcon. The study area is not at the edge of the species known distribution, the subject site is not within a priority management area, and there are no records from within the 10 km search area. Given these considerations, it is very unlikely that the subject site contains an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	The habitat within the subject site is unlikely critical habitat for the species, see above.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove/modify up to 3.64 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Grazing and clearing; secondary poisoning; and poaching of eggs/young are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Diamond Firetail (*Stagonopleura guttata*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 4.23 ha of potential habitat for the Diamond Firetail. Although the subject site is not at the edge of the species geographic distribution nor are there records from within the search area, the study area is within a priority management area. Therefore, if Diamond Firetails were present at the subject site, this could potentially constitute an important population. However, the removal of a relatively small amount of habitat (4.23 ha), compared to that which will continue to exist in the surrounding study area, is unlikely to place a local population at risk of extinction. As such, the proposal will not lead to a long-term decline in the size of a population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site given the absence of records. If one were to be present, the removal of 4.23 ha of potential habitat would not significantly reduce the species area of occupancy.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above. If one were to be present, the proposal would not exacerbate issues relating to fragmentation.
Adversely affect habitat critical to the survival of a species	Considering the lack of records within the search area and the subject sites small size, the habitat is unlikely to be critical to the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above. If one were to be present, the absence of nests suggests that no individuals are reproductively active.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify up to 4.23 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Clearing and fragmentation of habitat; incursion by exotic weeds; and predation of eggs and nestlings are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Corben's Long-eared Bat (*Nyctophilus corbeni*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 4.23 ha of potential habitat for Corben's Long-eared Bat. The study area is not at the edge of the species known distribution, the subject site is not within a priority management area, and there are no records from within the 10 km search area. Given these considerations, it is very unlikely that the subject site contains an important population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site, see above.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above.
Adversely affect habitat critical to the survival of a species	It is unlikely that the habitat at the subject site is critical to the survival of the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify up to 4.23 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Loss of woodland habitat and of hollow-bearing trees; inappropriate fire regimes; and disturbance at their roosting sites are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

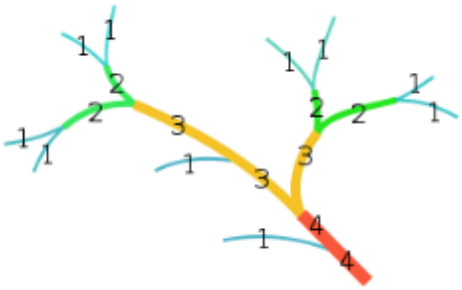
A spear-grass (*Austrostipa metatoris*)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	The proposal will impact up to 0.12 ha of potential habitat for *A. metatoris* – the remaining area was subject to a targeted survey for this species and it was not detected. Although there are no records from the 10 km search area, nor is the study area within a priority management area for the species, the subject site is at the edge of the species geographic distribution. Therefore, if *A. metatoris* were to be present at the subject site, this could potentially constitute an important population. However, the closest known records to the subject site are 45 km to the northwest, from Yelkin State Forest. Given the distances between the impact footprint and this population, and the absence of any individuals detected during targeted survey, it is doubtful whether any population occupies the subject site. As such, the removal of a relatively insignificant amount of habitat (0.12 ha) compared to that which will continue to exist in the surrounding study area, is unlikely to place a local population at risk of extinction. As such, the proposal will not lead to a long-term decline in the size of a population of this species.
Reduce the area of occupancy of an important population	It is unlikely that an important population exists at the site given the absence of records. If one were to be present, the removal of 0.12 ha of potential habitat would not significantly reduce the species area of occupancy.
Fragment an existing important population into two or more populations	It is unlikely that an important population exists at the site, see above. If one were to be present, the proposal would not exacerbate issues relating to fragmentation.
Adversely affect habitat critical to the survival of a species	Considering the lack of records within the search area and the subject sites small size, the habitat is unlikely to be critical to the species.
Disrupt the breeding cycle of an important population	It is unlikely that an important population exists at the site, see above.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will not remove/modify up to 0.12 ha of potential habitat for the species. This removal/modification of available habitat is unlikely to cause the species to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat	There is the potential for works to introduce invasive species to the proposal site or exacerbate existing infestations of significant invasive species. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Introduce disease that may cause the species to decline	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented (see **Section 7**).
Interfere with the recovery of the species.	Grazing; habitat degradation; and drought are the main threats for this species. The proposal is unlikely to significantly interfere with the recovery of the species within the region.
Conclusion	**Non-significant impact**

Appendix H: Terms and Abbreviations

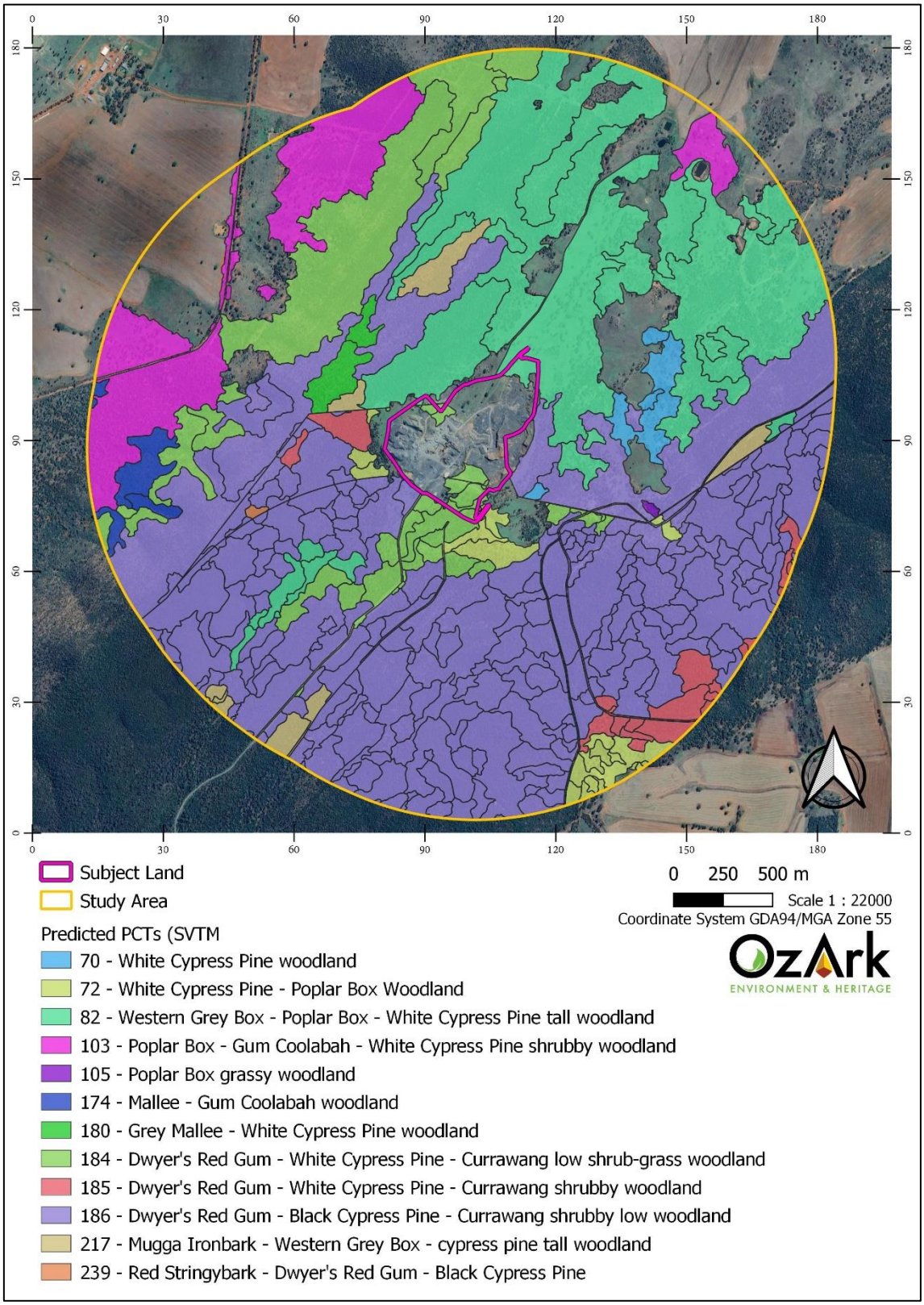
Abbreviation	Terminology	Description
BC Act	Biodiversity Conservation Act 2016 (NSW)	The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. This Act contains schedules relating to the listing of threatened species, populations and communities in NSW. It also outlines the framework regulating development impact assessments in relation to biodiversity.
	Biosecurity Act 2015 (NSW)	The broad objectives for biosecurity in NSW are to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants by Preventing their entry into NSW Quickly finding, containing and eradicating any new entries Effectively minimising the impacts of those pests, diseases, weeds and contaminants that cannot be eradicated through robust management arrangements. The *Biosecurity Act 2015* provides a statutory framework to help achieve these objectives.
CAMBA	China-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with China entered into in 1986. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
	Cumulative impacts	Impacts, when considered together, lead to a stronger impact than any impact in isolation.
	Direct impacts	Directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat. When applying each factor, consideration must be given to all of the likely direct impacts of the proposed activity or development.
DCCEEW	Department of Climate Change, Energy, the Environment and Water	Designs and implements the Australian Government's policies and programs to protect and conserve the environment, water and heritage and promote climate action.
DP	Deposited Plan	A plan of land deposited in Land and Property Information (part of the Land Management Authority) and used for legal identification purposes. They most commonly depict a subdivision of a parcel of land.
EEC	Endangered Ecological Community	An ecological community identified by relevant legislation likely to become extinct or is in immediate danger of extinction.
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW).	Provides the legislative framework for land use planning and development assessment in NSW.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).	Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
FM Act	Fisheries Management Act 1994 (NSW)	The objects of this Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. This Act protects aquatic habitats and species which are not protected under the BC Act.
IBRA	Interim Biogeographic	The Interim Biogeographic Regionalisation for Australia (IBRA) is a biogeographic regionalisation of Australia developed by the Australian Government's Department of the Environment. Each region is a land

Abbreviation	Terminology	Description
	Regionalisation of Australia	area made up of a group of interacting ecosystems repeated in similar form across the landscape.
	Indirect impacts	Occur when proposal-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. As with direct impacts, consideration must be given, when applying each factor, to all of the likely indirect impacts of the proposed activity or development.
JAMBA	Japan-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with Japan entered into in 1974. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
KTP	Key Threatening Process	A key threatening process is defined as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. A requirement of their listing on the TSC Act is that the process adversely affects two or more threatened species, populations or ecological communities, or may cause species, populations or ecological communities not threatened to become threatened.
	Local population (species)	A local population of a threatened plant species comprises those individuals occurring in a defined area or a cluster of individuals extend into habitat adjoining and contiguous with the study area where the individuals could reasonably be expected to cross-pollinate. A local population of fauna species comprises those individuals known or likely to occur in in a defined area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area. The local population of migratory or nomadic fauna species comprises those individuals likely to occur in the study area from time to time.
	Local occurrence (EEC)	The ecological community present within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of the ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
	Low condition (vegetation)	Vegetation in low condition means: a) woody native vegetation with native over-storey percent foliage cover less than 50% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and where either: – less than 50% of ground cover vegetation is indigenous species, or – greater than 90% of ground cover vegetation is cleared OR b) native grassland, wetland or herbfield where either: – less than 50% of ground cover vegetation is indigenous species, or – more than 90% of ground cover vegetation is cleared If native vegetation is not in low condition, it is in moderate to good condition. The percentages for the ground cover calculations must be made in a season when the proportion of native ground cover vegetation compared to non-native ground cover vegetation in the area is likely to be at its maximum. NOTE: Clearing the habitat of threatened species, populations or communities for the purposes of reducing its condition prior to assessment under the methodology may be a breach of environmental legislation, including sections 118A and 118D of the *National Parks and Wildlife Act 1974* (NPW Act), the *Native Vegetation Act 2003* (NV Act) and/or the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Abbreviation	Terminology	Description
MNES	Matters of national environmental significance	Refers to the seven matters of national environmental significance outlined under the EPBC Act.
NPW Act	National Parks and Wildlife Act 1974 (NSW)	The objects of this Act are as follows: The conservation of nature, including, but not limited to, the conservation of: habitat, ecosystems and ecosystem processes, and biological diversity at the community, species and genetic levels, and landforms of significance, including geological features and processes, and landscapes and natural features of significance including wilderness and wild rivers, The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to: places, objects and features of significance to Aboriginal people, and places of social value to the people of New South Wales, and places of historic, architectural or scientific significance, Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation, Providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation. The objects of this Act are to be achieved by applying the principles of ecologically sustainable development.
OEH	Office of Environment and Heritage	The Office of Environment and Heritage (OEH) is a separate agency within the Planning and Environment cluster. OEH was formed on 4 April 2011 and works to protect and conserve the NSW environment, including the natural environment, Aboriginal country, culture and heritage and our built heritage, and manages NSW national parks and reserves. This agency has since been replaced by DCCEEW
RAMSAR	Convention on Wetlands of International Importance	The Ramsar Convention's broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those remaining. This requires international cooperation, policy making, capacity building and technology transfer.
	Risk of extinction	The likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement	A bilateral migratory bird agreement with the Republic of Korea entered into in 2007. It provides an important mechanism for pursuing conservation outcomes for migratory birds, including migratory waterbirds.
RF Act	Rural Fires Act 1997	The objects of this Act are to provide: for the prevention, mitigation and suppression of bush and other fires in local government areas (or parts of areas) and other parts of the State constituted as rural fire districts, and for the co-ordination of bush firefighting and bush fire prevention throughout the State, and for the protection of persons from injury or death, and property from damage, arising from fires, and for the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and for the protection of the environment by requiring certain activities referred to in paragraphs (a)-(c1) to be carried out having regard to the

Abbreviation	Terminology	Description
		principles of ecologically sustainable development described in section 6 (2) of the *Protection of the Environment Administration Act 1991*.
Significant impact		A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity.
SIS	Species Impact Statement	A document included with an Environmental Impact Statement which details a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section. The requirements as to the contents of an SIS for different categories of protected species are given in section 110 of the TSC Act.
Strahler stream order		Strahler stream order and are used to define stream size based on a hierarchy of tributaries. 
TBDC	Threatened Biodiversity Data Collection	The Threatened Biodiversity Profile Data Collection is maintained in the NSW BioNet Atlas database, and includes profiles for threatened species, population and ecological communities that occur in NSW. The profiles contain detailed descriptions, photographs and information related to the distribution, habitat, ecology, threats and management priorities of each threatened entity. The Threatened Entity Profile Data Collection contains essential information used for the assessment of likely impacts of development proposals on threatened entities and in determining the amount of habitat that can be lost and how much must be offset to achieve an "Improve or Maintain" outcome for the affected species, populations or ecological communities.

Appendix I: State Vegetation Type Map C1.1.M1.1



Note: Areas not mapped to any colour are “not classified” and may be native or non-native.

Appendix J: Coverage of SEARs and Other Government Agency Requirements Relevant to this BDAR

Paraphrased Relevant Requirement		Relevant BDAR Section(s)
Coverage of Secretary's Environmental Assessment Requirements in the EIS		
• accurate predictions of any vegetation clearing on site;		**Section 5**
• a detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and		**Section 4.4, 5.1, 5.3, 6, 7, Appendices E, F, G**
• a detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.		**Section 7.2**
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS		
NSW DPI – Agriculture 11 June 2019	Include a biosecurity (pests & weeds) risk assessment outlining the likely plant, animal and community risks.	**Section 5.4 and Section 7.2**
	Develop a biosecurity response plan to deal with identified risks as well as contingency plans for any failures. Including monitoring and mitigation measures in weed and pest management plans.	**Section 7.2**
NSW Office of Environment & Heritage 20 June 2019	include threatened species impact not associated with vegetation communities such as scattered paddock trees or increases in road traffic.	**Section 7.7 and Section 7.8**
	Unless the vegetation can be avoided, the exact nature of the impact should be confirmed by applying the Biodiversity Offset Scheme Entry Threshold tool (BOSET) and a Test of Significance. Any determined impacts must be managed in a Biodiversity Development Assessment Report (BDAR).	**BDAR**
	Where impacts cannot be avoided, the EIS should detail how they will be remedied through biodiversity offsetting, including quantification of impacts and assessments of the value of offset areas, protection mechanisms and associated management regimes of those areas.	**Section 8**
	We recommend the applicant provide evidence that any learning associated with or ancillary to the activity is not likely to significantly affect threatened species, threatened ecological communities or their habitats. At a minimum that evidence should take the form of a Test of Significance according to the Minister's Guidelines.	**Appendices E, F, G**
	Appropriate measures to avoid, minimise and mitigate any impacts on vegetation and threatened species habitat should be set out in the EIS. If impacts on biodiversity are likely to be significant then the applicant ,must mitigate these impacts through the Biodiversity Offset Scheme according to the Biodiversity Conservation Act, namely a Biodiversity Development Assessment Report (BDAR).	**Section 7.2 and BDAR**
	The applicant should also apply the Biodiversity Offset Scheme Entry Threshold tool (BOSET) and submit the report with the application.	**Appendix A**

Paraphrased Relevant Requirement		Relevant BDAR Section(s)
	Where the proposal is likely to significantly affect threatened species within the meaning of Section 7.2 of the Biodiversity Conservation Act 2016, the application for development consent is to be accompanied by a Biodiversity Development Assessment Report, and the following requirements apply: • Biodiversity impacts related to the proposal are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.	**BDAR**
	• The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.	**Section 7.2**
	• The BDAR must include details of the measures proposed to address the offset obligation as follows: – The total number and classes of biodiversity credits required to be retired for the proposal.	**Section 8, Appendix D**
	– The number and classes of like-for-like biodiversity credits proposed to be retired.	**Appendix D**
	– The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.	**Appendix D**
	– Any proposal to fund a biodiversity conservation action.	**N/A**
	– Any proposal to make a payment to the Biodiversity Conservation Fund.	**Section 8.5**
	• If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.	**N/A**
	• The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under S6.10 of the Biodiversity Conservation Act 2016.	**Section 3.1**