ACCENT ENVIRONMENTAL

Appendix F: Biodiversity Development Assessment Report

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Peninsula Solar Farm

AUGUST 2022

Report prepared by

OzArk Environment & Heritage

for Accent Environmental Pty Ltd

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DOCUMENT CONTROLS

Proponent	Edify Energy Pty Ltd		
Client	Accent Environmental		
Purchase order number			
Document description	Peninsula Solar Farm BDAR		
	Name	**Signed**	**Date**
Clients reviewing officer			

Clients representative managing this document	**OzArk representative managing this document**		
Ian Finlay	Dr Crystal Graham (CG)		
Location	**OzArk job number**		
S:\OzArk EHM Data\Clients\Accent Environmental\ Peninsula Solar Power Station March 2021\Ecology	#3026		
Document status: V3.6 FINAL	**Version**	**Date**	**Action**
Internal Draft series V1.X	V1.0 V1.1	14/12/2021 17/12/2021	DO to KH KH to CG
First Draft for Client Review	V2.0 V2.1 V2.2	18/12/2021 27/01/2022 28/01/2022	CG to IF CG to KH KH to CG
Final Report	V3.0 V3.1 V3.2 V3.3 V3.4 V3.5 V3.6	28/01/2022 08/02/2022 14/03/2022 29/04/2022 29/04/2022 02/05/2022 25/08/2022	CG to IF CG to IF CG to IF CG to IF CG to IF CG to IF JEB to IF

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CERTIFICATION

I certify that I have reviewed and advised on 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 (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 advised by	**Dr Kate Hammill**
Signed	
Date	08/02/2022
Organisation	KHS Ecology & Bushfire Pty Ltd
Position	Ecologist & Bushfire Consultant
Qualification	Doctor of Philosophy (Ecology)
Accreditation number	BAAS 18022

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 (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 advised by	**Dr David Orchard**
Signed	
Date	28/08/2022
Organisation	OzArk Environment & Heritage
Position	Ecologist
Qualification	Doctor of Philosophy (Agriculture)
Accreditation number	BAAS 21028

Executive summary

Edify Energy Pty Ltd (the proponent) proposes to develop a solar farm in the locality of Payten's Bridge, New South Wales, to be known as the Peninsula Solar Farm (the proposal). OzArk Environment & Heritage (OzArk) was engaged by Accent Environmental Pty Ltd, on behalf of the proponent, to prepare the biodiversity assessment for the proposal. The proposal will clear up to 56.55 ha of native vegetation on Lot 441 DP1124885, Lot 442 DP1124885, and Lot 9 DP752938. The native vegetation clearing threshold for the relevant lot is 1 ha; as such, the proposal will trigger entry into the Biodiversity Offsets Scheme (BOS).

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

- PCT 267 – White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- PCT 282 – Blakely's Red Gum - White Box - Yellow Box - Black Cypress Pine box grass/shrub woodland on clay loam soils on undulating hills of central NSW South Western Slopes Bioregion

These PCTs are associated with the following Critically Endangered Ecological Communities (CEECs):

- *Biodiversity and Conservation Act 2016* (BC Act)-listed CEEC – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)-listed CEEC – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

All vegetation recorded during the survey met the relevant thresholds to be considered the CEEC under the BC Act. Consequently, up to 56.55 ha of the BC Act-listed CEEC will be impacted by this proposal. One vegetation zone (282_Good) was identified in the initial site survey as a component of the EPBC Act community but was excised from the development footprint in accordance with the principles of avoidance and minimisation.

In total, 32 Ecosystem Credit Species were generated by the Biodiversity Assessment Method Calculator (BAM-C). An additional Ecosystem Credit Species (*Miniopterus orianae oceanensis*) not generated by the BAM-C was detected during targeted surveys, bringing the number of Ecosystem Credit Species to 33. Of these, 32 Ecosystem Credit species were either detected on-site or assumed to be present, generating a total of 278 Ecosystem

Credits. One Ecosystem Credit species was removed due to habitat constraints. In addition, 21 Species Credit species were generated by the BAM-C. Five species were removed from the candidate list due to geographic limitations or habitat constraints. Targeted surveys were conducted for 15 species; one additional species, the Masked Owl (*Tyto novaehollandiae*), was not surveyed and consequently was assumed present. Targeted surveys detected the Superb Parrot (*Polytelis swainsonii*) on the subject land during this species' breeding season. No other targeted species credit species were detected, therefore, only species credits for the Superb Parrot and Masked Owl will be required to be offset, totalling 214 Species Credits.

The proponent intends to satisfy their Ecosystem and Species credit obligations by buying and retiring the necessary Ecosystem Credits from the open market or, if not available, paying directly into the Biodiversity Conservation Fund (BCF).

The significance of the proposed impact to EPBC Act-listed threatened, migratory, and marine species, populations and communities predicted to occur within a 10 km search area was assessed. No significant impact to any threatened entity likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended. Therefore, a referral of the proposal to the Department of Agriculture, Water and the Environment 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

FIGURES

TABLES

1 Introduction

1.1 Background

Edify Energy Pty Ltd (the proponent) proposes to develop a new solar farm in the locality of Payten's Bridge, New South Wales, to be known as the Peninsula Solar Farm (the proposal). The proposal development footprint spans across up to 235.36 hectares (ha) over three lots (up to 138.98 ha of Lot 441 DP1124885, up to 56.32 ha of Lot 442 DP1124885, and up to 40.06 ha of Lot 9 DP752938; **Figure 1-1** to **Figure 1-3**). Note that the values for Lots 441 and 442 include small areas of the adjacent road corridor require for access into the proposed solar farm.

OzArk Environment & Heritage (OzArk) was engaged by Accent Environmental Pty Ltd (the client), on behalf of the proponent, to prepare the biodiversity assessment for the proposal. A preliminary assessment identified the need for a Biodiversity Development Assessment Report (BDAR), due to the proposed clearing area of native vegetation exceeding the threshold for entry into the NSW Biodiversity Offsets Scheme (BOS) 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 (BAM), and details the proponent's biodiversity offset requirement (number of ecosystem and species credits).

1.2 The Proposal

The subject land is located on Lot 441 DP1124885, Lot 442 DP1124885 and Lot 9 DP752938 in Paytens Bridge, a locality c. 30 km southeast of Forbes (see **Figure 1-2** and **1-3**). At present, the site operates as both grazing and cropping land.

Overall, the proposed activities have a development footprint of c. 235.36 ha, of which c. 56.55 ha is native vegetation. Based on the results of the initial survey, the proponent has elected to exclude patches of high biodiversity value from the development in order to protect the intrinsic ecological value of the site. These are detailed in **Figure 1-1** and shown in **Figure 1-3** as exclusion areas**.**

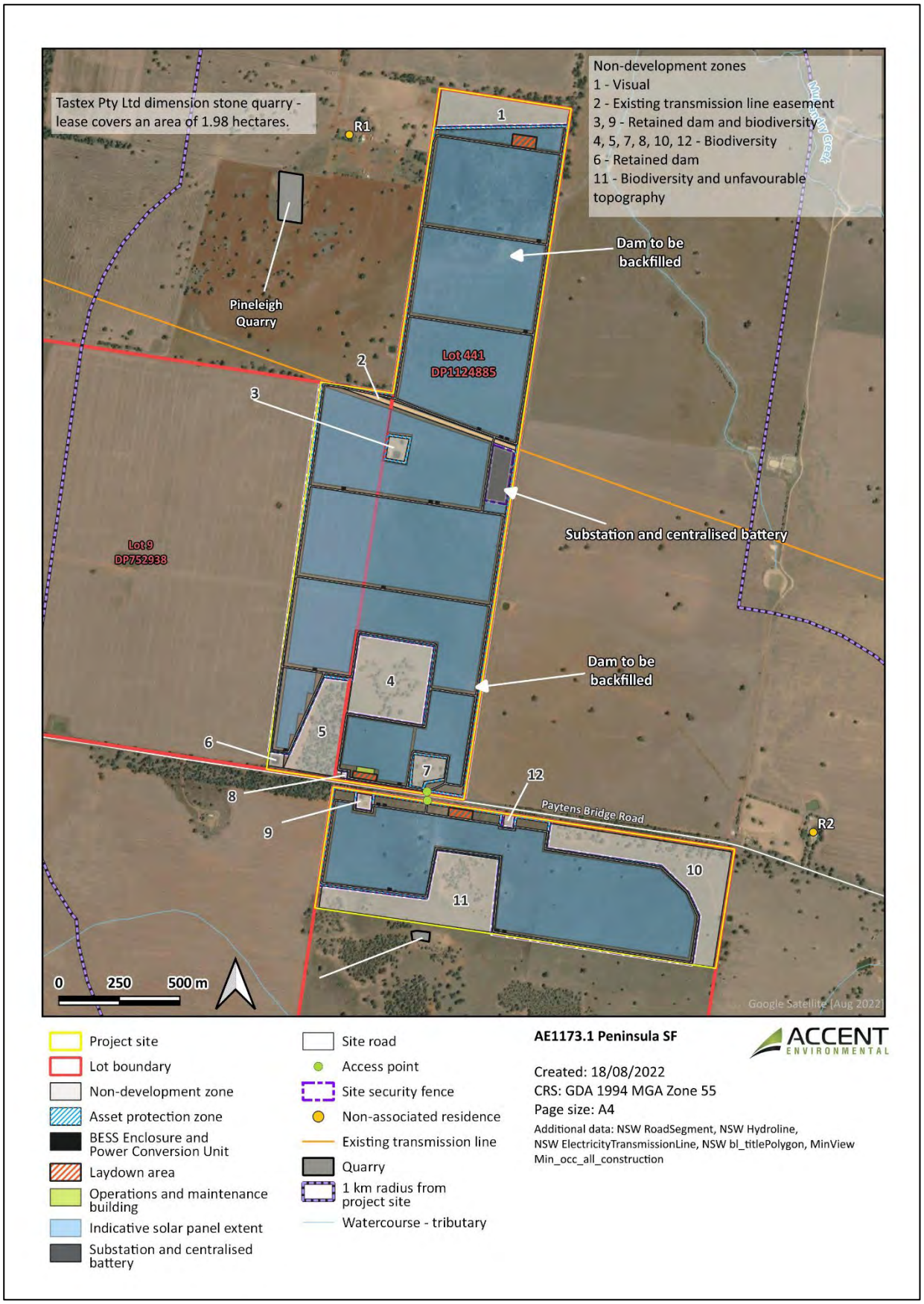

Figure 1-1. Proposed Site Layout.

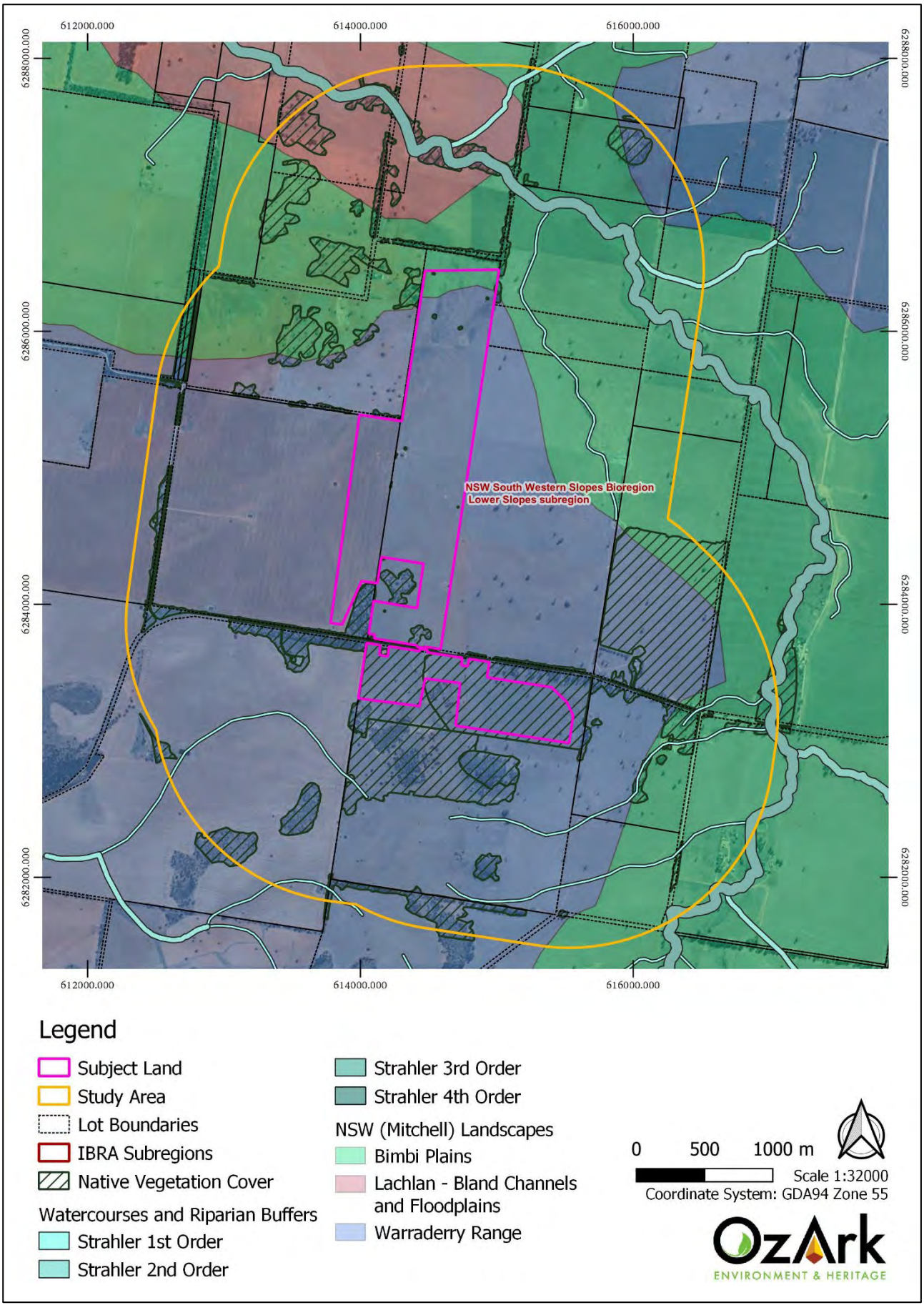

Figure 1-2. Location map showing the subject land, study area and key features required by the BAM.

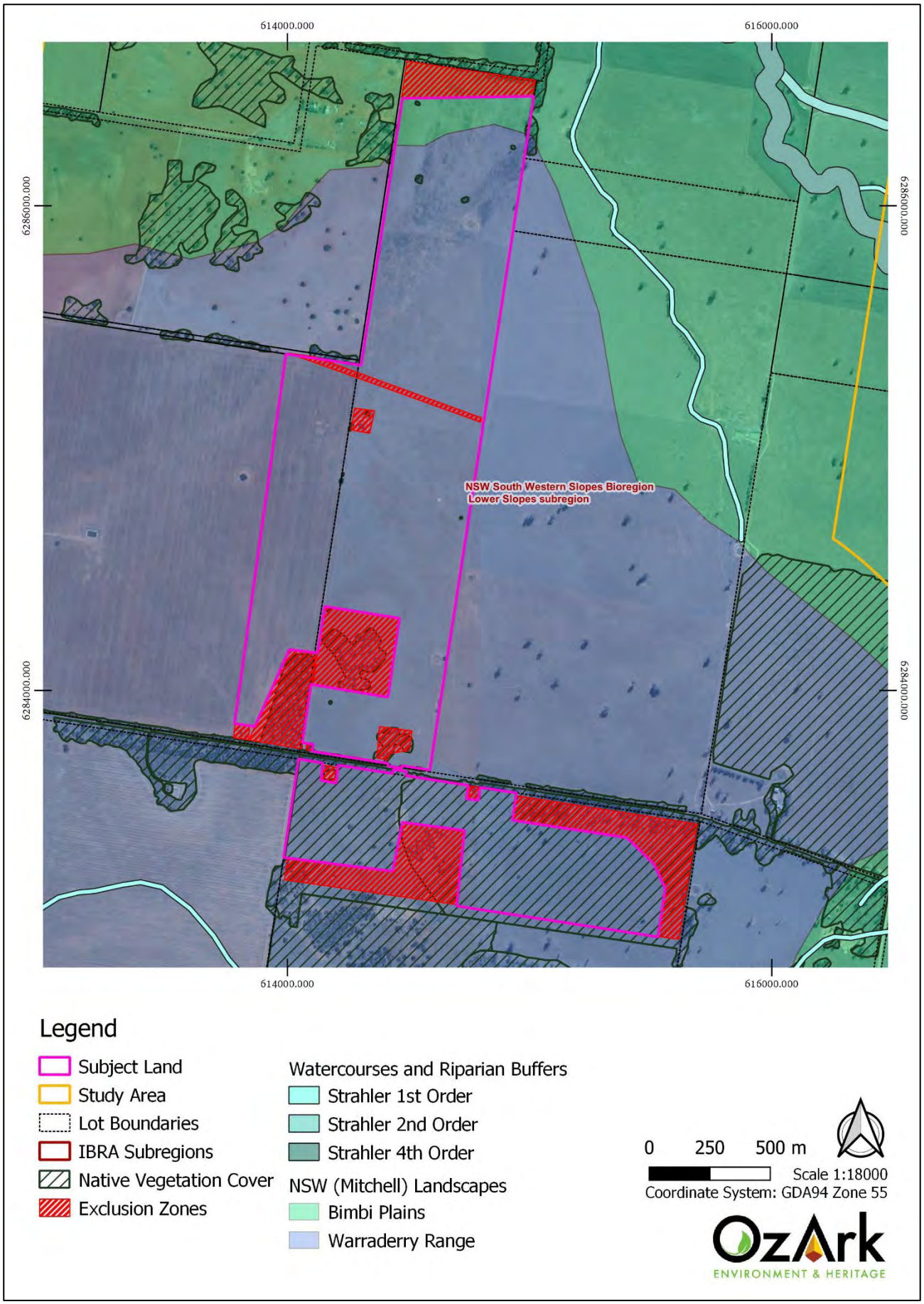

Figure 1-3. Site map showing the subject land and the areas excluded from the BDAR.

1.3 Relevant Terms

The following terms and definitions are used to describe the land assessed in this study.

Subject land and **Development Footprint –** The area of land that is directly impacted by the proposed development (including all infrastructure footprints, access roads and asset protection zones), it does not include land that has been excluded (see **Figure 1-1** and **1-3**).

Property boundary – Lot 441 DP1124885, Lot 442 DP1124885, and Lot 9 DP752938, on which the subject land occurs.

Study area –The study area refers to an area of land within a 1,500 m buffer from the outside edge of the subject land. The study area is the area assessed for the purpose of establishing landscape context including native vegetation cover.

10 km search area – The area within a 10 km radius of the subject land. This 10 km buffer has been used to search information sources, including the Protected Matters Search Tool (PMST) (Department of Agriculture, Water and the Environment 2021) and BioNet Atlas (DPIE, 2021) species sightings search.

1.4 Site Identification

The site is identified under the *Forbes Local Environment Plan 2012* (Cowra LEP) and on the NSW Planning Portal as follows.

- **Lot/Section/Plan No:** 441 DP1124885, Lot 442 DP1124885, and Lot 9 DP752938
- **Land Zoning:** RU1 Primary Production
- **Minimum Lot Size:** 200 ha
- **Terrestrial Biodiversity:** The relevant lots include areas mapped as having high terrestrial biodiversity value (**Appendix A**); however, these have been excluded from the development footprint.

The location of the proposal is shown on the location map (**Figure 1-2**) and the site map (**Figure 1-3**).

1.5 Regulatory Context

The Proposal will be assessed under Part 4 (Regional Development) of the EP&A Act. The BC Act requires all Regional Developments to be assessed in relation to the BOS, if entry is triggered by the location and/or size of the development. The *Biodiversity Conservation Regulation 2017* sets out the thresholds for entry into the BOS, which are as follows:

- If the amount of native vegetation proposed to be cleared exceeds the threshold area for the lot size for the LEP zone.
- When the development is located on land identified in the Biodiversity Value Map (https://www.lmbc.nsw.gov.au/Maps/), as defined by Clause 7.3 of the Regulation.
- If, in the absence of the above thresholds, the Proposal is likely to be a significant impact to threatened species, ecological communities or their habitat.

Since the proposal involves clearing of up to 56.55 ha of native vegetation and the native vegetation clearing threshold is 1 ha, the threshold for clearing is exceeded and therefore the BOS applies.

The subject land was not identified as occurring on bushfire prone land by the NSW Rural Fire Service, and as such, under Section 4.15 of the EP&A Act, the proponent will not be required to address the relevant bushfire protection requirements of the Rural Fire Service Document *Planning for Bush Fire Protection*. It is assumed that Asset Protection Zones (APZ) are included in the development footprint supplied by the proponent for the purposes of this BDAR.

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 also identifies any constraints on the proposal according to relevant Federal and NSW environmental legislations and includes the calculation of ecosystem and/or species credits requiring offset.

1.7 Legislation

1.7.1 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).

1.7.2 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.

1.7.3 NSW legislation

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.

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 any of the thresholds listed above (see Regulatory Context) are met.

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.

Biosecurity Act 2015

From 1 July 2017, the *Biosecurity Act 2015* and its subordinate legislation 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 impose 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.

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.

Consistently with those objectives, the FM Act aims to:

- Promote viable commercial fishing and aquaculture industries.
- Promote quality recreational fishing opportunities.
- Appropriately share fisheries resources between the users of those resources.
- Provide social and economic benefits for the wider community of NSW.
- Recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

Section 201 of the FM Act states that a person other than a government authority must seek a permit from NSW Department of Primary Industries – Fisheries (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.

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.

State Environmental Planning Policy (Biodiversity and Conservation 2021 (SEPP 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:

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

The *SEPP (Koala Habitat Protection)* 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'. *SEPP (Koala Habitat Protection) 2020* commenced on 30th November 2020 and *SEPP 2021* commenced on 17th March 2021. Currently both *SEPP 2020* and *SEPP 202*1 apply within NSW, this is an interim measure until all codes are developed under *SEPP 2021*. The *SEPP 2020* applies to RU1, RU2 and RU3 zoned land, excluding 9 LGAs within the Sydney basin. The *SEPP 2021* applies to all other zoned land within the additional 74 LGAs.

Forbes LGA is listed in Schedule 1 – Local Government Areas of the SEPP and therefore is subject to the requirements of the SEPP. As the subject land is zone RU1 (Primary Production), it falls within the remit of the 2020 SEPP.

The proposal's potential impacts to threatened species, including Koalas, have however been considered in this BAR. This includes a specific Koala habitat assessment, using the guidelines and Koala Habitat Assessment tool contained in the Commonwealth Department of the Environment (2014) *EPBC Act referral guidelines for the vulnerable koala* (**Appendix H**).

2 Methods

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 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.
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.

2.1 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. 53103. The role and key details of personnel involved in the project are provided in **Table 2-1**.

Table 2-1. Summary of OzArk personnel qualifications.

Name	Position	Role	CV Details
Dr Crystal Graham	Senior Ecologist	Quality control, technical review	• 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 • BAM training 2021 (application pending)
Madeline Walsh	Ecologist	Vegetation integrity plots (BAM plots), vegetation mapping, preliminary BAM-C calculations	• Accredited BAM assessor – Accreditation # BAAS21010 • Honours – Ecology – UNSW • Bachelor of Environmental Biology – University of Technology • WH&S Induction Training for Construction Work
Dr Kate Hammill	Ecologist	Vegetation integrity plots (BAM Plots), final BDAR review and BAM-C calculations	• Accredited BAM assessor – Accreditation # BAAS18022 • Doctor of Philosophy in Biology – University of Sydney • Graduate Diploma in Bushfire Protection – University of Western Sydney • Honours – Biology – University of

			Sydney • Bachelor of Science – University of Sydney
Dr David Orchard	Ecologist	Reporting	• 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
Dr Sean Graham	Ecologist	Targeted surveys	• Postdoctoral Fellow – Penn State University • Doctor of Philosophy (Biology) – Auburn University • Master's in Biology – Georgia State University • Bachelor of Arts – Georgia State University • WH&S Induction Training for Construction Work
Ian Griffith	Ecologist	Targeted surveys	• Honours – Genetics – La Trobe University • Bachelor of Biological Sciences – La Trobe University • First Aid Training • WH&S Induction Training for Construction Work

2.2 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:

- NSW Government Web Map Service (WMS) layers for NSW Imagery (compiled imagery, NSW Property, NSW Base Map and NSW Topographic Map) (http://spatialservices.finance.nsw.gov.au).
- EPBC Protected Matters Search Tool (https://www.environment.gov.au/epbc/protected-matters-search-tool)
- State Vegetation Type Map: Central West Lachlan Version 1.4 – VIS_ID 4468
- 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 Wildlife Atlas Vegetation classification (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.environment.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 draft important area mapping for Swift Parrot available from the Biodiversity Offsets and Agreement Management System (BOAMs).

All databases were searched prior to conducting initial fieldwork in June 2021 and reviewed (and updated where applicable) in November and December 2021 prior to final submission.

Results of the database searches are provided in **Appendix A**.

2.3 Category 1 – Exempt Land

In accordance with Section 6.8 of the BC Act, the BAM is to exclude the assessment of impacts of any clearing of native vegetation and loss of habitat on Category 1 – Exempt Land (according to Part 5A of the Local Land Services Act 2013), other than any impacts prescribed by the regulations under Section 6.3.

The mapping of Category 1 – Exempt Land is not yet publicly available for use in NSW, as such, native vegetation regulatory mapping has been determined based on an analysis of the following datasets:

- Historical and current land use component – NSW Land use
- Detectable woody vegetation clearing component – NSW Woody Vegetation Extent (NSW Department of Planning, Industry and Environment, 2011b)
- Historical and current aerial imagery – Historical Imagery (NSW Spatial Services 2021). See images of the subject land in **Appendix A**.

Review of the above led to the conclusion that the majority of the northern component of the development footprint (except for paddock trees) is Category 1 – Exempt land (**Figure 4-1, Appendix A**). This land is actively cropped and was planted to barley at the time of the surveys. The

remaining areas are considered to be Category 2 – Regulated Land and are therefore assessed in this BDAR (**Figure 4-1, Appendix A**).

2.4 Field survey

2.4.1 BAM survey methodology

Vegetation communities are identified in accordance with the online NSW Master Plant Community Type Classification (OEH, 2018b), 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 Version 1.4 – VIS_ID 4468* (OEH, 2019a), which provides 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 on 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 positively identify the community as being part of the 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, 2019).

According to **Table 2-2**, a minimum of 11 BAM plots are required for the current proposal. In total, 22 BAM plots were completed, of which 18 were retained in the final calculations (**Figure 4-2, Appendices B** and **C**). The plot locations were randomly selected whilst ensuring adequate survey effort within each vegetation zone (**Table 2-2**; **Table 4-2**). Plots that fell outside the smaller, revised final development footprint were retained only when needed to provide suitable coverage for a particular vegetation zone (**Figure 4-2**).

Table 2-2. Minimum number of plots and transects required per zone area (DPIE, 2020a).

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

Plots were 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 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 50m transect
- The plots were positioned within the subject land and their GPS locations were recorded (GDA 94 / MGA Zone 55).

The remainder of the subject land was traversed on foot to confirm the nature and extent of the vegetation (i.e. native or non-native).

2.4.2 Incidental flora and fauna sightings

Incidental flora and 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.

2.4.3 Aquatic surveys

The Strahler stream order and associated riparian buffer distance of each watercourse that occurs within the study area was determined using Appendix E of the BAM Manual (DPIE, 2020a). No aquatic surveys were undertaken.

2.4.4 Targeted surveys

Targeted surveys were carried out to confirm the presence/absence of a number of candidate species credit species identified by the BAM-C. A summary of OzArk's field survey methods is provided in **Table 2-3** and described in further detail in **Section 5** of this report.

Table 2-3. Summary of targeted survey methods and effort undertaken.

Survey Dates	Method	Effort
• 27-29 September 2021 • 13-14 October 2021	Diurnal bird surveys (concentrated at dawn and dusk).	20 person hours (bird surveys)
• 27 September 2021 - 13 October 2021	Camera traps for Eastern Pygmy-possum (*Cercartetus nanus*) and Squirrel Glider (*Petaurus norfolcensis*).	16 nights with up to 3 cameras (= 22 camera trap nights)
• 27-29 September 2021 • 13-14 October 2021	Dusk habitat tree watching for Eastern Pygmy-possum (*Cercartetus nanus*), Squirrel Glider. (*Petaurus norfolcensis*), Barking Owl (*Ninox connivens*).	5 nights (habitat tree or stag watching)
• 27-29 September 2021 • 13-14 October 2021	Nocturnal call playback for Barking Owl (*Ninox connivens*) and Bush Stone-curlew (*Burhinus grallarius*).	5 nights (call playback)
• 27-29 September 2021 • 13-14 October 2021	Spotlighting for Bush Stone-curlew (*Burhinus grallarius*), Barking Owl (*Ninox connivens*), and Koala (*Phascolarctos cinereus*).	5 nights (spotlighting)
• 27-29 September 2021	Elliot traps for small mammals.	3 nights × 19 traps (Elliot traps) = 57 trap nights
• 28-30 September 2021	Reptile survey, including rock turning.	420 rocks and 50 wooden posts overturned (reptile survey)
• 28 September 2021	Koala Spot Assessment Technique (SAT) surveys.	30 food trees assessed (Koala SAT)
• 29 September 2021 • 13-14 October 2021	Parallel transects (10 m separation) for threatened plants.	c. 77 km plant transects – 10 m spacing across all suitable habitat (flora surveys)
• 02-21 December 2021	Ultrasonic Bat Loggers (SM4BAT) for threatened bats	20 nights x 2 bat loggers (40 trap nights)

2.5 Habitat suitability

The suitability of the subject land as habitat for all species credit species generated by the BAM-C was assessed.

The presence / absence of threatened species was categorised as follows:

- ‘Present’ surveyed– the species was recorded during field surveys or has been previously recorded on the subject land.
- ‘Assumed present’ – the species was predicted to occur by the BAM-C, suitable habitat features occur on the subject land for that species and no targeted survey or expert report was commissioned.
- ‘Absent’ constraint – None of the habitat constraints or geographic limitations are present, the habitat is degraded or the species is a vagrant.
- ‘Absent’ surveyed – Targeted surveys undertaken during the time period specified for the species in the Threatened Biodiversity Data Collection (TBDC) and following DPIE threatened species survey guidelines (DEWHA, 2010b). Where no relevant published guidelines exist, the survey must be undertaken using best practice methods.

EPBC listed fauna that were predicted to occur within 10 km of the subject land were also assessed for their presence or absence on site (**Appendix E**).

2.6 Limitations

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

- BAM plots were completed in winter, during which time many flora and fauna species may have been absent, difficult to detect, or difficult to identify.
- Prevailing climatic conditions during the completion of BAM plots were wet and overcast, which may have impeded the observation of certain species. This may affect calculation of vegetation integrity.

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 conditions were not suitable for detecting the species at the time of the targeted survey, 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.

3 Landscape Features

3.1 Overview

A series of background searches were performed to comply with legal standards (**Table 3-1**).

Table 3-1. Environmental protection areas within the study area.

Environmental Protection Areas	Presence in the Study Area
Land identified on the Biodiversity Values Map under the *NSW BC Act 2016*	Yes, within the study area but not within the subject land (see **Appendix A**).
Area of Outstanding Biodiversity Value (AOBV) under the *NSW BC Act 2016*	No.
Watercourse mapped as Key Fish Habitat (KFH) and/or within the extent of an aquatic Endangered Ecological Community, listed under the *Fisheries Management Act 1994.*	Yes, within the study area but not within the subject land (see **Appendix A**).
An area reserved or dedicated under the *National Parks and Wildlife Act 1974* or *Wilderness Act 1987*.	No.
Is the proposal located within land reserved or dedicated within the meaning of the *Crown Lands Act 1989* for preservation of other environmental protection purposes.	No.
A World Heritage Area.	No.
Environmental Protection Zones in environmental planning instruments.	No.
Lands protected under *NSW State Environmental Planning Policy*, SEPP Koala Habitat Protection 2020	Yes, applies to all lands zoned RU1, RU2, or RU3 within the LGA, including the whole of the subject land.
Lands protected under *NSW State Environmental Planning Policy*, SEPP Koala Habitat Protection 2021	No, all land within the study area is zoned RU1 and consequently is subject only to the 2020 SEPP.
Lands protected under *SEPP Sydney Drinking Water Catchment*.	No.
Aquatic reserves dedicated under the *Fisheries Management Act 1994.*	No.
Wetland areas dedicated under the Ramsar Wetlands Convention.	No.
Land subject to a conservation agreement under the *National Parks and Wildlife Act 1974.*	No.
Land identified as State Forest under the *Forestry Act 1916.*	No.
Acid sulphate area.	No.

3.2 Bioregion

The study area is situated in the Lower Slopes subregion of the NSW South Western Slopes Bioregion, as per the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway & Cresswell, 1995). The Lower Slopes subregion is characterised by geology, landforms, soil types and vegetation as described in **Table 3-2**.

Table 3-2. Description of the Lower Slopes subregion (OEH, 2019b).

Bioregion	Brigalow Belt South
Subregion	Lower Slopes
Geology	As for the Upper Slopes (see below) but with larger areas of Tertiary and Quaternary alluvium. Upper Slopes: Ordovician to Devonian folded and faulted sedimentary sequences with inter-bedded volcanic rocks and large areas of intrusive granites.
Landforms	Undulating and hilly ranges and isolated peaks set in wide valleys at the apices of the Riverina alluvial fans.
Soils	Similar to the Upper Slopes (see below) but with more extensive red-brown earths on undulating plains and more extensive grey clays on alluvium. Upper Slopes: Shallow stony soils on steep slopes, texture contrast soils grading from red subsoils on upper slopes to yellow subsoils on lower slopes. Alluvial sands, loams and clays.
Vegetation	Dwyer's gum on granite, red ironbark on sedimentary rocks Hill red gum, white cypress pine and red stringybark in the ranges. Grey box woodlands with yellow box, white cypress pine and belah on lower areas. Poplar box, kurrajong, wilga and red box in the north, limited areas of bull mallee, blue mallee, green mallee and congoo mallee in the central west. Myall, rosewood and yarran on grey clays, yellow box, polar box, and belah on alluvial loams. River red gum on all streams with black box in the west with some lignum and river cooba.

3.3 NSW (Mitchell) Landscapes

Landscapes with relatively homogenous geomorphology, soils and broad vegetation types in NSW have been classified and mapped at a 1:250 000 scale. These landscapes are referred to as NSW (or Mitchell) Landscapes (Mitchell, 2002).

The subject land occurs largely within the Warraderry Range and partly within the Bimbi Plains (**Figure 1-2** and **1-3**). The Lachlan – Bland Channels and Floodplains also occurs within the study area. The characteristics of these landscapes are described below.

Warraderry Range

Rounded moderately steep ranges and hills on Ordovician phyllite and schist intruded by Devonian granite, general elevation 350 to 570m, local relief 180m. Open forests of red ironbark (*Eucalyptus sideroxylon*), white cypress pine (*Callitris glaucophylla*), red stringybark (*Eucalyptus macrorhyncha*).

Clearing status: Overcleared (81% cleared).

Bimbi Plains

Quaternary alluvial plains from bedrock hills and ridges of the Gobondery/Gillenbine and the Belmont/Brooklyn land systems. General elevation 200 to 250m, local relief 30m. Gravelly clay loams and red brown clays, red-brown texture-contrast soils on higher slopes grading to red-brown gradational and uniform profiles of clay loams and clays along creeks. Grey box (*Eucalyptus microcarpa*) and white cypress pine (*Callitris glaucophylla*) originally dominant, sparse bimble box (*Eucalyptus populnea*) along creek lines. Mostly cleared and cultivated.

Clearing status: Overcleared (93% cleared).

Lachlan– Bland Channels and Floodplains

Extensive Quaternary alluvial plains at the break in slope between the western slopes and western plains. Numerous tributary streams with levees and backplain swamps, occasional lakebed. General elevation 200 to 280m, local relief <10m. Grey cracking clays with gilgai along channels and in swamps. Low levees of red-brown sand or loamy sand on stream banks, extensive red-brown structured texture-contrast soils on the plain. Extensively cleared and cropped. Woodlands of bimble box (*Eucalyptus populnea*), grey box (*Eucalyptus microcarpa*), yellow box (*Eucalyptus melliodora*) and white cypress pine (*Callitris glaucophylla*) with grasses. River red gum (*Eucalyptus camaldulensis*) and river cooba (*Acacia stenophylla*) along creeks, black box (*Eucalyptus largiflorens*) lining back-plain swamp margins. Lignum (*Muehlenbeckia cunninghamii*), common reed (*Phragmites australis*) and cane grass (*Eragrostis australasica*) on lake floors and larger swamps. Bull oak (*Allocasuarina luehmannii*) and belah (*Casuarina cristata*) on extensive gilgai.

Clearing status: Overcleared (82% cleared).

3.4 Geology, Cave, Karst and Soil Features

The underlying geology and soil typical of the subject land and wider study area has been described in **Table 3-2** and above. A single area of outcropping rock, as well as areas of loose surface rock, were noted (see **Figure 5-2**). No caves or karst formations were detected on the subject land or within the wider area that was initially assessed.

3.5 Climate and Weather Data

The field assessments were conducted in June, September, and October of 2021. Weather conditions at the time of the initial BAM survey (June 2021) were cool to mild and wet, reaching a maximum temperature of 21.7^{o} C at Forbes Airport Weather Station, the closest weather station (Station ID 065103) to the Subject Land (Bureau of Meteorology, 2021). In total, 29.4 mm of rain was recorded during the initial BAM survey. Climate statistics have been recorded at Forbes Airport Weather Station since 1995 by the Bureau of Meteorology (BOM) (**Figure 3-1)**.

The study area generally experiences warm to hot summers, with the highest mean maximum temperature of 34.5°C experienced in January. Winters are mild to cool, with temperatures in the coolest month (July) ranging from a minimum of 2.6°C to a mean maximum of 14.7°C (Bureau of Meteorology, 2021).

An average of 493.0 mm of rainfall is recorded annually at Forbes Airport Weather Station. Rainfall is relatively uniform throughout the year, with no obvious wet or dry season (Bureau of Meteorology, 2021). In 2021, the region experienced rainfall significantly above the long-term average (**Figure 3-1**). Only April and May recorded rainfall below the monthly average.

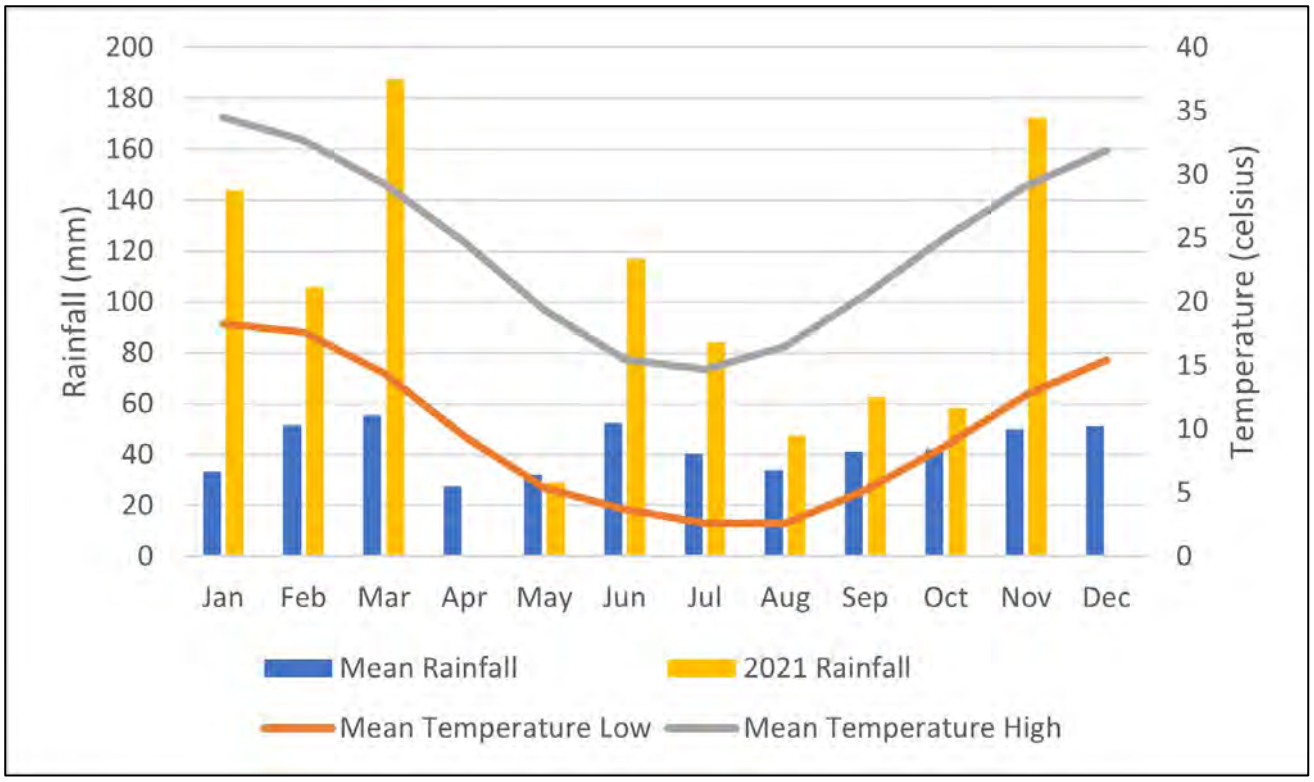

Figure 3-1. Climate statistics for Forbes Weather Station (ID 065103) showing mean minimum and maximum temperatures, mean rainfall, and rainfall for 2021 (Bureau of Meteorology, 2021).

3.6 Biodiversity Values Map

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017*. The subject land does not contain land identified on the BV Map (see **Appendix A**). Land mapped on the BV Map does occur within the study area: Mulyandry Creek, c. 520 m north of the proposal area, is mapped as Protected Riparian Land.

3.7 Areas of Outstanding Biodiversity Value

The site does not contain any currently listed Areas of Outstanding Biodiversity Value (AOBV).

3.8 SEPP (Koala Habitat Protection) 2020 and 2021

Forbes LGA is listed in Schedule 1 – Local Government Areas of the SEPP and therefore is subject to the requirements of the SEPP. As the subject land is zone RU1 (Primary Production), it falls within the remit of the 2020 SEPP. While the vegetation within the subject land is highly disturbed, it nevertheless contains areas of sparse woodland with Koala feed trees (White Box, Yellow Box, Grey Box, and Blakely's Red Gum). Of these four feed trees, White Box is listed under Schedule 2 of the Koala SEPP 2020. In some areas, White Box made up more than 15% of the total number of trees in the upper canopy, therefore the subject land could potentially be considered core Koala habitat. However, as there are no recent records of Koalas within 10 km of the subject land and Koalas were not recorded on site, it is therefore not considered core Koala habitat. The only record within 10 km is from 1972, c. 4.3 km ESE of the subject land. Targeted Koala surveys (Koala SAT and spotlighting) failed to detect any Koalas, or signs of Koalas, on the subject land (**Section 5.3.1**).

The subject land was further assessed under the EPBC Act Referral Guidelines for the vulnerable koala (**Appendix H)**, it was determined the subject land does not constitute critical habitat for the

koala and, the proposal is not likely to significantly impact current or future populations of Koalas and therefore does not require referral.

3.9 Native vegetation cover

Native vegetation cover (woody vegetation, including regrowth and plantations comprised of plants native to New South Wales and non-woody vegetation with no apparent signs of cultivation) was assessed within the study area and the subject land and estimated as the proportion of the study area retaining native vegetation (see **Figure 1-2**). A summary of the vegetation cover estimate is provided in **Table 3-3**. For the purposes of the BAM, the native vegetation cover class has been determined as >10-30%.

Table 3-3. Native vegetation cover estimates in the study area.

Vegetation Cover Type	Description	Cover Within Study Area (ha)	Total area of Study Area (ha)	Native Cover within Study Area (%)
Native vegetation	Remnant woodland and associated derived grassland.	452.17	2532.27	17.86

3.10 Rivers, Streams, Wetlands and Key Fish Habitat

No watercourses are mapped as occurring on the subject land (**Figure 1-2; Figure 3-2**). However, 12 minor, non-perennial watercourses are mapped within the study area, comprising nine Strahler 1st order streams, two Strahler 2nd order streams, and one Strahler 4th order stream (Mulyandry Creek).

Mulyandry Creek has been mapped as Key Fish Habitat (KFH) by the Department of Primary Industries – Fisheries. It has also been identified as Protected Riparian Land (PRL) by the Department of Planning, Industry and Environment. No impacts to this waterway as a result of this proposal are anticipated.

Sediment runoff (caused by ground disturbance/vegetation removal by the proposal) may flow into watercourses within the study area and indirectly cause impacts. However, as the nearest mapped watercourse is approximately 170 m from the subject land, and assuming standard mitigation measures are implemented, the likelihood of this occurring is low.

There are no wetlands mapped with the subject land or study area. The nearest mapped wetlands – two floodplain wetlands occupying 152.08 ha and 188.68 ha – are located c. 3.59 km and c. 5.87 km from the subject land respectively.

3.11 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 can be categorised into 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 (QLD Department of Environment and Heritage Protection, 2017).

Groundwater dependent ecosystems have been classified into seven types under two broad categories as follows (Kuginis *et al*. 2012):

- Subsurface ecosystems – Underground ecosystems
    - Karst systems and caves (limestone geology)
    - Subsurface aquifer (phreatic) ecosystems
    - Baseflow streams (hyporheic or subsurface component)
- Surface ecosystems – Above ground ecosystems
    - Groundwater dependent wetlands
    - Baseflow surface streams (surface/free-water component)
    - Estuarine and near shore marine ecosystems
    - Groundwater dependent terrestrial ecosystems; dependent on subsurface groundwater (phreatophytic).

The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems identified areas of low potential for interaction with terrestrial GDEs within the subject land and surrounding study area (**Figure 3-2**; Bureau of Meteorology, 2017). No high- or moderate-potential GDEs occur on the subject land or within the study area. No aquatic GDEs are mapped within the study area; the closest mapped aquatic GDEs are associated with the floodplain wetlands located c. 3.59 km and c. 5.87 km to the east.

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 6.2** for recommended mitigation measures regarding GDEs.

3.12 Connectivity Features

The subject land is situated in a landscape that has undergone extensive historic clearing. The subject land itself has been cleared for agricultural use, including both grazing and cropping, and only small remnants and isolated paddock trees remain of the original vegetation. The most notable remaining connectivity features in the surrounding landscape occur in the corridor associated with Paytens Bridge Rd, which retains an intermittent covering of woody vegetation, and in the numerous small remnants located in adjacent paddocks, which may act as stepping-stones between larger

remnants. Many of these remnants are identified in the Forbes LEP as possessing high terrestrial biodiversity value (**Appendix A**).

Collectively, the road corridor and wooded remnants may facilitate the movement of fauna species between larger local remnants, including Mulyandry, Tomanbil and Warraderry State Forests, and Conimbla and Nangar National Parks; however, the narrow and intermittent nature of many of these connectivity features is likely to limit their usefulness. Connectivity declines to the north and east of the subject land, where isolated paddock trees and tree lines associated with paddock fences represent the totality of the surviving vegetation.

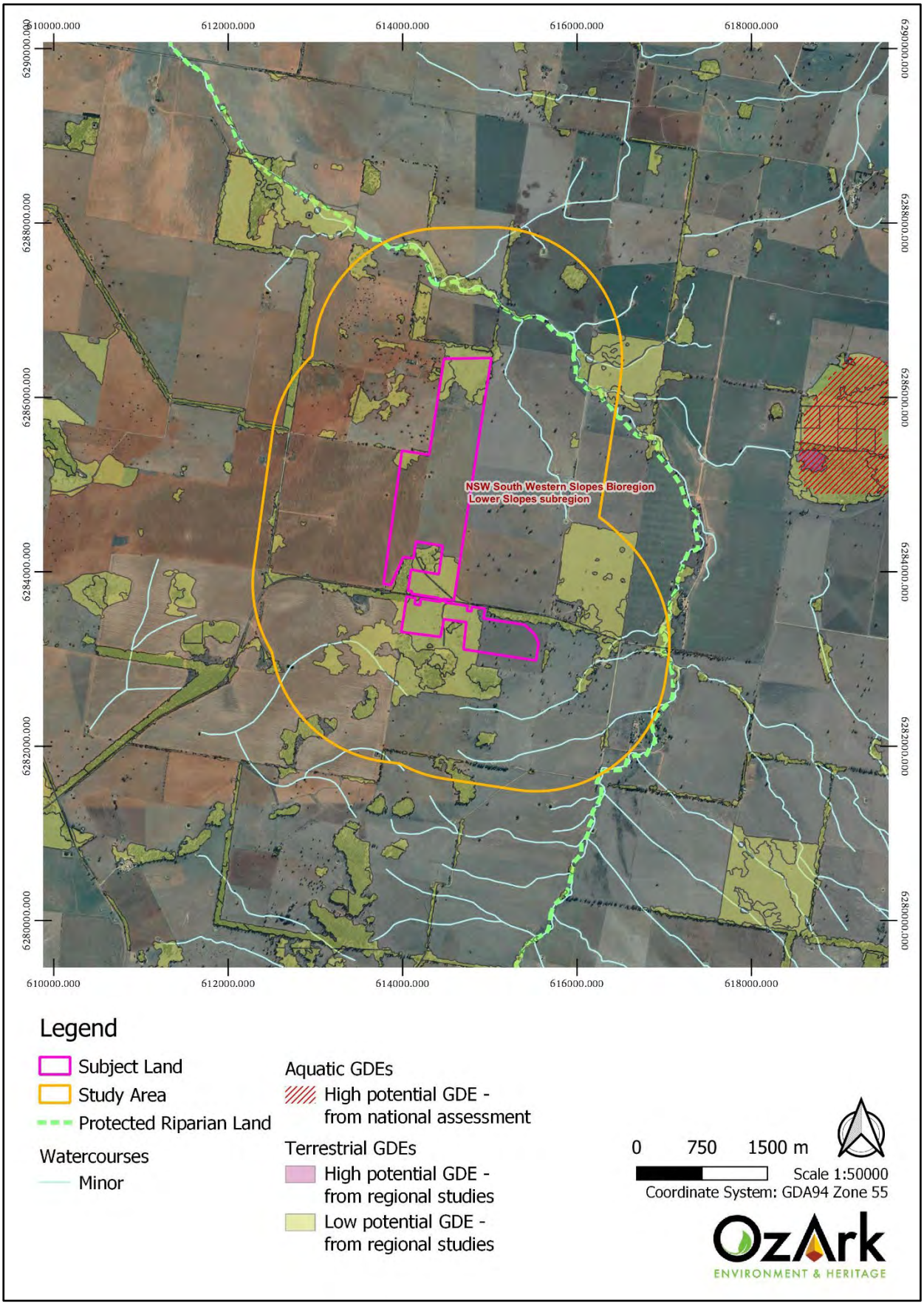

Figure 3-2. Watercourses, Groundwater Dependent Ecosystems, and Protected Riparian Land of the study area.

4 Native Vegetation

4.1 Plant Community Types

The subject land has been subjected to extensive historical clearing. Consequently, vegetation within the subject land consists of small wooded remnants, isolated paddock trees, derived grassland, and non-native vegetation.

Vegetation mapping (OEH, 2019a) available for the Central West/Lachlan region models three PCTs within the subject land:

- PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion
- PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
- PCT 250 – Derived tussock grassland of the central western plains and lower slopes of NSW

The field assessment determined that this modelling is largely incorrect. Instead, the following two PCTs were recorded (**Figure 4-1, Table 4-1**), occurring in a total of five condition states:

- PCT 267 – White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- PCT 282 – Blakely's Red Gum – White Box – Yellow Box – Black Cypress Pine box grass/shrub woodland on clay loam soils on undulating hills of central NSW South Western Slopes Bioregion

The modelled occurrence of PCT 250 corresponds to examples of PCT 267 and PCT 282 in poor condition. While the derived grassland community PCT 250 may broadly describe the vegetation present within the subject land, the BAM states that derived communities should be mapped to their most likely parent PCT; for this reason, mapping of these derived areas to PCT 267 and PCT 282 has been preferred. These communities were identified on the basis of proximity to higher-quality examples of these PCTs and on the basis of surviving groundcover composition.

PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions was present in the north-eastern corner, just outside of the subject land, and has been excluded from the development footprint (**Figure 4-1**). Within the north-eastern extent of the subject land, there is a small section of PCT 76 that appears to be overlapping the subject land, this represents overhanging tree canopy and these trees will not be removed or impacted by the proposal.

Vegetation zones are described further in **Table 4-1** and their extent mapped in **Figure 4-1**. The locations of BAM plots are given in **Figure 4-2**.

Photographs and data sheets completed in the field are provided in **Appendices B** and **C**.

Figure 4-1. Plant Community Types and Vegetation Zones identified during the vegetation survey.

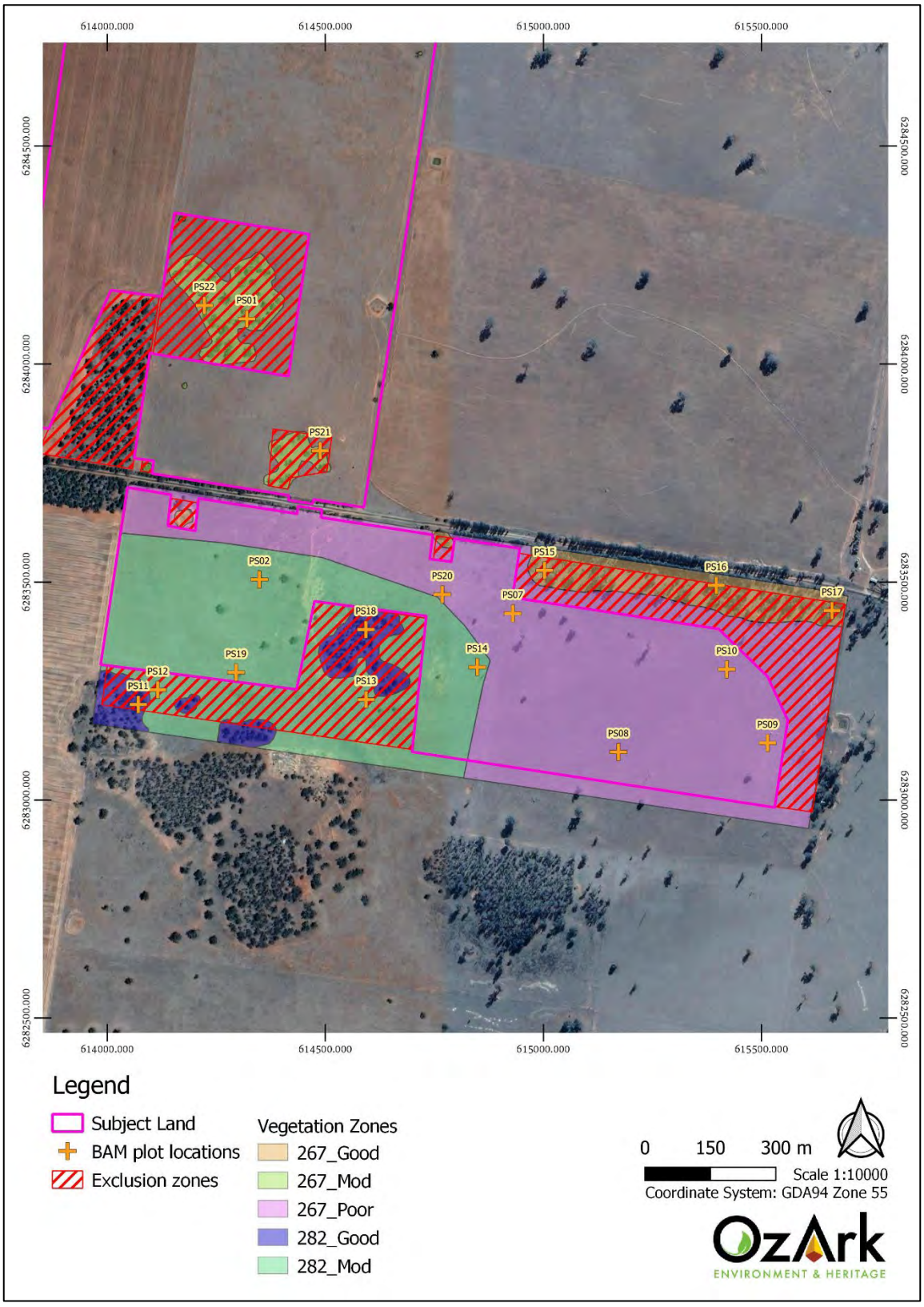

Figure 4-2. Locations of BAM Vegetation Integrity plots.

Note that the vegetation mapping in **Figure 4-2** was subsequently refined to match the final development footprint and exclusion of higher quality wooded areas.

Table 4-1. Plant Community Types present within the subject land.

PCT ID	PCT Name	Vegetation Formation	TEC Status BC Act	TEC Status EPBC Act	Justification of Identification	Current NSW Extent; Percent Cleared
267	White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion	Grassy Woodlands	Criteria met	Criteria not met	**Good condition:** • Woodland featuring a canopy of White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*), and Buloke (*Allocasuarina luehmannii*), all components of PCT 267. • Midstorey sparse but featuring the associated species Wingless Bluebush (*Maireana enchylaenoides*). • Groundcover similarly sparse but featuring the associated grass species *Rytidosperma caespitosum* (syn. *Austrodanthonia caespitosa*), *Enteropogon acicularis*, and *Austrostipa scabra*, as well as the associated forbs *Einadia nutans* and *Vittadinia cuneata*. • All strata (upper, mid and ground) contained at least one species from the BioNet description. • Filtering the BioNet Vegetation Classification Database by the Lower Slopes subregion and the identified canopy species returns only one other PCT (PCT 81). PCT 267 presents a closer match to the observed mid- and ground-layer species. **Moderate condition:** • Canopy cover 10 – 30% (mean 19%), dominated by White Box (*Eucalyptus albens*) or Yellow Box (*Eucalyptus melliodora*), both species associated with PCT 267. • Midstorey sparse or absent but in places featuring the associated species Wingless Bluebush (*Maireana enchylaenoides*). • Groundcover sparse and frequently invaded by weeds but possessing a similar spectrum of grass and forb species to the good condition PCT, including the associated species *Einadia nutans* and *Enteropogon acicularis*. • Occurs in proximity to both PCT 267 in good condition and examples of PCT 282; however, the above-listed species suggest a stronger affinity to PCT 267.	8,000 ha; 89.00%

					Poor condition: • Canopy frequently absent, but isolated trees of White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*), Grey Box (*Eucalyptus microcarpa)* and White Cypress-pine (*Callitris glaucophylla*) were noted. These species are all associated with PCT 267. • Shrub- and ground-layer variable, usually sparse, and with many exotic species; however, the associated species *Chloris truncata*, *Bothriochloa macra*, *Vittadinia cuneata*, and *Rytidosperma caespitosum* were noted throughout. • Occurs in proximity to both PCT 267 and similarly modified areas of PCT 282 and may grade into the latter. The above-listed species suggest a stronger affinity to PCT 267.	
282	Blakely's Red Gum – White Box – Yellow Box – Black Cypress Pine box grass/shrub woodland on clay loam soils on undulating hills of central NSW South Western Slopes Bioregion	Grassy Woodlands	Criteria met	Criteria met for zone 282_ good, only	**Good condition:** • Woodland with canopy dominated by White Box (*Eucalyptus albens*) or Blakely's Red Gum (*Eucalyptus blakelyi*) – this latter species is associated with PCT 282 but not with the nearby PCT 267. • Shrub layer sparse to absent. Ground-layer variable, often relatively diverse, with a mixture of species suggestive of both PCT 282 and PCT 267. Species associated with PCT 282 and found in this zone included *Glycine tabacina*, *Rumex brownii*, and *Cheilanthes sieberi*. • Filtering the BioNet Vegetation Classification Database by the Lower Slopes IBRA subregion and the above-listed species returns only three PCTs, of which one (PCT 633) is a derived grassland and can be disregarded. Of the remaining two (PCT 282 and PCT 81), the former was favoured as the latter is said to be dominated by Grey Box (*Eucalyptus microcarpa*) and this species was not detected in this vegetation zone. • Subsequently excised from the footprint. **Moderate condition:** • Derived grassland with isolated paddock trees, chiefly White Box (*Eucalyptus albens*), with some Blakely's Red Gum (*Eucalyptus blakelyi*) and Yellow Box (*Eucalyptus melliodora*). The presence of *E. blakelyi* suggests a stronger affinity to PCT 282 then PCT 267. • As with the good condition woodland, the mid- and ground-layer in this zone show	5,000 ha; 93.00%

					affinities to both PCT 267 and PCT 282. The presence of *Glycine tabacina*, *Cheilanthes sieberi*, *Rumex brownii*, *Aristida behriana*, and *Aristida ramosa* suggest a stronger affinity to PCT 282 than to PCT 267.	

4.2 Vegetation Zones, Patch Size and Vegetation Integrity

To be assessed under the BAM, native vegetation on the subject land has been assigned a zone, based on its condition state and the patch to which it belongs.

Two PCTs, containing three vegetation zones (PCT 267) and two vegetation zones (PCT 282) respectively, were identified during the site assessment (**Figure 4-1; Table 4-1; Table 4-2**). One vegetation zone, 282_good, was subsequently excised from the footprint in accordance with the principles of avoidance and minimisation and therefore has not been described below. Vegetation on the subject land has been disturbed by historic clearing, cropping and grazing.

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 whilst carrying out field work. A description of each vegetation zone is provided below:

- **Vegetation zone 267_good** – A woodland or open woodland (canopy c. 40%) featuring a canopy dominated by White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), and Buloke (*Allocasuarina luehmannii*). Some Yellow Box (*Eucalyptus melliodora*) was also noted in this zone and White Cypress-pine (*Callitris glaucophylla*) was common in roadside occurrences of this community. The shrub layer was sparse to absent. Wingless Bluebush (*Maireana enchylaenoides*), a component of PCT 267, was noted in places, as were the associated understorey species Ringed Wallaby Grass (*Rytidosperma caespitosum*), Curly Windmill Grass (*Enteropogon acicularis*), Rough Speargrass (*Austrostipa scabra*), Climbing Saltbush (*Einadia nutans*), and Fuzzweed (*Vittadinia cuneata*). This zone was observed to feature a relatively high diversity of native forbs and graminoids. Minor occurrences of the High-threat Exotic species Bathurst Burr (*Xanthium spinosum*) were noted.
- **Vegetation zone 267_moderate** – Open woodland to derived grassland (canopy c. 19%). Where canopy species were present, White Box (*Eucalyptus albens*) or Yellow Box (*Eucalyptus melliodora*) dominated. Isolated Grey Box (*Eucalyptus microcarpa*) and White Cypress-pine (*Callitris glaucophylla*) paddock trees were also noted. The shrub layer was largely absent. Wingless Bluebush (*Maireana enchylaenoides*) occurs in this zone, along with a small number of species considered to form components of PCT 267, including Climbing Saltbush (*Einadia nutans*) and Curly Windmill Grass (*Enteropogon acicularis*). The understorey is generally sparser, less diverse in native plants, and more strongly invaded by exotic species than 267_good. Bathurst Burr (*Xanthium spinosum*) and Silverleaf Nightshade (*Solanum elaeagnifolium*) both occur in this zone.
- **Vegetation zone 267_poor** – Derived grassland with infrequent paddock trees. These were largely White Box (*Eucalyptus albens*), but some Kurrajong (*Brachychiton populneus*) occurs in disturbed areas. The shrub layer was largely absent, though minor occurrences of Western Silver Wattle (*Acacia decora*) were noted. Exotic species were common in the mid- and ground-layers, but significant occurrences of native forbs and tussock grasses were noted. These included Fuzzweed (*Vittadinia cuneata*), Ringed Wallaby Grass (*Rytidosperma caespitosum*), Windmill Grass (*Chloris truncata*), and Red Grass (*Bothriochloa macra*). The High-threat Exotic weed Saffron

Thistle (*Carthamus lanatus*) was common, and occurrences of Bathurst Burr (*Xanthium spinosum*) were noted.

- **Vegetation zone 282_moderate** – Derived grassland with paddock trees or isolated paddock trees in an otherwise agricultural landscape. While retaining a relatively high diversity of native forbs and grasses, significant weed encroachment was noted in this zone. The High-threat Exotic weed Saffron Thistle (*Carthamus lanatus*) was reasonably common, and occurrences of Bathurst Burr (*Xanthium spinosum*) and Silverleaf Nightshade (*Solanum elaeagnifolium*) were noted.
- **Bare ground and non-native vegetation** – This encompasses cropped areas lacking native vegetation communities, derived grasslands or pastures now dominated by exotic species, road surfaces, bare earth, and similar areas that could not be assigned to a PCT.

A patch is defined in the BAM operational manual – Stage 1 (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. The extent of native vegetation was determined from a combination of satellite imagery and State Vegetation Mapping.

As more than 100 m separates vegetation in the north of the subject land from vegetation in the south, two patches were mapped. As total patch size exceeded the threshold for the largest patch size utilised by the BAM-C (100 ha), it was not necessary to continue mapping beyond the study area. The patch sizes for the vegetation zones that were recorded on the subject land are provided in **Table 4-2** and depicted in **Figure 4-3**.

Table 4-2. Vegetation zones and patch sizes of native vegetation on the subject land.

PCT ID	Condition State	VI Score	HBT	Area Impacted	Patch Number	Patch Size	BAM Patch Size Class	Vegetation Zone	BAM Plots
282	Moderate	20.8	Y	20.59	1	290.94	>100 ha	282_Mod	PS02 PS12 PS13 PS14 PS19
267	Good	79.3	Y	0.09	1	290.94	>100 ha	267_Good	PS15 PS16 PS17
267	Moderate	33.6	Y	0.28	1 2	328.69	>100 ha	267_Mod	PS01 PS21 PS22
267	Poor	14.6	Y	35.59	1	290.94	>100 ha	267_Poor	PS07 PS08 PS08 PS10 PS20

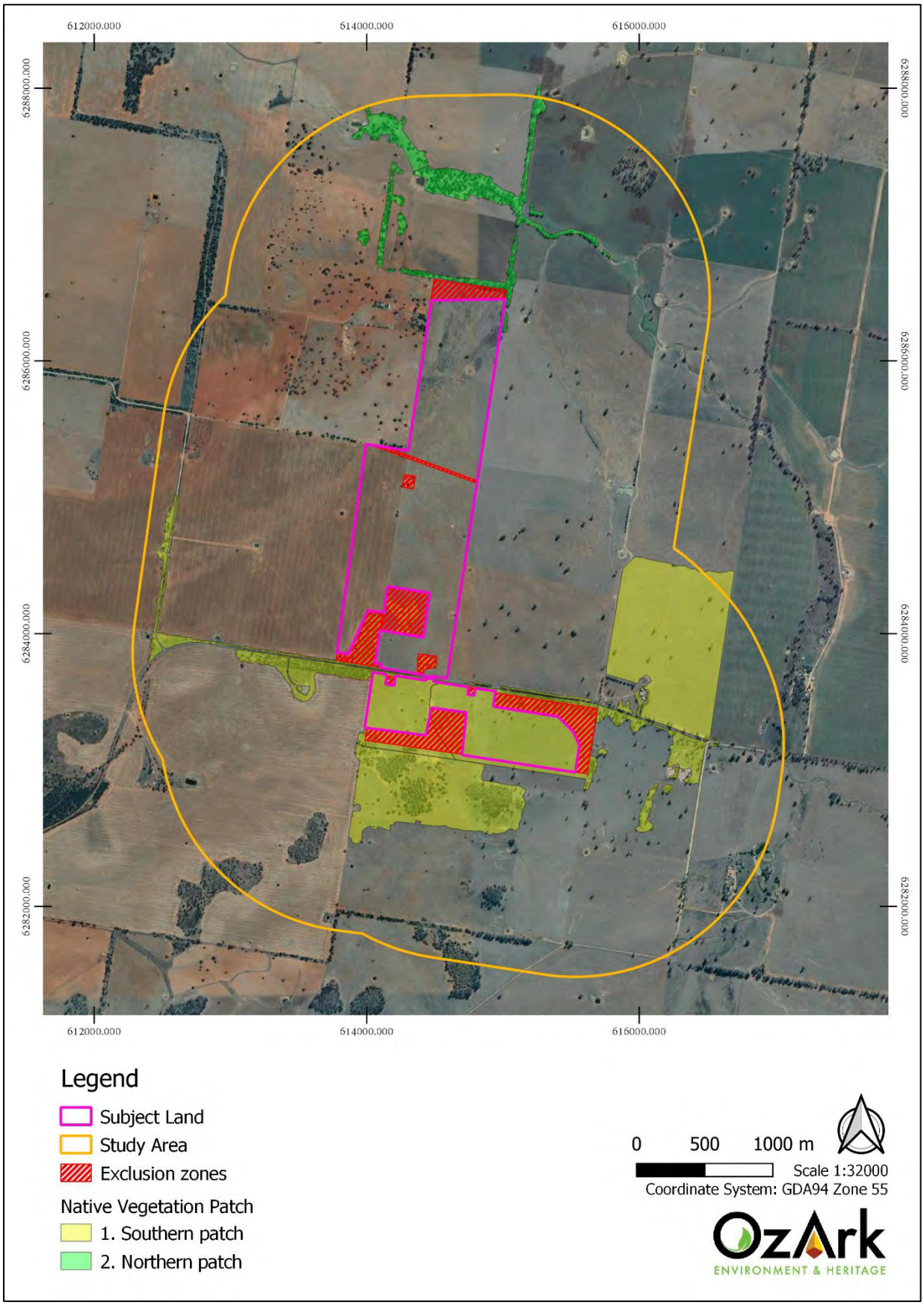

Figure 4-3. Native vegetation patches associated with the vegetation zones.

4.3 Flora Species Observed

The field survey identified a total of 81 flora species within the subject land and wider assessment area. Of these, 57 species (70.37%) were native and 24 (29.63%) exotic. Three of the recorded exotic species – Bathurst Burr (*Xanthium spinosum*), Silverleaf Nightshade (*Solanum elaeagnifolium*), and Saffron Thistle (*Carthamus lanatus*) – are listed as High Threat Exotic (HTE) species under BAM and therefore the BC Act.

Plot photographs, BAM plot datasheets and a list of all flora species observed during the field assessment are provided in **Appendices B** and **C**.

4.4 Threatened Ecological Communities

PCT 267 and PCT 282 are associated with the following TECs:

- BC Act, CEEC: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.
- EPBC Act, CEEC: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Additionally, PCT 267 may be associated with the following TECs:

- BC Act, EEC: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.
- EPBC Act, EEC: Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia.

All vegetation zones recorded on the subject land met the condition thresholds to be considered examples of the White Box – Yellow Box – Blakely's Red Gum CEEC listed under the BC Act (**Figure 4-4**). This listing applies to vegetation within the relevant IBRA subregions that are characterised by the presence or prior occurrence of *Eucalyptus albens*, *Eucalyptus melliodora*, and/or *Eucalyptus blakelyi*, and which possess a generally grassy understorey with at least some native species. In vegetation zone 267_Good, *E. albens* is co-dominant with Grey Box (*E. microcarpa*); however, this still falls within the broad community description contained in the BC Act determination.

The vegetation zone 282_Good was found to meet the condition criteria to be considered an example of the EPBC Act-listed CEEC White Box – Yellow Box – Blakely's Red Gum community and was subsequently excised from the development footprint. The remaining vegetation zones did not meet these criteria (**Figure 4-5**). Reasons for excluding each zone included the co-dominance of *Eucalyptus microcarpa* (267_Good), the scarcity of native non-grass species in the understorey (282_Mod, 267_Mod, 267_Poor), the absence of a listed "important" species for this CEEC (267_Good, 267_Mod), the scarcity of mature trees (282_Mod, 267_Mod, 267_Poor), and the absence of natural regeneration (282_Mod, 267_Mod, 267_Poor). The extent of each TEC is depicted in **Figure 4-6** and **4-7**.

Consequently, up to 56.55 ha of the BC Act-listed CEEC will be impacted by this proposal. There will be no impacts to the EPBC Act-listed CEEC as it has been excluded from the footprint.

While Grey Box (*Eucalyptus microcarpa*) was co-dominant in sections of 267_Good that fall outside the subject land, the small, disjunct occurrence of 267_Good that extends into the subject land is dominated by White Box (*E. albens*); consequently, this section was assessed against the White Box – Yellow Box – Blakely's Red Gum threshold conditions and not the Grey Box threshold conditions. While portions of this PCT are likely to represent examples of the BC Act- or EPBC Act-listed Grey Box TECs, these will not be impacted by the present proposal.

Identifying Box-Gum Woodland Following is a key for use in determining whether Box-Gum Woodland exists on a site. Where doubt exists over an appropriate category (e.g. whether the site is mainly grassy or is shrubby), use a precautionary approach that assumes that the community is present. At each stage there are two alternatives. Choose which is most like the site under consideration, and proceed to the alternative numbered in the right margin.	
1 The site is in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands or NSW South Western Slopes Bioregions: **2** 1 The site is outside the above bioregions: **the site is not Box-Gum Woodland**	Yes, the site is within the NSW South Western Slopes bioregion
2 There are no native species in the understorey, and the site is unlikely to respond to assisted natural regeneration (see section on Degraded Sites, page 3): **the site is not Box-Gum Woodland** 2 The understorey is otherwise: **3**	There were native species in the understorey
3 The site has trees: **4** 3 The site is treeless, but is likely to have supported White Box, Yellow Box or Blakely's Red Gum prior to clearing: **5**	All vegetation zones possessed at least some remnant trees.
4 White Box, Yellow Box or Blakely's Red Gum, or a combination of these species, are or were present: **5** 4 White Box, Yellow Box or Blakely's Red Gum have never been present: **the site is not Box-Gum Woodland**	The dominant trees were White Box and Yellow Box in PCT 267 (with Grey Box in 267_Good) and White Box, Yellow Box, and Blakely's Red Gum in PCT 282.
5 The site is predominantly grassy: **the site is Box-Gum Woodland** 5 The understorey of the site is dominated by shrubs excluding pioneer species (see section on The Understorey: page 2): **the site is not Box-Gum Woodland**	All zones were predominantly grassy and lacked any significant shrub layer. As such, all native vegetation meets the relevant condition thresholds to be considered the CEEC under the BC Act.

Figure 4-4. BC Act Condition thresholds for vegetation that meets the description of the CEEC White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (NSW Threatened Species Scientific Committee, 2011).

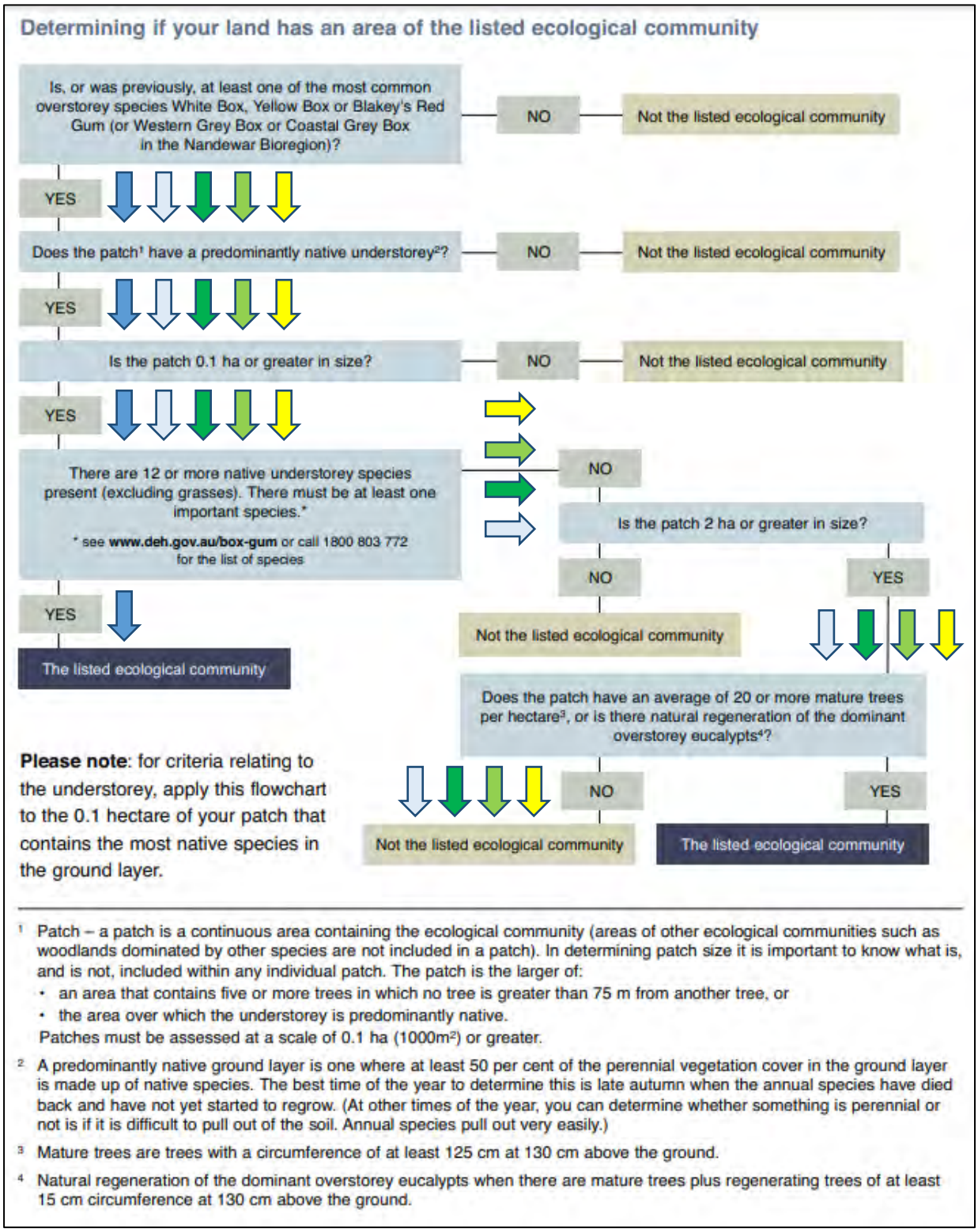

Figure 4-5. Vegetation zones assessed against the EPBC Act condition thresholds for the CEEC White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

In the above figure, vegetation zone 282_good (blue arrow) meets the condition criteria, while 282_moderate (light blue arrow), 267_good (dark green arrow), 267_moderate (green arrow), and 267_poor (yellow arrow) do not. The vegetation zone 282_good was excluded from the development footprint.

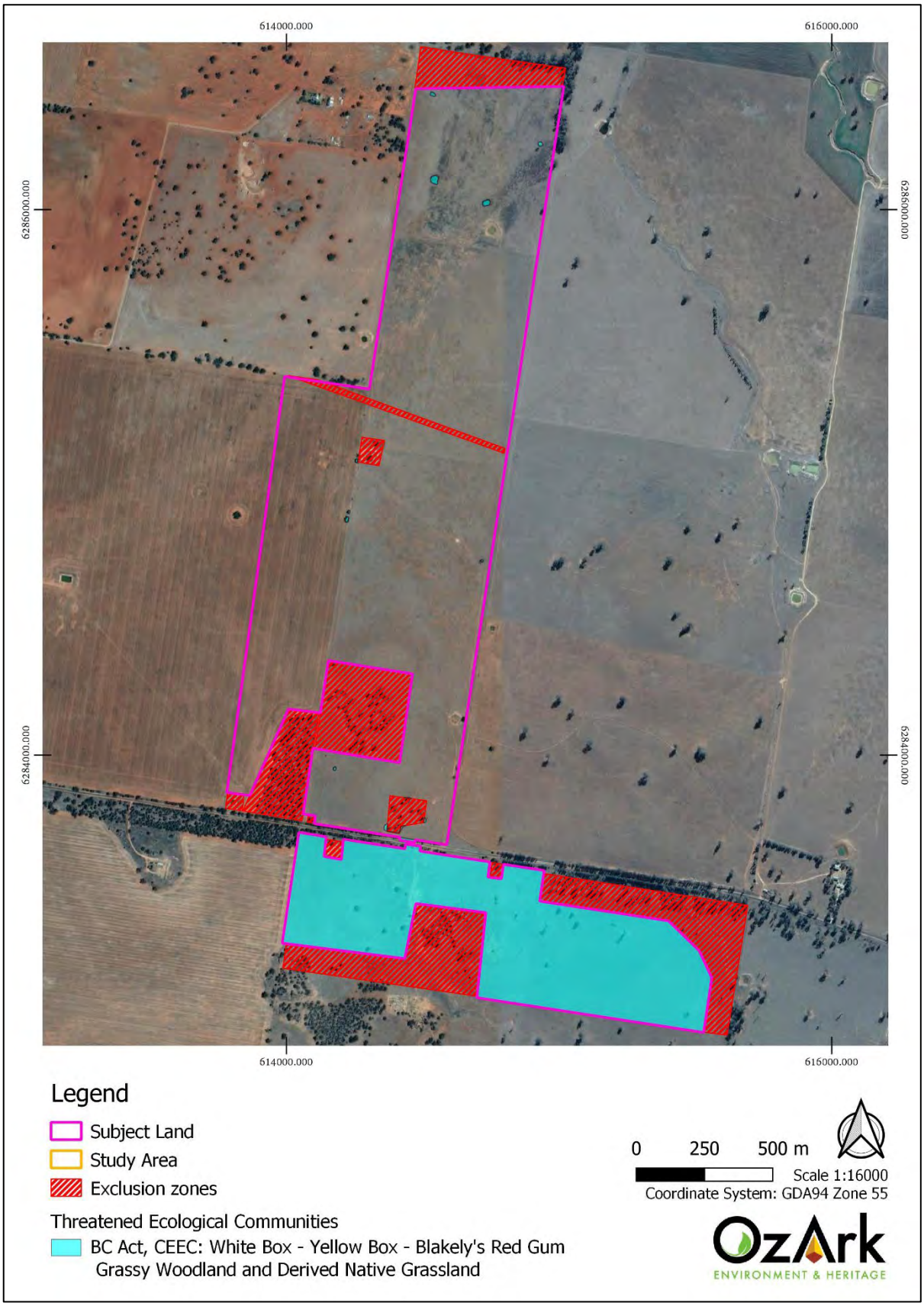

Figure 4-6. Extent of the BC Act-listed CEEC White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

5 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, 2020a).
- 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, 2020a).

5.1 Habitat Features Present

The subject land was assessed for its potential to provide habitat for threatened flora and fauna known or predicted to occur in the study area. Habitat features including but not limited to rock outcrops, caves and overhangs, hollow-bearing trees, wetlands (including dams), and watercourses were recorded, if present.

The subject land was found to contain an area of outcropping rock and scatterings of loose surface rock (**Figure 5-2**). Hollow-bearing trees with both large (>20cm diameter) and small (<20 cm diameter) hollows in both horizontal and vertical orientations were also recorded. Stags (standing dead trees), with and without hollows, were also recorded. No waterways, natural water bodies or wetlands were present within the subject land; however, several small agricultural dams were noted, and these could provide habitat for certain flora and fauna species (e.g., frogs, turtles, fish and waterbirds). Several of these dams have been excluded from the development footprint.

5.2 Ecosystem Credit Species

In total, 32 ecosystem credit species were generated by the BAM-C. The habitat suitability of the subject land for these species was assessed. One species was removed from the list due to habitat constraints, two predicted species were detected during targeted surveys (**Figure 5-7**), and an additional bat species (*Miniopterus orianae oceanensis*) not predicted by the BAM-C was detected during acoustic surveys (**Table 5-1**). Twenty-nine species are assumed present (**Table 5-1**). A habitat assessment summary for each species predicted by the BAM-C is detailed in **Appendix D**.

Table 5-1. Ecosystem credit species predicted to occur and the nature of their presence within, or absence from, the subject land.

Common Name	Scientific Name	Presence
Barking Owl	*Ninox connivens*	Assumed Present
Black Falcon	*Falco subniger*	Assumed Present
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis gularis*	Assumed Present
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	Assumed Present
Corben's Long-eared Bat	*Nyctophilus corbeni*	Assumed Present
Diamond Firetail	*Stagonopleura guttata*	Assumed Present

Common Name	Scientific Name	Presence
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	Assumed Present
Flame Robin	*Petroica phoenicea*	Assumed Present
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Assumed Present
Gilbert's Whistler	*Pachycephala inornata*	Assumed Present
Grey-headed Flying-fox (foraging)	*Pteropus poliocephalus*	Assumed Present
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	Assumed Present
Koala (foraging)	*Phascolarctos cinereus*	Assumed Present
Little Eagle (foraging)	*Hieraaetus morphnoides*	Assumed Present
Little Lorikeet	*Glossopsitta pusilla*	Assumed Present
Masked Owl (foraging)	*Tyto novaehollandiae*	Assumed Present
Regent Honeyeater (foraging)	*Anthochaera phrygia*	Assumed Present
Scarlet Robin	*Petroica boodang*	Assumed Present
Speckled Warbler	*Chthonicola sagittata*	Assumed Present
Spotted Harrier	*Circus assimilis*	Assumed Present
Spotted-tailed Quoll	*Dasyurus maculatus*	Assumed Present
Square-tailed Kite (foraging)	*Lophoictinia isura*	Assumed Present
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	Present (detected during survey)
Little Pied Bat	*Chalinolobus picatus*	Assumed Present (possibly detected by bat logger)
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	Present (detected during survey)
Superb Parrot (foraging)	*Polytelis swainsonii*	Present (detected during survey)
Swift Parrot (foraging)	*Lathamus discolor*	Assumed Present
Turquoise Parrot	*Neophema pulchella*	Assumed Present
Varied Sittella	*Daphoenositta chrysoptera*	Assumed Present
White-bellied Sea-Eagle (foraging)	*Haliaeetus leucogaster*	Assumed Present
White-throated Needletail	*Hirundapus caudacutus*	Assumed Present
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Assumed Present
Painted Honeyeater	*Grantiella picta*	Absent (habitat constraints)

5.3 Species Credit Species

In total, 21 species credit species were generated by the BAM-C (**Table 5-2**). 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 recommended guidelines, or else assumed present.

After consideration of habitat constraints, four species and one endangered population could be discounted due to distribution or the unsuitability of habitat within the subject land, while 16 species credit species still had the potential to occur. Surveys were conducted for 15 of the remaining 16 species determined to potentially occur at the site. Surveys followed relevant

and approved BAM survey methodologies (**Section 5.3.1**). One species was assumed present because the targeted surveys were outside of the recommended targeted survey month.

Table 5-2. Species credit species predicted to occur and the nature of their presence within or absence from the subject land.

Common Name	Scientific Name	Species presence
Ausfeld's Wattle	*Acacia ausfeldii*	Absent (surveyed)
Pink-tailed Legless Lizard	*Aprasia parapulchella*	Absent (surveyed)
Bush Stone-curlew	*Burhinus grallarius*	Absent (surveyed)
Gang-gang Cockatoo (breeding)	*Callocephalon fimbriatum*	Absent (surveyed)
Eastern Pygmy-possum	*Cercartetus nanus*	Absent (surveyed)
Large-eared Pied Bat	*Chalinolobus dwyeri*	Absent (surveyed)
Pine Donkey Orchid	*Diuris tricolor*	Absent (surveyed)
Little Eagle (breeding)	*Hieraaetus morphnoides*	Absent (surveyed)
Square-tailed kite (breeding)	*Lophoictinia isura*	Absent (surveyed)
Barking Owl (breeding)	*Ninox connivens*	Absent (surveyed)
Squirrel Glider	*Petaurus norfolcensis*	Absent (surveyed)
Koala (breeding)	*Phascolarctos cinereus*	Absent (surveyed)
Superb Parrot (breeding)	*Polytelis swainsonii*	Present (detected during survey)
Small Purple-pea	*Swainsona recta*	Absent (surveyed)
Silky Swainson-pea	*Swainsona sericea*	Absent (surveyed)
Masked Owl (breeding)	*Tyto novaehollandiae*	Assumed present
Grey-headed Flying Fox (breeding)	*Pteropus poliocephalus*	Absent (habitat constraint)
Regent Honeyeater (breeding)	*Anthochaera phrygia*	Absent (habitat constraint)
Swift Parrot (breeding)	*Lathamus discolor*	Absent (habitat constraint)
White-bellied Sea-Eagle (breeding)	*Haliaeetus leucogaster*	Absent (habitat constraint)
Squirrel Glider in the Wagga Wagga LGA	*Petaurus norfolcensis – endangered population*	Absent (geographic limitation)

5.3.1 Species credit species targeted surveys

Targeted species surveys were conducted according to the methodologies outlined in **Table 5-3**, which were based on the BAM and its associated guidelines and documents. The BioNet species records from within 10 km of the subject land are also displayed in **Table 5-4** for site context. The localities of threatened species detected on site during the targeted survey are displayed in **Figure 5-7.** Bat species detected on bat loggers are listed in **Appendix C.**

Table 5-3. Threatened Species Targeted Survey Methodology and Results.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
Ausfeld's Wattle	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below such that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the	**OEH, 2016**	**August - October**	Surveys were conducted on **29 September 2021** and **13-14 October 2021**.	1. The target species is associated with both PCT 267 and PCT 282. 2. (a) The targeted survey took place in September and October, within the survey window for this species. (b) The survey was conducted following an extended period of above-average rainfall, which is likely to have promoted the growth of the species, if present. (c) All vegetation zones in both PCT 267 and PCT 282 were searched. **3.** (a) Targeted surveys were undertaken using 20 m transects, as is recommended for medium-sized (1-6 m) shrub species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched (e) Tracks were recorded using handheld GPS devices (**Figure 5-3**). This survey did not detect Ausfeld's Wattle, nor any species which may be mistaken for Ausfeld's Wattle. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Pink-tailed Legless Lizard	1. The assessor must search the subject land for potential species-appropriate habitat: (a) sparse or no tree cover; (b) little or no leaf litter; (c) scattered small rocks lightly embedded in the soil surface, or resting on soil on top of more deeply buried rocks, (d) the presence of native grasses, especially (e) the presence of *Themeda triandra*. 2. Where appropriate habitat is present the assessor should; (a) search any appropriate homogeneous habitat by lifting suitable bushrock, searching for either active occupancy or evidence of recent occupancy (sloughed skins, potential	**DEC, 2004** **DSEWPC, 2011b**	**September - November**	Surveys were conducted over three days: **28-30 September 2021**. Survey entailed nocturnal searches, flipping of 420 rocks and 50 wooden posts.	1. (a-c) Suitable areas of loose surface rock were detected within the subject land. (d) Numerous native grass species were recorded; however, (e) *Themeda triandra* was not among them. 2. (a-b) In total, 420 rocks and 50 wooden posts were overturned. (c) Surveys were conducted in the morning and all survey activity followed an extended period of above-average rainfall (**Figure 3-1**). Bushrock areas where most rock turning took place are shown in **Figure 5-2.** **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	burrows) by the species, (b) Rock cover density is used to determine search effort for this species, 150-200 rocks should be searched per plot, (c) surveys must be conducted in the morning or on cloudy days and after periods of extended rainfall.				
Bush Stone-curlew	1. The assessor must search the subject site for signs of breeding as follows; (a) presence of male and female **OR** (b) calling to each other (duetting) **OR** (c) find nest. 2. Where signs of breeding on site are present, potential habitat must be recorded, potential habitat for this species included patches of dense vegetation, particularly where logs and dead wood is present. 3. Where potential habitat is identified on site then, night monitoring at the identified potential habitat locations for a minimum of 2 nights (4 or more nights should be conducted to reach at least 50% likelihood of	**DEC, 2004** **DEWHA, 2010b**	**January-December**	Call playback and spotlighting surveys were conducted over five nights (**27-29 September 2021, 13-14 October 2021**). Diurnal bird surveys were also conducted from **27-29 September 2021 and 13-14 October 2021**.	1. (a & b) No individuals were detected on the subject land. (c) No potential nests were recorded on the subject land. 2. No signs of breeding were detected (see above). Potential habitat for the species was surveyed 3. As no prescribed DPIE survey methodology is available for this species, the methodology used during this targeted survey was based on the NSW draft guidelines for surveying threatened species (DEC, 2004) and the Federal Guidelines for Surveying Threatened Birds (DEWHA, 2010b). The call playback survey was conducted over five nights (27-29 September 2021, 13-14 October 2021) to fall within the survey timing window and reach at least 50% probability of detection. Call playback was conducted as per DEC (2004): "Survey points should be approximately 2-4 km apart depending on weather conditions (calm, clear nights are best). Play calls for 30 s followed by 4.5 minutes of listening. Repeat 5 minute cycle three times per site." Call playback locations are shown in **Figure 5-1.** The species was also surveyed via five nights of spotlighting

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	detection) should be undertaken to detect the presence of any individual of this species using a potential habitat or demonstrating behaviour focussed on a potential patch of suitable habitat (e.g. territorial calls, persistent presence around a patch of dense vegetation of fallen log). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).				and 20 hours of diurnal searches (**Figure 5-6)**. **Result: Absent (Surveyed)**
Gang-gang Cockatoo (breeding)	1. Assessors should look for signs of breeding on site as follows; (a) begging birds of any age **OR** sex, **OR** (b) lone adult males identified during the breeding season (April to August); **OR** (c)an occupied nest. 2. Where signs of breeding are present, potential nest trees should be identified. Potential	**DEC, 2004** **DEWHA, 2010b**	**October - January**	Habitat tree watches were conducted at dusk (90 minutes per night) on five nights: **27-29 September 2021** and **13-14 October 2021**. Diurnal	1. (a-c). No birds and no signs of breeding were detected. However, as potential nest trees were identified, step 2 and 3 were still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, multiple potential nest trees were recorded within the subject land 3. Once potential roost sites had been identified, observation periods beginning 30 minutes prior to sunset and ending 60 minutes after sunset were

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	nest trees contain hollows that are; (i) at least 8 m above the ground; and (ii) in stems with a diameter of at least 30 cm; and (iii) hollow diameter is at least 15 cm; and (iv) stem angle is at least 45 degrees and may be near vertical or vertical. 3. Where there are potential nest trees identified on site, monitor for this species during the breeding season (October-January) to confirm the presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake a species survey using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).			bird surveys (primarily at dawn and dusk) were also conducted from **27-29 September 2021** and **13-14 October 2021**.	conducted. Additionally, potential roost trees are searched for evidence of the target species, e.g. dropped feathers, scats, or nest material. Habitat trees or stags watched are shown in **Figure 5-1**. The species was also surveyed via 20 hours of diurnal searches (**Figure 5-6)**. **Result: Absent (Surveyed)**
Eastern Pygmy-possum	No written guidelines for surveys. Camera traps have been identified as the most effective method of locating non-flying mammals present at low or moderate	**DSEPWC, 2011**	**October - March**	Habitat tree and stag watches were conducted over five	1. Three camera traps were baited with a mixture of oats, peanut butter, and honey and deployed on four trees within the subject land (**Figure 5-4**). No individuals of this species were detected.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	densities (DSEPWC 2011). The same guidelines identify stag-watching as an effective means of locating arboreal mammals.			nights: **27-29 September 2021** and **13-14 October 2021**. Three camera traps were deployed between **27-29 September 2021,** one trap was deployed from 29 September to 13 October 2021, amounting to a total of 22 trap nights.	2. Stag watching likewise did not detect any individuals of this species. Habitat trees or stags watched are shown in **Figure 5-1**. **Result: Absent (Surveyed)**
Large-eared Pied Bat	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below. 2. (a) The survey must take place within the appropriate survey window (mid November to end January) and (b) the survey	**OEH, 2018**	**November-January**	Two SM4BAT loggers were deployed from **02-21 December 2021**, amounting to 40 trap nights.	1. Two bat loggers were deployed on two trees within the excluded better quality forested or rocky habitat (**Figure 5-1**). No individuals of this species were detected. See **Appendix C** for a list of all species detected. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	should involve either harp traps/mist nets, or acoustic detection, over a minimum of 4 calendar nights (minimum of 16 trap nights)				
Pine Donkey Orchid	3. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below given that the following conditions can be met. 4. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 5. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and	**OEH, 2016**	**September - October**	Surveys were conducted on **29 September 2021** and from **13-14 October 2021**.	1. The target species is associated with PCT 267. 2. (a) The targeted survey took place in September and October, within the survey window for this species. (b) The survey was conducted following an extended period of above-average rainfall, which is likely to have promoted the growth of the species, if present. (c) All vegetation zones in PCT 267 were searched. 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for forb species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using handheld GPS devices (**Figure 5-3**). 4. This survey did not detect the Pine Donkey Orchid, nor any species (for example, other *Diuris* species) which may be mistaken for the Pine Donkey Orchid. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	(b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Little Eagle (breeding)	1. The surveyor must search the subject land for potential breeding habitat. Breeding habitat for this species is (a) live (occasionally dead) large old trees (b) within suitable vegetation **AND** (c) the presence of a male and female; or female with nesting material; (d) or an individual on a large stick nest in the top half of the tree canopy. 2. Where there are potential nest trees identified on site, monitor for this species during the breeding season (August-	**DEC, 2004** **DEWHA, 2010b**	**August - October**	Habitat tree watches were conducted over five nights: **27-29 September 2021** and **13-14 October 2021**. Diurnal bird surveys were also conducted from **27-29 September 2021**.	1. (a-c). No birds and no signs of breeding were detected. However, as potential nest trees were identified, step 2 and 3 were still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, multiple potential nest trees were recorded within the subject land 4. Once potential roost sites had been identified, observation periods beginning 30 minutes prior to sunset and ending 60 minutes after sunset were conducted. Additionally, potential roost trees are searched for evidence of the target species, e.g. dropped feathers, scats, or nest material. Habitat trees or stags watched are shown in **Figure 5-1**. The species was also surveyed via 20 hours of diurnal searches (**Figure 5-6)**.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	October) to confirm the presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).				**Result: Absent (Surveyed)**
Square-tailed Kite (breeding)	1. The surveyor must search the subject land for potential breeding habitat. Breeding habitat for this species is (a) live (occasionally dead) large old trees (b) within suitable vegetation **AND** (c) the presence of a male and female; or female with nesting material; (d) or an individual on a large stick nest in the top half of the tree canopy. 2. Where there are potential nest trees identified on site, monitor for this species during the breeding season (September-January) to confirm the	**DEC, 2004** **DEWHA, 2010b**	**September-January**	Habitat tree watches were conducted over five nights: **27-29 September 2021** and **13-14 October 2021**. Diurnal bird surveys were also conducted from **27-29 September 2021**.	1. (a-c). No birds and no signs of breeding were detected. However, as potential nest trees were identified, step 2 and 3 were still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, multiple potential nest trees were recorded within the subject land 5. Once potential roost sites had been identified, observation periods beginning 30 minutes prior to sunset and ending 60 minutes after sunset were conducted. Additionally, potential roost trees are searched for evidence of the target species, e.g. dropped feathers, scats, or nest material. Habitat trees or stags watched are shown in **Figure 5-1**. The species was also surveyed via 20 hours of diurnal searches (**Figure 5-6)**.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	presence of any actual nest trees on site. DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).				**Result: Absent (Surveyed)**
Barking Owl (breeding)	1. The assessor must search the subject site for signs of breeding as follows; (a) presence of male and female **OR** (b) calling to each other (duetting) **OR** (c) find nest. 2. Where signs of breeding on site are present, potential nest trees should be identified. Potential nest trees are living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground. 3. Where potential nest trees are identified on site then, night monitoring at the identified potential nest locations for a	**DEC, 2004** **DEWHA, 2010b**	**May-December**	Habitat tree watches were conducted over five nights: **27-29 September 2021** and **13-14 October 2021**. Diurnal bird surveys were also conducted from **27-29 September 2021**. Nocturnal call playback was conducted on **27-29**	1. (a-c). No birds and no signs of breeding were detected. However, as potential nest trees were identified, step 2, 3 and 4 were still undertaken to be certain that breeding habitat did not occur. 2. No signs of breeding were detected (see above). However, multiple potential nest trees were recorded within the subject land 3. Once potential roost sites had been identified, observation periods beginning 30 minutes prior to sunset and ending 60 minutes after sunset were conducted. Additionally, potential roost trees are searched for evidence of the target species, e.g. dropped feathers, scats, or nest material. Habitat trees or stags watched are shown in **Figure 5-1**. 4. Call playback was undertaken at two sites on five separate nights (27-29 September 2021, 13-14 October 2021). The Barking Owl call was played intermittently for

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	minimum of 2 nights (4 or more nights should be conducted to reach at least 50% likelihood of detection) should be undertaken to detect the presence of any owl of this species using a potential nest tree or demonstrating behaviour focussed on a potential nest tree (e.g. investigating the hollow or roosting within 10 m). DPIE is currently developing survey guidance for threatened bird species. In the interim, assessors must undertake species surveys using best practice methods that can be replicated for repeat surveys (as per the BAM threatened species survey requirements).			**September 2021** and on **13-14 October 2021**.	5 minutes followed by a 10 minute period of listening and spotlighting (**Figure 5-1; Figure 5-6)**. **Result: Absent (Surveyed)**
Squirrel Glider	No written guidelines for surveys. Francis et al. (2015) reported good success using camera traps to detect this species.	**Francis et al. (2015)**	**January-December**	Habitat tree watches were conducted over five nights: **27-29 September 2021** and **13-14 October 2021**. Three camera traps	1. Three camera traps were baited with a mixture of oats, peanut butter, and honey and deployed on four trees within the subject land (**Figure 5-4**). No individuals of this species were detected. 6. Stag watching likewise did not detect any individuals of this species. Habitat trees or stags watched are shown in **Figure 5-1**. The species was also surveyed via spotlighting (**Figure 5-6)**.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
				were deployed between **27-29 September 2021**.	**Result: Absent (Surveyed)**
Koala (breeding)	1. The surveyor must determine if potential habitat exists on the subject land, (a) either through associated PCTs **OR** (b) the presence of known feed trees **OR** (c) the presences of recent historic records. 2. If suitable habitat is recorded on the subject land then the surveyor must utilize the following methodology: (a) using an appropriate handheld spotlight, (b) conduct spotlighting transects of all potential habitat for (c) at least two consecutive nights, (d) over a distance of at least 1km per night.	**DEC, 2004**	**January-December**	Spotlighting surveys were conducted over five nights: **27-29 September 2021** and **13-14 October 2021**. Koala SAT conducted **28 September 2021**.	1. (a-c) The species is associated with PCTs 267 and 282. Four Koala food trees – *Eucalyptus albens*, *Eucalyptus melliodora*, *Eucalyptus microcarpa*, and *Eucalyptus blakelyi* – were recorded on the subject land. The closest historic Koala record is c. 4.3 km ESE and dates to 1972. The subject land was thus considered possible, though unlikely, Koala habitat. 2. (a-d) Spotlighting transects (**Figure 5-6**) were conducted using an appropriate head torch over three consecutive nights between the 27th and 29th of September and two consecutive nights in October 2021 (13-14th). In addition, 30 Koala food trees were assessed for the presence of scratches, scats, or other traces of the Koala using the Koala SAT method (Phillips and Callaghan 2007). **Result: Absent (Surveyed)**
Superb Parrot (breeding)	1. The assessor must determine whether appropriate habitat is present as follows; (a) determine the presence of eucalypt woodland, (b) particularly where the following species are present; *Eucalyptus*	**DEC, 2004** **DEWHA, 2010b**	**September - November**	Habitat tree watches were conducted over five nights: **27-29 September 2021** and **13-**	1. (a-b) Eucalypt woodland containing *Eucalyptus melliodora* and *Eucalyptus microcarpa* occurs within the subject land. (c) Multiple potential nest trees were recorded both on and immediately adjacent to the subject land. 2. (a-d) Both males and females of the species were

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	camaldulensis, E. melliodora, E. microcarpa. (c) determine if hollow bearing trees are present on the subject land. 2. DPIE does not provide targeted survey methodology for threatened birds under the BC Act however as this species is also listed as vulnerable under the EPBC act, surveys were conducted as per DAWE guidelines (DEWHA, 2010b) which are as follows; Where potential habitat is present the surveyor must conduct at least 12 hours either (a) Area searches or (b) transect surveys of suitable habitat, (c) preferably in the early morning (sunrise to 10 am) and evening (4 pm to sunset), to determine foraging habitat (d) and 12 hours of targeted habitat survey (habitat tree watching) to determine if individuals are accessing hollows on the subject land to determine if breeding habitat is present.			**14 October 2021**. Diurnal bird surveys were also conducted from **27-29 September 2021**.	sighted at numerous locations within the subject land and in habitat containing hollow-bearing trees immediately adjacent to the subject land (**Figure 5-7**). **Result: Present (Detected during survey)**
Small Purple-pea	1. Where a PCT associated with the target species is recorded	**OEH, 2016**	**September - November**	Surveys were conducted on	1. The target species is associated with both PCT 267 and PCT 282.

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	OR the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below given that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential			**29 September 2021** and from **13-14 October 2021**.	2. (a) The targeted survey took place in September and October, within the survey window for this species. (b) The survey was conducted following an extended period of above-average rainfall, which is likely to have promoted the growth of the species, if present. (c) All vegetation zones in both PCT 267 and PCT 282 were searched. 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for forb species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using handheld GPS devices (**Figure 5-3**). 4. This survey did not detect the Small Purple-pea, nor any species (for example, other *Swainsona* species) which may be mistaken for the Small Purple-pea. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				
Silky Swainson-pea	1. Where a PCT associated with the target species is recorded **OR** the surveyor determines that habitat present on the subject land is likely to support the target species then a targeted survey must be conducted using the methodology detailed below given that the following conditions can be met. 2. (a) The survey must take place within the appropriate survey window and (b) within abiotic conditions under which the target species is likely to be detected if present. (c) Appropriate habitat must be identified on the subject land. 3. (a) Parallel transects must be conducted at a prescribed distance based on the growth form of the target species and (b) the density of the	**OEH, 2008** **OEH, 2016**	**September - November**	Surveys were conducted on **29 September 2021** and from **13-14 October 2021**.	1. The target species is associated with both PCT 267 and PCT 282. 2. (a) The targeted survey took place in September and October, within the survey window for this species. (b) The survey was conducted following an extended period of above-average rainfall, which is likely to have promoted the growth of the species, if present. (c) All vegetation zones in both PCT 267 and PCT 282 were searched. 3. (a) Targeted surveys were undertaken using 10 m transects, as is recommended for forb species in open habitats. (b) The vegetation was open throughout. (c) A suitable walking speed of 4 km/h was maintained. (d) All associated habitat was searched. (e) Tracks were recorded using handheld GPS devices (**Figure 5-3**). 4. This survey did not detect the Silky Swainson-pea, nor any species (for example, other *Swainsona* species) which may be mistaken for the Silky Swainson-pea. **Result: Absent (Surveyed)**

Species	Survey requirements (TBDC)	Primary reference material	Survey timetable (BAM-C)	Survey Period (see also Table 2-3)	Results of survey
	surrounding vegetation. (c) Transects must be walked at a reasonable speed based on the density of the surrounding vegetation to maximise the potential of detection by the surveyor. (d) All potential habitat on the subject land must be searched for the species and (e) tracks of the walked transects should be recorded using a suitable GPS device.				

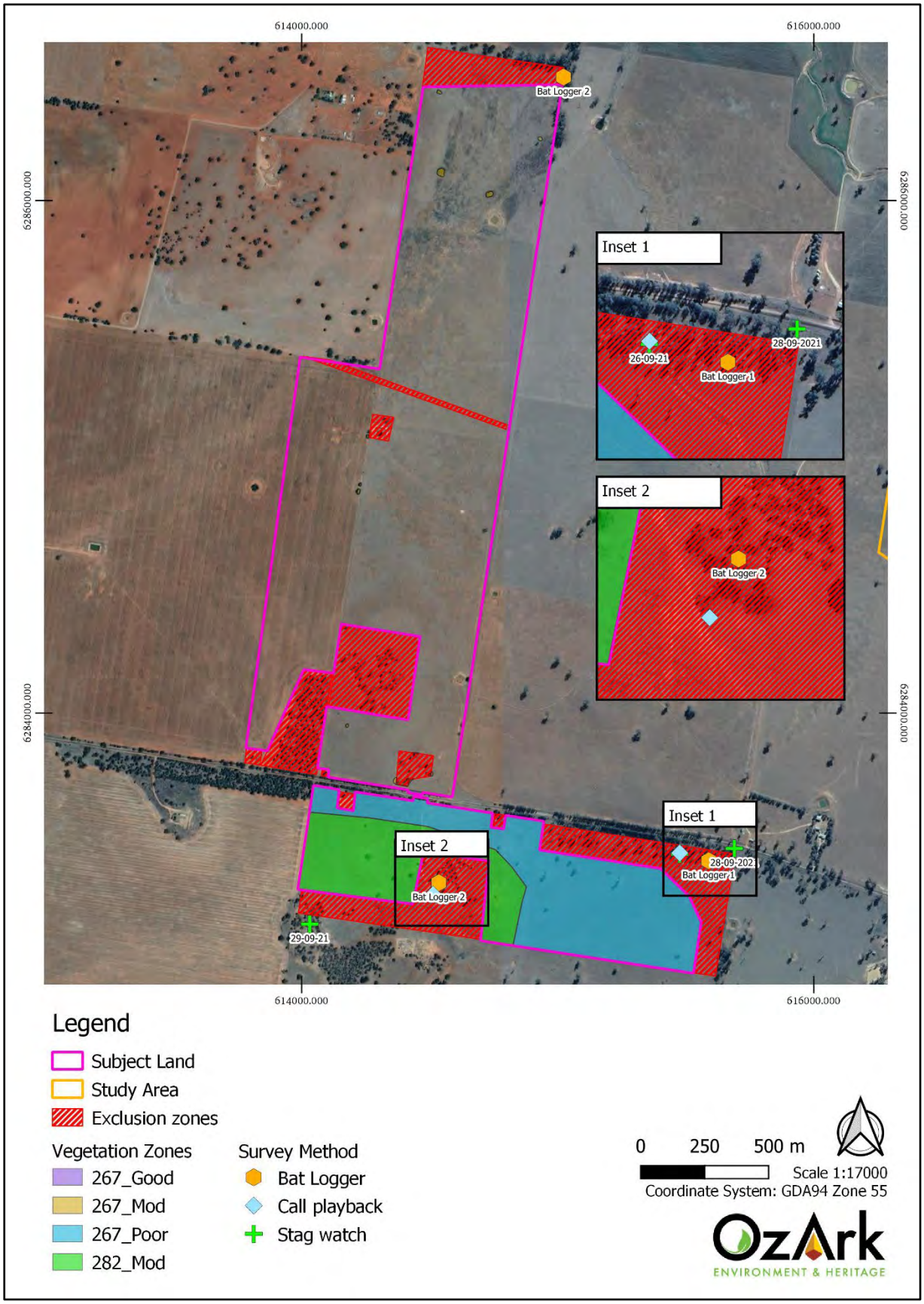

Figure 5-1. Targeted survey: Call playback, stag watch and bat logger locations. Trees both on and adjacent to the subject land were surveyed to assist in determining likelihood of occurrence.

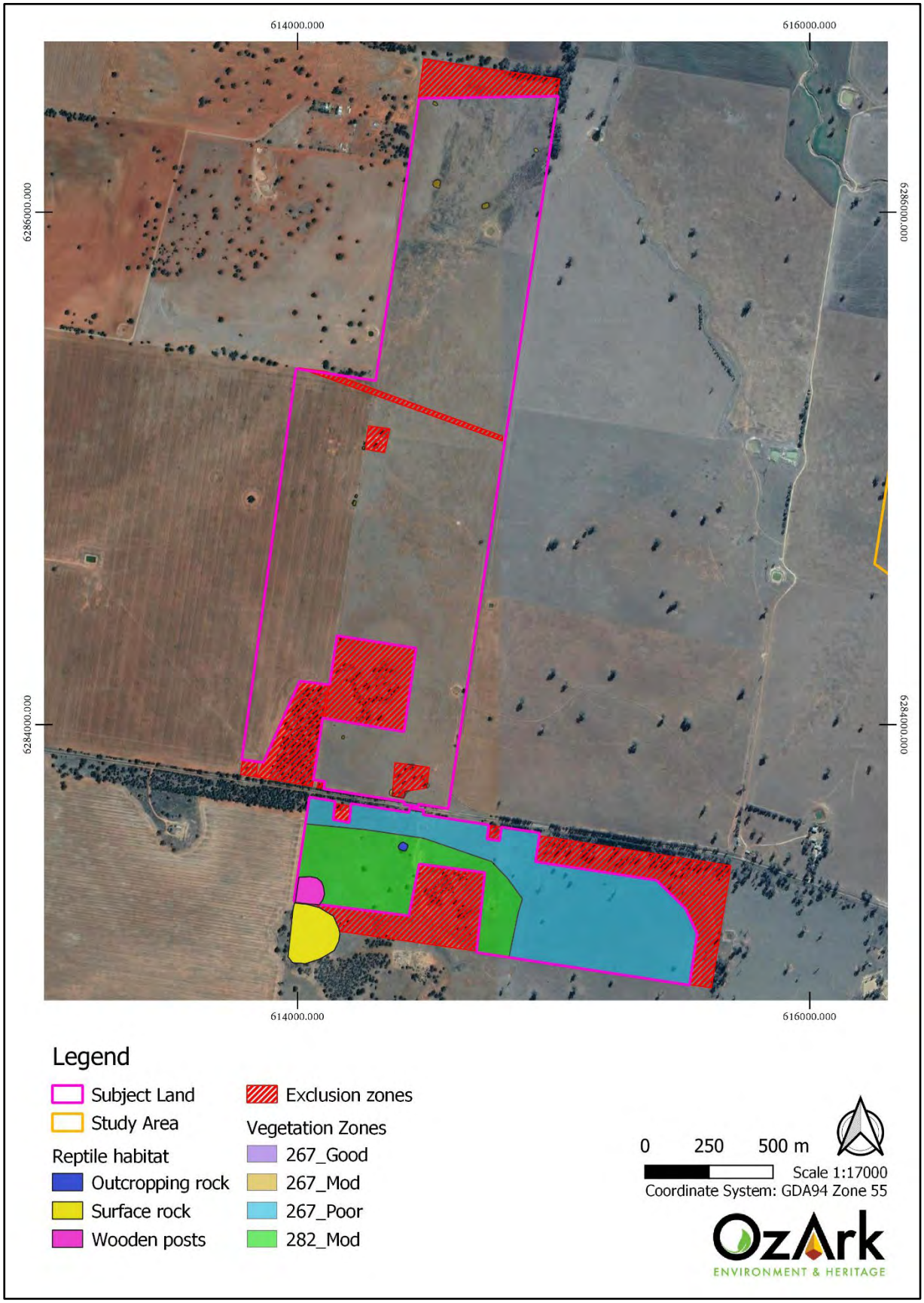

Figure 5-2. Targeted survey: Location of reptile habitat, including outcropping and surface rock (prescribed impacts) and wooden posts scattered on the ground.

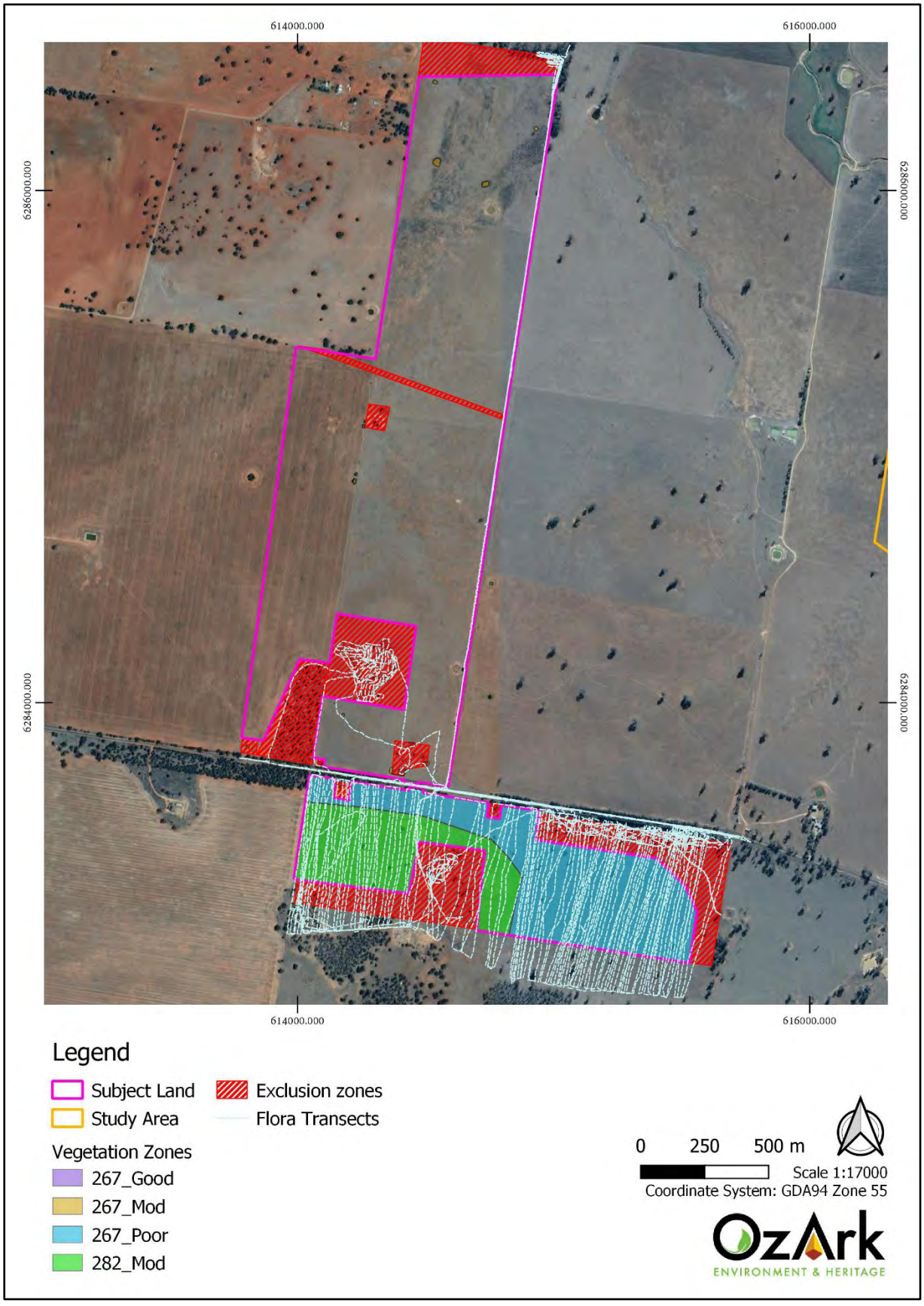

Figure 5-3. Targeted survey: Parallel flora transects.

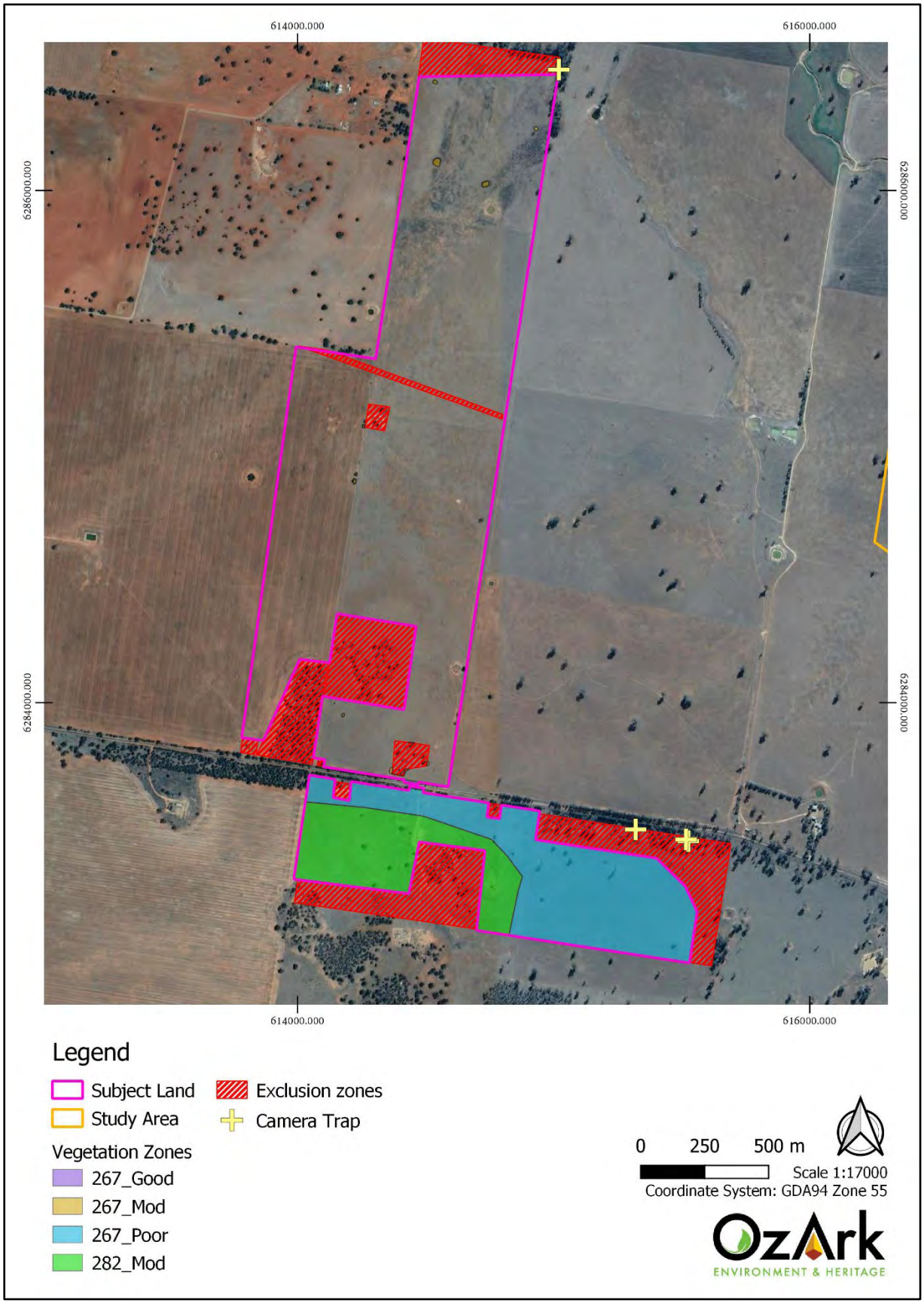

Figure 5-4. Targeted survey: Location of baited camera traps.

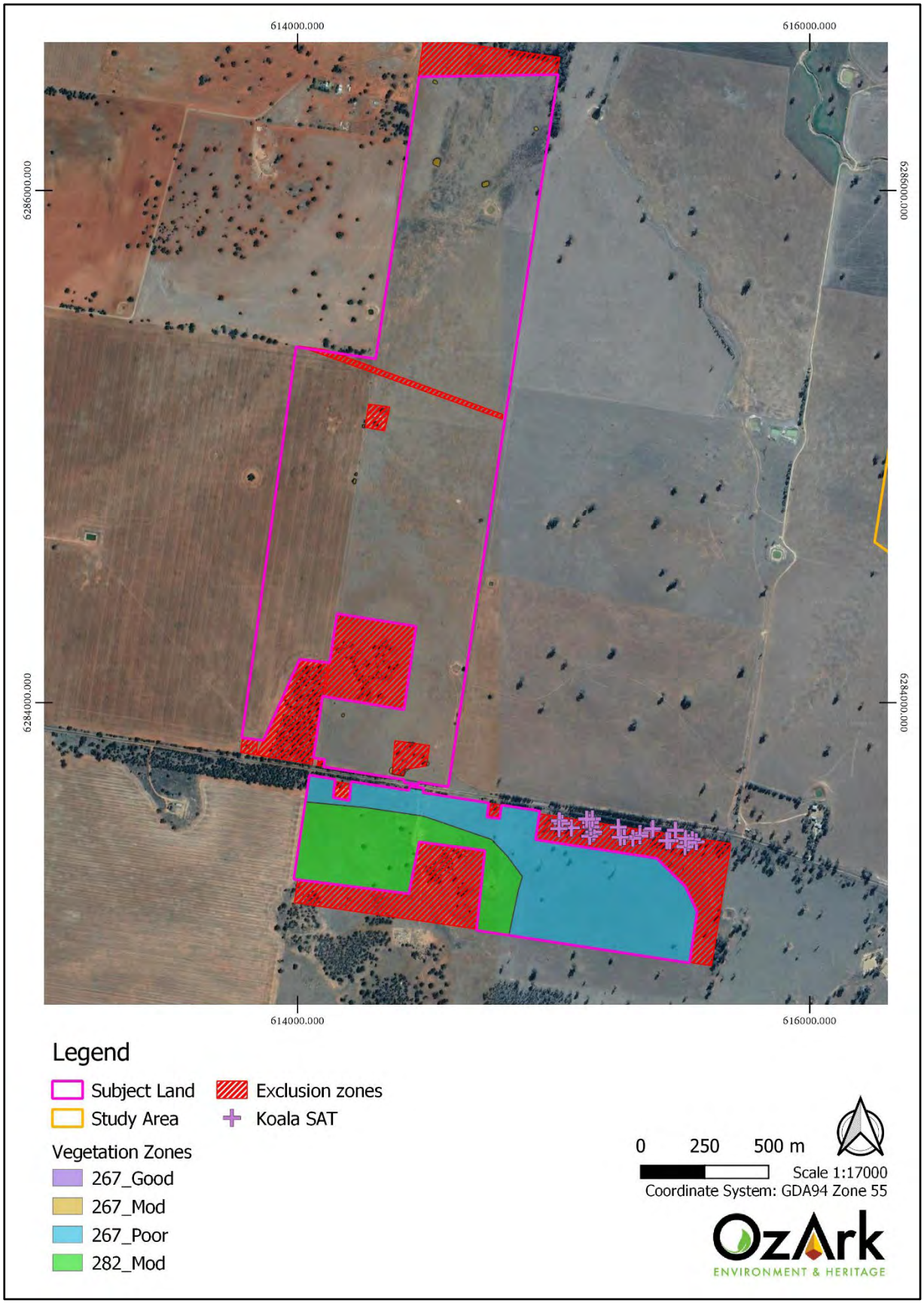

Figure 5-5. Targeted survey: Koala feed trees assessed during Spot Assessment Technique (SAT) survey.

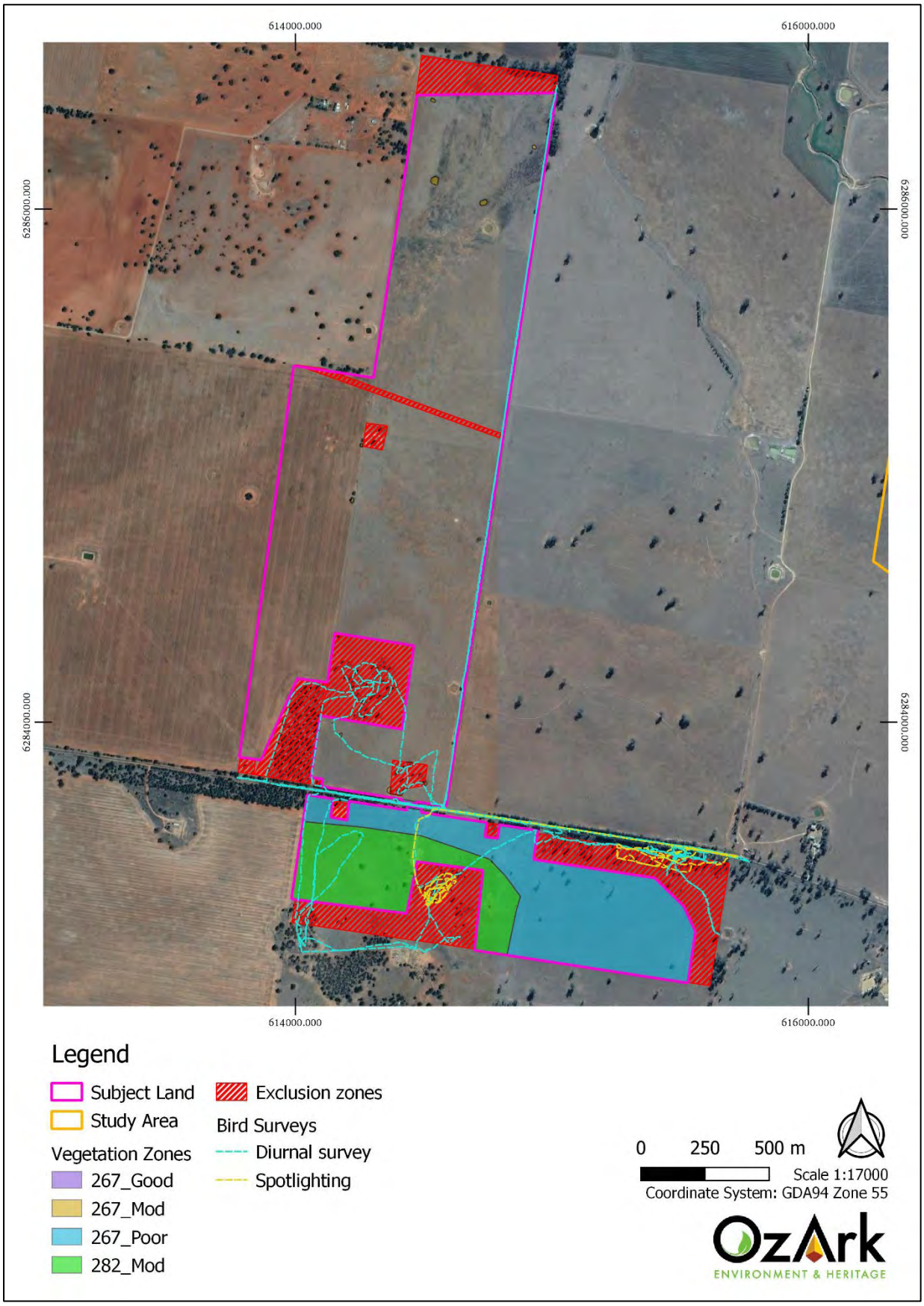

Figure 5-6. Targeted survey: Diurnal bird transects and nocturnal spotlighting transects.

Table 5-4. BioNet species records from within 10km of the subject land.

Scientific Name	Common Name	*NSW Status	+Comm. Status	No. records
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		19
Chthonicola sagittata	Speckled Warbler	V,P		15
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V,P		20
Daphoenositta chrysoptera	Varied Sittella	V,P		3
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		9
Petroica phoenicea	Flame Robin	V,P		2
Petroica boodang	Scarlet Robin	V,P		1
Phascolarctos cinereus	Koala	V,P	V	1
Austrostipa wakoolica	A Spear-grass	E1	E	4
Petaurus norfolcensis	Squirrel Glider	V,P		1
Haliaeetus leucogaster	White-bellied Sea-eagle	V,P		1
Circus assimilis	Spotted Harrier	V,P		1
Neophema pulchella	Turquoise Parrot	V,P,3		2
Polytelis swainsonii	Superb Parrot	V,P,3	V	8

*Listed under the BC Act, where E1 = Endangered, P = Protected, V = Vulnerable, 3 = category 3 sensitive species.

+Listed under the EPBC Act, where E = Endangered and V = Vulnerable.

5.3.2 Species credit species found, or assumed, present

One Species Credit Species generated by the BAM-C – the Masked Owl (*Tyto novaehollandiae*) was assumed present, as its indicated survey period (May to August) fell outside the window of opportunity for targeted surveys.

Male and female superb parrots were detected on the subject land during their breeding season. Although no fledglings were observed and no breeding pairs were observed entering or exiting hollows, the species is assumed to breed on the subject land. Species polygons for these species are given in **Figure 5-8**, incorporating all condition classes of PCT 267 within 100 m of suitable hollow bearing trees.

The remaining species were determined to be absent based on the results of targeted field surveys or due to habitat constraints (See **Section 5.3.1** and **Appendix D**).

Credits generated by the Masked Owl and Superb Parrot are given in **Table 5-5** below.

Table 5-5. Species credit summary for species assumed present.

Common Name	Scientific Name	Species presence	Impacted area	Biodiversity risk weighting	Potential SAII	Species credits generated
Masked Owl	*Tyto novaehollandiae*	Assumed Present	14.09 ha	2	False	107
Superb Parrot	*Polytelis swainsonii*	Present	14.09 ha	2	False	107

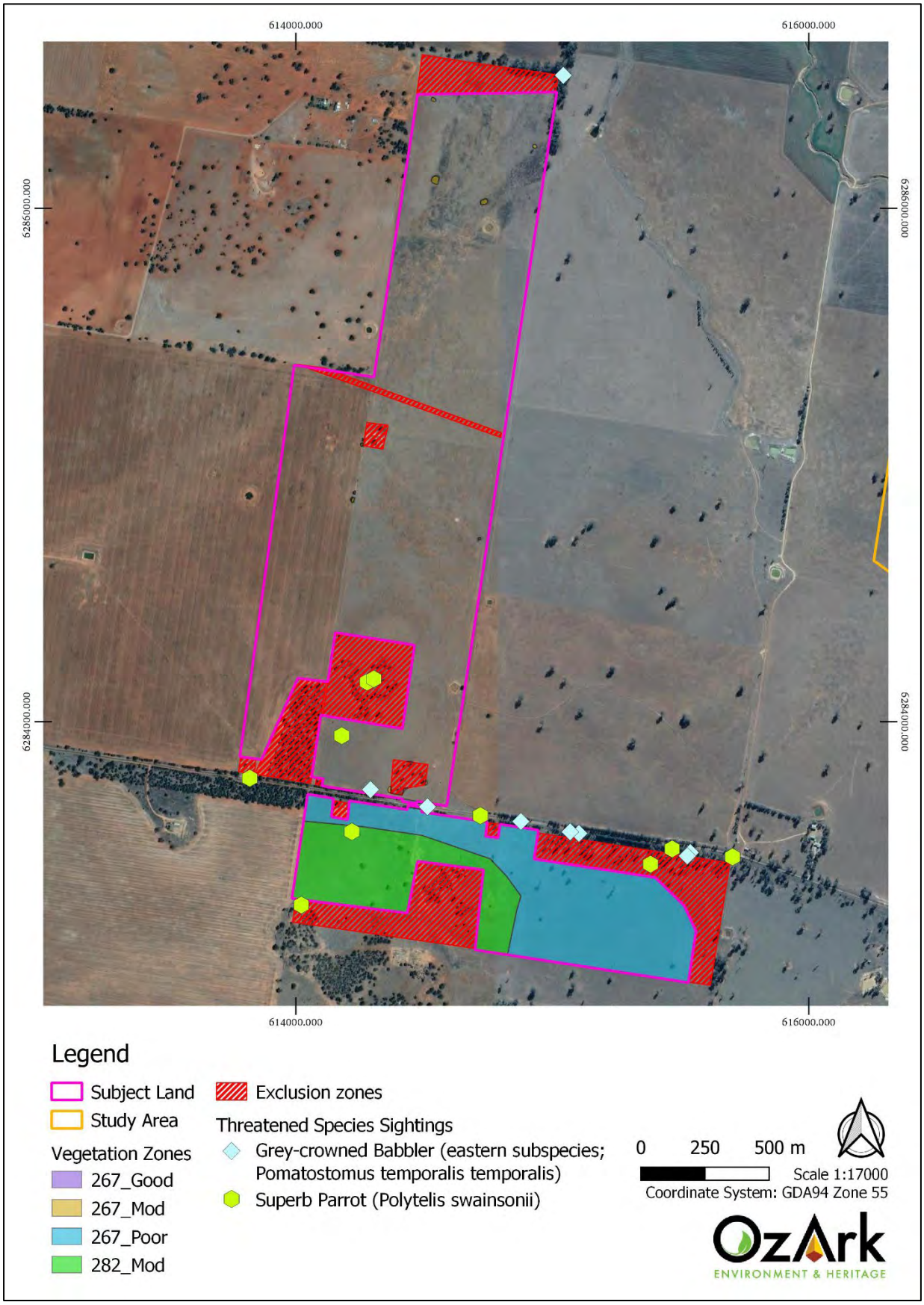

Figure 5-7. Threatened species detected on the subject land and nearby.

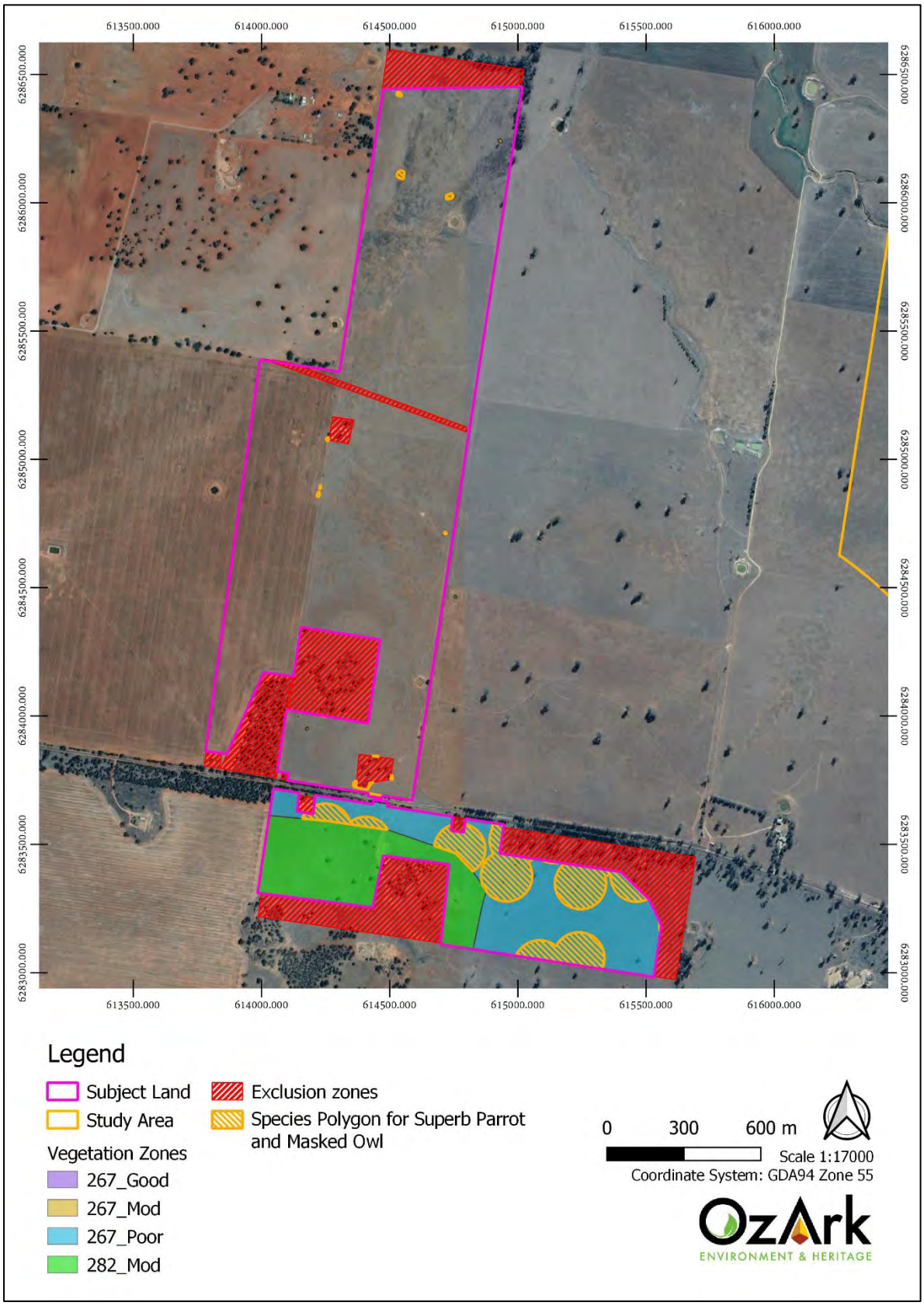

Figure 5-8. Species polygon for the Masked Owl and Superb Parrot, incorporating all condition classes of PCT 267 within 100 m of suitable nesting trees.

6 Impact Summary

6.1 Offset Scheme Threshold

The Proposal will not impact on 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 6-1** (NSW Office of Environment & Heritage, 2017). The subject land is currently zoned RU1 (Primary Production), with a minimum lot size of 200 ha. Clearing of 1 ha or more of native vegetation will require entry into the BOS. The Proposal will clear up to 56.55 ha of native vegetation; thus, entry into the BOS is required.

Table 6-1. Area clearing thresholds for entry into the 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

6.2 Avoidance, minimisation and mitigation

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

- The proposed impact area has been reduced in the planning phase to minimise impact to native vegetation on the subject land. Several of the higher-quality wooded areas (primarily in the southern part of the development footprint) have been excluded from the development footprint entirely. Areas of woodland vegetation meeting the threshold criteria for the EPBC Act-listed CEEC *White Box – Yellow Box – Blakely's Red Gum grassy woodland and derived native grassland* have been excised from the development footprint. **Figure 1-1** and **Figure 1-3** show areas that were originally planned to be developed but have since been excluded. The shading in **Figure 4-2** shows all native vegetation (PCTs) surveyed within the subject land, the entirety of which was originally intended to be removed. **Figure 4-1** shows the revised development footprint excluding the majority of the wooded areas.
- PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions was present in the north-eastern corner, just outside of the subject land, and has been excluded from the development footprint (**Figure 4-1**). Although the figure shows what appears to be a small section of PCT 76 overlapping the subject land, this represents overhanging tree canopy and these trees will not be removed or impacted by the proposal.

In addition, the following minimisation methods have been or will be implemented:

- Impacts have been largely confined to areas of vegetation with the lowest vegetation integrity scores.

- Vegetation will be removed in a manner that avoids damage to surrounding vegetation, ensuring disturbance to vegetation and soil is kept to a minimum.

Table 6-2 outlines recommended environmental safeguards to reduce impacts on vegetation, soil and biodiversity.

Table 6-2. Recommended environmental safeguards.

Impact	Environmental Safeguard	Timing
Clearing and prevention of over-clearing	1. 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).	Pre-disturbance
	2. Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation. Fencing or bunting installed to demarcate 'no go zones' where vegetation is to be retained.	Pre-disturbance
	3. 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.	Pre-disturbance
	4. A suitably qualified ecologist must be employed to conduct pre-clearance surveys at least 24 hours prior to any vegetation removal. The ecologist must identify and mark any potential habitat trees that may be impacted by the proposed vegetation removal works.	Pre-disturbance
	5. A suitably qualified ecologist must be present for the removal of all identified habitat trees to ensure any fauna can be relocated safely.	During disturbance
	6. Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation.	Pre-disturbance
	7. Where possible, vegetation to be removed will be mulched or placed on-site and re-used to stabilise disturbed areas.	During and after disturbance
Bushfire protection	8. 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	9. An erosion and sediment control plan will be addressed within an Environmental Management Plan	Pre-disturbance
Damage to native vegetation outside of impact zone	10. Stockpile and compound sites are to be located within the assessed subject land and preferentially according to the following criteria: o At least 40 m away from the nearest waterway. o In areas of low ecological conservation significance (i.e. previously disturbed land). o On relatively level ground.	Ongoing
	11. Stockpiling of materials and equipment, and parking of vehicles, is to be avoided within the dripline (extent of foliage cover) of any tree.	Ongoing
Introduction and spread of significant weeds and pathogens	12. Construction machinery (bulldozers, excavators, trucks, loaders and graders) would be clean, and soil- and weed-free, before entry to the work site.	Ongoing
	13. Weed-free fill only to be used for on-site earthwork, if required.	Ongoing
	14. 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.	Ongoing

Impact	Environmental Safeguard	Timing
Disturbance to fallen timber, dead wood, bush rock and anthropogenic habitat	15. Where practical, bush rock encountered on site is to be relocated to the edge of the disturbance area to enhance habitat. In particular, exfoliating rock should be relocated and repositioned such that the exfoliating pieces continue to provide habitat for fauna such as reptiles and bats.	Pre-disturbance and during disturbance
	16. If fauna is detected, stop work immediately and either leave the area undisturbed until the individuals have dispersed or engage suitably qualified personnel to facilitate their removal.	During disturbance
	17. Ensure any human structure is thoroughly searched for evidence of habitation by animals prior to removal. If evidence is detected contact a relevant qualified person to arrange the relocation of any species occupying the structure.	Pre-disturbance
	18. A suitably qualified ecologist must be present for the removal of all identified potential fauna habitat to ensure any fauna can be relocated safely.	During disturbance
Threatened species	19. A suitably qualified ecologist / fauna spotter catcher must search habitat and animal breeding places for fauna prior to clearing to relocate or mark habitat as do not disturb. A suitably qualified ecologist / fauna spotter catcher must also be present during clearing to inspect tree hollows following felling.	Pre-disturbance
	20. No new areas to be cleared without further assessment, as threatened flora species may occur in any unassessed impact area.	Ongoing
	21. If the development 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.	Ongoing

6.3 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.

6.4 Impacts to Native Vegetation

There are two PCTs (267 and 282) within the subject land, with up to 56.55 ha of native vegetation required to be removed. All vegetation zones within both PCTs were found to meet the condition criteria to be considered CEECs under the BC Act. Vegetation within the zone 282_good also meets the threshold criteria for the equivalent EPBC Act CEEC, but has been excluded from the final development impact.

Surveys (**Section 5.3.1**) of relevant habitat were conducted for threatened flora species. However, no threatened flora species were recorded. As such no impacts to threatened flora are anticipated.

6.5 Serious and Irreversible Impacts

The Guidance to assist a decision-maker to determine a serious and irreversible impact (NSW Office of Environment and Heritage, 2017) and the NSW threatened species data collection

has been used to determine which threatened entities require further assessment for Serious and Irreversible Impacts (SAII). One such entity is relevant to the present proposal.

6.5.1 White Box - Yellow Box - Blakely's Red Gum Grassy Woodland

All native vegetation recorded on the subject land meets the criteria to be considered either a derived or intact example of the White Box CEEC, which requires an assessment (see **Figure 4-6**). The assessment as per section 9.1 of the 2020 Biodiversity Assessment Method manual is as follows:

a) The proponent has, where possible, made efforts to avoid clearing the vegetation in the best condition, and has reduced the proposed development area to exclude these areas.

b) Two PCTs and four condition classes are present within the subject land.
   - PCT 267_Good is confined to areas adjacent to the road corridor and occupies 0.09 ha of the subject land. The Vegetation Integrity (VI) score of this patch is 79.3. PCT267_Mod (VI score = 33.6) is confined to isolated paddock trees and small wooded remnants and occupies 0.28 ha of the subject land. Most of PCT267_Good and PCT267_Mod have been excluded from the development footprint. PCT267_Poor (VI score = 14.6) is a derived grassland accounting for 35.6 ha of the southern paddock. PCT267_poor did not generate any ecosystem credits, whereas PCT267_Good and PCT267_Mod generated four and six respectively.
   - PCT282_Mod (VI score = 20.8) occurs as 20.6 ha of derived grassland at or near the southern limit of the subject land. PCT282_Mod generated 268 ecosystem credits.

c) The potential impacts to the BC Act-listed *White Box, Yellow Blakely's Red Gum Woodland* (*Box-Gum Woodland*) have been assessed to the criteria as specified within the *Guidance to assist a decision-maker to determine a serious and irreversible impact*. These thresholds broadly fall under the following points:
   i. Is in a rapid rate of decline
   ii. Has a very small population size
   iii. Are severely degraded or disrupted
   iv. Has a very limited geographic distribution
   v. Are unlikely to respond to measures to improve habitat.

   The CEEC is currently undergoing significant and rapid decline, as per (**i**), and has recently been reclassified as critically endangered. Its current distribution covers much of the western slopes and tablelands of NSW, suggesting that a significant "population" exists (**ii**) over a wide geographic distribution (**iv**); however, occurrences of this community are typically degraded and fragmented (**iii**). Most areas of this CEEC occurring within the subject land meet criteria under points (**iii**) and (**v**) in that they are highly degraded by clearing and agricultural practices (historic and current) and are subject to significant weed incursion. Highly degraded patches of 267_Poor and 267_Moderate are unlikely to respond to restoration without significant investment; however, there is some potential for 282_Mod and 267_Good to be restored or enhanced by weed control, supplementary planting, and exclusion of grazing animals and pests. The CEEC continues outside of the subject land and many higher-quality examples of the CEEC have been excluded from the development footprint. This

includes areas to the south of the subject land and areas nested within the subject land.

d) Within 500 m of the subject land, approximately 7.91 ha is mapped as containing PCT 267, which may be a component of the CEEC. It is likely that the total area belonging to the CEEC exceeds this figure, however, as many areas mapped as PCT 76 and PCT 250 were later determined to be White Box communities associated with this CEEC. The total area mapped to PCTs 76, 250, and 267 within 500 m of the subject land is 261.56 ha. It is unclear what proportion of this belongs to the CEEC.

e) The listing of the community was upgraded from endangered to critically endangered as of July 17th 2020 due to an ongoing and intensifying decline. The CEEC is known to occur within the IBRA subregion and is not known to be geographically restricted within the region. The project will clear up to 56.55 ha of the CEEC in the form of a derived grassland with minor inclusions of remnant woodland. All native vegetation within the subject land meets the condition thresholds for the CEEC, as do many adjacent areas subsequently excised from the development footprint.

f) There are no current estimates of the extent of the CEEC within the IBRA region and subregion. However, the extent of the CEEC as stated in the NSW Scientific Committee as of 2020 - final determination are as follows:

    a. Regarding the overall extent of the community, the CEEC has undergone severe and rapid decline:

        i. White Box Yellow Box Blakely's Red Gum Woodland has been drastically reduced in area and highly fragmented because of clearance for cropping and pasture improvement. In NSW, it is understood to have declined by approximately 93% relative to its pre-1750 extent (from 3,717,366 ha to 250,729 ha).

    b. Regarding its extent within the reserve system the CEEC is poorly represented:

        i. The community is poorly represented in conservation reserves. There are small occurrences of White Box - Yellow Box - Blakely's Red Gum Woodland in Border Ranges National Park, Goobang National Park, Goulburn River National Park, Manobalai Nature Reserve, Mt Kaputar National Park, Oxley Wild Rivers National Park, Queanbeyan Nature Reserve, Towari National Park, Warrumbungle National Park, Wingen Maid Nature Reserve and Wollemi National Park. The community also occurs in the following State Recreation Areas, Copeton State Recreation Area, Lake Glenbawn State Recreation Area and Lake Keepit State Recreation Area.

g) Impacts of the development, clearing or biodiversity certification project:

        i. The project will not impact the abiotic process of the area such as groundwater levels or alterations to the surface water patterns beyond what is already occurring within the highly modified agricultural landscape which surrounds the project. The subject land has been mapped as supporting low-potential GDEs based on regional assessment. No moderate- or high-potential GDEs exist on the subject land.

ii. The project will clear 15 live hollow-bearing trees associated with this CEEC, as well as six dead hollow-bearing trees, and an uncounted number of additional native trees within the 56.55 ha development footprint. The characteristic ground stratum species of the CEEC is largely missing due to past land use practices such as historic clearing and grazing. No fire management regimes are currently in place within the subject land.

iii. The project is unlikely to impact the quality and integrity of the CEEC through threats such as the introduction of invasive species or causing regular mobilizations of fertilizers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species within the CEEC.

h) As the vegetation within the subject land consists principally of modified derived grassland, the proposal is unlikely to significantly exacerbate the existing fragmentation of the local occurrence of this community. Most substantial wooded remnants have been excluded from the development footprint, and these will continue to act as stepping-stones between larger remnants.

At the time of writing, no targeted mitigation or regeneration strategies have been undertaken to ensure the continued survival of this CEEC beyond offsetting associated with Part 4 of the EP&A Act, including offsetting requirements relating to relevant clearing thresholds.

6.6 Prescribed impacts

The *Biodiversity Conservation Regulation 2017* lists eleven impacts as prescribed impacts that must be avoided, minimised and mitigated. These prescribed impacts and their relevance to the Proposal are described in **Table 6-3.**

Table 6-3. Prescribed impacts of the proposal.

Prescribed Impacts	Site Assessment	Mitigation Measure
Impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance.	No karsts, caves, crevices, cliffs or other features of geological significance present on the subject land or within the study area.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with rocks.	Areas of loose surface rock and outcropping rock will be impacted by the proposal. This area of bush rock was surveyed (see **Section 5.3**, **Figure 5-2**) and no individual Pink-tailed Legless Lizards or other threatened species were recorded.	**Table 6-2.**
Impacts of development on the habitat of threatened species or ecological communities associated with human made structures.	No human-made structures occur within the development footprint.	None required.
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	Non-native vegetation on the subject land, which includes agricultural crops and pasture species, may still provide habitat for species or ecosystem credit species, and mitigations associated with	**Table 6.2.**

Prescribed Impacts	Site Assessment	Mitigation Measure
	fauna interactions still apply.	
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The proposal will largely impact land that has already undergone extensive clearing. The loss of isolated paddock trees may slightly reduce connectivity between larger patches in the local landscape.	**Table 6-2.**
Impacts of the development on movement of threatened species that maintains their life cycle.	Due to the limited connectivity offered by the site, no significant impacts to the movement of any threatened species are expected as a result of this proposal.	None required**.**
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.	No waterways are mapped as occurring within the subject land. No threatened species or ecological were identified in association with the farm dams that occur within the subject land. No impacts to watercourses outside of the subject site are anticipated.	None required**.**
Impacts of wind turbine strikes on protected animals.	None associated with the proposal.	None required**.**
Impact of vehicle strikes on threatened species of animals or on animals that are part of a TEC.	An increase in overall traffic movement is anticipated due to the construction and ongoing operation of the proposed facility. Maintaining suitably low speed limits on site will help to mitigate impacts that arise from this increase.	**Table 6-2.**

6.7 Indirect impacts

The main impacts of the proposal are expected to be contained within the subject land, provided there is adequate demarcation between operational and non-operational areas. Possible indirect impacts are outlined in **Table 6-4.** Disturbance from machinery and operational activities will occur, such as noise and dust. However, these impacts will be minimised by following the environmental safeguards proposed in **Table 6-2**.

Table 6-4. Potential indirect impacts of the proposal

Nature of impact	Timing	Frequency	PCTs, threatened species and/or TECs impacted	Impact on biodiversity
Inadvertent impacts on adjacent habitat or vegetation	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land • Threatened species assumed present	Increased edge effects, loss of foraging habitat, potential injury or mortality to neighbouring fauna.
Reduced viability of adjacent habitat due to edge effects	Construction and Operation phase	Constant	• Native vegetation surrounding the subject land • Threatened species assumed present	Degradation of native vegetation and habitat for threatened flora and fauna.
Reduce viability of adjacent habitat due to noise, dust or light spill	Construction and Operation phase	Common	• Threatened species assumed present	Minor foraging and breeding habitat for fauna may be altered or removed.
Transport of weeds and pathogens from the site to adjacent vegetation	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land	Degradation of native vegetation.
Increased risk of starvation or exposure, and loss of shade or shelter	Construction and Operation phase	Rare	• Threatened species assumed present	Minor loss of foraging habitat.
Loss of breeding habitat	Construction and Operation phase	Possible	• Threatened species assumed present	Minor loss of potential breeding habitat.
Trampling of threatened flora species	Construction and Operation phase	Rare	• No threatened flora species were detected or assumed present, so no impacts are likely.	Possible minor loss of threatened flora.
Rubbish dumping	Construction and Operation phase	Possible	• Native vegetation surrounding the subject land • Threatened species assumed present	Degradation of native vegetation and habitat for threatened species.

6.8 Key threatening processes

Key Threatening Processes (KTPs) at the NSW State and Federal level will be exacerbated by the proposal. A summary of the proposed impacts relating to the relevant key threatening processes is given in **Table 6-5**. **Appendix F** lists all KTPs and includes explanations as to why many have been assessed as not being present in the study area or exacerbated by the proposal.

Threats exacerbated by poor biosecurity controls will be potentially exacerbated by the proposal. However, implementing the measures for preventing the introduction and spread of weeds described in **Table 6-2**, this potential is reduced.

Table 6-5. Key threatening processes exacerbated by the proposal.

Name	NSW status	Comm status	Likelihood of Occurrence	Exacerbated by Proposal
Aggressive exclusion of birds by abundant Noisy Miners, *Manorina melanocephala*	KTP	KTP	VERY LIKELY	**YES** The modification of woodland structure, for example by edge effects, is known to encourage occupancy by Noisy Miners. This proposal may extend the existing edge effects further into adjacent vegetation, which may facilitate invasion by Noisy Miners. This is unlikely to significantly influence Noisy Miner behaviour beyond these small areas of modified vegetation.
Anthropogenic Climate Change	KTP	KTP	VERY LIKELY	**YES** Some unavoidable emissions that contribute to climate change will occur from construction machinery and operation. There will also be contributions to climate change associated with vegetation clearing e.g. loss of carbon capture volume etc.
Clearing of native vegetation	KTP	KTP	VERY LIKELY	**YES** Up to 56.55 ha of native vegetation will be impacted. This vegetation exists in a range of condition classes, from heavily modified to relatively intact.
Competition from Feral Honeybees, *Apis mellifera*	KTP		LIKELY	**YES** It is very likely that the Feral Honeybee is already present in the subject land and in surrounding agricultural areas. The loss of hollow-bearing trees will increase competition between bees and hollow-dependent birds.
Invasion of native plant communities by exotic perennial grasses	KTP		VERY LIKELY	**YES** Exotic perennial grasses – including Perennial Ryegrass (*Lolium perenne*) and Cocksfoot (*Dactylis glomerata*) – already occur within the subject land. Disturbance to existing vegetation, including edge effects on adjacent vegetation, may allow these species to proliferate.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including	KTP	KTP	VERY LIKELY	**YES** The subject land contains exotic species that were originally introduced to Australia as garden plants, including Paterson's Curse (*Echium plantagineum*). It is possible that contaminated machinery may facilitate the spread of this species and other invasive garden plants. Impacts to existing

Name	NSW status	Comm status	Likelihood of Occurrence	Exacerbated by Proposal
aquatic plants				vegetation, including edge effects, is likely to create niches for these species to colonise.
Removal of dead wood and dead trees	KTP		VERY LIKELY	**YES** Several standing dead trees, including four with hollows, occur within or adjacent to the subject land. Areas of fallen timber and fence posts are also present.
Bushrock removal	KTP		VERY LIKELY	**YES** Areas of outcropping rock and loose surface rock occur within the subject land and will be impacted by the proposal.
Loss of Hollow-bearing Trees	KTP		VERY LIKELY	**YES** Seventeen live and four dead hollow-bearing trees occur wholly or partly within the subject land, bearing a total of nine large and 41 small hollows.

6.9 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 DoEE.

The EPBC Act protected matters search has identified four TECs, 24 threatened species, 11 listed migratory species and 18 listed marine species with the potential to occur in the 10 km search area (**Appendix A**). Of these, 10 threatened and seven migratory species possibly occur, based on habitat available on the subject land (**Appendix E**). An assessment of impact significance has been undertaken for these threatened species following EPBC guidelines, as detailed in **Appendix E**.

A summary of these matters and whether the proposal is likely to impact them is provided in **Table 6-6**. It is concluded that no MNES will be significantly impacted by the proposal.

Table 6-6. Impacts to Matters of National Environmental Significance.

Factor	Potential impact
Any impact on a World Heritage property?	NIL
Any impact on a National Heritage place?	NIL
Any impact on a wetland of international importance?	NIL
Any impact on a listed threatened species or communities?	Non-significant impact (**Appendix E**).
Any impacts on listed migratory species?	Non-significant impact (**Appendix E**)
Any impact on a Commonwealth marine area?	NIL
Does the proposal involve a nuclear action (including uranium mining)?	NIL
Additionally, any impact (direct or indirect) on Commonwealth land?	NIL Commonwealth Land is mapped within 10 km but

	not within the subject land.
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	NIL

7 Biodiversity Credit and Offset Report

7.1 Management Zones

The BAM considers future vegetation condition of different areas of the development footprint when calculating biodiversity credits and offsets. It has been assumed that all vegetation within the subject land will be managed the same, i.e., cleared. Therefore, offset requirements have been assessed assuming only one management zone. As indicated in **Figure 1-3**, certain areas possessing remnant woody vegetation will be excluded from the direct impacts of the proposal.

7.2 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, averaged across the construction and any APZ areas, is shown in **Table 7-1**.

Table 7-1. 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	Total Change in VI Score
282_Mod	282	20.6	20.8	Proposed construction area	0	-20.8	-20.8
267_Good	267	0.09	79.3	Proposed construction area	0	-79.3	-79.3
267_Mod	267	0.28	33.6	Proposed construction area	0	-33.6	-33.6
267_Poor	267	35.6	14.6	Proposed construction area	0	-14.6	-14.6

7.3 Ecosystem Credit Summary

The ecosystem credits required for the proposal are summarised in **Table 7-2**. Based on the VI score and area of impact to each PCT, 278 Ecosystem Credits are required to be offset for the proposal. The full biodiversity credit summary report is provided in **Appendix G**.

Table 7-2. Ecosystem credits requiring offsetting (copied from BAM-C).

Vegetation zone name	TEC name	Current vegetation integrity score	Change in Vegetation integrity (loss/ gain)	Area (ha)	BC Act listing status	EPBC Act listing status	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
282_Mod	White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native Grassland	20.8	-20.8	20.6	CE	CE	High Sensitivity to Potential Gain	2.5	True	268
267_Good	White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native Grassland	79.3	-79.3	0.09	CE	CE	High Sensitivity to Potential Gain	2.5	True	4
267_Mod	White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native Grassland	33.6	-33.6	0.28	CE	CE	High Sensitivity to Potential Gain	2.5	True	6
267_Poor	White Box - Yellow Box - Blakely's Red Gum Woodland and Derived Native	14.6	-14.6	35.6	CE	CE	High Sensitivity to Potential Gain	2.5	True	0

	Grassland									

7.4 Species Credit Summary

The species credits required for the proposal are summarised in **Table 7-3**. In total, one species credit species was detected and one species credit species was assumed to be present, generating an obligation to retire 214 species credits. The full biodiversity credit summary report is provided in **Appendix G.**

Table 7-3. Species credit summary.

Common Name	Scientific Name	Species presence	Impacted area	Potential SAII	Species credits generated
Superb Parrot	*Polytelis swainsoni*	Detected	14.09 ha	False	107
Masked Owl	*Tyto novaehollandiae*	Assumed Present	14.09 ha	False	107

7.5 Offset Requirement

Offsetting is required for the 278 Ecosystem Credits and 214 Species Credits listed above (**Appendix G**).

The applicant may either choose to purchase and retire the necessary number of credits on the open market or, if not available, offset credits through a direct payment into the Biodiversity Conservation Fund (BCF).

8 Summary and conclusions

The following summary of findings is provided to assist with ongoing project planning.

The proposal to develop a solar farm on Lot 441 DP1124885, Lot 442 DP1124885, and Lot 9 DP752938 will clear up to 56.55 ha of native vegetation. The native vegetation clearing threshold for the relevant lot is 1 ha, as such entry into the Biodiversity Offsets Scheme (BOS) will be triggered.

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

- PCT 267 – White Box – White Cypress Pine – Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion
- PCT 282 – Blakely's Red Gum - White Box - Yellow Box - Black Cypress Pine box grass/shrub woodland on clay loam soils on undulating hills of central NSW South Western Slopes Bioregion

These PCTs are associated with the following Critically Endangered Ecological Communities (CEECs):

- *Biodiversity and Conservation Act 2016* (BC Act)-listed CEEC – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)-listed CEEC – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

All vegetation recorded during the survey met the relevant thresholds to be considered the CEEC under the BC Act. Consequently, up to 56.55 ha of the BC Act-listed CEEC will be impacted by this proposal. One vegetation zone (282_Good) was identified in the initial site survey as a component of the EPBC Act community but was excised from the development footprint in accordance with the principles of avoidance and minimisation.

In total, 32 Ecosystem Credit Species were generated by the Biodiversity Assessment Method Calculator (BAM-C). An additional Ecosystem Credit Species (*Miniopterus orianae oceanensis*) not generated by the BAM-C was detected during targeted surveys, bringing the number of Ecosystem Credit Species to 33. Of these, 32 Ecosystem Credit species were either detected on-site or assumed to be present, generating a total of 278 Ecosystem Credits. One Ecosystem Credit species was removed due to habitat constraints. In addition, 21 Species Credit species were generated by the BAM-C. Five species were removed from the candidate list due to geographic limitations or habitat constraints. Targeted surveys were conducted for 15 species, and one additional species, the Masked Owl (*Tyto novaehollandiae*)

was not surveyed and assumed present. Targeted surveys detected the Superb Parrot (*Polytelis swainsonii*) on the subject land during the breeding season for this species. No other targeted species credit species were detected, therefore, only species credits for the Superb Parrot and Masked Owl will be required to be offset, totalling 214 Species Credits.

The proponent intends to satisfy their Ecosystem and Species credit obligations by buying and retiring the necessary Ecosystem Credits from the open market or, if not available, paying directly into the Biodiversity Conservation Fund (BCF).

The significance of the proposed impact to EPBC Act Listed threatened, migratory, and marine species predicted to occur within a 10 km search area was assessed. No significant impact to a threatened, migratory, wetland or marine species likely to result in the extinction of a local population was identified. The residual ecological impacts of the proposal would be adequately mitigated using the management actions recommended. Therefore, a referral of the proposal to the Department of Agriculture, Water and the Environment 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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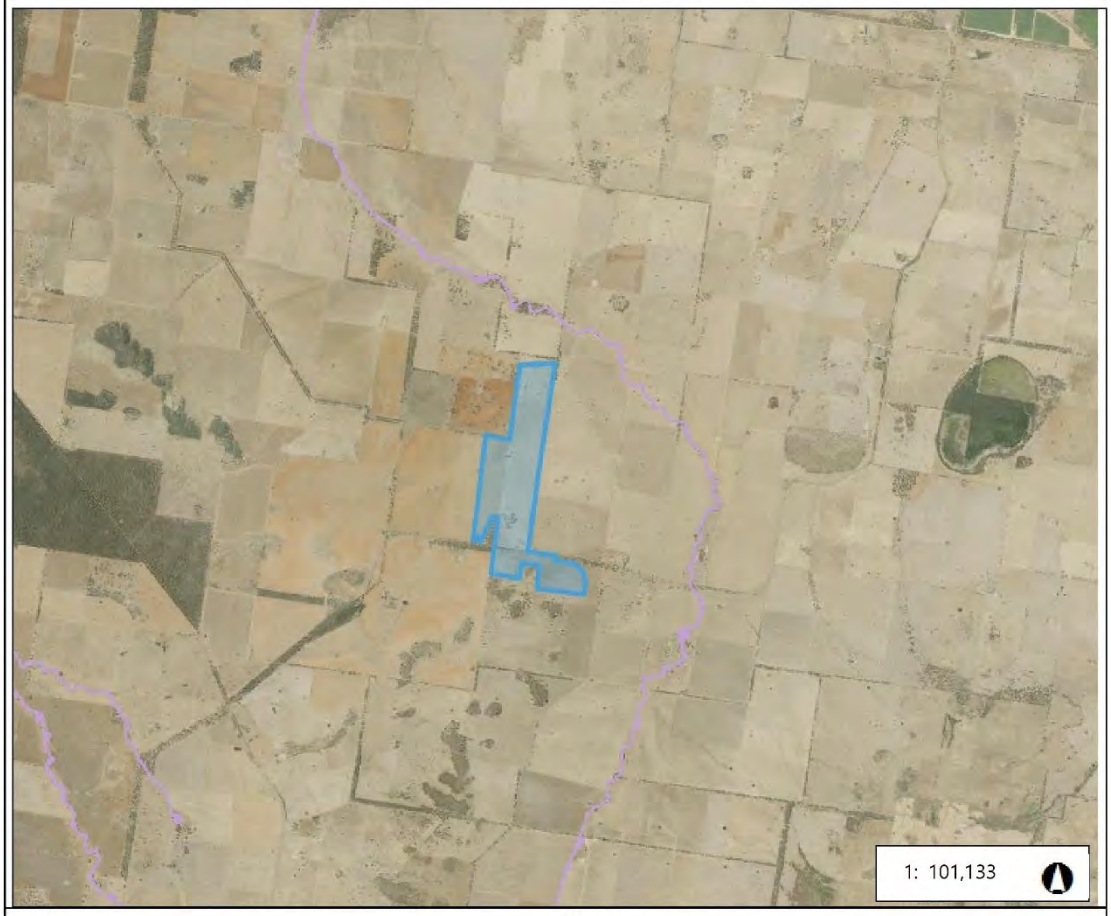
Appendix A: Database search results

BC Act Biodiversity Values Map

NSW GOVERNMENT

Biodiversity Offset Scheme (BOS) Entry Threshold Map



5,137.6 0 2,568.78 5,137.6 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.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

NSW GOVERNMENT

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	29/11/2021 5:20 PM		**BDAR Required***
Total Digitised Area	246.27	ha	
Minimum Lot Size Method	LEP		
Minimum Lot Size	200	ha	
Area Clearing Threshold	1	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

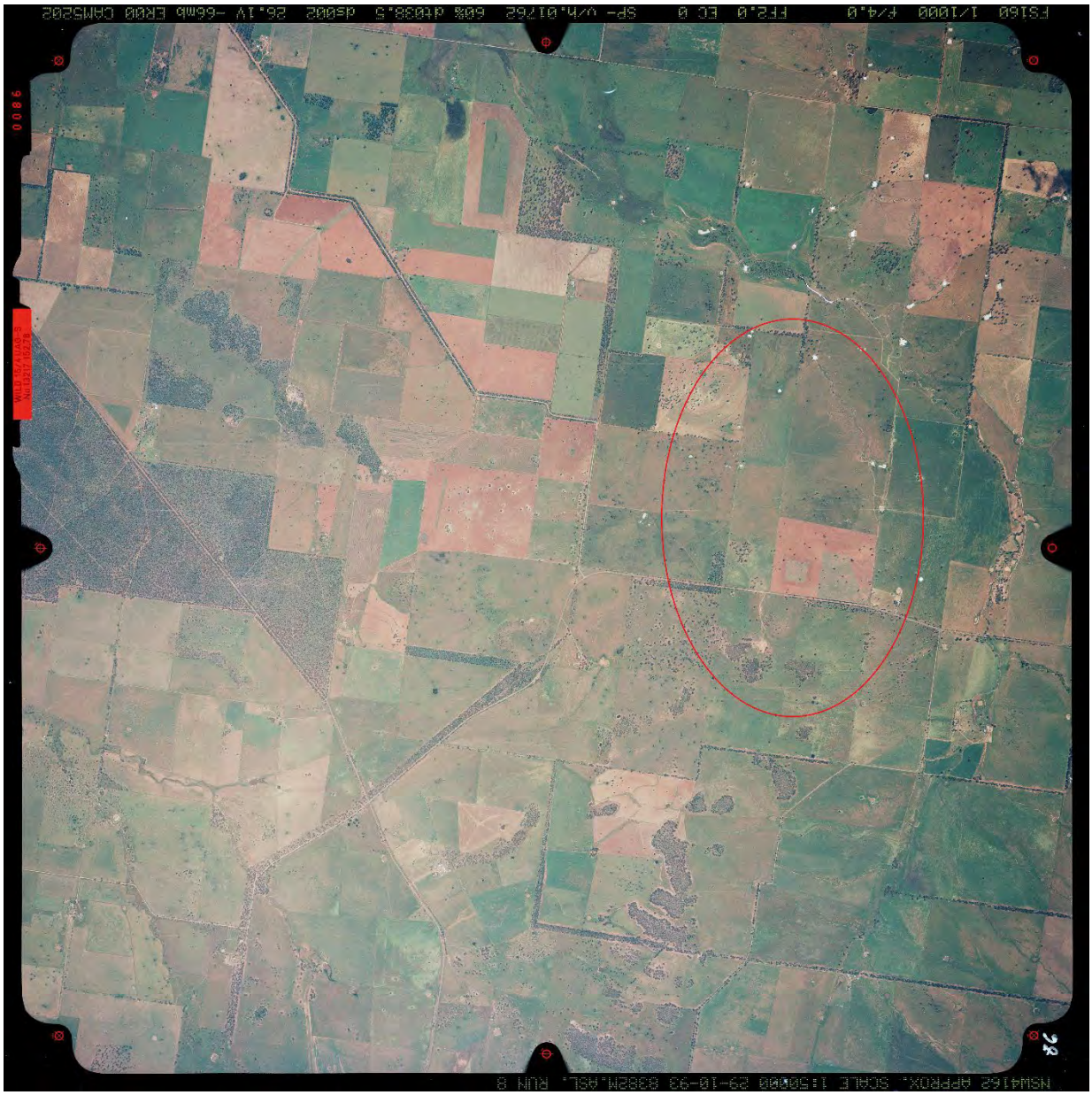
Acknowledgement

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: 29/11/2021 05:20 PM

Historical aerial imagery showing the extent of clearing in 1983. The subject land is crudely circled in red.

Historical aerial imagery showing the extent of clearing in 1993. The subject land is crudely circled in red.



EPBC Act Protected Matters Report

Australian Government
Department of Agriculture, Water and the Environment

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: 30-Nov-2021

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:	4
Listed Threatened Species:	24
Listed Migratory Species:	11

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

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 http://www.environment.gov.au/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:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	18
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:	2
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	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	500 - 600km upstream from Ramsar site	In feature area
Riverland	600 - 700km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site	In feature area

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	Buffer Status
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature 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	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maccullochella macquariensis			
Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii			
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macquaria australasica			
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature 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]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
Austrostipa metatoris			
[66704]	Vulnerable	Species or species habitat may occur within area	In feature area
Austrostipa wakoolica			
[66623]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium monoplocoides			
Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Tylophora linearis			
[55231]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat may occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [15740]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [15137]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In buffer area only

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.

BioNET Atlas search – threatened species predicted to occur within the NSW South Western Slopes Bioregion, Lower Slopes IBRA subregion.

*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. ^^ = Category 2 sensitive species.

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Amphibia	*Crinia sloanei*	Sloane's Froglet	V,P	E	6
Amphibia	*Litoria raniformis*	Southern Bell Frog	E1,P	V	14
Reptilia	*Aprasia parapulchella*	Pink-tailed Legless Lizard	V,P	V	4
Aves	*Leipoa ocellata*	Malleefowl	E1,P	V	82
Aves	*Anseranas semipalmata*	Magpie Goose	V,P		54
Aves	*Oxyura australis*	Blue-billed Duck	V,P		139
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		130
Aves	*Apus pacificus*	Fork-tailed Swift	P	C,J,K	28
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	27
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	28
Aves	*Ixobrychus flavicollis*	Black Bittern	V,P		1
Aves	*Circus assimilis*	Spotted Harrier	V,P		137
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	C	180
Aves	*Hamirostra melanosternon*	Black-breasted Buzzard	V,P,3		7
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		236
Aves	*Lophoictinia isura*	Square-tailed Kite	V,P,3		8
Aves	*Pandion cristatus*	Eastern Osprey	V,P,3		2
Aves	*^^Falco hypoleucos*	Grey Falcon	E1,P,2		52
Aves	*Falco subniger*	Black Falcon	V,P		98
Aves	*Grus rubicunda*	Brolga	V,P		68
Aves	*Ardeotis australis*	Australian Bustard	E1,P		1

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Aves	*Burhinus grallarius*	Bush Stone-curlew	E1,P		58
Aves	*Pluvialis fulva*	Pacific Golden Plover	P	C,J,K	3
Aves	*Pedionomus torquatus*	Plains-wanderer	E1,P	CE	2
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	25
Aves	*Actitis hypoleucos*	Common Sandpiper	P	C,J,K	4
Aves	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	74
Aves	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	3
Aves	*Calidris melanotos*	Pectoral Sandpiper	P	J,K	3
Aves	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	5
Aves	*Gallinago hardwickii*	Latham's Snipe	P	C,J,K	56
Aves	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	3
Aves	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	6
Aves	*Numenius phaeopus*	Whimbrel	P	C,J,K	1
Aves	*Tringa glareola*	Wood Sandpiper	P	C,J,K	7
Aves	*Tringa nebularia*	Common Greenshank	P	C,J,K	17
Aves	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	21
Aves	*Glareola maldivarum*	Oriental Pratincole	P	C,J,K	1
Aves	*Chlidonias leucopterus*	White-winged Black Tern	P	C,J,K	2
Aves	*Gelochelidon nilotica*	Gull-billed Tern	P	C	19
Aves	*Hydroprogne caspia*	Caspian Tern	P	C,J	10
Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3		2
Aves	*^^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		122
Aves	*^^Calyptorhynchus lathami*	Glossy Black-Cockatoo,	E2,V,P,2		98

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
		Riverina population			
Aves	^^*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V,P,2		145
Aves	*Glossopsitta porphyrocephala*	Purple-crowned Lorikeet	V,P,3		1
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		113
Aves	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	134
Aves	*Neophema pulchella*	Turquoise Parrot	V,P,3		275
Aves	*Polytelis swainsonii*	Superb Parrot	V,P,3	V	1101
Aves	*Ninox connivens*	Barking Owl	V,P,3		92
Aves	*Tyto novaehollandiae*	Masked Owl	V,P,3		P
Aves	*Climacteris affinis*	White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area	E2,P		16
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		2638
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		675
Aves	*Hylacola cautus*	Shy Heathwren	V,P		128
Aves	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	15
Aves	*Certhionyx variegatus*	Pied Honeyeater	V,P		20
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		121
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	174
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		256

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		1716
Aves	*Cinclosoma castanotum*	Chestnut Quail-thrush	V,P		3
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		290
Aves	*Pachycephala inornata*	Gilbert's Whistler	V,P		335
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		1064
Aves	*Drymodes brunneopygia*	Southern Scrub-robin	V,P		10
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		352
Aves	*Petroica boodang*	Scarlet Robin	V,P		82
Aves	*Petroica phoenicea*	Flame Robin	V,P		262
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		860
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	10
Mammalia	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		1
Mammalia	*Sminthopsis macroura*	Stripe-faced Dunnart	V,P		P
Mammalia	*Macrotis lagotis*	Bilby	E4,P	V	2
Mammalia	*Phascolarctos cinereus*	Koala	V,P	V	271
Mammalia	*Cercartetus nanus*	Eastern Pygmy-possum	V,P		P
Mammalia	*Petaurus norfolcensis*	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		10
Mammalia	*Petaurus norfolcensis*	Squirrel Glider	V,P		117
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	19
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		33
Mammalia	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	1

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		26
Mammalia	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1
Mammalia	*Myotis macropus*	Southern Myotis	V,P		9
Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	V	6
Mammalia	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		1
Mammalia	*Vespadelus baverstocki*	Inland Forest Bat	V,P		1
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		1
Flora	*Tylophora linearis*		V	E	36
Flora	*Brachyscome muelleroides*	Claypan Daisy	V	V	52
Flora	*Brachyscome papillosa*	Mossgiel Daisy	V	V	3
Flora	*Kippistia suaedifolia*	Fleshy Minuria	E1		4
Flora	*Leptorhynchos orientalis*	Lanky Buttons	V		68
Flora	*Senecio garlandii*	Woolly Ragwort	V		3
Flora	*Lepidium aschersonii*	Spiny Peppercress	V	V	11
Flora	*Lepidium monoplocoides*	Winged Peppercress	E1	E	27
Flora	*Wilsonia rotundifolia*	Round-leafed Wilsonia	E1		1
Flora	*Eleocharis obicis*	Spike-Rush	V	V	2
Flora	*Cullen parvum*	Small Scurf-pea	E1		3
Flora	*Swainsona murrayana*	Slender Darling Pea	V	V	49
Flora	*Swainsona recta*	Small Purple-pea	E1	E	2
Flora	*Swainsona sericea*	Silky Swainson-pea	V		73
Flora	*Acacia ausfeldii*	Ausfeld's Wattle	V		1
Flora	*Pilularia novae-hollandiae*	Austral Pillwort	E1,3		22

Class	Scientific Name	Common Name	*NSW status	+Comm. status	Records
Flora	*Eucalyptus leucoxylon* subsp. *pruinosa*	Yellow Gum	V		1
Flora	^^*Caladenia arenaria*	Sand-hill Spider Orchid	E1,P,2	E	1313
Flora	^^*Caladenia concolor*	Crimson Spider Orchid	E1,P,2	V	P
Flora	^^*Diuris* sp. (Oaklands, D.L. Jones 5380)				575
Flora	^^*Diuris tricolor*	Pine Donkey Orchid	V,P,2		407
Flora	*Amphibromus fluitans*	Floating Swamp Wallaby-grass	V	V	3
Flora	*Austrostipa metatoris*	A spear-grass	V	V	1
Flora	*Austrostipa wakoolica*	A spear-grass	E1	E	79
Flora	*Dichanthium setosum*	Bluegrass	V	V	3
Flora	*Grevillea ilicifolia* subsp. *ilicifolia*	Holly-leaf Grevillea	E4A		P
Flora	*Pomaderris cocoparrana*	Cocoparra Pomaderris	E1	E	4
Flora	*Philotheca angustifolia* subsp. *angustifolia*		E4,P		1

BioNET Atlas search – threatened ecological communities predicted to occur within the NSW South Western Slopes Bioregion, Lower Slopes IBRA subregion.

*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: K = known to occur, P = predicted to occur.

Common Name	*NSW status	+Comm. status	-Records
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	E3		K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3	E	K
Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion	E4B		K
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3	E	K
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	E3		P
White Box Yellow Box Blakely's Red Gum Woodland	E3	CE	K

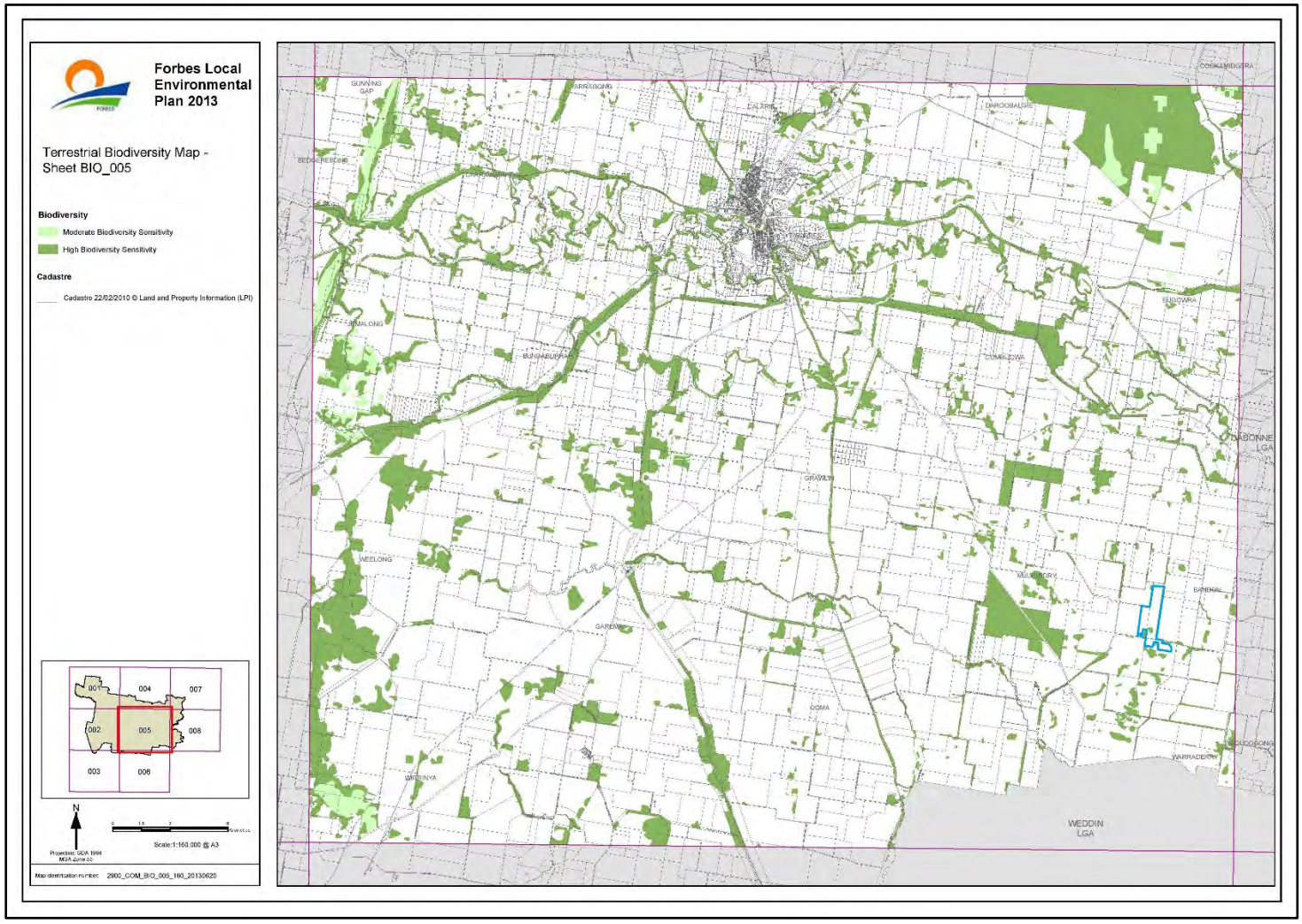
BioNET Atlas search – key threatening processes predicted to occur within the NSW South Western Slopes Bioregion, Lower Slopes IBRA subregion.

Common Name	NSW status	Comm status	Records
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	P
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
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 (*Rhinella marina*)	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

Common Name	NSW status	Comm status	Records
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
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

***Forbes Local Environmental Plan 2012* – Terrestrial Biodiversity Map.**

Areas marked in dark green are areas of high terrestrial biodiversity value and areas marked in light green are areas of moderate terrestrial biodiversity value. The subject land is outlined in blue. Note that while the subject land encircles areas of high biodiversity value, these have been excluded from the development footprint.



Appendix B: Vegetation plot locations and photographs

Plot Name	PCT	Condition	Easting (Zone 55)	Northing (Zone 55)	Photographs
PS01	267	Moderate	614321	6284102	 

PS02	282	Moderate	614348	6283500			
Note: PS03-PS06 have since been excluded from the development footprint and are not included here							

PS07	267	Poor	614931	6283430			
PS08	267	Poor	615171	6283104			

PS09	267	Poor	615511	6283124			
PS10	267	Poor	615422	6283291			

PS11	282	Good	614059	6283210			
PS12	282	Moderate	614120	6283253			

PS13	282	Moderate	614593	6283230			
PS14	282	Moderate	614846	6283305			

PS15	267	Good	615003	6283527			
PS16	267	Good	615397	6283492			

PS17	267	Good	615663	6283434		
PS18	282	Good	614594	6283389		

PS19	282	Moderate	614294	6283291			
PS20	267	Poor	614769	6283467			

PS21	267	Moderate	614486	6283797			
PS22	267	Moderate	614223	6284134			

Appendix C: Field survey results

BAM Data Sheets

BAM Plot - Field Survey Sheet

Page 1 of (2)

Date	2/06/2021	**Survey Name**	Peninsula Solar		
Recorders	M. Walsh	**Plot ID #**	PS01	**Zone ID**	267_Mod
Photo #	-	**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**	20
Easting	614321	**Northing**	6284102	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Moderate

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	2
	Shrubs	0
	Grasses etc	1
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	17
	Shrubs	0
	Grasses etc	10
	Forbs	5
	Ferns	0
	Other	0
High threat weed cover		1.1

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

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

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	1	Stem size class records # large trees (cf. benchmark)
50 - 79	1	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	3	Total #
2	>20cm**	0	3
Length of logs			Total (m)
			35

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**	15	15	5	10	5	10
	Bare ground	5	15	10	7	30	
	Cryptogam	-	-	-	-	-	
	Rock	-	-	1	-	40	

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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Page 2 of (2)

Date	2/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh	Plot ID #	PS01	Zone ID	267_Mod	
GF code	*Genus species* (tick if photographed or sample taken)	Cover %	Abund (count)	N, E, HTE	Stratum	
TG	Eucalyptus albens	7	1	N		
TG	Eucalyptus melliodora	10	2	N		
FG	Oxalis perennans	2	50	N		
	Malva parviflora	15	100	E		
	Urtica dioica	10	200	E		
GG	Enteropogon acicularis	10	50	N		
	Xanthium spinosum	1	4	HTE		
FG	Einadia nutans	2	20	N		
	Eleusine indica	5	50	E		
	Trifolium repens	2	20	E		
FG	Rumex brownii	1	5	N		
GG	Cynodon dactylon	1	5	N		
	Solanum elaeagnifolium	0.1	1	HTE		
	Brassica rapa	3	50	E		
	Solanum nigrum	1	15	E		
	Echium plantagineum	1	15	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 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

BAM Plot - Field Survey Sheet

Page 1 of (2)

Date	3/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS02	**Zone ID**	282_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			30
Easting	614348	**Northing**	6283500	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Moderate

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

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**	0
	Shrubs	0
	Grasses etc	15
	Forbs	3
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	90.2
	Forbs	10.2
	Ferns	0
	Other	0
High threat weed cover		3

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

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

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	0	Total #
	0	>20cm**	0	0
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	15	5	10	10	10
	Bare ground	-	1	2	-	5	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	3/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS02	Zone ID	282_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Sporobolus creber		5	15	N	
GG	Austrostipa aristiglumis		10	200	N	
GG	Bothriochloa macra		20	350	N	
GG	Panicum effusum		5	100	N	
GG	Chloris truncata		15	250	N	
	Echium plantaginuem		1	30	E	
GG	Aristida behriana		10	250	N	
GG	Paspalidium distans		0.5	5	N	
GG	Eragrostis lacunaria		2	30	N	
GG	Austrostipa scraba		15	270	N	
FG	Dichondra repens		5	50	N	
FG	Pelargonium australe		5	50	N	
	Solanum elaeagnifolium		0.1	2	HTE	
GG	Eragrostis parviflora		3	20	N	
GG	Eragrostis lacunaria		3	20	N	
GG	Panicum decompositum		0.6	20	N	
GG	Cynodon dactylon		0.5	5	N	
	Xanthium spinosum		0.1	1	HTE	
FG	Vittadinia cuneata		0.1	5	N	
	Trifolium repens		2	30	E	
GG	Aristida personata		0.1	5	N	
GG	Amphibromus nervosus		1	20	N	

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

BAM Plot - Field Survey Sheet

Page 1 of (2)

Date	4/06/2021	**Survey Name**	Peninsula Solar		
Recorders	M. Walsh			**Plot ID #** PS07	**Zone ID** 267_poor
Photo #	-			**Plot dimensions**	20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**	290
Easting	614931	**Northing**	6283430	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Poor

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

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**	0
	Shrubs	0
	Grasses etc	11
	Forbs	0
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	57
	Forbs	0
	Ferns	0
	Other	0
High threat weed cover		1

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

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

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 0	Total #
0		>20cm** 0	0
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**	5	2	3	5	3	3.6
	Bare ground	0.5	2	1	5	1	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS07	Zone ID	267_poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Aristida behriana		20	300	N	
	Eragrostis cilianensis		1	30	E	
	Echium plantagineum		1	50	E	
	Trifolium repens		1	50	E	
GG	Chloris truncata		15	170	N	
GG	Eragrostis parviflora		10	140	N	
GG	Aristida personata		3	20	N	
GG	Amphibromus nervosus		1	30	N	
GG	Bothriochloa macra		0.5	5	N	
GG	Panicum effusum		0.5	5	N	
GG	Panicum decomposition		3	20	N	
GG	Aristida ramosa		3	20	N	
GG	Sporobolus creber		0.5	5	N	
GG	Eragrostis elongata		0.5	5	N	
	Carthamus lanatus		1	20	HTE	

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

BAM Plot - Field Survey Sheet

Page 1 of (2)

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS08	**Zone ID**	267_poor
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			300
Easting	615171	**Northing**	6283104	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Poor

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

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**	0
	Shrubs	0
	Grasses etc	9
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	70
	Forbs	1
	Ferns	0
	Other	0
High threat weed cover		2

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

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

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 0	Total #
0		>20cm** 0	0
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**	5	10	5	2	2	4.8
	Bare ground	2	3	-	-	1	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS08	Zone ID	267_poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Eragrostis parviflora		25	300	N	
GG	Bothriochloa macra		15	150	N	
GG	Eragrostis elongata		5	20	N	
GG	Sporobolus creber		1	3	N	
GG	Cynodon dactylon		1	20	N	
GG	Chloris truncata		15	150	N	
	Echium plantagineum		1	50	E	
	Trifolium repens		1	50	E	
GG	Aristida personata		5	50	N	
FG	Pelargonium australe		0.5	20	N	
	Carthamus lantanus		1	20	HTE	
FG	Oxalis sp.		0.5	20	N	
	Eleusine indica		0.1	2	E	
GG	Aristida ramosa		1	20	N	
	Eragrostis cilianensis		0.5	15	E	
GG	Aristida behirina		2	30	N	
	Xanthium spinosum		1	2	HTE	

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

Date	3/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS09	**Zone ID**	267_poor
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			60
Easting	615511	**Northing**	6283124	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Poor

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	0
	Shrubs	0
	Grasses etc	9
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	78.5
	Forbs	0.6
	Ferns	0
	Other	0
High threat weed cover		0

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

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

BAM Function plot (1000m^2)

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	0	Total #
0	>20cm**	0	0
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	10	10	5	5	8
	Bare ground	-	1	1	3	2	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	3/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS09	Zone ID	267_poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Aristida personata		15	100	N	
GG	Eragrostis parviflora		25	300	N	
GG	Eragrostis elongata		5	4	N	
GG	Chloris truncata		15	100	N	
	Trifolium repens		1	20	E	
	Echium plantagineum		1	20	E	
GG	Aristida behriana		1	20	N	
FG	Vittadinia cuneata		0.1	2	N	
GG	Amphibromus nervosus		0.5	20	N	
GG	Aristida ramosa		1	20	N	
GG	Cynodon dactylon		5	50	N	
GG	Eragrostis lacunaria		1	30	N	
GG	Bothriochloa macra		15	70	N	
	Carthamus lanatus		1	20	HTE	

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

BAM Plot - Field Survey Sheet

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS10	**Zone ID**	267_poor
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			120
Easting	615422	**Northing**	6283291	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Poor

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	0
	Shrubs	0
	Grasses etc	10
	Forbs	1
	Ferns	0
	Other	1
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	73.5
	Forbs	1
	Ferns	0
	Other	1
High threat weed cover		1

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

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

BAM Function plot (1000m^2)

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	0	Total #
0	>20cm**	0	0
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**	5	10	15	10	10	10
	Bare ground	1	1	2	0.5	-	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS10	Zone ID	267_poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Eragrostis parviflora		20	200	N	
GG	Bothriochloa macra		25	50	N	
GG	Aristida ramosa		5	100	N	
GG	Chloris truncata		10	150	N	
GG	Panicum decompositum		5	100	N	
	Echium plantagineum		1	50	E	
GG	Eragrostis elongata		1	30	N	
FG	Pelargonium australe		1	30	N	
GG	Eragrostis lacunaria		0.5	20	N	
GG	Aristida personata		5	130	N	
	Eleusine indica		0.1	3	R	
GG	Panicum effusum		1	20	N	
GG	Cynodon dactylon		5	30	N	
OG	Glycine tabacina		1	20	N	
GG	Aristida behriana		1	25	N	
	Carthamus lanatus		1	20	HTE	
	Eragrostis cilianensis		0.1	10	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 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

BAM Plot - Field Survey Sheet

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	K. Hammill			**Plot ID #**	PS11	**Zone ID**	282_good
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			355
Easting	614059	**Northing**	6283210	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Good

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

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**	1
	Shrubs	1
	Grasses etc	14
	Forbs	11
	Ferns	1
	Other	0
Cover (sum of cover of natives species)	**Trees**	20
	Shrubs	0.5
	Grasses etc	57.6
	Forbs	4.6
	Ferns	0.1
	Other	0
High threat weed cover		0

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

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

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	1	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 #
1	>20cm**	0	2
Length of logs			Total (m)
			122

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**	70	10	30	40	50	40
	Bare ground	5	5	5	-	5	
	Cryptogam	-	-	-	-	-	
	Rock	-	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	K. Hammill		Plot ID #	PS11	Zone ID	282_good
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		20	16	N	
SG	Maireana microphylla		0.5	5	N	
GG	Digitaria brownii		2	50	N	
GG	Eragrostis sp. 1		10	200	N	
GG	Austrostipa sp.		10	200	N	
FG	Gonocarpus sp.		0.2	30	N	
GG	Chloris truncata		0.2	20	N	
FG	Oxalis perennans		0.2	30	N	
GG	Enteropogon acicularis		20	200	N	
FG	Solanum sp.		2	20	N	
FG	Einadia nutans		0.5	100	N	
FG	Dichondra repens		0.2	20	N	
FG	Sida corrugata		0.2	50	N	
GG	Eragrostis parviflora		5	100	N	
GG	Rytidosperma sp. 1		5	100	N	
GG	Cynodon dactylon		0.1	2	N	
GG	Eragrostis sp. 2		0.5	50	N	
GG	Panicum effusum		0.2	20	N	
GG	Rytidosperma sp. 2		0.2	50	N	
FG	Maireana enchylaenoides		0.5	10	N	
	Conyza sp.		0.1	5	E	
	Trifolium sp.		0.1	10	E	
EG	Cheilanthes sieberi		0.1	2	N	
FG	Wahlenbergia sp.		0.1	30	N	
FG	Vittadinia cuneata		0.1	2	N	
	Lepidium africanum		0.1	1	N	
FG	Rumex brownii		0.2	20	N	
FG	Pelargonium australe		0.5	100	N	
GG	Carex inversa		2	100	N	
GG	Sporobolus creber		0.2	10	N	
GG	Austrostipa scabra		2	50	N	

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

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS12	**Zone ID**	282_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			30
Easting	614120	**Northing**	6283253	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282

Condition state Moderate

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

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**	0
	Shrubs	0
	Grasses etc	14
	Forbs	5
	Ferns	1
	Other	1
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	80
	Forbs	6.5
	Ferns	1
	Other	0.2
High threat weed cover		1

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

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

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	0	<20cm 0	Total # 0
		>20cm** 0	
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	15	15	30	50	24
	Bare ground	1	2	-	5	5	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS12	Zone ID	282_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Austrostipa aristiglumis		20	300	N	
GG	Panicum decompositum		15	200	N	
GG	Austrostipa scrabra		10	200	N	
FG	Dichondra repens		2	40	N	
	Echium plantagineum		1	30	E	
GG	Digitaria hystrichoides		1	15	N	
FG	Oxalis perennans		1	30	N	
FG	Vittadinia cuneata		2	30	N	
GG	Eragrostis parviflora		2	30	N	
OG	Glycine tabacina		0.1	2	N	
GG	Sporobolus creber		1	15	N	
GG	Bothriochloa macra		5	150	N	
GG	Panicum effusum		2	15	N	
FG	Pelargonium australe		1	15	N	
	Brassica rapa		1	15	E	
GG	Eragrostis lacunaria		3	35	N	
FG	Solanum eremophilum		0.5	1	N	
GG	Aristida personata		6	30	N	
GG	Cynodon dactylon		5	50	N	
GG	Aristida behriana		2	30	N	
GG	Poa sieberiana		2	30	N	
OG	Convolvulus angustissimus		0.2	20	N	
	Cirsium sp.		0.1	1	E	
	Carthamus lanatus		1	15	HTE	
	Avena sativa		1	15	E	
GG	Aristida ramosa		1	15	N	
EG	Cheilanthes sieberi		1	15	N	

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 (2)

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS13	**Zone ID**	282_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			140
Easting	614593	**Northing**	6283230	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Moderate

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

BAM Composition / Structure plot (400m^2)

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

		Sum values*
Native Richness (count of native species)	**Trees**	0
	Shrubs	0
	Grasses etc	15
	Forbs	4
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	94
	Forbs	4
	Ferns	0
	Other	0
High threat weed cover		2

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

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

BAM Function plot (1000m^2)

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	0	Total #
0	>20cm**	0	0
Length of logs			Total (m)
			3

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	10	5	5	6
	Bare ground	20	15	5	40	5	
	Cryptogam	-	-	-	5	-	
	Rock	-	2	-	-	-	

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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	4/06/2021	Survey Name	Peninsula Solar				
Recorders	M. Walsh			Plot ID #	PS13	Zone ID	282_Mod
GF code	*Genus species* (tick if photographed or sample taken)			Cover %	Abund (count)	N, E, HTE	Stratum
GG	Aristida personata			20	300	N	
GG	Chloris truncata			10	300	N	
GG	Austrostipa scrabra			20	300	N	
GG	Bothriochloa macra			15	150	N	
GG	Eragrostis lacunaria			2	40	N	
GG	Eragrostis leptosachya			1	30	N	
GG	Panicum decompositum			3	40	N	
FG	Pelargonium australe			1	20	N	
GG	Eragrostis parviflora			3	40	N	
	Carthamus lanatus			2	20	HTE	
GG	Aristida ramosa			10	150	N	
GG	Rytidosperma caespitosum			1	10	N	
GG	Poa sieberiana			3	40	N	
GG	Austrostipa aristiglumis			2	20	N	
FG	Vittadinia cuneata			1	20	N	
FG	Dichondra repens			1	20	N	
GG	Cynodon dactylon			2	20	N	
	Echium plantagineum			1	20	E	
FG	Rumex brownii			1	10	N	
GG	Sporobolus creber			1	20	N	
GG	Digitaria hystrichoides			1	20	N	

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

BAM Plot - Field Survey Sheet

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS14	**Zone ID**	282_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			40
Easting	614846	**Northing**	6283305	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Moderate

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

BAM Composition / Structure plot (400m^2)		
Dimensions (circle applicable size)		
20 x 20 m	10 x 40 m	**Sum values***
Native Richness (count of native species)	**Trees**	0
	Shrubs	0
	Grasses etc	12
	Forbs	4
	Ferns	1
	Other	1
Cover (sum of cover of natives species)	**Trees**	0
	Shrubs	0
	Grasses etc	84
	Forbs	4.5
	Ferns	1
	Other	1
High threat weed cover		11

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

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

BAM Function plot (1000m^2)			
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 0	Total #
0		>20cm** 0	0
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**	20	25	15	10	15	17
	Bare ground	-	-	-	-	5	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS14	Zone ID	282_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
GG	Chloris truncata		20	500	N	
GG	Austrostipa aristiglumis		20	500	N	
GG	Austrostipa scabra		10	150	N	
	Carthamus lanatus		10	50	HTE	
GG	Aristida ramosa		5	50	N	
GG	Panicum decompositum		15	30	N	
GG	Aristida personata		5	50	N	
GG	Rytidosperma caespitosum		1	20	N	
GG	Eragrostis lacunaria		1	20	N	
GG	Eragrostis parviflora		1	20	N	
FG	Dichondra repens		2	20	N	
	Echium plantagineum		1	20	E	
FG	Vittadinia cuneata		0.5	10	N	
GG	Sporobolus creber		1	15	N	
EG	Cheilanthes sieberi		1	5	N	
GG	Poa sieberiana		5	140	N	
	Lolium perenne		0.5	10	E	
FG	Oxalis perennans		1	20	N	
OG	Convolvulus angustissimus		1	20	N	
	Solanum elaeagnifolium		1	10	HTE	
FG	Pelargonium australe		1	20	N	

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

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	K. Hammill			**Plot ID #**	PS15	**Zone ID**	267_Good
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			90
Easting	615003	**Northing**	6283527	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Good

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 (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	2
	Shrubs	0
	Grasses etc	12
	Forbs	9
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	15
	Shrubs	0
	Grasses etc	44.1
	Forbs	4.1
	Ferns	0
	Other	0
High threat weed cover		0

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

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	0	Stem size class records # large trees (cf. benchmark)
50 - 79	1	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	1	Total #
1	>20cm**	0	1
Length of logs			Total (m)
			57

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**	70	20	30	10	5	27
	Bare ground	-	-	-	20	90	
	Cryptogam	-	-	-	5	5	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	K. Hammill		Plot ID #	PS15	Zone ID	267_Good
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		5	2	N	
TG	Eucalyptus microcarpa		10	2	N	
GG	Enteropogon acicularis		20	1000	N	
GG	Austrostipa scabra		5	200	N	
GG	Eragrostis sp.		5	200	N	
FG	Dichondra repens		2	500	N	
FG	Vittadinia cuneata		0.1	2	N	
FG	Pelargonium australe		0.2	50	N	
GG	Digitaria brownii		2	50	N	
FG	Siga corrugata		0.2	20	N	
GG	Eragrostis parviflora		2	100	N	
GG	Aristida behriana		0.2	10	N	
GG	Panicum effusum		0.5	20	N	
GG	Austrostipa sp.		5	200	N	
FG	Solanum sp.		1	20	N	
GG	Paspalidium gracile		2	100	N	
FG	Einadia nutans		0.2	50	N	
FG	Oxalis perennans		0.1	10	N	
	Trifolium sp.		0.1	10	E	
GG	Austrostipa aristiglumis		2	50	N	
GG	Rytidosperma sp.		0.2	10	N	
	Lepidium africanum		0.1	5	E	
FG	Rumex brownii		0.1	1	N	
FG	Maireana enchylaenoides		0.1	5	N	
GG	Paspalidium constrictum		0.2	10	N	

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

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	K. Hammill			**Plot ID #**	PS16	**Zone ID**	267_Good
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			95
Easting	615397	**Northing**	6283492	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Good

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	3
	Shrubs	1
	Grasses etc	9
	Forbs	9
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	25
	Shrubs	0.1
	Grasses etc	41.5
	Forbs	5.4
	Ferns	0
	Other	0
High threat weed cover		0

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

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

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	0	Stem size class records # large trees (cf. benchmark)
50 - 79	1	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	1	Total #
1	>20cm**	0	1
Length of logs			Total (m)
			35

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	20	20	10	20	16
	Bare ground	-	-	-	10	20	
	Cryptogam	20	30	15	10	10	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	K. Hammill		Plot ID #	PS16	Zone ID	267_Good
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		10	1	N	
TG	Callitris glaucophylla		10	1	N	
GG	Enteropogon acicularis		20	500	N	
SG	Sclerolaena muricata		0.1	1	N	
GG	Eragrostis sp. 1		10	500	N	
FG	Dichondra repens		2	200	N	
FG	Sida corrugata		0.2	20	N	
FG	Pelargonium australe		0.2	20	N	
	Trifolium sp.		0.1	10	E	
FG	Solanum sp.		0.2	5	N	
GG	Austrostipa aristiglumis		1	20	N	
GG	Eragrostis parviflora		10	500	N	
FG	Arthropodium sp.		2	200	N	
FG	Vittadinia cuneata		0.1	2	N	
FG	Maireana enchylaenoides		0.1	2	N	
	Malva parviflora		0.1	1	E	
FG	Rumex brownii		0.1	2	N	
GG	Rytidosperma sp.		0.2	10	N	
GG	Austrostipa scabra		0.2	20	N	
GG	Austrostipa sp.		5	100	N	
GG	Aristida behriana		0.1	2	N	
FG	Einadia nutans		0.5	50	N	
TG	Casuarina cristata		5	1	N	
GG	Eragrostis sp. 2		5	500	N	

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 (2)

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M.Walsh			**Plot ID #**	PS17	**Zone ID**	267_Good
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			270
Easting	615663	**Northing**	6283434	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Good

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

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**	3
	Shrubs	1
	Grasses etc	9
	Forbs	7
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	40
	Shrubs	3
	Grasses etc	5.7
	Forbs	21
	Ferns	0
	Other	0
High threat weed cover		0.5

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

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

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	1	Stem size class records # large trees (cf. benchmark)
50 - 79	2	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 #
	2	<20cm	2	
		>20cm**	1	3

Length of logs	Total (m)
	37

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**	25	15	50	25	15	26
	Bare ground	30	1	-	15	2	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	M.Walsh		Plot ID #	PS17	Zone ID	267_Good
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus microcarpa		10	1	N	
TG	Allocasuarina luehmannii		20	3	N	
SG	Sclerolaena muricata		3	20	N	
FG	Solanum eremophilum		1	7	N	
GG	Panicum decompositum		1	20	N	
FG	Dichondra repens		1	30	N	
FG	Oxalis perennans		1	30	N	
GG	Eragrostis parviflora		2	30	N	
TG	Eucalyptus albens		10	1	N	
	Xanthium spinosum		0.5	2	HTE	
FG	Rumex brownii		0.5	2	N	
GG	Carex inversa		1	30	N	
GG	Enteropogon acicularis		10	300	N	
	Lepidium africans		0.5	2	E	
GG	Eragrostis lacunaria		1	30	N	
GG	Rytidosperma caespitosum		1	30	N	
GG	Austrostipa aristiglumis		2	50	N	
FG	Vittadinia cuneata		1	10	N	
GG	Aristida personata		2	30	N	
GG	Cynodon dactylon		2	20	N	
GG	Austrostipa scabra		1	20	N	
FG	Einadia nutans		1	30	N	
FG	Maireana enchylaenoides		0.1	1	N	
FG	Pelargonium australe		0.1	10	N	

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

BAM Plot - Field Survey Sheet

Page 1 of (2)

Date	4/06/2021	**Survey Name**	Peninsula Solar				
Recorders	K. Hammill			**Plot ID #**	PS18	**Zone ID**	282_good
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			211
Easting	614594	**Northing**	6283389	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Good

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

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**	1
	Shrubs	0
	Grasses etc	14
	Forbs	12
	Ferns	0
	Other	3
Cover (sum of cover of natives species)	**Trees**	35
	Shrubs	0
	Grasses etc	66.4
	Forbs	24.5
	Ferns	0
	Other	0.3
High threat weed cover		0

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

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

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	1	Total #
1	>20cm**	0	1
Length of logs			Total (m)
			102

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**	2	5	5	5	5	4.4
	Bare ground	-	2	15	5	20	
	Cryptogam	-	-	-	-	-	
	Rock	-	1	1	-	-	

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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	4/06/2021	Survey Name	Peninsula Solar			
Recorders	K. Hammill		Plot ID #	PS18	Zone ID	282_good
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus blakelyi		35	11	N	
FG	Solanum sp. 1		10	50	N	
GG	Enteropogon acicularis		15	500	N	
GG	Digitaria sp. 1		5	200	N	
GG	Panicum effusum		20	1000	N	
GG	Aristida personata		0.1	2	N	
GG	Eragrostis brownii		10	500	N	
GG	Austrostipa sp.		5	200	N	
GG	Austrostipa scabra		2	50	N	
FG	Dichondra repens		10	1000	N	
FG	Sida corrugata		0.5	30	N	
FG	Rumex brownii		0.1	5	N	
FG	Einadia nutans		0.2	20	N	
GG	Austrostipa aristiglumis		0.5	20	N	
FG	Oxalis perennans		0.2	20	N	
FG	Gonocarpus sp.		0.1	5	N	
FG	Wahlenbergia sp.		0.1	10	N	
OG	Convolvulus sp.		0.1	10	N	
GG	Sporobolus creber		0.2	10	N	
FG	Pelargonium australe		3	200	N	
	Conyza sp.		0.1	2	E	
FG	Euchiton sp.		0.1	1	N	
	Solanum sp. 2		0.1	2	E	
GG	Paspalidium distans		0.5	10	N	
GG	Digitaria sp. 2		0.5	10	N	
	Solanum sp. 3		0.1	2	E	
GG	Bothriochloa macra		0.5	20	N	
GG	Carex inversa		5	200	N	
GG	Chloris truncata		0.1	2	N	
GG	Eragrostis parviflora		2	50	N	
FG	Vittadinia cuneata		0.1	2	N	
FG	Calotis sp.		0.1	2	N	
OG	Glycine tabacina		0.1	1	N	

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 (2)

Date	22/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M.Walsh			**Plot ID #**	PS19	**Zone ID**	282_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			260
Easting	614294	**Northing**	6283291	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	282
Condition state	Moderate

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**	1
	Shrubs	1
	Grasses etc	9
	Forbs	6
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	10
	Shrubs	2
	Grasses etc	65
	Forbs	5
	Ferns	0
	Other	0
High threat weed cover		2

*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	1	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	1	Total #
	1	>20cm**	2	3
Length of logs				Total (m)
				14
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	15	10	10	5	9
	Bare ground	5	2	1	1	7	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	22/06/2021	Survey Name	Peninsula Solar			
Recorders	M.Walsh		Plot ID #	PS19	Zone ID	282_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		10	1	N	
GG	Aristida personata		20	200	N	
SG	Sclerolaena muricata		2	30	N	
FG	Solanum eremophilum		2	10	N	
GG	Sporobolus creber		10	100	N	
GG	Enteropogon acicularis		15	150	N	
GG	Eragrostis parviflora		10	150	N	
GG	Brothriochloa macra		5	50	N	
GG	Eragrostis elongata		1	20	N	
	Echium plantageum		2	50	E	
	Lepidium africanum		0.5	15	E	
GG	Eragrostis lacunaria		1	20	N	
FG	Vittadinia cuneata		0.5	20	N	
FG	Dichondra repens		1	50	N	
FG	Pelargonium australe		0.5	20	N	
	Trifolium repens		1	50	E	
GG	Aristida behriana		1	30	N	
	Brassica rapa		1	30	E	
	Carthamus lanatus		0.5	20	HTE	
	Marrubium vulgare		0.5	20	E	
GG	Cynodon dactylon		1	30	N	
FG	Rumex brownii		0.5	5	N	
	Avena sativa		0.5	20	E	
GG	Austrostipa aristiglumis		2	30	N	

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

BAM Plot - Field Survey Sheet

Date	22/06/2021	**Survey Name**	Peninsula Solar		
Recorders	M. Walsh	**Plot ID #**	PS20	**Zone ID**	267_poor
Photo #	-	**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**	330
Easting	614769	**Northing**	6283467	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Poor

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m | 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	1
	Shrubs	0
	Grasses etc	11
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	10
	Shrubs	0
	Grasses etc	66
	Forbs	0.6
	Ferns	0
	Other	0
High threat weed cover		1

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

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

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m | 10 x 100 m

Tree stem DBH (cm)		Notes on function attributes:
>80	1	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			
0	<20cm	3	Total #
	>20cm**	1	4
Length of logs			Total (m)
			35

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	10	10	8
	Bare ground	-	2	2	1	-	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Date	22/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS20	Zone ID	267_poor
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		10	1	N	
GG	Aristida vagans		10	150	N	
GG	Aristida behriana		10	100	N	
GG	Bothriochloa macra		15	200	N	
GG	Aristida ramosa		10	100	N	
GG	Chloris truncata		15	200	N	
GG	Eragrostis lacunaria		1	30	N	
GG	Eragrostis parviflora		2	50	N	
	Carthamus lanatus		1	20	HTE	
FG	Pelargonium australe		0.5	50	N	
	Echium plantageum		1	50	E	
GG	Rytidosperma caespitosum		0.5	20	N	
	Trifolium repens		1	50	E	
	Lepidium africanum		0.5	20	E	
FG	Solanum eremophilum		0.1	1	N	
	Avena sativa		0.5	30	E	
GG	Cynodon dactylon		1	30	N	
	Marrubium vulgare		0.1	2	E	
GG	Panicum decompositum		1	30	N	
GG	Aristida personata		0.5	20	N	

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

BAM Plot - Field Survey Sheet

Date	22/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS21	**Zone ID**	267_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			250
Easting	614486	**Northing**	6283797	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Moderate

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

BAM Composition / Structure plot (400m^2)

Dimensions (circle applicable size)

20 x 20 m 10 x 40 m

		Sum values*
Native Richness (count of native species)	**Trees**	1
	Shrubs	0
	Grasses etc	1
	Forbs	2
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	10
	Shrubs	0
	Grasses etc	1
	Forbs	0.1
	Ferns	0
	Other	0
High threat weed cover		1

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

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

BAM Function plot (1000m^2)

Dimensions (circle applicable size)

20 x 50 m 10 x 100 m

Tree stem DBH (cm)	
>80	1
50 - 79	2
30 - 49	-
20 - 29	-
10 - 19	-
5 - 9	-
< 5	-

Notes on function attributes:

Stem size class records # large trees (cf. benchmark)

Record stems for living trees only, and for all species

For multistemmed trees, record only the largest stem

Presence of <5cm stems records regeneration

Record # trees with hollows, not number of hollows

Count as one stem where tree is multistemmed

Hollow bearing stem may be a dead stem (incl. stag)

# Trees with hollows	<20cm	2	Total #
1	>20cm**	1	3
Length of logs			Total (m)
			22

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	2	1	2	3
	Bare ground	20	5	60	5	10	
	Cryptogam	-	-	-	-	-	
	Rock	2	1	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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 (2)

Date	22/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS21	Zone ID	267_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
	Avena sativa		30	500	E	
	Malva parviflora		5	60	E	
TG	Eucalyptus albens		10	1	N	
	Trifolium sp.		1	20	E	
	Echium plantagineum		2	50	E	
FG	Pelargonium australe		0.5	20	N	
FG	Oxalis perennans		0.5	50	N	
	Lepidium africanum		0.1	5	E	
GG	Cynodon dactylon		1	30	N	
	Xanthium spinosum		1	5	HTE	

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 (2)

Date	22/06/2021	**Survey Name**	Peninsula Solar				
Recorders	M. Walsh			**Plot ID #**	PS22	**Zone ID**	267_Mod
Photo #	-			**Plot dimensions**			20 × 50
Datum	GDA94	**Zone**	55	**Plot bearing along midline**			260
Easting	614223	**Northing**	6284134	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	NSW South Western Slopes
Subregion	Lower Slopes
Likely Vegetation Class	
Plant Community Type	267
Condition state	Moderate

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

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**	1
	Shrubs	0
	Grasses etc	5
	Forbs	4
	Ferns	0
	Other	0
Cover (sum of cover of natives species)	**Trees**	20
	Shrubs	0
	Grasses etc	8
	Forbs	1.2
	Ferns	0
	Other	0
High threat weed cover		0.6

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

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

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	2	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	3	<20cm 6 / >20cm** 0	Total # 6
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**	5	10	5	10	10	8
	Bare ground	15	5	15	10	10	
	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)			Microrelief
Cultivation			Slope
Grazing (native / stock)			Aspect
Soil erosion			Soil surface texture
Firewood removal			Soil colour
Fire (ground stratum, mid, canopy burnt?)			Site drainage
Storm damage			Distance to nearest water
Weediness			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

BAM Plot - Field Survey Sheet

Page 2 of (2)

Date	22/06/2021	Survey Name	Peninsula Solar			
Recorders	M. Walsh		Plot ID #	PS22	Zone ID	267_Mod
GF code	*Genus species* (tick if photographed or sample taken)		Cover %	Abund (count)	N, E, HTE	Stratum
TG	Eucalyptus albens		30	3	N	
GG	Aristida personata		3	30	N	
	Avena sativa		10	200	E	
	Urtica dioica		10	100	E	
	Conzya bonariensis		1	20	E	
GG	Chloris truncata		3	30	N	
	Eragrostis cilianensis		1	20	E	
	Sonchus oleraceus		2	50	E	
GG	Eragrostis elongata		0.5	30	N	
	Asphodelus fistulosus		0.1	5	E	
	Lepidium africanum		0.1	3	E	
GG	Aristida behriana		1	20	N	
	Xanthium spinosum		0.5	1	HTE	
	Malva parviflora		1	20	E	
	Echium plantageum		0.5	20	E	
FG	Dichondra repens		0.5	30	N	
FG	Oxalis perennans		0.5	30	N	
FG	Maireana enchylaenoides		0.1	1	N	
GG	Juncus psammophilus		0.5	5	N	
	Solanum elaeagnifolium		0.1	1	HTE	
	Trifolium repens		0.5	20	E	
	Dactylis glomerata		1	30	E	
FG	Einadia nutans		0.1	3	N	

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

Flora species list

The species listed here were detected during the initial BAM survey and during subsequent targeted surveys. Eighty-one species were detected in total, including 57 native (70.37%) and 24 exotic (29.63%). Of the exotic species detected on the subject land, three are HTEs.

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	Species name	Common name	Status
TG	*Allocasuarina luehmannii*	Buloke	N
TG	*Brachychiton populneus*	Kurrajong	N
TG	*Eucalyptus blakelyi*	Red Gum	N
TG	*Eucalyptus albens*	White Box	N
TG	*Eucalyptus melliodora*	Yellow Box	N
TG	*Eucalyptus microcarpa*	Grey Box	N
SG	*Acacia decora*	Western Silver Wattle	N
SG	*Maireana microphylla*	Small-leaf Bluebush	N
SG	*Sclerolaena muricata*	Rolypoly	N
FG	*Arthropodium* sp.	Chocolate Lily	N
FG	*Asphodelus fistulosus*	Onion Weed	E
FG	*Brassica rapa*	Field Mustard	E
FG	*Calotis* sp.	Burr-daisy	N
FG	*Carthamus lanatus*	Saffron Thistle	HTE
FG	*Cirsium* sp.	Spear Thistle	E
FG	*Conyza bonariensis*	Flaxleaf Fleabane	E
FG	*Conyza* sp.	Fleabane	E
FG	*Dichondra repens*	Kidneyweed	N
FG	*Echium plantagineum*	Paterson's Curse	E
FG	*Einadia nutans*	Climbing Saltbush	N
FG	*Euchiton* sp.	Cudweed	N
FG	*Gonocarpus* sp.	Raspwort	N
FG	*Lepidium africanum*	African Peppercress	E
FG	*Maireana enchylaenoides*	Wingless Bluebush	N
FG	*Malva parviflora*	Small-flowered Mallow	E
FG	*Marrubium vulgare*	White Horehound	E
FG	*Native forb (dead)*		N
FG	*Oxalis perennans*	Native Oxalis	N
FG	*Oxalis* sp.	Native Oxalis	N
FG	*Pelargonium australe*	Native Storksbill	N
FG	*Rumex brownii*	Swamp Dock	N
FG	*Rumex tenax*	Shiny Dock	N
FG	*Sida corrugata*	Corrugated Sida	N

Growth form	Species name	Common name	Status
FG	*Sisymbrium irio*	London Rocket	E
FG	*Solanum elaeagnifolium*	Silver-leaf Nightshade	HTE
FG	*Solanum eremophilum*	Native Solanum	N
FG	*Solanum nigrum*	Black-berry Nightshade	E
FG	*Solanum* sp. 1		E
FG	*Solanum* sp. 2		E
FG	*Solanum* sp. 3	Native Solanum	N
FG	*Sonchus oleraceus*	Common Sowthistle	E
FG	*Trifolium* spp.	Clovers	E
FG	*Urtica dioica*	Stinging Nettle	E
FG	*Vittadinia cuneata*	Fuzzweed	N
FG	*Wahlenbergia* sp.	Bluebell	N
FG	*Xanthium spinosum*	Bathurst Burr	HTE
GG	*Amphibromus nervosus*	Common Swamp Wallaby-grass	N
GG	*Aristida behriana*	Bunch Wiregrass	N
GG	*Aristida personata*	Purple Wire-grass	N
GG	*Aristida ramosa*	Purple Wiregrass	N
GG	*Aristida vagans*	Threeawn Speargrass	N
GG	*Austrostipa aristiglumis*	Plains Grass	N
GG	*Austrostipa scabra*	Rough Speargrass	N
GG	*Austrostipa* sp.	Speargrass	N
GG	*Avena sativa*	Oats	E
GG	*Bothriochloa macra*	Red Grass	N
GG	*Carex inversa*	Sedge	N
GG	*Chloris truncata*	Windmill Grass	N
GG	*Cynodon dactylon*	Couch	N
GG	*Dactylis glomerata*	Cocksfoot	E
GG	*Digitaria brownii*	Cotton Panic Grass	N
GG	*Digitaria hystrichoides*	Curly Umbrella Grass	N
GG	*Digitaria* sp. 1		N
GG	*Digitaria* sp. 2		N
GG	*Eleocharis acuta*	Spike-rush	N
GG	*Eleusine indica*	Crowsfoot Grass	E
GG	*Enteropogon acicularis*	Curly Windmill Grass	N
GG	*Eragrostis brownii*	Brown's Lovegrass	N
GG	*Eragrostis cilianensis*	Stinkgrass	E
GG	*Eragrostis elongata*	Clustered Lovegrass	N
GG	*Eragrostis lacunaria*	Purple Lovegrass	N
GG	*Eragrostis leptostachya*	Paddock Lovegrass	N
GG	*Eragrostis parviflora*	Weeping Lovegrass	N

Growth form	Species name	Common name	Status
GG	*Juncus psammophilus*	Rush	N
GG	*Lolium perenne*	Perennial Ryegrass	E
GG	*Panicum decompositum*	Native Millet	N
GG	*Panicum effusum*	Hairy Panic	N
GG	*Paspalidium distans*	Paspalidium	N
GG	*Poa sieberiana*	Snowgrass	N
GG	*Rytidosperma caespitosum*	Ringed Wallaby Grass	N
GG	*Rytidosperma* sp.1	Wallaby Grass	N
GG	*Rytidosperma* sp. 2	Wallaby Grass	N
GG	*Sporobolus creber*	Slender Rat's Tail Grass	N
EG	*Cheilanthes sieberi*	Poison Rock Fern	N
OG	*Convolvulus angustissimus*	Bindweed	N
OG	*Glycine tabacina*	Variable Glycine	N

Fauna species list

The species listed below were detected during the initial BAM survey and/or during subsequent targeted surveys.

BC Act/EPBC Act: V = Vulnerable. Status: N = Native, E = Exotic

Class	Species Name	Common Name	BC Act	EPBC Act	Status
Aves	*Acanthiza nana*	Yellow Thornbill	-	-	N
Aves	*Anas superciliosa*	Pacific Black Duck	-	-	N
Aves	*Anthus novaeseelandiae*	Australasian Pipit	-	-	N
Aves	*Cacatua galerita*	Sulfur-crested Cockatoo	-	-	N
Aves	*Cacatua tenuirostris*	Long-billed Corella	-	-	N
Aves	*Chenonetta jubata*	Australian Wood Duck	-	-	N
Aves	*Cincloramphus cruralis*	Brown Songlark	-	-	N
Aves	*Cincloramphus mathewsi*	Rufous Songlark	-	-	N
Aves	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	-	-	N
Aves	*Corcorax melanorhamphos*	White-winged Chough	-	-	N
Aves	*Corvus coronoides*	Australasian Raven	-	-	N
Aves	*Cracticus nigrogularis*	Pied Butcherbird	-	-	N
Aves	*Cracticus torquatus*	Grey Butcherbird	-	-	N
Aves	*Dacelo novaeguineae*	Laughing Kookaburra	-	-	N
Aves	*Egretta novaehollandiae*	White-faced Heron	-	-	N
Aves	*Entomyzon cyanotis*	Blue-faced Honeyeater	-	-	N
Aves	*Eolophus roseicapilla*	Galah	-	-	N
Aves	*Falco berigora*	Brown Falcon	-	-	N
Aves	*Falco cenchroides*	Nankeen Kestrel	-	-	N
Aves	*Grallina cyanoleuca*	Magpie-lark	-	-	N
Aves	*Gymnorhina tibicen)*	Australian Magpie	-	-	N
Aves	*Hirundo neoxena*	Welcome Swallow	-	-	N
Aves	*Malurus cyaneus*	Superb Fairy Wren	-	-	N
Aves	*Manorina melanocephala*	Noisy Miner	-	-	N
Aves	*Northiella haematogaster*	Eastern Bluebonnet	-	-	N
Aves	*Ocyphaps lophotes*	Crested Pigeon	-	-	N
Aves	*Pachycephala rufiventris*	Rufous Whistler	-	-	N
Aves	*Platycercus eximius*	Eastern Rosella	-	-	N
Aves	*Polytelis swainsonii*	Superb Parrot	V	V	N
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (Eastern subspecies)	V	-	N
Aves	*Rhipidura leucophrys*	Willie Wagtail	-	-	N
Aves	*Struthidea cinerea*	Apostlebird	-	-	N
Aves	*Sturnus vulgaris*	European Starling	-	-	E

Class	Species Name	Common Name	BC Act	EPBC Act	Status
Mammalia	*Antechinus flavipes*	Yellow-footed Antechinus	-	-	N
Mammalia	*Trichosurus vulpecula*	Brush-tailed Possum	-	-	N
Reptilia	*Cryptoblepharus australis*	Snake-eyed Skink	-	-	N
Reptilia	*Lerista muelleri*	Mueller's Three-toed Lerista	-	-	N
Reptilia	*Suta dwyeri*	Dwyer's Black-headed Snake	-	-	N
Reptilia	*Tiliqua scincoides*	Eastern Blue-tongued Lizard	-	-	N

Bat Logger Results

Bat loggers were deployed from 02-21 December 2021. Bat data was analysed by Lesryk Environmental. Bat Logger 1 recorded 381 bat calls across 17 nights. Bat Logger 2 recorded 880 bat calls across 19 nights. Ten species were positively identified, one of which (Large Bent-winged Bat, *Miniopterus orianae oceanensis*) is listed as Vulnerable under the BC Act. Two species were unable to be distinguished from one another using the call data captured, one of these species (Little Pied Bat) is listed as Vulnerable under the BC Act. It cannot be said with certainty that the Little Pied Bat is present on the subject land. Multiple species of *Nyctophilus* were detected, however, none were able to be identified to species level. None of the positively identified bat species are listed under the EPBC Act. None of the detected bats are Species Credit Species under the BAM (2020). Both Vulnerable bats are Ecosystem Credit Species bats under the BAM (2020).

Species	Common Name	BC Act	# nights positively identified Bat Logger 1	# nights positively identified Bat Logger 2	# nights tentatively identified Bat Logger 1	# nights tentatively identified Bat Logger 2
Austronomus (=Tadarida) australis	White-striped Freetail Bat		11	9		
Chalinolobus gouldii	Gould's Wattled Bat		14	12		
Chalinolobus morio	Chocolate Wattled Bat		2	9		
Chalinolobus picatus	Little Pied Bat*	V	0	0	2	1
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	2	1		1
Nyctophilus spp.	Long-eared Bats		0	4	2	1
Ozimops planiceps	Southern Free-tailed Bat		8	3		
Ozimops ridei	Ride's Free-tailed Bat		7	0		
Scotorepens balstoni	Inland Broad-nosed Bat		0	1		
Scotorepens greyii	Little Broad-nosed Bat*		0	0	2	1
Vespadelus darlingtoni	Large Forest Bat		0	1		3
Vespadelus regulus	Southern Forest Bat		2	4		
Vespadelus vulturnus	Little Forest Bat		0	4		

*Tentative identification, it was not possible to distinguish between *S. greyii* and *C. picatus.*

Appendix D: Habitat Suitability Assessment and BC Act Tests of Significance

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

Ecosystem Credit Species

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
Aves	*Anthochaera phrygia*	Regent Honeyeater (foraging)	E4A,P	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. **Assumed Present.**
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		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 understorey 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. **Assumed Present.**
Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo (foraging)	V,P,3		The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests.

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					Assumed Present, though not detected for breeding in targeted surveys.
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		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 understorey, 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 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. **Assumed Present.**
Aves	*Circus assimilis*	Spotted Harrier	V,P		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. **Assumed Present.**
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		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

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					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. **Assumed Present.**
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		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.**
Aves	*Falco subniger*	Black Falcon	V, P		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. **Assumed Present.**
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. **Assumed Present.**
Aves	*Grantiella picta*	Painted	V,P	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
		Honeyeater			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. **Absent (habitat constraint) – The species is associated with the vegetation communities recorded on the subject land; however, the scarcity of mistletoes within the subject land make it unsuitable for use by this species.**
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle (foraging)	V,P	C	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. **Assumed Present.**
Aves	*Hieraaetus morphnoides*	Little Eagle (foraging)	V,P		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. **Assumed Present, though not detected for breeding.**
Aves	*Hirundapus caudacutus*	White-throated	P	V,C,J,K	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,

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
		Needletail			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. **Assumed Present.**
Aves	*Lathamus discolor*	Swift Parrot (foraging)	E1,P,3	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.* **Assumed Present.**
Aves	*Lophoictinia isura*	Square-tailed Kite (foraging)	V,P,3		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. **Assumed Present, though not detected for breeding.**
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		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

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **Assumed Present.**
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW. he 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. **Assumed Present.**
Aves	*Neophema pulchella*	Turquoise Parrot	V,P,3		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. **Assumed Present.**
Aves	*Ninox connivens*	Barking Owl (foraging)	V,P,3		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

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					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. **Assumed Present, though not detected for breeding in targeted surveys.**
Aves	*Pachycephala inornata*	Gilbert's Whistler	V,P		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, chiefly by clearance of habitat. The eastern population extends from the central NSW mallee (Yathong, Nombinnie and Round Hill NRs), south and east through the Cocoparra Range to Pomingalarna Reserve (near Wagga Wagga) then north through the South West Slopes east as far as Cowra and Burrendong Dam, to the Goonoo reserves (with scattered records as far north as Pilliga). The north western limits of this population are poorly known, with records from as far west as Cobar and recent records from Quanda NR, though records further west may be due to confusion with the Golden Whistler. In a number of reserves in this area there have been no recent records (last records from Pulletop NR 1982, Pomingalarna Reserve 1995 and Ingalba NR 1999) and this species may be locally extinct. Occasional records are also made of this species in the Capertee Valley. The species is also recorded in River Red Gum forests along the Murray River valley between Mathoura and Wentworth, with the eastern populations (between Mathoura and Barham) apparently isolated from other NSW populations. West of Swan Hill, this population may interact with populations found to the north of the Murray River west of Balranald and as far north as the Scotia country (Tarawi NR and Scotia Sanctuary). **Assumed Present.**
Aves	*Petroica boodang*	Scarlet Robin	V,P		The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					usually contains abundant logs and fallen timber: these are important components of its habitat. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. The Scarlet Robin is a quiet and unobtrusive species which is often quite tame and easily approached. Birds forage from low perches, fenceposts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. **Assumed Present.**
Aves	*Petroica phoenicea*	Flame Robin	V,P		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.**
Aves	*Polytelis swainsonii*	Superb Parrot (foraging)	V,P,3	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. 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 understorey shrubs and on the ground and their diet

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					consists mainly of grass seeds and herbaceous plants. **Present (detected during survey).**
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		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 roosting each night. Nests are maintained year-round, and old nests are often dismantled to build new ones. **Present (detected during survey).**
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		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. **Assumed Present.**
Aves	*Tyto novaehollandiae*	Masked Owl (foraging)	V,P,3		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. **Assumed Present.**

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. **Assumed Present. A call tentatively identified as this species was recorded on bat loggers on the subject land (see Appendix B).**
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. **Assumed Present.**
Mammalia	*Nyctophilus corbeni*	Corben's Long-eared Bat	V,P	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 luehmannii* 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.**
Mammalia	*Phascolarctos cinereus*	Koala (foraging)	V,P	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Gray box (*Eucalyptus microcarpa*) is a known forage tree for koalas and was recorded on site. **Assumed Present, though not detected during targeted surveys.**
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox (foraging)	V,P	V	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating,

Relevant Clade	Scientific Name	Common Name	NSW status	Comm status	Habitat Assessment
					and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops. **Assumed Present.**
Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		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. **Assumed Present.**

Species credit species

Scientific Name	Common Name	NSW status	Comm. status	Habitat Assessment	Species presence
Acacia ausfeldii	Ausfeld's Wattle	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Anthochaera phrygia	Regent Honeyeater (Breeding)	E4A,P	CE	Mapped breeding area does not occur on the subject land.	Absent (habitat constraints)
Aprasia parapulchella	Pink-tailed Legless Lizard	V,P	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Burhinus grallarius	Bush Stone-curlew	E1,P		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Callocephalon fimbriatum	Gang-gang Cockatoo (breeding)	V,P,3		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Cercartetus nanus	Eastern Pygmy-possum	V,P		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Assumed present
Haliaeetus leucogaster	White-bellied Sea-Eagle (breeding)	V,P	C	No substantial waterway or waterbody exists within 1km of the subject land. The mapped minor watercourses are unlikely to be sufficient for this species.	Absent (habitat constraints)
Hieraaetus morphnoides	Little Eagle (breeding)	V,P		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Lathamus discolor	Swift Parrot (breeding)	E1,P,3	CE	Mapped breeding area does not occur on the subject land.	Absent (habitat constraints)
Lophoictinia isura	Square-tailed kite (breeding)	V,P,3		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Ninox connivens	Barking Owl (breeding)	V,P,3		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Petaurus norfolcensis	Squirrel Glider	E2,V,P		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Petaurus norfolcensis	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		The subject land is not within the Wagga Wagga LGA	Absent (geographic constraints)

Scientific Name	Common Name	NSW status	Comm. status	Habitat Assessment	Species presence
Phascolarctos cinereus	Koala (breeding)	V,P	V	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Polytelis swainsonii	Superb Parrot (breeding)	V,P,3	V	The species was recorded in multiple locations across the subject land.	Present (detected during survey)
Pteropus poliocephalus	Grey-headed Flying Fox (breeding)	V,P	V	Site visits did not locate any breeding camps of Grey-headed Flying Foxes.	Absent (habitat constraint)
Swainsona recta	Small Purple-pea	E1	E	A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Swainsona sericea	Silky Swainson-pea	V		A targeted survey was conducted for this species. The species was not detected and can be considered absent.	Absent (surveyed)
Tyto novaehollandiae	Masked Owl (breeding)	V,P,3		A targeted survey was not conducted for this species as the survey window had passed.	Assumed present

Appendix E: 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* (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

A Protected Matters Search identified four Endangered Ecological Communities, 24 threatened species, 11 migratory and 18 marine species as potentially occurring within 10 km of the subject land.

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. and;
    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 (DoE, 2013).

Wetlands of International Importance			
Name	Proximity	Assessment	Assessment of significance required (Yes/No)
Banrock station wetland complex	700-800 km	The proposal is not within close proximity of Banrock Station wetland complex.	No
Riverland	600-700 km	The proposal is not within close proximity of the Riverland	No
The Coorong, and Lakes Alexandrina and Albert Wetland	800-900 km	The proposal is not within close proximity of the Coorong and Lakes Alexandrina and Albert Wetland	No
Hattah-Kulkyne lakes	500-600km	The proposal is not within close proximity of the Hattah-Kulkyne lakes	No

Threatened Ecological Communities			
Name	Status	Habitat Assessment	Assessment of significance (Yes/No)
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	Community not present within subject land.	No
Poplar Box Grassy Woodland on Alluvial Plains	E	Community not present within subject land.	No
Weeping Myall Woodlands	E	Community not present within subject land.	No
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	Areas adjacent to the subject land meeting the condition thresholds for this community have been excluded from the development footprint.	No

Threatened species					
Species name	**Common Name**	**Status**	**Records within 10km?**	**Habitat Assessment**	**Assessment of Significance required (Yes/No)**
Anthochaera phrygia	Regent Honeyeater	CE	No	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides* and other Stringybark species, and Broad-leaved Ironbark *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii, A. pendula* and *A. cambagei* are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the	Yes

				recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. **Moderate – The species is associated with PCT 267 and PCT 282. Minor occurrences of woodland within and adjacent to the subject land may provide foraging habitat for this species.**	
Botaurus poiciloptilus	Australasian Bittern	E	No	The Australasian Bittern favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and. Hides during the day amongst dense reeds or rushes and feed 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 to a clutch. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands).**	No
Calidris ferruginea	Curlew Sandpiper	CE	No	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. 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 salt works 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 species is not associated with any plant communities recorded within the subject land. The site possesses only marginal habitat value (small farm dams). The nearest record is from Parkes, c. 48 km from the subject land.**	No
Falco hypoleucos	Grey Falcon	V	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. **Low – The species is not associated with any plant communities recorded within**	No

				the subject land. The subject land is at the eastern limit of the known range of this species.	
Grantiella picta	Painted Honeyeater	V	No	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, Brigalow 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.* **Low – The species is associated with the plant communities recorded within the subject land but requires a density of mistletoes that the subject land was found to lack.**	No
Hirundapus caudactus	White-throated Needletail	V	No	White-throated Needletails are non-breeding migrants, occurring in Australia only between late spring and early autumn, but mostly in summer, when they sometimes form large flocks, appearing as a swirling cloud of birds. Aerial birds; however, will roost in trees. **Moderate – The species is associated with PCT 267 and PCT 282. Chiefly an aerial species, but may make use of woodlands for roosting.**	Yes
Lathamus discolor	Swift Parrot	CE	No	The species 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. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land is outside the known important breeding areas of this species, which has not been recorded within 10 km of the site, but may provide some marginal foraging habitat.**	Yes
Leipoa ocellata	Malleefowl	V	No	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	No

				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. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (mallee communities or box communities with a thick understorey).**	
Numenius madagascariensis	Eastern Curlew	CE,M	No	The Eastern Curlew is widespread in coastal regions in the north-east and south of Australia, including Tasmania, and scattered in other coastal areas. It is rarely seen inland. It breeds in Russia and north-eastern China. On passage, they are commonly seen in Japan, Korea and Borneo. Small numbers visit New Zealand. The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons. The Eastern Curlew eats mainly small crabs and molluscs. Foraging by day and night, it is slow and deliberate, stalking slowly on sandy and muddy flats, picking from the surface or probing deep with its long bill. Eastern Curlews breed in the northern hemisphere on swampy moors and boggy marshes. Both sexes have similar plumage, with the males using their haunting calls and display flights to attract a mate and defend their territory. The nest is a shallow depression lined with grass. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands). Species is chiefly coastal.**	No
Polytelis swainsonii	Superb Parrot	V	Yes	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. **Present – This species was detected in multiple locations within the subject land and in adjacent vegetation.**	Yes
Rostratula australis	Australian Painted-snipe, Australian Painted snipe	E	No	Most records of the Australian Painted Snipe are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western 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	No

				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. **Low – The species is not associated with any plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (wetlands or still water bodies with vegetated margins).**	
Maccullochella macquariensis	Trout Cod	E	No	The Trout Cod is endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. The species was once widespread and abundant in these areas but has undergone dramatic declines in its distribution and abundance over the past century. The last known reproducing population of Trout Cod is confined to the Murray River below Yarrawonga downstream to Tocumwal. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Maccullochella peelii	Murray Cod	V	No	The iconic Murray Cod is the largest freshwater bony fish in Australia. This elongate, deep bodied fish has a broad, depressed head, a short rounded snout and a large mouth with the lower jaw protruding slightly, and jaws extending beyond the eyes. The soft dorsal, anal and caudal fins are large and rounded. Murray Cod are brownish to yellowish-green with a mottled pattern of darker and paler markings above and a pale belly. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Macquaria australasis	Macquarie Perch	E	No	Habitat critical to the survival of the Macquarie perch can be described as all areas within the species' range which are characterized by flowing runs or riffles and small complex rock piles, and in some waterways, instream woody habitats. **Absent – No suitable aquatic habitat occurs on the subject land.**	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	No	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. **Moderate – The species is associated with PCT 267 and PCT 282. The species has not been recorded within 10 km of the subject, which appears to lack the features preferred by this species, e.g. well-timbered gullies, caves, cliffs, crevices, and Fairy Martin nests. Some marginal foraging habitat may be present.**	Yes
Dasyurus maculatus	Spotted-tail Quoll, Tiger	E	No	The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern	Yes

maculatus	Quoll (SE Mainland population)			Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. The spotted-tailed Quoll is recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land and the adjacent wooded remnants may provide some marginal foraging habitat.**	
Nyctophilus corbeni	Corben's Long-eared Bat	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. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land offers nesting and foraging opportunities for this species.**	Yes
Phascolarctos cinereus	Koala	V	Yes	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. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land contains known Koala food trees, though typically at low densities, and may provide some habitat for this species.**	Yes
Pteropus poliocephalus	Grey-headed Flying Fox	V	No	Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land is not known to host a significant "camp" of Flying Foxes but may provide some marginal foraging habitat.**	Yes
Austrostipa metatoris	A Spear-grass	V	No	Most records of *Austrostipa metatoris* 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. **Low – The species is not associated with the vegetation communities recorded**	No

				within the subject land and has not been recorded within 10 km.	
Austrostipa wakoolica	A Spear-grass	E	Yes	*Austrostipa wakoolica* is 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). **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Lepidium monoplocoides	Winged Pepper-cress	E	No	*Lepidium monoplocoides* is widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie. **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Tylophora linearis		E	No	Majority of records occur in the central western region. Records from Goonoo, Pilliga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri*, *Callitris glaucophylla* and *Allocasuarina luehmannii.* **Low – The species is not associated with the vegetation communities recorded within the subject land and has not been recorded within 10 km.**	No
Aprasia parapulchella	Pink-tailed Legless Lizard	V	No	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*). Sites are typically well-drained, with rocky outcrops or scattered, partially buried rocks. Commonly found beneath small, partially embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. **Moderate – The species is associated with PCT 267 and PCT 282. The subject land possesses both rocky outcrops and areas of native grassland, which may be**	Yes

				suitable for this species.	
Apus pacificus	Fork-tailed Swift		No	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. The Fork-tailed Swift is almost exclusively aerial, flying from < 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. **Moderate – Can occur over most habitats, including dry open woodland of the kind found within the subject land.**	Yes
Motacilla flava	Yellow Wagtail		No	Mostly utilises well-watered open grasslands and the fringes of wetlands. Roosts in mangroves and other dense vegetation. **Low – Species has not been recorded within c. 230 km of the subject land. Typically habitat is largely absent.**	No
Myiagra cyanoleuca	Satin Flycatcher		No	In NSW, they are widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Found in tall forests and wetter habitats, such as forested gullies, but not rainforests. **Moderate – Some potential woodland habitat occurs within and adjacent to the subject land.**	Yes
Rhipidura rufifrons	Rufous Fantail	M	No	The Rufous Fantail is found in northern and eastern coastal Australia, being more common in the north. It is also foind in New Guinea, the Solomon Islands, Sulawesi and Guam. The Rufous Fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. The Rufous Fantail feeds on insects, which it gleans from the middle and lower levels of the canopy. It is a very active feeder and constantly fans tail and flicks wings and body while foraging. The Rufous Fantail builds a small compact cup nest, of fine grasses bound with spider webs, that is suspended from a tree fork about 5 m from the ground. The bottom of the nest is drawn out into a long stem. Both sexes share nest-building, incubation and feeding of the young. One or two broods may be raised in a season. **Low – Occasionally reaches west of the Great Dividing Range however no suitably dense habitat is within subject land.**	No
Actitis hypoleucos	Common Sandpiper		No	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. The species utilises a wide range of coastal wetlands and some inland wetlands,	No

				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 be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. **Low – The species is not associated with any plant communities recorded within the subject land. The nearest records of the species are c. 40 km from the subject land. The site possesses at most marginal habitat in the form of small farm dams.**	
Calidris acuminata	Sharp-tailed Sandpiper		No	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 salt lakes inland. **Low – The species is not associated with any plant communities recorded within the subject land. The nearest records of the species are c. 30 km from the subject land. The site possesses at most marginal habitat in the form of small farm dams.**	No
Calidris melanotos	Pectoral Sandpiper		No	In 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. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. **Low – The species is not associated with any plant communities recorded within the subject land. The nearest records of the species are c. 56 km from the subject land. The site possesses at most marginal habitat in the form of small farm dams.**	No
Gallinago hardwickii	Latham's Snipe		No	Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. Latham's Snipe breed in Japan and on the east Asian mainland. Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture. **Moderate – The species may occasionally make use of agricultural land.**	Yes
Ardea ibis	Cattle Egret		No	Originally found in Africa, Europe and Asia, the Cattle Egret is now found on nearly every	Yes

				continent, with birds in Australia originating from Asia. In Australia it is most widespread and common in north-eastern Western Australia across the Top End, Northern Territory, and in south-eastern Australia from Bundaberg, Queensland to Port Augusta, South Australia, including Tasmania. The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps and is often seen with cattle and other stock. **Moderate – There is potential marginal foraging habitat for the species, which can utilise open fields, particularly where cattle are present.**	
Chrysococcyx osculans	Black-eared Cuckoo		No	The Black-eared Cuckoo is found in drier country where species such as mulga and mallee form open woodlands and shrublands. It is often found in vegetation along creek beds (Birdlife Australia, 2019b). **Moderate – There is potential marginal foraging habitat for the species, which can utilise disturbed open woodlands.**	Yes
Haliaeetus leucogaster	White-bellied Sea-Eagle		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. **Low – The subject land lacks the required large open water bodies.**	No
Merops ornatus	Rainbow Bee-eater		No	The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (Higgins 1999). It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent water. It also occurs in inland and coastal sand dune systems, and in mangroves in northern Australia, and has been recorded in various other habitat types including heathland, sedgeland, vine forest and vine thicket, and on beaches. The Rainbow Bee-eater occurs in open woodlands and shrublands, including mallee, and in open forests that are usually dominated by eucalypts. It also occurs in grasslands and, especially in arid or semi-arid areas, in riparian, floodplain or wetland vegetation assemblages. **Moderate – There is potential foraging habitat for the species, which can utilise pastures and open woodlands, within the subject land.**	Yes
Neophema chrysostoma	Blue-winged Parrot			The Blue-winged Parrot breeds in Tasmania and the southern mainland, chiefly south-eastern South Australia and southern Victoria, but little is known of the species' movements. It occurs in inland regions of New South Wales. Often found in grasslands and grassy woodlands. **Moderate – Vegetation associations are not recorded, but some potential foraging habitat for this species occurs within the subject land. Local records are sparse,**	Yes

				with the nearest record being c. 24 km from the subject land and the next nearest being c. 60 km from the subject land.	
Rostratula benghalensis	Painted Snipe		No	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western 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. **Low – The species is not associated with plant communities recorded within the subject land. The site lacks critical habitat characteristics required by this species (vegetated wetland areas)**	No

EPBC Act-listed Critically Endangered and Endangered Species

Regent Honeyeater	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 56.55 ha of potential Regent Honeyeater habitat. As the subject is outside of the known breeding areas of this species, and as the species undergoes large-scale nomadic movements, impacts to the subject land are unlikely to significantly impact the Regent Honeyeater, except through a minor loss of connectivity provided by isolated paddock trees. This is unlikely to have a deleterious impact on the species leading to a long-term decrease in the size of the population at a regional scale.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land and has not been recorded within 10 km of the development footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 56.55 ha. Much of this habitat is unsuitable for use by this species, however, as it consists of isolated paddock trees in a highly modified landscape. The subject land does not occur within a mapped important area for the species.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential foraging habitat. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the site offers marginal foraging habitat only and is outside the known important areas for this species.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.

Regent Honeyeater	
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 56.55 ha of marginal foraging habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Swift Parrot	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 56.55 ha of potential Swift Parrot habitat. As the subject is outside of the known breeding areas of this species, and as the species undergoes large-scale nomadic movements, impacts to the subject land are unlikely to significantly impact the Swift Parrot, except through a minor loss of connectivity provided by isolated paddock trees. This is unlikely to have a deleterious impact on the species leading to a long-term decrease in the size of the population at a regional scale.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land and has not been recorded within 10 km of the development footprint. Consequently, it is unclear if the proposal will directly reduce the area of occupancy of this species. It will, however, reduce the total area of potential habitat for this species across its range by 56.55 ha. The subject land does not occur within a mapped important area for the species.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential foraging habitat. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the species has not been recorded locally and the subject land is outside the known important areas for this species.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat will be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.

Swift Parrot	
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 56.55 ha of foraging habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As the species is not known to make use of this habitat, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal would be unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

Spotted-tailed Quoll (SE mainland population)	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of a population	The proposal will impact up to 56.55 ha of potential habitat for the Spotted-tailed Quoll. No records of the species are known within c. 40 km and the species is unlikely to make extensive use of the sparse, open woodland and derived pasture recorded within the subject land. Consequently, impacts to the subject land are unlikely to significantly impact this species and any minor residual impacts are unlikely to have a deleterious impact on the species leading to a long-term decrease in the size of the population at a regional scale.
Reduce the area of occupancy of the species	The species is not known to make use of the subject land and has not been recorded within c. 40 km of the development footprint. Further, the subject land is at most marginally suitable for use by this species. Consequently, it is unlikely that the proposal will directly reduce the area of occupancy of this species. If the species makes use of nearby wooded remnants, impacts to the subject land may impede its movements between these areas of habitat.
Fragment an existing population into two or more populations	The proposal will exacerbate existing fragmentation of available habitat for the species by removing areas of potential foraging habitat. As no populations are known locally, and as connectivity exists in the wider landscape, this fragmentation is unlikely to isolate a population into two or more populations at the regional scale. Mitigation measures will be implemented to reduce habitat fragmentation wherever possible (see **Section 6**).
Adversely affect habitat critical to the survival of a species	The subject land is unlikely to constitute habitat critical to the survival of the species as the species has not been recorded locally and the habitat within the subject land is at most marginally suitable.
Disrupt the breeding cycle of a population	As no local populations are known, the proposal is unlikely to disrupt the breeding cycle for this species. The total area of suitable breeding habitat may be slightly reduced by this proposal; however, the better-quality habitat has largely been excluded from the development footprint.

Spotted-tailed Quoll (SE mainland population)	
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 56.55 ha of marginally suitable habitat for the species, as well as slightly exacerbating the existing fragmentation of local habitat patches. As no records of the species are known within c. 40 km, this reduction and fragmentation is unlikely to cause the species to decline at a regional scale.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	Machinery used on site can potentially act as a transport for biosecurity risks. Environmental safeguards for the management of biosecurity risks will be implemented to reduce these risks to a low level (see **Section 6**).
Interfere with the recovery of the species.	The proposal will result in a reduction in the total area of potentially suitable habitat for this species. This may have the effect of limiting the potential for the species to recover, as it will have less habitat to expand into. Owing to the marginal nature of the impacted habitat and the absence of local records of the species, this is unlikely to significantly interfere with the recovery of the species within the region, though some associated threats will be exacerbated as a result.
Conclusion	**Non-significant impact**

EPBC Act-listed Vulnerable Species

Superb Parrot	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. As the site is neither at the limit of the species' range nor within a core breeding area for the species, it is unlikely that an important population, as defined here, is present within the subject land. Further, as the species was recorded in both the disturbed and the better-quality remnants assessed during the site surveys, it is likely that the parrot will continue to use the disturbed understorey for foraging, and the woodland that has been excluded from the development footprint, once construction has concluded. As such, it is unlikely that any impacts resulting from this proposal will lead to a long-term decline in any local population.
Reduce the area of occupancy of an important population	The proposal will reduce the potential occupancy of this species by 56.55 ha. This figure is largely comprised of heavily modified derived grasslands, which are at most marginally suitable for this species. It is unlikely that an important population occurs locally and it is similarly unlikely that the proposal will significantly impact the known local population.
Fragment an existing important population into two or more populations	As the species is highly mobile and demonstrably capable of moving between existing remnants, no fragmentation is likely.
Adversely affect habitat critical to the survival of a species	The subject land falls outside the core breeding habitat of the species. For this reason, it is unlikely to constitute critical habitat for this species.
Disrupt the breeding cycle of an important population	Some potential breeding habitat for this species will be removed; however, the scale of this impact is not likely to disrupt the breeding cycle of this species to a significant degree. Higher quality habitat will remain.

Superb Parrot	
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 56.55 ha of associated native habitat for this species. The proposal will reduce overall habitat connectivity and foraging habitat; however, it will not isolate patches or dissect habitat features to the degree that the species may decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	A recovery plan has been prepared for the Superb Parrot the specific objective of this being to: 1. Determine population trends in the Superb Parrot. 2. Increase the level of knowledge of the Superb Parrot's ecological requirements. 3. Develop and implement threat abatement strategies 4. Increase community involvement in and awareness of the Superb Parrot recovery program. The proposal will not directly interfere with these aims.
Conclusion	**Non-significant impact**

White-throated Needletail	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. As the site is not at the limit of the species' range, and as the species does not breed in Australia, it is unlikely that an important population, as defined here, is present within the subject land.
Reduce the area of occupancy of an important population	The proposal will impact up to 56.55 ha of woodland and grassland habitat. As the species is largely aerial, the likely impact of this reduction is unclear but unlikely to significantly reduce the area of occupancy of this species. As indicated above, it is unlikely that an important population occurs locally.
Fragment an existing important population into two or more populations	As indicated above, it is unlikely that an important population occurs locally. Further, as the species is chiefly aerial and highly mobile, no fragmentation is likely.
Adversely affect habitat critical to the survival of a species	It is unlikely that the habitat within the subject land is critical to the survival of the species. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Disrupt the breeding cycle of an important population	This species does not breed in Australia; consequently, no impacts to its breeding cycle are likely.
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 56.55 ha of associated native habitat for this species. It will not isolate patches such that White-throated Needletails will be unable to access them or move from them into new areas. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

White-throated Needletail	
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	The potential impacts of this proposal to the White-throated Needletail are unclear, but the species is unlikely to be significantly affected by the reduction in potentially suitable habitat.
Conclusion	**Non-significant impact**

Large-eared Pied Bat	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. As the nearest record of this species occurs c. 60 km east of the subject land, and it was not detected during targeted survey, it is unlikely that an important population occupies or is dependent upon the subject land.
Reduce the area of occupancy of an important population	As indicated above, it is unlikely that an important population occurs locally.
Fragment an existing important population into two or more populations	As indicated above, it is unlikely that an important population occurs locally.
Adversely affect habitat critical to the survival of a species	It is unlikely that the habitat within the subject land is critical to the survival of the species. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Disrupt the breeding cycle of an important population	It is highly unlikely that the species occupies the subject site; consequently, no impacts on the breeding cycle of the species are likely.
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 56.55 ha of associated native habitat for this species. It will not isolate patches such that Large-eared Pied Bats will be unable to access them or move from them into new areas. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

Large-eared Pied Bat	
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	As this species was not detected during targeted surveys and the subject site appears to fall outside the typical range of the Large-eared Pied Bat, it is unlikely that the proposal will have any significant impact on the recovery of this species.
Conclusion	**Non-significant impact**

Corben's Long-eared Bat	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. The nearest records of this species occur in Warraderry State Forest (c. 14 km south of the subject land) and Nangar National Park (c. 27 km northeast). As the species is not known from the vicinity of the site, and as the subject land offers only limited suitable breeding habitat, it is an unlikely that an important population is dependent on the subject land.
Reduce the area of occupancy of an important population	As indicated above, it is unlikely that an important population occurs locally.
Fragment an existing important population into two or more populations	As indicated above, it is unlikely that an important population occurs locally.
Adversely affect habitat critical to the survival of a species	It is unlikely that the habitat within the subject land is critical to the survival of the species. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Disrupt the breeding cycle of an important population	As indicated above, it is unlikely that an important population occurs locally.
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 56.55 ha of associated native habitat for this species. It will not isolate patches such that Corben's Long-eared Bats will be unable to access them or move from them into new areas. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

Corben's Long-eared Bat	
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	The proposal will impact a small area of marginal potential habitat for this species. As nearby records are confined to larger wooded remnants, it is unlikely that this impact will significantly impede the recovery of this species.
Conclusion	**Non-significant impact**

Koala	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range. The subject land is unlikely to support an important population as only one record for the species exists within 10km, and this dates from 1972. Searches of suitable food trees and spotlighting within and adjacent to the subject land did not identify any evidence of occupation by Koalas.
Reduce the area of occupancy of an important population	No. The subject land is unlikely to support an important population (see above).
Fragment an existing important population into two or more populations	No. The subject land is unlikely to support an important population (see above).
Adversely affect habitat critical to the survival of a species	Application of the Koala Habitat Assessment Tool (**Appendix H**) determined that habitat present at the site would not constitute "core Koala habitat," returning a score of 4 (5 being the minimum score considered to be "core" habitat). For this reason, the subject land is not considered critical to the survival of the species.
Disrupt the breeding cycle of an important population	No. The subject land is unlikely to support an important population (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 56.55 ha of associated native habitat for this species, much of which is heavily modified and of doubtful utility to the Koala. The proposal may slightly reduce landscape connectivity, which is already of uncertain suitability for this species (see **Appendix H**).

Koala	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	According to the EPBC Act Referral Guidelines for the Koala, impacts which are likely to substantially interfere with the recovery of the koala may include one or more of the following: • Increasing koala fatalities in habitat critical to the survival of the koala due to dog attacks to a level that is likely to result in, an ongoing source of mortality. • Increasing koala fatalities in habitat critical to the survival of the koala due to vehicle-strikes to a level that is likely to result in an ongoing source of mortality. • Facilitating the introduction or spread of disease or pathogens for example Chlamydia or *Phytophthora cinnamomi*, to habitat critical to the survival of the koala, that are likely to significantly reduce the reproductive output of koalas or reduce the carrying capacity of the habitat. • Creating a barrier to movement to, between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala. • Changing hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term. As the subject land does not constitute critical habitat, the proposal will not interfere with the recovery of the species, according to these criteria.
Conclusion	**Non-significant impact**

Grey-headed Flying Fox	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. As the nearest known camps of this species are at Grenfell and Parks, c. 36 km and c. 50 km from the site respectively, it is highly unlikely that the subject land hosts an important population of this species.
Reduce the area of occupancy of an important population	The proposal will impact up to 56.55 ha of woodland and grassland habitat. As no important population is likely to occupy the site, this will not reduce the occupancy of an important population.
Fragment an existing important population into two or more populations	As indicated above, it is unlikely that an important population occurs locally.
Adversely affect habitat critical to the survival of a species	As the available habitat does not host an important population of the species, and as it provides at most occasional foraging habitat, it is unlikely to be critical to the survival of the species.
Disrupt the breeding cycle of an important population	As indicated above, it is unlikely that an important population occurs locally.
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 56.55 ha of associated native habitat for this species. It will not isolate patches such that Grey-headed Flying Fox will be unable to access them or move from them into new areas. Similar woodland and derived grassland exists throughout the surrounding agricultural landscape.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

Grey-headed Flying Fox	
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	The potential impacts of this proposal to the Grey-headed Flying Fox are likely to be limited, as no population is known to make use of the site.
Conclusion	**Non-significant impact**

Pink-tailed Legless Lizard	
Significant Impact Guideline	**Assessment**
Lead to a long-term decrease in the size of an important population of a species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species' range. Limited suitable habitat occurs within the subject land and intensive targeted survey efforts did not detect any members of this species. It is therefore unlikely that an important population of this species occupies the subject land.
Reduce the area of occupancy of an important population	It is unlikely that an important population of this species is present within the subject land.
Fragment an existing important population into two or more populations	It is unlikely that an important population of this species is present within the subject land.
Adversely affect habitat critical to the survival of a species	The subject land is at most marginally suitable for use by this species. It is unlikely to constitute critical habitat.
Disrupt the breeding cycle of an important population	It is unlikely that an important population of this species is present within the subject land.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Habitat for this species within the subject land is largely confined to small areas of outcropping rock. Intensive survey efforts within these areas failed to detect any members of this species. Consequently, impacts to this habitat are not expected to significantly impact this species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

Pink-tailed Legless Lizard	
Introduce disease that may cause the species to decline, or	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 6**).
Interfere with the recovery of the species.	The minor loss of potential habitat associated with this proposal is unlikely to interfere with the recovery of this species, especially given the apparent absence of this species from the subject land.
Conclusion	**Non-significant impact**

EPBC Act-listed migratory and marine species

Fork-tailed Swift	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Fork-tailed Swift does not breed in Australia. There are no significant threats to the Fork-tailed Swift in Australia. Due to the wide range and mobility of this species the potential impacts of this proposal will likely not be significant.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	See above. The species does not breed in Australia and there are no serious threats to the species in Australia. The species is almost exclusively aerial. Therefore, the proposal is unlikely to disrupt/impact this species.
Conclusion	**Non-significant impact**

Satin Flycatcher	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Satin Flycatchers primarily inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands. They are also typically associated with waterways and adjacent wooded vegetation communities. As the habitat within the subject land is broadly unsuitable for this species, the proposal is not likely to have a significant impact on this species.

Satin Flycatcher	
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	As most records of this species are concentrated in eastern Australia, predominantly in coastal regions and along the tablelands, it is highly unlikely that an ecologically significant proportion of the population of this species makes use of the subject land. A single record from Mulyandry State Forest (c. 9 km west of the subject land) is only recorded sighting within c. 30 km.
Conclusion	**Non-significant impact**

Latham's Snipe	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Latham's Snipe is a widely distributed species that is capable of making use of modified habitats, including pastures and farm dams. As habitat of this kind is ubiquitous in the landscape, the subject land is unlikely to constitute important habitat for this species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	This species does not breed in Australia and the ubiquity of modified habitat similar to that found in the subject land suggests that no significant impacts to migration or feeding are likely to result from this proposal. It is also unlikely that an ecologically significant proportion of the population is dependent on the subject site.

Latham's Snipe	
Conclusion	**Non-significant impact**

Cattle Egret	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	Cattle Egrets are now primarily associated with anthropogenic disturbance, particularly livestock grazing, following their rapid range expansion in the early 20th century. The subject land includes significant areas of grazing country, so it is possible that the species uses the subject land as a foraging resource. Due to the gregarious nature, large size and mobility of this species it is not likely to be significantly impacted by the proposal.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal would be unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	The species breeds in colonies in coastal areas and in large inland wetlands, such as the Macquarie Marshes. No colonies have been reported near the subject land and only one record of the species is known with 25 km.
Conclusion	**Non-significant impact**

Black-eared Cuckoo	
Significant Impact Guideline	**Assessment**

Black-eared Cuckoo	
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Black-eared Cuckoo is widely distributed throughout Australia and is primarily associated with mulga and mallee communities. It is often found in vegetation along creek beds. As the habitat within the subject land is clearly dissimilar to the above, it is unlikely that the proposal will impact any habitat that might be considered important.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	The Black-eared Cuckoo breeds throughout Australia (but particularly in southern areas) during the summer. As with most cuckoos, the species is a brood parasite relying on the presence of dome-nesting host species such as the Speckled Warbler in order to breed. The species has been recorded twice within 25 km of the subject land, but not since 1980. It is unlikely that an ecologically significant proportion of the population of the species is dependent on the subject land.
Conclusion	**Non-significant impact**

Rainbow Bee-eater	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Rainbow Bee-eater is widespread throughout Australia and occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. As it is widely distributed and possesses broad habitat tolerances, it is unlikely that the subject land constitutes important habitat for this species.

Rainbow Bee-eater	
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	The Rainbow Bee-eater breeds throughout Australia (but particularly in southern areas) during the summer. The species is ground nesting, burrowing into dry soils, often on slopes. The species has been recorded four times within 10 km, all within Mulyandry State Forest, and it is possible that the species occasionally makes use of the subject land. It is very unlikely, however, that these four records represent an ecologically significant proportion of the population.
Conclusion	**Non-significant impact**

Blue-winged Parrot	
Significant Impact Guideline	**Assessment**
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	The Blue-winged Parrot has been recorded only once within 25 km of the subject land and only three times within 100 km. Consequently, it is very unlikely that the habitat within the subject land is important for the ongoing survival of the species.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The subject land is likely already habitat for a range of pest species, including foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), cats (*Felis catus*), goats (*Capra hircus*) and wild dogs (*Canis lupus*). The proposal is unlikely to result in new invasive species becoming established.

Blue-winged Parrot	
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	Given the scarcity of records of the species near the subject land, it is highly unlikely that an ecologically significant proportion of the population of the species is dependent on the habitat within the subject land for any part of its lifecycle.
Conclusion	**Non-significant impact**

Appendix F: Key Threatening Processes

Key Threatening Processes (KTP) predicted as acting on the study area that may be exacerbated by the proposal.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
Threat	Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala* (Latham, 1802)	KTP	KTP	**VERY LIKELY**	**YES** The modification of woodland structure, for example by edge effects, is known to encourage occupancy by Noisy Miners. This proposal may extend the existing edge effects further into adjacent vegetation, which may facilitate invasion by Noisy Miners. This is unlikely to significantly influence Noisy Miner behaviour beyond these small areas of modified vegetation.
Threat	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		**VERY UNLIKELY**	**NO** No waterways occur within the subject land.
Threat	Anthropogenic Climate Change	KTP	KTP	**VERY LIKELY**	**YES** Some unavoidable emissions that contribute to climate change will occur from construction machinery. There will also be contributions to climate change associated with vegetation clearing e.g. loss of carbon capture volume etc.
Threat	Bushrock removal	KTP		**VERY LIKELY**	**YES** Areas of outcropping rock and loose surface rock occur within the subject land and will be impacted by the proposal.
Threat	Clearing of native vegetation	KTP	KTP	**VERY LIKELY**	**YES** Up to 56.55 ha of native vegetation will be impacted. This vegetation exists in a range of condition classes, from heavily modified to relatively intact.
Threat	Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*	KTP	KTP	**LIKELY**	**YES** It is likely that grazing by European Rabbits already takes place within the subject land. The loss of woody vegetation and potential proliferation of weedy groundcover species may exacerbate this threat.
Threat	Competition and habitat degradation by Feral Goats, *Capra hircus*	KTP	KTP	**LIKELY**	**NO** Nearby records of the Feral Goat are largely confined to remnant areas such as Nangar

					National Park and Weddin Mountains National Park. Nevertheless, it is possible that goats do occasionally make use of the subject land. As goats possess a wide grazing tolerance, it is unlikely that the activities contained in this proposal – such as removal or modification of vegetation – will exacerbate this threat.
Threat	Competition from feral honey bees, *Apis mellifera*	KTP		**LIKELY**	**YES** It is very likely that the Feral Honeybee is already present in the subject land and in surrounding agricultural areas. The loss of hollow-bearing trees will increase competition between bees and hollow-dependant birds.
Threat	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		**VERY UNLIKELY**	**NO** The subject land occurs well outside the core distribution of the Bell Miner. While the species has been recorded five times within 50 km of the subject land, the core distribution of the species begins c. 150 to 200 km to the east of the subject land, and the veracity of these outlying records is uncertain. The Bell Miner was not detected during the site assessment.
Threat	Herbivory and environmental degradation caused by feral deer	KTP		**UNLIKELY**	**NO** The nearest feral deer record is from Cowra, c. 50 km southeast of the subject land. It is unlikely that proposal activities will result in the spread of this species.
Threat	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		**UNLIKELY**	**NO** No significant impacts on fire frequency are expected to result from this proposal.
Threat	Importation of Red Fire Ants *Solenopsis invicta*	KTP	KTP	**VERY UNLIKELY**	**NO** This species is not currently known to occur in NSW but climate modelling indicates that it could in future occupy the eastern half of the state. This may include the subject land. It is unlikely that the present proposal will result in the introduction of this species to the state; however, machinery used on site can potentially act as a transport for biosecurity risks and appropriate decontamination measures should be observed

Threat	Infection by *Psittacine Circoviral* (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	**LIKELY**	**YES** The loss of hollow-bearing trees is likely to encourage repeat use of nesting hollows, which is a major cause of the spread of this disease.
Threat	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	**VERY UNLIKELY**	**NO** Limited aquatic habitat exists within the subject land and impacts to frog habitat are likely to be minimal. If frogs are handled during construction or operation, or if contaminated runoff is allowed to enter waterways, there is the potential for chytridiomycosis to spread. It is unlikely that the present proposal will result in any need to handle frogs or any contamination of nearby waterways.
Threat	Infection of native plants by *Phytophthora cinnamomi*	KTP	KTP	**LIKELY**	**YES** The presence of *Phytophthora* was not assessed. If present, soil disturbance and the movement of machinery are likely to facilitate its spread.
Threat	Introduction of the Large Earth Bumblebee *Bombus terrestris*	KTP		**VERY UNLIKELY**	**NO** This species is not currently known to occur in NSW. The most likely sources for introduction into the state are Tasmania and New Zealand. Unless machinery is imported from these locations, there is little risk of accidental introduction resulting from the present proposal.
Threat	Invasion and establishment of exotic vines and scramblers	KTP		**UNLIKELY**	**NO** No exotic vines or scramblers were recorded during the BAM survey. It is unlikely that suitable habitat for significant infestations of these species exists within the subject land; however, machinery used on site can potentially act as a transport for biosecurity risks and appropriate decontamination measures should be observed.
Threat	Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	KTP		**UNLIKELY**	**NO** Machinery used on site can potentially act as a transport for biosecurity risks. As there is only one records of Scotch Broom within 55 km (at Cowra), it is unlikely that the present proposal will facilitate the movement of this

					species. Machinery imported from areas with more significant infestations presents a greater risk.
Threat	Invasion and establishment of the Cane Toad (*Rhinella marina*)	KTP	KTP	**VERY UNLIKELY**	**NO** The subject land is outside the current known distribution of the Cane Toad and offers limited suitable habitat for this species. While machinery used on site can potentially act as a transport for biosecurity risks, it is unlikely that the present proposal will import individuals of these species or that this species will be able to colonise the subject land.
Threat	Invasion of native plant communities by African Olive *Olea europaea* subsp. *cuspidata*	KTP		**UNLIKELY**	**NO** Machinery used on site can potentially act as a transport for biosecurity risks. As there are only two records of the African Olive within 55 km, it is unlikely that the present proposal will facilitate the movement of this species. Machinery imported from areas with more significant infestations presents a greater risk.
Threat	Invasion of native plant communities by *Chrysanthemoides monilifera*	KTP		**UNLIKELY**	**NO** Machinery used on site can potentially act as a transport for biosecurity risks; however, most records of this species in NSW occur along the coast, and it is unlikely that suitable habitat occurs within the subject land.
Threat	Invasion of native plant communities by exotic perennial grasses	KTP		**VERY LIKELY**	**YES** Exotic perennial grasses – including Perennial Ryegrass (*Lolium perenne*) and Cocksfoot (*Dactylis glomerata*) – already occur within the subject land. Disturbance to existing vegetation, including edge effects on adjacent vegetation, may allow these species to proliferate.
Threat	Invasion of the Yellow Crazy Ant, *Anoplolepis gracilipes* into NSW	KTP		**VERY UNLIKELY**	**NO** This species does not currently occur in NSW and climate modelling suggests that any future invasion is likely to be confined to northern NSW. While machinery used on site can potentially act as a transport for biosecurity risks, it is unlikely that the present

					proposal would facilitate the spread of this species.
Threat	Invasion, establishment and spread of *Lantana*	KTP		**VERY UNLIKELY**	**NO** The subject land occurs well outside the known distribution of Lantana and is unlikely to provide suitable habitat.
Threat	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	**VERY LIKELY**	**YES** The subject land contains exotic species that were originally introduced to Australia as garden plants, including Paterson's Curse (*Echium plantagineum*). It is possible that contaminated machinery may facilitate the spread of this species and other invasive garden plants. Impacts to existing vegetation, including edge effects, is likely to create niches for these species to colonise.
Threat	Loss of Hollow-bearing Trees	KTP		**VERY LIKELY**	**YES** Seventeen live and four dead hollow-bearing trees occur wholly or partly within the subject land, bearing a total of nine large and 41 small hollows.
Threat	Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		**VERY UNLIKELY**	**NO** No significant hills occur within the subject land and no impacts to sites used for hill-topping are expected.
Threat	Predation and hybridisation by Feral Dogs, *Canis lupus familiaris*	KTP		**LIKELY**	**NO** It is likely that Feral Dogs are already present in the landscape. The proposal is not expected to exacerbate the threat posed by this population.
Threat	Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)	KTP		**VERY UNLIKELY**	**NO** No watercourses occur within the subject land.
Threat	Predation by the European Red Fox (*Vulpes vulpes)*	KTP	KTP	**LIKELY**	**NO** It is likely that the Red Fox is already present in the landscape. The proposal is not expected to exacerbate the threat posed by this population.
Threat	Predation by the Feral Cat *Felis catus*	KTP	KTP	**LIKELY**	**NO** It is likely that Feral Cats are already present in the landscape. The proposal is not expected to exacerbate the threat posed by this population.

Threat	Predation, habitat degradation, competition and disease transmission by Feral Pigs	KTP	KTP	**LIKELY**	**NO** It is likely that Feral Pigs are already present in the landscape. The proposal is not expected to exacerbate the threat posed by this population.
Threat	Removal of dead wood and dead trees	KTP		**VERY LIKELY**	**YES** Several standing dead trees, including four with hollows, occur within or adjacent to the subject land. Areas of fallen timber are also present.

Appendix G: BAM Credit Summary Report

NSW GOVERNMENT

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00026676/BAAS21028/21/00026683	Peninsula Solar Farm	16/06/2022
Assessor Name	Report Created	BAM Data version *
David Orchard	24/08/2022	54
Assessor Number	BAM Case Status	Date Finalised
BAAS21028	Finalised	24/08/2022
Assessment Revision	Assessment Type	BOS entry trigger
7	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* 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

Blakely's Red Gum - White Box - Yellow Box - Black Cypress Pine box grass/shrub woodland on clay loam soils on undulating hills of central NSW South Western Slopes Bioregion

4	282_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	20.8	20.8	20.6	PCT Cleared - 93%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	268
											Subtotal	**268**

Assessment Id
00026676/BAAS21028/21/00026683

Proposal Name
Peninsula Solar Farm

Page 2 of 6

NSW GOVERNMENT

BAM Credit Summary Report

White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion												
1	267_Good	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	79.3	79.3	0.09	PCT Cleared - 89%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	4

NSW GOVERNMENT

BAM Credit Summary Report

2	267_Mod	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	33.6	33.6	0.28	PCT Cleared - 89%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	6

Assessment Id
00026676/BAAS21028/21/00026683

Proposal Name
Peninsula Solar Farm

Page 4 of 6

NSW GOVERNMENT

BAM Credit Summary Report

3	267_Poor	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla	14.6	14.6	35.6	PCT Cleared - 89%	High Sensitivity to Gain	Critically Endangered Ecological Community	Critically Endangered	2.50	True	0
											Subtotal	**10**
											Total	**278**

Species credits for threatened species

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
Polytelis swainsonii / Superb Parrot (Fauna)									
267_Good	79.3	79.3	0.04			Vulnerable	Vulnerable	False	2
267_Mod	33.6	33.6	0.25			Vulnerable	Vulnerable	False	4

NSW GOVERNMENT

BAM Credit Summary Report

267_Poor	14.6	14.6	13.8			Vulnerable	Vulnerable	False	101
								Subtotal	**107**
Tyto novaehollandiae / Masked Owl (Fauna)									
267_Good	79.3	79.3	0.04			Vulnerable	Not Listed	False	2
267_Mod	33.6	33.6	0.25			Vulnerable	Not Listed	False	4
267_Poor	14.6	14.6	13.8			Vulnerable	Not Listed	False	101
								Subtotal	**107**

Appendix H: Koala Habitat Assessment

Table 4: Koala habitat assessment tool

Attribute	Score	Inland	Coastal
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	Evidence of one or more koalas within the last 2 years.
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years.	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.
	0 (low)	None of the above.	None of the above.
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	Has forest or woodland with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present.	Has forest or woodland with only 1 species of known koala food tree present.
	0 (low)	None of the above.	None of the above.
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	Area is part of a contiguous landscape ≥ 500 ha.
	+1 (medium)	Area is part of a **contiguous landscape** < 1000 ha, but ≥ 500 ha.	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha.
	0 (low)	None of the above.	None of the above.
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	

Koala Occurrence – One record of the Koala, dating to 1972, occurs c. 4.3 km ESE of the proposal area. No other records within 10 km have been located. Targeted Koala surveys (Koala SAT and spotlighting) failed to detect any Koalas, or signs of Koalas, on the subject land (**Section 5.3.1**).

Vegetation Composition – While the vegetation within the subject land is highly disturbed, it nevertheless contains areas of sparse woodland with four secondary Koala food trees (White Box, Yellow Box, Grey Box, and Blakely's Red Gum).

Habitat Connectivity – Some connectivity is provided by vegetation in the road corridor, though it is unclear whether this is wide enough to be useful to Koalas. Small, wooded remnants also occur along fences and in discrete pockets in nearby paddocks, and these may serve as stepping-stones between remnants. If Koalas are able to make use of these connectivity features, they may be able to move between the site and larger remnants such as Mulyandry and Tomanbil State Forests. These two remnants together exceed 1000 ha. To the

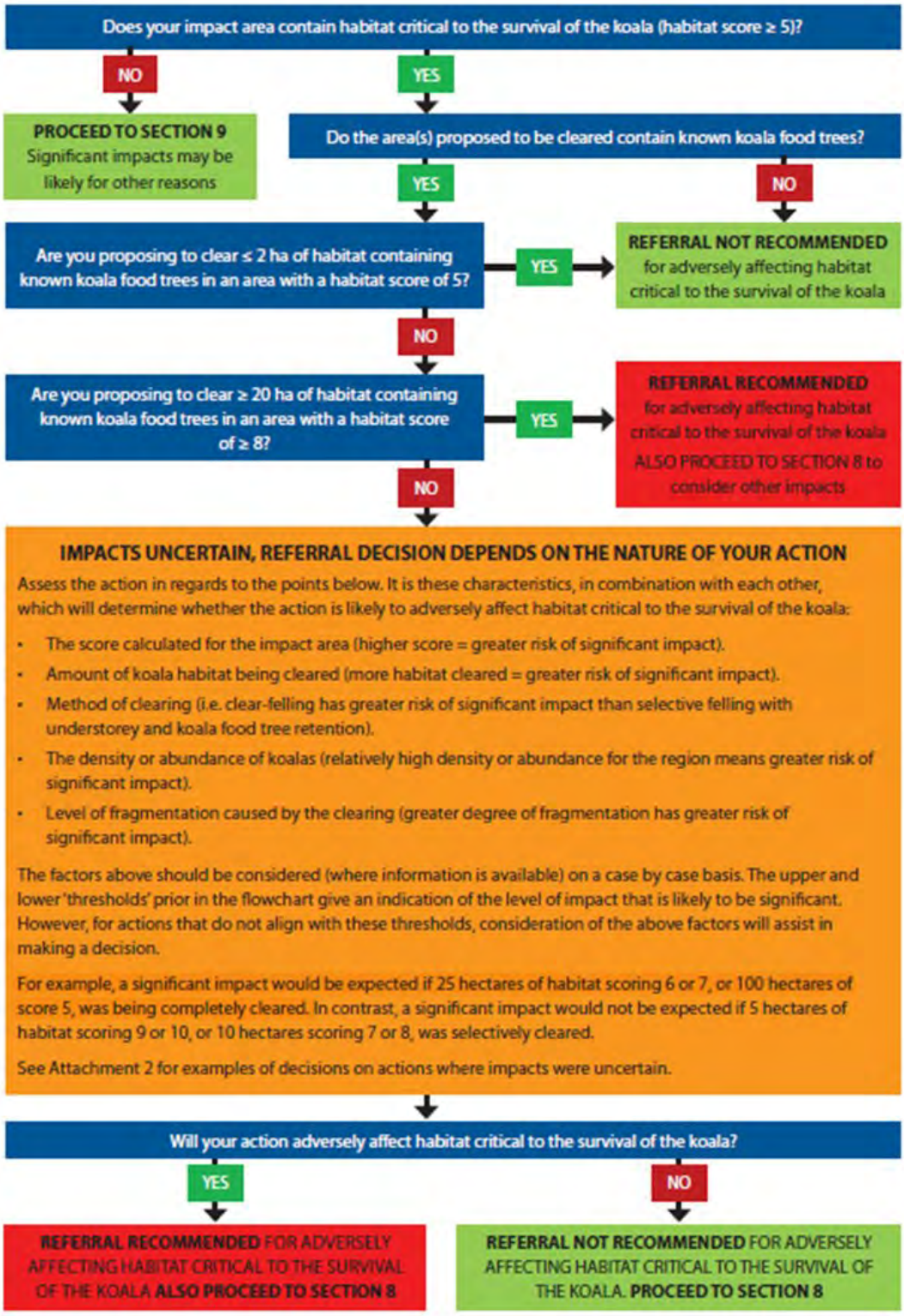
east and north of the proposal area, large (> 2 km) areas of agricultural land with few trees are likely to form barriers to the movement of Koalas.

Key Existing Threats – No Koalas have been recorded locally since 1972; consequently, no evidence of mortality is known. As the site is in an agricultural landscape and adjacent to a road, it is likely that there is significant dog and vehicle threat.

Recovery Value – As the habitat to be directly impacted by this proposal consists largely of scattered paddock trees, it is unlikely to be important for the recovery of the Koala.

TOTAL SCORE = 4. The subject land does not constitute critical habitat for the Koala.

Figure 2: Assessing adverse effects on habitat critical to the survival of the koala



Based on the EPBC Act referral guidelines for the vulnerable koala, the proposal is not likely to significantly impact current or future populations of Koalas and does not require referral.

Appendix I: Terms and abbreviations

Terms and abbreviations used in this report

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.
DoEE	Australian Government Department of Environment and Energy	The Department of the Environment designs and implements the Australian Government's policies and programmes 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	The Interim Biogeographic Regionalisation for Australia (IBRA) is a

	Biogeographic Regionalisation of Australia	biogeographic regionalisation of Australia developed by the Australian Government's Department of the Environment. Each region is a land area made up of a group of interacting ecosystems repeated in similar form across the landscape.
	Indirect impacts	Occur when project-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.
	Native Vegetation	1. For the purposes of this Part, native vegetation means any of the following types of plants native to New South Wales: a. trees (including any sapling or shrub or any scrub), b. understorey plants, c. groundcover (being any type of herbaceous vegetation), d. plants occurring in a wetland. 2. A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible. 3. For the purposes of this Part, native vegetation extends to a plant that is dead or that is not native to New South Wales if: a. the plant is situated on land that is shown on the native vegetation regulatory map as category 2-vulnerable regulated land, and b. it would be native vegetation for the purposes of this Part if it were native to New South Wales. 4. For the purposes of this Part, native vegetation does not extend to marine vegetation (being mangroves, seagrasses or any other species of plant that at any time in its life cycle must inhabit water other than fresh water). A declaration under Section 14.7 of the BC Act that specified vegetation is or is not marine vegetation also has effect for the purposes of this Part.
	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).
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.
PoEO Act	*Protection of the Environment Operations Act 1997*	The objects of this Act are as follows: • to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development, • to provide increased opportunities for public involvement and participation in environment protection, • to ensure the community has access to relevant and meaningful information about pollution, • to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms promoting: • pollution prevention and cleaner production, • the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,

		• the elimination of harmful wastes, • the reduction in the use of materials and the re-use, recovery or recycling of materials, • the making of progressive environmental improvements, including the reduction of pollution at source, • the monitoring and reporting of environmental quality on a regular basis, • to rationalise, simplify and strengthen the regulatory framework for environment protection, • to improve the efficiency of administration of the environment protection legislation, • to assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.
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 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.