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Gulgong Quarry – Biodiversity Development Assessment Report

Prepared for Talinga Pastoral Company

27 September 2024

Document Tracking

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Front cover photograph: Aerial imagery of the study area, April 2024 aerial photograph c/o O'Ryan Geospatial.

All aerial drone photography in this report has been provided by O'Ryan Geospatial.

Contents

List of Figures

List of Tables

Executive Summary

Bower Ecology was engaged by Outline Planning Consultants on behalf of Talinga Pastoral Company to prepare a Biodiversity Development Assessment Report to support an Environmental Impact Statement for a proposed Quarry at 'Talinga', Tallawang (the Project). The Project is located at 1848 Castlereagh Highway, Tallawang, near Gulgong New South Wales (NSW), within the Mid-Western Council Local Government Area. The Project involves clearing for the proposed construction of a quarry on the site to extract and to process up to 350,000 tonnes per annum of quarry material within a quarry footprint of 7.34 ha and a total resource of about 4.6 million tonnes. This is in addition to the construction of a quarry weigh-bridge, processing crusher, quarry site offices and additional associated infrastructure which are to be included within the subject land footprint. The proposed expansion would result in a total of approximately 1.54 ha of native vegetation including approximately 1.46 ha of PCT 281: low condition woodland, 0.08 ha PCT 277: moderate condition woodland (represented by five paddock trees) to be cleared to facilitate the proposed development.

The Gulgong Quarry expansion design was determined after a consideration to the biodiversity values present across the entire property (subject lot), thereby avoiding the elevated area along the west boundary of the property that harbours dense woodland. The proposed quarry footprint spreads over the hillock in the central part of the property that has sparse woodland of relatively poor health.

Extensive ecological surveys identified the vegetation within the subject land to be heavily degraded due to existing land uses and a large portion of the subject land was found to be historically cleared for the existing quarry borrow pit and access roads. The project has followed the avoid, minimise and mitigate strategy to address some of the potential impacts.

The minimum lot size associated with the Quarry is 100 ha, bringing the threshold for clearing to 1 ha or more. As the proposed development requires the clearing of 1.54 ha of native vegetation, the BOS will be triggered.

The subject land also includes approximately 6.46 ha of Category 1 Exempt Land under the Local Land Services Act 2013 which is not assessable under the BAM as per Section 1.5 (NSW 2020).

This report has been prepared in accordance with the Biodiversity Assessment Method (BAM) (NSW Department of Planning, Industry and Environment, 2020), to assess the biodiversity impact and offsetting obligation of the Project under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Biodiversity Conservation Regulation 2017.

Native vegetation surveys within the proposed quarry footprint identified two (2) Plant Community Types (PCTs) within the subject land:

- PCT 277: Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- PCT 281: Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Both PCT 281 and PCT 277 are generally associated with BC Act listed Threatened Ecological Community (TEC) '*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*' and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

(EPBC Act) TEC '*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community*' (CEEC).

It was found that the PCT 271 and PCT 281 vegetation within the subject land does not meet the condition class and threshold criteria for the EPBC Act Listed CEEC, as the patch did not contain 20 or more mature trees per hectare or natural regeneration of dominant overstorey eucalyptus species as per the survey guidelines (TSSC 2011).

Further, it was found that PCT 281 did not conform to the BC Act listed TEC due to the dominance of *Angophora floribunda* (Rough-barked Apple) in the canopy whilst PCT 277 did meet the determination. The latter was due to the dominance of Eucalyptus *blakelyi* (Blakely's Red Gum) and *Eucalyptus albens* (White Box) in the canopy layer.

Targeted surveys for candidate species at risk of a Serious and Irreversible Impact (SAII) and potential habitat for these species were undertaken by Bower Ecology from the 19th-23rd August, 2024, in accordance with the BAM. One Vulnerable species listed under the BC Act was identified within the subject land during Anabat monitoring during the 19th – 23rd August (the Large Bent-winged Bat). However, it was determined that due to the lack of breeding habitat (caves, tunnels or mines) within the survey area, that the species was only detected as a fly-over foraging recording as the subject land.

Although two listed SAII entities were identified within the subject land (the Large Bent-winged Bat and the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland), no serious and irreversible impacts are anticipated. Nonetheless, the decision as to the nature of SAII is vested in the consent authority.

Table 1: Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC/EC	Impact area (ha)	Number of ecosystem credits required
VZ 1: Low Condition Woodland	PCT 281: Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Not found to be associated with a TEC or EC	1.46 ha	0
VZ 2: Moderate Condition Woodland	PCT 277: Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Not found to be associated with a TEC or EC	0.08	2

Certification under clause 6.15 of the Biodiversity Conservation Act 2016

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

Signature: _____

Date: 27/09/2024_____

BAM Assessor Accreditation no: **BAAS 18018**

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

The lead or responsible assessor for the project must certify in the BDAR that the report has been prepared on the basis of the requirements of, and information provided under the BAM as at a specified date, and that date is within 14 days of the date the report is submitted to the decision-maker.

The BAM Calculator (BAM-C) must also be finalised and submitted within the Biodiversity Offsets and Agreement Management System (BOAMS). The date the assessor certifies (signs) the BDAR does not need to match the date on the finalised credit report; however, to be considered valid, the BDAR must be submitted to the decision-maker within 14 days of the finalisation of the BAM-C.

Details and experience of authors and contributors

Name	Position/Role	Tasks performed	Relevant qualifications
Steve Jarman	BAM Accredited Assessor (BAAS 18018), Principal Ecologist Author	Client liaison, survey planning, BAM calculations, document writing and review.	B. Env Mgmt (Hons 1); Masters of Conservation Biology.
Dr. Anand Datar	Co-author Senior Ecologist	Client liaison and survey planning. Site inspections including targeted threatened flora and fauna surveys. Report preparation and review.	PhD (Ecology); Masters of Env Mgmt; Masters of Science.
Hannah Martin	Co-author Ecologist	Site inspections including targeted threatened flora and fauna surveys. Report preparation, BAM calculations and GIS figure preparation.	B.Sc. (Biology)
Georgie McGregor	Ecologist	BAM calculations and GIS figure preparation.	B. Env Sc. (Hons1)
Levani Hogg	Ecologist	Report preparation and GIS figure preparation.	B.Env.Sc. (Ecology and Conservation)
Greg Ford	Principal Ecologist	Anabat analysis	Ba Applied Science (Biology); 1987; University of Southern Qld. Grad Dip Resource Management

Conflict of interest

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

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

Stage 1: Biodiversity Assessment

1 Introduction

1.1. Project Background

Bower Ecology was engaged by Outline Planning Consultants on behalf of the Talinga Pastoral Company to prepare a Biodiversity Development Assessment Report (BDAR) to support an Environmental Impact Statement (EIS) for a proposed Quarry at 'Talinga', Tallawang (the Project). The proposed quarry is located on Lot 1 DP 1239728. Figure 1 shows the subject land and associated lot whilst Figure 2 shows the locality of the project.

The 'subject land' (as defined in the BAM) is approximately 8.98 ha (Figure 1,Figure 3). This includes the areas of proposed quarry expansion and associated work areas, including construction of a weighbridge, processing crusher, quarry site offices and additional associated infrastructure, including minor upgrades to an internal access road and turning access from the Castlereagh Highway. Any mentioning of the development footprint within this report is synonymous with the subject land.

The Project is seeking development consent under Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). Detailed information of the applicable planning legislation and associated approval triggers is provided in the EIS for the project (Outline Consultants 2024).

This BDAR has been prepared in accordance with the 2020 version of the Biodiversity Assessment Method (BAM) (DPE 2020g).

1.2. Requirements for a BDAR

Under the NSW *Biodiversity Conservation Act 2016* (BC Act), a proposed development (as assessed under Part 4 of the EP&A Act) is required to be assessed via the NSW Biodiversity Offset Scheme (BOS) when specific entry requirements are triggered. If the BOS is triggered a development agreement (DA) is required to be accompanied by a BDAR prepared in accordance with the Biodiversity Assessment Method (BAM). The outcomes of the assessment of these thresholds for the Project is as below.

1.2.1. Native Vegetation Clearing Threshold

Native vegetation exists within the subject land, in the form of scattered native trees, and ground covers amongst exotic pasture grasses. This project has been determined to exceed the native vegetation clearing threshold. The subject lot (Lot 1 DP 1239728) have had minimum lot size of 100 ha. The Project proposes to clear areas of native vegetation across about 1.54 ha (greater than 1 ha) and based on the native area clearing thresholds BOS will be triggered. The BOS native vegetation clearing thresholds are reproduced in Table 2, with the relevant threshold highlighted in grey.

Table 2: Native Vegetation Clearing Threshold Triggers

Minimum lot size of the land	Area of clearing (native vegetation)
Less than 1 ha	0.25 ha or more
Less than 40 ha but not less than 1 ha	0.5 ha or more
Less than 1,000 ha but not less than 40 ha	1 ha or more
1,000 ha or more	2 ha or more

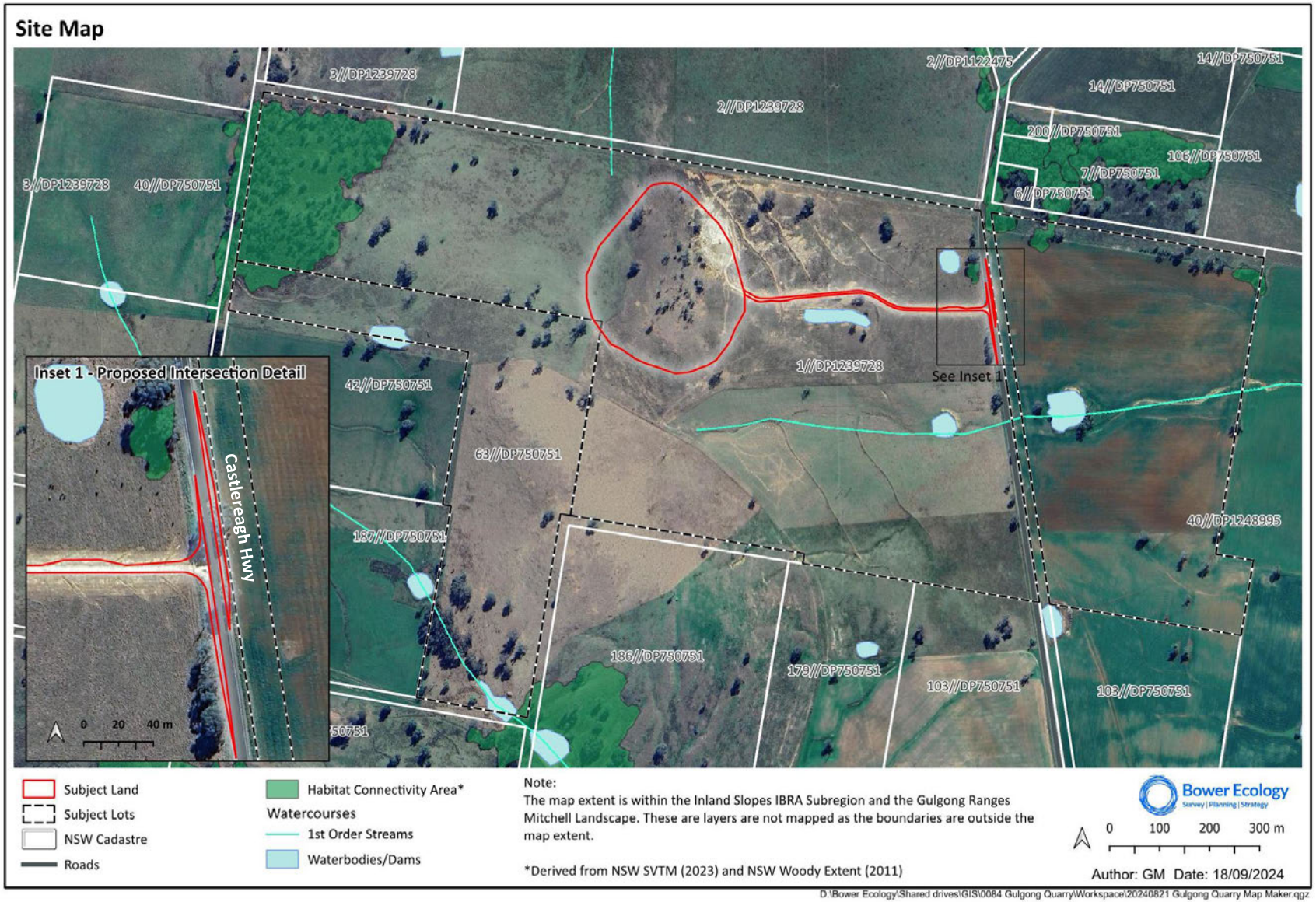

Figure 1: Site Map

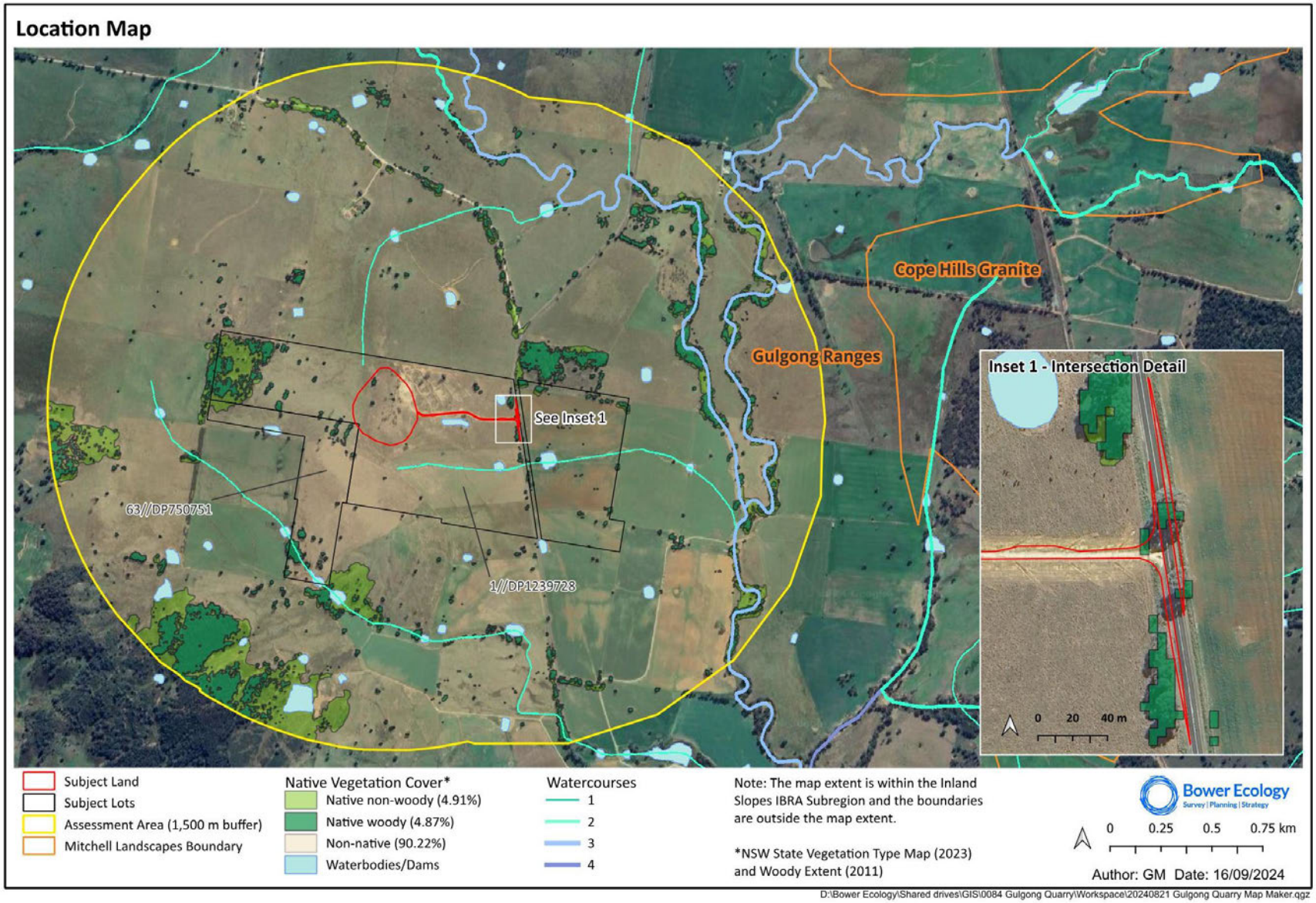

Figure 2: Location

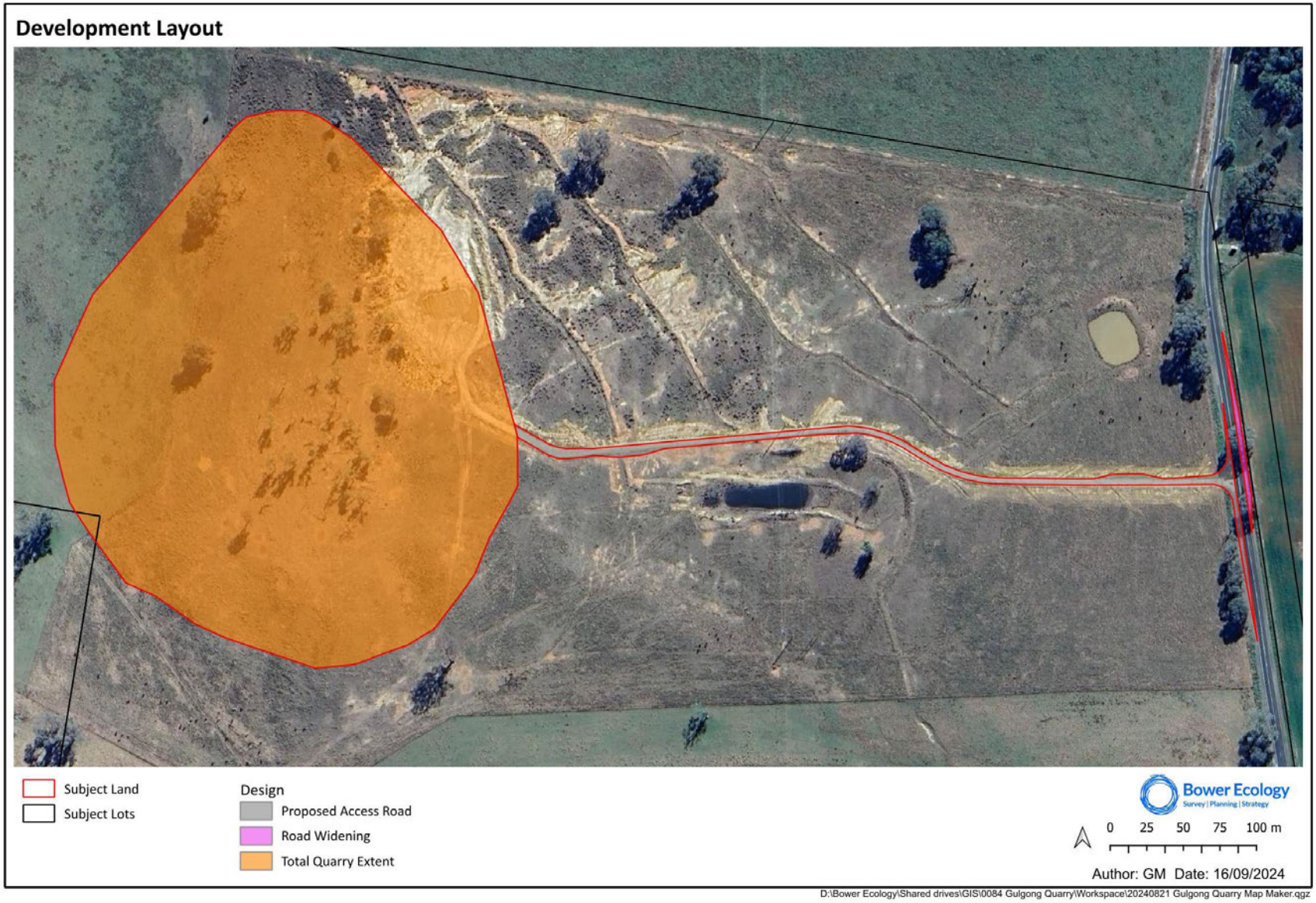

Figure 3: Development Layout

1.2.2. Biodiversity Values Map

The subject land does not contain any areas of Biodiversity Values Map (Figure 4).

1.2.3. Test of Significance

A test of significance for threatened species and threatened ecological communities identified as present within the subject land is provided in Appendix C. The results of the assessment show that a significant impact is not anticipated, however it is noted that Section 7.2(b) of the BC Act states that:

> *(1) For the purposes of this Part, development or an activity **is likely to significantly affect threatened species** if the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values.*

1.2.4. Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Values (AOBV) overlay the project area. Therefore, the proposed development will not impact any AOBV.

1.3. Purpose

The purpose of this BDAR is to document the findings of an assessment undertaken for the Project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM. This is in addition to addressing the requirements of the SEARs as provided in the EIS for the project as discussed further in Section 5.15.9 and Section 5.9 (Outline Consultants 2024). Specifically, the objectives of this BDAR are to:

- Identify the landscape features and site context (native vegetation cover) within the subject land and survey area;
- Assess native vegetation extent, plant community types (PCTs), TECs and vegetation integrity (site condition) within the subject land;
- Assess habitat suitability for threatened species that can be predicted by habitat surrogates (ecosystem credits) and for threatened species that cannot be predicted by habitat surrogates (species credit species);
- Identify potential prescribed biodiversity impacts on threatened species;
- Describe measures to avoid and minimise impacts on biodiversity values and prescribed biodiversity impacts during project planning;
- Describe impacts to biodiversity values and prescribed biodiversity impacts and the measures to mitigate and manage such impacts;
- Identify the thresholds for the assessment and offsetting of impacts, including:
    - Impact assessment of potential entities of serious and irreversible impacts (SAII);
    - Impacts for which an offset is required;
    - Impacts for which no further assessment is required;
- Describe the application of the no net loss standard, including the calculation of the offset requirement;
- Address the following requirements from the SEARs:
    - Accurate predictions of any vegetation clearing on site;
    - A detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological

communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and

- A detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.

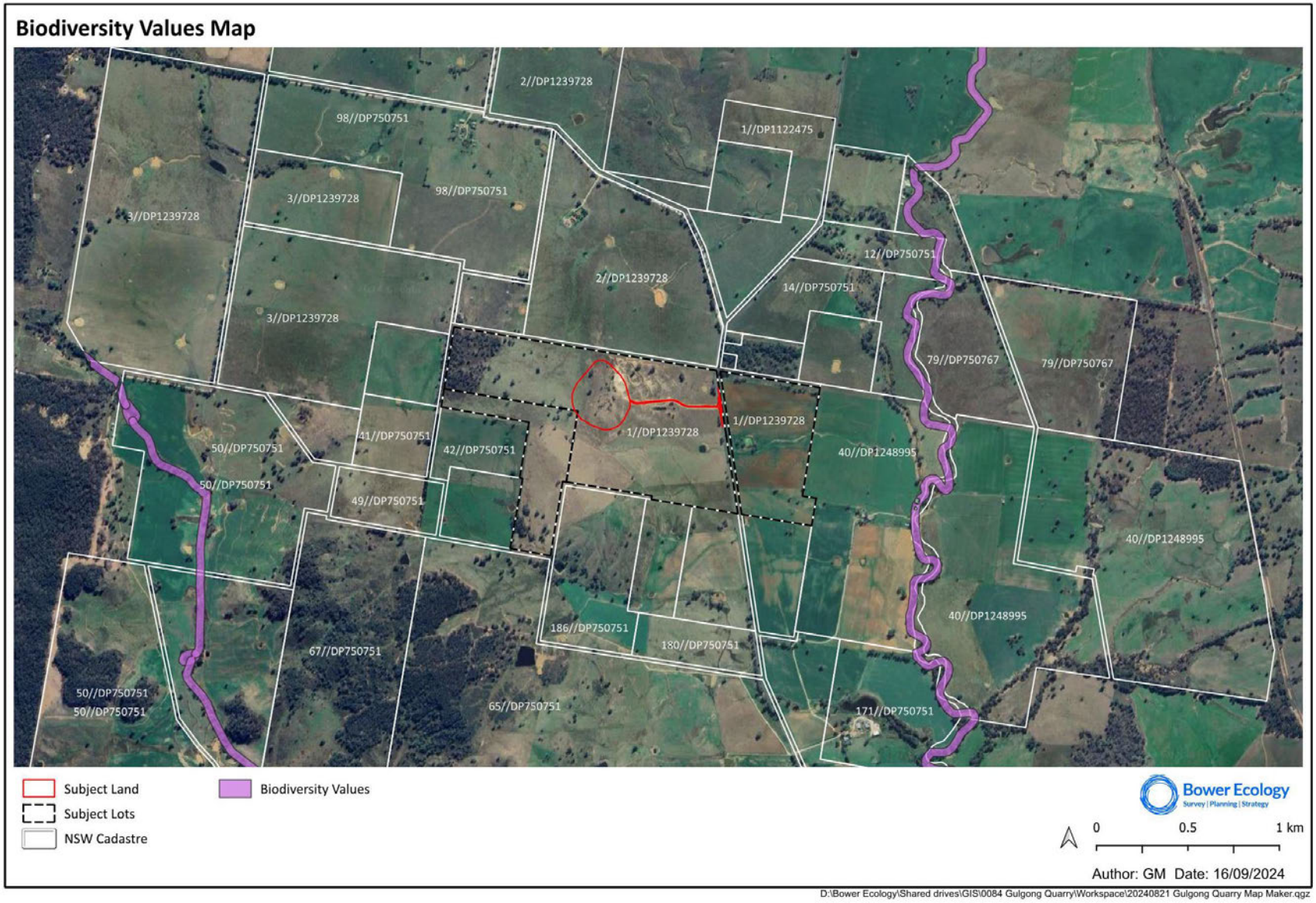

Figure 4: Biodiversity Values Map (as at 16/9/2024)

1.4. Relevant Legislative Frameworks

This Section documents the Commonwealth, State and local planning and environmental legislation relevant to the project and within the scope of this BDAR.

1.4.1. Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth Environmental Protection and Biodiversity Conservation Act (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas of national significance. It also provides a mechanism for national environment protection and biodiversity conservation. The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and provides protection for listed Matters of National Environmental Significance (MNES) including:

- Listed species and communities (e.g., listed threatened species and ecological communities and migratory species);
- Protected areas (e.g. World Heritage properties, Ramser Wetlands of international significance, conservation zones); and
- National, Commonwealth and Indigenous Heritage.

Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES must be referred to the Commonwealth Minister for the Environment.

As EPBC Act listed communities and threatened and migratory species and their habitat are potentially present within the study area; and potential impacts to EPBC Act listed MNES are also considered in this BDAR.

1.4.2. The NSW Environmental Planning and Assessment Act 1979

The EP&A Act (1979) governs planning and assessment of development projects in NSW. The planning legislation is administered by local councils and by the Department of Planning & Environment.

The proposed quarry project is 'designated development' under s.4.10 of the EP&A Act, requiring the preparation of an Environmental Impact Statement (EIS) as it triggers three (3) of the criteria listed in clause 26 'Extractive Industries' of Schedule 3 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation 2021) - namely: more than 30,000 cubic metres (about 63,000 tonnes) of quarry product is to be extracted per annum; has a slope (in one small part) over 18 degrees slope (32.5% slope); and involves an area of more than 2 hectares (ha).

Given that extraction of more than 30,000 tonnes per year of quarry resource is proposed to be extracted, and pursuant to s.4.46 of the EP&A Act, an 'integrated development' approval is required from the NSW Environment Protection. Authority (EPA). Once consent is obtained, the quarry will require the issue of an Environment Protection Licence (EPL).

The proposed quarry development is regionally significant development under Schedule 7 of the *State Environmental Planning Policy (Planning Systems) 2021*. The Western Regional Planning Panel is thus the consent authority under Section 4.5 of the EP&A Act. The proposed designated development is not State significant development as the project involves extraction of less than 500,000 tonnes per annum; a resource of less than 5 million tonnes; and is not located within an environmentally sensitive area of State significance.

The project is required to address Secretary's Environmental Assessment Requirement's (SEARs) issued by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 5 June 2024. In relation to biodiversity, the SEARs require:

- Accurate predictions of any vegetation clearing within the study area;
- A detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the Biodiversity Conservation Act 2016; and
- A detailed description of the proposed measures to maintain or improve the biodiversity values of the study area in the medium to long term, as relevant.

This BDAR has been developed in conjunction with the SEARs requirements and in accordance with the BAM (DPE 2020).

1.4.3. The NSW Biodiversity Conservation Act (2016) (The BC Act)

The BC Act provides a framework for the conservation of biodiversity in NSW. The Act establishes the Biodiversity Offset Scheme (BOS) which requires impacts of development over a certain threshold to be offset through direct payment to the Biodiversity Conservation Trust, purchasing of offset credits on the open market, or creating a land-based biodiversity stewardship site to generate the required credits.

As discussed in Section 1.2.1, this project qualifies for entry into the Biodiversity Offset Scheme (BOS) for meeting the native vegetation clearing threshold and, in this regard, this BDAR is prepared to satisfy the requirements of the BC Act.

1.4.4. Local Land Services Act 2013 (LLS Act)

The LLS Act was developed in order to develop a balanced approach to assessing biodiversity within designated for rural land management practices such as agriculture and grazing. DPE (NSW) has released the draft Native Vegetation Regulatory (NVR) map while the statewide NVR map is being updated by the department. While the draft map does not have legal effect, DCCEEW states that

> *"landholders can utilise the draft native vegetation regulatory map when making decisions about native vegetation management. For example, if landholders agree that land mapped as draft category 1 (exempt) land meets the criteria in the Local Land Services Act, they can feel confident they do not require Local Land Services approval to clear native vegetation on that land."* [1]

Hence, for the purpose of this BDAR, the Draft LLS mapping is accepted.

Furthermore, according to the Section 6.8 of the BC Act, the biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013*), other than any impacts prescribed by the regulations under Section 6.3 of BC Act (supported by Section 1.5 in BAM)[2].

[1]https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/native-vegetation-regulatory-map/draft-native-vegetation-regulatory-map)

[2] The potential impact to 'prescribed impacts' is included in Section 6 of this BDAR.

As per the draft NVR mapping, the subject land contains both Category 1 - exempt land and Category 2 – regulated land.

Category 1 - exempt land is defined as:

- land that was cleared of native vegetation as at 1 January 1990, and
- land that contains low conservation value grasslands.

Category 2 – regulated land is defined as:

- land that was not cleared of native vegetation as at 1 January 1990, and
- land that contains grasslands that are not low conservation value grasslands.

Figure 6 shows the LLS draft mapping within the subject land. Within the subject land, the central area of the hillock containing sparse tree cover, the scattered patches containing large trees, and an area near the access track's intersection with Castlereagh Highway are the areas that are mapped as Category 2 – regulated land and were assessed under BAM for the purpose of this BDAR. The rest of the area of the subject land and within the 100 m buffer outside the subjected land was exempted from the BAM Assessment pursuant to Section 1.5 of the BAM

Despite acceptance of the draft NVR mapping, our site survey also confirmed that if the open paddock areas were included in the BAM assessment the VI score would be less than 15, and hence the credit requirements would be the same. That is, no offsets would be required pursuant to Section 9.2.1(3) of the BAM.

1.4.5. NSW Biosecurity Act 2015

The *Biosecurity Act* (2015) includes a general biosecurity duty for matters such as the introduction, presence, spread or increase of a pest. This general biosecurity duty provides that any person who deals with biosecurity matter has a biosecurity duty to ensure that the biosecurity risk is prevented, eliminated, or minimised, so far as is reasonably practicable. The Biosecurity Act will be applicable for the project throughout the life of the project from planning, operation, closure and rehabilitation phases. While the BDAR does not directly address such requirements under the act, the Section 'Rehabilitation' in the EIS discusses the weed control measures.

1.4.6. NSW State Environmental Planning Policy (Koala Habitat Protection) 2021

The *State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP 2021) commenced on 17 March 2021 and has been incorporated into the *Biodiversity Conservation State Environmental Planning Policy 2021* (BC SEPP 2021).

There is no current existing KPoM for the Mid-Western Regional Council and therefore Chapter 3 of the SEPP applies.

Chapter 3 (provisions for koala) of the BC SEPP applies to all local government areas listed on Schedule 2 of the policy, except land dedicated under the *National Parks and Wildlife Act* (1974) or the *Forestry Act* (1916). The subject land is situated within Mid-Western Regional LGA, which is listed in Schedule 2 of the policy and is zoned as RU1 Primary Production. As such, the identification of an area of land zoned as RU1 Primary Production as 'Potential Koala Habitat' is determined by the presence of 'koala feed trees' species listed within Schedule 1 of the policy. The subject land did not contain any feed tree species as listed in Schedule 1 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* and therefore the subject land does not contain 'potential koala habitat' or 'core koala habitat' under the SEPP.

The subject land did contain some 'koala use trees'[3] (e.g. *Eucalyptus blakelyi* and *Eucalyptus albens*), however, due to highly fragmented nature of suitable habitat, the species is considered unlikely to rely on the habitat within the subject land Nonetheless, koalas may occasionally traverse the subject land or use trees within the subject land for foraging habitat. Further assessment of koala is provided throughout this BDAR (e.g. Section 2.6).

1.4.7. Water Management Act (2000) (WM Act)

Impacts to waterfront land are considered under the WM Act. Controlled activities that are subject to WM Act include work or action done on waterfront land where waterfront land includes the bed of rivers, lakes, or estuaries, as well as land on each side within 40 metres of a riverbank. Under the WM Act it is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land because of carrying out the controlled activity. This means that a controlled activity approval must be obtained from the NSW Office of Water before commencing the controlled activity. The design and construction of works or activities within a watercourse or adjoining waterfront land should protect and enhance water flow, water quality, stream ecology and existing riparian vegetation. Impacts on the hydrologic, hydraulic and geomorphic functions of a watercourse should also be minimised. The design must comply with the Office of Water Guidelines for watercourse crossings on waterfront land. Out of the two watercourses mapped onsite, neither watercourse is mapped within 40m the subject land (Figure 1), and hence an approval under the WM Act will not be required.

1.4.8. NSW Fisheries Management Act (1994) (FM Act)

The *Fisheries Management Act 1994* (FM Act) includes provisions to ensure the maintenance and restoration of fish passage. The area of the proposed quarry expansion will not affect any areas identified as aquatic reserve, key fish habitat, or habitat for threatened fish as listed under the NSW *Fisheries Management Act 1994* and hence the proposed development will not be required to be assessed under the FM Act.

1.4.9. Mid-Western Regional Local Environment Plan (2012)

The Mid-Western Regional LEP (2012) aims to provide environmental planning provisions for land within the Mid-Western Regional LGA. Within the MWR LEP (2012), the relevant objective relating to land zoned as RU1 (Primary Production) is "to encourage sustainable primary industry production by maintaining and enhancing the natural resource base".

The quarry is within land use zone RU1 (Primary Production). Under the LEP, extractive industries are permitted, with consent, in land use zone RU2. The development will assist with meeting the aims of the LEP.

1.4.10. Mid-Western Regional Development Control Plan (2013)

Under the Mid-Western Regional Development Control Plan 2013, Part 5.1 – Threatened Species and Vegetation Management applies. The objectives of Part 5.1 are:

a) An assessment of any potential impact on native flora and fauna is to accompany a development application. If considered necessary by Council a Flora and Fauna Impact Assessment will be required from a suitably qualified professional. This Assessment will determine whether a Species Impact Statement will be required.

b) Development applications should indicate all existing vegetation.

[3] This is for information only. Chapter 4 of the BC SEPP regulates 'koala use trees' and Chapter 4 does not apply to the project.

c) Buildings and access areas should be sited to avoid removal of trees.

This BDAR has been prepared to meet requirements of the BC Act and will therefore also meet this DCP requirement. I.e. the purpose of the BC 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.

1.4.11. Mid-Western Region Community Plan (2020)

The Mid-Western Region Community Plan (MWRCP 2020) offers an economic, social and business guide to the future vision of the Mid-Western Region on behalf of the community.

Theme 2 of the MWRCP 2020 is to "Take ownership of our natural environment and protect it through responsible practices" (MWRCP 2020). This BDAR aims to meet this objective of the MWRCP 2020 through the mitigation and management of impacts to biodiversity.

1.4.12. Central and Southern Tablelands Koala Management Area

The subject land falls within the Central and Southern Tablelands Koala Management Area under the NSW Koala Strategy. However, this resource does not stipulate any regulations as it only provides a guide to koala habitat restoration in reference to the 'Koala habitat restoration guidelines' (DPE 2022). These guidelines have been considered as part of proposed rehabilitation of the quarry (Section 8.4.11).

1.5. The Proposed Development

1.5.1. Location

The subject land is located approximately 21.5 kilometres north-west from Gulgong along the Castlereagh Highway and approximately 76.7 km east of Dubbo. The subject land is a rural holding currently used for agricultural purposes (grazing and pasture land). Additionally, a stony hillock on the site is currently utilised as a borrow pit, supplying hard rock for agricultural purposes. This existing borrow pit is seen in Figure 1 and marked as cleared area in Figure 6.

The Project is located on Lot 1 DP 1239728 (the site; 1848 Castlereagh Highway, Gulgong NSW) (Figure 1 and Figure 2) and is located within:

- Mid-Western Regional Council LGA;
- NSW South Western Slopes IBRA Region and Inland Slopes IBRA Subregion (Figure 2); and
- Gulgong Ranges Mitchell Landscape (Figure 2);

The existing borrow pit and access road has a total area of approximately 0.98 ha within the subject land. Figure 1 and Figure 3 show the local context, including adjacent land uses.

1.5.2. Development overview

The Project involves clearing for the proposed development of a quarry to extract and to process up to 350,000 tonnes per annum of quarry material within a quarry footprint of 7.34 ha and a total resource of about 4.6 million tonnes. The quarry material will be primarily used as road base or select fill to be used in nearby infrastructure projects undertaken within the Central-West Orana Renewable Energy Zone (CWO-REZ). The internal access route to the quarry connects directly with the Castlereagh Highway. Figure 5 shows the elements of the project.

The quarry will be developed over two stages (refer to the EIS for more information and the engineer plans in Appendix I); with this BDAR assessing the ultimate quarry extent. Key components of the proposed quarry operation are standard for the industry and will include the following:

- Clearing of land ahead of extraction.
- Ripping of weathered rock and blasting of unweathered (hard) quarry rock.
- Loose rock is then transported from the active quarry face to the processing plant within the quarry pit, where it is then crushed and screened, before being transported off-site.
- Transport of material from the quarry site via the internal quarry access route back to the Castlereagh Highway, before being transported to nearby infrastructure projects. The existing internal access route from the quarry back to the highway will be widened and two passing bays added. A section of approximate length 100 metres will be sealed, near the highway intersection, with a rumble grid also installed.
- The intersection with the Castlereagh Highway will be upgraded to a suitable standard to allow vehicles to turn in and turn out of the site. (i.e. a shoulder widening that will be sealed with bitumen). Engineering designs are provided in Appendix I.
- It is anticipated that once production significantly increases a quarry weigh-bridge may be installed. A weigh-bridge of the type commonly used in quarries of this scale have dimensions of 28m x 3.5m with a concrete deck. If utilised, the weigh bridge would be installed within 100m of the site entry from the highway, on the northern side of the internal access route.
- The proposed quarry site offices and staff amenities will be located within the quarry pit once the pit is of sufficient size.
- Stockpiles and storage areas to be within the approved quarry area. During the initial stage of quarry formation any overburden will be stored on the existing farm borrow pit before ultimate transfer to within the quarry.
- A centre-piece of the soil and water management strategy for the proposed quarry is the diversion of ‘clean’ water around the quarry and the collection and retention of all runoff from disturbed quarry working areas to within the active parts of the quarry footprint, ensuring that run-off does not contaminate off-site areas or waterways.
- Potentially, various other minor infrastructure such as water storage tanks, wheel washes, boom gates, sheds, etc (as described in the EIS). These will be placed within the subject land assessed within this BDAR, or separate approval will be sought.

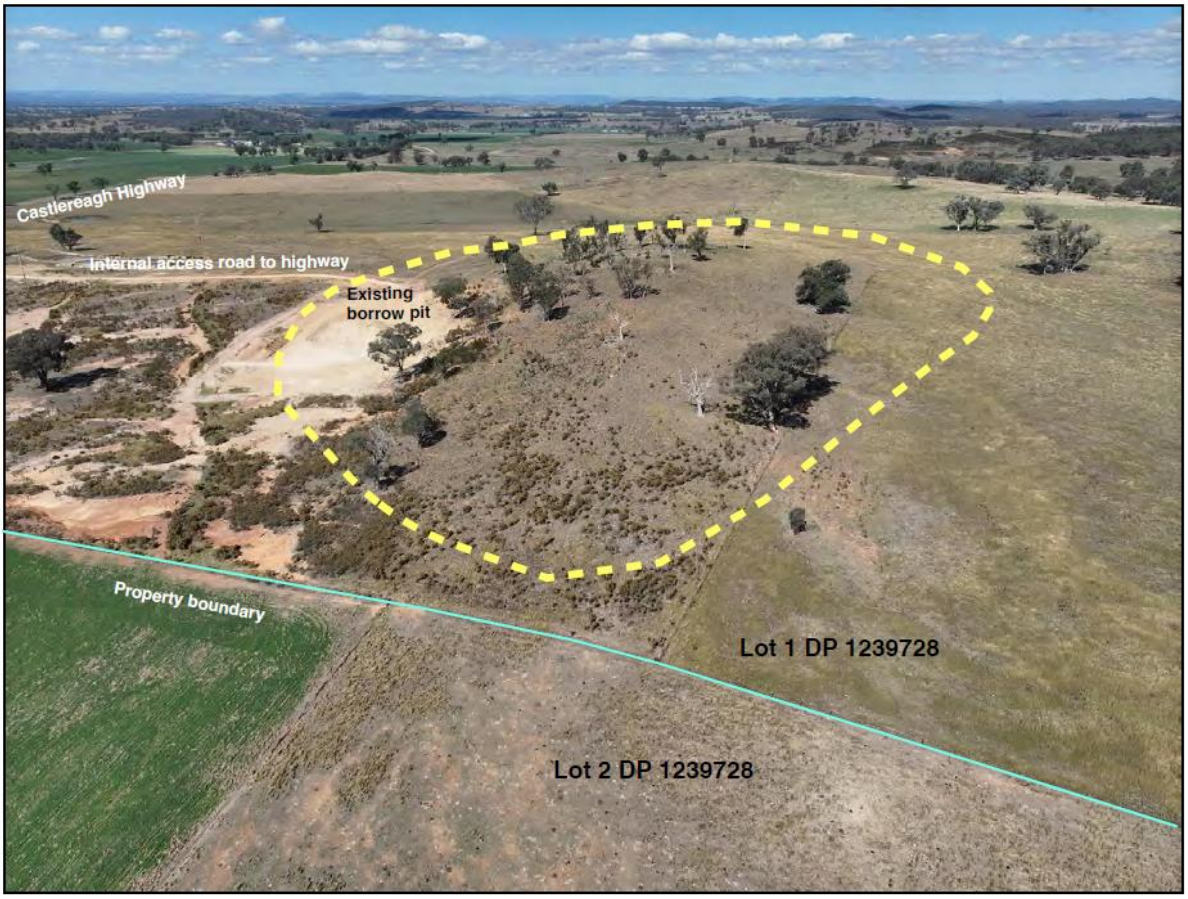

Figure 5: Project Elements

Figure Note: Aerial drone photograph of the stony knoll and immediate surrounds proposed to be developed for a hard rock quarry. Approximate extent of proposed quarry footprint shown with broken yellow line. View looking south from near the northern boundary of Lot 1 (shown with blue line). Source: April 2024 aerial photograph by O'Ryan Geospatial.

1.5.3. The subject land

The 'subject land' (as defined in the BAM) for this project includes the footprint of the quarry development as per the 'Gulgong Quarry Conceptual Design' (all stages included), the access track from Castlereagh Highway to the quarry footprint, and the widening of the Castlereagh Highway at the intersection with internal access track. It spans across approximately 8.71 ha as shown in Figure 1.

The quarry development footprint is located in the central area of the property and comprises of a rocky hillock in the centre and the surrounding stoney gentle slopes. The hillock is covered by pasture along with a woodland of native trees. The slopes and the surrounding flatter land harbours pasture with scattered native trees.

The subject land includes approximately 0.92 ha of previously cleared land. At present the subject land harbours a borrow pit and related modified topography, an access track and is being mainly used for grazing purpose.

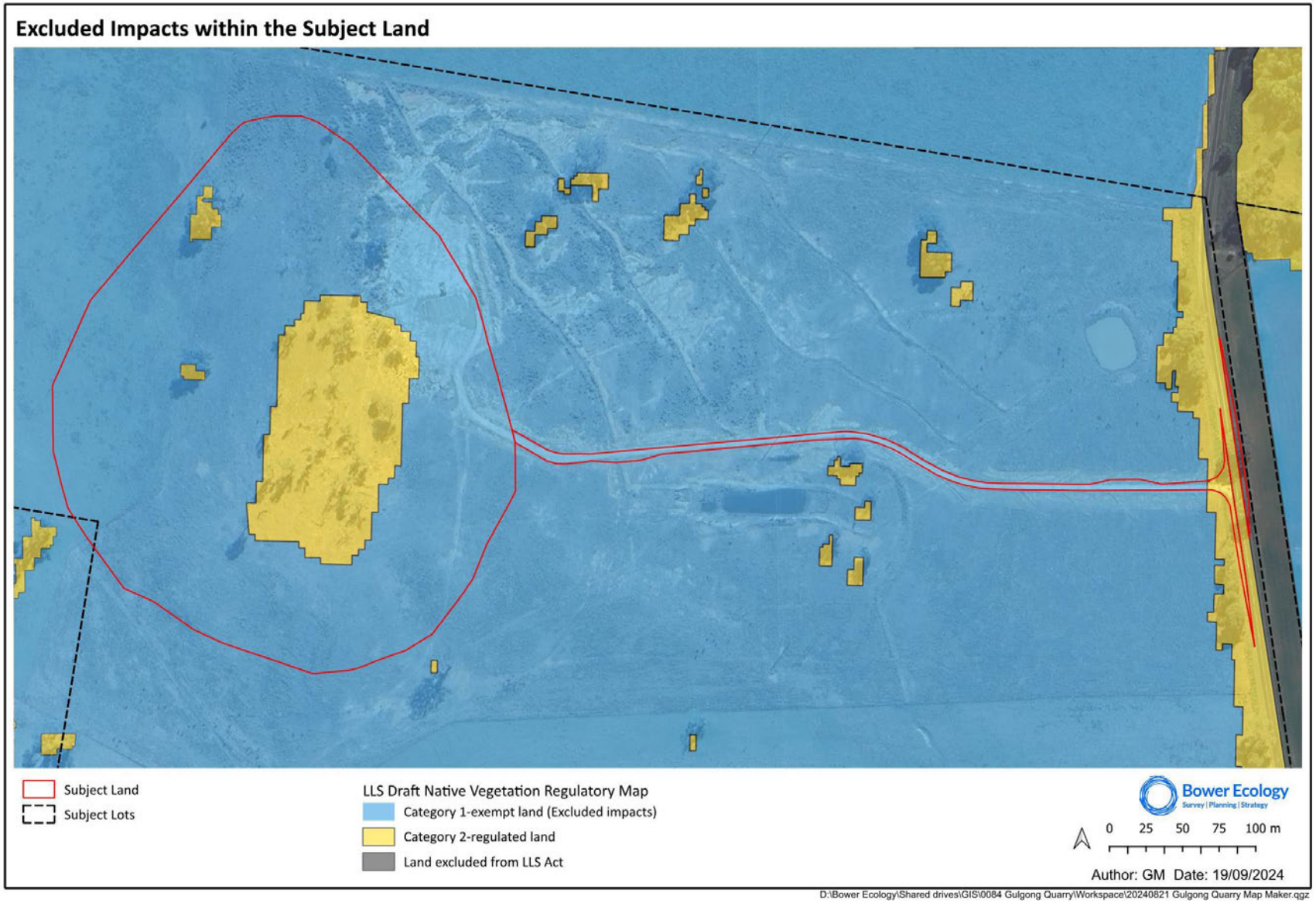

Figure 6: Excluded Impacts within the Subject Land

1.5.4. Other documentation

This BDAR was written in conjunction with the site-specific SEARs released on 5th June 2024 and subsequent draft Environmental Impact Statement (EIS; Outline Planning 2024). Additional relevant documentation is outlined within the EIS. The documents are listed as follows:

- Environmental Impact Statement (Outline Planning 2024)
- Geotechnical Assessment Report (Douglas Partners 2024),
- Contamination Assessment Report (Ballpark Environmental 2024),
- Water Balance and Groundwater Assessment Report (Martens and Associates 2024),
- Aboriginal Heritage Report (OzArk Heritage and Environment),
- Noise Impact Assessment Report (Vipac 2024),
- Air Quality Impact Assessment Report (Vipac 2024),
- Roads and Traffic Assessment Report (Streetwise 2024).

1.6. General Description of the Subject Land

1.6.1. Land use

Discussion with the current landowners and the desktop aerial searches identified the subject site as being historically cleared for agricultural purposes and is still currently utilised for such purposes. Historical aerial imagery has outlined that historical clearing has been conducted within the subject site as early as 1964 (Figure 7 and Figure 8). The subject site has been extensively grazed by sheep and cattle resulting in degraded ecological health within the subject land and the property. In addition, the site contains an access track, fencing and constructed dams used for farming, along with the existing borrow pit.

Figure 7: Historical aerial imagery of the subject land dated 31/12/1964 (NSW Government 2022)

Figure 8: Historical aerial imagery of the subject land dated 13/12/1995 (NSW Government 2022)

1.6.2. Geology, Topography and Soils

The subject land exhibits meta-sediments and meta-volcanics of Silurian and Ordovician age and comprises lithologies such as phyllites, shales to siltstones and sandstones with quartz veins. The subject land is mapped as Gulgong Ranges as described in Mitchell Landscapes (NSW Government 2002) and is characterised by a mix of sedimentary units including sandstone, shale and black shale, and volcanic units.

Douglas Partners (2024) conducted preliminary geotechnical investigations within the site between the 4th and 15th April 2024 where core drilling in and around the site was conducted to establish the geology profile of the site. Bore 1 was taken within the existing quarry borrow pit and identified 'typically medium and medium to high strength, highly fractured phyllite (a metamorphic rock)' (Photo Plate 1). Bore 2 was conducted at the south-west edge of the subject land and identified 'shallow, silty dark brown gravelly sandy soil overlying typically medium to high and high strength, moderately fractured meta-siltstone' (Figure 9).

The subject land and the surrounding landscape exhibits gently undulating topography with rocky and stoney gently sloping hillocks and the wide valleys and flat land spread around these. This topography has resulted from the erosion of the metasediments found in this region with slightly more erosion-resistant lithologies leading to the formation of the hillocks. The highest elevation across the subject land is on the top of the central hillock (532 m) and the lowest elevation within the subject land is near the intersection with the Castlereagh Highway (500 m).

The subject land is mapped as consisting of Ferrosols as described in the Australian Soil Classification. Ferrosols are defined as soils with a higher concentration of iron and weaker in acidity compared to other soils (NSW Government 2022). Ferrosols have a clay-loam to clay texture with a pH 4.5-5.6 in the topsoil and 4.4-5.2 in the subsoil. The subject land area does not have potential for acid sulphate soils and is not flood-prone (NSW Government 2022).

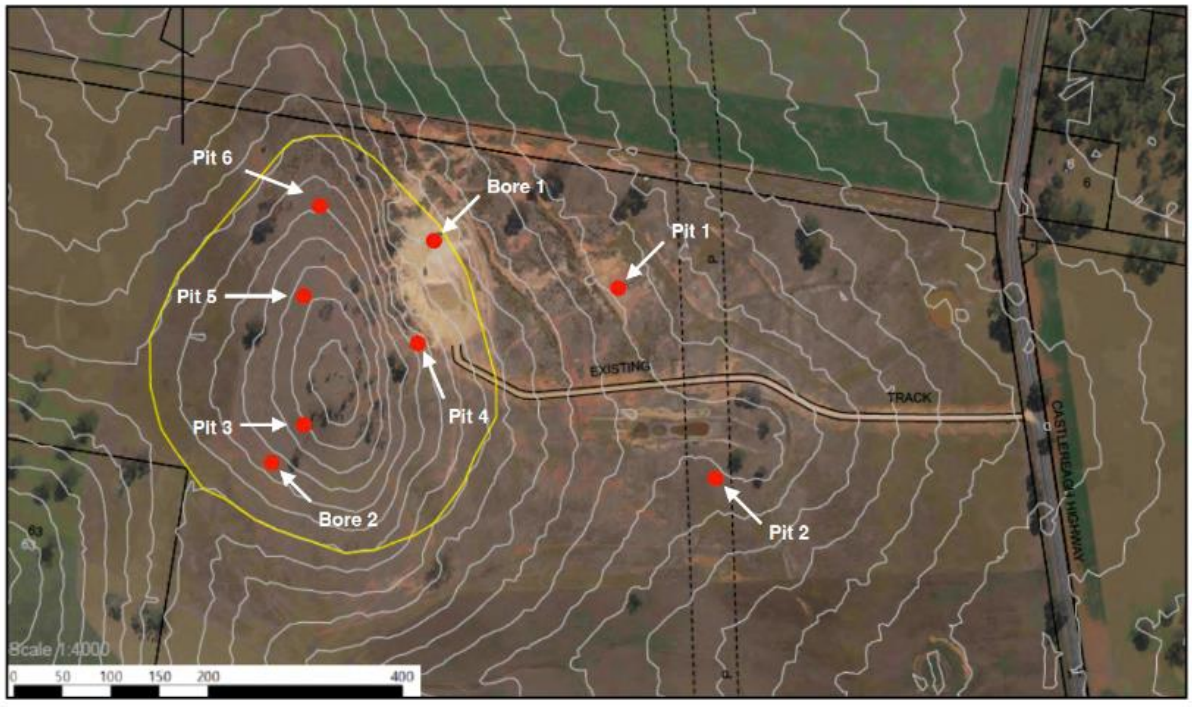

Figure 9: Location of Bore Pits conducted during preliminary geotechnical surveys (Douglas Partners 2024)

1.6.3. Hydrology and waterbodies

Desktop searches identified three small ponds formed by the agricultural dams within the subject lot, which was confirmed during the field investigations. However, none of these dams are located within the subject land. Additionally, Tallawang Creek runs north to south adjacent to the subject land with two (2) connecting ephemeral drainage lines running through the area of a 100 m buffer surrounding the subject land to the north and the south. However, none of these waterways occur within the subject land (Figure 2).

1.6.4. Vegetation

Desktop searches identified the subject land as comprising of extensively grazed pasture with scattered large native trees. Field surveys confirmed the desktop review; however, it was identified that the pastureland contained a component of native grass and forb species.

Surveys within the study area identified scattered canopy trees along all boundaries of the survey buffer. Additionally, a small patch of canopy individuals were identified within the central portion of the subject land. A large patch of dense vegetation was also observed to the west of the subject land, located approximately 620 metres directly west of the subject land.

The mid-storey was generally absent across the study area, however scattered occurrences of *Cassinia sifton* (Sifton Bush) were observed, with a dense patch of the species occurring to the north-east of the subject land. The groundcover layer was inconsistent across the study area, with some patches of regrowth native grass species, while other areas were dominated by introduced pastoral grasses. Overall, while there were patches of native groundcover, the groundcover would be considered low conservation value as less than 50% of the vegetation cover across the subject land consisted of native species. The vegetation within the study area was heavily degraded due to historical and current agricultural land usage.

1.6.5. Excluded impacts

Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1-exempt land (as defined in Part 5A of the LLS Act), other than prescribed impacts (as defined in clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation)). The subject land contains an area of Category 1 - exempt land that is excluded from the BAM Assessment for the purposes of this BDAR (Figure 6). It is, however, included in the assessment of prescribed impacts of the proposed development (discussed further in Section 5.9.

2 Methods

2.1. Review of existing information

This BDAR relies on information from field surveys completed in August 2024 (Section 5.4), as well as desktop searches that were completed prior to ecological surveys.

Published information sources used in this assessment include:

- Historic aerial imagery (NSW Government),
- Species Data that is held in BioNet Atlas (DPE 2020j),
- The Threatened Biodiversity Data Collection (TBDC 2023j),
- The NSW Seed database and its various components (NSW Government 2022f),
- Biodiversity Assessment Method (BAM 2020) (DPE 2020a),
- Surveying threatened plants and their habitats NSW Survey Guide for the BAM (DPE 2020d)
- 'Species credit' threatened bats and their habitats (DPE 2021c),
- BioNet Atlas (Department of Planning and Environment [DPE] 2023j),
- Threatened Biodiversity Profile Data Collection (TBPDC) (DPE 2023c),
- BioNet Vegetation Classification (DPE 2023d),
- Sharing and Enabling Environmental Data in NSW (SEED; NSW Government 2022f),
- Survey guidelines for Australia's threatened birds (DCCEEW 2010b),
- Survey guidelines for Australia's threatened mammals (DCCEEW 2011c),
- NSW State Vegetation Type Map (SVTM; DPE 2022d), and
- EPBC Act Protected Matters Search Tool (5 km radius) for threatened and migratory species populations, and ecological communities listed under the Commonwealth EPBC Act (DCCEEW 2022a).

All sources of information used during the compilation of this report are included in the list of References.

2.2. Matters of National Environmental Significance

A detailed assessment was completed to evaluate potential national environmental constraints impacting the subject land prior to the commencement of field surveys (refer Appendix H). This included a desktop analysis of Commonwealth Matters of National Environmental Significance (MNES) environmental databases and overlay mapping, protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), predicting the potential occurrence of threatened species on and around the subject land using the protected matters search tool (PMST). These desktop searches and subsequent results were conducted in accordance with the BAM guidelines (DPE 2020g) and the SEARs.

2.3. Landscape features

2.3.1. Landscape Features

Detailed desktop assessment of historical aerial imagery, environmental overlays on the SEED portal (NSW Government 2022f) and available council resources were conducted to develop a general understanding of the study area prior to on-ground surveys. Landscape features on the Subject Lot

and within the wider survey buffer were investigated during the field assessment carried out between 19th and 23rd Aug 2024. The findings are described further in Section 3.2.

2.3.2. Native vegetation cover

The native vegetation cover within the survey area was determined using existing vegetation mapping data, review of recent aerial imagery and field surveys within the subject land. Historic aerial imagery provides evidence of extensive land clearing and across the subject land pre-1964 (Figure 7; NSW Government, n.d.-b). Additionally, the historical aerial imagery identifies that the scattered trees contained within the subject land are likely remnant as they are observed in the aerial imagery from 1964. The native vegetation cover assessment was conducted using the Native Woody Vegetation Cover from SEED database and amendments were made within the subject land following the field surveys conducted from 19th to 23rd August 2024 (Section 5.4).

2.3.3. Field Surveys

Senior Ecologist Dr. Anand Datar and Ecologist Hannah Martin from Bower Ecology conducted field surveys from 19th to 23rd August 2024 for the ecological assessments required for this BDAR. A conservative 100 m survey buffer was placed around the subject land (Figure 1). This constitutes the 'survey area', and therefore this term differs from the 'subject land', as defined by the BAM (DPE 2020a). The survey area is approximately 30.4 ha in size.

Table 3 shows the ecological surveys carried out and the corresponding survey effort within the survey area. Specific survey methods are detailed in subsequent sections.

Table 3: Ecological surveys conducted within the subject land and wider survey area

Survey(s) Conducted	Survey Hours	Dates	Section
Targeted Spotlighting	**6hr 10m**	**19th-23rd Aug 2024**	**Section 2.6**
Targeted Bird Surveys	**5.5 hours**		
Habitat Searches	**4 hours**		
Vegetation Mapping	**1 hour**		
Anabat Monitoring	**4 nights**		
Active Searches (Reptiles)	**3 hours**		
Threatened Flora Surveys	**5 hours**		
Camera traps	**30 nights**	**19th Aug - 17th Sep 2024**	

2.4. Native vegetation, threatened ecological communities and vegetation integrity methods

2.4.1. Existing information

A desktop review of the type and condition of vegetation on the study area was undertaken using historical aerial photography, Geology, topographical mapping as well as the existing vegetation mapping using the SEED Database SVTM (State Government of NSW and DPE 2022) to obtain the existing PCT mapping within the subject land and the surroundings and was considered before the field surveys.

2.4.2. Mapping native vegetation extent

Bower Ecology conducted the field surveys from 19th to 23rd August 2024 to verify and update the vegetation extent and Plant Community Type (PCT) mapping. The vegetation within the Category 2 land areas of the subject land was ground-truthed to examine and verify the SVTM mapping of the

condition and extent of different plant communities. Mapping of plant communities within the subject land was undertaken by random meander surveys through patches of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Soils and lithology (where exposed) was also inspected. Landform and topographic position, and proximity to more intact forms of plant communities was also considered in mapping vegetation. The species present in each stratum was recorded to assist in assigning PCTs. Threatened Ecological Communities (TECs) and threatened flora species were also recorded incidentally during vegetation mapping efforts.

Records of plant community boundaries were made using the Global Positioning System digital tools and digital Geographical Information System (GIS), copies of the aerial photographs and previous mapping. The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map for the subject land.

During the field investigations, the native vegetation within subject land and survey area was assessed using the BAM methodology (vegetation mapping and plot-based survey).

The results of native vegetation assessment are further described in Section 4.

2.4.3. Vegetation Integrity Assessment

A vegetation integrity assessment was undertaken concurrently within the subject land (where possible) and adjoining area in accordance with the Section 4.2.1 and Section 4.3.2 of the BAM. Two floristic plots were established within the subject land as part of this BDAR (Figure 10).

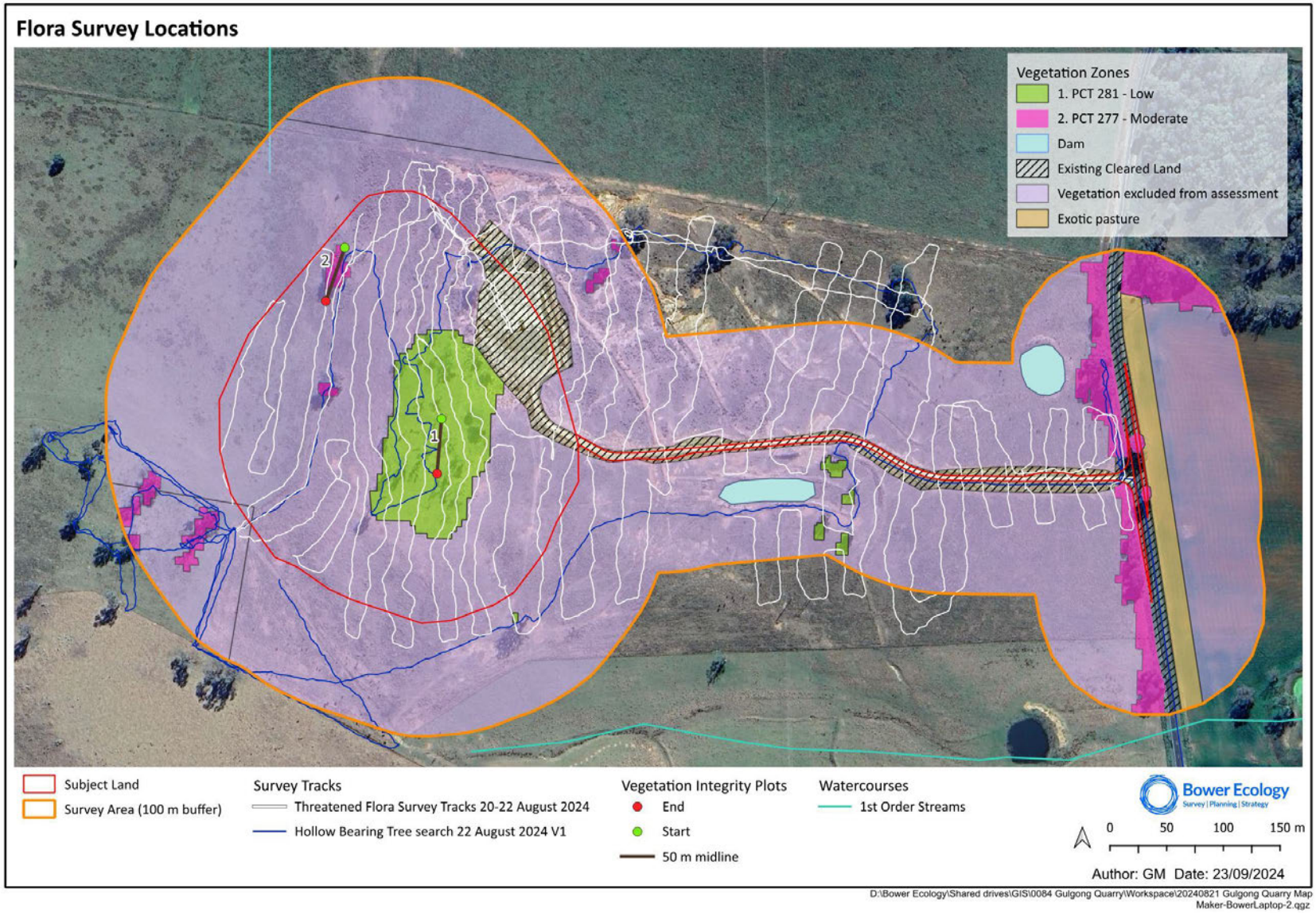

Figure 10: Flora Survey Locations

Each BAM plot entailed the establishment of a 20 x 50 m plot with an internal 20 m x 20 m plot. The following data was collected within each of the plots:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within a 20 m x 20 m floristic plot;
- Assessment of function attributes within a 20 x 50 m plot, including:
    - Count of number of large trees;
    - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
    - Regeneration based on the presence of living trees with stems <5 cm DBH;
    - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 x 50 m plot.

As shown in Table 4, the minimum number of plots has been completed for each vegetation zone

Table 4: Plot Requirements within the subject land as per the BAM (2020)

Vegetation Zone	PCT	Condition	Area (ha)	Number of plots required	Plots Completed
1: PCT 281: Low condition woodland	PCT 281	Low condition	1.46 ha	1	1
2: PCT 277: Low condition woodland	PCT 277	Low condition	0.08 ha	1	1

2.5. Threatened flora species survey

2.5.1. Habitat constraints assessment

Desktop assessments investigated the habitat constraints and microhabitats for predicted species credit flora species. Various resources and databases including Threatened Species and Community Profiles NSW and Commonwealth species profiles, and published reference literature was utilised for this. The habitat constraints were also assessed in the field during the field surveys.

2.5.2. Targeted flora species surveys

All of the candidate species credit species likely to use, occur on or within the study area must be assessed in accordance with Steps 3–5 in Section 5.3 of the BAM. Table 5 provides a summary of the flora species credit species surveyed for within the study area, and the associated methodology that was employed. The locations of the targeted flora species surveys are shown in Figure 10. No flora species that were assessed as candidate species credit species for further assessment were excluded.

Table 5: Threatened flora species seasonal survey requirements and survey methods

Common Name	Scientific Name	Recommended Survey Period (DPE 2020a)	Actual Survey Dates	Survey Methodology
Ausfeld's Wattle	*Acacia ausfeldii*	Aug-Oct	19th-23rd Aug	Survey methodology including extensive site meanders, 10-20 m spaced parallel transects within the subject land and BAM plots in accordance with the survey guidelines (DPE 2022a). Parallel transects were conducted in accordance with the guidelines and due to the predominantly degraded and open pasture condition of the vegetation within the subject land, transects were conducted using 10-20 m spacing.
Yass Daisy	*Ammobium craspedioides*	Oct-Nov		
Small Scurf-pea	*Cullen parvum*	All year		
Bluegrass	*Dichanthium setosum*	All year		
Tumut Grevillea	*Grevillea wilkinsonii*	Oct-Nov		
Tarengo Leek Orchid	*Prasophyllum petilum*	Oct-Nov		
Prasophyllum sp. Wybong	*Prasophyllum sp. Wybong*	Oct-Nov		
Small Purple-pea	*Swainsona recta*	All year		
Silky Swainson-pea	*Swainsona sericea*	All year		

2.6. Threatened fauna species survey

2.6.1. Habitat constraints assessment

Desktop assessments investigated the habitat constraints and microhabitats for predicted species credit flora species. Various resources and databases including NSW and Commonwealth species profiles, and published reference literature was utilised for this. The field surveys within the subject land and survey area included assessment of habitat constraints and microhabitats for predicted species credit fauna species such as caves and waterbodies, leaf litter, rocky outcrops (with required specifications) and hollow-bearing trees.

2.6.2. Targeted fauna species surveys

All of the candidate species credit species likely to use, or occur on the subject land, must be assessed in accordance with Steps 3-5 of Section 5.2.3, 5.2.4 and 5.2.5 of the BAM.

Targeted threatened fauna surveys were undertaken within the subject land for species credit species that were assessed as candidate species credit species for further assessment (see Section 5.3).

Table 6 provides a summary of the fauna species credit species surveyed for within the subject land. Details of each survey method utilised within the subject land are provided below. The locations of the targeted fauna species surveys are shown in Figure 11.

Table 6: Threatened Fauna survey methods

Common Name	Scientific Name	Recommended Survey Period (TBDC 2023j)	Actual Survey Dates	Survey Methodology
Mammals				
Brush-tailed Phascogale	*Phascogale tapoatafa*	December-June	19th-23rd August	Surveyed via habitat assessment, spotlighting and camera trapping in accordance with survey guidelines.
Koala	*Phascolarctos cinereus*	All year round	19th-23rd August	Surveyed via habitat assessment, spotlighting and camera trapping.
Southern Myotis	*Myotis macropus*	December-March	19th-23rd August	Surveyed via habitat assessment, and Anabat recording in accordance with survey guidelines.
Squirrel Glider	*Petaurus norfolcensis*	All year round	19th-23rd August	Surveyed via habitat assessment, spotlighting and camera trapping in accordance with survey guidelines.
Birds				
Superb Parrot (Breeding)	*Polytelis swainsonii*	September-November	19th-23rd August	Surveyed via habitat assessment and 8x diurnal bird surveys.
White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	July-December	19th-23rd August	Surveyed via habitat assessment and 48x diurnal bird surveys.
Reptiles				
Pink-tailed Legless Lizard	*Aprasia parapulchella*	September-November	19th-23rd August	Surveyed through visual active searches and habitat surveys.
Striped Legless Lizard	*Delma impar*	September-December	19th-23rd August	Surveyed through visual active searches and habitat surveys.
Insects				
Key's Matchstick Grasshopper	Keyacris scurra	August-May	19th-23rd August	Surveyed through visual active searches and habitat surveys.
Golden Sun Moth	*Synemon plana*	November-December	19th-23rd August	Surveyed through visual active searches and habitat surveys.

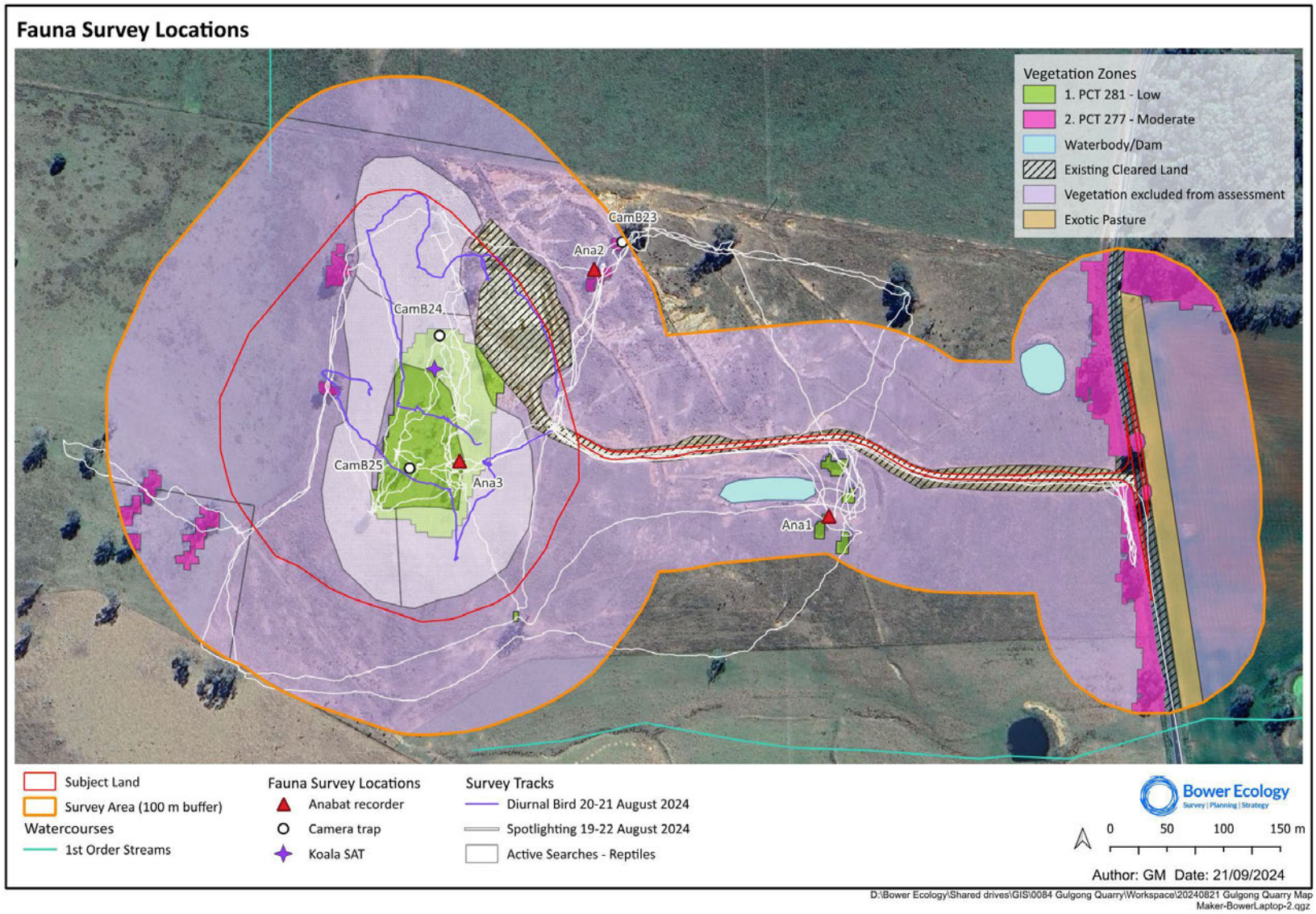

Figure 11: Fauna Survey Locations

2.6.3. Survey methods

2.6.3.1. Spotlighting Surveys

Target species: Brush-tailed Phascogale, Squirrel Glider, Koala

Spotlighting was undertaken throughout areas where suitable habitat is present using high powered hand-held torches, focussing on the potential for presence of mammal species. The Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE 2022a) was followed for the survey methodology. Spotlighting was undertaken throughout areas where suitable habitat is present using high powered hand-held torches, focussing on the potential for presence of mammal species. Spotlighting was undertaken once each night during between 19th and 23rd August 2024 in all areas of woody vegetation within the subject land for a survey period of approximately two hours each night. Figure 11 shows the survey tracks for spotlighting from all the surveys.

2.6.3.2. Motion Sensor Camera Traps

Target species: Brush-tailed Phascogale, Squirrel Glider, Koala

Motion sensor cameras were utilised to survey for mammal species. Bait holders suitable for arboreal mammals were mounted on the side of trees and filled with a mixture of honey, peanut butter and oats with some honey smeared on the trunk of the tree near the bait holder, with a motion sensor camera fixed on a tree trunk opposite to the bait and aimed at the bait. Bait stations at ground level were also set up using a mix of oats, peanut butter and honey. A total of three cameras were positioned including two arboreal and one ground camera. Each camera had been set to take photos in succession when triggered. The locations for camera traps were carefully selected assessing the habitat, hollows and other habitat features, fauna movement pathways and potential. The cameras were set on 20th August 2024 for a period of four weeks and removed on 17th September 2024. The location of cameras is shown in Figure 11.

2.6.3.3. Spot Assessment Technique Surveys

Target species: Koala

Surveys for Koalas were undertaken following the Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE 2022n). Survey using a method known as the Spot Assessment Technique (SAT) (Phillps and Callaghan 2011) were conducted throughout the subject site where suitable habitat (e.g. *Eucalyptus blakelyi*) were present. Survey location was based on the location of Koala food tree that were surrounded by a number of trees to complete the survey. Once a central food tree was established, a maximum of two-person minutes were spent searching for faecal pellets (scats) within a one metre radius of the base of the central tree and 29 surrounding trees. Tree trunks were searched for scratch marks, and the canopy will be observed for any Koalas present. As the Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE 2022n) requires use of two survey methods, spotlighting targeting the Koala was also undertaken during the field surveys. The location of SAT survey is shown in Figure 11.

2.6.3.4. Ulltrasonic Call Detection Surveys

Target species: Southern Myotis

Three ultrasonic call detection units were placed in proximity to areas of the most suitable habitat and left onsite for a minimum of four consecutive nights to record microbat activity. The locations for the recorders were carefully selected considering the habitat features, potential fly-ways and location of water bodies within the survey area. The units were set up on 19th August 2024 for a period of four nights and were retrieved on 23rd August 2024. The recorded bat calls were analysed,

and species identified by Balance Environmental. The Microbat Call Identification Report is provided in Appendix E: Anabat Results. Figure 10 shows the location of harp trap and ultrasonic call detection units.

2.6.3.5. Diurnal Bird Surveys

Target species: Superb Parrot (Breeding), White-bellied Sea-Eagle (Breeding)

Diurnal bird surveys are based on 'Threatened Biodiversity Survey and Assessment: Guidelines for Activities and Developments' (DPEm 2004), 'Survey Guidelines for Australia's Threatened Birds' (DCCEEW 2010b) and the EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (DCCEEW 2017f). Surveys were be undertaken using the area search method that involves walking within a 2-ha area and recording all avian species observed. This within the subject site for a minimum of 20 minutes per site each day for a minimum of three days between 19th and 23rd August 2024. Further to the above all bird species seen or heard calling were recorded during all surveys, including random meanders for vegetation mapping in August 2024.

During the habitat assessment the survey area was assessed for important components of habitat for White Bellied Sea-Eagle with reference to large stick nests on tall trees. The assessment included recording any evidence for presence of these species from observations or calls and it was undertaken in August 2024.

2.6.3.6. Active Search in Suitable Habitat

Target species: Pink-tailed Legless Lizard, Striped Legless Lizard

The survey area contained a suitable habitat with gentle slopes of the hillock in the middle of the subject area covered with suitable rocks for the habitat of pink tailed legless lizard and striped legless lizard. The surveys involved diurnal rock searches undertaken by turning suitably sized rocks in the areas of suitable habitat. All the suitable habitat within the subject land was covered during the active search surveys. The surveys were carried out as per the survey guidelines and the Conservation Advice for each species (DCCEEW 2021d and DCCEEW 2022e). The areas for active searches conducted between 19th and 23rd August 2024 are shown in Figure 11.

2.6.3.7. Meander Searches in Potential Habitat

Target species: Key's Matchstick Grasshopper, Golden Sun Moth

Desktop searches identified that the survey area potentially contained native temperate grasslands that may provide suitable habitat for key's matchstick grasshopper and golden sun moth. The surveys involved extensive meanders through the native grassland present within the survey area, with all the suitable habitat within the subject land covered during the search surveys. The surveys were carried out as per the Threatened Species Biodiversity Assessment Method Survey Guides for each species (DCCEEW 2021d and 2012e). The areas for active searches conducted between 19th and 23rd August 2024 are shown in Figure 11.

2.7. Species Likelihood of Occurrence Table

An assessment was conducted to gauge the likelihood of occurrence of threatened species, communities and populations identified as having a potential to occur within the subject land (Appendix G). The assessment was based upon desktop searches for the subject land, TBDC species information, and the Species Profile and Threats Database (SPRAT; DCCEEW 2020) extensive habitat searches conducted within the subject land and results of the targeted site surveys (Section 5.4).

Results of the likelihood assessment were based on the terms listed below (Table 7). The Species Likelihood of Occurrence Table is provided in Appendix G: Species Likelihood of Occurrence Table.

Table 7: Species Likelihood of Occurrence Criteria

Likelihood of species	Criteria
Known	The species was or has been observed within the subject land during site surveys.
Likely	The species has a medium to high potential probability of occurring within the subject land based on high-quality habitat.
Potential	The species has the slight potential to occur within the subject land based on suitable habitat observed within the site however the habitat was observed to be marginal, low quality or there is insufficient data to categorise the species as being likely or unlikely to occur.
Unlikely	The species has a low to very low likelihood of occurring within the subject land due to a lack of suitable habitat, a highly disturbed subject land or a lack of species recordings within the surrounding area.
N/A	No suitable habitat is present within the subject land.

2.8. Weather conditions

Table 8 describes weather observations during the surveys and the associated impact on survey methods/species detection. Weather conditions are sourced from the Bureau of Meteorology from Gulgong Post Office weather station (station number 062013; BOM 2024).

Table 8: Weather Conditions leading to and during field surveys

Period	Temperature minimum (°C)	Temperature maximum (°C)	Rainfall (mm)	Impact on survey efficacy
July 2024	3.8 °C	14.3 °C	73.6 mm	No significant impact
August 2024	6.3 °C	19.0 °C	55.2 mm	No significant impact
Survey Period (19th-23rd August 2024)	8 °C	20.4 °C	11.2 mm	No significant impact

2.9. BAM-C Calculations

The Biodiversity Assessment Method (BAM) Credit Calculator (BAM-C) was used in this assessment (App last updated: 13/04/2023 10:00 [Version: 1.4.0.00]; BAM data last updated: 14/03/2024 [Version: 67]).

The relevant BAM-C case for this BDAR includes Parent case 00050169 and Child case 00050170 under Assessor Number BAAS18018. Data entered into the BAM-C is provided in Appendix F. Outputs including credit reports are provided in Appendix D.

2.10. Limitations

The following limitations to survey methodology have been identified:

- Multiple threatened flora species were surveyed simultaneously during the vegetation mapping, plot surveys and threatened species transect surveys. Similar fauna groups were surveyed together such as birds, nocturnal mammals, reptiles etc. However, this did not have any impact on the quality of the assessment and quality of the data collected.
- Threatened flora transects were conducted outside of the target months for 4 (four) species. This does not pose an issue for the *Grevillea wilkinsonii* (Tumut Grevillea) as this species would be established and identifiable outside of survey months. However, the three (3) other flora species *Ammobium craspedioides* (Yass Daisy), *Prasophyllum petilum* (Tarengo Leek Orchid) and *Prasophyllum* sp. Wybong may be less likely to be identified outside of the recommended survey months due to the dormancy period of the species. However, it is unlikely these species would be present due to the degraded and heavily grazed nature of the subject land.
- The boundaries of PCTs and their condition states within the LLS Act Category 2 land in the subject land are dynamic and sensitive to the accuracy of the Category 2 land LLS Act draft mapping. The boundaries may also shift in response to land management practices and weather events. The vegetation mapping therefore reflects the LLS Act draft mapping and vegetation (condition and floristics) at the time of surveys only, and this is expected to change in the future and may differ from any previous surveys.
- During the survey, it was noted that the survey area had experienced heavy grazing (the current approved land use), as documented in photographs throughout this BDAR. Although species identification is done to the best of our ability, levels of grazing can alter the ability to observe and identify flora.

2.11. Permits and Licences

Bower Ecology has obtained the appropriate licences to undertake required fauna and flora surveys within NSW. These include:

- NSW Animal Ethics Approval (Project number RVF21/1496)
- NSW Animal Research License (Accreditation No. 82071)
- NSW Scientific License (License No. SL102544)

3 Site context

3.1. Assessment area

The subject lot is currently utilised for agricultural purposes (grazing and pastureland) and consists predominantly of areas that were subject to historical vegetation clearing for such purposes. As previously mentioned, there is evidence of grazing and land clearing pre-1964. Historic aerial imagery provides evidence of extensive land clearing and across the subject land pre-1964, however some remnant trees still exist in the subject land (Figure 7; NSW Government, n.d.-b).

The survey area comprises the area within a 1,500 m buffer around the outer boundary of the subject land (Figure 2) and spreads over 30.4 ha. The extent of native woody and non-woody vegetation cover within the survey area is considered suitable to assess the native vegetation cover relevant to the project in accordance with BAM and the NSW SEED database is used for the assessment. Figure 12 exhibits the woody and non-woody vegetation cover across the survey area.

3.2. Landscape Features

3.2.1. IBRA bioregions and IBRA subregions

The subject land falls within the NSW Southwestern Slopes IBRA Region and Inland Slopes IBRA Subregion (NSW Government, 2023) and is located in the northwest of the Mid Western Regional Council (LGA) (Figure 2).

3.2.2. Rivers, streams, estuaries and wetlands

The study area is located within the Macquarie-Bogan River catchment. Desktop searches have identified three small ponds within the survey area, however none of these dams are located within the subject land. Additionally, Tallawang Creek runs north to south adjacent to the subject land with two (2) connecting ephemeral drainage lines running through the proposed survey buffer to the north and the south (Figure 2). However, no waterways occur within the subject land.

3.2.3. Important and local wetlands

PMST results list four (4) Wetlands of International Importance (Ramsar Wetlands). The listed wetlands and their predicted proximity to Ramsar Wetlands are as follows:

- Banrock station wetland complex: 800-900km from the subject land,
- Riverland: 700-800km from the subject land,
- The Coorong, and Lake Alexandrina and Albert Wetland: 900-1000km from the subject land,
- The Macquarie Marshes: 200-300km

It is not anticipated that the proposed development will have an impact on these predicted wetlands due to the great distance from the wetlands. Additionally, the proposed development does not propose any impacts to waterbodies (directly or indirectly due to the retention of all site runoff) and therefore impacts to hydrological flow-on affects is not anticipated.

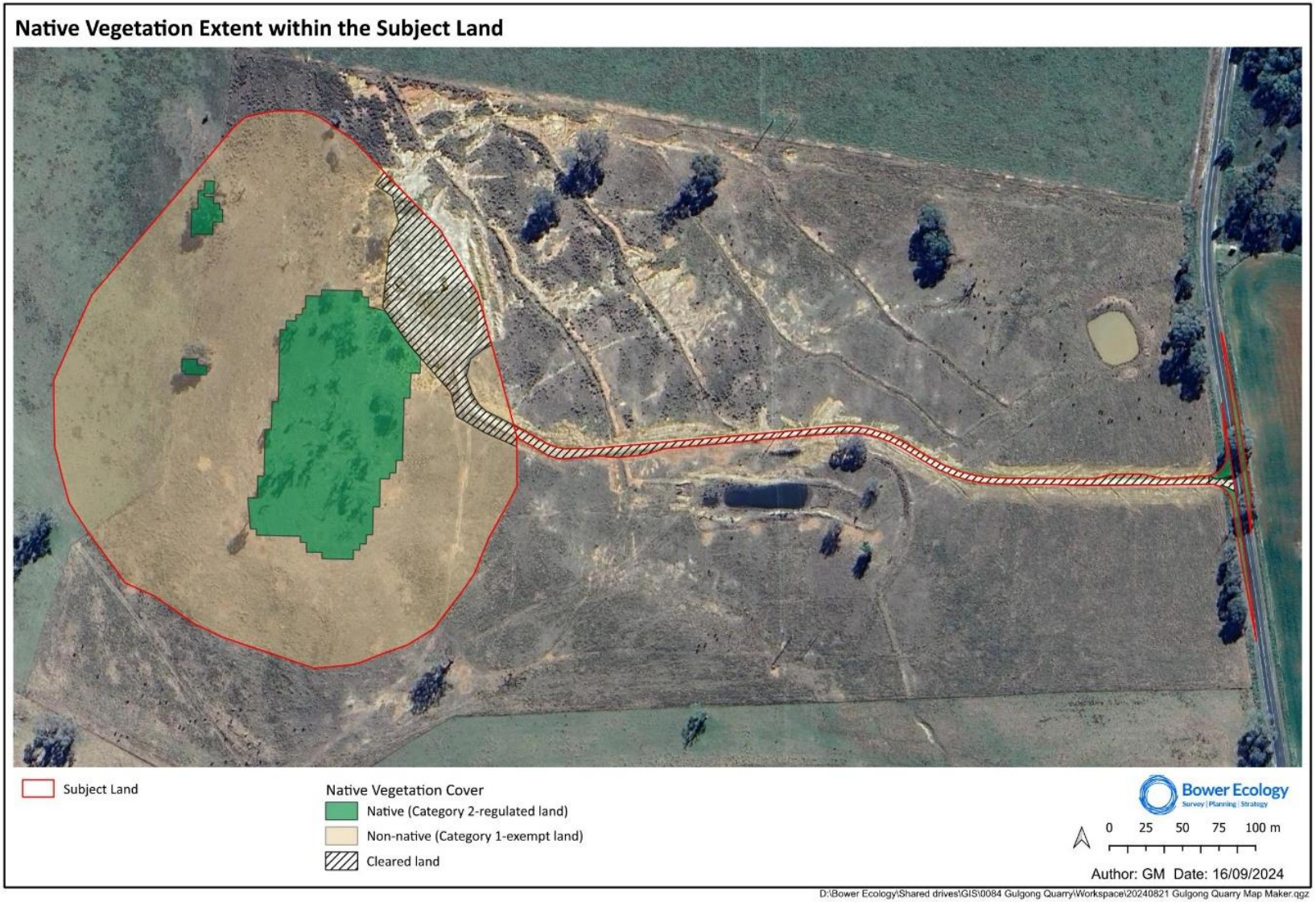

Figure 12: Native Vegetation Extent within the Subject Land

3.2.4. Habitat connectivity

The subject land does not form part of a regional or local biodiversity corridor, or a flyway for migratory species as identified via SEED (NSW Government 2022f). The subject land contains sparce scattered trees at the top of the hillock and the large native trees scattered across the subject land and wider subject lot. This vegetation may provide as stepping stones and habitat trees for the fauna that is moving across the landscape between the more intact patches in the region. Locally there are patches of more intact vegetation near the western boundary of the subject land (approx. 500 m away), to the south west of the subject land (approx. one km away) and on the other side of the Castlereagh Highway to the east of the subject land (approx. 500 m away) (Figure 2).

While the site is not directly adjacent to large areas of intact vegetation, scattered trees and patches of vegetation may provide connectivity (albeit limited by barriers such as open paddocks, fences and roads) to the following bushland areas in the regional context:

- Goodiman State Conservation Area, to the west (approx. 2.7 km away);
- Tuckland State Forest to the west-north west (approx. 6.2 km away);
- Barney's Reef to the east (approx. 6 km away).

Connectivity in the remainder of the assessment area is limited to stepping-stone habitat in the form of smaller scattered patches of vegetation within a predominantly agricultural landscape.

3.2.5. Karst, caves, crevices, cliffs, rocks or other geological features of significance

There are no areas containing karst, caves, cliffs, or other geological features of significance within the subject land and/ or survey area based on searches of available aerial imageries, or topographic data and the field investigations. Few rocky areas of small boulder heaps (1 – 2 m in diameter) were observed along the eastern boundary of the subject land and the subject land also contains a small outcrop (mostly a quarry wall, about 2 to 3 m high - Figure 13). Both these appear to be very recent in time. The central hillock within the subject land along the gentle slopes provides rocky area that may serve as a reptile habitat for a few species (Figure 13, Figure 11).

Figure 13: The exiting borrow pit and associated wall, and the hillock (right)

3.2.6. Areas of outstanding biodiversity value

There are no Areas of Outstanding Biodiversity Value, as identified under the BC Act, have been mapped within the subject land and survey area (DPE 2022d).

3.2.7. Bionet NSW (Mitchell) Landscapes

The subject land and the survey area occurs within a single BioNet NSW (Mitchell) Landscape, the 'Gulgong Ranges' Mitchell Landscape, which forms strike ridges with steep slopes and long debris aprons on complexly folded steep dipping Silurian lithic sandstone, quartzite and phyllite, Devonian sandstone, siltstone, shale, rhyolite and dacite. 'Gulgong Ranges' generally consists of shallow stony red and yellow texture-contrast soils with stony uniform loams on step slopes with a general elevation of 550 to 980m.

3.2.8. Additional landscape features identified in SEARs

There were no additional landscape features identified as outlined in the SEARs.

3.2.9. Soil Hazard Features

There were no current soil hazard features identified as having the potential to occur within the subject land. The subject land is not prone to flooding, landslips, mine subsidence or hazards (Outline Planning 2024). Additionally, the subject land does not contain areas mapped as containing Acid Sulfate Soils (NSW Government 2022e). This BDAR has been developed in conjunction with the EIS (Outline Planning 2024), which has outlined the potential for soil hazards, such as the potential for soil erosion, should the management and mitigation measures as outlined in this BDAR not be followed (Section 8).

3.2.10. Native vegetation cover

The native vegetation cover was determined using GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised aerial imagery. The assessment area (Figure 2) includes native vegetation cover of scattered native trees and patches of native vegetation. The rest of the assessment area comprises predominantly agricultural landscape with cleared land, open water, and exotic vegetation with potentially some native shrub and grass species intermixed in the pastures. The native vegetation cover within the assessment area is shown in Figure 2. Table 9 Summarises the extent of native vegetation cover within the assessment area and the resultant Class A (0 – 10%) as assessment of native vegetation cover.

Table 9. Native Vegetation Cover

	Woody Vegetation	**Non-woody Vegetation**
Assessment area (ha)	1500 m	1500 m
Total area of native woody vegetation cover (ha)	50.17 ha	50.57 ha
Percentage of native vegetation cover (%)	4.87% of the Assessment Area	4.91% of the Assessment Area
Class (0-10, >10-30, >30-70 or >70%)	'Class A' (0-10%)	'Class A' (0-10%)

4 Native vegetation, threatened ecological communities and vegetation integrity

4.1. Native vegetation extent

Desktop analysis of available data and detailed field surveys by Bower Ecology staff were conducted across the Category 2 land within the subject land to assess the native vegetation for the purpose of this BDAR. A desktop review of the type and condition of vegetation on the site was undertaken using historical aerial photography, and other attributes such as Geology and Topography, along with the existing vegetation mapping via the SVTM (State Government of NSW and DPE 2022). The native vegetation extent within the subject land is shown in Figure 12. All native vegetation within the Category 2 land within the subject land has been assigned to a PCT.

Some minor existing cleared areas are present within the Category 2 land in the form rock piles and existing quarry disturbance totalling an area of approximately 0.05 ha of the subject land. In accordance with Section 5.1.1.5 of the BAM, such areas do not require further assessment, unless they are proposed for restoration as part of an offset or provide habitat for species credit species.

Field surveys identified that the site contained a small sparse patch of remnant *Angophora floribunda* (Rough-barked Apple) individuals within the central portion of the subject land. There were also occurrences of large remnant individuals of species Rough-barked Apple, *Eucalyptus blakelyi* (Blakely's Red Gum), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus albens* (White Box) scattered across the subject lot and beyond. The remaining vegetation within the survey area contains mixed native and introduced grass species. Vegetation cover was mapped throughout the survey area through a combination of assessment for vegetation mapping, walking parallel threatened species survey transects, and the Vegetation Integrity plots. Category 2 land (assessable vegetation under BAM) within the subject land occupies 1.58 ha, which comprises 17.59% of the subject land.

4.1.1. Local Land Services Act 2013 (NSW) Mapping

As per Section 1.5 of the BAM Guidelines (2020), the BAM does not assess biodiversity values for native vegetation and loss of habitat on Category 1-exempt land (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts under Clause 6.1 of the BC Regulation (referred to as prescribed impacts in the BAM). Areas of both Category 1 – exempt land and Category 2 – regulated land are mapped within the subject land (Figure 6).

Desktop aerial imagery suggests that the subject lot has been cleared for agricultural purposes as far back as 1964 (Figure 7).

4.1.2. Changes to the mapped native vegetation extent

The actual native vegetation PCT extent identified during ecological surveys was slightly different to the PCT vegetation mapping from the SVTM data from Seed Database, NSW (Figure 14 and Figure 15). SVTM (State Government of NSW and DPE 2022) identified the subject land to be mapped as ‘not native vegetation’. SVTM mapping identified PCT 277 as only occurring in one small polygon along the Castlereagh Highway and approximately 740 m west of the quarry footprint (Figure 8a). However, the data from on-ground vegetation mapping and the two vegetation integrity plots suggested the subject land contained patches of PCT 281 and PCT 277 (characterised by scattered remnant canopy trees with a mixed native/non-native groundcover), with no large areas of consistent non-native vegetation identified.

4.1.3. Areas that are not native vegetation

Despite SVTM (State Government of NSW and DPE 2022) describing the site as 'not native vegetation', on-ground vegetation mapping and vegetation integrity plots identified the subject land to contain patches of pasture grasses that had a mix of both exotic species (dominant) as well as occurrences of native and non-native groundcovers.

4.2. Plant community types

4.2.1. Overview

Plant Community Types (PCTs) were mapped on the subject land in accordance with the BAM (DPE 2020), and with reference to SVTM (State Government of NSW and DPE 2022), and the BioNet Vegetation Classification (NSW Government 2023d). BioNet Vegetation Classification and State Vegetation Type Mapping and PCT Profiles were used to identify map the probable PCT based on the following considerations:

- Occurrence within the NSW Southwestern Slopes IBRA Region and Inland Slopes IBRA Subregion (NSW Government, 2023);
- Vegetation formation and characteristics;
- Alignment with TECs;
- Geology and landscape position; and
- And Composition – upper, middle and ground strata species.

Field vegetation surveys identified two PCTs held within the BioNet Vegetation Classification database occurring within the subject land (PCT 277 and PCT 281) with each exhibiting one vegetation zone as seen in Figure 16.

Areas containing sparse woodland at the top of the hillock, and few trees near the dam belong to PCT 281 and areas of scattered trees and low-quality native grassland belong to PCT 277. Figure 18 and Figure 19 show the general distribution of native vegetation and pasture across the land. In total, 7.10 ha was Category 1 Exempt Land under the LLS Act draft mapping.

Table 10 a summary of the PCTs and their vegetation zones as mapped during the field surveys carried out from 19th – 23rd August 2024. Two vegetation zones mapped within the subject land are VZ 1a: PCT 281 – Woodland (Low condition) and VZ 2a: PCT 277 – Woodland (Moderate condition) (Figure 16).

Threatened Ecological Communities are also discussed and mapped (Figure 17) below.

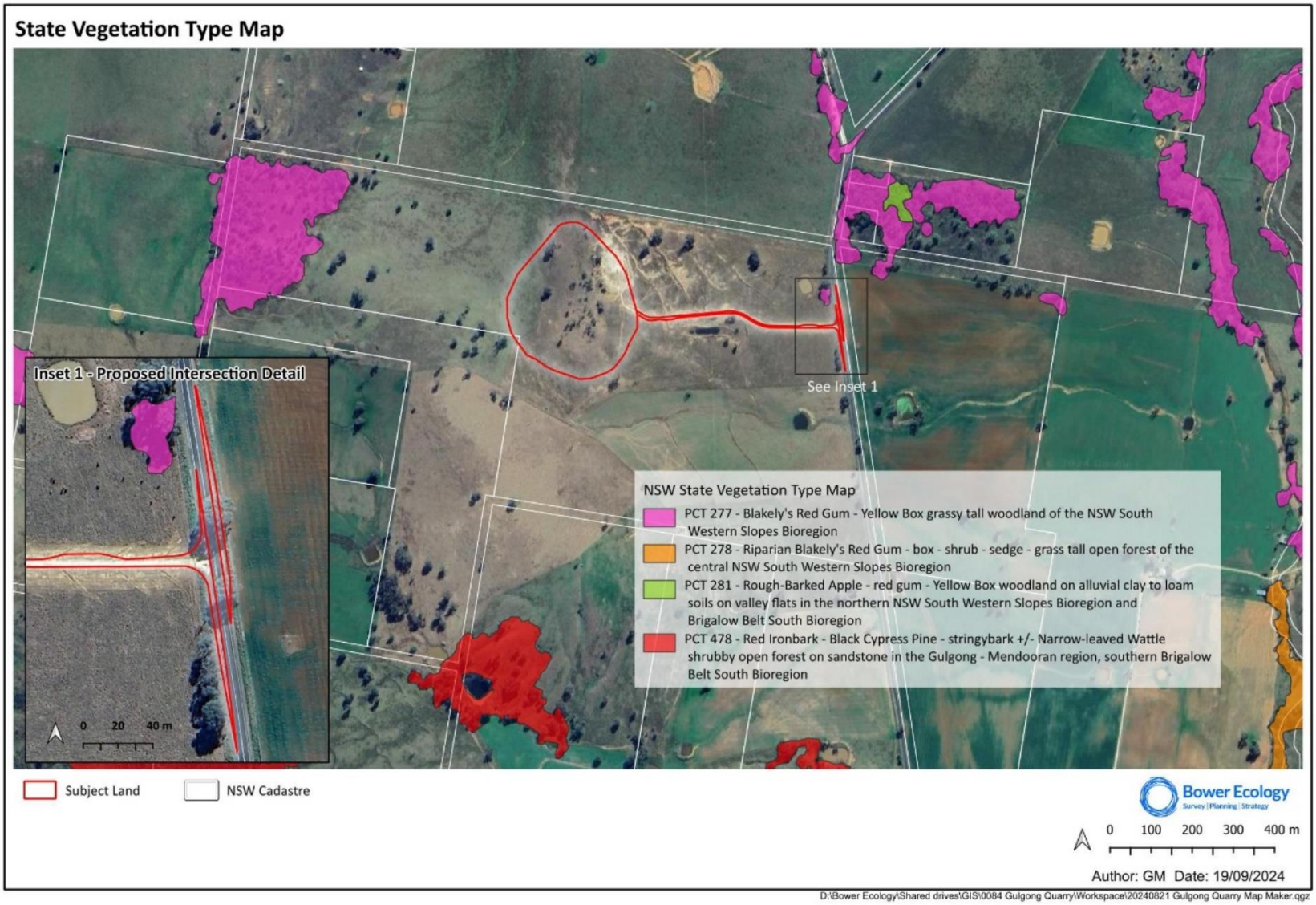

Figure 14: State Plant Community Type Map

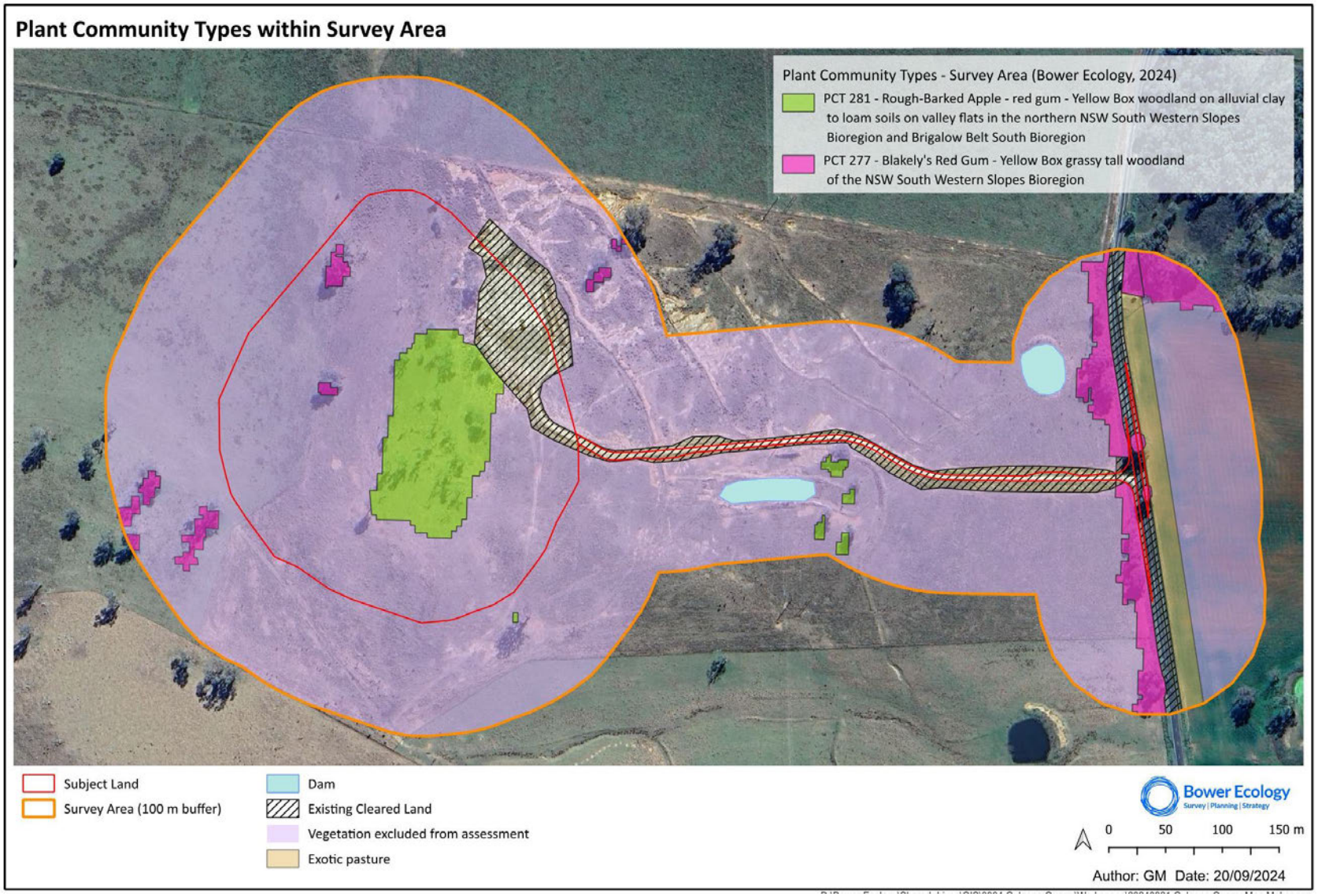

Figure 15: Ground-truthed Plant Community Types within Survey Area

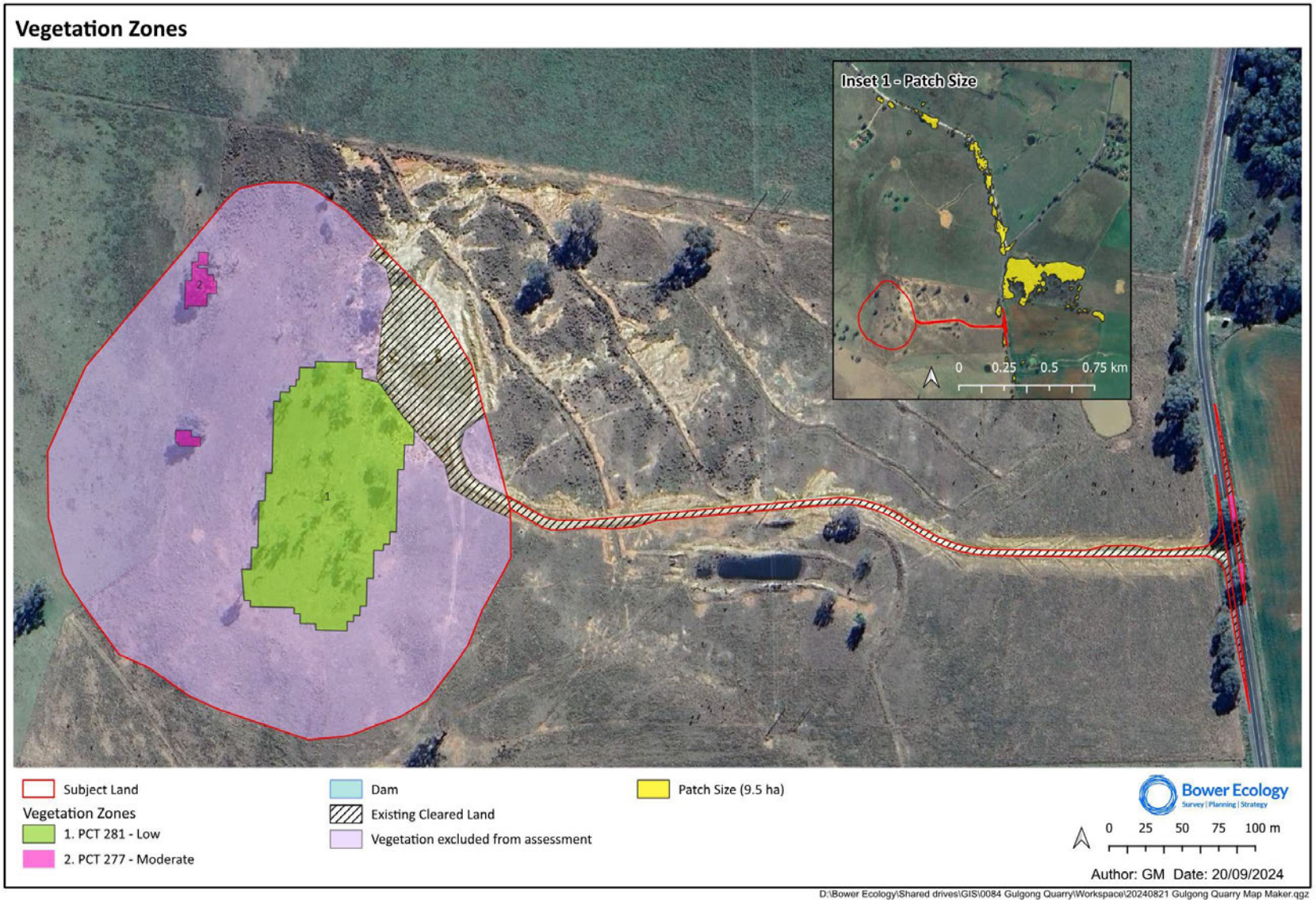

Figure 16: Vegetation Zones

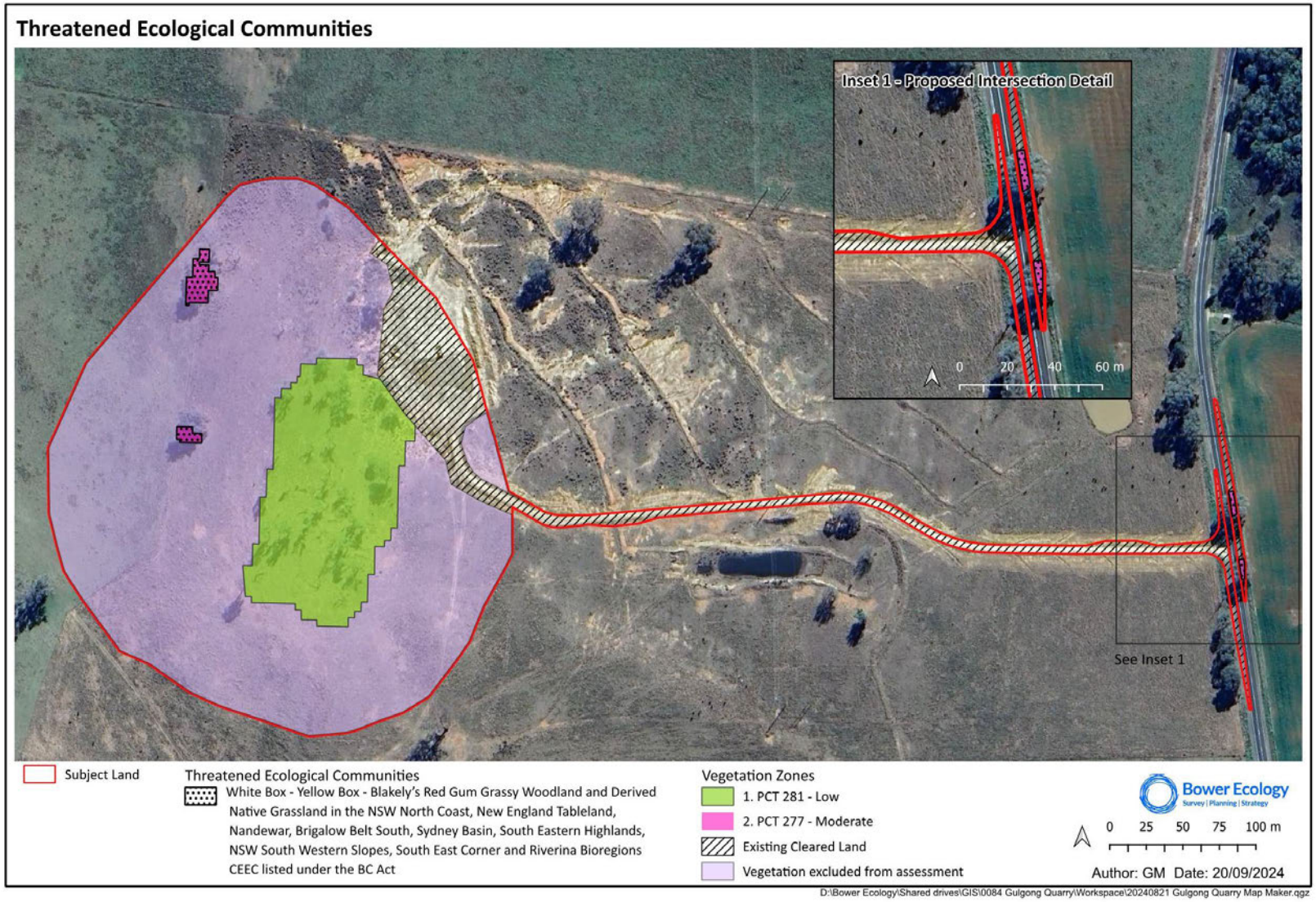

Figure 17: Threatened Ecological Communities

Figure 18: Aerial drone photograph showing Category 1- exempt land as displayed along the western boundary of the subject land

Figure 19: Aerial drone photograph taken from north displaying the scattered canopy trees within the central portion of the subject land

Table 10: PCTs and associated vegetation zones identified within the subject land

Vegetation Zone	PCT ID	PCT Name	Vegetation Formation	Percent Cleared	Condition Class	Area (ha)
Native Vegetation						
1a	281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	KF_CH3 Grassy Woodlands	N/A*	Low Condition Woodland	1.46 ha
2a	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	KF_CH3 Grassy Woodlands	N/A*	Moderate Condition Woodland	0.08 ha
					Total area	1.54 ha

Detailed descriptions of these PCTs and the justification for PCT selection is provided in the sections below. As previously mentioned in Section 2.10 (limitations), the boundaries of PCTs and their condition states within the Category 2 land in the subject land are dynamic and sensitive to the accuracy of the Category 2 land LLS Act draft mapping. The boundaries may also shift in response to land management practices and weather events. The vegetation mapping therefore reflects the LLS Act draft mapping and vegetation at the time of surveys only which is expected to change in the future and may differ from any previous surveys. Additionally, the subject land includes approximately 7.10 ha of Category 1 Exempt Land under the LLS Act and therefore, these areas are not assessable under the BAM as per Section 1.5.

4.2.2. PCT 277

4.2.2.1. PCT Overview and general description

This PCT is described as: *PCT 277: Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.*

Vegetation formation: KF_CH3 Grassy Woodlands

Vegetation Class: Western Slopes Grassy Woodland

Percent Cleared Value: 94%

BC Status: Generally associated with the Critically Endangered Ecological Community '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'. This community is also considered an SAII entity.

EPBC Act Status: Generally associated with the Critically Endangered Ecological Community, 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland'.

PCT 277 is described in the BioNet VIS Classification as Tall woodland to about 20 m high dominated by Blakelys Red Gum (*Eucalyptus blakelyi*) and Yellow Box (*Eucalyptus melliodora*) with sparse shrubs on fertile deep, loam or clay soils derived from a range of substrates including fine-grained sedimentary and metamorphic rocks but also volcanics and fine-grained granite. Occurs on flats, footslopes and hillslopes in the NSW South-western Slopes Bioregion. PCT 277 is found to occur within the subject land as stand-alone paddock trees amongst pasture. These areas are located in the west of the subject land (Figure 20), and at the location of the shoulder widening of the Castlereagh Hwy, where two mature trees (2 x *E. albens*) are proposed to be impacted (Figure 21). However, the ultimate intention of the proponent is to retain these two mature *E. albens* trees proposed to be impacted due to the shoulder widening of the Castlereagh Hwy, however for conservative reasons, they have been assessed as being removed within this BDAR. The proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

4.2.2.2. Condition states

The vegetation condition present at the time of ecological surveys within the subject land is indicative of historical and current land uses of agricultural and pastoral usage. The condition state is described as 'PCT 277: Moderate Condition Woodland' (0.08 ha).

Areas of PCT 277 within the Category 2 land within subject land exhibit scattered *Eucalyptus blakelyi* (Blakely's red gum) and *Eucalyptus albens* (White Box) individuals with a predominantly native ground cover dominated by *Austrostipa* spp. The shrub layer was absent however this is consistent with PCT 277. The groundcover consisted of a mixed native and non-native featuring *Bothriochloa macra* (Red-leg Grass), *Sporobolus creber* (Western Rat-tail Grass) and Rumex brownii (Swamp Dock) but predominantly contained introduced forbs such as *Trifolium repens* (White Clover), *Hypochaeris glabra* (Smooth Catsear) and *Arctotheca calendula* (Capeweed) (Figure 20).

4.2.2.3. Justification of PCT selection

While the grassland vegetation within the subject land was heavily degraded as a result of cattle grazing and historical land clearing, the canopy species were used as an indication of the associated PCT. As some portions of vegetation within the subject land was dominated by canopy species *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus albens* (White Box), PCT 277: *Blakely's Red Gum - Yellow Box grassy tall woodland* was considered to be the best fit for the moderate condition vegetation as identified in areas in Figure 15. Further justification against other possible PCTs is listed in Table 12.

SVTM (DCCEEW 2020, Figure 14) mapping shows PCT 277 mapped in close proximity to the subject land, approximately 817 m and 576 m to the east of the subject land suggesting the potential for the PCT to occur within the subject lot.

However, the occurrence of this PCT within the Category 2 area of the western part of the subject land was in the form of stand-alone canopy trees along a fence line (Figure 20 shows 2 of the 3 trees in this western patches of this vegetation zone).

Table 11. PCT Justification for the vegetation within the subject land

Possible PCT	PCT Name	Justification
PCT 266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	PCT 266 was identified as a potential PCT and is described as a tall woodland with trees to 25 m high dominated by *Eucalyptus albens* (White Box) often as the only tree species. Surveys conducted for this BDAR revealed that *Eucalyptus albens* (White Box) was not the only tree, or even the dominating canopy species. Additionally, the relevant landscape for PCT 266 is described as occurring on hillslopes in low hill or hill landform patterns in the NSW South-western Slopes Bioregion, whereas the vegetation within the subject land was located in a range of landscape features, including on flat open landscapes within the east of the survey area. The hillock area was also clearly not this PCT due to the dominance of *Angophera floribunda.* Therefore this PCT was not selected as occurring within the subject land.
PCT 276	Yellow Box grassy tall woodland on alluvium or parna loams and clays on flats in NSW South Western Slopes Bioregion	While the vegetation contained sparse occurrences of *Eucalyptus melliodora* (Yellow Box), the vegetation within the subject land was dominated by *Angophera floribunda*, *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus albens* (White Box). Additionally, the diagnostic landscape feature associated with this PCT is rich alluvial loam soils on flats, and these soils do not exist in the subject land. Therefore, this PCT was not selected to represent the vegetation within the subject land.
PCT 278	Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion	PCT 278 was identified as possible PCT match for the vegetation within the subject land. PCT 278 is described as a tall open forest or woodland dominated by *Eucalyptus blakelyi* (Blakelys Red Gum) often with *Eucalyptus melliodora* (Yellow Box), *Eucalyptus bridgesiana* (Apple Box) or *Eucalyptus goniocalyx* (Long-leaved Box). While the vegetation within the subject land was dominated by *Eucalyptus blakelyi* (Blakelys Red Gum) and contained occurrences of *Eucalyptus melliodora* (Yellow Box), the vegetation contained a occurrences of *Eucalyptus albens* (White Box). Additionally, this PCT's landscape positioning is described as occuring in gullies and on creek flats in hilly terrain or along creeks on plateaux, which was not the landscape identified within the survey area. Therefore, this PCT was not selected as a match for the vegetation within the subject land.

4.2.2.4. Alignment with TECs

PCT 277 is aligned with NSW BC Act listed TEC *'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*' (DPE 2022a). The PCT 277 vegetation within the subject land is considered to be the TEC as it contains an assemblage of species as outlined in the Final Determination, including *Eucalyptus blakelyi* (Blakely's Red Gum) (TSSC 2020) and *Eucalyptus albens* (White Box), the vegetation. Additionally, a small number of native groundcover species listed within the assemblage of species was found within the vegetation onsite.

4.2.2.5. Alignment with EPBC Act listed ECs

PCT 277 is aligned with EPBC Act listed EC '*White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (DPE 2022a). However, the vegetation within the subject land does not meet the condition class and threshold criteria, as the patch did not contain 20 or more mature trees per hectare or natural regeneration of dominant overstorey eucalyptus.

Figure 20: The two PCT 277 paddock trees within the subject land (background), with Category 1- Exempt Land from the northern portion of the Subject Land in the foreground

Figure 21: The indicative location of the proposed shoulder widening of the Castlereagh Hwy

4.2.3. PCT 281

4.2.3.1. PCT overview

This PCT is described as: *PCT 281: Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion.*

Vegetation formation: KF_CH3 Grassy Woodlands

Vegetation Class: Western Slopes Grassy Woodland

Percent Cleared Value: 67%

BC Status: Generally associated with the Critically Endangered Ecological Community '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 Status: Generally associated with the Critically Endangered Ecological Community, 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland'.

BioNet Vegetation Classification and State Vegetation Type Mapping was used to identify the most likely PCT for each vegetation zoned mapped within the subject land (State Government of NSW and DPE 2023d). This PCT occurs within the subject land in Low Condition Woodland vegetation assemblage.

Vegetation mapped as PCT 281 – Low Condition Woodland was identified as a patch of *Angophora floribunda* (Rough-barked Apple) individuals, with scattered occurrences of *Eucalyptus blakelyi* (Blakely's Red Gum) also present and a subdominant element. This vegetation zone exhibited a highly disturbed (heavily grazed) mid-storey and groundcover layer (Figure 22, Figure 23).

PCT 281 is described in the BioNet Vegetation Classification (BioNet 2022a) as a tall open forest dominated by *Angophora floribunda* (Rough-barked Apple) individuals, usually with *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box), with a sparse shrub layer and a dense to mid-dense ground cover. This description was in alignment to the vegetation present within the subject land. The groundcover layer was characterised by an open pasture land with mixed native and introduced grass, containing both native species, such as *Aristida vagans* (Threeawn Speargrass), *Juncus continuus* and *Bothriochloa macra* (Red-leg Grass), in addition to introduced species *Trifolium repens* (White Clover), *Paspalum dilatatum* (Paspalum) and *Arctotheca calendula* (Capeweed) (Figure 22, Figure 23).

4.2.3.2. Condition states

The vegetation condition present at the time of ecological surveys within the subject land are indicative of historical and current land uses of agricultural and pastoral usage. The condition states are described as 'PCT 281 Low Condition Woodland (1.46 ha)'.

4.2.3.3. Justification of PCT selection

SVTM (DCCEEW 2020) was used to understand locally mapped PCT's and identify the most likely PCT for the vegetation mapped onsite. While SVTM (DCCEEW 2020) did not map PCT 281 as locally occurring, the presence of *Angophora floribunda* (Rough-barked Apple) individuals was a key indicator of PCT 281. While *E. blakelyi* (Blakely's Red Gum) was identified within the areas mapped as PCT 281, occurrences of this species were sporadic and therefore it could not be considered a dominant canopy species. The vegetation description of PCT 281, as stated in the BioNet Vegetation

Classification, occurrences of PCT 281 can vary greatly as a result of historical clearing and fragmentation.

The pasture was mown and/or heavily grazed during the time of assessment. The canopy species were heavily used to determine the PCT, while some sporadic occurrences of native forbs and grasses were also used to verify the determination.

Figure 22: PCT 281: Low Condition Woodland within the central portion of the subject land

Figure 23: Groundcover condition of the vegetation along the western boundary of the PCT 281

4.2.3.4. Alignment with TECs

The vegetation within the subject land is not considered to be the TEC as it does not meet the components as outlined in the Final Determination (TSSC 2020). While the vegetation onsite contains some species listed in the assemblage of species outlined in the NSW Threatened Species Scientific Committee determination, the vegetation within areas mapped as PCT 281 was not dominated by one or more of the diagnostic canopy species listed in the determination: *Eucalyptus albens* (White Box), *E. melliodora* (Yellow Box) and *E. blakelyi* (Blakely's Red Gum).

4.2.3.5. Alignment with EPBC Act listed ECs

The Commonwealth Approved Conservation Advice for the 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland' outlines certain thresholds that the vegetation must meet in order to be considered the TEC, including key diagnostic requirements, patch size, condition classes and thresholds.

The vegetation within the subject land does not meet the condition class and threshold criteria, as the patch did not contain 20 or more mature trees per hectare or natural regeneration of dominant overstorey eucalyptus.

4.3. Vegetation integrity (vegetation condition)

4.3.1. Vegetation integrity survey plots

In accordance with the BAM (DPE 2020), two floristic plots were established within the subject land as part of this BDAR. One plot was established in VZ 1a. PCT 281 - Woodland (low condition), one plot was established in VZ 2a. PCT 277 - Woodland (moderate condition).

The boundaries of the 50 x 20 plot locations are shown in Figure 10. Vegetation condition attribute data recorded included species, counts, percent cover, and vegetation type. These data were entered into the BAM-C for each plot to determine the vegetation integrity scores (VIS) for PCT 281 and PCT 277.

BAM data recorded onsite was used for Function Condition score calculations in the BAM-C. However, for HBTs, a survey of HBTs within 100 m of the subject land (the survey buffer) was undertaken separate to the vegetation plot surveys using a GNSS GPS with maximum on-ground accuracy of +/-10 cm in optimal conditions. A count of all HBTs within the associated 20 x 50m BAM plot was then undertaken. The resulting counts were entered into the BAM-C.

Patch size was assessed as being >100 ha.

The area of PCT 281 was entered as 1.46 ha of Low Condition Woodland and PCT 277 was entered as 0.08 ha of Low Condition Woodland in the BAM-C.

Table 12: Vegetation Integrity Score Details

VI Element	PCT 281 – Low Condition Woodland	PCT 277 – Moderate Condition Woodland
Condition Class	Low	Moderate
Composition condition score	20.7	22
Structure condition score	1.1	66
Function condition score	54.4	38.4
Vegetation integrity score (Current)	10.6	38.2
Vegetation integrity score (Future)	0	0
Threshold for Requiring an Offset	≥17	≥15
Offset Required?	No	Yes

5 Habitat suitability for threatened species

5.1. Identification of threatened species for assessment

The BAM-C generates a list of threatened species requiring assessment utilising a number of variables. The following criteria have been utilised to predict the threatened species requiring further assessment:

- IBRA Region: NSW South Western Slopes
- IBRA Subregion: Inland Slopes
- NSW (Mitchell) Landscape: Gulgong Ranges
- Associated PCTs: PCT 281 and PCT 277
- Percent native vegetation cover in the assessment area: 5.08% of the Assessment Area (1500 m buffer)
- Patch size: 8 ha
- Credit type: ecosystem and/or species credit species; and
- Presence of watercourses and wetlands: Not present

Based on the above variables (and additional species manually added) the BAM-C generated a list of 18 ecosystem credit species', 20 'species credit species' including 5 'dual credit species' that are considered as ecosystem credit species for their foraging habitat and as species credit species for their breeding habitat. Additionally, an assessment of likelihood of occurrence for threatened species was conducted as identified through extensive desktop searches (refer to Appendix G). These results were used in conjunction with the development of the BDAR and also used to inform the threatened species surveys within the subject land.

5.2. Ecosystem credit species

5.2.1. Overview

A total of 18 ecosystem credit species are predicted, including five (5) dual credit species as per the BAM Calculator results (DPE 2020b; Table 13). Table 13 lists the ecosystem credit species associate with the two PCTs within the subject land that wee retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. All ecosystem credit species have been retained in the assessment.

Table 13: Ecosystem credit species from the BAM-C.

	Common Name	*Species Scientific Name*	Relevant PCT	Vegetation Zone	Threatened Status*		Sensitivity to gain class	Retained in the assessment?
					BC Act	EPBC Act		
1	Regent Honeyeater (Foraging)	*Anthochaera phrygia*	PCT 281 and PCT 277	VZ 1a and VZ 2a	CE	CE	High	Yes
2	Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	Moderate	Yes
3	Speckled Warbler	*Chthonicola sagittata*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	High	Yes
4	Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	V	High	Yes
5	Spotted-tailed Quoll	*Dasyurus maculatus*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	E	High	Yes
6	Black Falcon	*Falco subniger*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	Moderate	Yes
7	Little Lorikeet	*Glossopsitta pusilla*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	High	Yes
8	White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	High	Yes
9	White-throated Needletail	*Hirundapus caudacutus*	PCT 281 and PCT 277	VZ 1a and VZ 2a	NL	V	High	Yes
10	Swift Parrot (Foraging)	*Lathamus discolor*	PCT 281 and PCT 277	VZ 1a and VZ 2a	E	CE	Moderate	Yes
11	South-eastern Hooded Robin	*Melanodryas cucullata cucullata*	PCT 281 and PCT 277	VZ 1a and VZ 2a	E	E	Moderate	Yes
12	Large Bent-winged Bat (Foraging)	*Miniopterus orianae oceanensis*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	High	Yes
13	Scarlet Robin	*Petroica boodang*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	Moderate	Yes
14	Flame Robin	*Petroica phoenicea*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	Moderate	Yes
15	Superb Parrot (Foraging)	*Polytelis swainsonii*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	V	Moderate	Yes
16	Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	NL	Moderate	Yes
17	Grey-headed Flying-fox (foraging)	*Pteropus poliocephalus*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	V	High	Yes
18	Diamond Firetail	*Stagonopleura guttata*	PCT 281 and PCT 277	VZ 1a and VZ 2a	V	V	Moderate	Yes

* V = Vulnerable, E = Endangered, CE = Critically Endangered, NL = Not Listed

5.2.2. Justification for removal

No Ecosystem Credit Species were excluded from further assessment based on the basis of habitat constraints outlined in the BAM C (Section 5.2; DPE 2020b).

5.2.3. Presence of Ecosystem Credit species

Bat surveys were conducted by Bower Ecology and the analysis of ANABAT recordings by Balance Environmental showed probable calls of the Large Bent-winged Bat (*Miniopterus orianae oceanensis*). The Large Bent-winged Bat is an ecosystem credit species for foraging habitat and a species credit species for breeding habitat. The species has been retained within the assessment as an ecosystem credit species. No other ecosystem credit species were found to occur within the subject land during the field surveys.

5.3. Species credit species

5.3.1. Overview

A total of 28 species credit species were listed as candidate species in the BAM-C, including five (5) dual credit species which are considered as species credit species for their breeding or important habitat. These are listed in Table 14 (fauna) and Table 15 (flora).

Table 14: Candidate Fauna Species Credit Species.

	Common Name	Species Scientific Name	Threatened Status*		Biodiversity Risk Weighting	Retained in the assessment?
			BC Act	EPBC Act		
1	Regent Honeyeater (Breeding)	*Anthochaera phrygia*	CE	CE	3	No
2	Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	2	Yes
3	Striped Legless Lizard	*Delma impar*	V	V	1.5	Yes
4	White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	V	NL	2	Yes
5	Key's Matchstick Grasshopper	*Keyacris scurra*	E	E	2	Yes
6	Swift Parrot (Breeding)	*Lathamus discolor*	E	CE	3	Yes
7	Booroolong Frog	*Litoria booroolongensis*	E	E	2	No
8	Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	V	NL	3	No
9	Southern Myotis	*Myotis macropus*	V	NL	2	Yes
10	Squirrel Glider	*Petaurus norfolcensis*	V	NL	2	Yes
11	Squirrel Glider in the Wagga Wagga LGA	*Petaurus norfolcensis* - endangered population	E	NL	2	No
12	Brush-tailed Phascogale	*Phascogale tapoatafa*	V	NL	2	Yes
13	Koala	*Phascolarctos cinereus*	E	E	2	Yes
14	Superb Parrot (Breeding)	*Polytelis swainsonii*	V	V	2	Yes
15	Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	V	V	2	No
16	Golden Sun Moth	*Synemon plana*	V	V	1.5	Yes

* V = Vulnerable, E = Endangered, CE = Critically Endangered, NL = Not Listed

Table 15: Candidate Flora Species Credit Species.

	Common Name	Species Scientific Name	Threatened Status*		Biodiversity Risk Weighting	Retained in the assessment?
			BC Act	EPBC Act		
1	Bluegrass	*Dichanthium setosum*	V	V	2	Yes
2	Ausfeld's Wattle	*Acacia ausfeldii*	V	NL	2	Yes
3	Yass Daisy	*Ammobium craspedioides*	V	V	2	Yes
4	Small Scurf-pea	*Cullen parvum*	E	NL	2	Yes
5	Euphrasia arguta	*Euphrasia arguta*	CE	CE	3	Yes
6	Tumut Grevillea	*Grevillea wilkinsonii*	CE	CE	3	Yes
7	Cotoneaster Pomaderris	*Pomaderris cotoneaster*	E	E	2	Yes
8	Tarengo Leek Orchid	*Prasophyllum petilum*	E	E	2	Yes
9	Prasophyllum sp. Wybong	*Prasophyllum sp. Wybong*	NL	CE	3	Yes
10	Small Purple-pea	*Swainsona recta*	E	E	2	Yes
11	Silky Swainson-pea	*Swainsona sericea*	V	NL	2	Yes

* V = Vulnerable, E = Endangered, CE = Critically Endangered, NL = Not Listed

5.3.2. Justification of removal

Table 16 and Table 17 lists the candidate species within the subject land, and whether they have been retained within the assessment following consideration of habitat constraints, geographic limitations, vagrancy and quality of microhabitats. Of the assessed predicted species, fifteen have been retained for further assessment and six (6) removed from consideration. Justification is provided below Table 16 and Table 17 for species that have been removed from the assessment in accordance with Steps 1-3 of Section 5.2 of the BAM. All species not removed from consideration (i.e. retained in the assessment) are by default species credit species that require further assessment.

Table 16: Habitat constraints for candidate fauna species.

Common Name	Species Scientific Name	Credit Class*	Habitat Constraint (DPE 2023c)	Assessment
Regent Honeyeater (Breeding)	*Anthochaera phrygia*	S	As per Important Habitat Map.	No suitable breeding habitat present.
Pink-tailed Legless Lizard	*Aprasia parapulchella*	S	Rocky areas or within 50m of rocky areas.	Survey required.
South-eastern Glossy Black-Cockatoo (Breeding)	*Calyptorhynchus lathami lathami*	S/E	Hollow bearing trees: a living or dead tree with a hollow >15 cm diameter that occurs >8 metres above the ground.	Survey required.
Striped Legless Lizard	*Delma impar*	S	None.	Survey required.
White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	S/E	Other; Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Survey required.
Key's Matchstick Grasshopper	*Keyacris scurra*	S	None.	Survey required.
Swift Parrot (Breeding)	*Lathamus discolor*	S/E	As per Important Habitat Map.	No suitable breeding habitat present.
Booroolong Frog	*Litoria booroolongensis*	S	None.	No suitable breeding habitat present.
Large Bent-winged Bat (Breeding)	*Miniopterus orianae oceanensis*	S/E	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave; " observation type code "E nest-roost; " with numbers of individuals >500	No suitable breeding habitat present.
Southern Myotis	*Myotis macropus*	S	Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site	Survey required.
Squirrel Glider	*Petaurus norfolcensis*	S/E	None.	Survey required.
Squirrel Glider in the Wagga Wagga Local Government Area	*Petaurus norfolcensis-endangered population*	S/E	None.	No survey required – not in Wagga Wagga LGA.
Brush-tailed Phascogale	*Phascogale tapoatafa*	S	None.	Survey required.
Koala	*Phascolarctos cinereus*	S	Presence of koala use trees - refer to Survey Comments field in TBDC.	Survey required.
Superb Parrot (Breeding)	*Polytelis swainsonii*	S	Hollow bearing trees: Living or dead E. *blakelyi, E. melliodora*,	Survey required.

Common Name	Species Scientific Name	Credit Class*	Habitat Constraint (DPE 2023c)	Assessment
			E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta, E. bridgesiana with hollows greater than 5cm diameter that are greater than 4m above ground or trees with a DBH of greater than 30cm	
Grey-headed Flying-fox (Breeding)	*Pteropus poliocephalus*	S/E	Other; Breeding camps	No further survey required as survey required breeding camps were not present.
Golden Sun Moth	*Synemon plana*	S	Other; Wallaby grass (Rytidosperma sp), Speargrass (Austrostipa sp) or Chilean needlegrass (Nassella neesiana))	Survey required.

*S = Species Credit Species, E = Ecosystem Credit Species, S/E = Dual Credit Species

Table 17: Habitat constraints for candidate flora species.

Common Name	Species Scientific Name	Credit Class*	Habitat Constraint (DPE 2023c)	Assessment
Bluegrass	*Dichanthium setosum*	S	None.	Survey required.
Ausfeld's Wattle	*Acacia ausfeldii*	S	Other; Footslopes and low rises on sandstone	Survey required.
Yass Daisy	*Ammobium craspedioides*	S	None.	Survey required.
Small Scurf-pea	*Cullen parvum*	S	None.	Survey required.
Euphrasia arguta	*Euphrasia arguta*	S	None.	Survey required.
Tumut Grevillea	*Grevillea wilkinsonii*	S	None.	Survey required.
Cotoneaster Pomaderris	*Pomaderris cotoneaster*	S	None.	Survey required.
Tarengo Leek Orchid	*Prasophyllum petilum*	S	None.	Survey required.
Prasophyllum sp. Wybong	*Prasophyllum sp. Wybong*	S	None.	Survey required.
Small Purple-pea	*Swainsona recta*	S	None.	Survey required.
Silky Swainson-pea	*Swainsona sericea*	S	None.	Survey required.

*S = Species Credit Species, E = Ecosystem Credit Species, S/E = Dual Credit Species

Based on habitat constraints and/or lack of microhabitats, as well the as the known ecological of the species (refer to the TBPDC and BioNet Atlas), six fauna species in Table 16 (shaded grey) were excluded, as follows:

- *Anthochaera phrygia* (Regent Honeyeater) and *Lathamus discolor* (Swift Parrot) were excluded as the subject land is not mapped on the species' Important Habitat Map.
- *Litoria booroolongensis* (Booroolong Frog) was excluded due to a lack of microhabitats within the subject land.
- *Pteropus poliocephalus* (Grey-headed Flying-fox) was excluded due to the lack of breeding camps observed within the subject land. Additionally, the nearest known active Grey-headed Flying-fox camp is located approximately 29 km north of the site, making it unlikely that the species would utilise the site for breeding purposes.
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat [Breeding]) was excluded due to the lack of caves within the subject land.
- *Petaurus norfolcensis* - endangered population (Squirrel Glider in the Wagga Wagga Local Government Area) was excluded as the subject land falls outside the Wagga Wagga LGA, making it unlikely that the species would utilise the site.

5.3.3. Presence of candidate species credit species

This section contains a list of species requiring further assessment, including the species' descriptions, and listed habitat constraints or microhabitats from the Office of Environment and Heritage (OEH) Threatened species profiles and TBDC / BioNet Atlas (DPE 2023b). Relevant survey methods are then discussed in Section 2.5.

5.3.3.1. Acacia ausfeldii – Ausfeld's Wattle

The Ausfeld's Wattle is a spreading shrub 2-4m in height with long narrow leaves. Two or 3 flower clusters stem from the leaf axil. Flower heads are bright yellow and 6 - 8 mm in diameter. Seed pods are straight or slightly curved and 4 - 9 cm long by 2 - 4 mm wide.

The species is found to the east of Dubbo in the Mudgee-Ulan-Gulgong area of the NSW Southwestern Slopes bioregion, with some records in the adjoining Brigalow Belt South, Southeastern Highlands and the Sydney Basin bioregions. A large population is also known from

Tuckland State Forest, approximately 6km west from the subject land. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.2. Ammonbium craspedioides – Yass Daisy

The Yass Daisy is a rosette-forming perennial. The spring flowerheads are hemispherical buttons, to 20 mm wide, and surrounded at the base by papery leaf-like structures (bracts). The solitary flowerheads are borne on unbranched stems to 60 cm tall; the stems are sparsely leafed and edged with narrow "wings". Rosettes die off after fruiting.

The species is found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the Southwestern Slopes. Most populations are in the Yass region. Habitat for the Yass Daisy include secondary derived grassland and grazing land both of which are found within the subject land. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. Despite this, there is a very low likelihood of the species occurring within the site due to the highly disturbed nature and long history of grazing within the subject land. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.3. Aprasia parapulchella – Pink-tailed Legless Lizard

The Pink-tailed Legless Lizard is worm-like, with a dark-brown head and nape, gradually merging with the pale grey or grey-brown body. The tail is pink or reddish-brown towards the tip. The species grows to approximately 25cm in length.

The Pink-tailed Legless Lizard is primarily known from the Central and Southern Tablelands and the Southwestern Slopes, with a confirmed outlier record on the Hay Plains north of Hay. The species inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (*Themeda australis*).

As per the survey guidelines (DCCEEW 2010), 3 hours of targeted searches within suitable rocky habitat for the species were conducted. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. However, surveys were undertaken only 2 weeks prior to the first recommended survey month (being September) and suitable weather/temperatures were present during survey.

These surveys did not detect the species within the subject land and therefore it is not considered further. See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.4. Cullen parvam – Small Scruf-pea

The Small Scurf-pea is a small perennial pea that may either trail or stand erect. Its leaves comprise three elongated leaflets to 25 mm long by 8 mm wide. Its flowers are usually also in threes, purple, pink (or sometimes white), appearing in summer.

The species has a patchy distribution throughout southern NSW and Victoria. Extensive suitable habitat probably occurs across the border in NSW. Populations are found in open grassland or River Red Gum or Box-Gum Woodland and grazed land. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not

considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.5. Delma impar – Striped Legless Lizard

The stripped Legless Lizard is pale grey, brown above, with a darker head, and almost white below. The most distinguishing characteristic is a pattern of light and dark parallel lines running along the length of the body. They grow to about 30 cm in length, with up to three-quarters of this being the tail.

The Striped Legless Lizard occurs in the Southern Tablelands, the Southwest Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Common habitat included grassland dominated by perennial, tussock-forming grasses such as Kangaroo Grass (*Themeda australis*), spear-grasses (*Austrostipa* spp.) and poa tussocks (Poa spp.).

As per the survey guidelines (DCCEEW 2010), 3 hours of targeted searches within suitable rocky habitat for the species were conducted, which did not detect the species within the subject land and therefore it is not considered further. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. However, surveys were undertaken only 2 weeks prior to the first recommended survey month (being September) and conducted in the grass tussock habitat to optimise species detection.

See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.6. Dichanthium setosum- Bluegrass

Bluegrass is an upright grass less than 1 m tall. It has mostly hairless leaves about 2-3 mm wide. Flowers are densely hairy and are clustered together along a stalk in a cylinder-shape, growing in pairs.

Bluegrass occurs on the New England Tablelands, Northwest Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Habitat can include highly disturbed pasture and grazed lands. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.7. Euphrasia arguta - Euphrasia arguta

Euphrasia arguta is an erect annual herb ranging in height from 20-35 cm. Its branches are densely covered with stiff hairs and the leaf margins usually have 2-4 pairs of teeth. The flowers vary in colour from white to lilac with yellow and are borne on flower spikes of 50 to 90 flowers.

The species has a small patchy distribution in Nundle area of the NSW northwestern slopes. The predicted distribution ranges from the Southern Western slopes of NSW to the North Coast. Historical records show distribution across grasslands and grazed country. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.8. Grevillea wilkinsonii - Tumut Grevillea

The Tumut Grevillea typically grows to a large spreading shrub up to 2.5 m tall and 2 m wide. The individual flowers are small and distinctive, with pinkish to purple petals and a lilac-pink, green or

yellow tipped style. The fruits are woody capsules to 9 mm long; splitting lengthways to release one (rarely two) ovoid dark-brown seed 5-6.5mm long.

The Tumut Grevillea has a highly restricted distribution in the NSW South-west Slopes region. Its main occurrence is along a 6 km stretch of the Goobarragandra River approximately 20 km east of Tumut. Extensive site meanders including 10-20 m spaced transects did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further.

5.3.3.9. Haliaeetus leucogaster – White-bellied Sea-Eagle

The White-bellied Sea-Eagle is a large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey. The large, hooked bill is grey with a darker tip, and the eye is dark brown. The legs and feet are cream-white, with long black talons.

The White-bellied Sea-eagle it is widespread along the east coast, and along all major inland rivers and waterways in northern NSW. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. As per the survey guidelines (DPE 2023b), targeted searches within potential breeding habitat within the subject land was conducted. Additionally, extensive site meanders including 5.5 hours of diurnal bird surveys were conducted which did not detect the species within the subject land. No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for further information regarding threatened species survey effort across the subject land.

5.3.3.10. Keyacris scurra - Key's Matchstick Grasshopper

Key's Matchstick Grasshopper is a small, slender, wingless grasshopper characterised by its slanted face and sword-shaped antennae. Males are approximately 18mm in length and females 25mm. The species occurs in various colours, the most common being brown.

The species is found in native grassland and open woodland common with Kangaroo Grass (*Themeda australis*). It is distributed throughout southern NSW and ACT with its northern boundaries in the NSW Central Tablelands and Slopes. As per the survey guidelines (DPE 2023b), Extensive site meanders within the subject land during threatened flora transects did not detect the species or the presence of their stick nests used for breeding and therefore the species was not considered further. See Table 18 for further information regarding threatened species survey effort across the subject land.

5.3.3.11. Myotis macropus - Southern Myotis

The Southern Myotis disproportionately large feet; more than 8 mm long, with widely spaced toes which are distinctly hairy and with long, curved claws. It has dark grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm.

The species is found in the coastal band along eastern Australia. Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage.

As per the survey guidelines (DPE 2020), 3 Anabat traps were deployed in suitable habitat with an aim to detect this species. Cameras were deployed 20th of August 2024 and collected on the 17th of

September 2024 (29 nights), with no evidence of the species within the subject land indicated by these traps. Additionally, 6.1 hours of spotlighting was conducted throughout the site. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. Despite this, Anabat survey targeted the potential habitat (2 farm dams) and the recommended survey period for this species would be less relevant as the species forages year round.

No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.12. Petaurus norfolcensis - Squirrel Glider

The Squirrel Glider has a head and body length of about 20 cm. They have blue grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length.

The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. It can be found in open forests and woodlands especially box-ironbark and riparian woodlands. They live in tree hollows, generally in eucalyptus and create cup-shaped, leaf-lined nests in tree hollows (dens). Scattered Eucalyptus and Angophora individuals were identified within the subject land and therefore there is a low potential for the species to utilise the site.

As per the survey guidelines (DPE 2020), 3 camera traps were deployed in suitable habitat with an aim to detect this species. Cameras were deployed 20th of August 2024 and collected on the 17th of September 2024 (29 nights), with no evidence of the species within the subject land indicated by these traps. Additionally, 6.1 hours of spotlighting was conducted throughout the site. No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.13. Phascogale tapoatafa - Brush-tailed Phascogale

The Brush-tailed Phascogale is tree-dwelling marsupial carnivore. It has a characteristic, black, bushy ‘bottlebrush’ tail, with hairs up to 4 cm long. Its fur is grey above and pale cream below and it has conspicuous black eyes and large naked ears. Adults have a head and body length of about 20 cm, a tail length of about 20 cm and weigh 110 - 235 grams.

The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. It can be found in dry open sclerophyll forest as well as swamps, rainforests and wet sclerophyll forests. Scattered Eucalyptus and Angophora individuals were identified within the subject land and therefore there is a low potential for the species to utilise the site.

As per the survey guidelines (DPE 2020), 3 camera traps were deployed in suitable habitat with an aim to detect this species. Cameras were deployed 20th of August 2024 and collected on the 17th of September 2024 (29 nights), with no evidence of the species within the subject land indicated by these traps. Additionally, 6.1 hours of spotlighting was conducted throughout the site. No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.14. Phascolarctos cinereus – Koala

The Koala is an arboreal marsupial with fur ranging from grey to brown above, and white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 – 8 kg. During breeding, males advertise with loud snarling coughs and bellows.

The Koala has a fragmented distribution throughout eastern Australia within eucalypt woodlands and forests. The koala feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. The subject land contained five (5) of these koala use species, Angophora floribunda (Rough-barked Apple), Eucalyptus albens (White Box), Eucalyptus blakelyi (Blakely's Red Gum), Eucalyptus melliodora (Yellow Box) and Eucalyptus moluccana (Grey Box), so attention was paid to surveying for the species. As per the survey guidelines (DPE 2022), one (1) SAT was conducted within suitable habitat where no koala prescence was detected. Additionally, 3 camera traps were deployed in suitable habitat with an aim to detect this species. Cameras were deployed 20th of August 2024 and collected on the 17th of September 2024 (29 nights). No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for a summary of the targeted threatened fauna survey methodology.

5.3.3.15. Polytelis swainsonii – Superb Parrot (Breeding)

The Superb Parrot is a distinctive large, bright grass-green parrot with a long, narrow tail and sharply back-angled wings in flight. Males have yellow foreheads and throats and a red crescent that separates the throat from the green breast and belly. Females are slightly duller green and have a dull, light blue wash.

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. Breeding sites include the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers. Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground.

As per the survey guidelines (DPE 2023b), targeted searches within potential breeding habitat within the subject land was conducted. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. Despite this, there is a very low likelihood of the species occurring within the site due to the highly disturbed nature and long history of grazing within the subject land.

Additionally, extensive site meanders including 5.5 hours of diurnal bird surveys were conducted which did not detect the species within the subject land. No evidence of the species was indicated by surveys conducted within the subject site and therefore the species is not considered further. See Table 18 for further information regarding threatened species survey effort across the subject land.

5.3.3.16. Pomaderris cotoneaster – Cotoneater Pomaderris

Cotoneaster Pomaderris is a shrub growing to 4 m tall. Its young stems have a covering of short, white, star-shaped hairs. The upper surface of the leaf is bristly, and the lower surface has a fine white mat of star-shaped hairs. Its petal-less flowers are cream-coloured and flower between October and November.

Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.17. Prasophyllum petilum- Tarengo Leek Orchid

Tarengo Leek Orchid reaches to 35 cm tall. This species can be distinguished from the more common onion orchids that grow in its habitat by the pinkish-purple base to the leaf. The flower-stem emerges in mid spring to early summer from a hole near the base of the leaf.

Distribution spans the NSW South-west Slopes region growing in open grassland and grassy woodland. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. While this species was not surveyed during the recommended survey months, the disturbed nature and long history of grazing within the subject land means the likelihood of this species presence is very low. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.18. Prasophyllum sp. Wybong - Prasophyllum Wybong

Prasophyllum Wybong is a terrestrial orchid that grows to approximately 30 cm high. It has a single dull-green basal leaf that is tubular and fleshy. The single flower spike has numerous fragrant flowers.

Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Known to occur in open eucalypt woodland and grassland. Extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. While this species was not surveyed during the recommended survey months, the disturbed nature and long history of grazing within the subject land means the likelihood of this species presence is very low. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.19. Swainsona recta – Small Purple-pea

Small Purple-pea is a slender, erect perennial herb growing to 30 cm tall. It bears one to several sprays of between 10 and 20 purple, pea-shaped flowers. Flowers are followed by pods up to 10 mm long in summer.

This species has a wide distribution throughout the NSW Southwestern Slopes and the ACT, its predicted distribution ranges as far north as Goondiwindi. It grows in association with understorey dominants such as Kangaroo Grass (*Themeda australis*), spear-grasses (*Austrostipa* spp.) and poa tussocks (Poa spp.). As per the survey guidelines (DPE 2023b), extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.20. Swainsona sericea – Silky Swainson-pea

The Silky Swainson-pea is a prostrate or erect perennial, growing to 10 cm tall. The stems and leaves are densely hairy. The purple pea-shaped flowers are to 11 mm long and are held in groups of up to 8 flowers, on a stem to 10 cm tall.

The species has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. Found in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro. As per the survey guidelines (DPE 2023b), extensive site meanders including 10-20 m spaced transects and VI plots did not detect the species within the

subject land and therefore it is not considered further. See Table 19 for a summary of the targeted threatened flora survey methodology.

5.3.3.21. Synemon plana – Golden Sun Moth

The Golden Sun Moth medium-sized, day-flying (diurnal) moth. The female's upper side of the forewing is dark grey, patterned with paler grey, and the hindwing is bright orange with black spots near the edge. The male's upper side of the forewing is dark brown, patterned with pale grey, and the hindwing is bronzy-brown with dark brown patches.

The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. It occurs in natural temperate grassland and grassy woodland. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses (*Austrostipa* spp.) or Kangaroo Grass (*Themeda australis*).

As per the survey guidelines (DPE 2023b), Extensive site meanders within the subject land during threatened flora transects did not detect the species or the presence of their stick nests used for breeding. It should be noted that there is a limitation surrounding the potential presence of the species within the subject land as it was not surveyed for during the recommended survey months. Despite this, there is a very low likelihood of the species occurring within the site due to the highly disturbed nature and long history of grazing within the subject land and surveys were conducted in accordance with the survey guidelines. Therefore the species was not considered further. See Table 18 for further information regarding threatened species survey effort across the subject land.

5.4. Threatened species surveys

Targeted threatened species surveys were used to determine the presence of the species as outlined in Table 18 and Table 19.

Table 18: Fauna Survey Specification

Common Name	Scientific Name	Survey Methodology	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (total hours & no. people)	Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
Pink-tailed Legless Lizard	*Aprasia parapulchella*	Surveyed through targeted reptile searches.	☐ Yes	☒ No	3 hours with 2 observers	No	No
Striped Legless Lizard	*Delma impar*	Surveyed through targeted reptile searches.	☐ Yes	☒ No	5.5 hours with 1 observer	No	No
White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	Surveyed via habitat assessment and 4x dawn bird surveys.	☒ Yes	☐ No	5.5 hours with 2 observers	No	No
Key's Matchstick Grasshopper	*Keyacris scurra*	Surveyed through visual surveys.	☒ Yes	☐ No	5.5 hours with 1 observer	No	No
Southern Myotis	*Myotis macropus*	Surveyed via habitat assessment, spotlighting and Anabat trapping in accordance with survey guidelines.	☐ Yes	☒ No	6.1 hours with 2 observers	No	No
Squirrel Glider	*Petaurus norfolcensis*	Surveyed via habitat assessment, spotlighting and camera trapping in accordance with survey guidelines.	☒ Yes	☐ No	Spotlighting was conducted over 6.1 hours with 2 observers. Camera traps were left for 4 weeks.	No	No
Brush-tailed Phascogale	*Phascogale tapoatafa*	As above.	☒ Yes	☐ No	Spotlighting was conducted over 6.1 hours with 2 observers. Camera traps were left for 4 weeks.	No	No
Koala	*Phascolarctos cinereus*	Surveyed via habitat assessment, ground searches, spotlighting and camera trapping.	☒ Yes	☐ No	Spotlighting was conducted over 6.1 hours with 2 observers. 1 SAT survey was conducted.	No	No
Superb Parrot (Breeding)	*Polytelis swainsonii*	Surveyed via habitat assessment and 4x dawn bird surveys.	☐ Yes	☒ No	5.5 hours with 2 observers	No	No
Golden Sun Moth	*Synemon plana*	Spotlighting and visual searches were conducted.	☐ Yes	☒ No	6.1 hours with 2 observers	No	No

Table 19: Threatened Flora Surveys

Common Name	Scientific Name	Survey Methodology	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)	Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
Ausfeld's Wattle	*Acacia ausfeldii*	Surveyed through visual surveys.	☐ Yes	☐ No	3 hours with 1 observers	No	No
Yass Daisy	*Ammobium craspedioides*	Surveyed through visual surveys.	☐ Yes	☒ No	3 hours with 1 observers	No	No
Small Scurf-pea	*Cullen parvum*	Surveyed via habitat assessment and 4x dawn bird surveys.	☒ Yes	☐ No	3 hours with 1 observers	No	No
Bluegrass	*Dichanthium setosum*	Surveyed through visual surveys.	☒ Yes	☐ No	3 hours with 1 observers	No	No
Tumut Grevillea	*Grevillea wilkinsonii*	Surveyed via habitat assessment, spotlighting and Anabat trapping in accordance with survey guidelines.	☐ Yes	☒ No	3 hours with 1 observers	No	No
Tarengo Leek Orchid	*Prasophyllum petilum*	Surveyed via habitat assessment, spotlighting and camera trapping in accordance with survey guidelines.	☐ Yes	☒ No	3 hours with 1 observers	No	No
Prasophyllum sp. Wybong	*Prasophyllum sp. Wybong*	As above.	☐ Yes	☒ No	3 hours with 1 observers	No	No
Small Purple-pea	*Swainsona recta*	Surveyed via habitat assessment, ground searches, spotlighting and camera trapping.	☒ Yes	☐ No	3 hours with 1 observers	No	No
Silky Swainson-pea	*Swainsona sericea*	Surveyed via habitat assessment and 4x dawn bird surveys.	☒ Yes	☐ No	3 hours with 1 observers	No	No

5.5. Expert reports

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

5.6. Flora Survey Results:

5.6.1. VI Plot surveys

Plot data is provided in Appendix F. Species, strata, growth form, percent cover, and abundance are detailed in that Appendix also. No threatened flora species were recorded within the floristic plots.

Plot 1 was undertaken in PCT 281 'Low Condition Woodland' vegetation zone and plot 2 within PCT 277: 'Moderate Condition Woodland' (Figure 10).

5.6.2. Threatened Flora

No threatened flora species listed under the BC Act or EPBC Act were identified within the subject land during the threatened for a surveys (Figure 10).

5.7. Fauna survey results

5.7.1. Threatened Fauna

One (1) Vulnerable species listed under the BC Act was identified within the subject land during Anabat monitoring during the 19th – 23rd August (Figure 24). See below for further details.

5.7.2. Anabat Results

A 'Microbat Call Identification Report' (Appendix E) was conducted by Balance Environmental to process and identify Anabat monitoring data. The below table (Table 20) outlines the bats recorded during the 19th-23rd August 2024 at Gulgong Quarry with the location of the Anabat recorders shown on Figure 11.

Only one (1) vulnerable species listed under the BC Act was identified out of ten (10) species. This is *Miniopterus orianae oceanensis* (Large Bent-winged Bat), which is listed under the BC Act as vulnerable. It is not listed under the EPBC Act, however. This species is a dual credit species. That is, whilst foraging it is listed as an ecosystem credit species (when foraging), and where it is within breeding habitat it is listed as a species credit species. Due to the lack of breeding habitat within the subject land and surrounding area, this species has not been included as 'species credit species' in the BOAMS case for this project, however, it is included within the ecosystem credit listing due to the confirmed presence of foraging habitat.

Additionally, a *Nyctophilus* sp. was recorded within the subject area that could not be identified to species level based on the recordings. Only three (3) threatened species within this genus have been recorded as occurring within NSW and therefore have the potential to occur within the subject area, however all three (3) have been excluded from our finalised results because:

- *Nyctophilus howensis* (Lord Howe Island Bat) is considered extinct and is only known from a single skull recording found on Lord Howe Island in 1972; and
- Both *Nyctophilus bifax* (Eastern Long-eared Bat) and *Nyctophilus corbeni* (Corben's Long-eared Bat), which are both listed as Vulnerable under the NSW BC Act, are considered 'ecosystem credit species' and therefore are not required for further investigation.

Furthermore, BioNet data shows that the overwhelming majority (approx. >90%) of *Nyctophilus* records within the wider region (e.g. within 50 km of the subject land) are either *Nyctophilus*

geoffroyi or *Nyctophilus gouldi*, with less than approximately 10% of records being *Nyctophilus corbeni*, and no records of *Nyctophilus bifax.* The nearest BioNet threatened species records is *Nyctophilus corbeni* and this record is approximately 30km east from the subject land, past the town of Ulan in heavily vegetated conservation estate. As it is considered unlikely that the *Nyctophilus* sp. recorded in the Ananbat results is a threatened species, no *Nyctophilus* species have been added to the ecosystem credit species lists within the BOAMS case for this project. (Doing so would also not result in any difference to the credit requirements for the project).

Table 20: Results from Anabat Monitoring (Balance Environmental 2024)

Detector:	583127	605653	660606	Species Total
Positively identified calls				
Chalinolobus gouldii	35	44	10	89
Chalinolobus morio	8	28	2	38
Nyctophilus sp.	2	23	1	26
Scotorepens balstoni		5	1	6
Vespadelus darlingtoni	4	14	7	25
Vespadelus regulus	110	36	240	386
Vespadelus vulturnus	6	2	2	10
Miniopterus orianae oceanensis	18	7	14	39
Austronomus australis	1	9	2	12
Ozimops planiceps	37	48	18	103
Unresolved calls				
C. gouldii or *Ozimops* sp.	121	142	28	291
M. o. oceanensis or *Vespadelus* sp.	366	14	37	417
Ozimops ridei or *O. petersi*	5	9	2	16
V. regulus or *V. vulturnus*	72	18	1	91
Site Total	785	399	365	1549

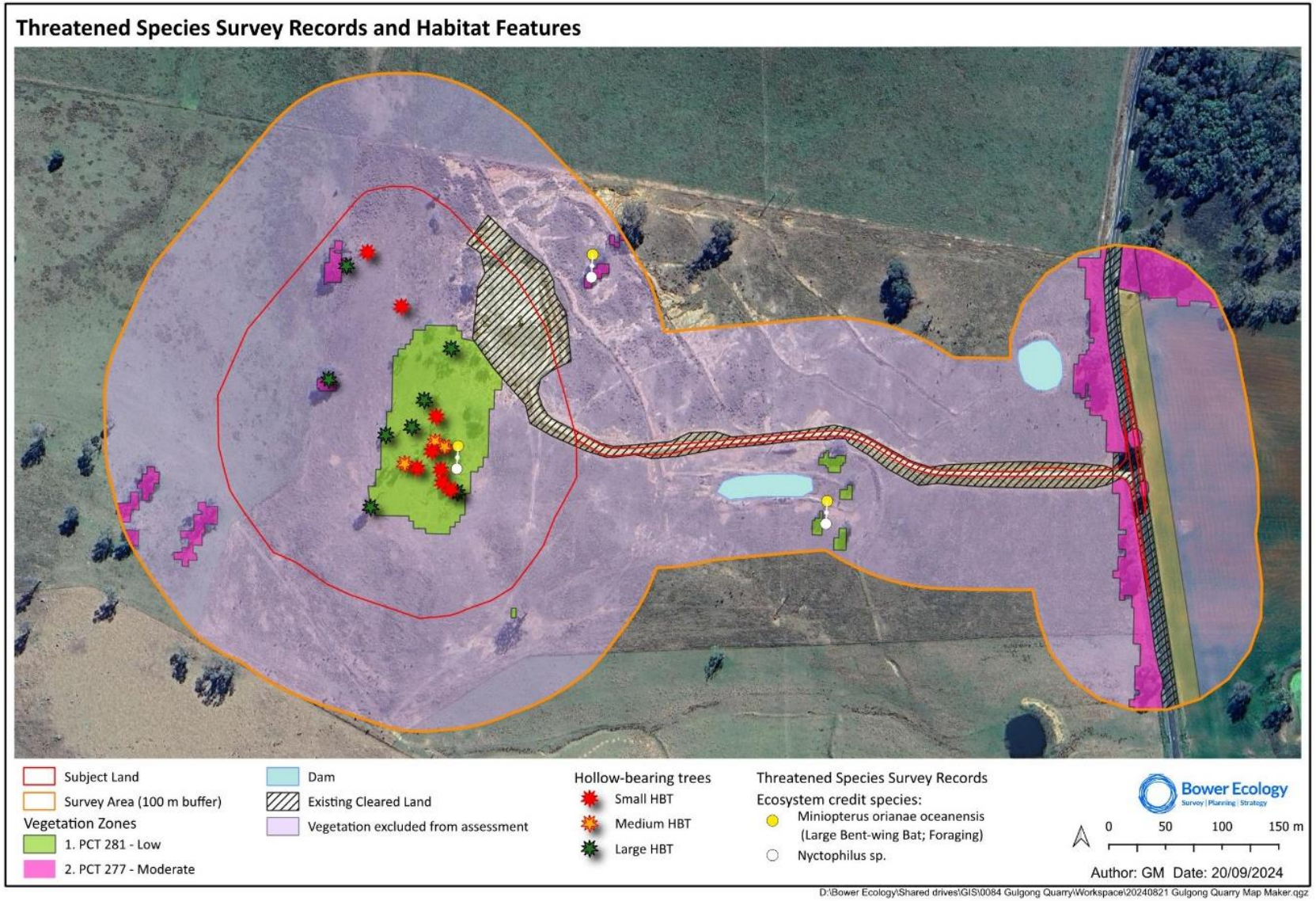

Figure 24: Threatened Species Survey Results

5.7.3. Threatened species in the locality

According to the BioNet Atlas, the following seven threatened fauna species have been recorded within 10 km of the subject land, none of which have been recorded within the subject land, or were recorded during the surveys undertaken for this project:

- *Ninox strenua* (Powerful Owl) – Species Credit Species
- *Climacteris picumnus victoriae* (Brown Treecreeper [eastern subspecies]) – Ecosystem Credit Species
- *Chthonicola sagittata* (Speckled Warbler) – Ecosystem Credit Species
- *Anthochaera phrygia* (Regent Honeyeater) – dual credit species
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler [eastern subspecies]) – Ecosystem Credit
- *Daphoenositta chrysoptera* (Varied Sittella) – Ecosystem Credit
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – Ecosystem Credit

As BioNet records are limited to areas where survey has occurred and has been reported on, it is predicted that other threatened fauna species, including koalas, are very likely to exist in the wider area, but no evidence of these was recorded during surveys or site visits.

5.7.4. Fauna Survey Results

Per Table 21, a total of 26 species of fauna were identified within the survey area, none of which were threatened species, three (3) of which were introduced species. Eight (8) native species were identified through the wildlife camera footage. The majority of these species were common avian species, in addition to two (2) native reptile species and three (3) native mammal species.

Table 21: Fauna Survey Results – species observed

Scientific Name	Common Name	Observation Method	Native Status	BC Act Status	EPBC Act Status
Birds					
Acanthiza nana	Yellow Thornbill	Dawn Bird Survey	Native	NL	NL
Alisterus scapularis	Australian King-Parrot	Dawn Bird Survey	Native	NL	NL
Anas superciliosa	Pacific Black Duck	Incidental sighting	Native	NL	NL
Cacatua galerita	Sulphur-crested Cockatoo	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL
Cacatua sanguinea	Little Corella	Dawn Bird Survey	Native	NL	NL
Chenonetta jubata	Australian Wood Duck	Motion Sensor Camera	Native	NL	NL
Corvus coronoides	Australian Raven	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL
Dacelo novaeguineae	Laughing Kookaburra	Dawn Bird Survey	Native	NL	NL
Eolophus roseicapilla	Galah	Dawn and Dusk Bird Survey	Native	NL	NL
Falco cenchroides	Nankeen Kestrel	Incidental sighting	Native	NL	NL
Grallina cyanoleuca	Magpie-lark	Dawn Bird Survey	Native	NL	NL
Gymnorhina tibicen	Australian Magpie	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL
Hirundo neoxena	Welcome Swallow	Dawn Bird Survey	Native	NL	NL
Manorina melanocephala	Noisy Miner	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL
Myiagra inquieta	Restless Flycatcher	Dawn Bird Survey	Native	NL	NL
Pardalotus punctatus	Spotted Pardalote	Incidental sighting	Native	NL	NL
Platycercus eximius	Eastern Rosella	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL
Psephotus haematonotus	Red-rumped Parrot	Dawn Bird Survey, Dusk Bird Survey and Motion Sensor Camera	Native	NL	NL

Strepera graculina	Pied Currawong	Dawn Bird Survey	Native	NL	NL
Sturnus vulgaris	Common Starling	Dawn and Dusk Bird Survey	Introduced	N/A	
Reptiles					
Pogona barbata	Eastern Water Dragon	Motion Sensor Camera	Native	NL	NL
Pseudonaja textilis	Eastern Brown Snake	Motion Sensor Camera	Native	NL	NL
Mammals					
Antechinus sp.	Unknown Antechinus	Motion Sensor Camera	Native	NL	NL
Sminthopsis murina	Common Dunnart	Motion Sensor Camera	Native	NL	NL
Tachyglossus aculeatus	Short-beaked Echidna	Motion Sensor Camera	Native	NL	NL
Bos taurus	Domestic Cow	Motion Sensor Camera	Introduced	NL	NL
Canis lupus	Wild Dog/Dingo	Motion Sensor Camera	Introduced	NL	NL
Felis catus	Feral Cat	Motion Sensor Camera	Introduced	NL	NL

5.8. Matters of National Environmental Significance (MNES)

PMST searches (Appendix H) identified five (5) Threatened Ecological Communities (TECs), 43 threatened species and 10 migratory species that are predicted to occur on and around the subject land.

No EPBC Act listed threatened or migratory species were identified during surveys undertaken for this BDAR. However, while the subject land was largely determined to be highly disturbed and fragmented due to historical land uses, the scattered large trees within the subject land may provide some (albeit limited) habitat to threatened species.

Regarding the five EPBC Act listed TECS, assessment undertaken as part of this BDAR has determined that the vegetation within the subject land does not conform to any EPBC Act listed TECs, including the TEC the White Box – Yellow Box CEEC Final Determination (DPE 2022). Per Section 4.2, the vegetation within the subject land does not meet the condition class and threshold criteria, as the vegetation did not contain 20 or more mature trees per hectare or natural regeneration of dominant overstorey eucalyptus species.

The assessment undertaken within this BDAR has determined that the project is unlikely to result in a significant impact to MNES, and therefore a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not considered required.

5.9. Area or count, and location of suitable habitat for a species credit species (a species polygon)

Whilst one species credit species (*M. orianae oceanensis*) was recorded within the subject land (Section 5.4), the species was only recorded as 'foraging' within the subject land. For reasons discussed in Section 5.7.2, further assessment of this species is not required.

No other threatened species were observed on site therefore there are no species polygons generated as part of this BDAR.

6 Prescribed Impacts Matters

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development on the habitat of threatened species or ecological communities associated with:
    - karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
    - human-made structures;
    - non-native vegetation;
- Development on areas connecting threatened species habitat, such as movement corridors;
- Development on areas mapped as non-native vegetation;
- Development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or subsidence from underground mining);
- Wind turbine strikes on protected animals; and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

An assessment of the relevance of these prescribed impacts to the project is provided in Table 22. The location of prescribed impacts is shown in Figure 25.

Prescribed impacts that have been identified within the subject land are outlined in Figure 11. These features are also displayed in Figure 25. An assessment of impacts is provided in Section 8.3, whilst how these impacts have been managed and mitigated have been explained further in Section 8.

Table 22: Prescribed impacts matters identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☒Yes / ☐No	Small rocky outcrop along eastern edge of subject land, approximately 4 m in width. Gentle slopes of the central hillock that have scattered rocks which may form suitable habitat for threatened species.	Pink-tailed Legless Lizard

Vehicle strikes	☒Yes / ☐No	Vehicle strike may occur along access road and during quarry works.	All fauna have the potential for vehicle strike. Mitigation measures have been discussed further in Section 8.
Human-made structures	☐Yes / ☒No	N/A	N/A
Non-native vegetation	☒Yes / ☐No	Patches of exotic pasture were identified within the central portion of the subject land and within the driveway polygons. The vegetation identified as Category 1 – exempt land would, on the whole, be considered non-native vegetation.	While no threatened entities were identified during extensive surveys conducted within the subject land, there is still a potential for threatened species to utilise the non-native vegetation in the subject land, even in a transient nature.
Habitat connectivity	☒Yes / ☐No	The PCT 281: Low Condition Woodland identified within the subject land provides low-value habitat connectivity to other scattered trees surrounding the subject land.	While no threatened entities were identified during extensive surveys conducted within the subject land, there is still a potential for threatened species to utilise the site.
Waterbodies, water quality and hydrological processes	☐Yes / ☒No	N/A	N/A
Wind turbine strikes (wind farm development only)	☐Yes / ☒No	N/A	N/A

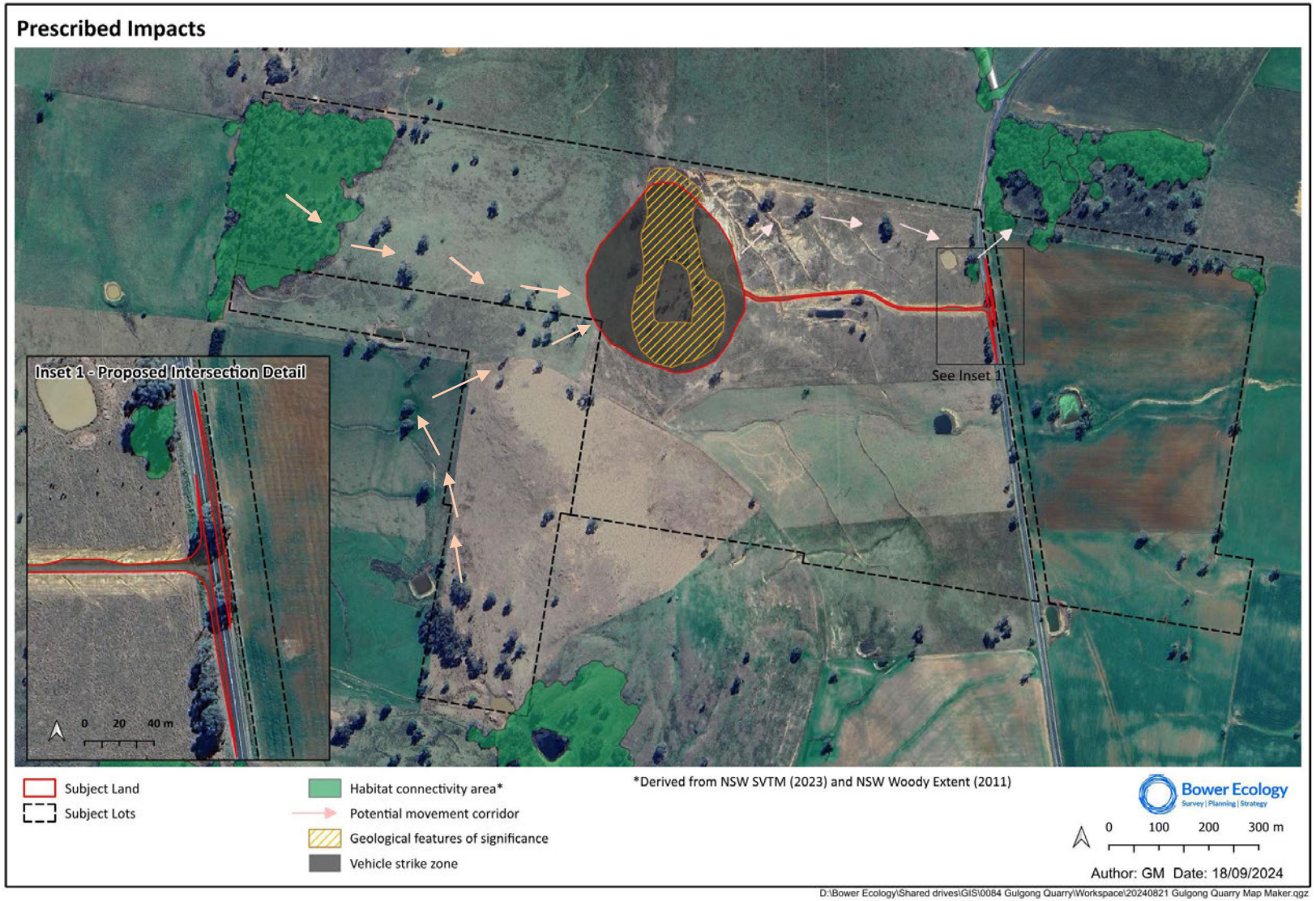

Figure 25: Prescribed Impact Matters

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

7 Avoid and minimise impacts

This Section includes demonstration of efforts to avoid and minimise impacts on biodiversity values identified within the subject land, which includes assessment of direct, indirect and prescribed impacts. Section 7.1.1 of the BAM states that knowledge of biodiversity values from Stage 1 assessment should inform the decision-making process relating to the location of a project. Measures to avoid or minimise impacts from clearing native vegetation and threatened species habitat can include locating the project in areas lacking or with low biodiversity values, avoiding areas mapped on the important habitat map, or avoiding native vegetation that is a TEC. A discussion of the considerations, measures and constraints relevant to avoidance are discussed in the sections below.

7.1. Project Constraints

The proposed project involves quarrying of rock material, and given the nature and purpose of the project, it is limited by the occurrence and location of the rock material available for quarrying. The topographical layout of the landscape within the subject lot is the other limiting factor that can affect the efficiency of the proposed quarrying, as quarrying the positive relief features (e.g. a hillock) can be more efficient as compared to quarrying below the mean surface relief.

7.2. Avoid and minimise impacts through site location and design

7.2.1. Project location

The subject lot has two features of positive relief with one hilly area near the western boundary of the subject lot and the hillock near the central portion of the subject lot. The initial quarry design considered the quarry resource located near the western hillock. However, considering the denser patch of remnant vegetation located at this location the central hillock area was selected for quarrying. This chosen location exhibits relatively sparse woody vegetation and generally offers low biodiversity and habitat value, and low native vegetation cover.

The Project has also been located within an area of land that has been subject to historic disturbances. As shown in Figure 7, the subject land and wider study area has been disturbed since at least 1964. It has been under agricultural use for a long period of time and the native vegetation within the subject land exists only as scattered remnant trees and some native groundcover. The positioning of the development footprint has sought to minimise impacts by placing it within the area previously cleared and dominated by agriculture.

The current quarry plan is closer to the Castlereagh Highway as compared to the western hillock and hence the transport of the extracted rock resources will avoid impact on the entire western part of the subject lot including the remnant vegetation patch near the Western edge. Additionally, as a result of this the project will have reduced carbon footprint for transportation of the quarried rock resource.

The current location of the proposed project minimises the impacts of native vegetation clearing and threatened species habitat by locating the proposal in area of lower biodiversity value. Apart from the hillock that harbours sparse remnant native vegetation, the rest of the development footprint is

located on cleared areas and areas impacted heavily by agriculture resulting in poor biodiversity value.

7.2.2. Project design

The proposed footprint of the development has been purposely designed to avoid and/or minimise both direct and indirect impacts to native vegetation, TECs, threatened species and their habitat by its small size and impact in comparison to the remaining land within the site. The design has focussed on the positive relief feature within the subject lot, thereby maximising the rock resource yield and reducing the total impact area.

The project is designed intentionally to contain areas of existing quarry, access road and driveway. Therefore, the area of impact as a result of the proposed development is reduced and large areas of vegetation will remain throughout the rest of the site. The access track for the transportation of quarried rock material to the Castlereagh Highway is proposed through the already disturbed area, the current access track and is a straight line of minimum distance to the highway, thereby improving the transport efficiency. The approximately oval – circular shape of the quarry footprint placed over the central hillock also ensures minimising the area of disturbance while increasing the yield of the rock resource quarried. The associated temporary infrastructure facilities such as site office will be located within the quarry footprint to avoid additional impacts on the subject lot as no additional area will be disturbed for this. This would be possible as the quarry will be developed in two stages.

In addition to this, the ultimate intention of the proponent is to retain the two mature *E. albens* trees proposed to be impacted due to the shoulder widening of the Castlereagh Hwy, however for conservative reasons, they have been assessed as being removed within this BDAR. The proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

7.2.3. Avoid and Minimise Prescribed Impacts

Geological features of significance, habitat connectivity, and vehicle strikes have been identified as prescribed impacts for the Project. Measures to avoid and minimise impacts on native vegetation and habitat through project location (see Section Project location7.2.1) and project design (see Section 7.2.2) are also relevant to the identified prescribed impacts.

In determining the location and design of the development footprint, the project has sought to avoid and minimise direct impacts of these prescribed impacts during the construction and operational phases of the project by:

- Geological features of significance:
    - Retaining the western hillock and associated suitable slopes with scattered suitable rocks.
- Habitat connectivity:
    - Positioning the development footprint where possible to avoid the removal of the
        - Denser patch of remnant vegetation to the west.
        - Scattered groups of old large remnant trees (potential stepping stones) across the subject lot.
    - Optimised quarry development footprint and straight alignment of access road to minimise the native vegetation clearing.
- Non-native Vegetation

- Aligning parts of the development footprint (where possible) to contain areas of existing infrastructure and roads reducing the impacts to non-native vegetation.
- Once quarry works have been completed, rehabilitation of vegetation to provide more optimal habitat for species that may be using the existing non-native vegetation for foraging.

- Vehicle strike:
  - Utilising existing access routes, rather than the creation of addition access;
  - Straight alignment of the access road from quarry to the Castlereagh highway minimising the distance of travel for the transport of quarried material within the subject lot;
  - All vehicles on site are to be confined to designated roads with a signposted speed limit of 30km per hour. Driving protocols will be outlined in site induction prior to all staff working within the site.

The implementation of the Rehabilitation Plan will also serve to minimise impacts on retained biodiversity values and reduce prescribed impacts.

7.3. Summary

Table 23 summarises the measures to avoid and minimise impacts.

Table 23: Avoidance and Minimisation of Impacts

Action	Outcome	Timing	Responsibility
Locate development within areas previously disturbed	Reduced impact to native vegetation and habitat; maintenance of connectivity.	Project planning	Proponent
Locate the development in areas of lesser biodiversity value	Reduced impact to native vegetation and habitat; maintenance of connectivity.	Project planning	Proponent
Designing the quarry footprint as compact oval shape	Reduced impact to native vegetation and habitat; maintenance of connectivity.	Project planning	Proponent
Designing the project to utilise the existing access route servicing the subject land.	Reduced impact to native vegetation and habitat; maintenance of connectivity.	Project planning	Proponent
Designing the project to locate the associated temporary infrastructure within the quarry footprint	Reduced impact to native vegetation and habitat; maintenance of connectivity.	Project planning	Proponent
Undertaking of actions and activities that provide for ecological restoration and ongoing maintenance of native vegetation and threatened species habitat,	Impacts to biodiversity values managed during construction and operational phases of the Project and then in the rehabilitation phase of the project.	Post-operations	Contractor, Proponent

as prescribed within the rehabilitation plan.			

It is also acknowledged that given the nature of the project, the operation of quarrying rock material will change the topographical layout of the landscape permanently. However, the project has a determined life span of 25 to 30 years, and some of the impacts that will occur during the operation of the project will be limited to the period of the project life. Once the quarrying operations are over, the subject land will undergo rehabilitation phase and some of the impacts will seize to exist, while some of the impacts will be repaired and restored through the rehabilitation process. The rehabilitation will assist to repair any impacts to habitat connectivity and native vegetation clearing, and the vehicle strikes will be limited only to the period of operation of the quarry.

8 Impact assessment

8.1. Direct impacts

The direct impact resulting from the Project is the loss of vegetation and associated habitat within the subject land. The extent of impact within the subject land is described further in Table 24, but will include clearing of all vegetation with the subject land.

This includes a very minor impact (0.08ha) to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. This is represented by the loss of 3 mature paddock trees in the west of the subject land (all *E. blakelyi,* Figure 26), as well two due to the proposed should widening of the Castlereagh Hwy (both are *E. albens,* Figure 27). Regarding the latter, the stems of these two trees are not within the zone of works (refer to designs in Appendix I), however laying of bitumen over the Tree Protection zones (TPZs) for these two trees is likely to reduce water infiltration into the root zone. Root impacts may also occur due to any grubbing that is required to level the ground level prior to laying of bitumen. The ultimate intention of the proponent is to retain these trees, however for conservative reasons, they have been assessed as being removed within this BDAR. The proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

Further discussion on the significance of this impact, given the SAII status, is provided in Section 9.

A direct impact to fauna habitat (foraging/breeding/shelter resources) will also occur due to the extent of clearing proposed, including twenty Hollow bearing trees (small, medium and large hollow sizes - Figure 24). As the proposal footprint is relatively small compared with the surrounding contiguous vegetation, the direct impacts of the proposed clearing on fauna species are likely to be minimal.

No significant direct impact to the fauna species is expected during vegetation clearing; however, the clearing itself does provide a residual risk to fauna due to direct mortality during clearing works. This risk can be minimised as discussed in Section 7 (but not completely eliminated).

The likelihood of direct mortality of threatened species during clearing and quarry works is considered to be very low / improbable if appropriate mitigation in Section 7 is followed.

No threatened flora and fauna species were confirmed to occur within the subject land except for the threatened bat *Miniopterus orianae oceanensis* (Large bent-winged bat), which, due to the lack of breeding habitat on site, was inferred to be foraging. Further discussion on the significance of this impact, given its SAII status, is provided in Section 9.

Additionally, the undifferentiated *Nyctophilus* sp. was recorded within the subject area. As detailed in Section 5.4, there is a low likelihood that this was a threatened *Nyctophilus* species. In any case, the threatened *Nyctophilus* spp. are all ecosystem credit species and will therefore be compensated for via retirement of ecosystem credits. It is also worth noting however, that no *Nyctophilus* sp. are associated with the PCTs 277 or 281, per the NSW Threatened Biodiversity Data Collection.

No other threatened species was recorded to be present within the subject land during the field surveys. As a result, no direct impacts are expected to occur to any of the threatened flora or fauna species.

Table 24: Extent of native vegetation impacts within the subject land

Veg Zone	PCT	PCT Name	Condition	BC Act Status	Area within subject land (ha)
1	281	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	Listed as BC Act TEC however vegetation within the subject land **does not conform** to the Final Determination (TBDC)	1.46 ha
2	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate	Associated with BC Act TEC as vegetation within the subject land **conforms to** the Final Determination (TBDC)	0.08 ha
Total area of assessed vegetation to be cleared					1.54 ha

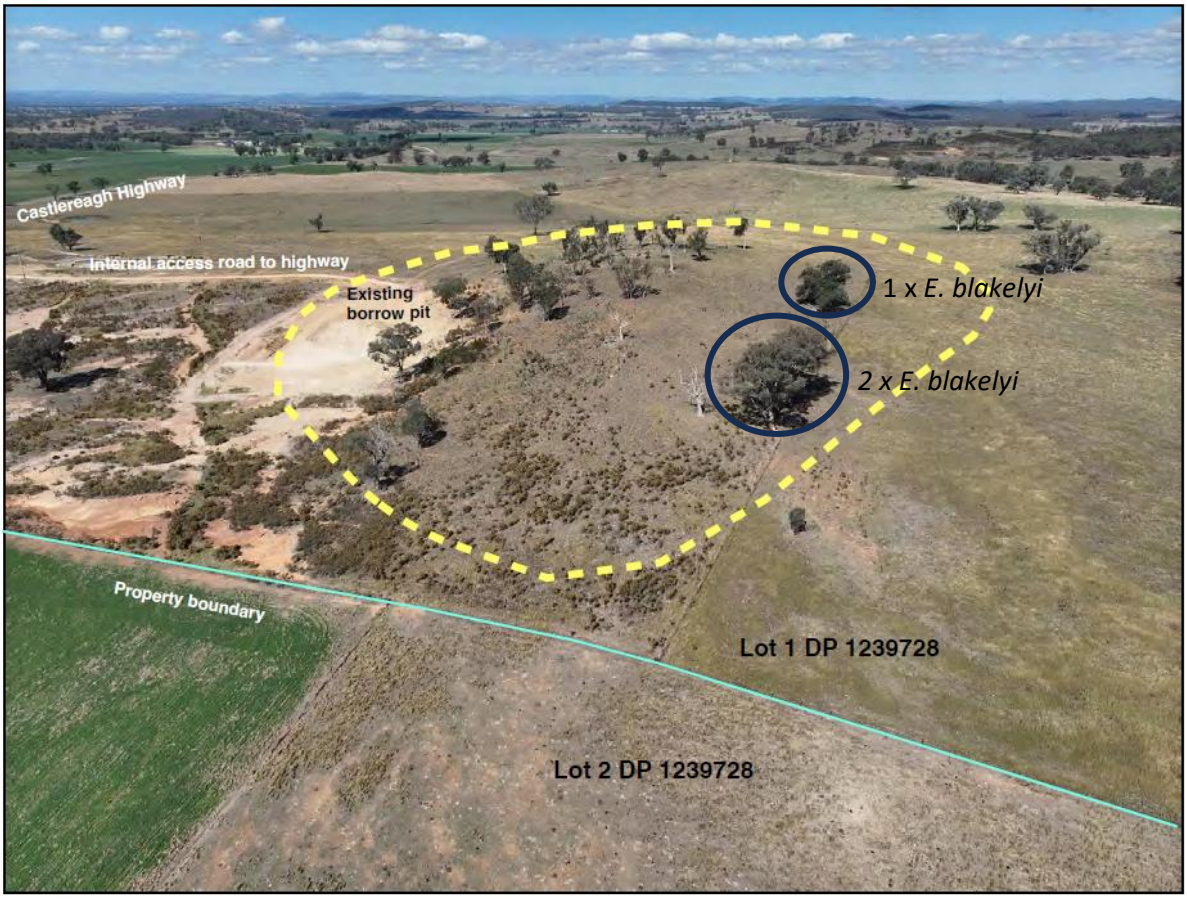

Figure 26: Three paddock trees in the western portion of the subject land, in Vegetation Zone 2, that are proposed for removal.

Figure 27: Two mature E. albens proposed to be removed in the eastern side of the subject land due to the shoulder widening of the Castlereagh Hwy.

8.1.1. Change in Vegetation Integrity Score

There are two (2) PCTs (281 and 277) present within the proposed project footprint. Each vegetation zone's VI score will be reduced to zero per Table 25.

Table 25: Impacts to vegetation integrity

Veg zone	PCT ID	Mgmt zone	Area (ha)	Current Score				Future Score				Change
				Composition	Structure	Function	VIS	Composition	Structure	Function	VIS	Change in VIS
1	281	A	1.46	20.7	1.1	54.4	10.6	0	0	0	0	-10.6
2	277	A	0.08	22	66	38.4	38.2	0	0	0	0	-38.2

8.1.2. Direct impacts to threatened species

8.2. Indirect impacts

Table 26 exhibits the potential indirect impacts to native vegetation and habitat. Some of these impacts are already in place due to existing quarry footprint and will be expanded to a greater area as a result of the proposed project. The expansion is unlikely to change the timing of such impacts but will expand the area of work to the south and west and therefore shift the associated ecological edge effects.

Table 26: The nature, extent, timing, duration, frequency and significance of predicted indirect impacts.

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
Vegetation Clearing and Subsequent Construction			
Inadvertent impacts on adjacent habitat or vegetation	Quarrying and material transport may result in inadvertent impacts on retained vegetation and habitat areas surrounding the works	During the single vegetation clearing campaign with a duration < 1 week. During construction of any associated infrastructure with an approximate duration of one to several weeks.	Low risk of negligible impact to native vegetation and threatened fauna.
Dust impact to surrounding vegetation via dust deposition and associated impacts to plant biology / impacts to habitat value.	Vegetation / habitat areas immediately surrounding the works.	During the single vegetation clearing campaign with a duration < 1 week. Additionally, stockpiled materials, the open pit, and road transport may cause dust deposition. During construction of any associated infrastructure with an approximate duration of one to several months.	Likely negligible impact to native vegetation No impact to threatened fauna.
Water Quality impacts to ecology values	Along mapped drainage lines adjacent to the north and south of the works however all runoff will be retained within the quarry within proposed sediment basins. The EIS for the project (Outline Planning Consultants 2024) notes that the likelihood of any overflow from the sediment basin is unlikely, given the capacity of the sediment basin system and depth of the quarry proposed. Extent limited as no aquatic habitat exists immediately adjacent the site.	Whilst exposed and unstable soils exist, during and after intensive weather events.	Unlikely negligible impact to native vegetation and threatened fauna.
Deposition of sediment downstream due to exposed soil	As above.	As above.	Likely negligible impact to native vegetation

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
			No impact to threatened fauna.
Noise/visual disturbance during construction of the quarry	Habitat immediately adjacent the works	During the single vegetation clearing campaign with a duration < 1 week. During construction of any associated infrastructure with an approximate duration of one to several months.	Likely negligible impact to threatened fauna. No impact to native vegetation.
Light spillage – impact to nocturnal fauna	Vegetation areas immediately surrounding the works	Will not occur during clearing or construction.	No impact to native vegetation or threatened fauna.
Transport of weeds and pathogens from the site to adjacent vegetation	Potential spread into adjacent areas of vegetation.	Post clearing, as a result of introduction from machinery during clearing and construction.	Unlikely negligible impact to native vegetation and threatened fauna.
Gulgong Quarry Activities (Operations)			
Dust impact to surrounding vegetation via dust deposition and associated impacts to plant biology / impacts to habitat value.	Dust can be generated by a variety of different activities that are carried out at the quarry site including: drilling; rock, breaking; crushing; extraction; trucks; machinery and blasting. Retained vegetation / habitat within the in the surrounding area may be impacted. The impact will likely be localised to the immediate vicinity of the operational area (e.g. less than 50m) and be negligible overall.	For the life of the quarry operations.	Likely negligible impact to native vegetation. No impact to threatened fauna.
Reduced viability of adjacent habitat due to edge effect	Vegetation / habitat areas immediately surrounding the operational area. A reduced viability will likely be localised to the immediate vicinity of the operational area (e.g. less than 50m).	For the life of the quarry operations.	Low impact, as habitat is already limited due to historical and current land uses. Likely negligible impact to native vegetation (due to changes in light penetration and associated floristic

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
			change) and likely minor impact to threatened fauna due to visual disturbance and noise.
Noise of quarry operations	Blasting at the premises will be limited to 1 blast on each day on which blasting is permitted. Noise will also be generated from general operations, such as from vehicles and other machinery.	For the life of the quarry operations.	No impact to native vegetation and likely negligible to minor impact to threatened fauna due to noise disturbance (potential foraging, resting, and breeding).
Light spillage – impact to nocturnal fauna	Vegetation areas immediately surrounding the operational area.	Operational lights will be turned off when operations cease for the day with only minimal security lights to be used during the night.	No impact to native vegetation and likely negligible to minor impact to threatened fauna.
Transport of weeds and pathogens from the site to adjacent vegetation (via machinery)	Potential spread into adjacent areas of vegetation.	For the life of the quarry. Risk only occurs when new machinery is introduced.	Likely negligible impact to native vegetation and likely no perceptible impact to threatened fauna.
Water Quality impacts to ecology values	Along mapped drainage lines adjacent to the north and south of the works. Extent limited as no aquatic habitat exists immediately adjacent the site, and any sediment loads will be retained onsite via retention basins. A minor risk of overtopping of the retention basins exists, during extreme weather events or periods of high rainfall, resulting in some potential sediment being transported via drainage lines. See Section 8.4.10 for more information.	Whilst exposed and unstable soils exist, during and after intensive weather events.	Unlikely negligible impact to native vegetation and threatened fauna. See Section 8.4.10 for more information.

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
Deposition of sediment downstream due to exposed soil	As above.	As above.	Likely negligible impact to native vegetation No impact to threatened fauna.
Increased risk of starvation or exposure, and loss of shade or shelter	Within subject land.	Not applicable given the degraded nature of the subject land and more suitable extent of contiguous habitat in the surrounding area.	None.
Loss of breeding habitat (assumed to be related to breeding habitat not directly impacted by works) through edge effects of noise and visual disturbance	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	Negligible impact expected due to the lack of mature forest (i.e. breeding habitat) adjacent to the proposed subject land.
Trampling of threatened flora species	Within quarry area.	For the life of the quarry operations.	Very unlikely to occur.
Inhibition of nitrogen fixation and increased soil salinity	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted.
Fertiliser drift	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted - as fertiliser will is not anticipated to be used.
Rubbish dumping	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted as site access is restricted via locked gate and wastes will be managed under an updated operational plan.
Wood collection	No wood collection will occur in areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted.
Removal and disturbance of rocks, including bush rocks	No removal or disturbance of rock habitat will occur in areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted.

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
Increase in predators	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted.
Increase in pest animal populations	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted.
Changed fire regimes	Vegetation areas surrounding the operational area.	For the life of the quarry operations.	No impact is predicted as fire regimes will continue as per current arrangements.
Disturbance to specialist breeding and foraging habitat (e.g., beach nesting for shorebirds).	Not applicable	Not applicable	Not applicable
Road Usage			
Transport of weeds and pathogens from the site to adjacent vegetation (via trucks)	Potential spread into adjacent areas of vegetation.	For the life of the quarry.	Negligible and unlikely. The quarry is not likely to be a source of weeds and pathogens. Additionally, similar to existing impact of operations. I.e. limited additional impact. Further, vehicle activity will be limited to designated roads and therefore spread of weeds will be limited.
Dust impact to surrounding vegetation via dust deposition and associated impacts to plant biology / impacts to habitat value.	Vegetation / habitat areas immediately surrounding the roads. The impact will likely be localised to the immediate vicinity of the roads (e.g. less than 20m).	For the life of the quarry.	Likely negligible impact to native vegetation. No impact to threatened fauna. Similar to existing impact of operations. I.e. despite increased traffic generation, there will be limited additional impact to biodiversity.

Relevant Aspect	Nature and Extent	Timing / Duration / Frequency	Residual Risk and Impact*
Threatened f**auna** mortalit**y due to vehicular interactions**	see Section 8.3.4.	see Section 8.3.4.	see Section 8.3.4.

* Assuming standard mitigation measures are in place per Section 10.

8.3. Prescribed Impacts

The Project has been assessed as resulting in three prescribed impacts (see Section 5.9). An assessment of these prescribed impacts is provided below. The indicative location of prescribed impacts is shown in Figure 25.

8.3.1. Geological features of significance

8.3.1.1. Nature

Within the subject land, a small rocky outcrop exists (Figure 25), which will be removed by the proposed quarry expansion. The central hillock in the development footprint has gentle slopes that are scattered with suitable sized rocks (up to 300 X 100 X 50 mm) that may serve as habitat feature for some threatened reptile species (although thorough survey undertaken as part of this BDAR [Table 3, Figure 11] did not identify the presence of any threatened reptile species). These slopes will be removed in the proposed quarry operation. No other geological features of significance were identified within the subject land.

8.3.1.2. Extent

As shown in Figure 25, the potential threatened species habitat created by scattered rocks of suitable dimensions across the gentle slopes of central hillock cover about 3.9 ha within the subject land.

8.3.1.3. Duration

The above-mentioned geological feature of significance will be permanently removed.

8.3.1.4. Entities affected and consequences

While several fauna species may be known to use the scattered rocks on the gentle slopes of stoney hillocks, the *Aprasia parapulchella* (pink-tailed legless lizard) is known to occur in such habitats in the region, and is also identified as a predicted species credit species for the subject land. However, the extensive active searches conducted within the subject land (Table 3, Figure 11) did not find the species (or other threatened species). A significant impact to this species is considered unlikely.

8.3.2. Habitat Connectivity

8.3.2.1. Nature

The subject land has a sparse woodland and the surrounding agricultural landscape only offers patches of one to three large trees and together may offer ‘stepping stones’ for the fauna moving across the more connected and larger patches of vegetation about 600 m to the west of the subject land and a similar patch to the east of the subject land. The region overall is dominated by historically cleared land with agricultural landscapes with scattered patches of trees and the trees within the subject land do not particularly provide a significant vegetation patch. The subject land does not form part of any major regional fauna corridors. The proposed development is not going to result into any significant fragmentation of large vegetation patches.

Although highly modified landscape and largely unsuitable for species requiring woodland and forest, the low grassy habitat with sparse scattered trees that predominates in the proposed quarry footprint residential area is likely to currently permit movement by a variety of wildlife due to the current low level of human usage of the site. However, the project will not significantly change the movement patterns of wildlife in the larger area, and after the quarry operations are completed, the rehabilitation within the subject land is likely to improve the habitat quality in the long term by

providing for the regeneration of the woodland and continued agricultural use of the land with minimal human disturbance.

8.3.2.2. Extent

The impacts to habitat connectivity as a result of the proposed quarry expansion will be restricted to the east-west connectivity mapped over the subject land (Figure 25).

8.3.2.3. Duration

All anticipated impacts to habitat connectivity will occur only during the construction and operation phase and then until the rehabilitation of the subject land reaches the desired success improving the habitat quality. Rehabilitation is further discussed in Section 8.4.11.

8.3.2.4. Threatened entities affected and consequences

The extensive field surveys did not detect occurrence of any threatened species apart from a single microbat species within the subject land. The temporary loss of habitat connectivity is unlikely to have a significant impact to the movement of microbats, species that are very mobile and may seek alternative routes in presence of the temporal disturbance dure to the project.

While the proposed quarry expansion during the construction and operation phase of the quarry may cause some minor disturbance to habitat connectivity in the larger area. However, the rehabilitation of the disturbed quarry footprint after the completion of the quarry operations is likely to result in an improvement of habitat and habitat connectivity in across the wider area. Overall, the proposed project is unlikely to have a significant impact on the movement of fauna across the wider landscape. The proposed development will not result in any habitat fragmentation across the landscape.

8.3.3. Non-native Vegetation

8.3.3.1. Nature

The subject land contains 6.46 ha of mapped non-native vegetation, with the mapped vegetation communities also containing a mixed native/non-native groundcover. While non-native vegetation, such as the pasture grass identified within the subject land may provide potential foraging habitat for certain native fauna species, it is overall not anticipated that the non-native vegetation within the site provides critical or optimal habitat for threatened flora or fauna species. The proposed development is not anticipated to result in any habitat loss or fragmentation to fauna due to the removal of non-native vegetation. The surrounding landscape overall is dominated by historically cleared land with agricultural land uses. Overall, the proposed development footprint is small in size compared to the extent of non-native vegetation that will remain within the subject lot and surrounding landscape.

After the quarry operations are completed, the rehabilitation within the subject land is likely to improve the habitat quality in the long term by providing more optimal habitat for fauna species that may utilise the site.

8.3.3.2. Extent

The impacts to non-native vegetation as a result of the proposed quarry expansion will be restricted to the 6.46 ha mapped over the subject land (Figure 25).

8.3.3.3. Duration

All anticipated impacts to non-native vegetation will occur only during the construction and operation phase.

8.3.3.4. Threatened entities affected and consequences

The extensive field surveys did not detect occurrence of any threatened species apart from a single microbat species within the subject land. The loss of non-native vegetation is unlikely to have a significant impact to the movement of microbats, due to the lack of suitable habitat the non-native vegetation would provide.

While the proposed quarry expansion during vegetation clearing phase of the quarry will cause disturbance to non-native vegetation, the rehabilitation of the disturbed quarry footprint after the completion of the quarry operations is likely to result in an improvement of habitat across the wider area. Overall, the proposed project is unlikely to have a significant impact on non-native vegetation across the wider landscape.

8.3.4. Vehicle Strikes

8.3.4.1. Nature

The subject land will involve quarrying and transportation of the rock material excavated and the subject land will have a movement of heavy machinery and large vehicles. Although the traffic would be largely slow moving on site, there would be some degree of risk to some wildlife, particularly, but not exclusively ground dwelling species as vehicle fauna strikes may occur within the subject land along the access road and within the quarry footprint. However, all vehicles on site are to be confined to designated roads with a signposted speed limit of 30km per hour to limit fauna strike. Driving protocols will be outlined in site induction prior to all staff working within the site which will outline risk of fauna strike.

Increases in traffic generation across the wider network will also result in a higher risk of vehicular strike to fauna.

8.3.4.2. Extent

The extent of vehicle strike will extend across the entire development footprint of 8.98 ha, within the quarry footprint and the access road. Traffic generated due to the project will also have a potential impact to wildlife across the broader traffic network.

8.3.4.3. Duration

Vehicle strikes will remain an impact for the construction, operation and then to a lesser extent through the rehabilitation phase of the project.

8.3.4.4. Threatened entities affected and consequences

The extensive fauna surveys have indicated that none of the threatened species are likely to occur within the subject land except a couple of microbat species that were detected moving through the subject land. The development footprint will be a disturbed area once the vegetation clearing has been carried out and the highly mobile threatened species are likely to avoid the area of subject land, thereby further reducing the potential vehicle strikes.

The project is unlikely to impact the threatened species and all the fauna occurring on the site via vehicle strikes.

8.4. Mitigation of Impacts to Native Vegetation and Habitat

A range of mitigation measures have been developed for the project to mitigate the impacts to native vegetation and habitat that are unable to be avoided. These include a range of measures to be undertaken before and during operations to limit the impact of the project. Each mitigation measure is discussed below, and a summary is provided in Table 27.

Table 27: Mitigation of Impacts to Native Vegetation and Habitat

Mitigation measure	Impact addressed (e.g. direct)	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impact
Site Induction	Indirect	Prepare induction protocols for all staff members required to conduct works within the subject land to outline the mitigation measures being implemented to project biodiversity values within the study area i.e waste management, road rules, clearing limits etc. Refer to Section 8.1 for further information.	Prior to all works, with each staff member to undergo inductions prior to commencing work.	Once off	Quarry operator/ Construction Manager	Low	Unnecessary result of indirect impacts i.e rubbish dumping, fauna strike etc.

Access Controls	Indirect	Preventing access to the subject land through fencing and locked gates to minimise ecological disturbance.	Prior to all works	Indefinitely	Quarry operator/ Construction Manager	Low	Unnecessary damage and disturbance to flora and fauna resulting in stress or mortality to fauna.
Driving Protocols	Indirect	Speed limit restrictions (max 30km per hour), speed limit signage and driving protocols outlined in site induction.	Prior to all works	Indefinitely	Quarry operator/Construction Manager	Low	Unnecessary mortality of or injury to fauna
Delineation of Clearing Limits	Indirect	Fencing, high visibility bunting and clear signage will delineate clearing limits.	Prior to all works	Once off	Site Manager/Construction Manager	Low	Overclearing of surrounding vegetation resulting in unnecessary impacts to flora and fauna.
Pre-clearance Surveys	Direct	Pre-clearance surveys will be conducted by a suitably qualified ecologist prior to any vegetation clearing in accordance with Section 8.1.	Pre-clearing phase	Once off	Quarry operator/ Construction Manager	Low	Unnecessary mortality of or injury to fauna

Clearing Process	Direct	Clearing protocols will be conducted with supervision from a suitably qualified ecologist in accordance with the Two-Stage Clearing process (Section 8.1).	Pre-clearing phase	Once off	Suitably qualified ecologist/ Construction Manager	Low	Unnecessary mortality of or injury to fauna
Fauna Capture Protocols	Direct	Captured fauna must be taken care of in accordance with approved animal care and ethics licencing.	Prior to all works	Indefinitely	Suitably qualified ecologist/ Construction Manager	Low	Unnecessary mortality of or injury to fauna
Weed Management	Direct	Implementation of standard weed prevention and mitigation measures as per Section 8.1.	Prior to all works	Indefinitely	Quarry operator/ Construction Manager	Moderate	Transport of weeds from the site to adjacent vegetation.
Erosion and Sedimentation Controls	Indirect	Implementation of standard erosion and sedimentation control measures to prevent unnecessary impacts as per Section 8.1.	Prior to all works	Indefinitely	Quarry operator/ Construction Manager	Moderate	Deposition of sediment downstream due to exposed soil.

Dust and Air Quality Management	Indirect	Implementation of standard dust abatement and air quality practises to limit impacts to local biodiversity	Prior to all works	During works	Quarry operator/ Construction Manager	Moderate	Unnecessary long-term impacts to the ecological condition of the site and its surrounding biodiversity
Rehabilitation	Direct	The life of the quarry is limited and thus once quarry works cease, the site will rehabilitated to an improved ecological condition.	Pre-clearing phase	Indefinitely	Quarry operator/Construction Manager	Low	Unnecessary long-term impacts to the ecological condition of the site and its surrounding biodiversity

8.4.1. Site Inductions

Inductions for contractors to the subject land during the construction phase and operation phase of the Project will be conducted to make them aware of the ecological issues present within the subject land and adjoining land. The induction will inform contractors of the mitigation measures being implemented to project biodiversity values within the study area. It will also outline their responsibilities for the minimisation of impacts to biodiversity values.

8.4.2. Access Controls

Measures will be implemented to control access to the subject land during the construction phase and operation phase of the Project to minimise disturbance to biodiversity values.

8.4.3. Driving Protocols

Speed restrictions will be implemented to minimise the risk to fauna, especially collision risks and vehicle strikes along the access roads and within the subject lot. Speeds within the subject lot on internal roads will not exceed 30 km/hour. Signs will be erected to remind drivers to be alert and to signal the speed limit. All vehicles that enter the site must be fit-for-task and should follow the designated internal roads throughout the subject lot.

8.4.4. Delineation of Clearing Limits

The clearing limits for the Project will be marked either by high visibility tape on trees, metal/wooden pegs, fencing or an equivalent boundary marker that will be installed prior to any clearing. To avoid unnecessary or inadvertent vegetation and habitat removal or impacts on fauna, disturbance will be restricted to the delineated area and no ancillary construction facilities (e.g. stockpiles) will occur beyond this boundary. The site supervisor will be responsible for ensuring that the clearing limit markers are installed and maintained.

8.4.5. Arboricultural Assessment

As previously mentioned, the ultimate intention of the proponent is to retain the two E. albens that are proposed to be impacted due to the shoulder widening of the Castlereagh Hwy (see Appendix I for design plans), however for conservative reasons, they have been assessed as being removed within this BDAR. Prior to works commencing, the proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

8.4.6. Pre-clearance Surveys

8.4.6.1. General

A pre-clearing survey will be undertaken within two weeks of clearing works by a Project Ecologist. These will involve the identification and marking of fauna habitat features including hollow-bearing trees, hollow-bearing logs; and nests within the tree canopy. Marked habitat features will be subject to the two-stage clearing process (see Section 8.4.7).

8.4.6.2. Koala

This will involve a pre-clearing survey on the day that clearing works are to be undertaken to determine presence/absence of a Koala. No clearance works can occur within 50 m of a tree occupied by a koala.

8.4.7. Clearing Process

8.4.7.1. Koala

During the clearing process the following protocols will be followed:

- Should a koala be encountered within the project area during clearing activities, all work must cease within a radius of 50 m of the tree in which the koala is observed, with no

further vegetation to be removed until approved by the Project Ecologist; a minimum period that includes at least one night will be allowed to enable the koala to disperse naturally; and

- If the koala is still present the following morning, it will be captured by individuals experienced in koala capture techniques, ideally either using a pole and flag technique or a koala trap and immediately relocated into a feed tree located outside of the project area.

8.4.7.2. Staging

The clearing will be conducted using a two-stage clearing process as follows:

- Stage 1: Clearing will commence following the identification of potential habitat features during the general pre-clearance surveys by the Project Ecologist. Hollow-bearing trees, or trees containing nests, marked during pre-clearing will not be cleared during the first stage; however, all vegetation around these trees will be cleared to enable isolation of the feature. Other habitat features, such as hollow-bearing logs, can be removed during Stage 1 only if done under supervision by a Project Ecologist;
- Stage 2 (Hollow-bearing trees): After hollow-bearing trees have been left overnight, the trees will be cleared in a controlled manner, under the supervision of a Project Ecologist. The felled habitat tree will be left overnight to allow any remaining fauna time to leave the hollows and disperse to adjacent habitat; and
- Stage 2 (Nests): After nest trees have been left overnight, and are determined to be unoccupied, the trees will be cleared in a controlled manner, under the supervision of a Project Ecologist. If nest trees are determined to be occupied, and animals have not relocated after one week of Stage 1 clearing, the animals are to be removed from the tree using an Elevated Work Platform or by a tree climber. Permits or approvals may be required prior to interference with active nests.

8.4.8. Fauna Capture Protocols

Any uninjured fauna captured during clearing will be moved to location within the subject lot, outside of the subject land. All fauna handling will be carried out by the Project Ecologist.

Any injured fauna captured during clearing will be taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized. All fauna handling will be carried out by the Project Ecologist.

8.4.9. Weed Management

Weed management is to be undertaken in accordance with the rehabilitation plan (refer to Section 8.4.11) and the North West Regional Strategic Weed Management Plan (LLS 2023). The North West Regional Strategic Weed Management Plan dictates regional priorities for weed management and lists all State priority weeds in accordance with Department of Primary Industries regulations. The rehabilitation plan applies to the entirety of the Project, and includes provision for weed management during construction, operation and rehabilitation phases of the Project.

The weed management measures detailed within the EIS are based on the following best practice strategies:

- Prevention: including appropriate hygiene measures to prevent entry of new weeds into the region and movement of existing weeds within the region;
- Eradication, including initial weed treatment that will include eliminating woody species and targeting large dominant infestations of exotic groundcovers. This may be achieved via a combination of manual weed removal and herbicide use; and

- Containment, including follow-up monitoring and maintenance should be undertaken in the project area, during and following the construction, operation and rehabilitation phases, to contain any re-emergence of weed species.

8.4.10. Erosion and Sedimentation Controls

During the vegetation clearing campaign, erosion and sedimentation control is to be undertaken to prevent sedimentation downstream. The erosion and sediment control measures will include implementation of the following:

- Installation of sediment control fences;
- Appropriate soil stripping and stockpiling controls including covering soil stockpiles; and
- Avoiding soil disturbance prior to heavy rainfall.

During operations, the drainage and sediment capture systems to be employed will prevent erosion, as well as ensuring that run-off does not contaminate offsite areas or downstream waterways. The EIS for the project (Outline Planning Consultants 2024) notes that the likelihood of sediment basin overflow is unlikely due to the capacity of the sediment basin system and depth of the quarry proposed.

The stormwater system has been designed to ensure that 95th percentile 5-day rainfall event (50.7mm) are captured by the quarry sediment basin system. The proposed sediment basin, will capture stormwater from the active quarry area. The water captured from the quarry sediment basin will be re-used for quarry-related purposes such as dust suppression. The size of sediment basin for each stage complies with Blue Book requirements and water balance for average, dry and wet years- refer Martens & Associates water balance report, attached as an Appendix to the EIS. Refer to Figure 28, which shows a typical quarry sediment basin. The minimum proposed sediment basin volumes proposed for each quarry stage are as follows:

- Stage 1: 2,600 cubic metres (2.6ML).
- Stages 2: 4,200 cubic metres (4.2ML).

Figure 28: Typical quarry sediment basin
Note: Photograph taken Dorrigo Quarry, August 2022. (c/o Outline Planning Consultants)

The effectiveness of these sediment control measures is proposed to be continuously monitored by the quarry operator and improvements made where necessary, with the following applied:

- Erosion and sediment control structures to be inspected regularly, or after any major rainfall event, to assess their success in preventing erosion, identify signs of potential erosion and retained sediment basin capacity.
- The erosion and sediment control structures to be cleaned of accumulated sediment material (or extended or replaced) as soon as approximately 30% capacity is lost due to the accumulated material such that the specified capacities are maintained. The sediment basins are to be treated, if required, to reduce the Total Suspended Solids level to the licensed concentration limit before being discharged to the environment. Treatment can be with gypsum or any other material that has been approved by the EPA.
- When required, a flocculent will be added to sediment basin to increase the efficiency of sediment settlement.
- Section 120 of the Protection of the *Environment Operations Act 1997* and any applicable licence must be complied with at all times.
- The concentration of a pollutant discharged at the discharge point must not exceed the concentration limits as set down in any issued licence. In this regard, the likelihood any overflow from the sediment basin is most unlikely, given the capacity of the sediment basin system and depth of the quarry proposed.

8.4.11. Rehabilitation

Rehabilitation works will be conducted once quarrying works within the subject land have ceased. It is anticipated that the total quarry will be 25-30 years, dependent on the eventual rate of extraction and market demand for the resource, with an additional 2 years required to complete rehabilitation of the site after quarrying is completed. As per the EIS (Outline Planning 2024), the quarry floor will

be rehabilitated back to agricultural use, whilst the benches will be revegetation with native trees and shrub species.

Progressive rehabilitation of the benches will be undertaken via seeding ground layer and shrub species, as well as planting of tube stock (for tree species). To encourage growth and to control weeds, an appropriate seed mix is required. The native groundcover and shrub seed mix sown at a total combined rate of approximately 10 kg/ha. Seed will be broadcast evenly ono the bench areas. Care will be taken to ensure it will not be buried. Seeding will be conducted in late spring and early autumn giving increased risk of success due to higher ground temperatures.

Species which could be used for revegetation (dependent upon seed and tubestock availability) are listed below in the accompanying Table 28. The species identified are typical of those found in the two PCTs on site (based on the Bionet Vegetation Classification System), as well as species observed on site. Substitutions are considered appropriate where:

- the species has been observed on site, or the species is documented as part of the PCT, or
- where a species is not commercially available or cannot be sourced from seed collection on site.

Refer to the EIS for more detailed information regarding the proposed rehabilitation and final end land use.

Table 28: Planting / seeding palette for rehabilitation works

Species	Relative Abundance (approx.)
Tree Layer (tubestock installation) – 1 plant per 50m²	
Angophera floribunda	75% of tubestock
Eucalyptus blakelyi	25% of tubestock
Shrub Layer (seeded) 4 kg/ha	
Acacia dealbata	15% of mix
Acacia implexa	10% of mix
Acacia leiocalyx	20% of mix
Acacia penniervis	10% of mix
Acacia verniciflua	10% of mix
Dodonaea viscosa	20% of mix
Hibbertia obtusifolia	15% of mix
Ground Layer (seeded) 6kg/ha	
Lomandra longifolia	10% of mix
Themada australis	20% of mix
Bothriochloa macra	20% of mix
Cynodon dactylon	50% of mix

8.4.12. Dust Management and Air Quality

Dust can be generated by a variety of different activities that are carried out at the quarry site including: vegetation clearing, drilling; rock, breaking; crushing; extraction; trucks; machinery and blasting. Measures proposed to reduce dust nuisance include:

- Use of water sprays on processing plant and materials stockpiles, as required. The quarry can draw water from the existing sediment basin, once established.
- A water tanker may be regularly used to spray water on working areas during dry and windy weather conditions.
- Quarry trucks leaving the site to the public road system are to have covered loads, with tailgates effectively sealed. All vehicles on site are to be confined to designated roads with a signposted speed limit of 30km per hour.
- Potentially dusty activities not to be carried out when weather conditions give rise to potential offsite dust emissions. Blasting will be restricted if windy conditions are likely to carry visible dust emissions beyond the quarry boundary.
- Miscellaneous dust sources such as spillages from trucks and silt are to be regularly cleaned up.
- Proper maintenance and tuning of the vehicles and equipment also assists in avoiding any off-site effects.
- Completed extraction areas will be stabilised and revegetated as soon as practical after completion.

These management strategies will avoid impacts to flora and fauna such as restriction of plants' natural processes, irritation to fauna species and negative impacts to air pollution. The results of the modelling by Vipac Engineers (Vipac 2024) predict that dust management strategies will comply with government criteria for dust and air quality..

8.4.13. Mitigation of Prescribed Impacts

The following mitigation measures, described in Section 7, are relevant to the prescribed impacts relevant to the Project:

- Inductions (habitat connectivity, vehicle strike);
- Access controls (vehicle strike);
- Driving controls (vehicle strike);
- Delineation of clearing limits (habitat connectivity).

No additional mitigation measures are proposed for prescribed impacts.

8.5. Adaptive Management for Uncertain Impacts

No adaptive management is proposed for uncertain impacts as this project is unlikely to result in any uncertain impacts that require adaptive management.

9 Serious and irreversible impacts

The determination of a SAII on biodiversity values is to be made by the decision-maker in accordance with the four principles set out in the BC Regulation. This section provides a summary of relevant information to assist with the determination.

9.1. SAII within or near the subject land

The below candidate species were identified as having potential to occur and at risk of a Serious and Irreversible Impact (SAII). Only one of which has been recorded within the subject land (refer Section 5.7).

- *Anthochaera phrygia* (Regent Honeyeater) – not recorded during surveys undertaken for this BDAR
- *Euphrasia arguta* (Euphrasia arguta) – not recorded during surveys undertaken for this BDAR
- *Lathamus discolor* (Swift Parrot) – not recorded during surveys undertaken for this BDAR
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat) – recorded foraging during surveys undertaken for this BDAR.

Further to this, the TEC White Box Yellow Box Blakely's Red Gum Woodland is considered to be an SAII entity, and small patches of this TEC (represented by five paddock trees and an understory of pasture) have been identified within the subject land.

9.2. Assessment for serious and irreversible impacts on biodiversity values

This Section aims to provide a guide to assist a decision-maker to determine a serious and irreversible impact, including criteria that enable the application of the four principles set out in Clause 6.7 of the BC Regulation to identify the species, populations and ecological communities that are likely to be at risk of SAIIs. This Section identifies biodiversity values at risk of an SAII as a result of the proposed development and evaluates the severity and extent of impact to the SAII.

9.2.1. Predicted Impacts to White Box Yellow Box Blakely's Red Gum Woodland

The TEC is listed as an SAII entity because (DEH 2024b):

- The ecological community is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline; and
- The population is currently observed, estimated, inferred or reasonably suspected to have a very small population size.

The Project will remove 0.08 ha of White Box Yellow Box Blakely's Gum Woodland. The proposed development footprint location was determined to avoid a much larger area of the PCT 277 and the associated TEC in western part of the subject lot, as well as to avoid nearby small areas that harbour this PCT and TEC. Transplanting the *Eucalyptus blakelyi* individuals to be impacted was considered but was determined not to be practical due to the large size of the individual trees.

The NSW TEC determination states that the TEC is has undergone a very large historical reduction in geographic distribution (since approximately 1750) and has experienced disruption of biotic processes of relative severity >90% over more than 90% of its distribution since 1750. Of the remaining area, a

large proportion of it has been modified and occurs as trees over a predominantly exotic understorey. Specifically, for PCT 277, the BioNet Vegetation Classification system states that large areas of isolated paddock trees remain with exotic ground pasture cover. It is noted that the impacts of the Gulgong Quarry Project are isolated paddock trees, which, as described directly above, are considered widespread.

If the five paddock trees are removed, an SAII to this TEC is not anticipated because:

- There is approximately 13 ha of this TEC is the surrounding area (to the west of the subject land (but on the subject lot and therefore controlled by the proponent), and to the north-east of the subject land. A reduction of five trees is considered insignificant in terms of local biodiversity loss, and to the TEC overall (across the state).
- The BOS will be utilised to compensate for the loss via the requirement to provide ecosystem credits for loss of PCT 277.
- Habitat connectivity between the remaining standalone paddock trees and the associated TEC vegetation patches described above will be maintained, albeit with a minor loss of some stepping stone habitat due to the project.
- The use of relevant species (e.g. *Eucalyptus blakelyi*) in the quarry rehabilitation plan is proposed to provide compensation for the loss of these trees.

9.2.2. Predicted Impacts to the Large Bent-winged Bat

The Large Bent-winged Bat is listed as an SAII entity because the species is considered unlikely 'to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable' (DEH 2024b).

Per Appendix E, 39 calls of the Large Bent-winged Bat were recorded over the four nights of Anabat survey, with each of the three anabat survey locations recording this species. As no breeding habitat was observed on site, the species were inferred to be foraging.

A SAII is not anticipated due to:

- The project will not impact breeding habitat for this species
- The habitat within the subject land is not considered high quality, whilst there are many other patches of better habitat in the wider locality.
- The BOS will be utilised to compensate for the loss of foraging habitat via the requirement to provide ecosystem credits for loss of PCT 277.

10 Impact summary

10.1. Introduction

The assessment thresholds that must be considered include the following:

- Impacts on an entity that is at risk of a serious and irreversible impact;
- Impacts for which the assessor is required to determine an offset requirement;
- Impacts for which the assessor is not required to determine an offset requirement; and
- Impacts that do not require further assessment by the assessor.

The following sections outline these assessment thresholds and their relevance to the project.

10.2. Impacts on Serious and Irreversible Impact Entities

Two SAII entities will be impacted by the proposed quarry:

- the White Box Yellow Box Blakely's Red Gum Woodland (0.08 ha, represented by 5 paddock trees); and
- loss of foraging habitat for the Large Bent-winged Bat

10.3. Impacts that require an offset

10.3.1.1. Native Vegetation

In accordance with Section 9.2.1 of the BAM, the Project requires offsets for the clearing of native vegetation associated with Vegetation Zone 2, because offsets are required where a vegetation zone has a vegetation integrity score of ≥15 where the PCT is representative of an EEC or a CEEC. It is noted in Table 29 that Vegetation Zone 2 scored 38.2.

Vegetation Zone 2 will be offset despite the final assessment of retention/removal of the two *E. albens* that are proposed to be impacted due to the shoulder widening of the Castlereagh Hwy (see Appendix I for design plans).

However, Vegetation Zone 1 is not required to be offset because its vegetation integrity score was 10.6, and this is less than any thresholds for offset in Section 9.2.1 of the BAM.

The PCTs and vegetation zones requiring offsets is documented in Section 4.2. This area is mapped in Figure 16.

Table 29 Summary of impacts that require an offset – ecosystem credits

Vegetation zone	PCT number and name	Condition Name	TEC	Impact area (ha)	Loss in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ 1: PCT 281 – Low Condition Woodland	Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low Condition Woodland	N/A	1.46 ha	-10.6	1.75	0
VZ 2: PCT 277 – Moderate Condition Woodland	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate Condition Woodland	Associated with BC Act listed	0.08 ha	-38.2	1.75	2
Total					2		

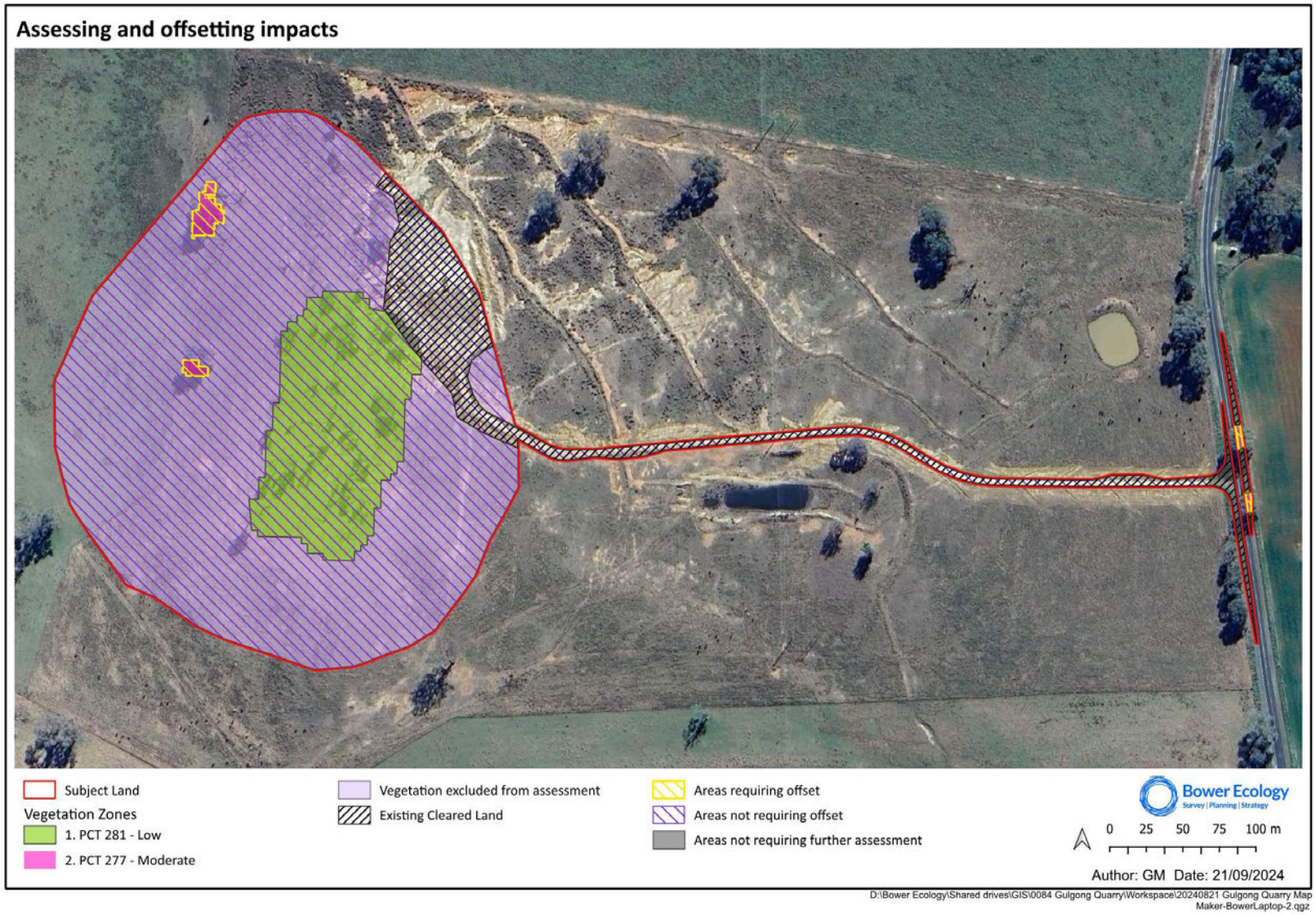

Figure 29: Requirements for Offset

11 Biodiversity Credit Report

The BAM-C credit report must identify the numbers and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules and those that could be retired in accordance with the variation rules. These are identified for each ecosystem credit in Table 30. Ecosystem credit reports are provided in Appendix D.

11.1. Ecosystem Credits

Table 30. Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)
PCT 277 Low Condition Woodland	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 268, 272, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 301, 316, 326, 337, 347, 383, 421, 426, 433, 434, 437, 441, 444, 461, 483, 509, 516, 544, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1609, 1693, 1695, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3401, 3403, 3404, 3405, 3406, 3485, 4147	Grassy Woodlands	Associated with BC Act listed 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	N/A	Yes	Inland Slopes IBRA Subregion (NSW Government, 2023)

12 Conclusion

This BDAR has been prepared to assess the impacts on biodiversity associated with the proposed expansion of Gulgong Quarry. Specifically, it has considered the relevant 'biodiversity' requirements of the SEARs, and the Biodiversity Assessment Method (BAM) (NSW Department of Planning, Industry and Environment, 2020) to assess the biodiversity impact and potential offset obligation of the Project under the NSW *Biodiversity Conservation Act 2016* (BC Act).

The proposed development proposes to clear 1.54 ha of vegetation and as the area is above the vegetation clearing threshold, the BOS was triggered. Category 1 – exempt land mapped within the subject land was excluded from the assessment in accordance with Section 1.5 of the BAM.

Regarding the assessable vegetation however, 1.46 ha of PCT 281 low condition woodland and 0.08 ha of PCT 277 moderate condition were assessed. Based on results of the BAM-C, two ecosystem credits will be required for the removal of the mapped PCTs across the site.

PCT 281 and 277 are generally associated with EPBC Act and BC Act listed TECs, however it was determined as a result of extensive surveys within the subject land, that only the vegetation in Vegetation zone 2 (PCT 277) met the NSW determination for this TEC. The impact to this TEC is represented by the loss of 5 mature paddock trees (which is calculated as 0.08 ha).

However, the two (2) mature *E. albens* trees proposed to be indirectly impacted due to the shoulder widening of the Castlereagh Hwy, are ultimately intended to be retained however for conservative reasons, they have been assessed as being removed within this BDAR. The proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

One threatened species listed under the BC Act was identified within the subject land during Anabat monitoring during the 19th – 23rd August (the vulnerable Large Bent-winged Bat). However, it was determined that due to the lack of breeding habitat (caves, tunnels or mines) within the assessment area, that the species was only detected as a fly-over foraging recording as the subject land. Hence, no species credits are required for this species.

Although two SAII entities were identified within the subject land, no serious and irreversible impacts are anticipated. Nonetheless, the decision as to the nature of SAII is vested in the consent authority.

Overall, the development has been designed to consider environmental requirements within the SEARs, and within relevant legislation and plans. Ongoing impacts of operation, albeit likely to be minor, shall be managed via an overarching operational plan for the quarry.

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Appendix A: Review BAM Requirements

Table 31. Assessment of compliance with BDAR minimum information requirements

BDAR section	BAM ref.	BAM requirement	Section reference(s) in the BDAR
Introduction	Chapters 2 and 3	**Information**	
		Introduction to the biodiversity assessment including:	–
		☒ brief description of the proposal	Section 1.5.2
		☒ identification of subject land boundary, including: ☒ operational footprint ☒ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	Section 1.5.3
		☒ general description of the subject land	Section 1.5.3
		☒ sources of information used in the assessment, including reports and spatial data	Section 2.1
		☒ identification and justification for entering the BOS	Section 1.2.1
		Maps and tables	–
		☒ Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1

Landscape	Sections 3.1 and 3.2, Appendix E	**Information**	
		Identification of site context components and landscape features, including:	–
		☒ general description of subject land topographic and hydrological setting, geology and soils	Section 1.6
		☒ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	Section 3.2.10
		☒ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	Section 3.2.1
		☒ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	Section 3.2.2
		☒ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	Section 3.2.3
		☒ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	Section 3.2.4
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	Section 3.2.5
		☒ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	Section 3.2.6
		☒ any additional landscape features identified in any SEARs for the proposal	Section 3.2.8
		☒ NSW (Mitchell) landscape on which the subject land occurs	Section 3.2.7
		☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	Section 2.3
		Maps and tables	–
		☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☐ N/A: Landscape features identified in BAM Subsection 3.1.3	Figure 1

		☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☐ N/A: Landscape features identified in BAM Subsection 3.1.3 ☐ N/A: Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 2
		Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include:	–
		☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☐ N/A: wetlands and important wetlands ☒ Shown in Figure 12: connectivity of different areas of habitat ☐ N/A: karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☐ N/A: areas of outstanding biodiversity value occurring on the subject land and assessment area ☐ N/A: any additional landscape features identified in any SEARs for the proposal ☐ NSW (Mitchell) landscape on which the subject land occurs	Figure 2 and Figure 12

		Data	–
		☒ All report maps as separate jpeg files	–
		Individual digital shape files of:	–
		☒ subject land boundary	–
		☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	–
		☒ cadastral boundary of subject land	–
		☒ areas of native vegetation cover	–
		☐ N/A: landscape features	–

Native vegetation	Chapter 4, Appendix A and Appendix H	**Information**	
		☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1–3.) and Subsection 4.1.1)	Section 2.3.2 and Section 4.1
		☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	Section 4.1.3
		☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	Section 4.1.2
		☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	Section 2.3.3
		☐ N/A: Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	–
		For each PCT within the subject land, describe:	–
		☒ PCT name and ID	Section 4.2.2and Section 4.2.3
		☒ vegetation class	Section 4.2.2.1 and Section 4.2.3.1
		☒ extent (ha) within subject land	Section 4.2.2.1 and Section 4.2.3.1
		☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1–3.))	Section 4.2.2.3 and Section 4.2.3.3
		☒ plant species relied upon for identification of the PCT and relative abundance of each species	Section 4.2.2.3 and Section 4.2.3.3
		☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1–2.))	Section 4.2.2.4 and 4.2.3.4

		☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	Section 4.2.2.1 and Section 4.2.3.1
		Describe the vegetation integrity assessment of the subject land, including:	
		☒ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	Section 4.2.2.2
		☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	Section 4.2.2.2
		☒ area (ha) of each vegetation zone	Section 4.2.2.2
		☒ assessment of patch size (as described in BAM Subsection 4.3.2)	Section 4.3.1
		☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1–2.)	Section 4.3.1
		☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	Section 4.3.1
		Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A):	–
		☒ identify the PCT or vegetation class for which local benchmark data will be applied ☐ N/A: identify published sources of local benchmark data (if benchmarks obtained from published sources) ☐ N/A: describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	Figure 12
		☐ N/A: provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	–
		☐ N/A: provide written confirmation from the decision-maker that they support the use of local benchmark data	–
		Maps and tables	–
		☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 12
		☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 12
		☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 10

		☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 10
		☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 17
		☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 16
		Table of current vegetation integrity scores for each vegetation zone within the site and including:	
		☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	Section 4.3.1
		Data	–
		☒ All report maps as separate jpeg files	–
		☒ Plot field data (MS Excel format)	–
		☒ Plot field datasheets	–
		Digital shape files of:	–
		☒ PCT boundaries within subject land	–
		☒ TEC boundaries within subject land	–
		☒ vegetation zone boundaries within subject land	–
		☒ floristic vegetation survey and vegetation integrity plot locations	–
Threatened species	Chapter 5	**Information**	–
		Identify ecosystem credit species likely to occur on the subject land, including:	–
		☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	Section 5.2
		☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Section 5.2.2
		☐ N/A: justification for addition of any ecosystem credit species to the list	–
		Identify species credit species likely to occur on the subject land, including:	–

		☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Section 5.3
		☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	Section 5.3.2
		☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	Section 5.3.3
		☐ N/A: justification for addition of any species credit species to the list	–
		From the list of candidate species credit species, identify:	–
		☐ N/A: species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)) ☐ N/A: species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)) ☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)) ☐ N/A: species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.))	Section 5.3.3
		Present the outcomes of species credit species assessments from:	–
		☒ threatened species survey (as described in BAM Section 5.2.4)	Section 5.4
		☐ N/A: expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	–
		Where survey has been undertaken include detailed information on:	–
		☒ survey method and effort (as described in BAM Section 5.3)	Section 5.6
		☐ N/A: justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	–
		☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	Section 5.4
		☒ survey personnel and relevant experience	Page xiii
		☐ N/A: describe any limitations to surveys and how these were addressed/overcome	–
		Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	–

		☐ N/A: justification of the use of an expert report ☐ N/A: identify the expert, provide evidence of their expert credentials and departmental approval of expert status ☐ N/A: all requirements of Box 3 have been addressed in the expert report	Section 5.5
		Where use of local data is proposed (BAM Subsection 1.4.2):	–
		☐ N/A: identify relevant species ☐ N/A: identify data to be amended ☐ N/A: identify source of information for local data, e.g. published literature, additional survey data, etc. ☐ N/A: justify use of local data in preference to VIS Classification or TBDC data	–
		☐ N/A: provide written confirmation from the decision-maker that they support the use of local data	–
		Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	–
		☒ the unit of measure for each species is documented	Section 5.9
		for species assessed by area:	–
		☐ N/A: the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	–
		☐ N/A: a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	–
		for species assessed by counts of individuals:	–
		☐ N/A: the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	–
		☐ N/A: the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	–
		☐ N/A: the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	–

		☐ N/A: Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	–
		Maps and tables	–
		☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	Table 13
		☒ the ecosystem credit species removed from the list	Table 13
		☐ N/A: the sensitivity to gain class of each species	
		☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	Table 14
		☒ N/A: the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	Table 16 and Table 17
		☐ N/A: the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	–
		☐ N/A: Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	–
		☐ N/A: Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	–
		Data	
		☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	–
		☒ Survey locations including GPS coordinates of any plots, transects, grids	–
		☐ N/A: Digital shape files of each species polygon including GPS coordinates of located individuals	–
		☐ N/A: Species polygon map in jpeg format	–
		☐ N/A: Expert reports and any supporting data used to support conclusions of the expert report	–
		☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	–

Prescribed impacts	Chapter 6	**Information**	
		Identify potential prescribed biodiversity impacts on threatened entities, including:	–
		☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☐ N/A: waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	Section 6
		☐ N/A: protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	–
		☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	Section 6
		☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Section 6
		☐ N/A: Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	
		Where the proposed development is for a wind farm:	–
		☐ N/A: identify a candidate list of protected animals that may use the development site as a flyway or migration route, including: resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	–
		☐ N/A: provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	–
		☐ N/A: predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	–

		Where the proposal may result in vehicle strike:	–
		☐ N/A: identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	–
		Maps and tables	–
		☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	Figure 25
		☒ Map showing location of potential vehicle strike locations	Figure 25
		☐ N/A: Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	–
		Data	
		☒ Digital shape files of prescribed impact feature locations	–
		☒ Prescribed impact features map in jpeg format	–
Avoid and minimise impacts	Chapter 7	**Information**	
		Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	–
		☐ N/A: modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	–
		☐ N/A: routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	–
		☐ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	Section 7.2.1
		☐ N/A: alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	–
		☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	Section 7.2.2
		☐ N/A: Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	–

		☐ N/A: Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	–
		Maps and tables	–
		☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	Table 23
		☐ N/A: Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	–
		☐ N/A: Maps demonstrating indirect impact zones where applicable	–
		Data	
		Digital shape files of:	–
		☒ alternative and final proposal footprint	–
		☒ direct and indirect impact zones	–
		☒ Maps in jpeg format	–
Assessment of impacts	Chapter 8, Sections 8.1 and 8.2	**Information**	
		☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	Section 8.1
		Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	–
		☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	Section 8.3
		☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	Section 8.1
		☐ N/A: reporting any limitations or assumptions, etc. made during the assessment	–
		☒ identification of the threatened entities and their habitat likely to be affected	Section 8.1
		Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	–
		assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	–

		☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	Section 8.3.1
		☐ N/A: human-made structures	–
		☒ non-native vegetation	Section 8.3.3
		☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Section 8.3.2
		☐ N/A: movement of threatened species that maintains their life cycle	–
		☐ N/A: water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	–
		☐ N/A: assessment of the impacts of wind turbine strikes on protected animals	–
		☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Section 8.3.4
		☒ evaluate the consequences of prescribed impacts	Section 8.3
		☒ describe impacts that are uncertain	Section 8.5
		☐ N/A: document limitations to data, assumptions and predictions	–
		Maps and tables	–
		☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	Section 10.3.1.1
		Data	–
		N/A	–
Mitigation and management of impacts	Chapter 8, Sections 8.4 and 8.5	**Information**	
		Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	–
		☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	Section 8.2 and Section 8.4
		☒ document any adaptive management strategy proposed	Section 8.5

		Identification of measures for mitigating impacts related to:	–
		☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	Section 8.4
		☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	Section 8.5
		Maps and tables	–
		☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	Table 27
		Data	–
		N/A	–
Impact summary	Chapter 9	**Information**	–
		Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1) including:	–
		☒ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAII present on the subject land	Section 9.1
		☒ for each TEC, report the extent of the TEC in NSW	Section 9.2.1
		☒ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAII present on the subject land	Section 9.2.2
		☒ for each threatened species, report the population size in NSW	Section 9.2.2
		☐ N/A: documenting assumptions made and/or limitations to information ☒ documenting all sources of data, information, references used or consulted ☐ N/A: clearly justifying why any criteria could not be addressed	References
		☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	Section 10.3
		☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	Section 10.1
		☐ N/A: Identification of areas not requiring assessment in accordance with BAM Section 9.3	–
		Maps and tables	
		☒ Map showing the extent of TECs at risk of an SAII within the subject land	Figure 17

		☒ Map showing location of threatened species at risk of an SAII within the subject land	Figure 24
		Map showing location of:	–
		☒ impacts requiring offset	Figure 29
		☒ impacts not requiring offset	Figure 29
		☒ areas not requiring assessment	Figure 29
		Data	
		Digital shape files of:	–
		☒ extent of TECs at risk of an SAII within the subject land	–
		☒ location of threatened species at risk of an SAII within the subject land	–
		☒ boundary of impacts requiring offset	–
		☒ boundary of impacts not requiring offset	–
		☒ boundary of areas not requiring assessment	–
		☒ Maps in jpeg format	–
Impact summary	Chapter 10	**Information**	
		Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	–
		☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H) ☒ change in vegetation integrity score (BAM Subsection 8.1.1) ☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	Section 10.3
		☒ biodiversity risk weighting for each	Table 29
		☒ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 29
		Maps and tables	
		☒ Table of PCTs requiring offset and the number of ecosystem credits required	10.3.1.1
		☐ N/A: Table of threatened species requiring offset and the number of species credits required	

		Data	
		☒ Submitted proposal in the BAM Calculator	–
Biodiversity credit report	Chapter 10	**Information**	
		☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	Section 11
		☒ BAM credit report in pdf format	Appendix D: Relevant BAM-C Reports
		Maps and tables	
		☒ Table of credit class and matching credit profile	Table 30
		Data	
		☒ BAM credit report in pdf format	Appendix D: Relevant BAM-C Reports

Appendix B: SEARs

Department of Planning, Housing and Infrastructure

Gary Peacock
Outline Planning Consultants Pty Ltd
432 Carool Road
Carool NSW 2486

Via email: gpeacock@outline.com.au

5 June 2024

Planning Secretary's Environmental Assessment Requirements
Gulgong Quarry Project (EAR 1894)

Dear Gary,

I refer to your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the above development, which is designated local development under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Please find attached a copy of the SEARs for the Environmental Impact Statement (EIS) for the development. These requirements have been prepared in consultation with relevant government agencies based on the information your company has provided to date. Comments from Transport for New South Wales are outstanding and will be provided for consideration in the EIS once received by the Department. The agencies' comments are attached for your information (see Attachment 2). You must have regard to these comments in the preparation of the EIS.

In your request for SEARs, you have also indicated that the proposal is classified as integrated development under section 4.46 of the EP&A Act. You are encouraged to consult with the relevant agencies with respect to licence/approval requirements. If further integrated approvals are required, you must undertake your own consultation with the relevant public authorities and address their requirements in the EIS.

The Department wishes to emphasise the importance of effective and genuine community consultation during the preparation of the EIS. This process should provide the community with a clear understanding of the proposal and its potential impacts and include active engagement with the community regarding key issues of concern. The development application (DA) for the proposed development must be accompanied by clear evidence of the consent to the lodgement of the DA of all owners of land directly subject to the DA.

Please contact the consent authority at least two weeks before you propose to submit your DA. This will enable the consent authority to:

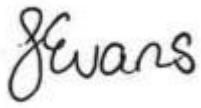
- confirm the applicable fees; and
- determine the number of copies (hard-copy and digital) of the EIS that will be required for reviewing purposes.

If your proposal is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environmental Protection and Biodiversity* Conservation *Act 1999* (EPBC Act). This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Commonwealth Department of Climate Change, Energy the Environment and Water to determine if an approval under the EPBC Act is required (http://www.environment.gov.au or 6274 111).

You should also contact the Mine Safety branch of the NSW Resources Regulator in regard to matters relating to compliance with the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.

If you have any enquiries about these requirements, please contact Emily Pemberton on 02 8275 1783 or email at emily.pemberton@dpie.nsw.gov.au

Yours sincerely,



Jessie Evans

Director Resource Assessments
Energy, Resources and Industry
as delegate for the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* and Part 8 of the *Environmental Planning and Assessment Regulation 2021.*

Designated Development

EAR Number	EAR 1894
Proposal	Establishment of a hard rock quarry over approximately 3.6 ha with an estimated total resource of 1.95 megatonnes (Mt). The proposed rate of extraction is up to 299,000 tonnes per annum for up to 20 years.
Location	1848 Castlereagh Highway, Tallawang, near Gulgong, NSW, 2852 (Lot 1 DP1239728)
Applicant	Hamish Drury and Sally Drury
Date of Issue	05 June 2024
Date of Expiry	05 June 2026
General Requirements	The Environmental Impact Statement (EIS) for the development must comply with the requirements in Clauses 190, 192 and 193 of Part 8 Division 5 of the *Environmental Planning and Assessment Regulation 2021.* In particular, the EIS must include: • an executive summary; • a comprehensive description of the development, including: - a detailed site description and history of any previous activities on the site, including a current survey plan; - identification of the resource, including the amount, type, composition; - the layout of the proposed works and components (including any existing infrastructure that would be used for the development); - an assessment of the potential impacts of the development, as well as any cumulative impacts, including the measures that would be used to minimise, manage or offset these impacts; - a detailed rehabilitation plan for the site; - any likely interactions between the development and any existing/approved developments and land uses in the area, paying particular attention to potential land use conflicts with nearby residential development; - a list of any other approvals that must be obtained before the development may commence; - the permissibility of the development, including identification of the land use zoning of the site; - identification of sensitive receivers likely to be affected by the development using clear maps/plans, including key landform areas, such as conservation areas and waterways; • a conclusion justifying why the development should be approved, taking into consideration: – alternatives; – the suitability of the site;

	– the biophysical, economic and social impacts of the project, having regard to the principles of ecologically sustainable development; and – whether the project is consistent with the objects of the Environmental Planning and Assessment Act 1979; and – a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.
Consultation	In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers and any surrounding landowners that may be impacted by the development. The EIS must describe the consultation that was carried out, identify the issues raised during this consultation, and explain how these issues have been addressed in the EIS.
Key Issues	The EIS must assess the potential impacts of the proposal at all stages of the development, including the establishment, operation and decommissioning of the development. The EIS must address the following specific issues: • Noise – including a quantitative assessment of potential: - construction and operational noise and off-site transport noise impacts of the development in accordance with the *Interim Construction Noise Guideline, NSW Noise Policy for Industry and NSW Road Noise Policy* respectively; - reasonable and feasible mitigation measures to minimise noise emissions; and - monitoring and management measures; • Blasting & Vibration – including: - proposed hours, frequency, methods and impacts; and - an assessment of the likely blasting and vibration impacts of the development, having regard to the relevant ANZECC guidelines and paying particular attention to impacts on people, buildings, livestock, infrastructure and significant natural features; • Air – including an assessment of the likely air quality impacts of the development in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The assessment is to give particular attention to potential dust impacts on any nearby private receivers due to construction activities, the operation of the facility; • Water – including: - a detailed site water balance and an assessment of any water licensing requirements or other approvals required under the *Water Act 1912* and/or *Water Management Act 2000*, including a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo - an assessment of potential impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives; and - a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts; • Biodiversity – including: - accurate predictions of any vegetation clearing on site; - a detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and

	- a detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant. • Heritage – including: - An Aboriginal Cultural Heritage Assessment Report (ACHAR), prepared in accordance with relevant policy and guidelines, identifying, describing and assessing any impacts to Aboriginal cultural heritage sites or values associated with the project. o The ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of thorough archaeological survey and test excavations (where required); o Include evidence of adequate and continuous consultation with Aboriginal stakeholders in determining and assessing impacts, developing and selecting options for avoidance of Aboriginal cultural heritage; and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010).); • Traffic & Transport – including: - accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products; - an assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State Road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads; - a description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development; - evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and - a description of access roads, specifically in relation to nearby Crown roads and fire trails; • Land Resources– including an assessment of: - potential impacts on soils and land capability (including potential erosion and land contamination) and the proposed mitigation, management and remedial measures (as appropriate); and - an assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts; • Waste – including estimates of the quantity and nature of the waste streams that would be generated or received by the development and any measures that would be implemented to minimise, manage or dispose of these waste streams; • Hazards – including an assessment of the likely risks to public safety, paying particular attention to potential bushfire risks and the transport, storage, handling and use of any hazardous or dangerous goods; • Visual – including an assessment of the likely visual impacts of the development on private landowners in the vicinity of the development and key vantage points in the public domain, including with respect to any new landforms; • Social & Economic – an assessment of the likely social and economic impacts of the development; and • Rehabilitation – including: - a detailed description of the proposed rehabilitation measures that would be undertaken throughout the development; - a detailed rehabilitation strategy, including justification for the proposed final landform and consideration of the objectives of any relevant strategic land use plans or policies; and

	potential impacts on landforms (topography), paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds etc).
Environmental Planning Instruments	The EIS must take into account all relevant State Government environmental planning instruments, guidelines, policies, and plans. While not exhaustive, Attachment 1 contains a list of some of the environmental planning instruments, guidelines, policies and plans that may be relevant to the environmental assessment of this development. During the preparation of the EIS you must also consult the Department's EIS Guideline – Extractive Industries – Quarries. This guideline is available at https://www.planning.nsw.gov.au/sites/default/files/2023-02/extractive-industries-quarries-eis-guideline.pdf In addition, the EIS must assess the development against *Mid-Western Regional Local Environmental Plan 2012* and any relevant development control plans/strategies.

ATTACHMENT 1

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Environmental Planning Instruments, Policies, Guidelines & Plans

Environmental Planning Instruments - General	
	State Environmental Planning Policy (Resources and Energy) 2021
	State Environmental Planning Policy (Planning Systems) 2021
	State Environmental Planning Policy (Transport and Infrastructure) 2021
	State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
	State Environmental Planning Policy (Biodiversity and Conservation) 2021
	State Environmental Planning Policy (Resilience and Hazards) 2021
	Mid-Western Regional Local Environmental Plan 2012
Risk Assessment	
	AS/NZS 4360:2004 Risk Management (Standards Australia)
	HB 203: 203:2006 Environmental Risk Management – Principles & Process (Standards Australia)
	DPI Land Use Conflict Risk Assessment Guide
Land	
	State Environmental Planning Policy (Resilience and Hazards) 2021
	Agricultural Land Classification (DPI)
	Rural Land Capability Mapping (OEH)
	Soil and Landscape Issues in Environmental Impact Assessment (NOW)
	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC)
	Guidelines for Consultants Reporting on Contaminated Sites (EPA)
	Agricultural Issues for Extractive Industry Development (DPI)
Water	
Groundwater	NSW Aquifer Interference Policy 2012 (NOW)
	Guide to Groundwater Management in NSW (DPE)
	NSW State Groundwater Quality Protection Policy (NOW)
	NSW State Groundwater Quantity Management Policy (NOW)
	Australian Groundwater Modelling Guidelines 2012 (Commonwealth)
	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	Guidelines for the Assessment & Management of Groundwater Contamination (EPA)
Surface Water	NSW State Rivers and Estuary Policy (NOW)
	NSW Government Water Quality and River Flow Objectives (EPA)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (EPA)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)
	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA)

	Managing Urban Stormwater: Soils & Construction (Landcom) and associated Volume 2E: Mines and Quarries (DECC)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control (EPA)
	Technical Guidelines: Bunding & Spill Management (EPA)
	A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH)
	NSW Guidelines for Controlled Activities (NOW)
Flooding	Floodplain Development Manual (OEH)
	Floodplain Risk Management Guideline (OEH)
Biodiversity	
	Biodiversity Assessment Method (DPIE 2020)
	Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (DPIE 2019)
	Ancillary rules: Biodiversity conservation actions
	Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying variation rules
	NSW Surveying threatened plants and their habitats (DPIE 2019)
	Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians (DECC 2009)
	Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft (DEC 2004)
	Threatened Species Assessment Guideline – The Assessment of Significance (DPIE 2019)
	Threatened Species Test of Significance Guidelines (OEH, 2018)
	OEH principles for the use of biodiversity offsets in NSW
	NSW State Groundwater Dependent Ecosystem Policy (NOW)
Heritage	
	The Burra Charter (The Australia ICOMOS charter for places of cultural significance)
	Guide to investigation, assessing and reporting on Aboriginal cultural heritage in NSW (OEH) 2011
	Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH)
	Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (OEH)
	Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (OEH)
	NSW Heritage Manual (OEH)
	Statements of Heritage Impact (OEH)
Noise	
	NSW Noise Policy for Industry (EPA)
	Interim Construction Noise Guideline (EPA)
	NSW Road Noise Policy (EPA)
Air	
	Protection of the Environment Operations (Clean Air) Regulation 2022
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA)
	Assessment and Management of Odour from Stationary Sources in NSW (DEC)

	National Greenhouse Accounts Factors (Commonwealth)
Transport	
	Guide to Traffic Generating Development (RTA)
	Road Design Guide (RMS) & relevant Austroads Standards
	Future Transport Strategy 2056
	Austroads Guide to Traffic Management
	Austroads Guide to Traffic Management
Hazards	
	Hazardous and Offensive Development Application Guidelines – Applying SEPP 33
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning for Bushfire Protection 2019 (RFS)
Resource	
	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 (JORC)
Waste	
	Waste Classification Guidelines (EPA)
	Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes 1999 (EPA)
Rehabilitation	
	Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Strategic Framework for Mine Closure (ANZMEC-MCA)

ATTACHMENT 2

AGENCY CORRESPONDENCE

Appendix C: Test Of Significance

The below assessment applies to the proposed expansion at Gulgong Quarry.

Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats—

in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

One (1) Vulnerable species, Large Bent-winged Bat (*Miniopterus orianae oceanensis*), listed under the BC Act was detected on site during field surveys on the 19-23 August 2024. However, in accordance with the Species Credit Threatened Bat Guidelines (DPE 2021c), it was established that the species was only detected as a fly-over foraging recording as the subject land, as greater survey area, does not contain the breeding habitat required (caves, tunnels or mines) for the species.

Additionally, the undifferentiated *Nyctophilus* sp. was recorded within the subject area. Only three (3) threatened species within this genus have been recorded as occurring within NSW and therefore have the potential to occur within the subject area, however all three (3) have been excluded from our finalised results because:

- *Nyctophilus howensis* (Lord Howe Island Bat) is considered extinct and is only known from a single skull recording found on Lord Howe Island in 1972; and
- Both *Nyctophilus bifax* (Eastern Long-eared Bat) and *Nyctophilus corbeni* (Corben's Long-eared Bat), which are both listed as Vulnerable under the NSW BC Act, are considered 'ecosystem credit species' and therefore are not required for further investigation.

Furthermore, BioNet data shows that the overwhelming majority (approx. >90%) of *Nyctophilus* records within the wider region (e.g. within 50 km of the subject land) are either *Nyctophilus geoffroyi* or *Nyctophilus gouldi*, with less than approximately 10% of records being *Nyctophilus corbeni*, and no records of *Nyctophilus bifax.* The nearest BioNet threatened species records is *Nyctophilus corbeni* and this record is approximately 30km east from the subject land, past the town of Ulan in heavily vegetated conservation estate. As it is considered unlikely that the *Nyctophilus* sp. recorded in the Ananbat results is a threatened species, no *Nyctophilus* species have been added to the ecosystem credit species lists within the BOAMS case for this project. (Doing so would also not result in any difference to the credit requirements for the project).

No other threatened species were recorded on site during surveys in 19-23 August 2024. While the BDAR identified additional threatened species that may occur within the site, these species are unlikely to utilise the highly modified habitat within the subject land, including the 1.46 ha of PCT 281 and 0.08 ha of PCT 277 proposed to be cleared. Further, this native vegetation does not constitute breeding or critical foraging habitat for threatened species targeted for survey or observed on site. In addition, the extent of vegetation proposed to be cleared compared to the areas of contiguous vegetation to be retained surrounding the quarry, is relatively small. The listed threatened fauna species are highly mobile and occupy larger home ranges.

Twenty hollow-bearing trees (HBTs) would be removed within the area proposed to be cleared, however, none of the hollows were observed to be occupied by threatened species and no evidence of breeding (behaviour, owl pellets, etc) was seen during targeted surveys and hollow searches. A total of 4 HBTs would be retained within a 100 m buffer of the quarry footprint.

There are no mapped watercourses within the subject land. Two (2) mapped ephemeral drainage lines (first-order streams) are mapped within the 100 m survey buffer, however these watercourses will not be impacted by the proposed development alignment. It is therefore not anticipated that the proposed development will have an impact on either waterway.

As such, the Project is not likely to impact the life cycle of any species such that the species would be under increased threat.

in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity—

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The native vegetation proposed to be cleared has been identified as PCT 281 and PCT 277, where only the 0.08 ha of PCT 277 was found to associated with BC Act Listed TEC, as outlined in this BDAR. Regardless, the clearance of 0.08 ha of the community would not adversely affect or modify the composition of the surrounding occurrence of PCT 277, as the native vegetation within the subject land was observed to be highly fragmented and disturbed. In addition, the footprint of the subject land has been purposely designed to be located within low-quality vegetation, in order to mitigate any impacts to threatened species or ecological communities. See Section 10.2 of the BDAR for further discussion.

This BDAR identified that there were threatened ecological communities associated with the two PCTs, PCT 281 and PCT 277, proposed for clearance within the subject land, BC Act listed Threatened Ecological Community (TEC) '*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*' and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) TEC '*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community'* (CEEC).

It was found that the PCT 271 and PCT 281 vegetation within the subject land does not meet the condition class and threshold criteria for the EPBC Act Listed CEEC, as the patch did not contain 20 or more mature trees per hectare or natural regeneration of dominant overstorey eucalyptus species as per the survey guidelines (TSSC 2011). Further, it was found that PCT 281 did not conform to the BC Act listed TEC due to the dominance of *Angophora floribunda* (Rough-barked Apple) in the canopy whilst PCT 277 did meet the determination. The latter was due to the dominance of *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus albens* (White Box) in the canopy layer.

The Project will remove 0.08 ha of White Box Yellow Box Blakely's Gum Woodland. The proposed development footprint location was determined to avoid a much larger area of the PCT 277 and the associated TEC in western part of the subject lot, as well as to avoid nearby small areas that harbour this PCT and TEC. Overall, the proposed clearing is considered a very minor impact (0.08ha) to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. This is represented by the loss of 3 mature paddock trees in the west of the subject land (all *E. blakelyi,* Figure 26), as well two due to the proposed should widening of the Castlereagh Hwy (both are *E. albens,* Figure 27).

in relation to the habitat of a threatened species or ecological community—

i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

The area of 0.08 ha of PCT 277 proposed to be removed was found to be associated with BC Act listed TEC 'White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast'. PCT 281 (1.54 ha) was not found to be associated with a TEC. However, overall the proposed clearing is considered a very minor impact (0.08ha) to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. The proposed development footprint location was determined to avoid a much larger area of the PCT 277 and the associated TEC in western part of the subject lot, as well as to avoid nearby small areas that harbour this PCT and TEC. This is represented by the loss of 3 mature paddock trees in the west of the subject land (all *E. blakelyi,* Figure 26), as well two due to the proposed should widening of the Castlereagh Hwy (both are *E. albens,* Figure 27). Regarding the latter, the stems of these two trees are not within the zone of works (refer to designs in Appendix I), however laying of bitumen over the Tree Protection zones (TPZs) for these two trees is likely to reduce water infiltration into the root zone. Root impacts may also occur due to any grubbing that is required to level the ground level prior to laying of bitumen. The ultimate intention of the proponent is to retain these trees, however for conservative reasons, they have been assessed as being removed within this BDAR. The proponent will engage a qualified arborist to assess the potential impact of works on the TPZs in order to confirm if they can be retained.

Additionally, extensive surveys conducted within PCT 277, identified the vegetation to be heavily degraded due to existing land uses and a portion of the subject land was found to be historically cleared for the existing quarry borrow pit and access roads. The project has followed the avoid, minimise and mitigate strategy to address potential impacts.

One (1) Vulnerable species, Large Bent-winged Bat (*Miniopterus orianae oceanensis*), listed under the BC Act was detected on site during field surveys on the 19-23 August 2024. However, in accordance with the Species Credit Threatened Bat Guidelines (DPE 2021c), it was established that the species was only detected as a fly-over foraging recording as the subject land, as greater survey area, does not contain the breeding habitat required (caves, tunnels or mines) for the species. No other threatened species were recorded on site during surveys in 19-23 August 2024.

Additionally, the undifferentiated *Nyctophilus* sp. was recorded within the subject area. However, only three (3) threatened species within this genus have been recorded as occurring within NSW and therefore have the potential to occur within the subject area, however all three (3) have been excluded from our finalised results. One of these species' has been included due to the rarity and extinction listing of the species while the other two species have been identified as 'ecosystem credit species'. These species have not been identified as 'ecosystem credit species' via the BAM-C, however, will be included within the ecosystem credit listing, where required (DPE 2020b).

While the desktop searches conducted for the subject land identified threatened species that had a potential to occur within the subject land, it was determined that these threatened entities are unlikely to utilise the subject land. The 0.08 ha of PCT 277 and 1.46 ha of PCT 281 proposed to be cleared is highly modified and degraded as a result of historical and current agricultural land uses within the subject land. In addition, the extent of vegetation proposed to be cleared compared to the areas of contiguous vegetation to be retained surrounding the WTP, is relatively small. The listed threatened fauna species are highly mobile and occupy larger home ranges.

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No areas of habitat will become significantly fragmented or isolated as a result of the proposed quarry expansion, as the small area proposed to be cleared (1.46 ha of PCT 281 and 0.08 ha of PCT 277) is around the edge of the existing cleared quarry footprint.

The subject land does not form part of a regional or local biodiversity corridor and only contains sparce scattered trees at the top of the hillock, with the addition of large native trees scattered across the subject land and wider subject lot. This vegetation may provide as stepping stones and habitat trees for the fauna that is moving across the landscape between the more intact patches in the region. Locally there are patches of more intact vegetation near the western boundary of the subject land (approx. 500 m away), to the south west of the subject land (approx. one km away) and on the other side of the Castlereagh Highway to the east of the subject land (approx. 500 m away).

However, the native vegetation observed onsite was identified as highly disturbed and modified, and will not reduce connectivity to surrounding areas of native vegetation. The proposed development has been strategically positioned, where possible to develop on within areas of existing infrastructure and avoid the removal denser surrounding vegetation.

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The 1.46 ha of PCT 281 and 0.08 ha of PCT 277 proposed to be removed does not constitute breeding habitat or provide critical foraging habitat for any threatened species targeted during surveys or observed on site. While one (1) confirmed Vulnerable microbat recordings via the three (3) Anabat monitors deployed within the survey area, it was established that one was only detected as a fly-over foraging recording and the other recording would be considered a 'ecosystem credit species' and will only be included within the BAM C calculations where required. Twenty (20) HBTs will be removed as part of the proposed vegetation clearance, however, no threatened species were observed occupying the hollows and no evidence of breeding was seen. As such, the removal of this small area (1.54 ha) of native vegetation is unlikely to be detrimental to the long-term survival of these species.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No declared areas of outstanding biodiversity value (AOBV) occur within the proposed quarry footprint. No indirect impacts on off-site AOBV are predicted to occur.

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Project involves clearing of native vegetation and loss of twenty hollow-bearing trees, which are considered key threatening processes in NSW. Vegetation clearing is considered a key threatening process under the BC Act however the 1.46 ha of PCT 281 and 0.08 ha of PCT 277 proposed to be removed is not considered to a key threatening process (DPE 2016). The removal of twenty HBTs within 1.54 ha of native vegetation is unlikely to significantly increase the impact of these key threatening processes in the locality, due to the presence of HBTs and equivalent contiguous native vegetation in the immediate vicinity of the area proposed to be cleared. Additionally, the sites current land use is as an existing quarry and therefore the project is a continuation of such land usage and would not contribute additionally to key threatening processes. Despite this, the mitigation strategies as outlined in this BDAR aim to manage other potential key threatening processes such as weed intrusion.

Appendix D: Relevant BAM-C Reports

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00050169/BAAS18018/24/00050170	Gulgong Quarry	14/03/2024
Assessor Name	Report Created	BAM Data version *
Steven Jarman	27/09/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS18018	Part 4 Developments (General)	Open
Assessment Revision	Date Finalised	BOS entry trigger
0	To be finalised	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.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	281_Low	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Low	1.3	1	
2	277_Moderate	277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate	0.08	1	

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050169/BAAS18018/24/00050170	Gulgong Quarry	14/03/2024
Assessor Name	Report Created	BAM Data version *
Steven Jarman	27/09/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS18018	Part 4 Developments (General)	Open
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Area clearing threshold	To be finalised

* 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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Flame Robin	Petroica phoenicea	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Little Lorikeet	Glossopsitta pusilla	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Regent Honeyeater	Anthochaera phrygia	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Regent Honeyeater	Anthochaera phrygia	277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Scarlet Robin	Petroica boodang	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
South-eastern Hooded Robin	Melanodryas cucullata cucullata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Speckled Warbler	Chthonicola sagittata	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Superb Parrot	Polytelis swainsonii	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Swift Parrot	Lathamus discolor	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
White-throated Needletail	Hirundapus caudacutus	281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Candidate Species Report

Proposal Details

Assessment Id 00050169/BAAS18018/24/00050170	Proposal Name Gulgong Quarry	BAM data last updated * 14/03/2024
Assessor Name Steven Jarman	Report Created 27/09/2024	BAM Data version * 67
Assessor Number BAAS18018	Assessment Type Part 4 Developments (General)	BAM Case Status Open
Assessment Revision 0	Date Finalised To be finalised	BOS entry trigger 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.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia ausfeldii Ausfeld's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Ammobium craspedioides Yass Daisy	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Cullen parvum Small Scurf-pea	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Delma impar Striped Legless Lizard	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Dichanthium setosum Bluegrass	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Euphrasia arguta Euphrasia arguta	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Keyacris scurra Key's Matchstick Grasshopper	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Myotis macropus Southern Myotis	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Ninox strenua Powerful Owl	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis - endangered population Squirrel Glider in the Wagga Wagga Local Government Area	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Polytelis swainsonii Superb Parrot	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Pomaderris cotoneaster Cotoneaster Pomaderris	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Prasophyllum petilum Tarengo Leek Orchid	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Prasophyllum sp. Wybong Prasophyllum sp. Wybong	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Swainsona recta Small Purple-pea	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?
Swainsona sericea Silky Swainson-pea	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Synemon plana Golden Sun Moth	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☑ Survey month outside the specified months?

Threatened species Manually Added

Common Name	Scientific Name
Powerful Owl	Ninox strenua

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Booroolong Frog	Litoria booroolongensis	Refer to BAR
Grey-headed Flying-fox	Pteropus poliocephalus	Refer to BAR
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Swift Parrot	Lathamus discolor	Refer to BAR

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00050169/BAAS18018/24/00050170	Gulgong Quarry	14/03/2024
Assessor Name	Report Created	BAM Data version *
Steven Jarman	27/09/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS18018	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	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

Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion												
2	277_Moderate	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	38.2	38.2	0.08	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	2
											Subtotal	**2**
Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion												
1	281_Low	Not a TEC	10.6	10.6	1.3	PCT Cleared - 67%	High Sensitivity to Gain			1.75		0
											Subtotal	**0**
											Total	**2**

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

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00050169/BAAS18018/24/00050170

Assessor Name
Steven Jarman

Proponent Names

Assessment Revision
0

BOS entry trigger
BOS Threshold: Area clearing threshold

Proposal Name
Gulgong Quarry

Assessor Number
BAAS18018

Report Created
27/09/2024

Assessment Type
Part 4 Developments (General)

BAM data last updated *
14/03/2024

BAM Data version *
67

BAM Case Status
Open

Date Finalised
To be finalised

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
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	Critically Endangered Ecological Community	277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Species		

Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Not a TEC	1.3	0	0	0
277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	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	0.1	2	0	2

277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
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 This includes PCT's:	-	277_Moderate	Yes	2	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

BAM Biodiversity Credit Report (Like for like)

281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 268, 272, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 301, 316, 326, 337, 347, 383, 421, 426, 433, 434, 437, 441, 444, 461, 483, 509, 516, 544, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1609, 1693, 1695, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3401, 3403, 3404, 3405, 3406, 3485, 4147	Western Slopes Grassy Woodlands >=50% and <70%	281_Low	Yes	0	Inland Slopes, Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00050169/BAAS18018/24/00050170

Proposal Name

Gulgong Quarry

BAM data last updated *

14/03/2024

Assessor Name

Steven Jarman

Assessor Number

BAAS18018

BAM Data version *

67

Proponent Name(s)

Report Created

27/09/2024

BAM Case Status

Open

Assessment Revision

0

Assessment Type

Part 4 Developments (General)

Date Finalised

To be finalised

BOS entry trigger

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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
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	Critically Endangered Ecological Community	277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	Not a TEC	1.3	0	0	0.00
277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	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	0.1	2	0	2.00

277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived	-	277_Moderate	Yes	2	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower

	Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highla This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1307, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1691, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149,					Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	4150					
281-Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 268, 272, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 301, 316, 326, 337, 347, 383, 421, 426, 433, 434, 437, 441, 444, 461, 483, 509, 516, 544, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1609, 1693, 1695, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3401, 3403, 3404, 3405, 3406, 3485, 4147	Western Slopes Grassy Woodlands >=50% and <70%	281_Low	Yes	0	Inland Slopes,Bogan-Macquarie, Bondo, Capertee Uplands, Capertee Valley, Crookwell, Hill End, Kerrabee, Lower Slopes, Murray Fans, Murrumbateman, Orange, Pilliga, Talbragar Valley and Wollemi. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grassy Woodlands	Tier 3 or higher threat status	281_Low	Yes (including artificial)	0	IBRA Region: NSW South Western Slopes, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

Appendix E: Anabat Results

Microbat Call Identification Report

Prepared for ("Client"):	Bower Ecology
Survey location/project name:	Gulgong, NSW
Survey dates:	19-23 August 2024
Client project reference:	
Job no.:	BOW-2404
Report date:	11 September 2024

Methods

Data received

Balance! Environmental received 3295 full-spectrum ultrasonic files (.WAV format), recorded over four consecutive nights (19th – 22nd August 2024), using three Anabat detectors. GPS metadata saved by the detectors indicates that each unit was deployed at a separate location and remained at the same site for the duration of the survey.

Bat-call analysis

All post-processing and analyses were performed with *Anabat Insight* (Version 2.1.2; Titley Scientific, Brisbane), as follows:

1. The entire dataset was first scanned twice using the *Search* tool to separate files containing potentially-identifiable bat calls from those with only non-bat background noise and/or short duration calls (<3 pulses) that would be of little use for species identification. To achieve this, the following *Search* criteria were applied to every file:
    a. Filter settings
        i. Characteristic frequency (Fc) = 10 – 165 kHz
        ii. Pulse duration (Dur) = 2 – 120 ms
        iii. Time between pulses (TBC) = 5 – 1500 ms
        iv. File must contain a minimum of three (3) pulses that match the above criteria.
    b. Analysis settings
        i. ZC threshold = 15 (first pass) and "Auto" (second pass)
        ii. Smoothness = 5 (first pass) and "None" (second pass)
        iii. Search Per Pulse
2. Files that passed the above noise filtration process were then scanned using the *Decision Tree* tool, to group them according to the average zero-crossing metrics of the calls within. *Decision Tree* grouping was based primarily on characteristic frequency (Fc), with some frequency groups further subdivided using metrics such as pulse duration (Dur), slope of the characteristic section (Sc), and a custom "bandwidth" metric derived from the difference between maximum frequency (Fmax) and Fc.
3. Species present within each *Decision Tree* output group were verified by manually reviewing the call spectrograms and comparing pulse properties and metrics with those of regionally relevant reference calls and the call descriptions provided in Pennay *et al.* (2004).

The likelihood of species' occurrence in the survey area was confirmed by referring to relevant distributional information (e.g., Australasian Bat Society 2021; Baker & Gynther 2023; Churchill 2008).

Where a call is assigned to a single species in the above process, it is implied that the identification is highly reliable (i.e. better than 90% probability that the call belongs to the relevant species). Those calls are listed as "Positively identified" in the Results and the species should be regarded as "Definitely present" at the relevant site. Where there is any doubt over call identities, a multi-species label is applied, and those calls are presented as "Unresolved calls" in the Results. All members of those species groups should be regarded as "Possibly present" at the relevant site unless also listed as "Positively identified calls".

Reporting standard

The format and content of this report follows Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003), available on-line at http://www.ausbats.org.au/. Species nomenclature follows Armstrong *et al.* (2020).

Results & Discussion

The noise filtration process excluded 1777 WAV files from further analysis. The remaining 1518 files contained 1549 identifiable bat calls, 47% (734) of which were positively attributed to distinct taxa. The other 815 "unresolved" calls could not be reliably identified and were assigned to several multi-species groups.

At least eleven and possibly 14 species were detected (see **Table 1**). The positively identified calls were attributed to nine distinct species plus the undifferentiated *Nyctophilus* genus, three species of which –*N. corbeni, N. geoffroyi* and *N. gouldi* – potentially occur in the study area.

Sixteen unresolved calls represented at least one and possibly two additional species (*Ozimops* petersi and/or *O. ridei*); however, the remaining unresolved calls all belonged to species that were otherwise reliably identified.

Sample spectrograms of each identified call type are presented in **Appendix 1**.

Table 1 Bats recorded during the Gulgong survey, 19th – 23rd August 2024.

Number of calls allocated to each species and unresolved group.

Detector:	583127	605653	660606	Species Total
Positively identified calls				
Chalinolobus gouldii	35	44	10	89
Chalinolobus morio	8	28	2	38
Nyctophilus sp.	2	23	1	26
Scotorepens balstoni		5	1	6
Vespadelus darlingtoni	4	14	7	25
Vespadelus regulus	110	36	240	386
Vespadelus vulturnus	6	2	2	10
Miniopterus orianae oceanensis	18	7	14	39
Austronomus australis	1	9	2	12
Ozimops planiceps	37	48	18	103
Unresolved calls				
C. gouldii or *Ozimops* sp.	121	142	28	291
M. o. oceanensis or *Vespadelus* sp.	366	14	37	417
Ozimops ridei or *O. petersi*	5	9	2	16
V. regulus or *V. vulturnus*	72	18	1	91
Site Total	785	399	365	1549

References

Armstrong, K.N., Reardon, T.B., and Jackson, S.M. (2020). A current taxonomic list of Australian Chiroptera. Australasian Bat Society. Version 2020-06-09. URL: http://ausbats.org.au/species-list/4593775065

Australasian Bat Society (2021), *BatMap.* http://ausbats.org.au/batmap. Accessed 8/6/2024.

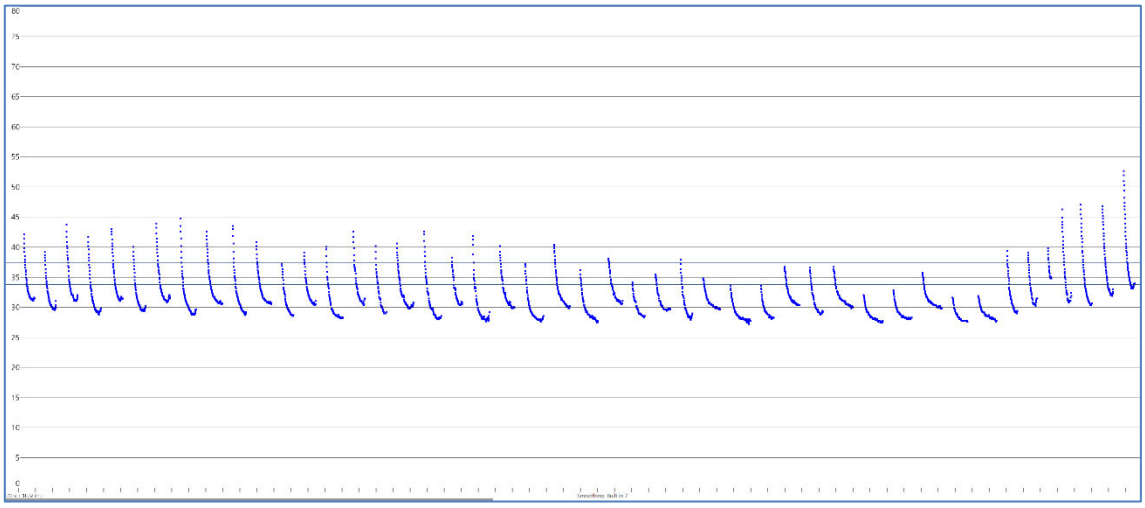
Baker, A.M. and Gynther, I.C. (editors) (2023). *Strahan's Mammals of Australia*. Fourth Edition; Reed New Holland Publishers; Sydney.

Churchill, S. (2008). *Australian Bats.* Jacana Books, Allen & Unwin; Sydney.

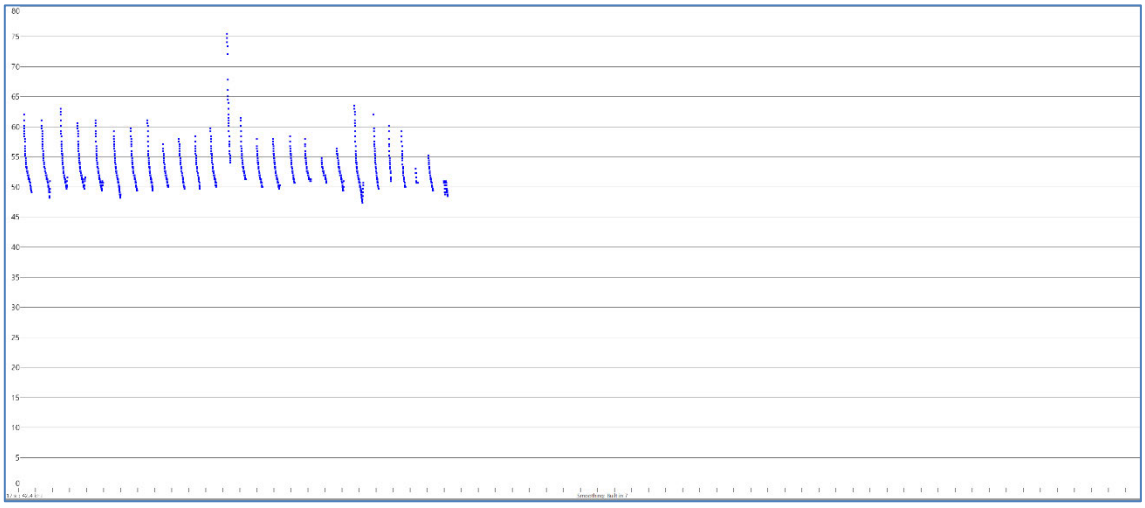
Pennay, M., Law, B., and Reinhold, L. (2004). *Bat calls of New South Wales*: Region based guide to echolocation calls of Microchiropteran bats. NSW Department of Environment and Conservation, Hurstville.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

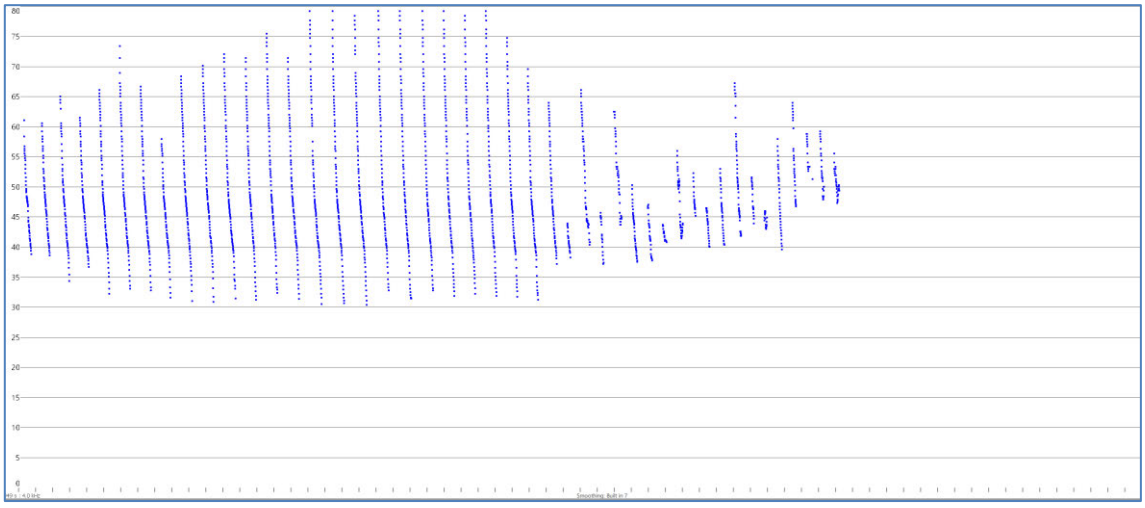
Appendix 1 Representative call sequences recorded at Gulgong, 19-23 August 2024.
x-axis = 10 ms per tick-mark; time between pulses removed ("compressed")



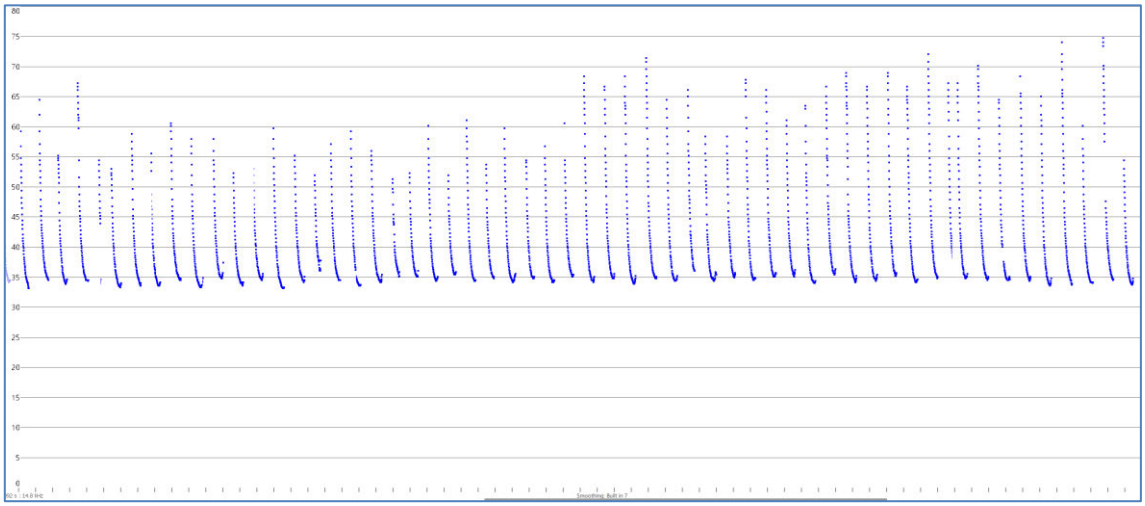
Chalinolobus gouldii



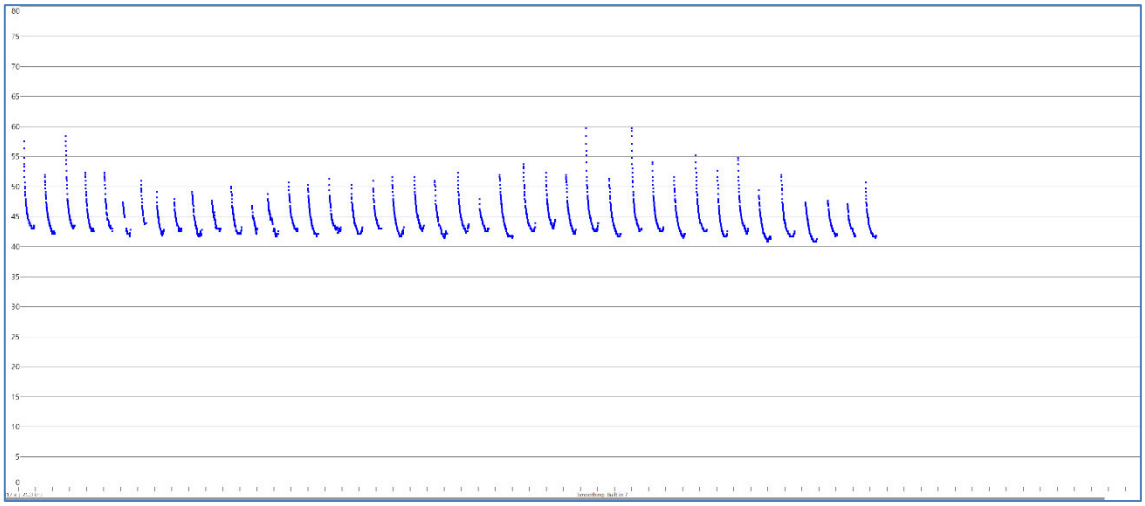
Chalinolobus morio



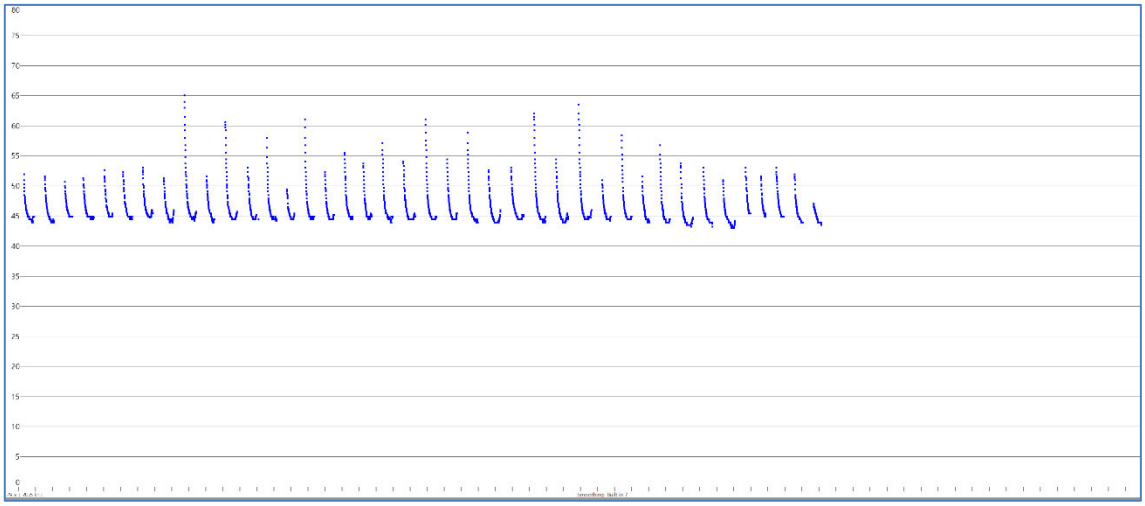
Nyctophilus sp.



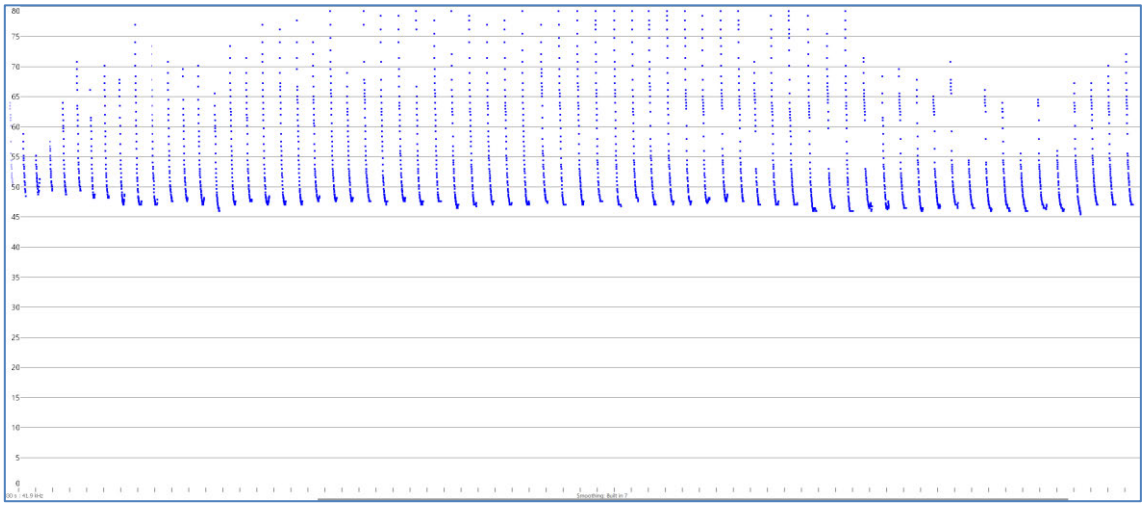
Scotorepens balstoni



Vespadelus darlingtoni

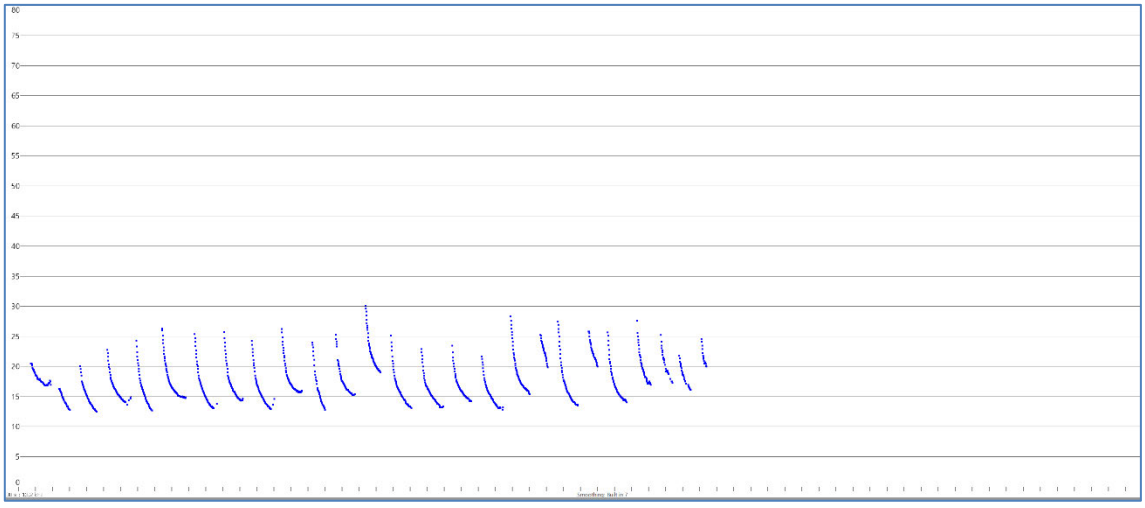


Vespadelus regulus

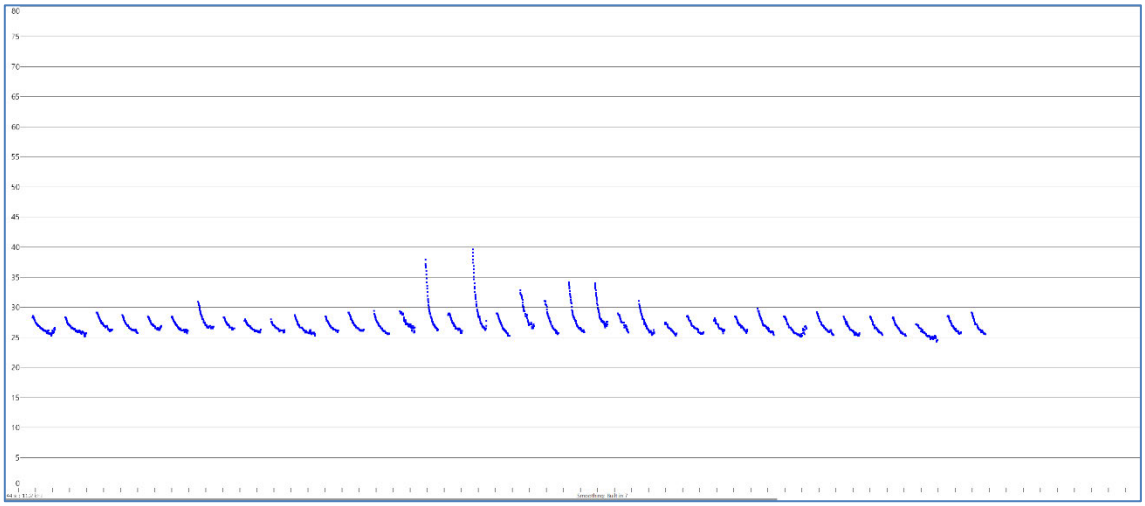


Vespadelus vulturnus

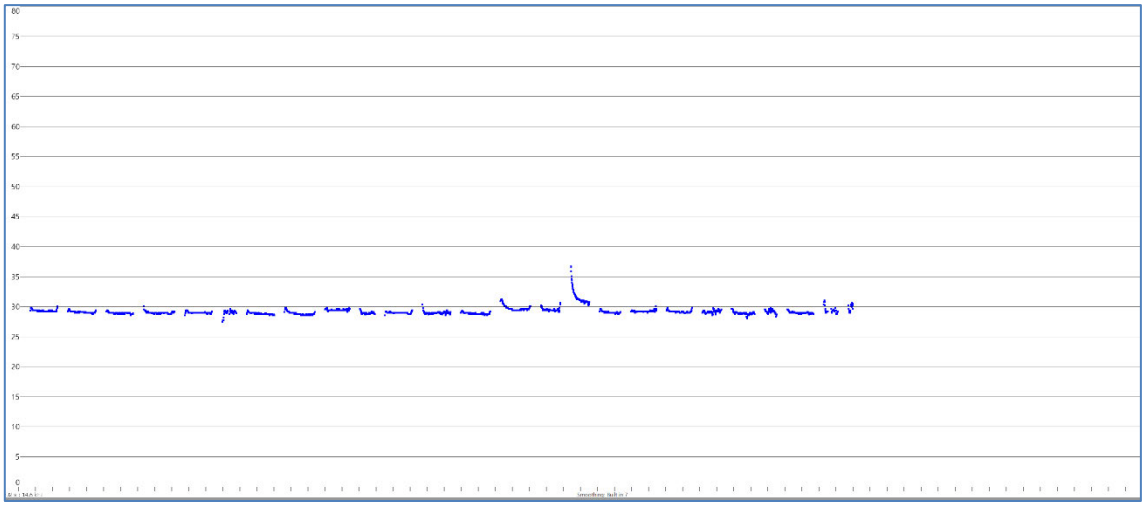
Miniopterus orianae oceanensis



Austronomus australis



Ozimops planiceps



Ozimops ridei or *O. petersi*

Appendix F: Field Data

	Plot 1	Plot 2
PCT	281	277
Area	1.46 ha	0.08 ha
Patch Size	8 ha	8 ha
Condition Class	Low	Moderate
Easting	162537	728002.4
Northing	6430467	6433676.7
Bearing	180	180
compTree	1	1
compShrub	2	0
compGrass	2	4
compForb	2	1
compFern	0	0
compOther	0	0
strucTree	2	30
strucShrub	0.2	0
strucGrass	2.1	16.2
strucForb	0.2	0.1
strucFern	0	0
strucOther	0	0
funLargeTrees	3	2
funHollowTrees	3	1
funLitterCover	3	30
funLenFallenLogs	60	16
funTreeStem5to9	1	0
funTreeStem10to19	0	0
funTreeStem20to29	0	0
funTreeStem30to49	0	0
funTreeStem50to79	0	0
funTreeRegen	0	0
funHighThreatExotic	10	0
Plot-based vegetation		
Vegetation Integrity	10.6	38.2

Plot 1 Floristics

Species Name	Exotic?	HTW?	Growth form group	Cover	Abundance		Notes / explanation of change
Angophora floribunda			Tree (TG)	2	2		
Phytolacca octandra	1			1	5		
Anthosachne scabra			Grass & grassli	2	50		
Rumex brownii			Forb (FG)	0.1	5		
Hypochaeris glabra	1			3	200		
Paspalum dilatatum	1	*1*		10	500		
Arctotheca calendula	1			0.5	20		
Bothriochloa macra			Grass & grassli	0.1	5		
Trifolium sp.	1			25	10000		
Cotula australis			Forb (FG)	0.1	10		
Cassinia sifton			Shrub (SG)	0.1	1		
Arctotheca calendula	1			0.2	20		
Melichrus urceolatus			Shrub (SG)	0.1	1		

Plot 2 Floristics

Species Name	Exotic?	HTW?	Growth form group	Cover	Abundance		Notes / explanation of change
Anthosachne scabra			Grass & grassli	30	600		
Eucalyptus blakelyi			Tree (TG)	2	1		
Cheilanthes sieberi			Fern (EG)	0.1	100		
Hypochaeris glabra	1			3	500		
Stypandra glauca			Forb (FG)	0.5	10	Click +/- to expand or collapse sappling dat	
Cassinia sifton			Shrub (SG)	0.2	8		
Trifolium sp.	1			2	500		
Goodenia hederacea			Forb (FG)	0.1	50		
Bromus spp.	1		Grass & grassli	0.1	2		
Capsella bursa-pastoris	1			0.1	1		
Pultenaea microphylla			Shrub (SG)	0.2	5		
Conyza bonariensis	1			0.2	100		
Melichrus urceolatus			Shrub (SG)	0.1	1		
Bothriochloa macra			Grass & grassli	0.2	20		

Appendix G: Species Likelihood of Occurrence Table

Key for Table 1:

- ‘known’ = the species was or has been observed within the survey area.
- ‘likely’ = a medium to high probability that a species uses the survey area.
- ‘potential’ = suitable habitat for a species occurs within the survey area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur.
- ‘unlikely’ = a very low to low probability that a species uses the subject land. This is based on both survey for the species, current levels of disturbance, available habitat and/or species distribution.
- ‘no’ = habitat within the study area and in the vicinity is unsuitable for the species.

Note: all threatened species data is from the NSW Bionet Threatened Biodiversity Profile Data Collection, unless otherwise referenced.

Table 1: Species Likelihood Assessment

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Acacia ausfeldii	Ausfeld's Wattle	V	NL	Species	Established plants are likely to be killed by fire, as mature and juvenile plants have a single-stemmed growth form.;1|Associated species include Eucalyptus albens, E. blakelyi and Callitris spp., with an understorey dominated by Cassinia spp. and grasses.;2|Acacia ausfeldii is likely to have a dormant soil seedbank from which germination is stimulated by fire; a small number of seeds have been observed to germinate in the absence of fire.;3|When stimulated by fire, germination appears to be reduced at depth, and by low fire temperature. Laboratory experiments show strong germination only at the highest temperature treatment of 100ºC (Brown et al. 2003).;4|Flowers from August to October.;5|	Potential
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dual	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.;1|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.;2| 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.;3|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. ;4|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 recovery of this species a full understanding of the habitats used in the non-breeding season is critical.;5|There are several known key breeding areas, four of them in NSW - Capertee Valley, Lower Hunter Valley, Mudgee/Wollar and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria.;6|An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.;7|	Potential

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dual	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.;1|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.;2| 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.;3|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. ;4|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 recovery of this species a full understanding of the habitats used in the non-breeding season is critical.;5|There are several known key breeding areas, four of them in NSW - Capertee Valley, Lower Hunter Valley, Mudgee/Wollar and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria.;6|An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.;7|	Potential - within 5km of site (BioNet). The species may occasionally use or fly over the survey area; however there is very limited habitat for this species within the survey area.
Aphelocephala leucopsis	Southern Whiteface	V	V	No Data	Southern whiteface occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. There is a broad hybrid zone between the two subspecies extending north from the western edge of the Nullarbor Plain. The northern boundary extends to about Carnarvon in the west, to the southern Northern Territory in central Australia, but is slightly further south in Queensland where the species is largely confined to the south-west of the Mitchell Grass Downs and along the southern state border. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter. Although the species typically forages in small groups of 2–8 individuals, birds may congregate in larger flocks during the non-breeding season, with as many as 70 birds recorded in foraging parties in winter. The species often participates in mixed species feeding flocks, particularly with other whiteface and thornbill species. (Infomation from SPRAT).	Potential
Aprasia parapulchella	Pink-tailed Legless Lizard	V	V	Species	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis).;1|Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.;2|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.;3|Feeds on the larvae and eggs of the ants with which it shares its burrows.;4|It is thought that this species lays 2 eggs inside the ant nests during summer; the young first appear in March.;5|Not all sites are rocky. For instance, on the Hay Plains the species has been recorded from a disturbed ants nest in chenopod shrubland and the West Wyalong population occurs in mallee woodland.;6|	Potential

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Aprasia parapulchella	Pink-tailed Legless Lizard	V	V	Species	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis).;1|Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.;2|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.;3|Feeds on the larvae and eggs of the ants with which it shares its burrows.;4|It is thought that this species lays 2 eggs inside the ant nests during summer; the young first appear in March.;5|Not all sites are rocky. For instance, on the Hay Plains the species has been recorded from a disturbed ants nest in chenopod shrubland and the West Wyalong population occurs in mallee woodland.;6|	Unlikely
Botaurus poiciloptilus	Australasian Bittern	E	E	Ecosystem	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.).;1|Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails.;2|Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.;3|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.;4|	No
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Dual	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. ;1|In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands,particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.;2|May also occur in sub-alpine Snow Gum (Eucalyptus pauciflora) woodland and occasionally in temperate rainforests.;3|Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground.;4|	Unlikely
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V	V	Dual	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods.;1|Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations.;2|In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (Casuarina cristata).;3|Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.;4|Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.;5|	Unlikely
Chalinolobus dwyeri	Large-eared Pied Bat	E	E	Species	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 caves, overhangs, mine adits and concrete structures such as derelict buildings. They remain loyal to the same cave over many years.;1|Found in well-timbered areas containing gullies.;2|The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy.;3|Likely to hibernate through the coolest months.;4|It is uncertain whether mating occurs early in winter or in spring.;5|	Unlikely

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Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	Ecosystem	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.;1|Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding.;2|Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. ;3|When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae.;4|Hollows in standing dead or live trees and tree stumps are essential for nesting. ;5|The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). Each group is composed of a breeding pair with retained male offspring and, rarely, retained female offspring. Often in pairs or cooperatively breeding groups of two to five birds. ;6|	Potential
Commersonia procumbens (syn. *Androcalva procumbens*)	Commersonia procumbens	V	V	Species	Grows in sandy sites, often along roadsides.;1|Recorded in Eucalyptus dealbata and Eucalyptus sideroxylon communities, Melaleuca uncinata scrub, under mallee eucalypts with a Calytrix tetragona understorey, and in a recently burnt Ironbark and Callitris area. Also in Eucalyptus fibrosa subsp. nubila, Eucalyptus dealbata, Eucalyptus albens and Callitris glaucophylla woodlands north of Dubbo.;2|Other associated species include Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium and Kunzea parvifolia.;3|Fruiting period is summer to autumn. Flowers from August to December.;4|Appears to produce seed which persists for some time in the seed bank. Large numbers of seedlings have been observed germinating after fire at sites where the species was not apparent above ground before the fires. Clusters of individuals may be clonal.;5|The species is often found as a pioneer species of disturbed habitats. It has been recorded colonising disturbed areas such as roadsides, the edges of quarries and gravel stockpiles and a recently cleared easement under power lines.;6|Has been recorded in populations of 50+ individuals of various ages, 28 plants on the western side of the road and 58 plants on the sunnier eastern side. Populations may comprise a single cohort of individuals, or have a multi-aged structure where some individuals appear to be old with thickened runners.;7|	Potential
Crinia sloanei	Sloane's Froglet	E	E	Species	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.;1|	No
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Ecosystem	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.;1|Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.;2|Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds.;3|Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.;4|A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl.;5|Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creeklines.;6|Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.;7|	Potential

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Delma impar	Striped Legless Lizard	V	V	Species	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component.;1|Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.;2|Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass Themeda australis, spear-grasses Austrostipa spp. and poa tussocks Poa spp., and occasionally wallaby grasses Austrodanthonia spp.;3|Sometimes present in modified grasslands with a significant content of exotic grasses.;4|Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter.;5|Sometimes utilises dried cowpats for shelter.;6|Actively hunts for spiders, crickets, moth larvae and cockroaches.;7|Two papery eggs are laid in early summer.;8|Goes below ground or under rocks or logs over winter.;9|	Potential
Dichanthium setosum	Bluegrass	V	V	Species	Flowering time is mostly in summer.;1|Associated with heavy basaltic black soils and red-brown loams with clay subsoil.;2|Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat.;3|Associated species include Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia and Psoralea species.;4|Locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult. ;5|	Potential
Euphrasia arguta	Euphrasia arguta	CE	CE	Species	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'.;1|Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance.;2|The number of plants at a given site may vary over time depending on the season and disturbance history.;3|Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once.;4|Euphrasia arguta has an annual habit and has been observed to die off over the winter months, with active growth and flowering occurring between January and April.;5|As with other species of Euphrasia, this species is semi-parasitic and attaches to the roots of other associated plants.;6|	Unlikely
Falco hypoleucos	Grey Falcon	V	V	Ecosystem	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.;1|Also occurs near wetlands where surface water attracts prey.;2|Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken.;3|Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.;4|	Potential
Grantiella picta	Painted Honeyeater	V	V	Ecosystem	Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests.;1|A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.;2|Insects and nectar from mistletoe or eucalypts are occasionally eaten.;3|Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.;4|	Potential

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Haliaeetus leucogaster	White-bellied Sea-Eagle	V	NL	Dual	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.;1|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. ;2|Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). ;3|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. ;4|Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.;5|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.;6|May be solitary, or live in pairs or small family groups consisting of a pair of adults and dependent young. ;7|Typically lays two eggs between June and September with young birds remaining in the nest for 65-70 days.;8|	Unlikely
Hirundapus caudacutus	White-throated Needletail	V	V	Ecosystem	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 (Coventry 1989; Tarburton 1993; Watson 1955). 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. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps . When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	Potential
Homoranthus darwinioides	Fairy Bells	V	V	Species	Grows in in various woodland habitats with shrubby understoreys, usually in gravely sandy soils. Landforms the species has been recorded growing on include flat sunny ridge tops with scrubby woodland, sloping ridges, gentle south-facing slopes, and a slight depression on a roadside with loamy sand.;1|Associated species include Callitris endlicheri, Eucalyptus crebra, E. fibrosa, C. trachyphloia, E. beyeri subsp. illaquens, E. dwyeri, E. rossii, Leptospermum divaricatum, Melaleuca uncinata, Calytrix tetragona, Allocasuarina spp. and Micromyrtus spp.;2|Flowers in spring or from March to December.;3|The species has been cultivated in Sydney from Rylstone cuttings and at Burrendong Arboretum near Wellington.;4|Forms small shrubs or shrublets, often in tangled masses. It has a localised distribution and may be the dominant undershrub at some sites. Its abundance in populations ranges from rare (only one plant at site) to locally very abundant.;5|	Unlikely due to grazing land use
Lathamus discolor	Swift Parrot	E	CE	Dual	Migrates to the Australian south-east mainland between February and October.;1|On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.;2|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.;3|Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana, Blackbutt E. pilularis, and Yellow Box E. melliodora.;4|Return to some foraging sites on a cyclic basis depending on food availability.;5|Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.;6|	Potential

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Lathamus discolor	Swift Parrot	E	CE	Dual	Migrates to the Australian south-east mainland between February and October.;1|On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.;2|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.;3|Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana, Blackbutt E. pilularis, and Yellow Box E. melliodora.;4|Return to some foraging sites on a cyclic basis depending on food availability.;5|Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.;6|	Potential
Leipoa ocellata	Malleefowl	E	V	Ecosystem	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species.;1|Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers.;2|Malleefowl will occupy areas within 5 years of fire, however higher breeding densities are recorded from older age classes.;3|A pair may occupy a range of between 50 and 500 ha, overlapping with those of their neighbours. Mainly forage in open areas on seeds of Acacias and other native shrubs (Cassia, Beyeria, Bossiaea), buds, flowers and fruits of herbs and various shrubs, insects (cockroaches, ants, soil invertebrates), and cereals if available.;4|Incubate eggs in large mounds that contain considerable volumes of sandy soil. The litter within the mounds must be dampened for it to decompose and provide heat for incubation of eggs. Up to 34 eggs may be laid in a single season, though usually between 15 and 24 (and clutches smaller in dry years). The male monitors the temperature within the egg chamber using its bill, and regularly works the mound during the breeding season to maintain a constant temperature around 34 degrees. The chicks hatch after between 49 and 96 days (average around 60) and can walk as soon as they emerge from the mound, can run quickly within 2 hours and can fly within 24 hours.;5|Recently burnt areas are used for foraging, with malleefowl taking advantage of increased herbage, while adjacent unburnt habitats are used for roosting, nesting, and daytime shelter.;6|	Unlikely
Lepidium aschersonii	Spiny Peppercress	V	V	Species	Found on ridges of gilgai clays dominated by Brigalow (Acacia harpophylla), Belah (Casuarina cristata), Buloke (Allocasuarina luehmanii) and Grey Box (Eucalyptus microcarpa). In the south has been recorded growing in Bull Mallee (Eucalyptus behriana). Often the understorey is dominated by introduced plants. The species grows as a a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter.;1|Flowers from spring to autumn.;2|Plants in the Narrabri population have been observed producing abundant seed, and as the species is believed to be short-lived and large numbers of plants were present at the site, Lepidium aschersonii appears to be successfully reproducing.;3|Populations have been known to immediately disappear following inundation by flooding, reappearing several seasons later. An apparent increase in numbers during drought conditions has also been observed. The species is reported to be salt tolerant and also grows well under dry conditions. ;4|Recorded population sizes vary from 18 to 5000+ plants. Plant numbers decrease with increasing overstorey density, and plants were not found where the Brigalow canopy cover exceeded about 60%. The species is often described as a “weed” where it dominates paddocks.;5|	Unlikely

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Lepidium monoplocoides	Winged Peppercress	E	E	Species	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Allocasuarina luehmannii (Bulloak) and/or eucalypts, particularly Eucalyptus largiflorens (Black Box) or Eucalyptus populnea (Poplar Box). The field layer of the surrounding woodland is dominated by tussock grasses.;1|Recorded in a wetland-grassland community comprising Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma and Pycnosorus globosus, on waterlogged grey-brown clay. Also recorded from a Maireana pyramidata shrubland.;2|Flowers from late winter to spring, or August to October.;3|The species is highly dependent on seasonal conditions. Occurs in periodically flooded and waterlogged habitats and does not tolerate grazing disturbance.;4|The number of plants at each site varies greatly with seasonal conditions, but sites tend to be small in area with local concentrations of the plant. Has been recorded as uncommon to locally common with hundreds of plants at sites.;5|	Unlikely
Litoria booroolongensis	Booroolong Frog	E	E	Species	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. ;1|Adults occur on or near cobble banks and other rock structures within stream margins.;2|Shelter under rocks or amongst vegetation near the ground on the stream edge.;3|Sometimes bask in the sun on exposed rocks near flowing water during summer.;4|Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn.;5|Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.;6|	Unlikely
Lophochroa leadbeateri	Pink Cockatoo	V	E	Dual	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water.;1|Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines.;2|Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant.;3|Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.;4|	Potential
Melanodryas cucullata cucullata	South-eastern Hooded Robin	E	E	Ecosystem	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.;1|Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.;2|Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.;3|Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season.;4|May breed any time between July and November, often rearing several broods.;5|The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground.;6|The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground.;7|A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.;8|	Unlikely
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	NL	Dual	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.;1|Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.;2|Maternity caves have very specific temperature and humidity regimes.;3|At other times of the year, populations disperse within about 300 km range of maternity caves.;4|Cold caves are used for hibernation in southern Australia.;5|Breeding or roosting colonies can number from 100 to 150,000 individuals.;6|Hunt in forested areas, catching moths and other flying insects above the tree tops.;7|	Known (observed foraging on site via anabat). No breeding habitat exists on site however (based on survey results)
Myotis macropus	Southern Myotis	V	NL	Species	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage.;1|Forage over streams and pools catching insects and small fish by raking their feet across the water surface.;2|In NSW females have one young each year usually in November or December.;3|	Unlikely
Neophema chrysostoma	Blue-winged Parrot	V	V	No Data	Blue-winged parrots breed on mainland Australia south of the Great Dividing Range in southern Victoria from Port Albert in Gippsland west to Nelson, and sometimes in the far south-east of South Australia, and the north-western, central and eastern parts of Tasmania. Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones . The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs. (Infomation from SPRAT).	Potential

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Ninox strenua	Powerful Owl	V	NL	Species	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.;1|The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. ;2|The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying-foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. ;3|Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 ha can support a pair when prey are dense. Where hollow trees and prey have been depleted, the owls need up to 4000 ha.;4|Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.;5|Powerful Owls are monogamous and mate for life. Nesting typically occurs from May to October, being variable between pairs and among years. Fledging can occur as late as December if a pair re-nests after a failed first attempt. Clutches consist of two dull white eggs and incubation lasts approximately 38 days.;6|	Although BioNet shows this species was recorded within 10km of the site, the subject land does not represent core habitat for this species, and there is limited foraging opportunity and no breeding opportunity on within the subject land.
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Ecosystem	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.;1|Roosts in tree hollows, crevices, and under loose bark.;2|Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground.;3|Mating takes place in autumn with one or two young born in late spring to early summer.;4|	Unlikely
Ozothamnus tesselatus	Ozothamnus tesselatus	V	V	Species	Grows in eucalypt woodland.;1|	Unlikely due to grazing land use
Pedionomus torquatus	Plains-wanderer	E	CE	Dual	Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species.;1|Habitat structure appears to play a more important role than plant species composition. Preferred habitat of the Plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses.;3|Most of the grassland habitat of the Plains-wanderer is <5 cm high, but some vegetation up to a maximum of 30 cm is important for concealment, as long as grass tussocks are spaced 10-20 cm apart.;4|During prolonged drought, the denudation of preferred habitats may force birds into marginal denser and taller grassland habitats that become temporarily suitable.;5|The average home range of a single bird is about 12 ha. Breeding pairs have overlapping home ranges that total approximately 18 ha.;6|The Plains-wanderer is a ground-dwelling grassland bird, which is cryptic and very difficult to observe during the day. Graziers have seen Plains-wanderers during the day when mustering sheep. The species can only be properly surveyed at night using spotlighting techinques.;7|	Unlikely
Petaurus norfolcensis	Squirrel Glider	V	NL	Species	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.;1|Prefers mixed species stands with a shrub or Acacia midstorey.;2|Live in family groups of a single adult male one or more adult females and offspring.;3|Require abundant tree hollows for refuge and nest sites.;4|Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.;5|	Unlikely

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Phascogale tapoatafa	Brush-tailed Phascogale	V	NL	Species	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.;1|Also inhabit heath, swamps, rainforest and wet sclerophyll forest.;2|Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater..;3|Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates.;4|Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha.;5|Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.;6|Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.;7|	Potential
Phascolarctos cinereus	Koala	E	E	Species	Inhabit eucalypt woodlands and forests.;1|Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.;2|Inactive for most of the day, feeding and moving mostly at night.;3|Spend most of their time in trees, but will descend and traverse open ground to move between trees.;4|Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.;5|Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.;6|Females breed at two years of age and produce one young per year.;7|	Potential
Phascolarctos cinereus	Koala	E	E	Species	Inhabit eucalypt woodlands and forests.;1|Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.;2|Inactive for most of the day, feeding and moving mostly at night.;3|Spend most of their time in trees, but will descend and traverse open ground to move between trees.;4|Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.;5|Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.;6|Females breed at two years of age and produce one young per year.;7|	Potential
Polytelis swainsonii	Superb Parrot	V	V	Dual	Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest.;1|In the Riverina superb parrots 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 and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.;2|Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground;3|Nest in small colonies, often with more than one nest in a single tree.;4|Breed between September and January, with nesting typically from October to late December.;5|May forage up to 10 km from nesting sites, primarily in grassy box woodland.;6|Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.;7|	Potential
Polytelis swainsonii	Superb Parrot	V	V	Dual	Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest.;1|In the Riverina superb parrots 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 and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.;2|Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground;3|Nest in small colonies, often with more than one nest in a single tree.;4|Breed between September and January, with nesting typically from October to late December.;5|May forage up to 10 km from nesting sites, primarily in grassy box woodland.;6|Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.;7|	Potential
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	Species	Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.;1|Little is known about the ecology of the species. It is probably killed by fire but plants have been observed to re-sprout from the stem following death of the crown from apparent drought.;2|Populations tend to be isolated and range in size from a few individuals to many hundreds.;3|Populations are not apparently influenced by local variations in habitat - it is not obvious why they are only growing where they are.;4|	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Species	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites.;1|Also grows in grassy woodland in association with River Tussock Poa labillardieri, Black Gum Eucalyptus aggregata and tea-trees Leptospermum spp. near Queanbeyan and within the grassy groundlayer dominated by Kanagroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT).;2|Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (near Queanbeyan, Ilford and Hall).;3|Flowers in October at Boorowa and Ilford, and December at sites near Queanbeyan and Delegate.;4|Population density at the Boorowa site is higher in the open grassland dominated by wallaby grasses Austrodanthonia spp., compared to that within the denser stands of Kangaroo Grass Themeda australis.;5|Highly colonial, with very large numbers present and very conspicuous at the Boorowa site, but cryptic at the Queanbeyan, Ilford and Delegate sites where low numbers are recorded. The population near Muswellbrook is also small.;6|Flowers are followed by fleshy seed capsules in summer.;7|Plants retreat into subterranean tubers after fruiting, so are not visible above-ground outside of growing periods.;8|	Unlikely due to grazing land use
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Species	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites.;1|Also grows in grassy woodland in association with River Tussock Poa labillardieri, Black Gum Eucalyptus aggregata and tea-trees Leptospermum spp. near Queanbeyan and within the grassy groundlayer dominated by Kanagroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT).;2|Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (near Queanbeyan, Ilford and Hall).;3|Flowers in October at Boorowa and Ilford, and December at sites near Queanbeyan and Delegate.;4|Population density at the Boorowa site is higher in the open grassland dominated by wallaby grasses Austrodanthonia spp., compared to that within the denser stands of Kangaroo Grass Themeda australis.;5|Highly colonial, with very large numbers present and very conspicuous at the Boorowa site, but cryptic at the Queanbeyan, Ilford and Delegate sites where low numbers are recorded. The population near Muswellbrook is also small.;6|Flowers are followed by fleshy seed capsules in summer.;7|Plants retreat into subterranean tubers after fruiting, so are not visible above-ground outside of growing periods.;8|	Unlikely due to grazing land use
Prasophyllum sp. Wybong	Prasophyllum sp. Wybong	NL	CE	Species	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. A perennial orchid, appearing as a single leaf over winter and spring. Flowers in spring and dies back to a dormant tuber over summer and autumn. Known to occur in open eucalypt woodland and grassland.	Unlikely due to grazing land use
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Dual	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.;1|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.;2|Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young.;3|Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.;4|Site fidelity to camps is high; some camps have been used for over a century.;5|Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km.;6|Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.;7|Also forage in cultivated gardens and fruit crops.;8|	Potential
Pycnoptilus floccosus	Pilotbird	V	V	No Data	Pilotbirds are endemic to south-east Australia. Upland Pilotbirds occur above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria. Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne. Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. (Information from SPRAT).	Unlikely
Rostratula australis	Australian Painted Snipe	E	E	Ecosystem	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.;1|Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.;2|The nest consists of a scrape in the ground, lined with grasses and leaves.;3|Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only.;4|Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.;5|	Unlikely

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Stagonopleura guttata	Diamond Firetail	V	V	Ecosystem	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands.;1|Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.;2|Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.;3|Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).;4|Usually encountered in flocks of between 5 to 40 birds, occasionally more.;5|Groups separate into small colonies to breed, between August and January.;6|Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests.;7|Birds roost in dense shrubs or in smaller nests built especially for roosting.;8|Appears to be sedentary, though some populations move locally, especially those in the south.;9|Has been recorded in some towns and near farm houses.;10|	Potential
Swainsona murrayana	Slender Darling Pea	V	V	Species	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams.;1|Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.;2|Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains.;3|The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated.;4|Swainsona species contain a poisoning principle, swainsonine, which affects the nervous system and is toxic to stock.;5|	Unlikely due to grazing land use
Swainsona recta	Small Purple-pea	E	E	Species	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx.;1|Grows in association with understorey dominants that include Kangaroo Grass Themeda australis, poa tussocks Poa spp. and spear-grasses Austrostipa spp.;2|Plants die back in summer, surviving as a rootstocks until they shoot again in autumn.;3|Flowers throughout spring, with a peak in October.;4|Seeds ripen at the end of the year.;5|Individual plants have been known to live for up to 20 years.;6|Generally tolerant of fire, which also enhances germination by breaking the seed coat and reduces competition from other species.;7|	Unlikely due to grazing land use
Swainsona sericea	Silky Swainson-pea	V	NL	Species	Found in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro.;1|Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes.;2|Sometimes found in association with cypress-pines Callitris spp.;3|Habitat on plains unknown.;4|Regenerates from seed after fire.;5|	Unlikely due to grazing land use
Thesium australe	Austral Toadflax	V	V	Species	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.;1|Often found in association with Kangaroo Grass (Themeda australis).;2|A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.;3|	Unlikely
Tylophora linearis	Tylophora linearis	V	E	Species	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.;1|Also grows in association with Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species and Casuarina species.;2|Flowers in spring, with flowers recorded in November or May and is suspected to be related to rainfall, with fruiting probably 2 to 3 months later.;3|Altitudes are generally in the range of 300 - 400 m a.s.l.;4|	Unlikely

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Class of Credit	Habitat and Ecology	Likelihood of occurrence in Subject Land / Survey Area
Zieria ingramii	Keith's Zieria	E	E	Species	Grows in dry sclerophyll forest on light sandy soils. All known populations have been recorded in Eucalyptus-Callitris woodland or open forest with a shrubby to heathy understorey. Eucalyptus dwyeri appears to be a key predictor of Z. ingramii distribution.;1|Mostly from gentle slopes in red-brown and yellow-brown sandy loams, often with a rocky surface.;2|Associated and understorey species include Eucalyptus crebra, E. fibrosa, E. dwyeri, E. beyeriana, E. microcarpa, Callitris endlicheri, Allocasuarina diminuta, A. distyla, A. verticillata, Leptospermum divaricatum, L. parvifolium, Acacia triptera, Acacia gladiiformis, Acacia brownii, Grevillea floribunda, G. triternata, Hakea decurrens, Boronia glabra, Philotheca salsolifolia, Leucopogon attenuatus, Melaleuca uncinata, M. erubescens, Kunzea parvifolia, Calytrix tetragona, Brachyloma daphnoides, Melichrus urceolatus, Cassinia aculeata, Dodonaea viscosa subsp. spatulata, D. peduncularis, D. heteromorpha, Dillwynia sericea, Hibbertia riparia, Dampiera lanceolata, Dianella longifolia, Prostanthera species and Goodenia species.;3|Flowering time is in spring and plants bear fruit in summer. Plants can produce flowers and fruits any time between July and March.;4|Grows only in small localised populations within the north-east and central areas of Goonoo SCA, however further searches are warranted within the western area of Goonoo SCA. Population sizes vary from 6 to 80 individuals. The age structure within populations may be even and single-aged or uneven and multi-aged.;5|	Unlikely

Appendix H: PMST Search Results

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-Jul-2024

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	43
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
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:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	7
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
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	800 - 900km upstream from Ramsar site	In feature area
Riverland	800 - 900km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream from Ramsar site	In feature area
The macquarie marshes	200 - 300km 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
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In buffer area only
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community may 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			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	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 buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	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
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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 likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area
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]	Endangered	Species or species habitat likely to 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 likely to 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]	Endangered	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			
Androcalva procumbens [87153]	Vulnerable	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Homoranthus darwinioides [12974]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In buffer area only
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In feature area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
Zieria ingramii Ingram's Zieria, Keith's Zieria [56734]	Endangered	Species or species habitat likely to occur within area	In buffer area only
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

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Delma impar](#)			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may 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 likely 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 likely to occur within area	In feature area
[Rhipidura rufifrons](#)			
Rufous Fantail [592]		Species or species habitat may occur within area	In feature area
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]	Vulnerable	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
[Calidris melanotos](#)			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

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

Other Matters Protected by the EPBC Act

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
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]	Vulnerable	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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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]	Vulnerable	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 may occur within area	In feature area
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat likely 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 feature area
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
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 likely to occur within area overfly marine area	In feature area
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Goodiman Conservation Area	CCA Zone 3 State	NSW	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Barneys Reef Wind Farm	2022/09358		Assessment	In buffer area only
Central-West Orana Renewable Energy Zone Transmission Project	2022/09353		Assessment	In buffer area only
Controlled action				
Narrabri to Wellington gas transmission pipeline	2011/5913	Controlled Action	Completed	In buffer area only
Open cut coal mine & associated infrastructure	2011/6158	Controlled Action	Post-Approval	In feature area
Wollar to Wellington 330kV Transmission Line Project	2005/2202	Controlled Action	Post-Approval	In buffer area only
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
Referral decision				
Proposed large-scale solar farm project	2022/9171	Referral Decision	Referral Publication	In buffer area only

Bioregional Assessments			[Resource Information]
SubRegion	BioRegion	Website	Buffer Status

SubRegion	BioRegion	Website	Buffer Status
Central West	Northern Inland Catchments	BA website	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.

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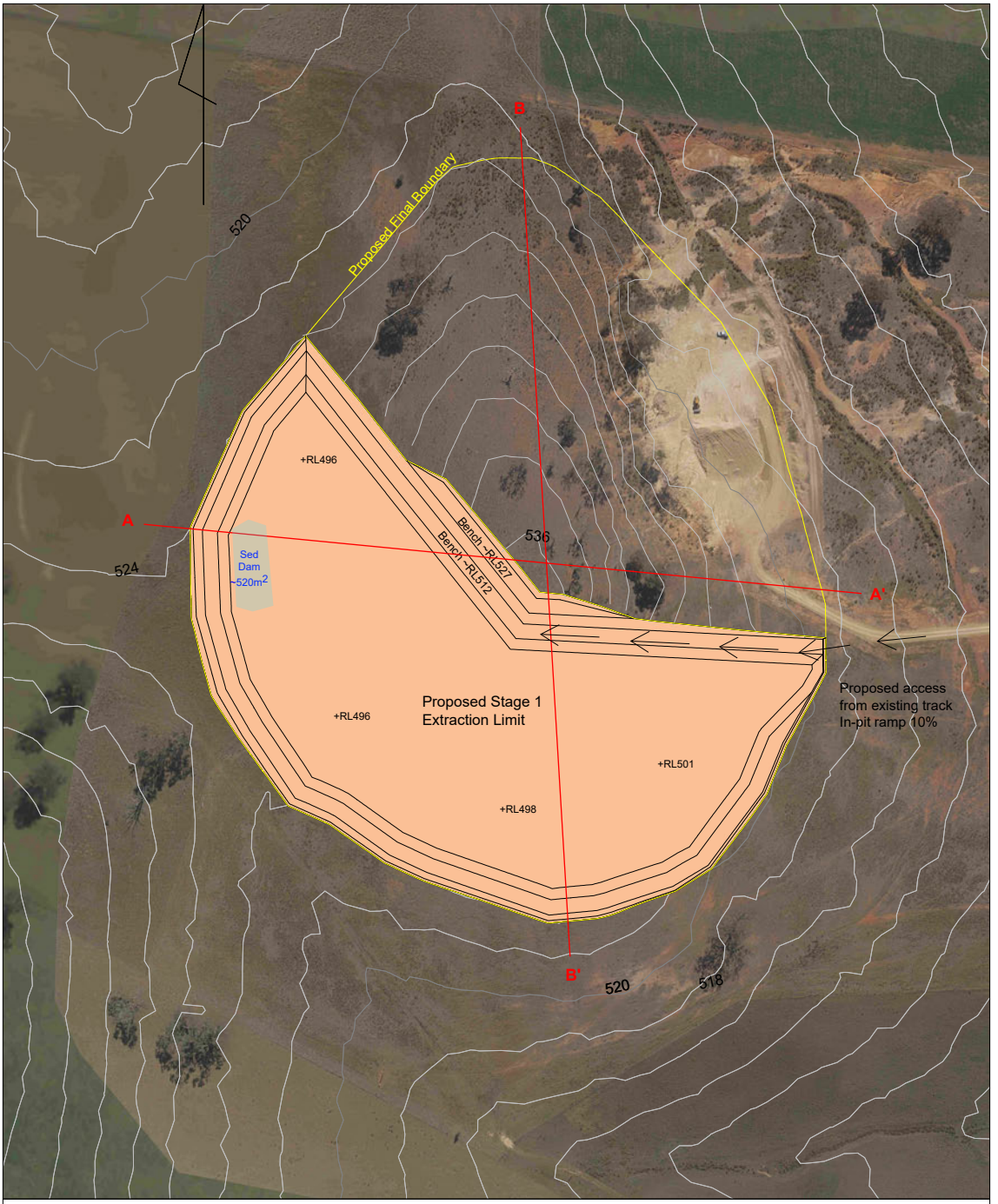
Appendix H: SEARs requirements

Table 32 addresses the SEARs requirements.

Table 32. SEARs Requirement as addressed within the BDAR

SEARs Requirement	Addressed?
Accurate predictions of any vegetation clearing on site;	Section 4 outlines the vegetation identified within the subject land, including. Section 8.1.1 outlines the extent of vegetation clearing required for the proposed quarry expansion with 1.54 ha of vegetation require for clearing. This requirement has been addressed.
A detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and	Extensive targeted threatened flora and fauna surveys were conducted across the subject land in accordance with the BAM (2020) and the *Biodiversity Conservation Act* 2016. Section 4 outlines targeted threatened survey results and provides results from threatened ecological community mapping. Section 5 outlines suitability for threatened flora and fauna species within the subject land. No groundwater dependent ecosystems were identified as having the potential to be impacted by the proposed development. This requirement has been addressed.
A detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.	Section 8.2 details the proposed mitigation measures to prevent further impacts to biodiversity within and surrounding the subject land. Section 8.4.11 outlines the proposed rehabilitation works to be conducted once quarrying works within the subject land have ceased. This requirement has been addressed.

Appendix I: Engineering Plans



Gulgong Quarry Conceptual Design Stage 1

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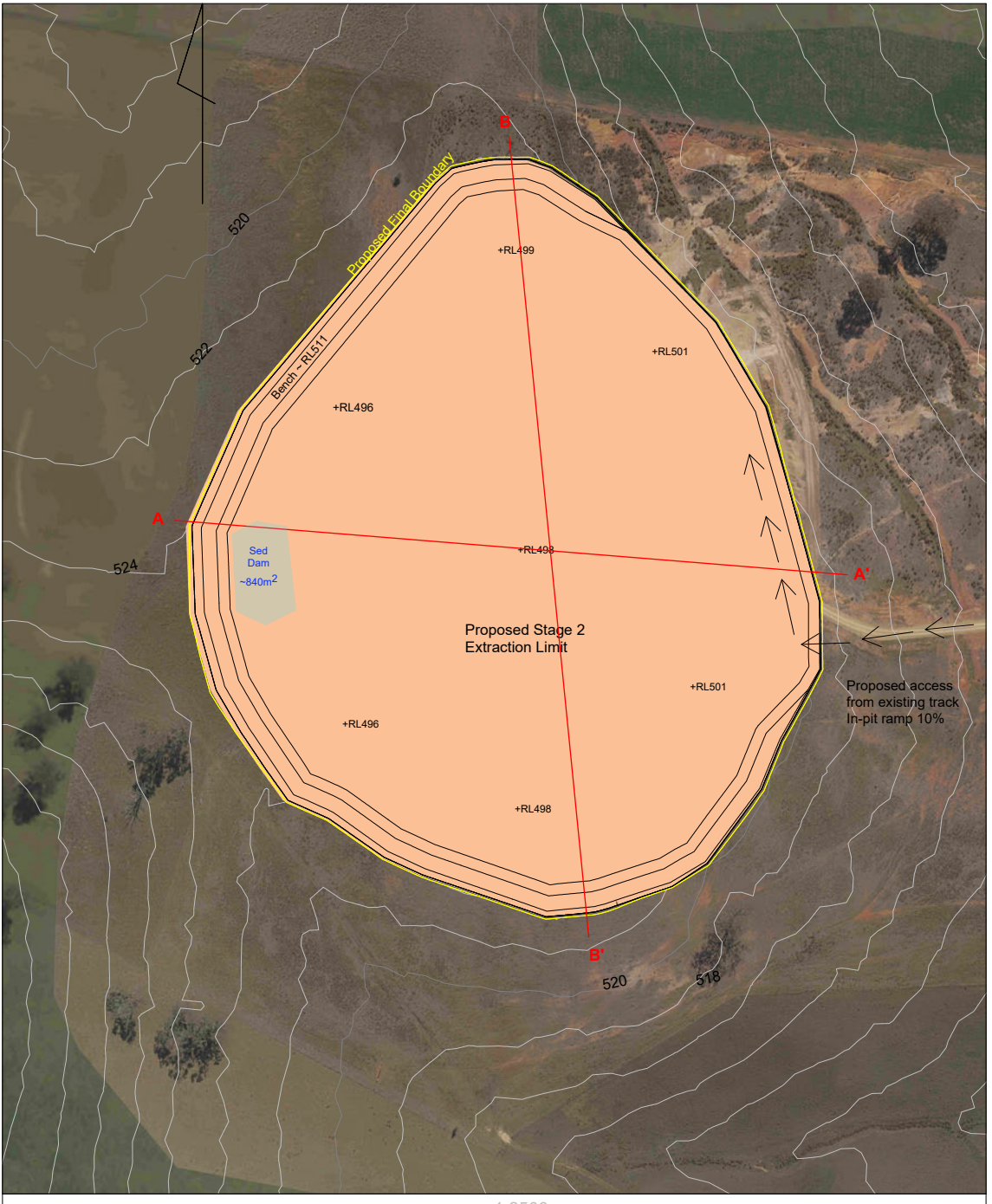
Disclaimer:
- This plan is a conceptual design only
- This plan is not suitable for operational use
- This plan should be used for visual reference only

Drawn by: A Richards	Date: 06/09/2024
Approved by:	Date:
Date of Survey: unknown	
Project: Gulgong Quarry Conceptual Design	



Gulgong Quarry Conceptual Design
Stage 2

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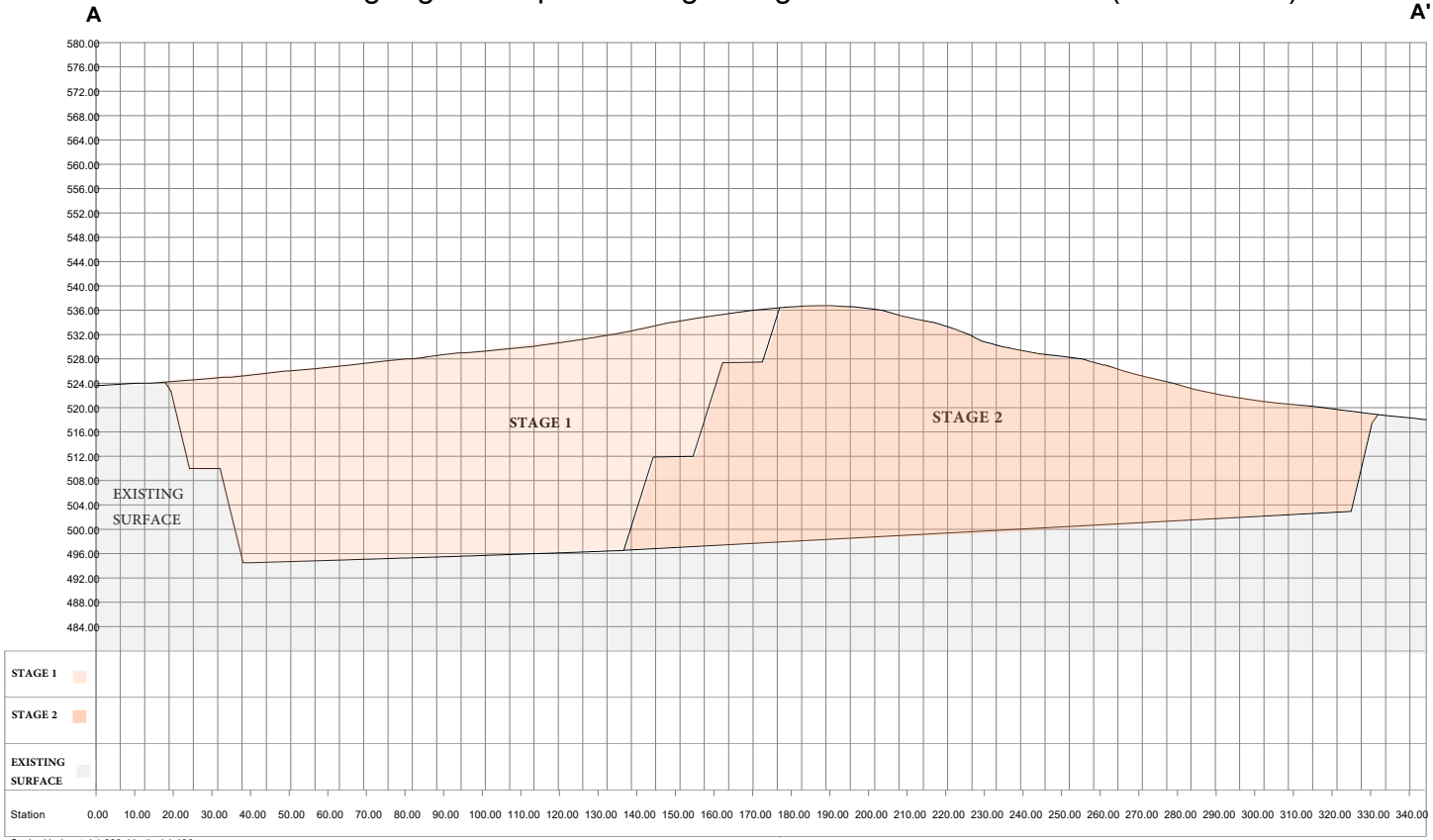
Approved by:	Date:
Date of Survey: unknown	
Project: Gulgong Quarry Conceptual Design	

Gulgong Conceptual Design Stages - AA' Section View (East - West)



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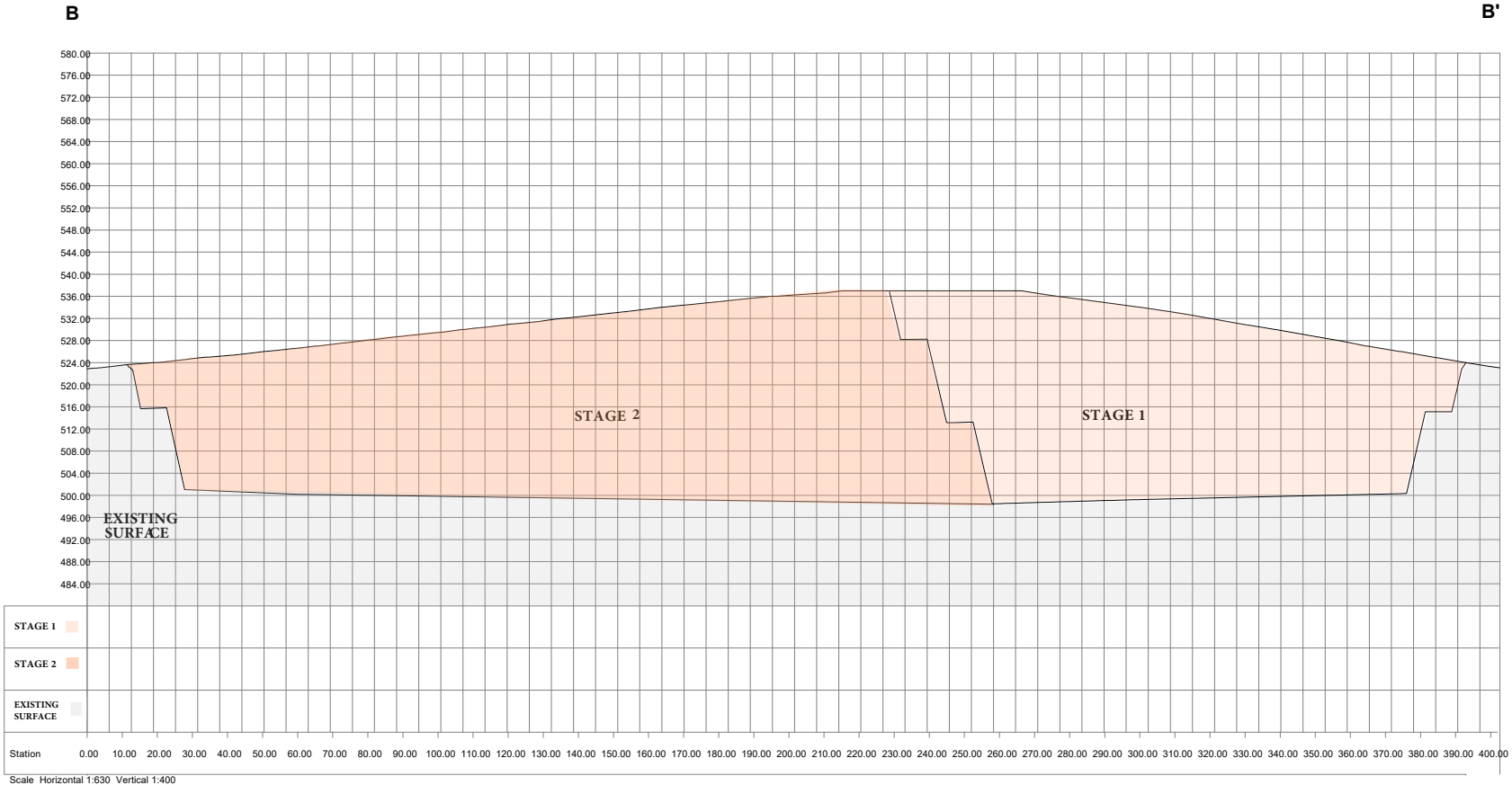
Gulgong Conceptual Design Stages - BB' Section View (North - South)



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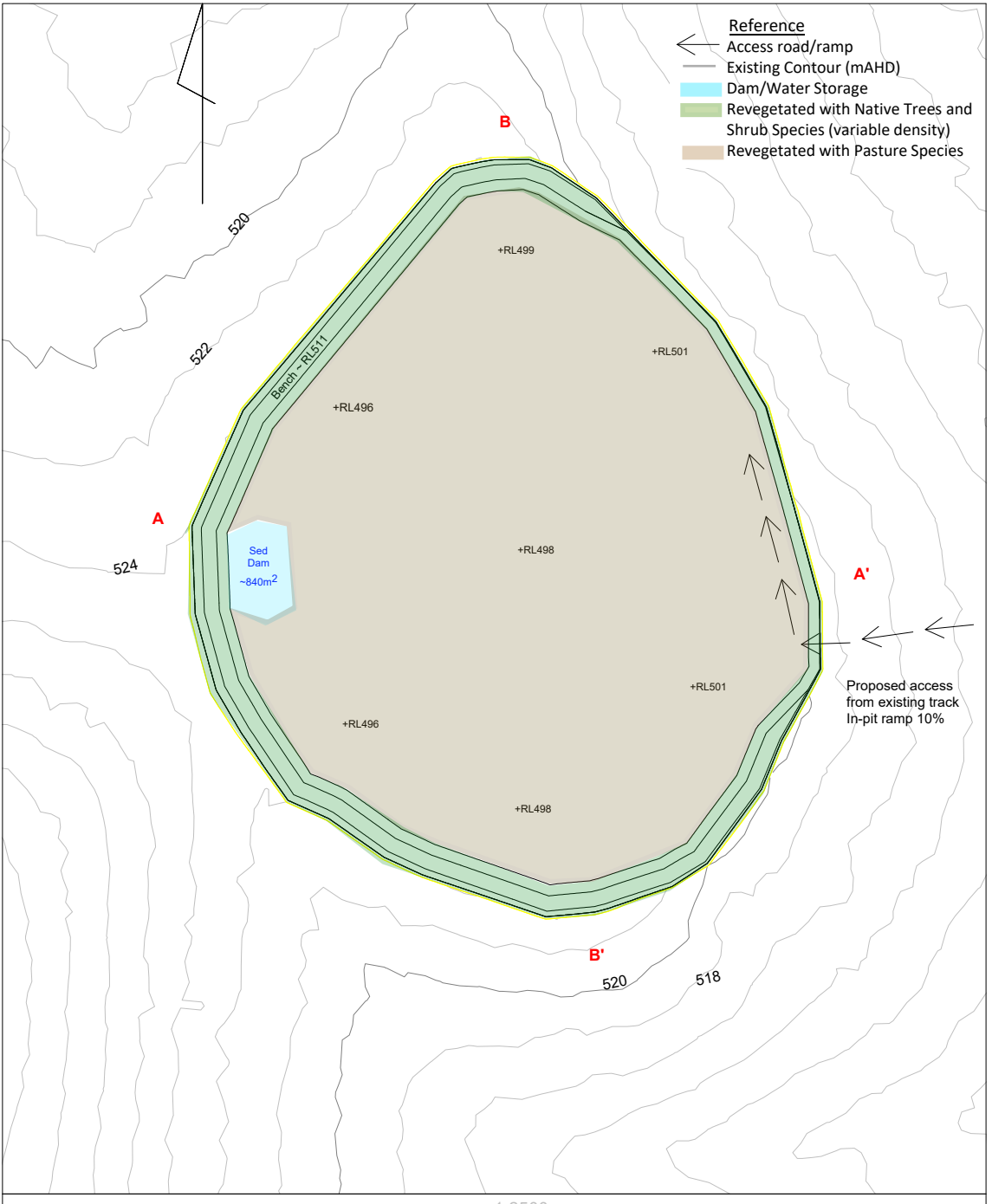

Gulgong Quarry Conceptual Rehabilitation Plan - Stage 4

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Approved by:	Date:
Date of Survey: unknown	
Project: Gulgong Quarry Conceptual Design	