Wellington South Battery Energy Storage System

Biodiversity Development Assessment Report

Prepared for AMPYR Australia Pty Ltd

September 2023

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AMPYR Australia Pty Ltd

J210534 RP1

September 2023

Version	Date	Prepared by	Approved by	Comments
V1	16 April 2022	Bianca Seal	Cecilia Phu	Draft
V2	20 May 2022	Bianca Seal	Cecilia Phu	Draft
V3	26 May 2022	Bianca Seal	Cecilia Phu	Final, submitted for adequacy review.
V4	31 August 2022	Bianca Seal	Cecilia Phu	Final
V5	24 October 2022	Bianca Seal	Cecilia Phu	Final
V6	24 July 2023	Bianca Seal	Cecilia Phu	Final
V7	13 September 2023	Bianca Seal	Cecilia Phu	Final, final lodgement

Approved by

Cecilia Phu
Associate Ecologist
13 September 2023

Level 3 175 Scott Street
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BDAR declaration

Certification under clause 6.15 Biodiversity Conservation Act 2016 and conflict of interest

I, Bianca Seal, 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: 13/09/2023

BAM Assessor Accreditation no: BAAS23008

This BDAR has been prepared to meet the requirements of BAM 2020.

Actual, perceived or potential conflict of interest

It is noted that EMM is engaged to undertake work for both development and conservation (Stewardship) clients. There is the potential for actual, perceived or potential conflicts of Interest. This section discloses relevant information known at the time of preparation of this report to such considerations.

- EMM staff or relatives involved in the preparation of this report do not own, and were not aware of any other EMM staff or relative holding or having interests in Stewardship sites or any of the biodiversity credits identified as being required in this report.
- There were no debts to debts to the client or associates of the client.
- There were no known potential conflicts of interest between the client for this report with another client of EMM.

Staff qualifications and contributions

EMM staff that have contributed to field surveys and authoring this report are listed in the table below.

Name	Position	Project role	Qualifications	Relevant years of experience
Cecilia Phu	Associate Ecologist	Contributing BAM assessor, vegetation mapping, BDAR review	BSc (Hons) BAM Accredited Assessor (BAAS17058)	14+
Bianca Seal	Senior Ecologist	Lead BAM assessor, vegetation mapping, lead BDAR author, targeted flora and fauna surveys	BSc, GradDipGIS BAM Accredited Assessor (BAAS23008)	4
David James	Fauna Ecologist	Fauna surveys	BSc (Hons) (Zoology and Marine Biology)	30+
Peter Tolley	GIS Analyst	Report figures, GIS support	BEnvSc, MGIS	4
Michael Forbes	GIS Analyst	Report figures, GIS support	BAppSc (Ecology)	16
Luke O'Brien	Ecologist	Targeted threatened fauna surveys	BEnvScMngmnt BSc (Hons) Biodiversity Assessment Method Accredited Assessor BAAS22017	7

Name	Position	Project role	Qualifications	Relevant years of experience
Erica-Danae Goldsmith	Ecologist	Targeted threatened flora and fauna surveys	BSc (Zoology) Conservation Biology	2
Jennifer Lindsay	Ecologist	Targeted threatened fauna surveys	BEnvSc	2

Executive Summary

ES1 Project description

AMPYR Australia (AMPYR) and Shell Energy (Shell) propose to develop and operate the Wellington Battery Energy Storage System (the project) located within the Dubbo Regional Council local government area (LGA) at 6773 Goolma Road at Wuuluman. The subject land is located within the New South Wales (NSW) Government declared Central-West Orana Renewable Energy Zone (CWO REZ). The proposed battery energy storage system (BESS) would be developed within Lot 1 DP 1226751 and Lot 32 DP 622471.

This Biodiversity Development Assessment Report (BDAR) has been prepared by EMM Consulting Pty Limited (EMM) on behalf of AMPYR to support the Environmental Impact Statement (EIS) as part of the application for development consent under Part 4, Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). EMM has conducted the necessary biodiversity assessments required under the Biodiversity Offset Scheme (BOS) and the Secretary's Environmental Assessment Requirements (SEARs) to assess impacts of the project under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

ES2 Landscape features

The project occurs across the NSW South Western Slopes IBRA region and Inland slopes IBRA subregion on the Mullion Slopes and Macquarie Alluvial Plains BioNet NSW Landscapes (formerly Mitchell Landscapes). The percent of native vegetation is estimated at approximately 58%, based on the Central West Lachlan vegetation mapping and aerial imagery. The patch size is calculated to be greater than 100 ha due to contiguity (within 100 m) of vegetation in the subject land with nearby vegetation within the region.

ES3 Native vegetation

The subject land contains 8.79 ha of PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion. PCT 266 is associated with the critically endangered White Box – Yellow Box – Blakely's Red Gum grassy Woodland ecological community (Box Gum Woodland) listed under the BC Act and the EPBC Act.

The vegetation within the subject land conforms to the BC Act listing; however, it does not meet the condition thresholds listed under the EPBC Act.

ES4 Threatened species

The subject land has an extensive history of use for agricultural purposes, particularly for cropping and grazing. This has resulted in limited habitat values for threatened species but has the potential to support native species that might utilise hollows, small rocky areas or grassy woodland and grassland habitats for foraging. Waterways within the subject land are highly degraded due to stock access, vegetation clearing and weed encroachment. The Macquarie River is located to the south of the subject land; however, there are weak vegetated links, represented by semi cleared grassy woodlands, between the Macquarie River and the vegetation within the subject land.

Habitat assessments within the subject land concluded that targeted surveys were required for 11 species:

- Pink-tailed Legless Lizard (*Aprasia parapulchella*)
- Bush Stone-curlew (*Burhinus grallarius*)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*)

- *Euphrasia arguta*
- Squirrel Glider (*Petaurus norfolcensis*)
- Brush-tailed Phascogale (*Phascogale tapoatafa*)
- Koala (*Phascolarctos cinereus*)
- Superb Parrot (*Polytelis swainsonii*)
- Key's Matchstick Grasshopper (*Keyacris scurra*)
- Barking Owl (*Ninox connivens*)
- Masked Owl (*Tyto novaehollandiae*).

The Superb Parrot was the only threatened fauna species to be observed during targeted surveys. Pink-tailed Legless Lizard is assumed present. No threatened flora species were recorded.

ES5 Impact avoidance, minimisation and mitigation

The project will result in direct and indirect impacts as a result of the construction and operation of the project.

Avoidance and minimisation strategies include carrying out technical assessments in parallel with development design to inform the design and reduce potential impacts to biodiversity values, minimise impacts to Box Gum Woodland by reducing and/or relocating the design, and minimising impacts by utilising an existing access track.

Impacts to biodiversity values will be mitigated through pre-clearance surveys, planting locally native species characteristic of Box Gum woodland in future landscaping, retention of logs, rocks and debris to be placed in the subject land post-construction and weed hygiene measures.

ES6 Impact assessment

The project will result in the following direct impacts:

- loss of 8.79 ha of native vegetation and associated habitat for fauna species
- loss of 8.79 ha of PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, which conforms to the Box Gum Woodland CEEC listed under the BC Act
- loss of up to seven hollow-bearing trees.

One Serious and Irreversible Impacts (SAII) entity occurs within the subject land; Box Gum Woodland. The SAII entity has been assessed in accordance with the BAM.

One prescribed impact is expected to occur as a result of the proposal. The Superb Parrot and Pink-tailed Legless Lizard species polygons includes 3.93 ha and 2.5 ha of non-native vegetation respectively, which is not required to be offset under the BAM. Mitigation measures to minimise impacts to the Superb Parrot and Pink-tailed Legless Lizard ensure prescribed impacts to these species are addressed.

ES7 Assessment of impacts under other relevant biodiversity legislation

i Environment Protection and Biodiversity Conservation Act 1999

Whilst PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion is listed as critically endangered under the EPBC Act, the vegetation within the subject land does not meet the condition thresholds listed under the EPBC Act.

One EPBC Act listed fauna species was recorded within the subject land; the Superb Parrot. Another fauna species was assumed present; Pink-tailed Legless Lizard. A further two species was assessed as potential impact due to their likelihood of occurrence; the Swift Parrot and Regent Honeyeater. The project is unlikely to significantly impact these four species.

ii Biosecurity Act 2015

One priority weed of the Central West region was recorded in the subject land; African Boxthorn (*Lycium ferocissimum*).

ES8 Biodiversity offsets

The project requires a total of 41 ecosystem credits to compensate for impacts on native vegetation and species habitat. An additional 92 species credits are required to offset the residual impacts of the project for the Superb Parrot and Pink-tailed Legless Lizard.

One vegetation zone which occurs within the subject land does not require offsetting as the vegetation integrity of this zone falls below the offset threshold under the BAM. Additional areas which do not require offsetting include existing cleared access tracks and watercourses, both of which occur within the subject land.

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1 Introduction

1.1 The project

AMPYR Australia (AMPYR) and Shell Energy (Shell) propose to develop and operate the Wellington Battery Energy Storage System (the project). This involves the development of a large-scale battery energy storage system (BESS) with a discharge capacity of 500 megawatts (MW) and a storage capacity of 1,000 megawatt hours (MWh). The project also incorporates an on-site substation and connection infrastructure to facilitate transfer of energy to and from the electrical grid, and ancillary infrastructure.

The site proposed to be developed is located within the Dubbo Regional Council local government area (LGA) at 6773 Goolma Road at Wuuluman, approximately 2.2 km north-east of the township of Wellington and 44 km south-east of the township of Dubbo (Figure 1.1). The project site is located within the New South Wales (NSW) Government declared Central-West Orana Renewable Energy Zone (CWO REZ). The project will be developed within privately owned land (Lot 32 DP 622471) and will incorporate either an overhead or underground transmission line and upgrade works to Wellington substation in the adjoining TransGrid owned landholding (Lot 1 DP 1226751) (Figure 1.2).

This Biodiversity Development Assessment Report (BDAR) has been prepared by EMM Consulting Pty Limited (EMM) on behalf of AMPYR to support the Environmental Impact Statement (EIS) as part of the application for development consent under Part 4, Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The project is classified as State significant development (SSD) under the EP&A Act as it is within the meaning of 'electricity generating works' (clause 20) under Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021.

EMM has conducted the necessary biodiversity assessments required under the Biodiversity Offset Scheme (BOS) and the Secretary's Environmental Assessment Requirements (SEARs) (see Section 1.4) to assess impacts of the project under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.2 Site description

The subject land is zoned as RU1 - Primary Production and SP2 – Electricity Generating Works, with surrounding land uses also including SP2 – Correctional Centre and R5 – Large Lot Residential. These land uses have resulted in a highly fragmented landscape with limited connectivity.

Within the subject land, historical land clearing for agricultural practices have resulted in native vegetation occurring as paddock trees and small patches of canopy, in addition to areas of derived native grassland. Some areas of grassland are dominated by exotic grasses and herbaceous species. Other areas of the subject land are subject to cropping and have no developed vegetation structure and lack native vegetation diversity. Vegetation within the buffer area increases in density as larger patches, however connectivity is still limited due to historical clearing practices.

1.3 Terms and definitions

Project elements referred to in this BDAR are described in Table 1.1.

Table 1.1 Project elements referred to in this BDAR

Project elements	Definition
Buffer area	1,500 m buffer of project footprint (site-based developments only).
Study area	Area that was surveyed for ecological values. For this project this includes the subject land and additional areas of Lot 1 DP 1226751 and Lot 32 DP 622471.
Subject land	Area subject to all proposed direct impacts in accordance with the 'subject land' described in the BAM (DPIE 2020a). This is synonymous with the 'development boundary' as identified within the EIS, which includes temporary laydown areas and ancillary structures.
Indirect impact area	Area subject to anticipated indirect impacts, which was delineated as 5 m buffer from the subject land.

1.4 Assessment requirements

AMPYR submitted a request for Secretary's environmental assessment requirements (SEARs) to the NSW Department of Planning and Environment (DPE) along with supporting documentation describing the project, stakeholder engagement, key matters to be addressed in the EIS and the proposed assessment methods. The SEARs were issued on 1 October 2021. Table 1.2 lists the assessment requirements relevant to the BDAR and describes where these are addressed in the BDAR.

Table 1.2 Secretary's Environmental Assessment requirements

Requirement	Section addressed
Biodiversity • An assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the *Biodiversity Conservation Act 2016* (NSW), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), unless BCS and DPIE determine the proposed development is not likely to have any significant impacts on biodiversity values.	All sections of this BDAR
• The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM.	Chapter 6
• If an offset is required, details of the measures proposed to address the offset obligations.	Section 6.6

1.5 Purpose of this report

The specific objectives of this assessment are to:

- describe biodiversity values of the study area
- assess the likelihood that threatened species and communities (threatened biodiversity) listed under relevant the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) could occur in the study area
- document the strategies implemented to avoid and/or minimise impacts of the project on threatened biodiversity
- assess residual threatened biodiversity impacts, after avoidance and minimisation strategies have been implemented

- provide environmental safeguards to mitigate threatened biodiversity impacts during construction and operation.

1.6 Information sources

1.6.1 Publications and databases

In order to provide context for the project, information about flora and fauna species, populations, communities and habitats from the locality (generally within 20 km) was obtained from the following databases:

- BioNet Atlas of NSW Wildlife for previous threatened species records (DPE 2023)
- Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) likely to occur within the subject land
- the NSW Plant Community Types (PCTs), as held within the BioNet Vegetation Classification database.

1.6.2 Other relevant reports

This biodiversity assessment has been prepared with reference to other technical reports that were prepared within the locality. The other relevant reports referenced in this biodiversity assessment are listed below:

- *Wellington Solar Farm Environmental Impact Statement* (NGH Environmental 2017)
- *Wellington North Solar Plant Environmental Impact Statement* (NGH Environmental 2018)
- *Biodiversity Development Assessment Report – Orana BESS* (NGH Environmental 2023).

1.6.3 Spatial data

Spatial data encompassing the study area, including the subject land, was obtained from AMPYR. Base map data was obtained from Department of Finance, Services and Innovation (DFSI) NSW databases, with cadastral data obtained from DFSI digital cadastral database. Mapping for stream orders was obtained from NSW Department of Primary Industries (DPI).

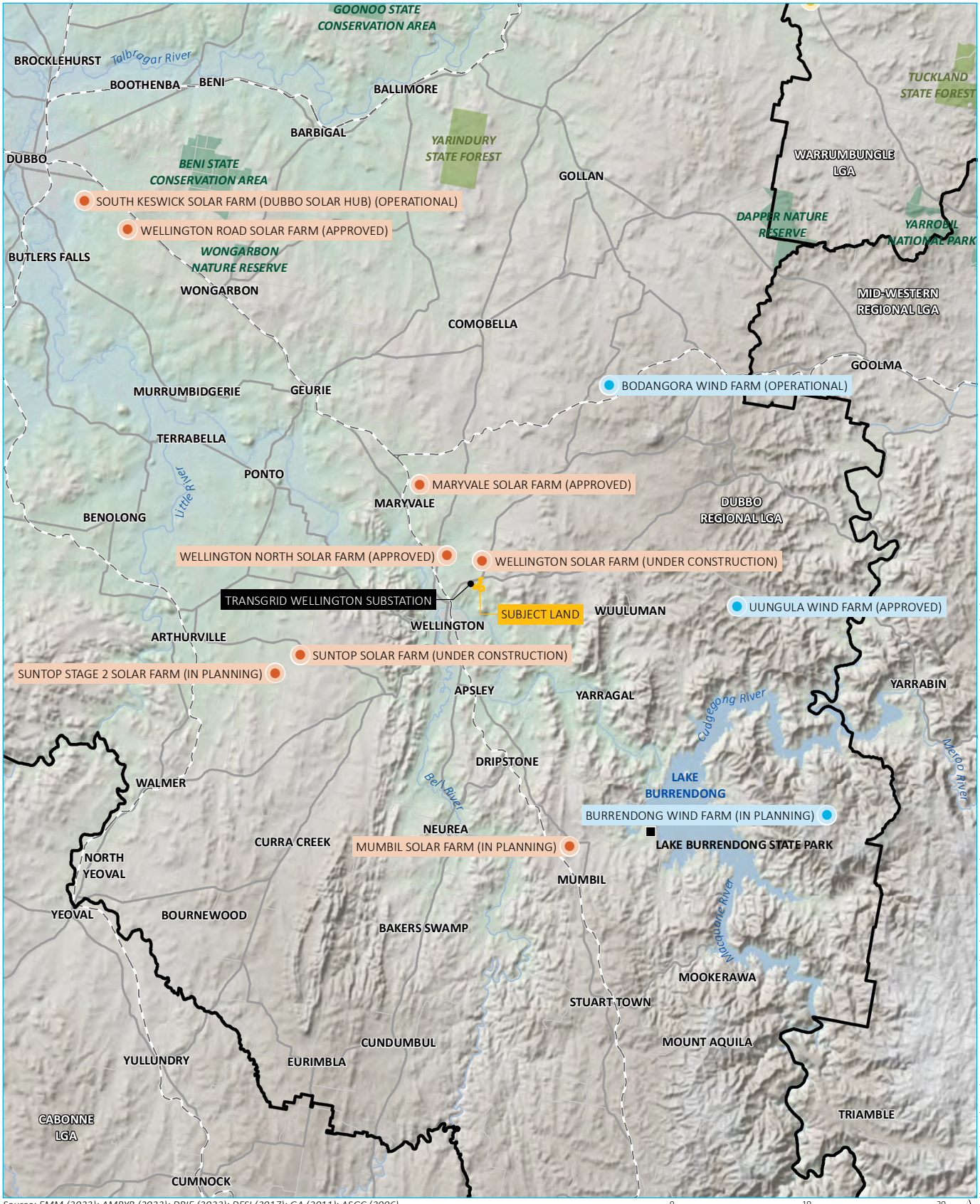
The following spatial datasets were utilised during the development of this report:

- *State Vegetation Type Map: Central West/Lachlan Region version 1.4. VIS_ID 4468* (DPIE 2015)
- *NSW* (previously termed Mitchell) *Landscapes Version V3.1* (OEH 2017)
- *Interim Biogeographic Regionalisation of Australia* (IBRA) *Version 7* (DoEE 2018)
- Strahler Stream Order (DPI 2015)
- Freshwater threatened species distribution maps (DPI 2021a)
- Key fish habitat map – Murray Darling Basin North (DPI 2021b)
- Local Government Area (DFSI 2017)
- Road Segment (DFSI 2017)
- NPWS Reserve (DFSI 2017)

- State Forest (DFSI 2017)
- Important Area maps (BCS 2021).

Mapping undertaken during the site assessment was conducted using a hand-held GPS unit, mobile tablet computers running Collector for ArcGIS™ and Survey123 for ArcGIS™ and aerial photo interpretation. Accuracy is subject to accuracy of GPS devices, generally ± 5 m. Mapping has been produced using a Geographic Information System (GIS; ArcGIS 10.8.1).

Spatial data relevant to this BDAR was provided to DPE following lodgement of the BDAR.



Source: EMM (2022); AMPYR (2022); DPIE (2022); DFSI (2017); GA (2011); ASGC (2006)

0 10 20 km

GDA 1994 MGA Zone 55

N

KEY

- Subject land
- Lake Burrendong State Park
- Rail line
- Major road
- Minor road
- River
- Named waterbody
- Local government area
- NPWS reserve
- State forest

Renewable energy project

- Solar farm
- Wind farm

Regional context

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 1.1

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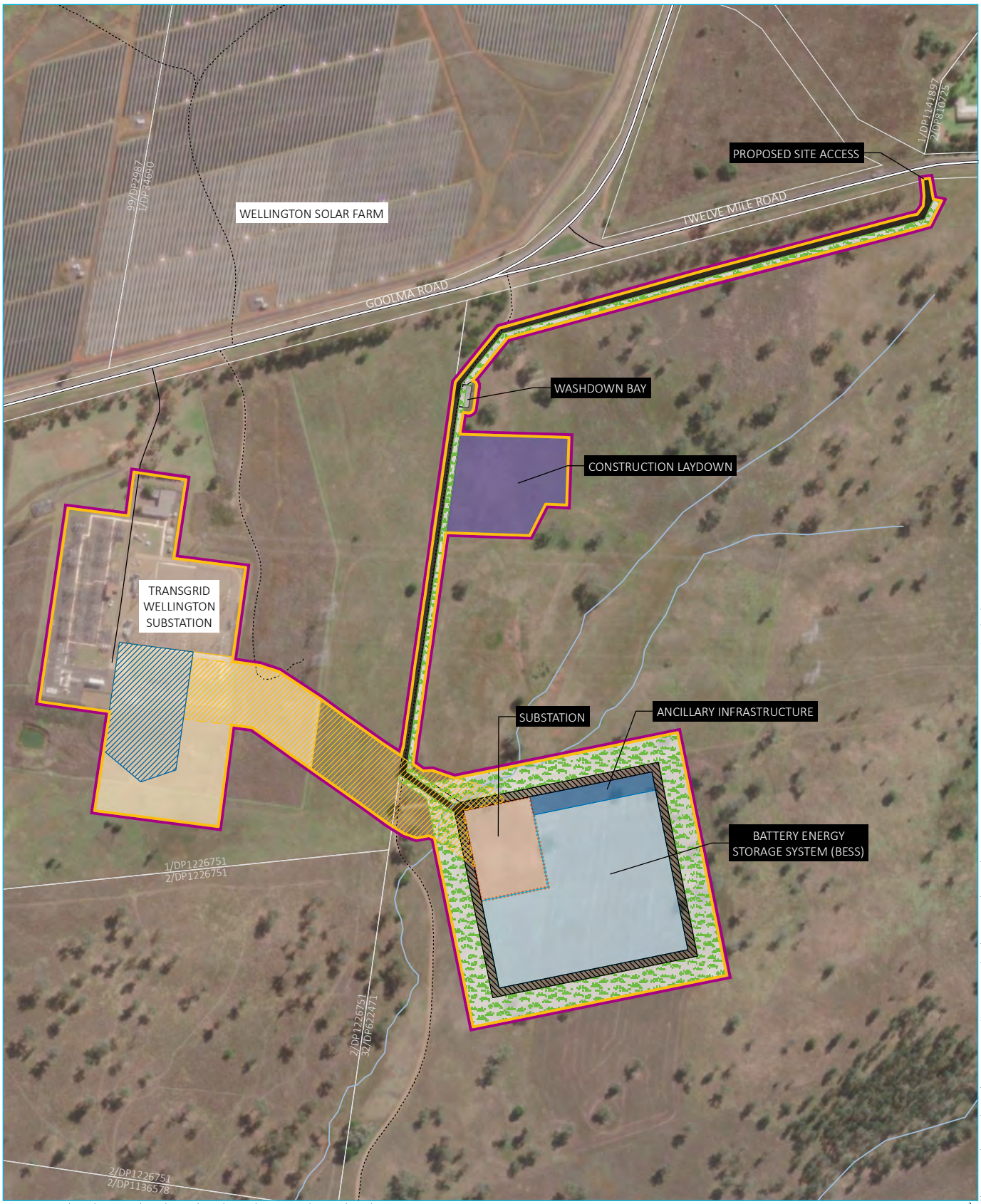

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

0 100 200 m

GDA 1994 MGA Zone 55

N

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KEY

- Subject land
- Development boundary

Project components

- Indicative asset protection zone (10 m)
- Indicative transmission connection corridor
- Indicative TransGrid substation upgrade core infrastructure area
- Indicative TransGrid substation upgrade disturbance area
- Battery Energy Storage System (BESS) (battery rows offset at 6 m spacing and setback from substation)
- Substation
- Ancillary infrastructure
- Washdown bay
- Construction laydown
- Indicative landscaping (post construction)
- Access road
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

The project

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 1.2

EMM creating opportunities

2 Legislative context

This chapter provides a brief outline of the key biodiversity legislation and government policy considered in this assessment.

2.1 Commonwealth

2.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, heritage places and water resources which are defined as Matters of National Environmental Significance (MNES) under the EPBC Act. These are:

- world heritage properties
- places listed on the National Heritage Register
- Ramsar wetlands of international significance
- threatened flora and fauna species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)
- water resources, in relation to coal seam gas or large coal mining development.

Under the EPBC Act, an action that may have a significant impact on a MNES is deemed to be a 'controlled action' and can only proceed with the approval of the Commonwealth Minister for the Environment. An action that may potentially have a significant impact on a MNES is to be referred to DAWE for determination as to whether or not it is a controlled action. If deemed a controlled action the project is assessed under the EPBC Act and a decision made as to whether or not to grant approval.

The project is unlikely to have a significant impact on a biodiversity MNES, and therefore will not be referred to DAWE and it is unlikely to be deemed a controlled action on the basis of impacts to biodiversity. Further information is provided in Section 7.1.

2.2 State

2.2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) was enacted to encourage the consideration and management of impacts of proposed development or land-use changes on the environment and the community. The EP&A Act is administered by DPE.

The EP&A Act provides the overarching structure for planning in NSW; however, is supported by other statutory environmental planning instruments (EPIs) including State Environmental Planning Policies (SEPPs). EPIs relevant to the natural environment are outlined further below.

i State Environmental Planning Policy (Biodiversity and Conservation) 2021

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) was ratified on 1 March 2022 and consolidates, transfers and repeals provisions of numerous SEPPs, which includes the former State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020) and State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021). No policy changes have been made to the Koala SEPPs.

The former Koala SEPP 2020 and 2021 together aimed to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline. In nine metropolitan Sydney local government areas (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA Koala SEPP 2021 applies to all land use zones. Outside of these areas Koala SEPP 2020 continues to apply to all land zoned RU1, RU2, and RU3.

The project is not a development application that requires approval from Council, and thus consideration of the Koala SEPP 2020 and Koala SEPP 2021 are not triggered. Nonetheless, consideration has been given to the potential occurrence and impacts upon the koala within this report.

2.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) is the legislation responsible for the conservation of biodiversity in NSW through the protection of threatened flora and fauna species, populations and ecological communities. The BC Act, together with the Biodiversity Conservation Regulation 2017 (BC Regulation), established the Biodiversity Offsets Scheme (BOS).

The BOS includes establishment of the Biodiversity Assessment Method (the BAM, DPIE 2020a) for use by accredited persons in biodiversity assessment under the scheme. The purpose of the BAM is to assess the impact of actions on threatened species and threatened ecological communities, and their habitats and determine offset requirements. For major projects, use of the BAM is mandatory, unless a BDAR waiver is granted.

The BAM sets out the requirements for a repeatable and transparent assessment of terrestrial biodiversity values on land in order to:

- identify the biodiversity values on land subject to proposed development
- determine the impacts of a proposed development, following all measures to avoid, minimise and mitigate impacts
- quantify and describe the biodiversity credits required to offset the residual impacts of proposed development on biodiversity values.

This biodiversity assessment has been undertaken in accordance with the requirements of the BAM.

2.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) contains provisions for the conservation of fish stocks, key fish habitat, biodiversity, threatened species, populations and ecological communities. It regulates the conservation of fish, vegetation and some aquatic macroinvertebrates and the development and sharing of the fishery resources of NSW for present and future generations. The FM Act lists threatened species, populations and ecological communities, key threatening processes (KTPs) and declared critical habitat. Assessment guidelines to determine whether a significant impact is expected are detailed in section 220ZZ and 220ZZA of the FM Act.

Another objective of the FM Act is to conserve key fish habitat (KFH). These are defined as aquatic habitats that are important to the sustainability of recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species. KFH is defined in Section 3.2.1 and Section 3.2.2 of the *Policy and Guidelines for Fish Conservation and Management* (DPI 2013).

There is no aquatic habitat present in the subject land (see Section 3.1.2 and 5.1 for more details). The project is unlikely to have any impacts on threatened aquatic species, populations, communities, habitats or KFH.

2.5 Biosecurity Act 2015

The primary objective of the *Biosecurity Act 2015* (Biosecurity Act) is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

The Biosecurity Act stipulates management arrangements for weed biosecurity risks in NSW, with the aim to prevent, eliminate and minimise risks. Management arrangements include:

- any land managers and users of land have a responsibility for managing weed biosecurity risks that they know about or could reasonably be expected to know about
- applies to all land within NSW and all waters within the limits of the State
- local strategic weed management plans will provide guidance on the outcomes expected to discharge duty for the weeds in that plan.

NSW WeedWise identifies relevant weed species by region. The relevant region for the project is the Central West. About 99 priority weed species are listed for the Central West region (DPI n.d.).

The Central West Regional Strategic Weed Management Plan 2017–2022 (LLS 2017) supports regional implementation of the Biosecurity Act by articulating community expectations in relation to effective weed management and facilitating a coordinated approach to weed management in the region. The plan identifies weed management in the region, weed risk assessment and prioritisation, actions, details regarding how to apply the actions, and measures proposed to increase the chance of success and for continuous improvement. Appendix 1 provides a list of priority weeds for the Central West LLS region and Appendix 2 identifies other weeds of regional concern. Should any of these species be recorded in the subject land, the management actions provided in the plan will need to be implemented.

The provisions of the Biosecurity Act are discussed further in Section 2.5.

2.6 Water Management Act 2000

Division 6 of the *Water Management Act 2000* (WM Act) requires consideration of controlled activities on waterfront land (i.e. activities within 40 m of top of bank) and aquifer interference activities. The NSW Aquifer Interference Policy (NOW 2012) requires an assessment of potential impacts on groundwater users, including groundwater dependent ecosystems.

The project will be constructed within 40 m of waterfront land, however a water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act* (WM Act) will not be required pursuant to Section 4.41 of the EP&A Act. Section 91 of the WM Act states that a controlled activity approval confers a right on its holder to carry out a specified controlled activity at a specified location in, on or under waterfront land. Under Section 4.41 of the EP&A Act states that SSD does not require a controlled activity approval. The WM Act is further discussed in Section 4.3 of the EIS. Groundwater will not be intercepted for the project and therefore it does not represent an aquifer interference activity.

Stage 1

Biodiversity of assessment

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3 Landscape features

3.1 Landscape features

The landscape features described in the following sections are shown on Figure 3.1 and Figure 3.2.

3.1.1 Bioregions and landscapes

The project occurs across the NSW South Western Slopes IBRA region and Inland slopes IBRA subregion.

The buffer area occurs across two BioNet NSW Landscapes (formerly Mitchell Landscapes, OEH 2017):

- Mullion Slopes
- Macquarie Alluvial Plains.

As the majority of the buffer area is located in the Mullion Slopes BioNet NSW Landscape this was the landscape used in this assessment.

3.1.2 Rivers, streams, estuaries and wetlands

The subject land is located within the Macquarie-Bogan catchment. The Macquarie-Bogan catchment covers 74,800 square kilometres of central-west NSW (DPIE n.d). The catchment originates from the Great Dividing Range to the east and flows north-westerly until it joins the Barwon River.

Wuuluman Creek occurs within the buffer area, north of the subject land. Wuuluman Creek flows to the west for 5.4 km and joins into the Macquarie River, which at its closest point occurs approximately 500 m to the south of the buffer area (Figure 3.1).

The subject land and buffer area also contain a number of unnamed waterways including:

- eleven unnamed first-order water courses
- six unnamed second-order water courses
- two unnamed third-order water courses.

The majority of these unnamed waterways flow into the Macquarie River to the south of the buffer area.

The subject land intersects two of these unnamed first-order water courses and one unnamed second-order water course and their associated riparian corridor buffers (Figure 3.2). These waterways lack aquatic habitat, filling with water only in periods of high and sustained rainfall. The first-order streams generally lack canopy or shrub stratum and consist of grasses whilst fragmented occurrences of native canopy vegetation occurs within the second-order stream riparian buffer.

The waterways within the subject land are not mapped as KFH (DPI 2021b), however the unnamed stream to the south which flows into the Macquarie River has been mapped. This same stream has also been mapped within the freshwater threatened species distribution for the Purple-Spotted Gudgeon (*Mogurnda adspersa*) (DPI 2021a). Four additional fish distributions have also been mapped within the Macquarie River:

- Eel-tailed Catfish (*Tandanus tandanus)*
- Olive Perchlet (*Ambassis agassizii*)
- Silver Perch (*Bidyanus bidyanus*)

- Trout Cod (*Maccullochella macquariensis*).

No nationally important or RAMSAR wetlands have been mapped within the subject land or are located within the locality. No Coastal Wetlands defined under the State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) are mapped within the buffer area.

3.1.3 Connectivity

The subject land is fragmented with native vegetation often occurring as paddock trees and small patches of canopy in addition to derived native grassland. These occurrences are consistent with historical land clearing for agricultural practices. Vegetation within the buffer area and locality increase in density as larger isolated patches and isolated trees and may provide connectivity of the subject land to the increasingly vegetated patches to the south and east, primarily toward the Macquarie River.

The watercourses within the buffer area support similarly fragmented riparian corridors which flow toward the Macquarie River. One unnamed first-order watercourse supports a larger patch of riparian and native vegetation, directly to the south-east of the subject land (Figure 3.1). Despite this, connectivity is limited due to the historical clearance of downstream riparian vegetation of the third-order stream before joining the Macquarie River. The unnamed second-order waterway which intersects the western corner of the BESS footprint within the subject land, connects the subject land to the Macquarie River. Outside of the subject land however, the riparian corridor is heavily cleared and fragmented, and is unlikely to provide direct connectivity.

3.1.4 Areas of geological significance

No areas of geological significance occur in the buffer area. Treed slopes occur which are characteristic of the central-west landscape, however, these are unlikely to contain karsts, caves, crevices and cliffs.

3.1.5 Areas of outstanding biodiversity value

There are no areas of outstanding biodiversity value, as declared by the NSW Minister for Energy and Environment, within the subject land.

3.2 Assessment of site context

Vegetation mapping across the subject land and locality (DPIE 2015) identifies a range of vegetation communities. To calculate native vegetation cover, these vegetation types were classified as native or non-native (Table 3.1) The native vegetation extent was then assessed against aerial imagery to adjust for inconsistencies between the regional vegetation mapping and aerial imagery. Areas such as cropped farmland were excluded, whilst treed waterways and planted vegetation screens were included.

A 1,500 m buffer was placed around the subject land and the area of native vegetation within the buffer area and the percent native vegetation was then calculated, consistent with the requirements of the BAM (DPIE 2020a). The extent of native vegetation cover based on this data source is shown in Figure 3.1.

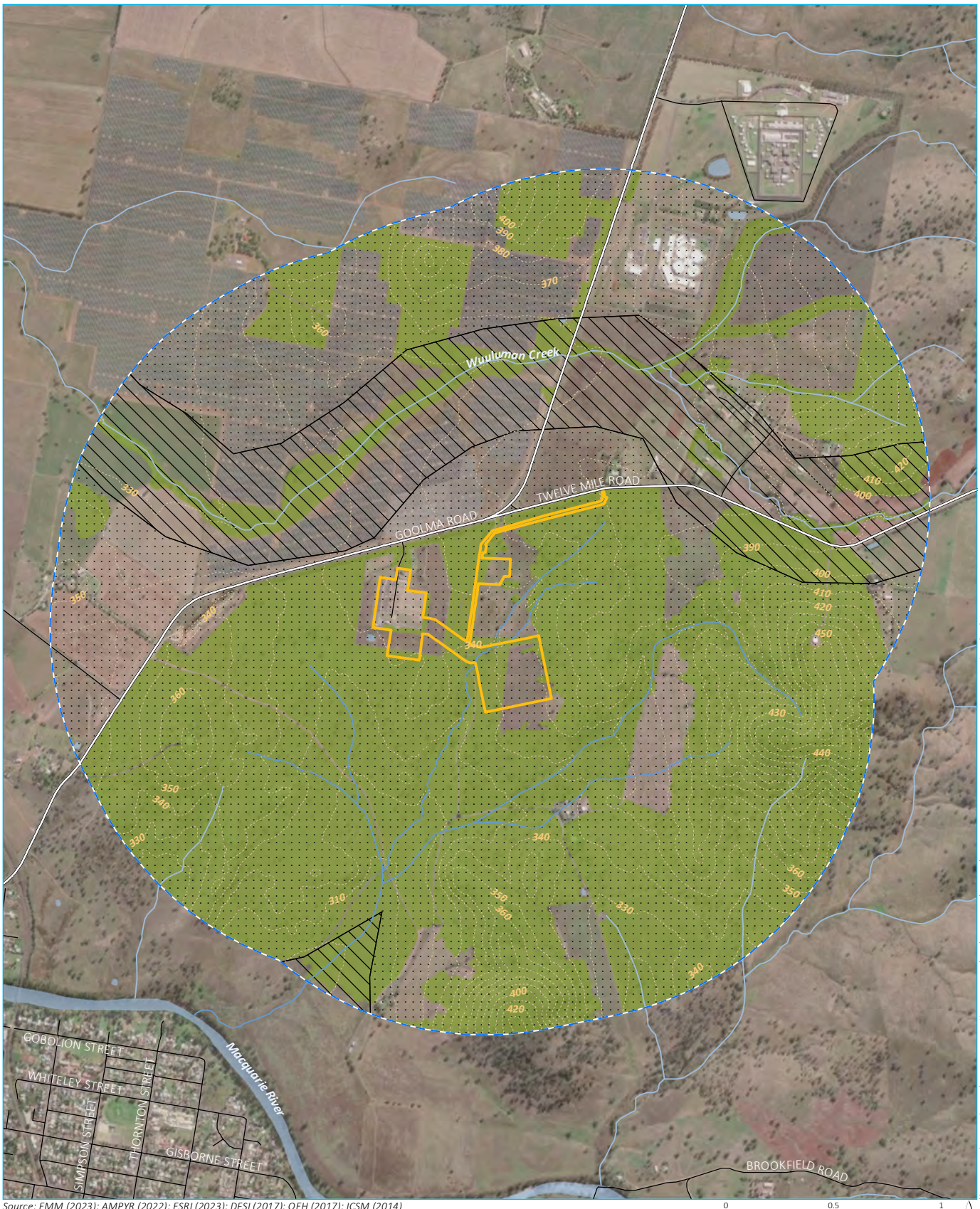
Table 3.1 Native vegetation assessment

PCT (DPIE 2015)	Classification
76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Native
78 – River Red Gum riparian tall woodland/open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Native
201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Native
266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Native
277 – Blakelys Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Native
511 – Queensland Bluegrass – Redleg Grass – Rats Tail Grass – spear grass – panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion	Native
Not native	Not native

Vegetation proximal to the subject land is highly fragmented, with native vegetation often occurring in isolated patches surrounded by a matrix of agricultural land. This is also consistent with the remaining vegetation within and adjoining the subject land. Native vegetation cover for the subject land is provided in Table 3.2.

Table 3.2 Percentage of native vegetation cover by IBRA subregion

IBRA subregion	Native vegetation in buffer area (ha)	Buffer area (ha)	Approximate percentage of native vegetation in buffer area (%)	Cover class (%)
Inland Slopes	737.55	1270.51	58.05	30–70



Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017); OEH (2017); ICSM (2014)

0 0.5 1 km

GDA 1994 MGA Zone 55

N

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KEY

- Subject land
- 1,500 m buffer area
- Major road
- Minor road
- Topographic contour (10 m)
- Watercourse/drainage line
- Waterbody
- Native vegetation cover

Mitchell landscape (v3.1)

- Macquarie Alluvial Plains
- Mullion Slopes

Note: the entire view extent is within the:
- NSW South Western Slopes IBRA 7 region
- Inland Slopes IBRA7 sub-region

Location map

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 3.1

EMM creating opportunities

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

0 100 200 m

GDA 1994 MGA Zone 55

N

KEY

- Subject land
- Major road
- Minor road
- Vehicular track
- Topographic contour (5 m)
- Cadastral boundary
- Native vegetation cover

Strahler stream order

- 1st order
- 2nd order

Riparian buffer

- 10 m
- 20 m

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Site map

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 3.2

EMM
creating opportunities

4 Native vegetation

4.1 Background review

Biodiversity surveys were conducted by NGH Environmental to the north of the subject land (NGH 2017, 2018). These surveys concluded that PCTs 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, 277 – Blakely's Red Gum – Yellow Box grassy tall woodland and 437 – Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion occur within the locality. Previous regional mapping (DPIE 2015) have these areas primarily mapped as PCT 511 – Queensland Bluegrass – Redleg Grass – Rats Tail Grass – spear grass – panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion.

The majority of the subject land was also mapped as PCTs 266 and 511 (DPIE 2015). As with the mapping from the previous surveys in the locality (NGH 2017, 2018), the mapping for this project has been changed to reflect vegetation on ground, which is PCT 266. The occurrence of PCT 511 was considered, however the grassland present within the subject land was determined to be derived from the surrounding woodland vegetation and therefore consistent with PCT 266. Further discussion and justification is provided in Section 4.3.2.

Table 4.1 Preliminary plant community types in the subject land (DPIE 2015)

PCT ID	PCT name
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
511	Queensland Bluegrass – Redleg Grass – Rats Tail Grass – spear grass – panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion

4.2 Detailed vegetation mapping and habitat assessment

An assessment of the subject land was undertaken on 29–30 July 2021, 18–20 November 2021, 8–9 March 2023 and 7 June 2023. This assessment included detailed vegetation mapping and flora and fauna habitat assessments.

The study area was traversed on foot and by vehicle, with vegetation mapped and aligned with NSW PCTs. To identify PCTs within the subject land, the data collected during the preliminary site visit to map vegetation was assessed. Floristic data collected during plot surveys (Section 0) were used to confirm the vegetation mapping. Plot surveys and vegetation integrity assessments are discussed in Section 0.

PCTs were stratified into vegetation zones based on broad condition state, to meet the requirements of the BAM (DPIE 2020a) and better define Threatened Ecological Communities (TECs). Vegetation zones were delineated based on the definitions provided in Table 4.2. Where there was some uncertainty about correct PCT alignment, or to justify PCT alignment, a series of rapid vegetation assessments (RVAs) were undertaken, with the three dominant species in the overstorey, mid storey and groundcover recorded. Vegetation was mapped in the field using GPS-enabled tablet computers using Collector for ArcGIS™. GPS tracks were also recorded for each visit, which are shown in Figure 4.1. No tracks were recorded for the vegetation assessment of the amended access to the site on the 7 June 2023. Where surveys were not undertaken within the subject land, vegetation mapping was extrapolated based on knowledge of the study area, regional mapping and aerial imagery interpretation.

Table 4.2 Definitions used in delineation of vegetation zones

Condition class	Description
intact_moderate	Forest and woodland with some disturbance, however most typical plant growth forms present, albeit in low density. Minimal establishment of exotic plants, with native grasses dominant within the lower stratum. Mature and hollow-bearing trees, suitable as animal nesting and breeding sites, are present at near-natural density. Moderate habitat value for arboreal and terrestrial animals. Moderate potential to support disturbance-sensitive plant species.
intact_low	Small patches of trees with moderate disturbance of grazing and soil disturbance by livestock. The tree growth form is present but native species of shrubs are absent or occur at low density and low diversity. Exotic species encroachment is occurring; however, a moderate native ground cover of grasses and tussocks is dominant.
intact_poor	Small patches of trees with high disturbance of grazing and soil disturbance by livestock. The tree growth form is present but native species of shrubs, forbs, grasses etc. are absent amongst dominant exotic species. Mature and hollow-bearing trees, suitable as animal nesting and breeding sites, are present but are isolated from substantial areas of woodland or forest and only likely to be available to mobile species such as birds and bats. Habitat value for arboreal and terrestrial animals is low. Minimal potential to support disturbance-sensitive plant species.
DNG_good	Grassland derived from the clearing of native forest or woodland, that has been excluded from recent grazing and soil disturbance by livestock. High diversity of native grasses and herbs and a low level of establishment of exotic plants. Trees are absent or only represented by isolated individuals. A variety of native grasses and forbs dominate the ground layer. Exotic species occur at relatively low density and are mostly annual species and typically comprise of less than 40% of vegetation cover present. Habitat value for arboreal animals is low. Habitat value for terrestrial animals is moderate. Moderate potential to support disturbance-sensitive plant species.
DNG_moderate	Grassland derived from the clearing of native forest or woodland, that has been subject to grazing and soil disturbance by livestock, and a low to moderate level of establishment of exotic plants. Trees are absent or only represented by isolated individuals. A moderate variety of native grasses and forbs dominate the ground layer. Exotic species occur at relatively moderate density, are mostly annual species and typically comprise between 40–50% of vegetation cover present. Habitat value for arboreal animals is low. Habitat value for terrestrial animals is moderate. Moderate potential to support disturbance-sensitive plant species.
DNG_planted	A native grassland derived from clearing of native forest or woodland which has also been planted with hedgerows of Old Man Saltbush (*Atriplex nummularia*). No canopy layer occurs. The shrub stratum is limited to the occurrence of Old man Saltbush. The ground stratum has a high diversity of native grass and forb species. Exotic species occur at low density at <1% cover. Moderate potential to support disturbance-sensitive plant species.
Non-native	Exotic or cropped patches of vegetation. No native present due to historical cropping practices. Highly unlikely to support native vegetation. The area is treeless and supports minimal flora or fauna habitat. Includes areas where recent cropping evident, due to monoculture of species and formed cropping tracks in the soil.

4.2.1 Vegetation integrity assessment

Following the stratification of vegetation zones within the subject land, native vegetation integrity was assessed using data obtained via a series of plots, as per the methodology outlined in Section 4.2.1, 4.3.3 and 4.3.4 of the BAM (DPIE 2020a). Plot data was collected from the subject land on 29–30 July 2021, 18–20 November 2021 and 7 June 2023. At each plot location the following was undertaken:

- one 20 x 20 m plot, for assessment of composition and structure
- one 20 x 50 m plots for assessment of function, including a series of five 1 x 1 m plots to assess average leaf litter cover.

The assessment of composition and structure, based on a 20 x 20 m plot, recorded species name, stratum, growth form, cover and abundance rating for each species present within the plot. Cover (foliage cover) was estimated for all species rooted in or overhanging the plot, and recorded using decimals if less than 1%, rounded to whole number (1–5%) or estimated to the nearest 5% (5–100%). Abundance was counted (up to 20) and estimated above 20, and recorded using the following intervals: 1, 2, 3, 4, 5, 10, 20, 50, 100, 500, 1,000, 1,500, 2,000 etc.

The assessment of function recorded the number of large trees, the presence of tree stem size class, tree regeneration, number of trees with hollows and length of fallen logs, as well as leaf litter cover within the 20 x 50 m plot and five 1 x 1 m subplots. The minimum number of plots and transects per vegetation zone was determined using Table 3 of the BAM (DPIE 2020a). Datasheets are provided in Appendix A while compiled plot data is provided in Appendix B.

The majority of plot surveys were conducted prior to the final design of the project. This was to inform the design and avoid and minimise impacts where possible (see Section 6.3). For this reason, some plots are located outside of the subject land but are still situated within close proximity of the subject land. Despite falling outside of the final design of the subject land, these are representative and have been used to inform the stratification of management zones within the subject land (Table 4.2). Eleven plots associated with the vegetation zones within the final design of the subject land were utilised in the BAM calculator. Four of these 11 plots fall within the final design of the subject land and seven fall within close proximity adjacent to the subject land.

Surveys for flora and vegetation communities were completed under the authority of Scientific License (SL100409). A list of flora species was compiled for each plot and PCT. Records of all flora species will be submitted to BCS for incorporation into the Atlas of NSW Wildlife.

4.3 Results

4.3.1 Vegetation description and environmental weeds

The vegetation within the subject land occurs as small patches of remnant native vegetation in variable condition, derived native grassland and exotic vegetation in the form of cropland. All of the vegetation within the subject land has been impacted by past land use, particularly with ongoing grazing. The majority of the subject land has previously been subjected to cropping or grazing, with very little to no native species cover and a lack of species diversity.

A total of 92 species (48 native and 44 exotic) were recorded within the subject land. Most of these species were native and exotic groundcovers, with a sparse shrub layer present and a total of two tree species. White Box (*Eucalyptus albens*) is the dominant canopy species with smaller occurrences of White Cedar (*Melia azedarach*) along the dry watercourse and west of the proposed access track. Four high threat weeds were also recorded within the study area and include Bathurst Burr (*Xanthium spinosum*), Paspalum (*Paspalum dilatatum*), Saffron Thistle (*Carthamus lanatus*) and African Boxthorn (*Lycium ferocissimum*).

4.3.2 Plant community types and vegetation zones

One PCT was recorded within the subject land; PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion in addition to non-native vegetation (Table 4.3).

Table 4.3 Plant community types mapping within the subject land

Plant community type	Vegetation formation	Vegetation class	Percentage cleared	Direct impacts (ha)	Indirect impacts (ha)
PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Grassy Woodlands	Western Slopes Grassy Woodlands	94	8.79	1.83
Non-native vegetation	n/a	n/a	n/a	7.7	0.5

Vegetation zones were delineated by the presence/absence of canopy and condition of derived grasslands as discussed in Table 4.2. A list of vegetation zones in the subject land is provided in Table 4.4 and described in Table 4.5.

Table 4.4 Vegetation zones identified within the subject land along with broad condition state and ancillary as identified by EMM

PCT ID	PCT name	Condition	Ancillary	Extent in direct impact area (ha)	Extent in indirect impact area (ha)	Vegetation integrity score
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Intact	Moderate	0.12	0.05	49
			Low	0.15	0.02	48.9
			Poor	0.72	0.12	36.6
		Derived Native Grassland (DNG)	Moderate	7.1	1.19	10.1
			Planted	0.7	0.44	36.1

i PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

PCT 266 is best described as a grassy woodland dominated by White Box (*Eucalyptus albens*). PCT 266 has been historically impacted by previous agricultural practices such as cropping and grazing. Areas of moderate to poor quality are distinguished largely by the presence or absence of White Box, the species composition and exotic species cover. Table 4.5 provides a description of the vegetation zones attributed to this PCT.

Table 4.5 PCT 266- Vegetation zones description

Vegetation Zones – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	
PCT ID	**266**
Common name	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
Condition class	Condition class was allocated to either intact or derived native grassland (DNG). Within each condition class, an ancillary code of moderate, low or poor was attributed depending on the condition of vegetation (see Section Table 4.2 and below).
Extent within the subject land	**8.79 ha** 0.72 ha (PCT266_intact_poor) 0.15 ha (PCT266_intact_low) 0.12 ha (PCT266_intact_moderate) 7.1 ha (PCT266_DNG_moderate) 0.7 ha (PCT266_DNG_planted)
Description	The intact vegetation zones have a canopy dominated by White Box. The midstorey is largely absent. Three native shrub species which sparsely occur across these intact vegetation zones include Creeping Saltbush (*Atriplex semibaccata*), Small-leaf Bluebush (*Maireana microphylla*) and Narrawa Burr (*Solanum cinereum*). One exotic shrub species occurs and is also sparsely scattered, being African Boxthorn (*Lycium ferocissimum*). The ground layer occurs in varying conditions across PCT 266. The ground layer for PCT 266 comprises primarily of native and exotic grasses and herbaceous species. Common native species include Speargrass (*Austrostipa scabra*), *Aristida* spp., Wallaby Grass (*Rytidosperma racemosum*), Climbing Saltbush (*Einadia nutans*) and Kidney Weed (*Dichondra repens*). Common exotic species include Wimmera Ryegrass (*Lolium rigidum*), Perennial Ryegrass (*Lolium perenne*) and Hedge Mustard (*Sisymbrium officinale).*
Survey effort	A total of 11 plot surveys were conducted, with a total of four falling within the final design of the subject land and seven falling within close proximity adjacent to the subject land (See Figure 4.1). • Vegetation zone 1 – PCT266_intact_poor; 2 plots (both fall outside of final subject land • Vegetation zone 2 – PCT266_intact_low; 3 plots (one within subject land) • Vegetation zone 3 – PCT266_intact_moderate; 1 plot (falls outside of the subject land) • Vegetation zone 4 – PCT266_DNG_moderate; 4 plots (two within subject land) • Vegetation zone 5 – PCT266_DNG_planted; 1 plot (falls within the subject land).

Table 4.5 PCT 266- Vegetation zones description

Vegetation Zones – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	
Condition description	The community is largely in medium to poor condition with a lack of canopy cover and a high diversity of exotic species. **PCT266_intact_poor:** This vegetation zone has a predominantly exotic species cover with little native species diversity. Species within this vegetation zone include *Lolium* spp., Hedge Mustard, White goosefoot (*Chenopodium album*), Mediterranean Barley Grass (*Hordeum hystrix*) and Prairie Grass (*Bromus catharticus*). A White Box canopy occurs, however current grazing and adjacent cropping has resulted in a dominant exotic species encroachment with no native midstorey. **PCT266_intact_low:** This vegetation zone also has a White Box canopy and lacks a native midstorey. Exotic species encroachment also occurs; however, native grasses and tussocks are diverse. Some of these species include Common couch (*Cynodon dactylon*), Wallaby Grass, Plains Grass (*Austrostipa aristiglumis*), Knotweed Goosefoot (*Einadia polygonoides*) and Corrugated Sida (*Sida corrugata*). **PCT266_intact_moderate:** This vegetation zone has a White Box canopy with a predominantly native understorey with little to no exotic species encroachment. Native grasses are dominant, however a herbaceous occurrence of species also occurs. These species include Knotweed Goosefoot, Variable Glycine (*Glycine tabacina*), Swamp Dock (*Rumex brownii*) and Tarvine (*Boerhavia drummondii*). **PCT266_DNG_moderate:** This vegetation zone occurs throughout the subject land in areas which lack a canopy. These areas are still subject to grazing pressure; however, sustain a moderate cover of native perennial grasses. Annual weeds increase in density during summer and spring, however die back outside of their optimal growing season. A midstorey is absent in this vegetation zone. **PCT266_DNG_planted:** This vegetation zone occurs to the north of the subject land located within the proposed access route for the project. The DNG is similarly comprised of native grasses within the PCT266_DNG_moderate vegetation zone, however a mid-storey exists in the form of Old Man Saltbush, planted as a hedgerow; likely reflecting the land use in the surrounding landscape as agricultural fodder. The ground stratum for this vegetation zone has a substantially higher cover of native grasses and forbs when compared to DNG_moderate. Photographs of each vegetation zone and relevant condition are located below (Plate 4.1 to Plate 4.5).
Characteristic species used for identification of PCT	According to the NSW VIS Classification Version 2.1, the canopy layer species recorded within this community that align with the dominant species listed as characteristic of this PCT includes White Box. As the midstorey of the community within the subject land is sparse and lacking diversity, no described species of PCT 266 occur. Aligning ground layer species include Bear's Ear (*Cymbonotus lawsonianus*), Bunch Wiregrass (*Aristida behriana*), Purple Wiregrass (*Aristida ramosa*), Hairy Panic (*Panicum effusum*), *Oxalis perennans*, Many-flowered Mat-rush (*Lomandra multiflora*), Rock fern (*Cheilanthes sieberi*), *Vittadinia cuneata*, Swamp Dock (*Rumex brownii*) and Windmill Grass (*Chloris truncata*).

Table 4.5 PCT 266- Vegetation zones description

Vegetation Zones – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	
Justification of evidence used to identify the PCT	Several characteristics were used to identify PCT 266 including: • PCT 266 occurs within the NSW South Western Slopes Bioregion on slopes and crests in hill landform patterns- the bioregion and landform on which the subject land occurs • the dominant canopy species described for the PCT is White Box- similar to that of the canopy within the subject land • additional characteristic species occur within the subject land (see above) • the PCT often occurs as small patches or paddock trees with a weedy ground cover- the subject land is fragmented and is occurs as small patches • the Statewide Vegetation Map (DPIE 2015) maps PCT 266 and PCT 511 across the subject land. PCT 511 was considered, however, as the vegetation within the subject land is considered to be derived from PCT 266, the latter PCT was mapped • previous studies (NGH 2017; 2018) within the locality have mapped areas previously mapped as PCT 511 (DPIE 2015) as PCT 266, based on the survey effort and species observed.
Status	PCT 266 within the subject land represents 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 (Box Gum Woodland) Critically Endangered Ecological Community (CEEC) (NSW TSSC 2020) listed under the BC Act as it: • occurs on fertile soils in the NSW South Western Slopes IBRA region, where the subject land is located • is dominated by White Box, a representative canopy species which occurs within the subject land • has an understorey comprising grasses and herbs, which occurs, albeit at low diversity within the subject land, which are similar species to the listed floristic description • has a sparse shrub layer. The EPBC Act Policy Statement for White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands (DEH 2006) describes the listed community (under the EPBC Act) as a woodland or derived native grassland, characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, that is dominated by White Box, Yellow Box and/or Blakely's Red Gum. To be considered part of the listed community, remnants must also: • have a predominantly native understorey (ie more than 50% of the perennial ground layer must comprise native species) • be 0.1 ha or greater in size and contain 12 or more native understorey species (excluding grasses), including one or more identified important species, or • be 2 ha or greater in size and have either natural regeneration of the overstorey species or an average of 20 or more mature trees per ha. Using the above criteria, no areas of mapped PCT 266 within the subject land meet the criteria for White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland as listed under the EPBC Act (see Table 7.1 for detailed assessment).
Estimate of percent cleared value of PCT across its distribution	94%
Patch size	• Vegetation zone 1 – PCT266_intact_poor; >100 ha • Vegetation zone 2 – PCT266_intact_low; >100 ha • Vegetation zone 3 – PCT266_intact_moderate; >100 ha • Vegetation zone 4 – PCT266_DNG_moderate; >100 ha • Vegetation zone 5 – PCT266_DNG_planted; >100ha

Table 4.5 PCT 266- Vegetation zones description

Vegetation Zones – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	
Hollow-bearing trees	• Vegetation zone 1 – PCT266_intact_poor; present • Vegetation zone 2 – PCT266_intact_low; present • Vegetation zone 3 – PCT266_intact_moderate; present • Vegetation zone 4 – PCT266_DNG_moderate; absent • Vegetation zone 5 – PCT266_DNG_planted; absent

Plate 4.1 PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (intact_poor)

Plate 4.2 **PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (intact_low)**

Plate 4.3 **PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (intact_moderate)**

Plate 4.4 **PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (DNG_moderate)**

Plate 4.5 PCT 266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (DNG_planted)

ii Non-native vegetation

Areas of cropped and cultivated land for grazing occur within the subject land. These areas were apparent during desktop assessment and analysis of aerial imagery, as well as when ground-truthing. Table 4.6 provides a description non-native vegetation.

Table 4.6 Non-native vegetation

Description	
PCT ID	Not applicable
Common name	Cropped and cultivated for grazing
Description	The non-native vegetation within the subject land primarily comprises of exotic groundcovers which include Soft Brome (*Bromus molliformis*), *Lolium* sp., Saffron Thistle, Milk Thistle (*Silybum marianum*), Prickly Lettuce (*Lactuca serriola*), *Conyza* sp., Mediterranean Barley Grass, Lucerne (*Medicago sativa*), Bearded Oats (*Avena barbata*) and *Petrorhagia dubia.* Minor occurrences of disturbance tolerant native ground covers occur, however these are in low abundance and low density.
Extent within the subject land	7.7 ha

Plate 4.6 Non-native vegetation within the subject land (cropped)

4.3.3 Vegetation integrity scores

PCT 266 occurs as four vegetation zones within the subject land, which have been mapped and/or entered into the credit calculator to determine vegetation integrity scores. A summary of the vegetation integrity score for each vegetation zone is provided in Table 4.4. The vegetation integrity score is based on the transect data which is compared with benchmark values for each vegetation type.

A total of 11 plot surveys were conducted, with a total of four falling within the final design of the subject land and seven falling within close proximity adjacent to the subject land. The plot surveys which fall outside the final subject land have been used within the BAMC to inform the assessment, due to the uniformity of vegetation within each vegetation zone and their proximity to the subject land (Figure 4.1).

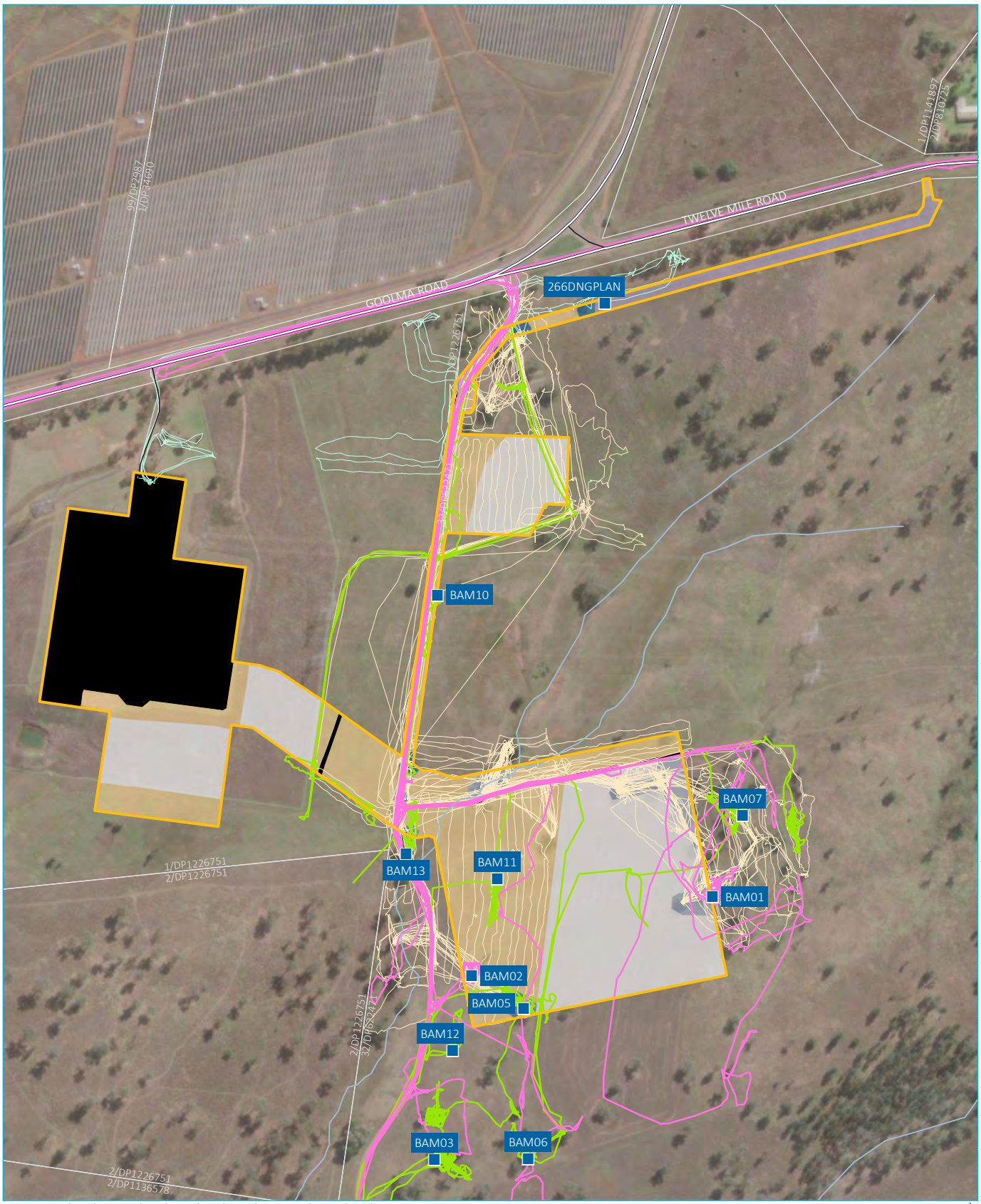
Vegetation integrity scores for wooded vegetation varied between 36.6 and 49. Plot data from the derived native grassland in moderate condition derived a low vegetation integrity score of 10.1, below the benchmark for required offsetting. The vegetation integrity score for the derived native grassland in the planted condition is 36.1, above the benchmark for required offsetting. The vegetation integrity score for the intact woodland in poor condition is lower than the other intact vegetation zone, reflective of the level of past disturbance to this vegetation zone.

4.3.4 Threatened ecological communities

Based on the information outlined in Table 4.5 above, one threatened ecological community has been recorded within the subject land. A summary is provided in Table 4.7. The vegetation community within the subject land is listed under the BC Act; however, does not meet the condition thresholds under the EPBC Act (see Table 4.5 and Section 7.1.1i for discussions).

Table 4.7 Threatened ecological communities recorded in the subject land

PCT ID and name	EPBC Act	BC Act	Associated PCTs and vegetation zones	Direct impact area (ha)
266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Not listed. Does not meet thresholds (see Table 4.5 and Section 7.1.1i)	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 Critically Endangered.	All of PCT 266	8.79



Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

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KEY

- Subject land
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary
- Plot location

Threatened species transect

- December 2021
- March 2023

Vegetation survey tracks

- July 2021
- November 2021
- Not vegetated
- Non-native

Plant community type

PCT 266 | White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (moderate)

Plant community types in the subject land and plot/transect locations

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 4.1

EMM
creating opportunities

5 Threatened species

5.1 Threatened species habitat assessment and description

The subject land has an extensive history of use for agricultural purposes, particularly for cropping and grazing. As a result, the subject land provides limited connectivity for fauna. Fauna habitat features occur within the subject land, however, due to the fragmented and disconnected nature of these habitat features, only highly mobile species such as birds are likely to utilise these features.

A habitat assessment for fauna habitat features was conducted prior to targeted surveys to assess suitability of the subject land for fauna, such as nests, hollows, rock piles and potential foraging habitat.

Seven hollow-bearing trees occur within the subject land and a further 31 within the study area (see Figure 6.1 and Appendix C for details). These hollows vary in size and have the potential to support mobile species such as owls, birds and bats. A number of small nests were observed during targeted bird surveys; however, these were observed to be occupied by the Australian Magpie (*Gymnorhina tibicen*) and Brown Goshawk (*Accipiter fasciatus*). These species are not threatened or listed under the BC Act or EPBC Act. No large raptor nests were observed within the subject land during the habitat assessment. Small areas of embedded rocky habitat also occur within the subject land (Plate 5.1). These may be suitable for reptile species which utilise small rocks as refugia within a native grassland landscape.

It also likely that the subject land would be temporarily utilised by fauna species which may utilise the mature trees to forage. The lack of floral diversity (only White Box within the subject land) is likely to support just one flowering season, as opposed to being a foraging resource year-round.

Waterways within the subject land are highly degraded due to stock access, vegetation clearing and weed encroachment. These waterways lack aquatic habitat, filling with water only in periods of high and sustained rainfall. This unnamed waterway is connected to the Macquarie River to the south. There are weak vegetated links represented by semi cleared grassy woodlands, between the Macquarie River and the vegetation within the subject land. Species which may occur along the Macquarie River and require connected woody vegetation to traverse (such as arboreal mammals) are disconnected from the subject land.

Plate 5.1 Rocky habitat within the subject land

5.2 Ecosystem credit species

Ecosystem credits species are threatened species that can be reliably predicted to use an area of land based on habitat surrogates. For the purposes of the BAM (DPIE 2020a), ecosystem credit species are deemed to be offset through the habitat surrogates (PCTs) in which they occur.

A list of ecosystem credit species predicted to occur within the subject land, based on the PCTs present and generated by the calculator associated within the BAM (DPIE 2020a) is provided in Table 5.1. The potential for these species to occur within the subject land was assessed in accordance with Section 5.2.2 of the BAM (DPIE 2020a).

Table 5.1 Assessment of ecosystem credit species within the subject land

Scientific name	Common name	Biodiversity Risk Weighting	Justification for exclusion
Anthochaera phrygia	Regent Honeyeater (Foraging)	3.00	Not excluded
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	Not excluded
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	2.00	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)

Table 5.1 Assessment of ecosystem credit species within the subject land

Scientific name	Common name	Biodiversity Risk Weighting	Justification for exclusion
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	2.00	Excluded from all zones. No zones within the subject land contain *Allocasuarina* or *Casuarina* spp
Chthonicola sagittate	Speckled Warbler	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Circus assimilis	Spotted Harrier	-	Not excluded
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Daphoenositta chrysoptera	Varied Sittella	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Dasyurus maculatus	Spotted-tailed Quoll	-	Not excluded
Falco subniger	Black Falcon	-	Not excluded
Falsistrellus tasmaniensis	Eastern False Pipistrelle	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Glossopsitta porphyrocephala	Purple-crowned Lorikeet	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Glossopsitta pusilla	Little Lorikeet	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Grantiella picta	Painted Honeyeater	-	Excluded from all zones. No zones within the subject land contain mistletoe
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	2.00	Not excluded
Hieraaetus morphnoides	Little Eagle (Foraging)	1.50	Not excluded
Hirundapus caudacutus	White-throated Needletail	-	Not excluded
Lathamus discolor	Swift Parrot (Foraging)	3.00	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Lophoictinia isura	Square-tailed Kite (Foraging)	1.50	Not excluded
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-	Not excluded
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	3.00	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Neophema pulchella	Turquoise Parrot	-	Not excluded

Table 5.1 Assessment of ecosystem credit species within the subject land

Scientific name	Common name	Biodiversity Risk Weighting	Justification for exclusion
Ninox connivens	Barking Owl (Foraging)	2.00	Not excluded
Nyctophilus corbeni	Corben's Long-eared Bat	-	Not excluded
Petroica boodang	Scarlet Robin	-	Not excluded
Petroica phoenicea	Flame Robin	-	Not excluded
Polytelis swainsonii	Superb Parrot (Foraging)	2.00	Not excluded
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	2.00	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	-	Not excluded
Stagonopleura guttata	Diamond Firetail	-	Not excluded
Tyto novaehollandiae	Masked Owl (Foraging)	2.00	Excluded from cleared vegetation zones (condition class 266_DNG_moderate and 266_DNG_planted)

5.3 Species credit species

5.3.1 Candidate species assessment

In accordance with Step 3 (Section 5.2.3 of BAM (DPIE 2020a)), a field assessment of habitat constraints and microhabitats was undertaken in the field to determine the suitability of habitat within the subject land for:

- candidate species (species credit species associated with specific geographic and landscape feature constraints)
- species predicted to occur by the EPBC Act Protected Matters Search Tool.

Candidate species predicted by the BAMC are shown in Table 5.2. An assessment of the geographic and landscape constraints has been provided for each species, with a justification provided where species have been excluded, in accordance with Steps 1 to 3 (Section 5.2.1 to 5.2.3) of the BAM.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Acacia ausfeldii	Ausfeld's Wattle	Footslopes and low rises on sandstone.	Yes	-	-	No	No. Habitat degraded. The subject land does not contain required microhabitats and lacks a native midstorey.
Ammobium craspedioides	Yass Daisy	N/A	-	South of Cowra	-	No	No. Subject land occurs north of Cowra.
Anthochaera phrygia	Regent Honeyeater	Important mapped areas (breeding).	-	-	-	No	No. The subject land is not a mapped important area.
Aprasia parapulchella	Pink-tailed Legless Lizard	Rocky areas, or within 50m of rocky areas.	-	-	-	Yes	Yes. The subject land contains areas of Box Gum Woodland derived native grassland with partially buried rocks.
Burhinus grallarius	Bush Stone-curlew	Fallen/standing dead timber including logs.	-	-	-	Yes	Yes. The subject land contains some open areas of Box Gum Woodland with fallen timber and standing dead trees.
Callocephalon fimbriatum	Gang-gang Cockatoo	Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	-	-	-	Yes	Yes. The subject land contains eucalypts with hollows greater than 9 cm diameter.
Calyptorhynchus lathami	Glossy Black-Cockatoo	Living or dead tree with hollows greater than 15 cm diameter and greater than 8 m above ground.	Yes	-	-	No	No. Habitat degraded. While the subject land contains the habitat constraints of this species, their preferred foraging habitat is absent from the subject land.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Euphrasia arguta	*Euphrasia arguta*	-	-	-	-	Yes	Yes. Suitable habitat within the subject land.
Grevillea wilkinsonii	Tumut Grevillea	-	Yes	-	-	No	No. Habitat degraded. The subject land does not contain required microhabitats and lacks a native midstorey.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Living or dead mature trees within suitable vegetation within 1 km of a rivers, lakes, large dams or creeks, wetlands and coastlines.	-	-	-	No	No. No stick nests were observed within the subject land.
Hieraaetus morphnoides	Little Eagle	Nest trees – live (occasionally dead) large old trees within vegetation.	-	-	-	No	No. No stick nests were observed within the subject land.
Keyacris scurra	Key's Matchstick Grasshopper		-	-	-	No	Yes. Suitable native grassland within the subject land.
Lathamus discolor	Swift Parrot	Important mapped areas[1]	-	-	-	No	No. The subject land is not a mapped important area.
Lophoictinia isura	Square-tailed Kite	Nest trees	-	-	-	No	No. No stick nests were observed within the subject land.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Miniopterus orianae oceanensis	Large Bent-winged Bat	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	No. The required habitat constraints are absent from the subject land.
Ninox connivens	Barking Owl	Living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground.	-	-	-	No	Yes. The study area contains living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground.
Petaurus norfolcensis	Squirrel Glider	N/A	-	-	-	Yes	Yes. The subject land supports forests and woodlands dominated by Box species, although a shrubby or *Acacia* spp. dominated mid-storey is largely absent. Species was considered likely to occur in all PCTs excluding areas lacking tree cover.
Petaurus norfolcensis – endangered population	Squirrel Glider in the Wagga Wagga Local Government Area	-	-	Wagga Wagga LGA	-	No	No. Subject land does not occur within the Wagga Wagga LGA.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Petrogale penicillata	Brush-tailed Rock-wallaby	Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines.	-	-	-	No	No. The subject land does not support required habitat or is it located within 1 km of required habitat.
Phascogale tapoatafa	Brush-tailed Phascogale	-	-	North of Hwy from Ulan to Gulgong, North of Hwy East from Gulgong to Wellington, N/NW of highway from Wellington to Molong, W/NW of Hwy from Molong to Forbes	-	Yes	Yes. PCT 266 contains dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter, which the species prefers. Subject land located within geographic constraint.
Phascolarctos cinereus	Koala	Presence of koala use trees - refer to Survey Comments field in TBDC.	-	-	-	Yes	Yes. The subject land supports potential Koala use trees.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Polytelis swainsonii	Superb Parrot	Living or dead *E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta* with hollows greater than 5 cm diameter; greater than 4 m above ground or trees with a DBH of greater than 30 cm.	-	-	-	Yes	Yes. The subject land supports potential habitat.
Prasophyllum sp. Wybong	*Prasophyllum sp. Wybong*	-	Yes	-	-	No	No. Habitat degraded. The subject land does not contain required microhabitats.
Pteropus poliocephalus	Grey-headed Flying-fox	Breeding camps.	-	-	-	No	No. The Grey-headed Flying-fox is not a candidate species as its required habitat constraint is absent.
Swainsona recta	Small Purple-pea	-	Yes	-	-	No	No. Habitat degraded. The subject land does not contain required microhabitats.
Swainsona sericea	Silky Swainson-pea	-	Yes	-	-	No	No. Habitat degraded. The subject land does not contain required microhabitats.

Table 5.2 Candidate threatened species assessment

Step 1 – Identify threatened species for assessment		Step 2 – Assessment of habitat constraints and vagrant species					Step 3 – Identify candidate species for further assessment
Scientific name	**Common name**	**Habitat constraints**	**Habitat degraded**	**Geographic constraints**	**Vagrant species?**	**Constraint present in subject land?**	**Candidate species (yes/no) and rationale**
Synemon plana	Golden Sun Moth	Wallaby grass (*Rytidosperma* sp), Chilean needlegrass (*Nassella nessiana*) or Serrated Tussock (*Nassella trichotoma*).	Yes	South of Mid-Western Highway	-	No	No. Subject land is not located within geographic constraint.
Tyto novaehollandiae	Masked Owl	Living or dead trees with hollows greater than 20 cm diameter.	-	-	-	No	No. The study area contains living or dead trees with hollows greater than 20 cm diameter.

5.3.2 Candidate species credit species requiring further assessment

Candidate species for further assessment were identified in accordance with Step 1 to 2 (Section 5.2.1 to 5.2.2) of BAM (DPIE 2020a). A list of species requiring further assessment is provided in Table 5.3.

Table 5.3 Candidate species credit species requiring further assessment

Scientific name	Common name	EPBC Act	BC Act	Flora or fauna
Aprasia parapulchella	Pink-tailed Legless Lizard	Vulnerable	Vulnerable	Fauna
Burhinus grallarius	Bush Stone-curlew	-	Endangered	Fauna
Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered	Vulnerable	Fauna
Euphrasia arguta	*Euphrasia arguta*	Critically Endangered	Critically Endangered	Flora
Keyacris scurra	Key's Matchstick Grasshopper	Endangered	Endangered	Fauna
Ninox connivens	Barking Owl	-	Vulnerable	Fauna
Petaurus norfolcensis	Squirrel Glider	-	Vulnerable	Fauna
Phascogale tapoatafa	Brush-tailed Phascogale	-	Vulnerable	Fauna
Phascolarctos cinereus	Koala	Endangered	Endangered	Fauna
Polytelis swainsonii	Superb Parrot	Vulnerable	Vulnerable	Fauna
Tyto novaehollandiae	Masked Owl	-	Vulnerable	Fauna

The timing of the BDAR and submission of the EIS to DPE for review prior to exhibition (3/6/2022) coincided with an update to the BAM calculator (16/6/2022, version 54). Subsequent design changes resulted in the Key's Matchstick Grasshopper being included in this assessment post-adequacy review.

Advice was sought from BCS (August 2022) on this species and targeted survey requirements. The advice stated that additional surveys for Key's Matchstick Grasshopper can occur prior to the Response to Submissions (RtS) phase of the project's planning pathway (Appendix G). Targeted surveys for Key's Matchstick Grasshopper have been completed and are discussed in Sections 5.3.3 and 5.3.3iie.

Additional design amendments required for the site access during the Response to Submission phase (RtS) resulted in additional targeted surveys being required for Barking Owl and Masked Owl due to suitably sized hollows being observed adjacent to the amended site access track. These surveys are also discussed below.

5.3.3 Targeted survey methods

i Targeted flora surveys

Targeted flora searches were conducted based on the methodology described under the BAM (DPIE 2020b). Parallel field traverses were conducted at a distance of 10 metres apart across the subject land. The traverses took place on the 14 to 16 December 2021 and 8 March 2023 and meets the survey timing requirements for target species (Table 5.4). All traverses were recorded using a global positioning system (GPS) and are shown in Figure 4.1.

Table 5.4 Targeted flora survey method

Scientific name	Common name	Recommended survey period	Survey date
Euphrasia arguta	-	November to March	13 to 16 December 2021; 8 March 2023

ii Targeted fauna surveys

Targeted fauna surveys were undertaken over 49 days between 18 November 2021 to 29 June 2023. Survey methods and effort are summarised in Table 5.5 and further discussed for each fauna group below. Fauna survey locations are illustrated in Figure 5.1.

a Reptiles

Reptile surveys were undertaken for the Pink-tailed Legless Lizard. Methods and survey effort have been developed with consideration to BCD correspondence (Appendix G), and state and federal guidelines (DEC (2004); DPE(2022) and DSEWPaC (2011b)) and are outlined in Table 5.6.

Table 5.5 Targeted fauna survey method

Target species group	Target species	Survey method	Recommended survey period	Survey timing
Reptiles	Pink-tailed Legless Lizard (*Aprasia parapulchella*)	• Habitat search. • Habitat mapping and rock searches.	September to November[1].	18 to 20 November 2021; 9 March 2023
Arboreal mammals	Squirrel Glider (*Petaurus norfolcensis*)	• Arboreal trapping. • Spotlighting. • Camera trapping.	Year-round	13 to 17 December 2021
	Brush-tailed Phascogale (*Phascogale tapoatafa*)	• Spotlighting. • Camera trapping.	December to June	16 December 2021 to 25 January 2022
	Koala (*Phascolarctos cinereus*)	• Spotlighting. • SAT searches.	Year-round	14 to 15 December 2021
Diurnal birds	Gang-gang Cockatoo (*Callocephalon fimbriatum*)	• Transect and area searches. • Targeted nest surveys.	October to January	14 to 15 December 2021
	Superb Parrot (*Polytelis swainsonii*)		September to November	
Nocturnal birds	Bush-stone Curlew (*Burhinus grallarius*)	• Spotlighting. • Call playback.	Year-round	14 and 15 December 2021
	Barking Owl (*Ninox connivens*)	• Stag watches.	May to December	28 and 29 June 2023
	Masked Owl (*Tyto novaehollandiae*)		May to August	28 and 29 June 2023
Invertebrates	Keys Matchstick Grasshopper (*Keyacris scurra*)	• Transect searches.	March to May; August to December	14 and 15 December 2022

1. The BAM-C outlines the recommended survey period is September to November, however EMM have received advice for the project from BCD stating that an acceptable survey window is from September to May, subject to optimal climatic conditions (Appendix G).

Table 5.6 Methods and survey effort – reptiles

Method	Survey description	Survey effort
Habitat assessment and rock search	Initial surveys were conducted in November 2021, based on the best available advice at the time (DEC 2004). All rocks within suitable habitat were searched over a 30 minute search period from 18 to 20 November 2021. The species was not observed. Based on advice from BCD, additional targeted surveys were completed. Targeted surveys were conducted on 9 March 2023 and comprised of a detailed habitat assessment within the subject land to map rocky habitat (using Collector for ArcGIS™). Where visibility was limited (due to tall grasses), 10 metre parallel transects were conducted, whilst random meander transects were completed where sight of rocky habitat was not restricted. Where possible, rocks were flipped and checked for the target species. Whilst mapping rocky habitat, the number of rocks flipped was recorded. The targeted survey was conducted from 7:30am to 11:20am. Within this time frame, weather was monitored to ensure the survey was below the required temperature (Appendix H). As there are known records adjacent to the west of the site (DPE 2023), priority areas adjacent to this site were searched at the start of the survey. A 50 m buffer from the subject and was also searched (where possible). A total of 194 rocks were searched across 0.41 ha of rocky habitat within the study area.	**BCD advice:** The following survey methodology is recommended: • Search success appears to be highest in spring and early summer on warm but not hot days – note that detection probability is increased after a period of rainfall extending over several days. • Restrict searches to an area of relatively homogeneous habitat within each site and a search beneath all rocks that can be turned is made. • Rock cover density rather than fixed area size determines a survey area, and 200 rocks need to be turned to be reasonably confident of determining the species' presence. • During summer months surveys are carried out in the mornings or on cloudy days (at least 6/8 cover) when soil temperatures beneath the rocks are not too high. • During late autumn surveys are carried out on clear sunny days as warming of the rocks appears to attract individuals to the soil surface beneath the rocks. **State guidelines (DPE 2022):** • Habitat surveys consist of diurnal rock searches undertaken by turning over suitably sized rocks in areas of suitable habitat. • Turn over a minimum of 200 suitably sized rocks for every 5 ha of suitable habitat (DPE 2022 and references therein). Suitably sized rocks are approximately: – 300 mm wide and 50 mm deep (DPE 2022 and references therein) – 100–150 mm wide, 120–220 mm long, 50–150 mm deep (DPE 2022 and references therein). • Undertake surveys in the 2 hours after sunrise and 2 hours before sunset on sunny days (<50% cloud cover). • Cease surveys once temperatures exceed 25°C.

b Arboreal mammals

Arboreal mammal surveys were undertaken for the following species:

- Squirrel Glider
- Brush-tailed Phascogale
- Koala.

Methods and survey effort have been developed in accordance with DEC (2004), DSEWPaC (2011b) and Phillips and Callaghan (2011) for the Koala. Methods and survey effort is outlined in Table 5.7.

Table 5.7 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Arboreal trapping	Twenty Elliot B were placed at 2 m above the ground. Where possible, traps were placed 50 m apart on suitable trees within the subject land: • traps were baited with a mixture of peanut butter, rolled oats and honey • a mixture of water and honey was sprayed on each tree trunk • traps were checked early in the morning and closed for the day • traps were re-opened and rebaited in the late afternoon.	DEC (2004) requires 24 trap nights over 3-4 consecutive days per 50 ha of stratification unit, with replication for every additional 100 ha. Based on the above stratification units, this would equate to a minimum survey effort of 72 trap nights. Due to the small size of stratification units within the subject land, traps were placed in suitable habitat within and adjacent to the subject land. This included riparian vegetation and connected vegetation which extends outside of the subject land. Surveys were undertaken within the subject land and adjacent habitat over 4 nights, equating to 80 trap nights. The minimum survey effort was exceeded.
Spotlighting	Spotlight surveys were undertaken using handheld LED spotlights and included: • 1 km transects were undertaken by two observers (2 km total transect length) • observers moved at a speed of less than 1 km per hour (i.e. one hour for the 1 km transect) scanning vegetation and trees for animals using both spotlights • all animals observed were recorded. Spotlighting for arboreal mammals was done concurrently with nocturnal bird spotlighting surveys.	DSEWPaC (2011b) recommends two parallel transects per 5 ha site, while DEC (2004) recommends two transects per 200 ha of stratification unit, repeated across two nights. In line with DSEWPaC (2011b) and DEC (2004), a survey effort of two 1 km transects was undertaken within the subject land. Two transects (1 km minimum distance) were completed across two nights, totalling 2 km in length.

Table 5.7 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Camera trapping	Ten arboreal camera traps were placed in areas of poor to moderate condition woodland where the species is most likely to occur. The camera traps were placed on suitable trees within and adjacent to the subject land: • traps were baited with a mixture of peanut butter, rolled oats and honey • a mixture of water and honey was sprayed on each tree trunk.	DEC (2004) has not described camera trapping survey effort. The threatened biodiversity profile data collection (TBDC) states that for the Brush-tailed phascogale survey effort must be undertaken using baited cameras: A baited canister with small holes and capped at either end, to limit bait theft by other species, or honey-water, sprayed very liberally in front of each camera. Cameras should be set at head height, or above, facing the branch or tree trunk where a honey-based bait has been placed. Cameras must remain in place for a minimum of 4 weeks with cameras checked and baits replaced after 2 weeks. A minimum of 4 cameras, independent of the size of the subject land, must be used for sites up to 1 ha, then an additional 2 cameras for every ha of potential habitat thereafter. For 1 ha of suitable habitat within the subject land, this equates to 112 camera trap nights. As per the arboreal trapping, cameras were placed in suitable habitat within and adjacent to the subject land. This included riparian vegetation and connected vegetation which extends outside of the subject land. A total of 10 camera traps were installed across the subject land over 40 nights, equalling a total of 400 camera trap nights. The minimum survey effort was exceeded.

Table 5.7 Methods and survey effort – arboreal mammals

Method	Survey description	Survey effort
Spot Assessment Technique (SAT) searches	The SAT (Phillips and Callaghan 2011) was undertaken, as follows: • centre tree was located and marked • the 29 nearest trees to the centre tree were also identified • Koala faecal pellets were searched for beneath each of the 30 trees within a distance of 100 cm • initial inspections were checked in undisturbed ground surface, followed by a more thorough inspection involving disturbance of leaf litter and ground cover (if no faecal pellets were initially detected) • an average of approximately two person minutes per tree were dedicated to the faecal pellet search.	Two SAT searches were undertaken within the subject land. Due to the fragmented landscape, not all of these trees were located in connected patches. Some patches are linear, in small patches (groups of three) or isolated. Sixty trees in total were surveyed, both within and immediately adjacent to the subject land.

c Diurnal birds

Diurnal bird surveys were undertaken for the following species:

- Gang-gang Cockatoo
- Superb Parrot

Bird survey methods and survey effort have been developed in accordance with DEC (2004) and DSEWPaC (2010) guidelines. Methods include a mix of transect and areas searches, to record bird activity, and targeted nest searches. Methods and survey effort are outlined in Table 5.8.

Due to project scheduling, targeted surveys for Superb Parrot were not able to be conducted during the recommended survey period for the species. However, due to the known occurrence of the Superb Parrot within the locality, a survey effort to consider breeding habitat was considered necessary. Survey effort was conducted to assess the likely use of the subject land for breeding, such as fidelity of hollows and the occurrence of juveniles.

Table 5.8 Methods and survey effort – diurnal birds

Method	Survey description	Survey effort
Transect and area searches	• Land based areas searches and transects. • Surveyors walked transects and conducted area searches within the subject land. • All calls and habitat features were investigated. • Birds observed or heard were recorded.	DEC (2004) has not resolved bird survey requirements and does not provide guidance on survey effort. The TBDC outlines that signs of breeding should be assessed (lone individuals identified during the breeding season or an occupied nest). If these are observed, potential nest trees should be identified. For the Superb Parrot, the TBDC states that breeding habitat can be identified by the presence of habitat features and observed nest, or two or more birds seen on site. DSEWPaC (2010) was reviewed for Superb Parrot survey efforts, which indicated a requirement of 12 hours over 4 days (3 hours per day) for sites less than 50 ha. Morning surveys are preferable (sunrise to 10 am). Five transect and area searches were conducted over two hours across the survey area. For the Superb Parrot, the minimum survey effort was not met because the species was observed flying over the subject land, confirming presence of the species and thus not requiring further survey. No survey requirements for the Gang-gang Cockatoo have been outlined by DEC (2004) or DSEWPaC (2010). As a result of the relatively small area of the subject land, it was concluded that five transect and area searches over two hours across the survey area provided a thorough survey effort and would be considered adequate.
Targeted nest searches	• Observers travelled across available habitat, seeking out habitat features including nest trees and hollows. • Suitable nest or breeding hollows were marked and observed for breeding activity.	DEC (2004) has not resolved nest search requirements and does not provide guidance on survey effort. DSEWPaC (2010) was reviewed and sympatric species survey efforts indicated 12 hours over 4 days (3 hours per day). Nest searches were carried out in conjunction with transect and area searches and spotlighting. A total of 4 hours was completed across three days. This was considered adequate, due to the small size of potential habitat (1 ha) and the relatively small number of trees within the subject land.

d Nocturnal birds

Nocturnal bird surveys were undertaken for the following species:

- Bush-stone Curlew
- Barking Owl
- Masked Owl

Bird survey methods and survey effort were developed in accordance with DEC (2004). Methods included call playback, spotlighting, targeted nest searches and hollow watches. Methods and survey effort are outlined in Table 5.9.

Table 5.9 Methods and survey effort – nocturnal birds

Method	Survey description	Survey effort
Call playback and spotlighting	DEC (2004) recommends call playback and spotlighting are undertaken to target the Bush-stone Curlew. • Surveys were commenced with a 15 minute listening period. Calls were played for 30 seconds, followed by 4.5 minutes of listening. This 5 minute cycle was repeated three times. • Call playback was conducted at each end of the subject land, at the furthest points from the previous call playback survey. Call playback was only conducted for the Bush-stone Curlew. • This was followed by spotlighting on foot for one hour throughout the subject land. All observed fauna species were identified and recorded.	DEC (2004) recommends a number of survey methods for the Bush-stone including: • call Playback – 2–4 km apart and conducted during the breeding season • day habitat search- flushing of Bush-stone Curlew by walking through potential habitat • spotlighting: by foot or from a vehicle driven in first gear. Based on the above, and availability of suitable habitat, two call playback sites were surveyed in conjunction with one 1 km spotlight transect over two consecutive nights. The minimum survey effort was reached.
Targeted nest searches	Targeted nest searches were conducted concurrently during the diurnal bird surveys. A search for potential breeding habitat for Bush-stone Curlew occurred.	As above (Table 5.8).
Hollow watches	DEC (2004) suggests call playback, but this should not be undertaken during the breeding season so as not to disturb breeding owls. DEC (2004) guidelines also recommend daytime habitat searches (for hollows and pellets) and stag watching (observe each hollow for 30 minutes prior to sunset and 60 minutes after sunset).	A total of three hollow-bearing trees were considered suitable breeding habitat adjacent to the subject land (Figure 5.1). Suitable hollows were revisited at dusk and observed from a distance for a period of 90 minutes for any evidence of use by owls. The hollow watches were completed for two consecutive nights on 28 and 29 June 2023.

e Invertebrates

Invertebrate surveys were undertaken for the Key's Matchstick Grasshopper. Survey methods and survey effort were developed in accordance with advice obtained from the BCD (Appendix G). Methods and survey effort are outlined in Table 5.10.

Table 5.10 Methods and survey effort- invertebrates

Method	Survey description	Survey effort
Transect searches	Targeted surveys were conducted within all native PCTs within the project site, primarily focused on derived native grasslands and open patches of native woodland. Surveys were conducted between 10:00 am and 4:00 pm to avoid the colder time periods of the day. Weather observations for the 14th and 15th of December included a maximum temperature of 22˚C and 24˚C respectively (BOM 2023). No rain occurred during the monitoring event.	**BCD advice:** • Survey between 10:00 am and 4:00 pm, on warm sunny days. Avoid wind in less active periods of August. • A slow meander through preferred habitat, slightly disturbing the vegetation to enhance detectability if present by encouraging movement. • Transects 5 m apart and up to 100 m long spatially covering all potential habitat. • Focus on open woodland, derived native grassland and grassland that include relatively undisturbed Kangaroo Grass (*Themeda triandra*) and/or dense patches of Common Everlasting (*Chrysocephalum apiculatum*). Less likely in denser woodland with significant shading.

5.3.4 Targeted survey results

i Targeted flora surveys

No targeted flora species were found during the surveys.

ii Targeted fauna surveys

One target fauna species was observed during targeted surveys; Superb Parrot. The Superb Parrot was observed during diurnal bird surveys on multiple occasions in addition to an opportunistic record. Observation details are summarised in Table 5.11 below and are shown in Figure 5.1 and Figure 5.2.

Despite targeted surveys occurring for the Pink-tailed Legless Lizard, the survey was not conducted within the specified timeframe for the BAM. The Pink-tailed Legless Lizard was also recorded within proximity to the subject land (DPE 2023; NGH 2023). The recent records within proximity and the adjoining landscape provides contiguous habitat for the species. For these reasons, despite being targeted, the Pink-tailed Legless Lizard has been assumed present.

A Southern Boobook (*Ninox Boobook*) was observed occupying one of the hollow-bearing trees during owl surveys (Photograph 5.1). This species is not listed under the BC Act or EPBC Act and will not be directly impacted (hollow-bearing tree is located outside (within 100m) of the subject land).

Table 5.11 Superb Parrot observation during targeted surveys

Date observed	Survey method	Number of individuals	Sex known?	Life stage
14 December 2021	Transect and area searches	4	Mixed sexes	Adult
		1	Female	Adult
		2	Unknown	Adult
15 December 2021	Opportunistic	1	Female	Juvenile

Photograph 5.1 Southern Boobook observed occupying a hollow-bearing tree adjacent to the subject land

iii Candidate species presence, extent and habitat quality

Table 5.12 defines the presence (or absence) of candidate species in the subject land and habitat quality. The number of individuals impacted by the project is provided for count-based species, while the area of habitat impacted is provided for area-based species. The area of habitat has been used to define the species polygon for area-based species, in accordance with Step 4 to 6 of the BAM (Section 5.2.4 to 5.2.6).

Table 5.12 Candidate species presence, extent and habitat quality

Scientific name	Common name	Step 4 – Determine candidate species presence/absence	Step 5 – Determine the area or count, and location of suitable habitat for a species credit species		Step 6 – Determine the habitat condition within the species polygon for species assessed by area	
			Individuals impacted (count-based species)	Area impacted (area-based species)	Associated vegetation zone/s	Vegetation integrity score
Aprasia parapulchella	Pink-tailed Legless Lizard	Not recorded – however assumed present	-	5.19 [2].	PCT266_intact_low PCT266_intact_poor PCT266_DNG_moderate	48.9 36.6 10.1
Burhinus grallarius	Bush Stone-curlew	Not recorded	-	-	-	-
Callocephalon fimbriatum	Gang-gang Cockatoo	Not recorded	-	-	-	-
Euphrasia arguta	-	Not recorded	-	-	-	-
Keyacris scurra	Keys Matchstick Grasshopper	Not recorded	-	-	-	-
Ninox connivens	Barking Owl	Not recorded	-	-	-	-
Petaurus norfolcensis	Squirrel Glider	Not recorded	-	-	-	-
Phascogale tapoatafa	Brush-tailed Phascogale	Not recorded	-	-	-	-
Phascolarctos cinereus	Koala	Not recorded	-	-	-	-
Polytelis swainsonii	Superb Parrot	Recorded during targeted survey	N/A	6.74 [3].	PCT266_intact_low PCT266_intact_moderate PCT266_intact_poor PCT266_DNG_moderate PCT266_DNG_planted	48.9 49 36.6 10.1 36.1
Tyto novaehollandiae	Masked Owl	Not recorded	-	-	-	-

2. Species polygon established in accordance with the Threatened Reptiles: Biodiversity Assessment Metho survey guide (DPE 2022) by providing a 50m buffer around all mapped rocky habitat. As no credits are generated within the non-native vegetation zones, the impacts to the species in this vegetation zone is assessed as a prescribed impact (Section 6.2).
3. Species polygon established in accordance with TBDC by providing a circular buffer with a 100m radius around each nest tree where breeding site is confirmed. This includes all areas surrounding the hollows, such as exotic grassland, as the purpose of the buffer is to minimise disturbance/avoid clearing. As no credits are generated within the non-native vegetation zones, the impacts to the species in this vegetation zone is assessed as a prescribed impact (Section 6.2).

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

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KEY

- Subject land
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary
- Hollow-bearing tree
- Pink-tailed Legless Lizard rocky habitat

Diurnal bird survey

- Bird survey point
- Bird survey transect

Mammal survey

- SAT survey
- Camera trapping
- Arboreal Elliot trapping

Nocturnal survey

- Call-playback
- Hollow watch
- Spotlight survey
- Spotlight transect

- Not vegetated
- Non-native

Plant community type

PCT 266 | White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (moderate)

Targeted fauna results and transects

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 5.1

EMM
creating opportunities

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

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KEY

- Subject land
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary
- Key's matchstick grasshopper survey tracks
- Not vegetated
- Non-native

Plant community type

PCT 266 | White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (moderate)

Key's Matchstick Grasshopper survey

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 5.2

EMM creating opportunities

Stage 2

Impact assessment

EMM
creating opportunities

6 Impact assessment

This chapter identifies the potential impacts of project on the biodiversity values. Measures taken to date to avoid and minimise impacts are summarised and recommendations to assist in the design development that further avoids, minimises and mitigates impacts are provided.

6.1 Potential direct and indirect impacts

6.1.1 Direct impacts

Without any measures to avoid, minimise or mitigate impacts, the project would result in the following direct impacts on biodiversity:

- loss of 8.79 ha of native vegetation
- loss and degradation of native fauna habitats (including seven hollow-bearing trees).

Wherever possible, direct impacts have been avoided and/or minimised through the design of the subject land (Section 6.3). Impacts will be further managed and mitigated through the development of a biodiversity management plan, using the measures recommended in the below sections. Any residual impacts would be compensated through implementation of the biodiversity offset scheme.

6.1.2 Indirect impacts

Section 8.2 of BAM (DPIE 2020a) requires the assessment of indirect impacts on native vegetation, threatened ecological communities and threatened species habitats.

Delineation of a project into different management zones allows for direct impacts (i.e. total loss of native vegetation and fauna habitat in a given area) and indirect impacts (e.g. decreasing condition in retained native vegetation and fauna habitats adjacent to direct impacts) to be quantified. The following section describes how the indirect impacts have been defined for the project. Mitigation measures have been provided in Section 6.3 to manage these indirect impacts.

The indirect impact area has been calculated using a five-metre buffer area. Due to the existing weed encroachment within the study area, the nature of the proposed works and the flat slope associated with the subject land, a five-metre indirect buffer area was considered adequate. This is because weed encroachment is unlikely to be exacerbated or extend into areas which may be weed-free. Weed encroachment can be associated with slope gradient; however, due to the relatively flat landscape, slope is not considered to be an escalating factor.

Without any measures to avoid, minimise or mitigate impacts, the project would result in the following indirect impacts on biodiversity:

- erosion and sedimentation
- weed introduction and spread
- disturbance from increased noise and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour).

i Erosion and sedimentation

Construction of the project may lead to erosion and sedimentation and potential reduction in water quality to the unnamed watercourse within the subject land. During the project, sediment may be mobilised and transported by surface water during rainfall events, and potentially discharging into watercourses and drainage lines and potentially reducing water quality in downstream aquatic habitats and the Macquarie River. Increased suspended sediments can reduce light penetration into the water column, reducing photosynthesis of aquatic macrophytes, and decreasing dissolved oxygen levels.

Erosion and sediment control measures will be implemented during the project. Strict controls will be put in place to ensure sediment does not runoff into watercourses.

ii Weed introduction and spread

The project has the potential to facilitate dispersal of weed species. As the subject land contains high threat weeds and additional exotic species, weed spread has the potential to occur across the subject land. Uncontrolled movement of vehicles, equipment and personnel within the subject land is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the subject land which may also introduce new species. Many weed species thrive on ground disturbance and will rapidly colonise disturbed areas in advance of native species recolonisation.

Increased pest flora abundance has adverse impacts on native vegetation and biodiversity, as well as potential negative economic effects on local land uses.

Weed impacts will be mitigated during the proposed activity and includes measures such as wash down protocols and weed containment measures (Section 6.3.1).

iii Noise and dust disturbance

Noise may adversely affect fauna by interfering with communication (e.g. territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Noise will be generated by the project through the use of equipment and vehicles and will vary from short intermittent noise from plant and equipment.

Increased dust from vegetation clearing and vehicle movements during construction has the potential to temporarily and locally impact flora and fauna values in the vicinity of the subject land. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity (also resulting in reduced habitat quality for fauna) and impact on respiratory systems of fauna.

Potential noise and dust impacts will be temporary as they will only be evident during vegetation clearing. Dust levels will be monitored and when needed dust suppression implemented such as wetting down dirt roads or reducing vehicle speeds.

6.2 Prescribed and uncertain impacts

An assessment of prescribed and uncertain impacts is provided in Table 6.1.

Table 6.1 Assessment of prescribed impacts

Feature	Present	Description of features	Potential impact	Affected threatened species	Section of BDAR where this impact is addressed.
Karst, caves, crevices, cliffs, rocks and other geological features of significance	No	No geologically significant features are present within the subject land	The project does not include geological features of significance; therefore this prescribed impact is not relevant to the project.	N/A	N/A
Human-made structures or non-native vegetation	Yes	Non-native grassland (cropping)	A species polygon has been created for the Superb Parrot and Pink-tailed Legless Lizard. This species polygon intersects 3.93 ha and 2.5 ha of non-native vegetation respectively and will not generate species credits under the BAM. Mitigation measures to minimise impacts to the Superb Parrot and Pink-tailed Legless Lizard ensure prescribed impacts to these species are addressed.	Superb Parrot	Sections 5.3 and 6.3; Figure 6.3.
Habitat connectivity	No	N/A	Native vegetation and fauna habitats are highly fragmented in the subject land. Ecosystem and species credit species predicted to occur in the subject land predominantly comprise highly mobile birds and mammals, and therefore most species will not be impacted by fragmentation. The design of the subject land results in minimal fragmentation and no isolation as surrounding suitable habitat remains connected.	N/A	N/A
Impacts of development on movement of threatened species that maintains their life cycle	No	N/A	The project is located in a fragmented and disconnected patch of sparse woodland, which limits existing movement of threatened species. Breeding habitat for Superb Parrot and Pink-tailed Legless Lizard has been offset under the BAM. No additional breeding habitat of threatened species was found during the assessment.	N/A	N/A
Waterbodies, water quality and hydrological processes	No	N/A	The subject land intersects three unnamed waterways. Although mapped as waterways, there is a lack of aquatic habitat and hydrological influence, filling with water only in periods of high and sustained rainfall. The first-order streams generally lack canopy or shrub stratum and consist of grasses whilst fragmented occurrences of native canopy vegetation occurs within the second-order stream riparian buffer. For this reason, the project is not expected to intersect groundwater given its shallow depth. Impacts on groundwater dependent ecosystems are not expected. Therefore, impacts on threatened species and ecological communities as a result of changes in water quality, water bodies and hydrological processes are not expected during construction or operation. Accordingly, management of this prescribed impact is not required.	N/A	N/A

Table 6.1 Assessment of prescribed impacts

Feature	Present	Description of features	Potential impact	Affected threatened species	Section of BDAR where this impact is addressed.
Impacts of wind turbine strikes on protected animals.	No	N/A	The project does not include wind turbines; therefore this prescribed impact is not relevant to the project.	N/A	N/A
Vehicle strikes	No	N/A	The project traffic impact assessment (Appendix L of the EIS) concluded that the project would result in up to 100 light vehicle trips and up to 60 heavy vehicle trips per day during the construction phase, and minor increases in vehicle movements during operation. Construction traffic will be restricted to 10 km/h and will be enforced by signposting. Therefore, the project is not predicted to significantly increase animal vehicle strikes above existing levels. Accordingly, management of this prescribed impact is not required.	N/A	N/A

6.3 Avoidance, minimisation and management

The BAM requires projects to outline the strategies and actions that may have been taken to avoid or minimise impacts on biodiversity values during proposal planning (DPIE 2020a). The following section summarises the key values within the subject land, in addition to the avoidance and minimisation strategies.

6.3.1 Key values within the subject land

The subject land has a long history of agricultural use, which has had a substantial influence on the current condition of the site. Although cropping and stock grazing continues to be undertaken on the subject land, the subject land nevertheless continues to strongly feature grassy woodland and derived native grassland vegetation.

Avoidance and mitigation strategies presented in the following section are driven by the following key biodiversity values identified on the subject land, which include:

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box-Gum Grassy Woodland), which is listed under the BC Act and is also an SAII entity (see Section 6.4.1)
- old growth trees with hollows suitable for fauna use
- suitable foraging and breeding habitat for the Superb Parrot (listed under the BC Act and EPBC Act).

It is recognised that Box-Gum Grassy Woodland is critically endangered and is a potential SAII due to:

- overclearing (>90%) i.e. reduction in geographic extent (Principle 1)
- continuing impacts from land use affecting quality of remaining extents and patch size (Principle 2).

Furthermore, Box-Gum Grassy Woodland is known to provide functional habitat for a suite of fauna species (including threatened species), including hollow-dependent fauna. The decline in Box-Gum Grassy Woodland and derived native grassland has led to a decline in associated fauna assemblages (DECCW 2011).

6.3.2 Avoidance strategy

EMM has carried out a number of technical assessments within the subject land (refer to the EIS). These surveys have been carried out in parallel with, and have informed the evolution of, the development design (Figure 2.1 in the EIS). As part of consultation with the landowner and associated technical assessments, the original design of the subject land has been significantly altered and located in areas with lower biodiversity values.

Key avoidance measures that have been implemented by AMPYR during the development design are provided in Table 6.2 below and refers to the reference numbers provided in Figure 6.1.

Iterative project planning, informed by the baseline studies outlined above, has allowed a range of impacts to be avoided and others to be minimised throughout the life of the project. To compensate for unavoidable disturbance, biodiversity offsets will be provided.

Table 6.2 Avoidance strategy

Reference number (Figure 6.1)	Avoidance description
1	This option was considered early in the project. This patch is primarily located in 100% Box-Gum Woodland and derived native grassland (inferred from regional mapping (DPIE 2015), which would leave no strategy for avoidance or minimisation. This patch occurs as one connected patch. This option was eliminated once biodiversity constraints, in addition to other environmental constraints, were considered.
2	The location of the washdown bay was considered throughout the design process, originally being located at the property entrance within a patch of Box-Gum Woodland with a moderately diverse understorey (2a). Although the trees were sufficiently spaced apart to enable the washdown to be located between trees, it was recognised that this location could have potential to have indirect or adverse effects on the trees and surrounding grassland if the appropriate controls were not in place to manage dirty water and contaminants. The final washdown bay location is to the south of this location (2b), absent of trees within what is primarily cropped land with non-native grassland.
3	Additional plant community types and better condition PCT 266 (low and moderate) occurs within the study area. These PCTs may have been suitable habitat for additional threatened species and resulted in a higher impact to these species. The design was moved to entirely avoid these PCTs. This avoids more suitable habitat, including approximately 280 metres of the unnamed waterway.
4	Better condition PCT 266 derived native grassland is located to the east of the study area. This derived native grassland is considered to be in good condition, due to apparent fencing exclusion to livestock. It was communicated early that this derived grassland contains good condition habitat, suitable for threatened flora and fauna species. The derived native grassland was ruled out on that basis.
5	Approximately 280 metres of the unnamed waterway which travels through the study area has been avoided. This waterway supports mature Box-Gum Woodland tree species and associated fauna habitat.
6	The impact to hollows was identified as key constraint early in the project as they provide functional habitat for native fauna species. Avoiding impact to hollow-bearing trees was identified as a key opportunity for the project. The subject land has been designed to avoid 81% of hollow-bearing trees which were recorded in the study area. Out of the total 37 hollow-bearing trees which occur within the study area, 30 will be avoided.
7	The layout of the BESS was reconfigured to maximise the use of cropped land where there is no native vegetation. This resulted in prioritising the retention of high-moderate quality Box Gum Woodland and derived grassland within the property. This also avoids most of the creek line and moderate quality Box-Gum Woodland to the west of the creek. Locating the design on cropped land, minimises impact on Box Gum Woodland and derived grassland CEEC (BC Act) resulting from the project and to fauna habitat.
8	The access track into the battery energy storage system has been continuously considered throughout the project life. Designing the access track within this location has avoided clearing hollow-bearing trees and a potentially different PCT (including additional potential threatened species). The access track within the subject land has been located to avoid planted and mature canopy species to the north and south which provide hollows for fauna. The planted hedgerow and grazed understorey is also unlikely to contain habitat for threatened flora species.
9	The subject land has been reduced to avoid direct impacts to a hollow-bearing tree suitable for Superb Parrot, in addition to rocky habitat for the Pink-tailed Legless Lizard.
10	This access track into the Wellington substation was considered as an option to utilise the existing driveway. The planted trees along the driveway included Yellow Box (*Eucalyptus melliodora*), Mugga Ironbark (*Eucalyptus sideroxylon*) and Kurrajong (*Brachychiton populneus*), which is likely a PCT different to PCT 266 within the subject land. The avoidance of this route option results in avoidance of a new PCT and potentially additional threatened species.

6.3.3 Minimisation, mitigation and amelioration measures

Table 6.3 summarises the minimisation, mitigation and amelioration measures to minimise the potential for development-related impacts on biodiversity.

Table 6.3 Impact minimisation, mitigation and amelioration measures

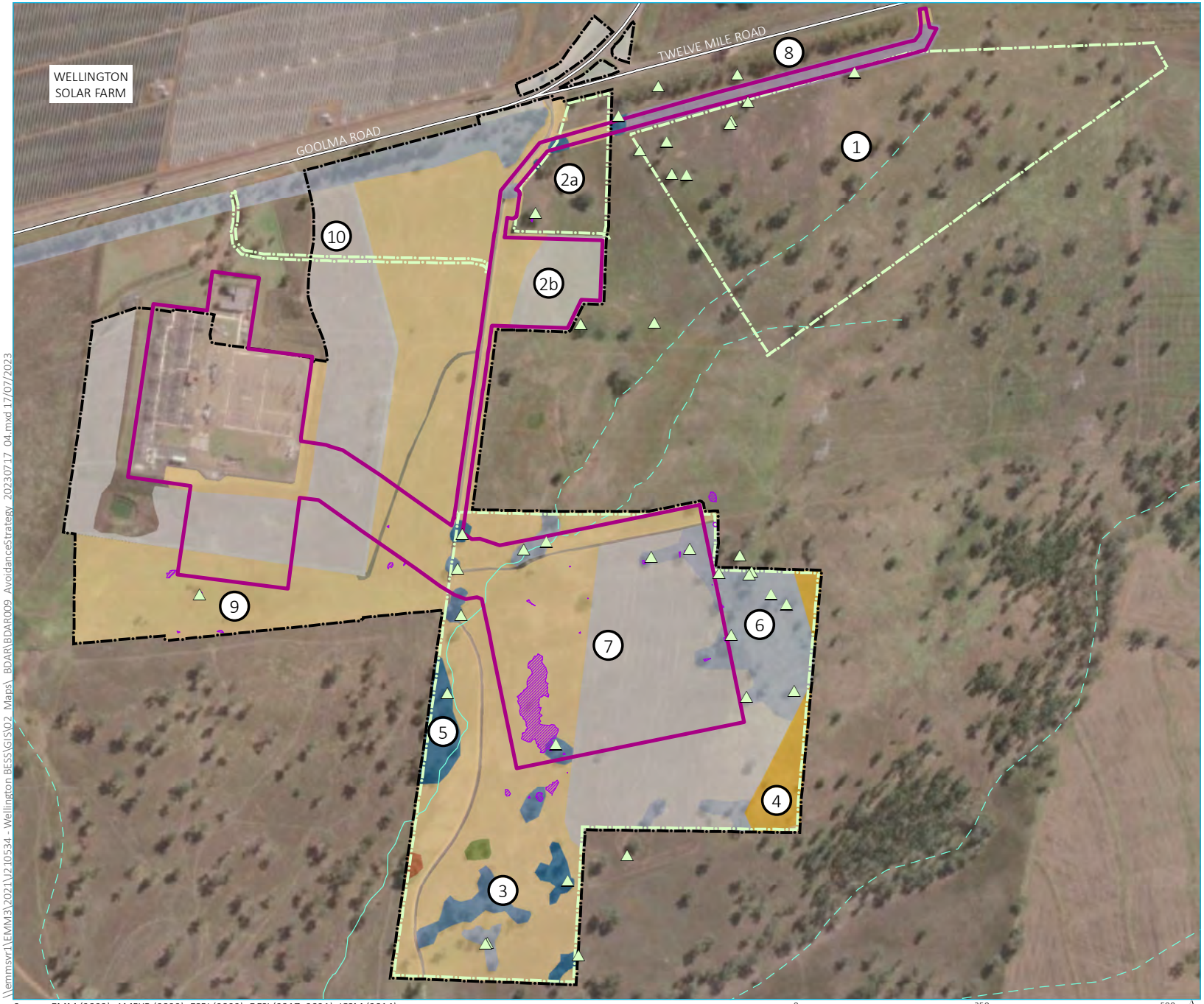
Impact	Action	Intended outcome	Timing	Responsibility
Removal of Box Gum Woodland and derived native grassland	Retain vegetation where possible within the transmission line connection. Limit the removal of vegetation to necessary trees and trimming of branches.	Minimise the direct impact to vegetation within the transmission line connection by managing and maintaining vegetation as opposed to complete removal of all vegetation.	Construction Post-construction	Contractor
	Locate the access of the BESS on most of the existing access track within the subject land.	Minimise removal of Box Gum Woodland and derived native grassland.	Design	Contractor
	Following construction, include species consistent with PCT 266 into landscaping and vegetation screens.	Increase the floristic and structural diversity present in the subject land consistent with PCT 266.	Post-construction	Contractor
Removal of hollow-bearing trees	Minimise removal of hollow-bearing trees which occur within the subject land, where possible. A visual screening area is included in the subject land, where efforts to retain the 7 remaining trees will be made. Although this is the aim of AMPYR and SHELL, impacts to hollow-bearing trees include the removal of the 7 trees within the subject land for the purpose of this assessment.	Minimise impact to hollow-bearing trees within the subject land.	Design	Contractor
	Install 7 nest boxes or equivalent within the cadastral boundary of the site in remnant woodland. As a priority, the removed hollows should be retained to be re-installed on remnant trees within the site. Where this is not possible, nest boxes can be used.	Supplement hollow-bearing tree loss as a result of the project	Construction	Contractor
Removal of potential habitat for native fauna (hollow-bearing trees) (for all species including the Superb Parrot)	Pre-clearance surveys to be conducted prior to removal of hollow-bearing trees (at the locations specified in the BDAR).	Mitigate injury to potential fauna species inhabiting hollows.	Pre-construction	Contractor Qualified Ecologist
	If the Superb Parrot is found to be utilising a hollow, removal of the hollow-bearing tree must be postponed until the breeding pair has left the hollow for the breeding season and no eggs or hatchlings remain in the hollow (September to December). An exclusion zone must be installed should the Superb Parrot be found within a hollow.	Avoid impact to the hatchlings during the breeding season.	Pre-construction	Contractor

Table 6.3 Impact minimisation, mitigation and amelioration measures

Impact	Action	Intended outcome	Timing	Responsibility
Removal of logs, rocks (including embedded rocks) and debris from the subject land	Retain hollow logs, all rocks and debris to be used post construction in remnant woodland. These will be relocated outside of the subject land (within the cadastral boundary) in the remnant woodland to the east, south and west to retain species habitat and connectivity. Avoid relocation of rocks during Pink-tailed Legless Lizard breeding season (December to late March).	Retain and improve potential fauna habitat within the indirect impact area and study area post construction.	Post-construction	Contractor
	Pre-clearance surveys to be conducted immediately prior to removal of logs, rocks and debris.	Avoid fauna fatalities by providing places for refuge and a mechanism to get to these refugia (by capture if necessary).	Pre-construction	Contractor Qualified Ecologist
Indirect impacts on White Box woodland to be retained	Retained trees will be marked for their protection during construction, where required. Markings will be monitored and reapplied where necessary during construction.	Avoid indirect impact to retained trees.	Pre-construction	Contractor
	All workers to be made aware of ecologically sensitive areas and the need to avoid impacts. This includes adjacent native vegetation.	Avoid unintentional impacts to Box Gum woodland and native vegetation.	Pre-construction	Contractor
Erosion and sedimentation to the indirect impact area	Sediment controls, including fencing and sediments traps, should be installed in any areas where works will occur in proximity to low lying vegetation. This includes along the boundary of the unnamed watercourse.	Avoid increased sedimentation and erosion of the unnamed watercourse within the subject land.	Pre-construction	Contractor
Weed introduction and spread	Remove weeds prior to clearing. Weeds are to be stockpiled appropriately prior to removal from the subject land to avoid the spread of seed and other propagules.	Minimise weed introduction and spread.	Construction	Contractor
	Weed hygiene protocols are in place prior to entering the subject land. This includes wash-down procedures to all plant and machinery.	Avoid weed introduction from outside of the subject land.	Construction	Contractor
Disturbance	Monitor dust levels and implement suppression strategies where required such as wetting down dirt roads or reducing vehicle speeds.	Reduce dust settlement on native vegetation and habitat for native species.	Construction	Contractor

Table 6.3 Impact minimisation, mitigation and amelioration measures

Impact	Action	Intended outcome	Timing	Responsibility
Threatened species finds	Have a threatened species protocol; for managing threatened species which may be found on site during construction.	Identify and avoid impact and stress on threatened species (flora and fauna).	Pre-construction Construction	Contractor



KEY

- Current design
- Study area
- Previously considered areas
- Pink-tailed Legless Lizard rocky habitat

Existing environment

- Major road
- Hollow-bearing tree

Strahler stream order

- 1st order
- 2nd order
- 3rd order

Plant community type

PCT 85 | River Oak forest and woodland
- Moderate (intact)

PCT 266 | White Box grassy woodland (Box Gum Woodland CEEC (BC Act))
- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (good)
- DNG (moderate)

PCT 279 | Blakeley's Red Gum- White Cypress Pine woodland
- Moderate (intact)

- Non-native vegetation
- (0) Reference number: refer to Table 6.2 Avoidance strategy

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Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

0 250 500 m

GDA 1994 MGA Zone 55

N

Avoidance strategy

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 6.1

EMM creating opportunities

6.4 Serious and Irreversible Impacts

An impact is to be regarded as serious and irreversible (SAII) if it is likely to contribute significantly to the risk of a threatened species (including endangered populations) or an ecological community becoming extinct based on the following 4 principles:

- Principle 1: The impact will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline.
- Principle 2: The impact will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size.
- Principle 3: The impact is made on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution.
- Principle 4: The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity, and therefore its members are not replaceable.

Candidate SAII entities with regards to the project are discussed in the following sections against the relevant principles for the listing of the SAII entity, based on information from the Threatened Biodiversity Data Collection (TBDC). No assessment of any other threatened entities at risk of an SAII has been requested by the decision-maker. SAII assessments are provided in Sections 6.4.1 and 6.4.2.

6.4.1 Threatened ecological communities

Table 6.4 and Table 6.5 provide an assessment of White Box Yellow Box Blakely's Red Gum Woodland against the assessment criteria provided in Section 9.1.1 of BAM (DPIE 2020a).

Table 6.4 Current status of White Box Yellow Box Blakely's Red Gum Woodland CEEC

Criteria	Data/information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Current total geographic extent (ha) of the threatened ecological community (TEC) in NSW.	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland has undergone a very large reduction in geographic distribution. The best estimate of the extent of occurrence (EOO) is 702,800 km^2, based on a minimum convex polygon enclosing likely occurrences of the community. The best estimate of the area of occupancy (AOO) is 151,100 km^2.	NSW TSSC 2020	Not all areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values.
Estimated reduction in geographic extent of the TEC since 1970.	Approximately greater than 90% reduction in pre-1750 distribution. According to the NSW TSSC (2020): • The TSSC (2006) estimated that less than 5% of the original distribution remained, however the extent to which remaining examples continue to support characteristic biota, their interactions and function is unknown. • The very large historical decline in geographic distribution is corroborated by other sources although there is some uncertainty surrounding the current extent of the community and its pre-1750 distribution. Considering the evidence for historical, recent and contemporary clearing in combination, it is very likely that the reduction in the distribution of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland exceeds 90% when averaged across the entire range of the community.	NSW TSSC 2020 Commonwealth TSSC (2006)	No estimate of vegetation extent as at 1970 is available.

Table 6.4 Current status of White Box Yellow Box Blakely's Red Gum Woodland CEEC

Criteria	Data/information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Extent of reduction in ecological function, describing the degree of environmental degradation or disruption to biotic processes.	The Threatened Biodiversity Profile description (BCS 2022) lists the following threats affecting the ecological function of the TEC: • Habitat loss, degradation and fragmentation from agricultural, forestry, mining, infrastructure and residential development. • Degradation by over grazing and trampling by introduced and native herbivores resulting in losses of plant species and structural diversity (simplification of the understorey and ground layer and suppression of overstorey regeneration), erosion and other soil changes (e.g. loss of cryptogams, increased nutrient status). • Degradation of remnants by non-native plant species, including noxious weeds, exotic pasture species and environmental weeds, including garden escapes, olives and pines. • Degradation of remnants by feral pest animals resulting in the loss or modification of habitat and predation of native fauna that are part of the White Box Yellow Box Blakely's Red Gum Woodland TEC. • Removal of native ground layer in box-gum woodland remnants where trees have been partially or fully removed. • Altered fire regimes. These threats affect the ecological function of the TEC at varying levels lead to different states of the TEC. The extent to which this reflects a permanent or temporary loss depends on the mechanism and severity of disturbance as well as any measures that are undertaken to reverse decline. As such, the extent of reduction in ecological function is unknown.	BCD, 2022 NSW TSSC 2020	Data on the extent of reduction is not available.
Evidence of restricted geographic distribution based on the TEC's geographic range in NSW:			
Extent of occurrence (ha)	702,800 km^2	NSW TSSC 2020	Not all areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values.

Table 6.4 Current status of White Box Yellow Box Blakely's Red Gum Woodland CEEC

Criteria	Data/information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Area of occupancy (ha)	151,100 km^2	NSW TSSC 2020	Not all areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values.
Number of threat-defined locations	The BAM (DPIE 2020a) defines threat-defined locations in terms of threatened species but does not mention TECs. According to the Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria (IUCN 2017), a threat-defined location is: • A geographically or ecologically distinct area in which a single threatening event can rapidly affect all occurrences of an ecosystem type. The IUCN definition is similar to that included in the BAM and is considered to encompass the intent of the requirements of BAM for TECs. The most serious plausible threat to the TEC is land clearing, particularly for agriculture, including the intensification of agricultural activity through conversion of land use from grazing of native pastures to improved pastures or cropping. In line with the approach suggested in IUCN (2017), broad interpretation of threat-defined locations identifies two jurisdictional zones with different regulatory controls on land clearing: • the leasehold Western Division of New South Wales • the freehold Central Division and Eastern Division of New South Wales. An alternative interpretation of threat-defined locations based on biogeographical regions (bioregions) would produce an estimate of six threat-defined locations.	DPIE 2020a IUCN 2017 NSW TSSC 2020	Data is not strictly defined by the BAM. Assumptions have been made from additional data sources.

Table 6.5 Impact assessment of White Box Yellow Box Blakely's Red Gum Woodland CEEC

Criteria	Data/information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Impact on the geographic extent of the TEC (Principles 1 and 3)			
Area of TEC to be impacted by the proposal (ha).	The project would directly impact on 8.79 ha of the TEC.	-	-
Area of TEC to be impacted by the proposal as a % of the current geographic extent in NSW (%).	The best estimate of the extent of occurrence (EOO) is 702,800 km^2. The project would impact on 0.000013% of its current extent.	NSW TSSC 2020	Not all areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values.
Direct/indirect impacts likely as a result of the proposal to contribute to loss of flora/fauna species characteristic of the TEC.	The project would result in the direct removal of 8.79 ha of the TEC, which is 0.000013% of the current extent. Indirect impacts to the TEC include weed introduction and spread and erosion and sedimentation. Retained areas of the TEC outside the subject land will be avoided. Weed management and erosion mitigation measures in accordance with Table 6.3 will also be developed and implemented in retained areas of the community within the indirect impact areas. There will be no change to fire regimes.	-	-
Impacts likely to contribute to further environmental degradation or disruption of biotic processes (Principle 2)			
Remaining extent of isolated areas of TEC (ha).	The project would affect small discrete areas of the TEC within broader patches. It would not isolate any areas of the TEC and would not have a substantial impact on the patch size of remaining areas.	DPIE 2015	Patch connectivity has been assessed using regional vegetation mapping.
Average distance between remaining remnants – remnant is retained (m).	Were the remnant to be retained, the patch would remain connected to adjacent patches (including derived grasslands of the TEC).	-	-
Average distance between remaining remnants – remnant is removed (m).	Were the remnant to be removed, the patch would remain connected to adjacent patches (including derived grasslands of the TEC). The project would result in the removal of the TEC across an approximate 305 m span, however the TECs continues to be connected outside of the subject land.	-	-

Table 6.5 Impact assessment of White Box Yellow Box Blakely's Red Gum Woodland CEEC

Criteria	Data/information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information
Estimated maximum dispersal distance of species associated with the TEC (km)	According to Corlett (2009), typical maximum dispersal distances for different dispersal mechanisms are as follows: No specialised mechanism 0–10 m Ant dispersal 0–10 m Wind (large-winged fruits) 10–100 m Rodents 10–100 m Small to medium-sized forest birds and arboreal mammals 100 m–1 km Flying-foxes (large seeds) 100 m–1 km Large and open-country birds 1 km–10 km Wind (small plumed seeds) 1 km–10 km Terrestrial mammals 1 km–10 km Wind (tiny seeds/spores, and very small plumed seeds) > 10 km Flying-foxes (small seeds) > 10 km *Eucalyptus* spp. (including *Eucalyptus albens* characteristic of the tree growth form component of the TEC within the subject land) have very limited seed dispersal capabilities, likely in the 0–10 range or 10–100 m range for any given event and species and are considered capable of migrating across landscapes only in the order of ~71–142 m in 71 years (Booth, 2017). No shrub species characteristic of the TEC occurs within the subject land, with the exception of Old Man Saltbush, planted for agricultural fodder in PCT266_DNG_planted which occurs within 0.7 ha of the subject land. Three of the characteristic grass species of the TEC in the genera Aristida and Austrostipa are likely to be animal-dispersed and capable of dispersing between 1 and 10 km. The three grasses in the genera Chloris, Bothriochloa and Rytidosperma are likely wind-dispersed, as are most species of forbs in the family Asteraceae. The wind-dispersed grasses are likely to be capable of dispersing between 1 and 10 km. and very small plumed seeds of many species of in the Asteraceae (daisy family) are likely to be capable of dispersing more than 10 km. Many of the forb and grass species that make up the ground layer of the TEC are likely to have no specialised dispersal mechanism or to be ant-dispersed and only capable of dispersal to distances of less than 10 m.	Corlett 2009 Booth, 2017.	-

Table 6.5 Impact assessment of White Box Yellow Box Blakely's Red Gum Woodland CEEC

<table>
<tr><th>Criteria</th><th>Data/information</th><th>Data sources</th><th>Details of data deficiency, assumptions, reasons for low confidence in information</th></tr>
<tr><td>Area to perimeter ratio of remaining remnants (ratio)</td><td>The project will increase the edge to area ratio of remaining areas of the TEC by a small amount. The increased edge length is approx. 230 m, however the existing areas of the TEC are already exposed to edge effects including weed encroachment.</td><td>-</td><td>-</td></tr>
<tr><td>Vegetation integrity analysis</td><td>Vegetation integrity for the TEC is presented in the summary table below:
<table>
<tr><th>Vegetation zone</th><th>Direct impacts (ha)</th><th>Indirect impacts (ha)</th><th>VI score</th></tr>
<tr><td>PCT266_intact_moderate</td><td>0.12</td><td>0.05</td><td>49</td></tr>
<tr><td>PCT266_intact_low</td><td>0.15</td><td>0.02</td><td>48.9</td></tr>
<tr><td>PCT266_intact_poor</td><td>0.72</td><td>0.12</td><td>36.6</td></tr>
<tr><td>PCT266_DNG_moderate</td><td>7.1</td><td>1.19</td><td>10.1</td></tr>
<tr><td>PCT266_DNG_planted</td><td>0.7</td><td>0.44</td><td>36.1</td></tr>
<tr><td>Total</td><td>8.79</td><td>1.82</td><td>-</td></tr>
</table></td><td></td><td></td></tr>
</table>

6.4.2 Threatened species

Section 9.1.2 of BAM (DPIE 2020a) requires additional impact assessment for threatened species that are also listed as candidate entities for Serious and Irreversible Impacts (SAII). Based on assessment of habitat suitability and targeted surveys, candidate entities for SAII threatened species are unlikely to occur on the subject land and do they do not require further assessment.

6.5 Impacts not requiring offsets

In accordance with Section 9.2.1 of BAM (DPIE 2020a), impacts on vegetation zones and threatened species habitat do not require offsets where:

- a vegetation zone representative of a critically endangered or endangered ecological community has a vegetation integrity score less than 15, and/or
- a vegetation zone representative of a vulnerable ecological community and/or threatened species habitat has a vegetation integrity score less than 17, and/or
- a vegetation zone that is not listed has a vegetation integrity score less than 20.

Table 6.6 provides a summary of the vegetation zones that do not trigger the above thresholds.

Table 6.6 Summary of impacts not requiring offsets – native vegetation

Vegetation zone	PCT	Name	Area	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
4	266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	PCT266_DNG_ moderate	7.1	10.1	0	-10.1	0

Areas not requiring assessment in accordance with Section 9.3 of BAM (DPIE 2020a) include:

- existing roads
- cleared and highly disturbed land
- watercourses.

6.6 Impacts requiring offset

This section provides an assessment of the impacts requiring offsetting in accordance with Section 9.2 of BAM (DPIE 2020a).

i Impacts on native vegetation

Impacts to native vegetation requiring offsets include:

- direct impacts on 1.69 ha of PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (Figure 6.2).

A summary of the ecosystem credits required for all vegetation zones, including changes in vegetation integrity score, are provided in Table 6.7. A total of 41 ecosystem credits are required to offset the residual impacts of the project. A credit report is provided in Appendix F.

Offsets will be provided through implementation of the biodiversity offset scheme.

Table 6.7 Summary of impacts requiring offsets - native vegetation

Vegetation zone number	PCT	Vegetation zone name	Area	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
3	266 – White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	PCT266_intact_moderate	0.12	49	0.0	-49	4
2		PCT266_intact_low	0.15	48.9	0.0	-48.9	5
1		PCT266_intact_poor	0.72	36.6	0.0	-36.6	16
5		PCT266_DNG_planted	0.7	36.1	0.0	-36.1	16

ii Impacts on threatened species

Impacts to threatened species habitat requiring offsets include impacts on 6.74 ha of breeding habitat for the Superb Parrot and 5.19 ha of habitat for the Pink-tailed Legless Lizard. The threatened species polygons for offsetting for the Superb Parrot were calculated based on a 100 m buffer of suitable hollow-bearing trees (hollows greater than 5 cm diameter; greater than 4 m above ground). A list of suitable hollows has been included in Appendix C. The threatened species polygon for the Pink-tailed Legless Lizard has been calculated based on a 50 m buffer of suitable rocky habitat (Figure 6.3).

A summary of the species credits required for all vegetation zones occupied by the threatened species, including changes in vegetation integrity score, are provided in Table 6.8 and Figure 6.3. A total of 92 species credits are required to offset the residual impacts of the project. A credit report is provided in Appendix F.

Offsets will be provided in accordance with the biodiversity offset scheme.

Table 6.8 Summary of impacts requiring offsets - threatened species

Species	Vegetation zone name	Area (ha)/individual (HL)	Habitat condition (vegetation integrity) loss)	Candidate SAII	Species credits
Superb Parrot	PCT266_intact_low	0.15	-48.9	No	4
	PCT266_intact_moderate	0.12	-49		3
	PCT266_intact_poor	0.61	-36.6		11
	PCT266_DNG_moderate	5.2	-10.1		26
	PCT266_DNG_planted	0.65	-36.1		12
Pink-tailed Legless Lizard	PCT266_DNG_moderate	4.48	-10.1	No	23
	PCT266_intact_low	0.09	-48.9		2
	PCT266_intact_poor	0.62	-36.6		11

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

0 100 200 m

GDA 1994 MGA Zone 55

N

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KEY

- Subject land
- Impacts requiring offsets
- Impacts not requiring offsets
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary
- Not vegetated
- Non-native

Plant community type

PCT 266 | White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (moderate)

Offset requirements

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 6.2

EMM creating opportunities

Source: EMM (2023); AMPYR (2022); ESRI (2023); DFSI (2017, 2021); ICSM (2014)

0 100 200 m

GDA 1994 MGA Zone 55

N

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KEY

- Subject land
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary
- Hollow-bearing tree
- Pink-tailed Legless Lizard rocky habitat

Species polygons

- Superb Parrot
- Pink-tailed Legless Lizard

- Not vegetated
- Non-native

Plant community type

PCT 266 | White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate (intact)
- Low (intact)
- Poor (intact)
- DNG (planted)
- DNG (moderate)

Species polygons

Wellington Battery Energy Storage System
Biodiversity Development Assessment Report
Figure 6.3

EMM
creating opportunities

7 Assessment of other relevant biodiversity legislation

7.1 Environment Protection and Biodiversity Conservation Act 1999

This chapter provides an assessment of the project's impacts specific to species and communities listed under the EPBC Act. A likelihood of occurrence assessment for protected matters is presented in Section 7.1.1.

7.1.1 Likelihood of occurrence assessment

i Threatened ecological communities

Seven TECs were predicted to occur within the subject land by the Protected Matters Search Tool (PMST) (Appendix D):

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Weeping Myall Woodlands
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- Natural Temperate Grassland of the South Eastern Highlands
- Poplar Box Grassy Woodland on Alluvial Plains.

PCT 266 is consistent with White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered ecological community (CEEC). The remaining TECs listed above are not consistent with the vegetation communities within the subject land.

The EPBC listing for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is dependent on condition, patch size and presence or absence of important species. Table 7.1 outlines the assessment process taken place to determine whether the vegetation zones (in relation to associated BAM plots) within the subject land conform to the EPBC listing (DEH 2006).

Table 7.1 EPBC listing determination against criteria (DEH 2006)

Criteria	Determination	Associated BAM plot	Discussion
Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum (or Western Grey Box or Coastal Grey Box in the Nandewar Bioregion)?	Yes	All plots	All vegetation zones are dominated by White Box, or considered to be a derived grassland from the White Box TEC.

Table 7.1 EPBC listing determination against criteria (DEH 2006)

Criteria	Determination	Associated BAM plot	Discussion
Does the patch have a predominantly native understorey?	Yes	BAM01; BAM06; BAM07; BAM13, PCT266_DNG_planted	Percentages range from 51% to 99% cover.
	No	BAM02–BAM05; BAM09–BAM12	Percentages fall below 50% cover. These plots do not meet the condition threshold.
Is the patch 0.1 ha or greater in size.	Yes	BAM01; BAM06; BAM07, PCT266_DNG_planted	Patch sizes range from 0.2 ha to 2.59 ha.
	No	BAM13	This plot falls within a patch less than 0.1 ha. This patch does not meet the condition threshold.
There are 12 or more native understorey species present (excluding grasses). There must be at least one important species.	No	BAM01; BAM06; BAM07, PCT266_DNG_planted	BAM01 does not contain 12 or more native species and does not have a listed important species. BAM06, PCT266_DNG_planted and BAM07 have at least one important species but do not have 12 or more native species. These four patches do not meet the condition threshold.

ii Threatened species

The PMST and/or BAMC predicted that 36 species listed under the EPBC Act could occur within the subject land. The likelihood of occurrence for these species is assessed in Appendix E. The Superb Parrot (*Polytelis swainsonii*) was observed flying over the subject land during targeted surveys (see Section 5.3.4ii). No additional EPBC-listed threatened species were recorded in the subject land. Four species were considered to have a moderate to high likelihood of occurrence following the desktop assessment and field survey. These species include:

- Superb Parrot (*Polytelis swainsonii*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Lathamus discolor*)
- Pink-tailed Legless Lizard (*Aprasia parapulchella*).

The result of the significant impact assessments are listed in Table 7.2 to Table 7.5.

iii Migratory species

Eleven species listed as migratory species under the EPBC Act were predicted to occur in the subject land based on database searches undertaken. Three of these species have already been assessed as they are also listed as a threatened species under the EPBC Act. An assessment of the likelihood of the remaining eight migratory species utilising habitat within the subject land was carried out (Appendix E).

No species listed as migratory or marine under the EPBC Act were recorded as being present in subject land, nor are any considered likely to occur in the subject land. Some migratory species may fly high over the subject land but are unlikely to utilise the vegetation or other habitats present at or near ground level.

7.1.2 Significant impact assessments

Four species were considered to have a moderate to known likelihood of occurrence following the desktop assessment and field survey. These species and the result of the significant impact assessment are listed in Table 7.2.

Table 7.2 Species considered to have moderate to known likelihood of occurrence and subject to significant impact assessments

Scientific name	Common name	EPBC status	Likelihood of occurrence	Significant impact assessment result
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	High	Unlikely
Lathamus discolor	Swift Parrot	Critically Endangered	High	Unlikely
Aprasia parapulchella	Pink-tailed Legless Lizard	Vulnerable	Assumed present	Unlikely
Polytelis swainsonii	Superb Parrot	Vulnerable	Known	Unlikely

i Regent Honeyeater and Swift Parrot (Critically Endangered)

The Regent Honeyeater has a patchy distribution and reduced range along south-east Australia which extends from south-east Queensland, through New South Wales (NSW) and the Australian Capital Territory (ACT), to central Victoria (DoE 2016). It is most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation and lowland coastal forest. In addition, it can be found in a range of other habitats including remnant trees in farmland, roadside reserves and travelling stock routes, and in planted vegetation in parks and gardens.

Within its current distribution there are four known key breeding areas where the Regent Honeyeater is regularly recorded. These are the Bundarra-Barraba, Capertee Valley and Hunter Valley districts in New South Wales, and the Chiltern area in north-east Victoria. The Regent Honeyeater is comprised of a single population and with the total population size estimated at 350–400 mature individuals as at 2010 (DoE 2010 and references therein).

The National recovery plan for the Regent Honeyeater (DoE 2016) defines habitat critical for survival of the species as any breeding or foraging areas where the species is likely to occur, in addition to any newly discovered breeding or foraging locations. The Regent Honeyeater is reliant on select species of eucalypt and mistletoe which provide rich nectar flows.

The Swift Parrot is a highly mobile bird, breeding in Tasmania in summer and migrating north to mainland Australia for winter, primarily Victoria and NSW. In NSW, Swift Parrots forage in forests and woodlands throughout the coastal and western slopes regions each year. Coastal regions tend to support larger numbers of birds when inland habitats are subjected to drought.

The Swift Parrot occurs as a single, migratory population and with the total population size estimated at 1000 pairs (Saunders et al., 2010). The National recovery plan for the Swift Parrot (Saunders and Tzaros 2011) defines habitat critical for survival of the species as those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot, or are otherwise identified by the recovery team.

The Regent Honeyeater and Swift Parrot were not recorded during surveys of the subject land. The subject land does not occur in any known breeding areas of either species and likely supports foraging habitat only. Potential habitat within the project comprises areas of PCT 266 (all vegetation zones and conditions).

Table 7.3 provides an assessment of significance for the removal of up to 8.79 ha and indirect impact to 1.83 ha of potential Regent Honeyeater and Swift Parrot habitat, in accordance with the assessment criteria for critically endangered species (DoE 2013).

Table 7.3 Assessment of significance for the Regent Honeyeater and Swift Parrot for the subject land

Criteria	Discussion
Lead to a long-term decrease in the size of a population.	The subject land is located approximately 80 kilometres from the known breeding area of Capertee valley for the Regent Honeyeater and does not constitute breeding habitat for the Swift Parrot. Whilst both species may utilise the subject land to forage, it is likely to occur during the White Box flowering season, generally between April to November (Greening Australia n.d.). The White Box community extends beyond the subject land and locality. The removal of 8.79 ha of potential foraging habitat is unlikely to lead to a long-term decrease in the size of a population of the Regent Honeyeater or Swift Parrot.
Reduce the area of occupancy of the species.	The project will reduce the potential area of occupancy for both species by 8.79 ha, approximately 1.35% of potential habitat within the buffer area.
Fragment an existing population into two or more populations.	The Regent Honeyeater and Swift Parrot are highly mobile bird species. For this reason, the removal of 8.79 ha for the project is unlikely to fragment the existing populations. These species are able to fly over the subject land.
Adversely affect habitat critical to the survival of a species.	Habitat critical for survival of the Regent Honeyeater includes (DoE 2016): • any breeding or foraging areas where the species is likely to occur • in addition to any newly discovered breeding or foraging locations. Habitat critical for the survival of the Swift Parrot includes (Saunders and Tzaros 2011): • those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot • areas identified by the recovery team. There are no records of the Regent Honeyeater or Swift Parrot within the subject land, with the nearest previous records occurring approximately 10 kilometres and 8 kilometres away, respectively. The subject land does not constitute habitat critical to the survival of the Swift Parrot. The potential foraging habitat for the Regent Honeyeater within the subject land represents foraging areas where the species is likely to occur, and therefore represents habitat critical to the survival of the species. Section 6.3 details avoidance measures implemented by AMPYR into the project design to minimise impacts on habitat for this species. The removal of 8.79 ha and indirect impact to 1.83 ha of potential habitat is unlikely to adversely affect the survival of the species.
Disrupt the breeding cycle of a population.	The subject land is not likely to support breeding habitat of the Regent Honeyeater or the Swift Parrot. The breeding cycle of the populations are unlikely to be disrupted by the project.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The project will remove 8.79 ha of potential foraging habitat for the Regent Honeyeater and Swift Parrot and indirectly impact a further 1.83 ha. The subject land occurs within a landscape of potential foraging habitat, including White Box woodland and the removal of 8.79 ha is unlikely to remove or modify the availability or quality of habitat that the species is likely to decline.
Result in invasive species that are harmful to the critically endangered species becoming established in the critically endangered species habitat.	Soil disturbance for the project has potential to result in the spread of invasive weeds to indirect impact areas and potential habitat. Much of the surrounding vegetation is in moderate to poor condition, due to existing weed encroachment. Weed control procedures will be developed during the EIS to minimise the impact on potential foraging habitat for the Regent Honeyeater and Swift Parrot. Any additional exotic species introduced to the subject land are unlikely to further exacerbate invasive species impact to these species habitat.
Introduce disease that may cause the species to decline.	Swift Parrots may be susceptible to beak and feather disease (Saunders and Tzaros 2011). Disease outbreaks usually occur in wild animal populations where significant stresses arise. The clearance of potential foraging habitat is unlikely to cause significant stress such that a disease outbreak would occur.

Table 7.3 Assessment of significance for the Regent Honeyeater and Swift Parrot for the subject land

Criteria	Discussion
Interfere substantially with the recovery of the species	Recovery actions for the Regent Honeyeater include (DoE 2016): • improve the extent and quality of the Regent Honeyeater habitat • bolster the wild population with captive-bred birds until the wild population becomes self-sustaining • increase understanding of the size, structure, trajectory and viability of the wild population • maintain and increase community awareness, understanding and involvement in the recovery program. Recovery actions for the Swift Parrot also include (Saunders and Tzaros 2011) identifying the extent and quality of habitat in addition to monitoring and managing habitat and creating awareness of the recovery program. The project will interfere with the quality and extent of potential habitat for both species, however this is unlikely to be substantial, removing 8.79 ha.
Conclusion	The project is unlikely to significantly impact the Regent Honeyeater or Swift Parrot due to: • the clearance of potential habitat is unlikely to result in a significant impact on the species • the area to be removed does not represent habitat critical to the survival of the Swift Parrot. It does represent habitat critical to the survival of the Regent Honeyeater, however the amount to be removed is unlikely to adversely affect the survival of the species • the project is unlikely to disrupt the breeding cycle of a population • the project is unlikely to further exacerbate invasive species impact to these species habitat • the project will not interfere with recovery of the species.

ii Pink-tailed Legless Lizard (Vulnerable)

The Pink-tailed Legless Lizard occurs in New South Wales (NSW), Victoria and the Australian Capital Territory where it is widely but patchily distributed along the foothills of the western slopes of the Great Dividing Range between Bendigo in Victoria and Gunnedah in NSW (Commonwealth TSSC 2015 and references therein). Within this range, the species occurs in patchy and fragmented locations on sloping, open woodland areas with predominantly native grassy ground layers and partially embedded rocks (OEH 2023). The species appears to be associated with microhabitat features such as rockiness and the presence of ground-layer species, primarily characteristic of Kangaroo Grass (*Themeda triandra*) (Commonwealth TSSC 2015 and references therein).

The species appears to have a stronghold primarily in the Canberra region (Jones 1999), with most records occurring west of Belconnen and Fisher respectively, along the Murrumbidgee River (DPE 2023; Osborne and Wong 2013). It also occurs south of Queanbeyan associated with the foothills and surrounds of Jerrabomberra Creek (DPE 2023). The species was detected as part of surveys for the Orana BESS (NGH, 2023) which occurs within the adjacent lot of the subject land. Three individuals were detected across an area of 47.87 ha of suitable rocky habitat (NGH 2023). The species occurrence within the Orana BESS site adjacent to the subject land is likely to be a small population over a diffuse area. Three individuals within a large area of suitable habitat (47.87 ha) are unlikely to be a stronghold population. The nearest population from these three records occurs approximately 32 kilometres to the west of the subject land, at Toongi, NSW (DPE 2023) with a total of 69 records. The records adjacent to the subject land are unlikely to be part of a larger known population.

The Pink-tailed Legless Lizard is a dietary specialist which feeds mainly on the eggs and larvae of ants. The species is oviparous and has a clutch size of two, which it most likely laid inside ant nests (Commonwealth TSSC 2015 and references therein). The estimated population size of the Pink-tailed Legless Lizard is highly varied due to its cryptic nature. Wong et al. (2011) states that populations size estimates at single sites have ranged from 37 individuals per 3000 rocks turned (Lower Molonglo River, 1999) up to 157 individuals per 40,000 rocks turned at the same site. This indicates that population estimates and densities are highly variable and may not be reliable.

Male and female individuals have been observed to occur under the same rocks in groups of 2 to 5 individuals (Wong et al. 2015) whilst the species has been recorded below rocks and travelling above ground during the day (Commonwealth TSSC 2015 and references therein).

The Pink-tailed Legless Lizard was not recorded during surveys undertaken by EMM in the subject land. Surveys were undertaken in suitable habitat within peak survey period. The subject land was also surveyed outside of peak survey period in accordance with survey advice from BCD (Appendix G). The species was detected as part of surveys for the Orana BESS (NGH, 2023) which occurs within the adjacent lot of the subject land. Three individuals were sighted as part of NGH surveys (NGH 2023). For this reason, despite targeted survey, the species has been assumed present due to its proximity to the subject land.

Potential habitat within the subject land comprises 5.19 ha of rocky habitat. This has been calculated based on rocky habitat within the subject land (0.35 ha), and a 50 m buffer surrounding the rocky habitat (the remaining 4.84 ha).

Table 7.4 provides an assessment of significance for the removal of up to 5.19 ha of potential Pink-tailed Legless Lizard rocky habitat, in accordance with the assessment criteria for vulnerable species (DoE 2013).

Table 7.4 Assessment of significance for the Pink-tailed Legless Lizard for the subject land

Criteria	Discussion
Lead to a long-term decrease in the size of an important population	Important populations have not been defined in the recovery plan for the Pink-tailed Legless Lizard (Commonwealth TSSC 2015 and references therein). The significant impact guidelines (DoE 2013) describes an important population as those that are key source populations for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DoE 2013). A known population occurs to the west of the subject land, where three individuals were observed in 2022 (NGH, 2023; DPE 2023). The nearest known population to these recent records is located at Toongi, NSW, approximately 32 km west of the subject land (DPE 2023). Whilst the Pink-tailed Legless Lizard was not recorded during surveys within the subject land, the population adjoining the subject land is likely to be its own sub-population. This population is likely to utilise the subject land due to being in proximity within contiguous land. The affected population is located in a highly modified landscape in an agricultural setting. It is not at or near the edge of the geographic range of the species. The subject land has a high diversity of exotic species and lacks Kangaroo Grass; one of the characteristic microhabitat features known to the species. The subject land is likely to contain marginal habitat for the Pink-tailed Legless Lizard. Due to the marginal habitat in which it is located, it is unlikely to be a large population with potential as a key source population for breeding, dispersal or maintaining genetic diversity. There is therefore a low likelihood of it being an important population. The known population adjacent to the subject land is unlikely to be part of an important population due to: • its unlikely occurrence as a stronghold population • low number of records • the subject land is not at the edge of the species range Despite this, the species assumed presence within the subject land has conservatively been assessed as an important population for the purposes of this assessment. PCT 266 occurs across the locality, which characteristically occurs on the rolling rocky slopes within the region. The Orana BESS site will be retaining 37.15 ha of suitable habitat (NGH 2023), whilst the landscape provides a largely connected mosaic of marginal rocky habitat for the species. Approximately 5.19 ha of suitable marginal habitat for the Pink-tailed Legless Lizard will be removed as a result of the project, consisting of areas containing surface rock and native vegetation within a 50 m buffer distance around such areas. This is a small amount of habitat to be removed when compared with suitable habitat within the locality. It is unlikely that the project will cause the species' population to experience a long-term decline. With appropriate control measures in place the project has potential to avoid causing a substantial decline in the quality of the important population where possible.

Table 7.4 Assessment of significance for the Pink-tailed Legless Lizard for the subject land

Criteria	Discussion
	The project is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	The species assumed presence within the subject land is unlikely to be part of an important population due to its unlikely occurrence as a stronghold population, low number of records and the subject land is not at the edge of the species range. The subject land is assumed to support marginal habitat for an important population which occurs west of the subject land. The project will reduce the area of occupancy of the assumed important population by 5.19 ha. This is not a significant reduction when compared to potential habitat within the locality and immediate landscape.
Fragment an existing important population into two or more populations	The species assumed presence within the subject land is unlikely to be part of an important population due to its unlikely occurrence as a stronghold population, low number of records and the subject land is not at the edge of the species range. The Pink-tailed Legless Lizard occurs as a fragmented population across its range. Within the landscape, there is likely to be rocky habitat that will provide suitable habitat for the species. Rocky habitat has been observed to the west and south of the subject land. The subject land is connected to Goolma Road, which is likely to be a barrier to the species to the north. Movement patterns of the species are not known, however the species is known to utilise fragmented patches of rocky habitat. Having suitable rocky habitat within the surrounding landscape may allow for the species to traverse to these already fragmented areas outside of the subject land. As the subject land occurs within proximity to Goolma Road, and on the northern edge of suitable marginal habitat, the project is unlikely to fragment an important population as it may still utilise land to the south.
Adversely affect habitat critical to the survival of the species	Habitat critical to the survival of the species has not been defined by the conservation advice. The significant impact guidelines (DoE 2013) state that habitat critical to the survival of a species are areas that are necessary for: • for activities such as foraging, breeding, roosting, or dispersal • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • to maintain genetic diversity and long-term evolutionary development, or • for the reintroduction of populations or recovery of the species or ecological community. Habitat critical to the survival of the species may constitute stronghold populations of the species, such as those within the Canberra region and those located within larger areas of relatively intact native vegetation. These large populations are likely to retain the genetic diversity of the species and ensure long-term maintenance of the species. Dispersal distances and movement patterns of the species are relatively unknown, however other legless lizard species have been observed travelling between 12 to 60 metres from last capture (O'Shea 2005) and genetically differentiated at 400 metres (Commonwealth TSSC 2016b). Dispersal distances for the Pink-tailed Legless Lizard may be similar, due to it's occurrence in fragmented and isolated patches within its range. Given the size of the species, the dispersal distance may be within proximity to suitable habitat within the immediate landscape. The landscape in general occurs as sloping hills with rocky outcrops and isolated rocks where management of the land has not altered the substrate (complete removal through cropping). PCT 266 and associated rocky habitat is likely to occur in the locality. The suitable habitat within the subject land is part of a larger area of suitable habitat in the locality. The affected habitat is located in a highly modified landscape in an agricultural setting. It is not at or near the edge of the geographic range of the species. Due to the marginal habitat in which it is located, it is not likely to be a large population with potential as a key source population for breeding, dispersal or maintaining genetic diversity. There is therefore unlikely to constitute critical habitat. The project is unlikely to reduce the extent of habitat critical to the survival of the species.

Table 7.4 Assessment of significance for the Pink-tailed Legless Lizard for the subject land

Criteria	Discussion
Disrupt the breeding cycle of an important population	The species assumed presence within the subject land is unlikely to be part of an important population due to its unlikely occurrence as a stronghold population, low number of records and the subject land is not at the edge of the species range. As the species has been found adjacent to the subject land (NGH 2023), it is assumed that the area adjacent to the subject land is also utilised for breeding. The Pink-tailed Legless Lizard was not found within the subject land during targeted surveys, however the species could be utilising the subject land due to its connectivity with the known population to the west. The project may disrupt the breeding cycle of individuals of Pink-tailed Legless Lizard if they were to be utilising the subject land. As the population is known to occur outside of the subject land, it can be surmised that breeding is likely to occur there. Any disruption within the subject land is likely to interrupt the breeding cycles of individuals as opposed to an entire important population. As they are known to persist within areas outside of the subject land, the breeding cycle of an important population is unlikely to be significantly disrupted. Mitigation measures include preclearance surveys and relocation of rocks outside of the breeding season (December to late March).
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Pink-tailed Legless Lizard was not found within the subject land during targeted surveys, however the species could be utilising the subject land due to its connectivity with the known population to the west. The removal of 5.19 ha of suitable habitat will occur as a result of the project. However, the known extent of habitat which occurs within the locality (of which 37.15 ha will be retained as part of the Orana BESS (NGH 2023)), is likely to continue to support the known population. The species also occurs within a wide range across NSW, Victoria and the ACT, where the species has been recorded at highest known density. The project is likely to impact on a proportion of the known population, however will not likely impact significantly on the species as a whole. For this reason, the removal of 5.19 ha of potential suitable habitat within the subject land is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species would decline.
Result in invasive species that are harmful to the species becoming established in the species habitat	Soil disturbance for the project has potential to result in the spread of invasive weeds to indirect impact areas and potential habitat. Much of the surrounding vegetation is in moderate to poor condition, due to existing weed encroachment. Weed control procedures will be developed during the EIS to minimise the impact on potential habitat for the Pink-tailed Legless Lizard. Foxes and feral cats have been recognised as potential predators which prey on the Pink-tailed Legless Lizard, however the project is unlikely to increase, or encourage these species movements within the subject land (Commonwealth TSSC 2015).
Introduce disease that may cause the species to decline	No diseases are known as a threat to the species (Commonwealth TSSC 2015). The project is unlikely to introduce disease that may cause the species to decline.

Table 7.4 Assessment of significance for the Pink-tailed Legless Lizard for the subject land

Criteria	Discussion
Interfere substantially with the recovery of the species	The conservation advice states that the species has a number of threats (Commonwealth TSSC 2015) including: • habitat loss and fragmentation • habitat degradation • removal of rocks • inappropriate fire regimes • predators. The project will impact on two of these threats by: • removing 5.19 ha of potential marginal habitat, • removing rocks (0.35 ha) The removed rocks will be relocated outside of the subject land to provide additional suitable habitat for the species outside of the subject land and connectivity within the landscape. The project is unlikely to exacerbate habitat degradation, as the surrounding area within the study area is subject to grazing and weed pressures. The species has been found adjacent to the subject land in similar conditions. The project is unlikely to increase the threat of inappropriate fire regimes or predators. With appropriate control measures in place including relocation of rocky habitat and individuals and pre-clearance surveys, the project is unlikely to substantially interfere with the recovery of the species.
Conclusion	The project is unlikely to significantly impact the Pink-tailed Legless Lizard due to: • the project is unlikely to adversely affect any of habitat critical to the survival of the species • the project is unlikely to lead to a long-term decrease in the size of an important population • the total amount of potential suitable habitat to be removed equates to 5.19 ha, which includes 0.35 ha of rocky habitat. This is minimal when compared to potential habitat within the locality and immediate landscape • the project is unlikely to fragment an existing important population • the project is unlikely to disrupt the breeding cycle of an important population • the project is unlikely to affect habitat to the extent that the species is likely to decline • the project is unlikely to further exacerbate invasive species or cause new species to become established within the subject land • the project is unlikely to introduce disease that may cause the species to decline • With appropriate control measures in place for the species including relocation and pre-clearance surveys, the project is unlikely to substantially interfere with the recovery of the species.

iii Superb Parrot (Vulnerable)

The Commonwealth Conservation Advice for the Superb Parrot (Commonwealth TSSC 2016a) describes the conservation status, distribution, biology/ecology and threats to the survival of the Superb Parrot. In NSW, the Superb Parrot occurs west of the Great Dividing Range, in Canberra, Goulburn and west to Nyngan and Swan Hill. The Superb Parrot nests in large, living or dead trees with many hollow branches, typically near watercourses. On the inland slopes, they use at least six species of eucalypts (Commonwealth TSSC 2016a and references therein), but have a particular reliance on Blakely's Red Gum (*E. blakelyi*) (Manning et al., 2006). An assumed reliance on White Box (*E. albens*) and Yellow Box (*E. melliodora*) remains unproven (Commonwealth TSSC 2016a and references therein). Most nest sites are within 10 km of Box Gum Woodland. Following breeding, Superb Parrots disperse and forage on a variety woodland and other habitat types. Threats to the survival of the species comprise the loss and degradation of habitat, competition for nest hollows, roadkill, illegal collection of wild birds, Psittacine beak and feather disease and climate change.

The National Recovery Plan for the Superb Parrot (Baker-Gabb 2011) details the species biology, ecology, distribution, populations, habitat and threats. The recovery plan describes the species as nomadic, resident, dispersive and migratory, making regular seasonal movements between breeding and non-breeding areas, in response to changes in food availability. When making local foraging movements, the species usually moves through wooded corridors, rarely crossing large areas of open ground.

The breeding range of the Superb Parrot is concentrated on the NSW South Western Slopes and Riverina bioregions.

The three main breeding areas comprise:

- the area bounded by Molong, Rye Park, Yass, Coolac, Cootamundra and Young
- along the Murrumbidgee River between Wagga Wagga and Toganmain Station to Goolgowi
- along the Murray and Edward Rivers, east of Barmah and Millewa State Forest to south of Taylors Bridge.

The total population of the Superb Parrot has been estimated at 5,000 to 8,000 birds, 6,500 of which comprise adults.

The recovery plan (Baker-Gabb 2011) defines habitat critical to the survival of the Superb Parrot as breeding habitat that comprises riverine forests in the Riverina and Box-Gum Woodlands on the tablelands and slopes. Tree species typically selected for nesting on the slopes and tablelands comprise River Red Gum (*E. camaldulensis*), Blakely's Red Gum, Apple Box, Grey Box (*E. microcarpa*), White Box and Red Box (*E. polyanthemos*). Of the species described above, White Box occurs in the subject land and surrounds.

Foraging habitat critical to the survival of the species is defined by the recovery plan (Baker-Gabb 2011) as Boree Woodlands between the Murrumbidgee and Murray Rivers, River Red Gum Forest, Box-Pine Woodland and White Cypress Pine Woodland. White Box woodland (PCT 266) occurs within the subject land and most likely comprises foraging habitat critical to the survival of the species.

The Superb Parrot was recorded within the subject land three times and once adjacent to the subject land. The Superb Parrot was observed flying over the subject land on all occasions. Potential habitat within the subject land comprises areas of PCT 266 (all vegetation zones and conditions).

Table 7.5 provides an assessment of significance for the removal of up to 8.79 ha and indirect impact to 1.83 ha of potential Superb Parrot habitat, in accordance with the assessment criteria for vulnerable species (DoE 2013).

Table 7.5 Assessment of significance for the Superb Parrot for the subject land

Criteria	Discussion
Lead to a long-term decrease in the size of an important population.	Important populations have not been defined in the recovery plan for the Superb Parrot (Baker-Gabb 2011). An important population is described as those that are key source populations for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range (DoE 2013). The Superb Parrot is likely to be breeding within the locality and maintaining the genetic diversity within the population. The subject land is not located at the edge of the species range. As such, the Superb Parrot occurrence within the subject land is considered an important population. The recovery plan (Baker-Gabb 2011) also includes mapped areas of where breeding is likely or may occur. The subject land does not occur within these mapped breeding areas. The areas mapped as 'breeding likely or may occur' are located south of the subject land, from Orange, NSW down to Deniliquin on the NSW-Victorian border. The Superb Parrot was observed flying over the subject land during targeted surveys. No hollows were observed to be in use, however a number of potential suitable hollows for breeding occur within and adjacent to the subject land. Seven potential suitable hollows occur within the subject land, with an additional 19 suitably sized hollow-bearing trees within the study area. Due to the extent of similarly established Box Gum Woodland within the buffer area and locality, it is expected that additional suitable hollows would be available to the species. The removal of up to seven potentially suitable hollow-bearing trees is unlikely to significantly impact the breeding cycle of the Superb Parrot. Similarly, the extent of foraging habitat within the buffer area (in addition to the wider locality) is likely able to support foraging habitat for the species, after removal of 8.79 ha (1.35% of available habitat within the buffer area) as a result of the project. For the reasons stated above, the project is unlikely to lead to a long-term decrease in the size of an important population of the Superb Parrot.
Reduce the area of occupancy of an important population.	The project will reduce the potential area of breeding habitat by 6.74 ha (seven hollow-bearing trees and hollows within the 100 m buffer) and foraging habitat by an additional 2.05 ha for the Superb Parrot. The total amount of breeding and foraging habitat to be removed equates to 8.79 ha, approximately 1.35% of potential habitat within the buffer area. Additional suitable habitat is also likely available in the locality.
Fragment an existing important population into two or more populations.	The subject land occurs in an already fragmented grassy woodland landscape. The Superb Parrot is a highly mobile species and was observed flying over the subject land. The Superb Parrot's home range extends beyond the subject land. The species is likely to traverse the subject land with male birds foraging at least 9 km from their nesting colonies (Baker-Gabb 2011 and references therein). Superb Parrots are considered nomadic, depending on foraging resources. As White Box is the only flowering tree resource to occur within the subject land, the species is likely to utilise additional resources for foraging outside of the subject land.
Adversely affect habitat critical to the survival of the species.	Habitat critical to the survival of the species has been defined by the recovery plan (Baker-Gabb 2011) as breeding habitat that comprises riverine forests in the Riverina and Box Gum Woodlands on the tablelands and slopes and foraging habitat comprising Boree Woodlands between the Murrumbidgee and Murray Rivers, River Red Gum Forest, Box-Pine Woodland and White Cypress Pine Woodland. The subject land contains vegetation which aligns with the definition of critical habitat for both breeding and foraging. The project will remove 8.79 ha of habitat critical to the survival of the Superb Parrot. Section 6.3 details avoidance and mitigation measures implemented by AMPYR into the project design to minimise impacts on habitat for this species. The removal of 8.79 ha is unlikely to adversely affect the survival of the species, due to the small extent of clearing habitat critical to the survival of the species (approximately 1.35% of potential habitat within the buffer area). The habitat within the subject land is located within a much larger extent of habitat, which is also likely to be habitat critical to the survival of the species. The habitat critical to the species, whilst somewhat fragmented, is sparsely connected throughout the locality due to the species ability to traverse the landscape.

Table 7.5 Assessment of significance for the Superb Parrot for the subject land

Criteria	Discussion
Disrupt the breeding cycle of an important population.	As mentioned above, the Superb Parrot was observed flying over the subject land during targeted surveys. No hollows were observed to be in use, however a number of potential suitable hollows for breeding occur within and adjacent to the subject land. Seven potential suitable hollows occur within the subject land, with an additional 19 suitably sized hollow-bearing trees. Due to the extent of similarly established Box Gum Woodland within the buffer area and locality, it is expected that additional suitable hollows would be available to the species. In the inland slopes, most nests are in large Blakely's Red Gums, with many nest trees either dead or suffering from dieback (Baker-Gabb 2011). Blakely's Red Gum does not occur within the subject land or the study area. Breeding habitat has the potential to occur within the subject land, however Blakely's Red Gum are better associated with the riparian areas, such as the Macquarie River approximately 2 km south of the subject land. Section 6.3 details avoidance measures implemented by AMPYR into the project design to minimise impacts on habitat for this species. Mitigation measures include: • Pre-clearance surveys to inspect hollows prior to clearing. • If the Superb Parrot is found to be utilising a hollow, a hollow inspection will be undertaken using an elevated work platform, tree climber and/or inspection camera. The appropriate management action will then be taken to minimise impact to the species (see Table 6.3). • weed management protocols to reduce impacts to foraging habitat. With limited potential breeding habitat available within the subject land, and the mitigation measures mentioned above, the project is unlikely to disrupt the breeding cycle of an important population of the Superb Parrot.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The project will remove 8.79 ha of potential foraging and breeding habitat for the Superb Parrot and indirectly impact a further 1.83 ha. The subject land occurs within proximity to the Macquarie River, in addition to a likely abundance of suitable foraging and breeding habitat within the locality. The removal and indirect impact to 8.79 ha and 1.83 ha of potential habitat respectively, is unlikely to remove or modify the availability or quality of habitat that the species is likely to decline.
Result in invasive species that are harmful to the species becoming established in the species habitat.	Soil disturbance for the project has potential to result in the spread of invasive weeds to indirect impact areas and potential habitat. Much of the surrounding vegetation is in moderate to poor condition, due to existing weed encroachment. Weed control procedures will be developed during the EIS to minimise the impact on potential foraging habitat for the Superb Parrot. Noisy Miners (*Manorina melanocephala*) are considered a key threatening process and have the potential to impact on the Superb Parrot, due to the aggressive exclusion of birds from potential woodland and forest habitat (Commonwealth TSSC 2013). The Noisy Miner was observed during targeted surveys throughout the subject land, in addition to the Superb Parrot. These species appear to co-exist within the subject land and locality. The Noisy Miner occurs in fragmented landscapes and can be associated with edge effects. As the project is unlikely to further fragment potential habitat for the Superb Parrot or increase edge effects to retained patches of vegetation, the invasive species is unlikely to further exacerbate impacts on the Superb Parrot, as the two species co-exist. Any additional exotic species introduced to potential Superb Parrot habitat as a result of the project, are unlikely to further exacerbate invasive species impact to Superb Parrot habitat.
Introduce disease that may cause the species to decline.	Superb Parrots may be susceptible to beak and feather disease. Disease outbreaks usually occur in wild animal populations where significant stresses arise. The clearance of 8.79 ha potential habitat, with mitigation measures in place prior to construction, is unlikely to cause significant stress such that a disease outbreak would occur. Mitigation measures outlined in Section 6.3.1 would reduce the stress on the species if it occurs during the project.

Table 7.5 Assessment of significance for the Superb Parrot for the subject land

Criteria	Discussion
Interfere substantially with the recovery of the species.	Recovery actions for the Superb Parrot aim to determine population trends, increase knowledge of the species ecological requirements, develop and implement threat abatement strategies and increase community involvement and awareness of the recovery program (Baker-Gabb 2011). As recovery actions are focused on increasing knowledge of the species, the project is unlikely to interfere with recovery.
Conclusion	The project is unlikely to significantly impact the Superb Parrot due to: • the project is unlikely to lead to a long-term decrease in the size of an important population • the total amount of breeding and foraging habitat to be removed equates to 8.79 ha, approximately 1.35% of potential habitat within the buffer area. Additional suitable habitat is also likely available in the locality • the species is highly mobile and the project is unlikely to fragment the existing population • the project is unlikely to adversely affect habitat critical to the survival of the species • the project is unlikely to disrupt the breeding cycle of an important population • the project is unlikely to further exacerbate invasive species or cause new species to become established within the subject land • the project is unlikely to interfere with recovery of the species.

7.2 Biosecurity Act 2015

One priority weed of the Central West was recorded in the subject land, namely African Boxthorn (*Lycium ferocissimum*). African Boxthorn is regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk it may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. The species must not be imported into NSW or sold.

The biodiversity management plan for the project would directly address the control of African Boxthorn.

If any priority weeds of NSW are identified in the subject land during construction, they must be removed from the subject land. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

The species must not be imported into NSW or sold. In addition, there is a regional recommended measure for land managers in the central tablelands to mitigate the risk of new weeds being introduced to, and spread from, their land. The plant should not be bought, sold, grown, carrier or released into the environment. Conservation areas, natural environments and primary production lands should be protected that are free of the priority weeds.

8 Conclusion

This BDAR has been prepared in accordance with BAM (DPIE 2020a) and biodiversity-related SEARs issued by DPIE.

EMM has carried out a number of technical assessments within the subject land (refer to the EIS). These surveys have been carried out in parallel with, and have informed the evolution of, the development design. This process has ensured the avoidance and minimisation of biodiversity constraints as far as practicable. Residual impacts include:

- loss of 8.79 ha of native vegetation and associated habitat for fauna species
- loss of 8.79 ha of White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion CEEC listed under the BC Act
- loss of up to seven hollow-bearing trees
- indirect impact to a further 1.83 ha of native vegetation and associated habitat for fauna species and the White Box grassy woodland CEEC.

The project requires 41 ecosystem credits to compensate for impacts on native PCTs and ecosystem credit species. In addition to ecosystem credits, the project also requires 92 species credits for the Superb Parrot and Pink-tailed Legless Lizard.

The BDAR has also considered impacts on species and ecological communities listed under the EPBC Act. The project is not expected to result in significant impacts to the Superb Parrot or the Pink-tailed Legless Lizard. A referral under the EPBC Act is not required, as the project is not considered to be a controlled action.

References

Baker-Gabb, D., 2011, *National Recovery Plan for the Superb Parrot Polytelis swainsonii*. Department of Sustainability and Environment, Melbourne.

Biodiversity Conservation and Science Directorate (BCS) 2021, *Bionet Atlas of NSW Wildlife*, NSW Government, www.environment.nsw.gov.au/atlasapp/

- 2022, *Threatened Biodiversity Profile database*, NSW Department of Planning and Environment.

BOM 2023, Wellington, New South Wales, *December 2022 Daily Weather Observations*, Australian Government, accessed on 2 February 2023 via http://www.bom.gov.au/climate/dwo/202212/html/IDCJDW2142.202212.shtml.

Booth T H, 2017, Going nowhere fast: a review of seed dispersal in eucalypts, *Australian Journal of Botany*, 2017, 65, 401–410, https://www.publish.csiro.au/bt/pdf/BT17019).

Commonwealth TSSC 2006, Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, available from: http://www.environment.gov.au/biodiversity/threatened/communities/box-gum.html, in effect under the EPBC Act from 18-May-2006.

- 2013, Advice to the Minister for Sustainability, Environment, Water, Population & Communities from the Threatened Species Scientific Committee (the Committee) on Amendments to the List of Key Threatening Processes under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), Commonwealth Government.

- 2015, *Conservation Advice Aprasia parapulchella Pink-tailed worm-lizard*, Canberra: Department of the Environment, available from http://www.environment.gov.au/biodiversity/threatened/species/pubs/1665-conservation-advice-01102015.pdf, in effect under the EPBC Act from 01-Oct-2015.

- 2016a, *Conservation Advice- Polytelis swainsonii (Superb Parrot)*, Canberra: Department of the Environment.

- 2016b, *Conservation Advice Delma impar striped legless lizard*, Canberra: Department of the Environment and Energy.

Corlett R, 2009, Seed Dispersal Distances and Plant Migration Potential in Tropical East Asia, *Biotropica*, 41(5), 592-598. Retrieved May 4, 2021, from http://www.jstor.org/stable/27742821.

DEC 2004, *Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities- Working Draft*, Department of the Environment and Conservation.

DECCW 2011, *National Recovery Plan- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland- A critically endangered ecological community*, Department of Environment, Climate Change and Water NSW, Sydney.

DEH 2006, *EPBC Act Policy Statements- White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands*, Australian Government.

DFSI 2017, *Data pertaining to the DCDB (digital cadastral database) and the DTDB (digital topographic database)*, NSW Department of Finance, Services and Innovation.

DoE 2013, *Matters of National Environmental Significance- Significant Impact Guidelines 1.1*, Australian Government.

- 2016, *National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia),* Canberra, ACT: Commonwealth of Australia, accessed February 2022 via

http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-regent-honeyeater-anthochaera-phrygia-2016.

DoEE 2018, *Interim Biogeographic Regionalisation of Australia (IBRA) Version 7*, Department of Energy and Environment, Canberra, July 2021 from https://data.gov.au/dataset/ds-nsw-188ae132-d7b4-4a1a-8785-21786bcbe0bf/details.

DPE 2022, *Threatened reptiles Biodiversity Assessment Method survey guide*, Department of Planning and Environment, NSW Government.

- 2023, *NSW Bionet Atlas*, NSW Government, accessed https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet

DPI 2013, Policy and Guidelines for Fish Conservation and Management, Department of Primary Industries, NSW Government.

- 2015, Strahler Stream Order.
- 2021a, *Freshwater threatened species distribution maps*, NSW Government, accessed February 2022 via https://www.dpi.nsw.gov.au/fishing/species-protection/threatened-species-distributions-in-nsw/freshwater-threatened-species-distribution-maps.
- 2021b, *Key fish habitat map - Murray Darling Basin North*, NSW Government, accessed February 2022 via Fisheries NSW Spatial Data Portal (https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal).
- n.d, *Priority weeds for the Central West*, NSW Department of Primary Industries, https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=51, accessed 16 February 2022.

DPIE 2015, *State Vegetation Type Map: Central West/Lachlan Region version 1.4. VIS_ID 4468*, NSW Government, accessed July 2021 via https://datasets.seed.nsw.gov.au/dataset/central-west-lachlan-regional-native-vegetation-pct-map-version-1-0-vis_id-4358182f4.

- 2017, *State Vegetation Type Map: Central Tablelands Region Version 1.0. VIS_ID 4778*, NSW Government, accessed March 2022 via https://datasets.seed.nsw.gov.au/dataset/state-vegetation-type-map-central-tablelands-region-version-0-1-vis_id-4778.
- 2019, *Guidance to assist a decisionmaker to determine a serious and irreversible impact*, NSW Government.
- 2020a, *Biodiversity Assessment Method*, NSW Government.
- 2020b, *Surveying threatened plants and their habitats NSW survey guide for the Biodiversity Assessment Method*, NSW Government.
- N.d, *Water in New South Wales- Macquarie Bogan*, NSW Government, accessed October 2021 via https://www.industry.nsw.gov.au/water/basins-catchments/snapshots/macquarie-bogan#:~:text=Catchment%20area,the%20Barwon%20River%20near%20Brewarrina.

DSEWPaC 2010, *Survey Guidelines for Australia's Threatened Birds*, Department of Sustainability, Environment, Water, Population and Communities.

- 2011a, *Survey Guidelines for Australia's Threatened Reptiles*, Department of Sustainability, Environment, Water, Population and Communities. Australian Government.

- 2011b, *Survey Guidelines for Australia's Threatened Mammals, Department of Sustainability, Environment, Water, Population and Communities.* Australian Government.

Greening Australia n.d, *Eucalyptus albens fact sheet*, accessed February 2022 via https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/FACT-SHEET_Eucalyptus_albens.pdf

Jones, S.R. 1999, *Conservation Biology of the Pink-tailed Legless Lizard Aprasia parapulchella* (thesis), University of Canberra: Applied Ecology Research Group.

LLS (Local Land Services) 2017, *Central West Regional Strategic Weed Management Plan 2017 – 2022*, https://www.lls.nsw.gov.au/__data/assets/pdf_file/0011/722873/Web-version_Central-West-Regional-Weed-Mgmt-Plan..pdf, accessed 16 February 2022.

NGH (NGH Environmental) 2017, *Environmental Impact Statement- Wellington Solar Farm*, First Solar.

- 2018, *Environmental Impact Statement- Wellington North Solar Plant*, AGL.

- 2023, *Biodiversity Development Assessment Report- Orana BESS*, https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-45242780%2120230419T013656.121%20GMT

NOW 2012, *The NSW Aquifer Interference Policy*, Department of Primary Industries, Office of Water, NSW Government.

NSW TSSC 2020, *Notice of and reason for the Final Determination- White Box Yellow Box Blakelys Red Gum Grassy Woodland and Derived Native Grassland*, NSW Government.

OEH 2016, *State Vegetation Type Map: Riverina Region Version v1.2 - VIS_ID 4469*, NSW Government, accessed 3 March 2022 via https://datasets.seed.nsw.gov.au/dataset/riverina-regional-native-vegetation-map-version-v1-0-vis_id-4449.

- 2017, *Mitchell Landscapes*, Version V3.1, NSW Office of Environment and Heritage, Sydney.

- 2023, *Pink-tailed Legless Lizard- profile*, NSW Government, accessed 4 July 2023 via https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10061

Osborne W., Wong D., 2013, *The extent of habitat for the vulnerable Pink-tailed Worm Lizard (Aprasia parapulchella) in the West Belconnen – Ginninderra Creek investigation area - confirmatory distribution surveys and mapping*, Institute for Applied Ecology: University of Canberra.

O'Shea, M. B., 2005, *Methods for assessment and techniques for management of striped legless lizard Delma impar populations in South-eastern Australia* (thesis), Victoria University; Sustainability Group.

Phillips S and Callaghan J 2011, The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus, *Australian Zoologist 35 (3):* 774-780.

Saunders, D., Tzaros, C., Webb, M. and Thurstans, S. 2010, *Background Document - Swift Parrot Lathamus discolour Recovery Plan*, Department of Environment, Climate Change and Water, Queanbeyan, and Birds Australia.

Saunders, D. and Tzaros, C., 2011, *National Recovery Plan for the Swift Parrot Lathamus discolor*, Birds Australia, Melbourne.

Willy Weather 2023, *Wellington Weather Forecast*, accessed 9 March 2023 via https://www.willyweather.com.au/nsw/central-west/wellington.html

Wong, D.T.Y., Jones, S. R., Osborne, W. S., Brown, G. W., Robertson, P., Michael D. R., Kay G. M., 2011, The life history and ecology of the Pink-tailed Worm-lizard Aprasia parapulchella Kluge - a review, *Australian Zoologist*: 35(4):927-940.

Appendix A

Vegetation integrity assessment field datasheets

EMM
creating opportunities

BAM Site – Field Survey Form

Plot ID:	266DNGPlan	**Date:**	07/06/23	**Project number:**	J210534	**Plot dimensions:**	10x100(10x40)
Datum:	GDA94	**Easting:**	684,939	**Recorders:**	BS, CP		
Zone:	55	**Northing:**	6,399,799	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	62
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	DNG_Planted	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	8
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	20
	Grasses etc.:	56.7
	Forbs:	0.7
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	50	55	15	60	10
Average litter cover (%):	38				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Planted rows over DNG

Plot Disturbance

Grazed- cow pats, planted hedgerow

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	BS, CP	**Plot ID:**	266DNGPlan	**Date:**	07/06/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Atriplex nummularia (Old Man Saltbush)*	20	80		N
Grass & grasslike (GG)	*Bothriochloa decipiens var. decipiens (Pitted Bluegrass)*	40	4000		N
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.2	40		N
Grass & grasslike (GG)	*Anthosachne scabra (Wheatgrass, Common Wheatgrass)*	1	400		N
Grass & grasslike (GG)	*Rytidosperma fulvum (Wallaby Grass)*	0.2	100		N
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	15	2000		N
	Salvia verbenaca (Vervain)	0.1	10		E
Grass & grasslike (GG)	*Rytidosperma setaceum (Small-flowered Wallaby-grass)*	0.1	10		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.2	20		N
	Conyza spp. (A Fleabane)	0.1	3		E
	Marrubium vulgare (White Horehound)	0.1	20		E
Forb (FG)	*Oxalis perennans*	0.1	5		N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	10		N
	Cirsium vulgare (Spear Thistle)	0.1	5		E
	Brassica spp. (Brassica)	0.1	2		E
Grass & grasslike (GG)	*Dichelachne spp. (A Plumegrass)*	0.1	10		N
Forb (FG)	*Vittadinia cuneata (A Fuzzweed)*	0.1	10		N
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	10		N
	Paspalum dilatatum (Paspalum)	0.1	3		HTE
Grass & grasslike (GG)	*Austrostipa spp. (A Speargrass)*	0.1	10		N
	Bromus molliformis (Soft Brome)	0.1	10		E
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.1	1		N

BAM Site – Field Survey Form

Plot ID:	BAM01	**Date:**	29/07/21	**Project number:**	J210534			**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	685,069	**Recorders:**	BS, CP				
Zone:	55	**Northing:**	6,399,084	**IBRA region:**	NSW South Western Slopes (Inland slopes)			**Midline bearing:**	35
Plant Community Type:			266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion			**Condition class:**	intact_poor	**PCT confidence:**	high
Vegetation Class:			Western Slopes Grassy Woodlands			**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	0
	Grasses etc.:	3
	Forbs:	1
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	8
	Shrubs:	0
	Grasses etc.:	20.3
	Forbs:	0.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	8
80 + cm:	1		
50 – 79 cm:	1		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	1
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	65	5	10	30
Average litter cover (%):	23				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

On slight slope

Plot Disturbance

Weedy, previous pasture

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	BS, CP	**Plot ID:**	BAM01	**Date:**	29/07/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus albens (White Box)*	8	2		N
	Lolium spp. (A Ryegrass)	10	5000		E
Grass & grasslike (GG)	*Bromus spp. (A Brome)*	0.1	10		N
Grass & grasslike (GG)	*Cynodon spp.*	0.2	100		N
Grass & grasslike (GG)	*Aristida spp. (A Wiregrass)*	20	500		N
	Urtica urens (Small Nettle)	1	100		E
	Silybum marianum (Variegated Thistle)	0.1	3		E
	Xanthium spinosum (Bathurst Burr)	0.1	2		HTE
	Chenopodium album (Fat Hen)	0.5	20		E
	Sisymbrium officinale (Hedge Mustard)	10	300		E
	Trifolium spp. (A Clover)	0.1	20		E
	Marrubium vulgare (White Horehound)	0.1	3		E
	Malva parviflora (Small-flowered Mallow)	0.2	10		E
Forb (FG)	*Lepidium spp. (A Peppercress)*	0.1	3		N
	Capsella bursa-pastoris (Shepherd's Purse)	0.1	1		E

BAM Site – Field Survey Form

Plot ID:	BAM02	**Date:**	30/07/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,779	**Recorders:**	BS, CP		
Zone:	55	**Northing:**	6,398,988	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	329
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	DNG_moderate	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	3
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	6.1
	Forbs:	2.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	5	5	5	20
Average litter cover (%):	11				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Gentle slope, at bottom

Plot Disturbance

Pasture improved

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	BS, CP	**Plot ID:**	BAM02	**Date:**	30/07/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Forb (FG)	*Dichondra repens (Kidney Weed)*	2	20		N
Forb (FG)	*Cymbonotus lawsonianus (Bear's Ear)*	0.1	3		N
	Lolium spp. (A Ryegrass)	50	8000		E
Grass & grasslike (GG)	*Aristida spp. (A Wiregrass)*	5	60		N
Grass & grasslike (GG)	*Eragrostis spp. (A Lovegrass)*	1	20		N
	Paspalum dilatatum (Paspalum)	0.5	30		HTE
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	0.1	1		N
	Marrubium vulgare (White Horehound)	0.5	100		E
	Capsella bursa-pastoris (Shepherd's Purse)	0.1	2		E
	Trifolium spp. (A Clover)	0.5	200		E
	Sisymbrium officinale (Hedge Mustard)	1	50		E
	Conyza bonariensis (Flaxleaf Fleabane)	0.1	30		E
	Salvia verbenaca (Vervain)	5	8000		E
	Lactuca serriola (Prickly Lettuce)	0.5	30		E
	Silybum marianum (Variegated Thistle)	0.1	2		E
	Malva parviflora (Small-flowered Mallow)	0.1	1		E

BAM Site – Field Survey Form

Plot ID:	BAM03	**Date:**	18/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,734	**Recorders:**	CP		
Zone:	55	**Northing:**	6,398,767	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	128
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	intact_low	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	1
	Grasses etc.:	5
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	0.1
	Grasses etc.:	2.5
	Forbs:	0.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	23
80 + cm:	3		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	4
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	75	35	10	5	2
Average litter cover (%):	25.4				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Slight rise

Plot Disturbance

Weedy, grazed and pasture improved.

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM03	**Date:**	18/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	*Solanum cinereum (Narrawa Burr)*	0.1	3		N
Tree (TG)	*Eucalyptus albens (White Box)*	30	3		N
	Lycium ferocissimum (African Boxthorn)	1	2		HTE
	Medicago sativa (Lucerne)	0.1	10		E
	Bromus catharticus (Praire Grass)	2	300		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	2	100		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	5		N
	Lolium rigidum (Wimmera Ryegrass)	15	3000		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Hordeum hystrix (Mediterranean Barley Grass)	1	100		E
	Marrubium vulgare (White Horehound)	2	100		E
	Sonchus oleraceus (Common Sowthistle)	0.1	20		E
	Silybum marianum (Variegated Thistle)	0.1	1		E
	Conyza spp. (A Fleabane)	0.1	1		E
Forb (FG)	*Oxalis perennans*	0.1	30		N
	Dactylis glomerata (Cocksfoot)	0.1	10		E
	Lepidium bonariense (Argentine Peppercress)	0.1	20		E
	Sisymbrium officinale (Hedge Mustard)	1	100		E
	Bromus sterilis (Sterile Brome)	3	200		E
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	20		N
Grass & grasslike (GG)	*Rytidosperma racemosum (Wallaby Grass)*	0.1	2		N
Forb (FG)	*Einadia hastata (Berry Saltbush)*	0.1	2		N
Grass & grasslike (GG)	*Austrostipa verticillata (Slender Bamboo Grass)*	0.1	2		N
	Lolium perenne (Perennial Ryegrass)	10	2000		E
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.1	2		N
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	0.2	30		N
	Chenopodium ambrosioides (Mexican Tea)	0.1	1		E
Forb (FG)	*Urtica incisa (Stinging Nettle)*	0.1	1		N
	Xanthium spp.	0.1	1		E

BAM Site – Field Survey Form

Plot ID:	BAM05	**Date:**	18/11/21	**Project number:**	J210534	**Plot dimensions:**	20x20
Datum:	GDA94	**Easting:**	684,841	**Recorders:**	CP		
Zone:	55	**Northing:**	6,398,949	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	308
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	intact_low	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	1
	Grasses etc.:	5
	Forbs:	3
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	0.1
	Grasses etc.:	6.3
	Forbs:	0.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	11
80 + cm:	2		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	2
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	65	30	55	65	10
Average litter cover (%):	45				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Red soil, maybe granite?

Plot Disturbance

Sheep grazed, very weedy

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM05	**Date:**	18/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus albens (White Box)*	30	2		N
	Dactylis glomerata (Cocksfoot)	1	40		E
	Phalaris canariensis (Canary Grass)	1	30		E
Grass & grasslike (GG)	*Austrostipa aristiglumis (Plains Grass)*	0.5	20		N
Grass & grasslike (GG)	*Rytidosperma racemosum (Wallaby Grass)*	0.5	30		N
	Lolium rigidum (Wimmera Ryegrass)	20	3000		E
	Bromus sterilis (Sterile Brome)	0.5	20		E
	Hordeum hystrix (Mediterranean Barley Grass)	0.2	50		E
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	0.2	40		N
	Bromus catharticus (Praire Grass)	0.1	20		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	5	1000		N
	Malva parviflora (Small-flowered Mallow)	0.2	40		E
	Sisymbrium officinale (Hedge Mustard)	10	80		E
	Marrubium vulgare (White Horehound)	5	200		E
	Conyza spp. (A Fleabane)	0.1	1		E
	Salvia verbenaca (Vervain)	0.1	2		E
	Medicago sativa (Lucerne)	0.1	5		E
	Vicia spp. (Vetch)	0.1	10		E
Forb (FG)	*Oxalis exilis*	0.1	20		N
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	15		N
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.1	20		N
Shrub (SG)	*Atriplex semibaccata (Creeping Saltbush)*	0.1	1		N
	Silybum marianum (Variegated Thistle)	1	20		E
	Lepidium bonariense (Argentine Peppercress)	0.5	50		E
Grass & grasslike (GG)	*Paspalidium distans*	0.1	1		N

BAM Site – Field Survey Form

Plot ID:	BAM06	**Date:**	19/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,847	**Recorders:**	CP		
Zone:	55	**Northing:**	6,398,768	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	82
Plant Community Type:	266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion			**Condition class:**	intact_moderate	**PCT confidence:**	high
Vegetation Class:	Western Slopes Grassy Woodlands			**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	7
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	10.1
	Shrubs:	0
	Grasses etc.:	20.2
	Forbs:	0.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	7
80 + cm:	2		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	2
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	5	5	80	5
Average litter cover (%):	21				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Rocky rise next to crop land

Plot Disturbance

Weedy, apparently not pasture improved but has lots of pasture species in it. Similar to other woodland areas surveyed.

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM06	**Date:**	19/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus albens (White Box)*	10	1		N
Tree (TG)	*Melia azedarach (White Cedar)*	0.1	1		N
Forb (FG)	*Chamaesyce drummondii (Caustic Weed)*	0.1	1		N
	Sida spinosa	0.1	100		E
	Medicago sativa (Lucerne)	0.1	40		E
	Marrubium vulgare (White Horehound)	1	70		E
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	100		N
Forb (FG)	*Oxalis exilis*	0.1	100		N
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.1	50		N
Forb (FG)	*Boerhavia dominii (Tarvine)*	0.1	20		N
	Sonchus oleraceus (Common Sowthistle)	0.1	10		E
	Salvia verbenaca (Vervain)	0.1	30		E
Other (OG)	*Glycine tabacina (Variable Glycine)*	0.1	50		N
	Silybum marianum (Variegated Thistle)	0.1	2		E
Other (OG)	*Convolvulus erubescens (Pink Bindweed)*	0.1	5		N
	Lepidium bonariense (Argentine Peppercress)	0.1	3		E
	Rapistrum rugosum (Turnip Weed)	0.1	2		E
Forb (FG)	*Rumex brownii (Swamp Dock)*	0.1	1		N
	Centaurea solstitialis (St Barnabys Thistle)	0.1	10		E
	Petrorhagia dubia	0.1	10		E
Forb (FG)	*Vittadinia cuneata (A Fuzzweed)*	0.1	2		N
Grass & grasslike (GG)	*Austrostipa verticillata (Slender Bamboo Grass)*	0.1	2		N
Grass & grasslike (GG)	*Paspalidium constrictum (Knottybutt Grass)*	5	400		N
Grass & grasslike (GG)	*Rytidosperma fulvum (Wallaby Grass)*	0.1	20		N
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	15	500		N
	Lolium rigidum (Wimmera Ryegrass)	10	2000		E
	Bromus sterilis (Sterile Brome)	10	1000		E

BAM Site – Field Survey Form

Plot ID:	BAM07	**Date:**	19/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	685,105	**Recorders:**	CP		
Zone:	55	**Northing:**	6,399,182	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	246
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	intact_poor	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	0
	Grasses etc.:	5
	Forbs:	5
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	0
	Grasses etc.:	2.4
	Forbs:	0.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	1
80 + cm:	2		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	2
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	65	20	10	70	75
Average litter cover (%):	48				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

Sheep grazed. Near water tanks

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM07	**Date:**	19/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus albens (White Box)*	25	2		N
	Lolium rigidum (Wimmera Ryegrass)	10	2000		E
	Hordeum hystrix (Mediterranean Barley Grass)	10	2000		E
	Medicago sativa (Lucerne)	0.2	50		E
	Sisymbrium officinale (Hedge Mustard)	0.5	200		E
	Marrubium vulgare (White Horehound)	0.2	40		E
	Bromus catharticus (Praire Grass)	5	1000		E
Grass & grasslike (GG)	*Cynodon dactylon (Common Couch)*	2	4		N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.5	100		N
	Malva parviflora (Small-flowered Mallow)	0.5	30		E
	Lepidium bonariense (Argentine Peppercress)	0.1	2		E
	Rapistrum rugosum (Turnip Weed)	0.1	2		E
	Chenopodium album (Fat Hen)	0.1	5		E
	Silybum marianum (Variegated Thistle)	0.1	2		E
	Vicia spp. (Vetch)	0.1	1		E
Forb (FG)	*Boerhavia dominii (Tarvine)*	0.1	2		N
Grass & grasslike (GG)	*Rytidosperma fulvum (Wallaby Grass)*	0.1	40		N
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.1	1		N
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	0.1	1		N
	Conyza bonariensis (Flaxleaf Fleabane)	0.1	2		E
Forb (FG)	*Sida spp.*	0.1	20		N
Grass & grasslike (GG)	*Austrostipa aristiglumis (Plains Grass)*	0.1	1		N
	Avena barbata (Bearded Oats)	0.1	10		E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	0.1	10		N
Forb (FG)	*Oxalis exilis*	0.1	1		N

BAM Site – Field Survey Form

Plot ID:	BAM10	**Date:**	20/11/21	**Project number:**	J210534	**Plot dimensions:**	10x100
Datum:	GDA94	**Easting:**	684,737	**Recorders:**	CP		
Zone:	55	**Northing:**	6,399,448	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	180
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	DNG_moderate	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	2
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	10
	Forbs:	0.2
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	15	10	10	25
Average litter cover (%):	14				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM10	**Date:**	20/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	*Austrostipa aristiglumis (Plains Grass)*	10	1000		N
	Bromus sterilis (Sterile Brome)	0.5	100		E
	Avena barbata (Bearded Oats)	5	500		E
	Lolium rigidum (Wimmera Ryegrass)	20	5000		E
	Sonchus oleraceus (Common Sowthistle)	0.2	20		E
	Rapistrum rugosum (Turnip Weed)	1	100		E
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.1	60		N
	Silybum marianum (Variegated Thistle)	0.1	1		E
	Medicago sativa (Lucerne)	0.1	20		E
	Petrorhagia dubia	0.1	10		E
	Bromus molliformis (Soft Brome)	0.1	20		E
	Hordeum hystrix (Mediterranean Barley Grass)	0.1	20		E
	Vicia spp. (Vetch)	0.2	80		E
Other (OG)	*Glycine tabacina (Variable Glycine)*	0.2	60		N
	Marrubium vulgare (White Horehound)	0.1	2		E
	Lysimachia arvensis (Scarlet Pimpernel)	0.1	20		E
	Carthamus lanatus (Saffron Thistle)	0.5	20		HTE
	Trifolium campestre (Hop Clover)	0.2	100		E
Forb (FG)	*Dichopogon fimbriatus (Nodding Chocolate Lily)*	0.1	2		N

BAM Site – Field Survey Form

Plot ID:	BAM11	**Date:**	20/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,810	**Recorders:**	CP		
Zone:	55	**Northing:**	6,399,105	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	181
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	DNG_moderate	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	4
	Forbs:	10
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.1
	Grasses etc.:	11.2
	Forbs:	3.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	30	10	25	10
Average litter cover (%):	19				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM11	**Date:**	20/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Forb (FG)	*Chamaesyce drummondii (Caustic Weed)*	0.1	1		N
	Lolium rigidum (Wimmera Ryegrass)	30	3000		E
	Bromus molliformis (Soft Brome)	0.2	20		E
	Medicago sativa (Lucerne)	0.1	20		E
Forb (FG)	*Dichondra repens (Kidney Weed)*	1	20		N
Forb (FG)	*Dichopogon fimbriatus (Nodding Chocolate Lily)*	0.1	10		N
Forb (FG)	*Vittadinia cuneata (A Fuzzweed)*	0.1	20		N
Forb (FG)	*Solanum esuriale (Quena)*	0.1	40		N
	Sonchus oleraceus (Common Sowthistle)	0.1	20		E
	Echium plantagineum (Patterson's Curse)	0.1	3		E
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	10	500		N
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.1	1		N
Forb (FG)	*Sida corrugata (Corrugated Sida)*	1	300		N
	Avena barbata (Bearded Oats)	0.1	10		E
Forb (FG)	*Oxalis exilis*	1	500		N
	Salvia verbenaca (Vervain)	1	300		E
	Rapistrum rugosum (Turnip Weed)	0.1	10		E
	Erodium cicutarium (Common Crowfoot)	0.1	1		E
	Capsella bursa-pastoris (Shepherd's Purse)	0.1	1		E
	Trifolium campestre (Hop Clover)	0.1	30		E
Shrub (SG)	*Maireana microphylla (Small-leaf Bluebush)*	0.1	1		N
	Carthamus lanatus (Saffron Thistle)	0.1	1		HTE
Other (OG)	*Glycine tabacina (Variable Glycine)*	0.2	100		N
	Petrorhagia dubia	0.1	10		E
Forb (FG)	*Boerhavia dominii (Tarvine)*	0.1	30		N
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	1		N
	Silybum marianum (Variegated Thistle)	0.1	1		E
	Centaurea solstitialis (St Barnabys Thistle)	0.1	20		E
Grass & grasslike (GG)	*Bothriochloa spp. (Redgrass, Bluegrass)*	0.1	1		N
Grass & grasslike (GG)	*Chloris truncata (Windmill Grass)*	0.1	2		N
	Trifolium arvense (Haresfoot Clover)	0.1	20		E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	1	15		N
	Marrubium vulgare (White Horehound)	0.1	1		E

BAM Site – Field Survey Form

Plot ID:	BAM12	**Date:**	20/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,755	**Recorders:**	CP		
Zone:	55	**Northing:**	6,398,899	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	15
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	DNG_moderate	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	7
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	1
	Forbs:	0.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	10	25	30	45	25
Average litter cover (%):	27				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM12	**Date:**	20/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
	Lolium rigidum (Wimmera Ryegrass)	30	3000		E
	Bromus molliformis (Soft Brome)	1	500		E
	Marrubium vulgare (White Horehound)	0.1	20		E
Forb (FG)	*Oxalis exilis*	0.2	100		N
	Trifolium campestre (Hop Clover)	1	200		E
	Conyza spp. (A Fleabane)	3	200		E
	Sonchus oleraceus (Common Sowthistle)	0.1	30		E
	Bromus sterilis (Sterile Brome)	0.5	40		E
	Salvia verbenaca (Vervain)	1	100		E
	Carthamus lanatus (Saffron Thistle)	0.1	2		HTE
Forb (FG)	*Boerhavia dominii (Tarvine)*	0.1	50		N
Forb (FG)	*Einadia nutans (Climbing Saltbush)*	0.1	20		N
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	1	30		N
Forb (FG)	*Daucus glochidiatus (Native Carrot)*	0.1	20		N
Forb (FG)	*Vittadinia cuneata (A Fuzzweed)*	0.1	1		N
	Centaurea solstitialis (St Barnabys Thistle)	0.1	20		E
	Medicago sativa (Lucerne)	0.5	40		E
	Rapistrum rugosum (Turnip Weed)	0.1	10		E
	Phalaris canariensis (Canary Grass)	0.1	1		E
Forb (FG)	*Dichondra repens (Kidney Weed)*	0.1	1		N
	Trifolium arvense (Haresfoot Clover)	0.2	100		E
	Hordeum hystrix (Mediterranean Barley Grass)	0.1	20		E
	Avena barbata (Bearded Oats)	0.1	20		E
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.1	1		N
	Centaurea melitensis (Maltese Cockspur)	0.1	1		E
	Petrorhagia dubia	0.1	20		E

BAM Site – Field Survey Form

Plot ID:	BAM13	**Date:**	20/11/21	**Project number:**	J210534	**Plot dimensions:**	20x50
Datum:	GDA94	**Easting:**	684,699	**Recorders:**	CP		
Zone:	55	**Northing:**	6,399,135	**IBRA region:**	NSW South Western Slopes (Inland slopes)	**Midline bearing:**	5
Plant Community Type:		266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion		**Condition class:**	intact_low	**PCT confidence:**	high
Vegetation Class:		Western Slopes Grassy Woodlands		**EEC:**	yes	**EEC confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	0
	Grasses etc.:	30
	Forbs:	1.7
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	2		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	2
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	10	10	30	25
Average litter cover (%):	16				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	J210534				
Recorders:	CP	**Plot ID:**	BAM13	**Date:**	20/11/21

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	*Eucalyptus albens (White Box)*	30	2		N
	Centaurea melitensis (Maltese Cockspur)	0.1	2		E
	Bromus catharticus (Praire Grass)	10	500		E
	Marrubium vulgare (White Horehound)	0.1	10		E
Grass & grasslike (GG)	*Austrostipa aristiglumis (Plains Grass)*	10	200		N
	Lolium rigidum (Wimmera Ryegrass)	15	2000		E
	Medicago sativa (Lucerne)	0.5	50		E
Grass & grasslike (GG)	*Aristida ramosa (Purple Wiregrass)*	5	100		N
	Phalaris canariensis (Canary Grass)	0.1	30		E
Grass & grasslike (GG)	*Rytidosperma racemosum (Wallaby Grass)*	10	1000		N
	Rapistrum rugosum (Turnip Weed)	0.1	20		E
	Bromus sterilis (Sterile Brome)	0.2	50		E
	Sonchus oleraceus (Common Sowthistle)	0.1	30		E
	Silybum marianum (Variegated Thistle)	0.1	2		E
	Trifolium campestre (Hop Clover)	0.1	80		E
	Petrorhagia dubia	0.1	50		E
Forb (FG)	*Sida corrugata (Corrugated Sida)*	0.1	20		N
Forb (FG)	*Daucus glochidiatus (Native Carrot)*	0.1	30		N
	Lepidium bonariense (Argentine Peppercress)	0.1	40		E
Forb (FG)	*Oxalis exilis*	0.2	100		N
Forb (FG)	*Calotis lappulacea (Yellow Burr-daisy)*	0.5	40		N
Forb (FG)	*Vittadinia cuneata (A Fuzzweed)*	0.5	30		N
Forb (FG)	*Einadia polygonoides (Knotweed Goosefoot)*	0.1	10		N
	Carthamus lanatus (Saffron Thistle)	0.1	2		HTE
Grass & grasslike (GG)	*Austrostipa scabra (Speargrass)*	5	100		N
Forb (FG)	*Einadia hastata (Berry Saltbush)*	0.1	20		N
	Hordeum hystrix (Mediterranean Barley Grass)	0.1	20		E
	Echium plantagineum (Patterson's Curse)	0.1	2		E
	Dactylis glomerata (Cocksfoot)	0.1	3		E
Forb (FG)	*Plantago debilis (Shade Plantain)*	0.1	20		N
	Cirsium vulgare (Spear Thistle)	0.1	1		E

Appendix B
Vegetation integrity plot data

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Table B.1 Vegetation integrity data

plot	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic
BAM02	55	684779	6398988.0	329	0	0	3	2	0	0	0.0	0.0	6.1	2.1	0.0	0.0	0	0	11.0	0.0	0	0	0	0	0	0	0.5
BAM10	55	684737	6399448.0	180	0	0	1	2	0	1	0.0	0.0	10.0	0.2	0.0	0.2	0	0	14.0	0.0	0	0	0	0	0	0	0.5
BAM11	55	684810	6399105.0	181	0	1	4	10	0	1	0.0	0.1	11.2	3.7	0.0	0.2	0	0	19.0	0.0	0	0	0	0	0	0	0.1
BAM12	55	684755	6398899.0	15	0	0	1	7	0	0	0.0	0.0	1.0	0.8	0.0	0.0	0	0	27.0	0.0	0	0	0	0	0	0	0.1
BAM03	55	684734	6398767.0	128	1	1	5	6	0	0	30.0	0.1	2.5	0.6	0.0	0.0	3	4	25.4	23.0	0	0	0	0	0	0	1.0
BAM05	55	684841	6398949.0	308	1	1	5	3	0	0	30.0	0.1	6.3	0.3	0.0	0.0	2	2	45.0	11.0	0	0	0	0	0	0	0.0
BAM13	55	684699	6399135.0	5	1	0	4	8	0	0	30.0	0.0	30.0	1.7	0.0	0.0	2	2	16.0	0.0	0	0	0	0	0	0	0.1
BAM06	55	684847	6398768.0	82	2	0	4	7	0	2	10.1	0.0	20.2	0.7	0.0	0.2	2	2	21.0	7.0	0	0	0	0	0	0	0.0
BAM01	55	685069	6399084.0	35	1	0	3	1	0	0	8.0	0.0	20.3	0.1	0.0	0.0	2	1	23.0	8.0	0	0	0	0	1	0	0.1
BAM07	55	685105	6399182.0	246	1	0	5	5	0	0	25.0	0.0	2.4	0.9	0.0	0.0	2	2	48.0	1.0	0	0	0	0	0	0	0.0
DNGPlanted	55	684939	6399799.0	62	0	1	8	6	0	0	0.0	20.0	56.7	0.7	0.0	0.0	0	0	38.0	0.0	0	0	0	0	0	0	0.1

Appendix C
Hollow-bearing tree data

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Table C.1 Hollow-bearing trees within the study area

Tree species	Number of hollows	Hollow size	Tree DBH (cm)	Comments	Considered suitable habitat for Superb Parrot (species polygon)
Stag	2	<5 cm: 1; 5–20 cm: 1	80	-	Yes
Eucalyptus albens	1	<5 cm	-	-	No
Eucalyptus albens	1	5–20 cm	80	15 cm roughly, 8 m from ground	Yes
Eucalyptus albens	1	<5 cm	60	Bat hollow?	No
Eucalyptus albens	1	5–20 cm	50	10 cm wide	Yes
Eucalyptus albens	1	5–20 cm	80	10 cm wide	Yes
Eucalyptus albens	2	<5 cm: 1; 5–20 cm: 1	80	One 10 cm the other 10 cm. 6 m from ground	Yes
Eucalyptus albens	3	<5 cm: 2; >20 cm: 1	80	Large hollow is fairly basal (1 m from ground), small hollow in hanging branch	No
Eucalyptus albens	2	<5 cm: 2	40	Approx 1–2 m from ground	No
Eucalyptus albens	1	5–20 cm	80	2 m from ground. Forked hollow	No
Eucalyptus albens	1	5–20 cm	80	Approx 10 m from ground. 10 cm wide	Yes
Eucalyptus albens	2	<5 cm: 1; 5–20 cm: 1	80	10–15 cm wide, in branch. 5 m from ground	Yes
Eucalyptus albens	8	<5 cm: 1; 5–20 cm: 7	80	Above 5 m from ground	Yes
Eucalyptus albens	6	<5 cm: 1; 5–20 cm: 5	80	Above 8 m from ground	Yes
Eucalyptus albens	6	<5 cm: 4; 5–20 cm: 2	80	All small hollows. Not so much gang gang.	Yes
Eucalyptus albens	4	<5 cm: 4	80	All small hollows	No
Eucalyptus albens	4	<5 cm: 4	80	All small hollows	No
Eucalyptus albens	2	<5 cm: 1; 5–20 cm: 1	40	1 potential larger hollow. Unable to confirm	Yes
Eucalyptus albens	2	<5 cm: 1; 5–20 cm: 1	55	Low to ground, 2 m up. 7.5 cm wide	No

Table C.1 Hollow-bearing trees within the study area

Tree species	Number of hollows	Hollow size	Tree DBH (cm)	Comments	Considered suitable habitat for Superb Parrot (species polygon)
Eucalyptus albens	1	5–20 cm	45	Low to ground, 2 m up. 20 cm wide	No
Eucalyptus albens	1	5–20 cm	80	Starling observed using hollow	Yes
Eucalyptus albens	2	<5 cm: 1; 5–20 cm: 1	80	Suitable hollow for gang gang. 10 m high	Yes
Eucalyptus albens	3	5-20 cm	80	Above 8 m from ground	Yes
Eucalyptus albens	3	<5 cm: 2; 5–20 cm: 1	80	Potential medium hollow. 8 m from ground	Yes
Stag	6	<5 cm: 3; 5–20 cm: 3	55	5–10 cm wide, in branch. 5 m from ground	Yes
Eucalyptus albens	5	<5 cm: 3; 5–20 cm: 2	70	10–15 cm wide. 10 m from ground	Yes
Stag	5	<5 cm: 3; 5–20 cm: 2	65	-	Yes
Eucalyptus albens	9	<5 cm: 4; 5–20 cm: 5	90	-	Yes
Eucalyptus albens	7	<5 cm: 2; 5–20 cm: 3 >20 cm: 2	80	Over 20's – approximately 6 and 8 above ground. 5–20's 6 and 10 above ground. See photos	Yes
Eucalyptus albens	3	<5 cm: 2; 5–20 cm: 1	80	5–20 approximately 8 m high	Yes
Eucalyptus albens	3	<5 cm: 1; 5–20 cm: 2	80	5–20's approximately 5 and 6 m above ground. See photos.	Yes
Stag	4	<5 cm: 2; 5–20 cm: 2	70	Approximately 10 m from ground	Yes
Eucalyptus albens	1	<5 cm: 1	80	-	No
Eucalyptus albens	1	>20 cm: 1	80	Not suitable for owls? Hollow runs from base up to top of trunk. Chimney hollow. See photos	No
Eucalyptus albens	3	<5 cm: 2; >20 cm: 1	80	Approximately. 6 m from ground. See photos	Yes
Eucalyptus albens	2	5–20 cm: 1; >20 cm: 1	80	5–20 – 10 m high. Greater than 20 – chimney hollow, 8 m high	Yes
Eucalyptus albens	2	5–20 cm: 2	80	Approximately 10 high	Yes

Table C.1 Hollow-bearing trees within the study area

Tree species	Number of hollows	Hollow size	Tree DBH (cm)	Comments	Considered suitable habitat for Superb Parrot (species polygon)
Eucalyptus albens	2	<5 cm: 2	80	-	No

Appendix D
Protected Matters Search Results

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Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

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

Report created: 01-Feb-2022

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:	7
Listed Threatened Species:	33
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	3
Commonwealth Heritage Places:	1
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
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	700 - 800km 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	150 - 200km 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
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area	In buffer area only
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community may occur within area	In buffer area only

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Polytelis swainsonii](#) Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
[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
[Maccullochella macquariensis](#) Trout Cod [26171]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known 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 known 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
[Petrogale penicillata](#) Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pteropus poliocephalus](#)			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
[Androcalva procumbens](#)			
[87153]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Austrostipa wakoolica](#)			
[66623]	Endangered	Species or species habitat likely to occur within area	In feature area
[Dichanthium setosum](#)			
bluegrass [14159]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Euphrasia arguta](#)			
[4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Indigofera efoliata](#)			
[4951]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[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 recta](#)			
Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area	In feature area
Zieria obcordata Granite Zieria [3240]	Endangered	Species or species habitat known 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

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

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

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [13256]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [13255]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13257]	NSW	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Wellington Post Office	NSW	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Narrabri to Wellington gas transmission pipeline	2011/5913	Controlled Action	Completed	In feature area
Uungula Wind Farm, Goolma, NSW	2013/7026	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
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

Bioregional Assessments

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 E
Likelihood of occurrence assessment

EMM
creating opportunities

Class	Scientific name	Common name	FM Act listing	BC Act listing	EPBC Act listing	Habitat Association	PMST (DAWE)	BAMC (BCD 2022)	Likelihood of occurrence	Justification
Bird	*Actitis hypoleucos*	Common Sandpiper	-	-	Mi	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. Generally the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks.	Y	-	Negligible	No suitable habitat within the disturbance footprint.
Bird	*Anthochaera phrygia*	Regent Honeyeater	-	CE	CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These birds are also found in drier coastal woodlands and forests in some years. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany (Eucalyptus robusta) and Spotted Gum (Corymbia maculata) forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.	Y	Y	High	Potential foraging habitat within the study area. Previous records within the study area and associated with PCT 266.
Bird	*Apus pacificus*	Fork-tailed Swift	-	-	Mi	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs. The Fork-tailed Swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They forage aerially, up to hundreds of metres above ground, but also less then 1 m above open areas or over water. They often occur in areas of updraughts, especially around cliffs.	Y	-	Low	Potential foraging habitat within the study area and associated with PCT 266. Low number of previous records within the study area, the species may fly-over the study area however unlikely to utilise the habitat within the development footprint.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	-	E	E	The Australasian Bittern is widespread and found over most of NSW except for far north-west. Preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds or cutting grass (Gahnia sp.) growing over a muddy or peaty substrate (OEH 2018).	Y	-	Negligible	No suitable habitat within the study area
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	-	-	Mi	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage. In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined	Y	-	Negligible	No suitable habitat within the study area
Bird	*Calidris ferruginea*	Curlew Sandpiper	-	E	CE; Mi	Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	Y	-	Negligible	No suitable habitat within the study area
Bird	*Calidris melanotos*	Pectoral Sandpiper	-	-	Mi	In New South Wales (NSW), the Pectoral Sandpiper is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands.	Y	-	Negligible	No suitable habitat within the study area
Bird	*Callocephalon fimbriatum*	Gang-gang Cockatoo		V	E	In summer, the Gang-gang Cockatoo is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, they may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.		Y	Moderate	Potential foraging habitat within the study area. Associated with PCT Potential habitat within the study area however no wetland occurs within close proximity and the species has not been previously recorded.
Bird	*Falco hypoleucos*	Grey Falcon	-	E	V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The species is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey (OEH 2018).	Y	-	Negligible	
Bird	*Gallinago hardwickii*	Latham's Snipe	-	-	Mi	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. The range extends inland over the eastern tablelands in south-eastern Queensland (and occasionally from Rockhampton in the north), and to west of the Great Dividing Range in New South Wales. In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity	Y	-	Negligible	No suitable habitat within the study area
Bird	*Grantiella picta*	Painted Honeyeater	-	V	V	The species is sparsely distributed from south-eastern Australia to north-western Queensland, with its greatest concentrations and breeding locations occurring on the inland slopes of the Great Dividing Range in NSW. It inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of Black Box (E. largiflorens) and River Red Gum (E. camaldulensis), Box-Ironbark-Yellow Gum woodlands, Acacia-dominated woodlands, Paperbarks, Casuarina, Callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips although it breeds in quite narrow roadside strips if ample mistletoe fruit is available (OEH 2018).	Y	Y	Low	Potential foraging habitat within the study area, however these are not the associated species described, nor do they occur as a connected remnant, rather in patches within the indicative project area. One previous record within the study area.
Bird	*Hirundapus caudacutus*	White-throated Needletail	-	-	V; Mi	The White-throated Needletail is widespread in eastern and south-eastern Australia. In NSW this species extends inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, 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 (DoEE 2018).	Y	Y	Low	Historical previous records. May utilise the study area to fly over as the species is exclusively aerial.
Bird	*Lathamus discolor*	Swift Parrot	-	E	CE	This species migrates in the autumn and winter months to south-eastern Australia. In NSW, it mostly occurs on the coast and south-west slopes in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (OEH 2018). Favoured feed trees include winter flowering species such as Swamp Mahogany, Spotted Gum, Red Bloodwood (C. gummifera), Mugga Ironbark and White Box. Commonly used lerp infested trees include Inland Grey Box, Grey Box (E. moluccana) and Blackbutt (E. pilularis).	Y	Y	High	Potential foraging habitat within the study area. Previous records within the study area and associated with PCT 266.
Bird	*Leipoa ocellata*	Malleefowl	-	E	V	Malleefowl predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 – 450 mm mean annual rainfall) areas. The species utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. The species is less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey. 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 (OEH 2018).	Y	-	Negligible	No suitable habitat within the study area
Bird	*Motacilla flava*	Yellow Wagtail	-	-	Mi	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra (Birdlife International 2017).	Y	-	Negligible	No suitable habitat within the study area
Bird	*Myiagra cyanoleuca*	Satin Flycatcher	-	-	Mi	The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990). Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	Y	-	Low	Study area located on edge of species range. No previous records within the locality despite potential degraded habitat.
Bird	*Numenius madagascariensis*	Eastern Curlew	-	-	CE; Mi	During non-breeding this species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal saltworks and sewage farms.	Y	-	Negligible	No suitable habitat within the study area
Bird	*Polytelis swainsonii*	Superb Parrot	-	V	V	The Superb Parrot is found throughout eastern inland NSW. This species inhabits forests and woodlands dominated by eucalypts, especially River Red Gums and box eucalypts such as Yellow Box or Inland Grey Box. Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands (DoEE 2018).	Y	Y	Known	Species observed during targeted surveys. Species associated with the Macquarie River, south-west of the study area. High number of previous records indicate species may utilise study area to forage.
Bird	*Rhipidura rufifrons*	Rufous Fantail	-	-	Mi	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (E. radiata), Mountain Ash (E. regnans), Alpine Ash (E. delegatensis), Blackbutt (E. pilularis) or Red Mahogany (E. resinifera); usually with a dense shrubby understorey often including ferns.	Y	-	Negligible	No suitable habitat within the study area
Bird	*Rostratula australis*	Australian Painted Snipe	-	E	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. The species also uses inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (OEH 2018).	Y	-	Negligible	No suitable habitat within the study area
Fish	*Galaxias rostratus*	Flathead Galaxias	CE	-	CE	The flathead galaxias is only known from the southern half of the Murray-Darling Basin system. There have been isolated records from a lagoon near Bathurst in New South Wales (in the Macquarie River catchment) and from the Lower Murray River in South Australia. The flathead galaxias inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for still or slow flowing waters. The species has a preference for schooling in midwater.	Y	-	Negligible	No permanent or ephemeral waterbodies for the species to occur.
Fish	*Maccullochella macquariensis*	Trout Cod	E	-	E	The Trout Cod is known from a single natural population, two stable translocated populations and many stocked populations. All stocked sites require continued stocking and there is only limited evidence that some stocked populations are self sustaining. The single naturally occurring population is restricted to a small (approximately 120 km) stretch of the Murray River from below Yarrawonga Weir to Strathmerton, but is occasionally taken downstream as far as the Barmah State Forest and further downstream to Gunbower. Unconfirmed records have also been made further downstream from near Murrabit, Swan Hill and near Tooleybuc. Recent research in the Murray and Murrumbidgee Rivers show that Trout Cod occupy stream positions characterised by a high abundance of large woody debris (or 'snags') in water that is comparatively deep and close to riverbanks. However, midstream snags are also an important habitat component.	Y	-	Negligible	No permanent or ephemeral waterbodies for the species to occur.
Fish	*Maccullochella peelii*	Murray Cod	-	-	V	The Murray Cod was historically distributed throughout the Murray-Darling Basin (the Basin), which extends from southern Queensland, through New South Wales (NSW), the Australian Capital Territory (ACT) and Victoria to South Australia, with the exception of the upper reaches of some tributaries. The species still occurs in most parts of this natural distribution (the species' distribution) up to approximately 1000 m above sea level. The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs.	Y	-	Negligible	No permanent or ephemeral waterbodies for the species to occur.
Fish	*Macquaria australasica*	Macquarie Perch	E	-	E	Macquarie Perch have declined considerably from their historical distribution within NSW and they are now considered isolated to the upper reaches of the Lachlan and Murrumbidgee Rivers in southern NSW. It is also found in low numbers in the Mongarlowe River, where the population is considered likely to be the result of a translocation from the Murray-Darling Basin. Other populations exist in Cataract Dam in the Nepean River catchment, as well as a 2008 record from Georges River near Campbelltown, the first record from the river since 1894. It persists in the Burrinjuck, Cotter (Murrumbidgee) and Wyangala impoundments. A breeding population in the Queanbeyan River upstream of the Googong Reservoir exists solely due to a translocation of individuals from the reservoir past a natural barrier. The Googong reservoir population is believed to be effectively extinct. Macquarie perch may occasionally become displaced downstream from the Queanbeyan River into Googong, but they do not form a population in the reservoir. The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water). Populations may survive in impoundments if able to access suitable spawning sites	Y	-	Negligible	No permanent or ephemeral waterbodies for the species to occur.

Class	Scientific name	Common name	FM Act listing	BC Act listing	EPBC Act listing	Habitat Association	PMST (DAWE	BAMC (BCD 2022)	Likelihood of occurrence	Justification
Insect	*Synemon plana*	Golden Sun Moth	-	E	CE	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses Austrodanthonia spp. The species habitat includes grasslands dominated by wallaby grasses and are typically low and open. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses Austrostipa spp. or Kangaroo Grass (Themeda australis).	-	Y	Low	Disturbance footprint is located outside of the species range. Grassland within indicative project area is disturbed. Derived native grassland does occur, however species has not been previously recorded and is only associated with PCT 266 and may lack preferred flora species.
Mammal	*Chalinolobus dwyeri*	Large-eared Pied Bat	-	V	V	In NSW this species has been recorded from a large range of vegetation types including: dry and wet sclerophyll forest; Cyprus Pine (Callitris glauca) dominated forest; tall open eucalypt forest with a rainforest sub-canopy; sub-alpine woodland; and sandstone outcrop country. The species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging. Roosting has also been observed in disused mine shafts, caves, overhangs and disused Fairy Martin (Hirundo ariel) nests, also possibly roosts in the hollows of trees.	Y	-	Low	Known roost habitat such as sandstone cliffs/escarpmants, mine shafts, caves and overhangs are absent from the locality. A small number of hollow-bearing trees occur within the disturbance footprint, however these occur within a fragmented landscape and are unlikely to support the species. Previous records within locality, however these occur greater than 10 km from the development footprint and are small in number (2 previous records)
Mammal	*Dasyurus maculatus*	Spotted-tailed Quoll	-	V	E	This species has been recorded from a wide range of habitats, including: coastal heathlands, open and closed eucalypt woodlands, wet sclerophyll and lowland forests (OEH 2018). Unlogged forest or forest that has been less disturbed by timber harvesting is preferable. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food, such as birds and small mammals, and large areas of relatively intact vegetation through which to forage. Home ranges are estimated to be 620–2,560 ha for males and 90–650 ha for females (DoEE 2018).	Y	Y	Low	Development footprint is highly disturbed and fragmented which does not provide suitable intact vegetation for the species.
Mammal	*Nyctophilus corbeni*	Corben's Long-eared Bat	-	V	V	Inhabits a variety of vegetation types, including mallee, Bull Oak 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. Overall, the distribution of the south eastern form coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species. Roosts in tree hollows, crevices, and under loose bark. A slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground (OEH 2018). The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches (Turbill and Ellis 2006 in TSSC 2015), suggesting its home range is probably large (Lumsden et al., 2008 in TSSC 2015). The species has also been found to be much more abundant in habitats that have a distinct tree canopy and a dense, cluttered understorey layer (Turbill and Ellis 2006 in TSSC 2015).	Y	Y	Low	Hollow-bearing trees within study area. These occur within a fragmented landscape however with sparse canopy cover and a lack of mid- and ground-stratum vegetation. No previous records within the locality.
Mammal	*Petrogale penicillata*	Brush-tailed Rock-wallaby	-	E	V	In NSW the Brush-tailed Rock Wallaby occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. The Brush-tailed Rock Wallaby browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	Y	Y	Negligible	No suitable habitat within the study area
Mammal	*Phascolarctos cinereus*	Koala	-	V	E	The Koala inhabits eucalypt woodlands and forests and 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 (OEH 2018). Large populations of koalas occur on the western slopes and plains, in particular the Pilliga region (Kavanagh and Barrott 2001) and in Gunnedah (Smith 1992) and Walgett LGAs (J. Callaghan, Australian Koala Foundation, pers. comm.). Primary feed trees within the Western Slopes and Plains Koala Management Area (KMA) are River Red Gum (E. camalduensis) and Coolabah (E. coolabah). These do not occur within the study area. White box (E. albens) which occurs within the woodland to the north and north-east of the existing DWD is listed as secondary feed tree within the Western Slopes and Plains KMA. No koalas, koala scratches or scats were detected within this area, despite targeted searches by DPM Envirosciences in 2015. White Box does not occur within the study area. There are no Koala records within 20 km of the study area, and three records within a 50 km radius.	Y	Y	Low	The species was not found during targeted surveys.Just one previous record within 10 km of the development footprint.
Mammal	*Pteropus poliocephalus*	Grey-headed Flying-fox	-	V	V	Grey-headed Flying foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Y	Y	Low	No breeding camps observed during field survey. A low number of records within the locality. Species may use study area to
Plant	*Ammobium craspedioides*	Yass Daisy	-	V	V	Found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the South Western Slopes. Most populations are in the Yass region. Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in association with a large range of eucalypts (Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida).	-	Y	Low	Despite being associated with PCT 266, no previous records within the locality. The derived native grassland is in moderate to low condition due to being historically disturbed.
Plant	*Androcalva procumbens*	Commersonia procumbens	-	V	V	This species is endemic to NSW and mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. The species grows in sandy sites, often along roadsides. It has been recorded in Eucalyptus dealbata and Eucalyptus sideroxylon communities, Broombush (Melaleuca uncinata) scrub, under mallee eucalypts with a Calytrix tetragona understorey, and in a recently burnt Ironbark and Callitris area. Other associated species include Acacia triptera, Callitris endlicheri, Yellow Box, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium and Kunzea parvifolia (OEH 2018).	Y	-	Low	No Eucalyptus dealbata occurs within the disturbance footprint, however a small patch occurs within close proximity. This patch is highly disturbed. A plot was conducted within this small patch, and the species was not observed. The substrate is not sandy to support the species.
Plant	*Austrostipa wakoolica*	A spear-grass	-	E	E	This species is confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. This species grows in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Flowering occurs between October to December (OEH 2018).	Y	-	Low	Potentially unsuitable soils for the species to occur. No previous records within the locality. Not associated with PCT 266.
Plant	*Dichanthium setosum*	Bluegrass	-	V	V	Bluegrass occurs on the New England Tablelands, North West 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. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. 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.	Y	-	Low	Potential habitat occurs within the study area. Species was not found during targeted surveys.
Plant	*Euphrasia arguta*	-	-	CE	CE	Euphrasia arguta was rediscovered in the Nundle area of the NSW north western slopes and tablelands in 2008. Prior to this, it had not been collected for 100 years. Historically, Euphrasia arguta has only been recorded from relatively few places within an area extending from Sydney to Bathurst and north to Walcha. The Royal Botanic Gardens Specimen Register records an additional location reported and vouchered in 2002 from near the Hastings River; and Euphrasia arguta was also recorded from the Barrington Tops in 2012. 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'. 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.	Y	Y	Low	Associated with PCT 266. Species was not found during targeted survey.
Plant	*Grevillea wilkinsonii*	Tumut Grevillea	-	CE	E	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 where about 1,000 plants are known. The other occurrence is a small population that straddles the boundary of two private properties at Gundagai where only eight mature plants survive. At the Goobarragandra River sites the species generally grows in close proximity to the water, at altitudes between 310 and 340 m. Most healthy adult plants occur in open sunny areas, and those plants found under the canopy of dense vegetation tend to be spindly and are sometimes subject to sooty mould infestations. The associated native vegetation in the Goobarragandra sites are typically remnant riverine shrub communities adjacent to open-forest, with the most common tree species being Blakely's Red Gum (Eucalyptus blakelyi), Apple Box (E. bridgesiana), Yellow Box (E. melliodora), and Red Stringybark (E. macrorhyncha) and with Kurrajongs (Brachychiton populneus) sometimes growing in nearby paddocks.	-	Y	Low	Despite being associated with PCT 266, no previous records within the locality. The indicative project area is also primarily historically disturbed.
Plant	*Indigofera efoliata*	Leafless Indigo	-	E	E	Very rare and possibly now extinct, known only from a few collections in the Dubbo area. Mr E.F. Biddiscombe is the only person alive to have seen Indigofera efoliata in the wild, in August 1955. Sites were located along the Dubbo to Minore railway line and road, on Wallaringa and Geurie properties and in Goonoo State Forest. It almost certainly dies back to a substantial underground rootstock in unfavourable seasons and it is possible that aerial parts do not appear at all unless there is significant rainfall. Associated species include Allocasuarina luehmannii, Exocarpos cupressiformis, Alectryon oleifolius, Geijera parviflora, Eucalyptus melliodora, Acacia deanei, Acacia buxifolia, Acacia hakeoides, Acacia spectabilis, Acacia lineata, Acacia oswaldii, Eremophila mitchellii, Myoporum platycarpum, Hakea leucoptera, Dodonaea viscosa, Apophyllum anomalum, Cassinia aculeata and Lissanthe strigosa.	Y	-	Negligible	No known associated species observed during field survey. Low number of previous records.
Plant	*Lepidium monoplocoides*	Winged Peppercress	-	E	E	Widespread in the semi-arid western plains regions of NSW. Collected from widely scattered localities, with large numbers of historical records but few recent collections. There is a single collection from Broken Hill and only two collections since 1915, the most recent being 1950. Also previously recorded from Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin. Recorded more recently from the Hay Plain, south-eastern Riverina, and from near Pooncarie. 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. 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. Flowers from late winter to spring, or August to October.	Y	-	Negligible	No suitable habitat within the study area. No previous records.
Plant	*Prasophyllum petilum*	Tarengo Leek Orchid	-	E	E	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population c.10 km west of Muswellbrook. It also occurs at Hall in the Australian Capital Territory. This species has also been recorded at Bowning Cemetery where it was experimentally introduced, though it is not known whether this population has persisted. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. 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). Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (near	Y	-	Negligible	No suitable habitat within the study area. No previous records.
Plant	*Prasophyllum sp. Wybong*	-	-	-	CE	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.	Y	Y	Low	Degraded habitat within the study area. No previous records

Class	Scientific name	Common name	FM Act listing	BC Act listing	EPBC Act listing	Habitat Association	PMST (DAWE	BAMC (BCD 2022)	Likelihood of occurrence	Justification
Plant	*Swainsona recta*	Small Purple-pea	-	E	E	Small Purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT and a single population of four plants near Chiltern in Victoria. 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). Grows in association with understorey dominants that include Kangaroo Grass (Themeda australis), poa tussocks Poa spp. and spear-grasses Austrostipa spp.	Y	Y	Low	Habitat within the study area is not suitable for the species due to previous disturbance. Low number of previous records within 10km of the development footprint.
Plant	*Tylophora linearis*	-	-	V	E	The majority of records of this species occur in the central western region. Records are from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. The species grows in dry scrub and open forest. It has been recorded from low-altitude sedimentary flats in dry woodlands of Red Ironbark (Eucalyptus fibrosa), Mugga Ironbark, White Box, Black Cypress Pine (Callitris endlicheri), White Cypress Pine and Bull Oak.	Y	-	Low	Despite potential White Box habitat, the species is not associated with PCT 266 and has not been previously recorded. The White Box habitat within the development footprint is disturbed and not likely to support the
Plant	*Zieria obcordata*	Granite Zieria	-	E	E	Occurs at two sites with a geographic range of 105 km. These are in the Wuuluman area near Wellington, comprising of a single subpopulation over 3 sites comprising up to 200 plants and Crackerjack Rock/Rock Forests area NW of Bathurst, with a subpopulation comprising of 14 sites, totaling to approximately 700 adults plants after good seasons. Grows in eucalypt woodland or shrubland dominated by species of Acacia on rocky hillsides. Also occurs in Eucalyptus and Callitris dominated woodland with an open, low shrub understorey, on moderately steep, mainly west to north-facing slopes in sandy loam amongst granite boulders. The altitude range of sites is 500 to 830 metres. Associated vegetation includes Eucalyptus blakelyi, Brachychiton populneus and Acacia implexa woodland with pockets of low shrub understorey. Also in E. goniocalyx, E. blakelyi, E. macrorhyncha, A. doratoxylon, A. vestita and Callitris glaucophylla woodland with a shrubby understorey. Understorey species include Pandorea pandorana, Isotoma axillaris, Westringia eremicola, Leucopogon attenuatus, Dillwynia sericea, Olearia ramulosa, Stypandra glauca, Stellaria pungens, Acacia vestita, Melichrus urceolatus, Cryptandra amara, Lepidosperma, Styphelia, Kunzea, Haloragis and Cheilanthes species. Main flowering period is in spring (September-October), but plants tend to have flowers present throughout the year.	Y	-	Low	Potential habitat within the indicative disturbance footprint, however it is marginal and was not observed during multiple site visits. Moderate number of previously recorded individuals, however only only one occurs within 10 km of the development footprint.
Reptile	*Aprasia parapulchella*	Pink-tailed Legless Lizard	-	V	V	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. The species inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). The species occurs in woodland with sandstone outcrops preferring ridges, buffs and slopes with a north west aspect. Thermally suitable microhabitat may be a limiting resource for the species (DoEE 2018). Sites are typically well-drained, with rocky sandstone outcrops or scattered, partially-buried rocks. The species is 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 (OEH 2018). The species has not been recorded within the locality.	Y	Y	High	Species was not found during targeted surveys however the species has been found adjacent to the subject land as recent as 2022. Three previous records within the locality. Species has been assumed present.

Notes:V= Vulnerable; E= Endangered; CE= Critically Endangered; Mi= Migratory.

Appendix F
Biodiversity credit report

EMM
creating opportunities

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00031224/BAAS23008/22/00031225

Proposal Name
Wellington Battery Energy Storage System

BAM data last updated *
22/06/2023

Assessor Name
Bianca Seal

Assessor Number
BAAS23008

BAM Data version *
61

Proponent Names

Report Created
12/09/2023

BAM Case Status
Finalised

Assessment Revision
3

Assessment Type
Major Projects

Date Finalised
12/09/2023

* 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	266-White Box grassy woodland in the upper slopes sub-region 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
Calyptorhynchus lathami / Glossy Black-Cockatoo
Grantiella picta / Painted Honeyeater

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
266-White Box grassy woodland in the upper slopes sub-region 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	8.8	25	16	41

266-White Box grassy woodland in the upper slopes sub-region 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: 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,	-	266_intact_poor	Yes	16	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.

	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					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland,	-	266_intact_low	Yes	5	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

	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,					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3415, 3533, 4147, 4149, 4150					
	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: 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,	-	266_intact_moderate	Yes	4	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.

	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					
	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: 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,	-	266_DNG_moderate	No	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.

	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					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland,	-	266_DNG_Planted	No	16	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

	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,					Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	3415, 3533, 4147, 4149, 4150					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Aprasia parapulchella / Pink-tailed Legless Lizard	**266_intact_poor, 266_intact_low, 266_DNG_moderate**	5.2	36.00
Polytelis swainsonii / Superb Parrot	**266_DNG_moderate, 266_intact_low, 266_intact_moderate, 266_intact_poor, 266_DNG_Planted**	6.7	56.00

Credit Retirement Options

Like-for-like credit retirement options

Aprasia parapulchella / Pink-tailed Legless Lizard	Spp	IBRA subregion
	Aprasia parapulchella / Pink-tailed Legless Lizard	Any in NSW
Polytelis swainsonii / Superb Parrot	Spp	IBRA subregion
	Polytelis swainsonii / Superb Parrot	Any in NSW

Appendix G
BCS correspondence

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From:	Ben Ellis
To:	Cecilia Phu
Cc:	Elisha Dunn
Subject:	RE: Wellington BESS project
Date:	Wednesday, 31 August 2022 3:15:14 PM
Attachments:	image001.png image002.png image003.png image004.png image005.jpg

Hi Cecilia,

It is no problem to move forward with an assumed presence for the Key's Matchstick Grasshopper at this stage.

If your proponent has intentions to conduct further surveys for the species, this should be undertaken prior to any determination being provided by the consent authority. As a final credit obligation for the project will be required to inform the project's conditions of consent.

Additional surveys could occur prior to the Response to Submissions (RTS) phase of the projects planning pathway. However, it will be important to note your intentions to do so within the exhibited EIS + BDAR so the assessing officer within my team and consent authority can be made aware.

Please note that any changes to the BDAR prior to the RTS being prepared, either through addressing comments made by BCS, or to further refine development impact/surveys, may in turn require the BAM-C for the project to be updated and the BDAR to be recertified by the Accredited Assessor.

If you are looking for some guidance on Key's Matchstick Grasshopper survey techniques, please feel free to reach out to rog.nw@environment.nsw.gov.au. Our team have assisted other consultants looking to survey for this species previously and can provide you with some guidance.

If you require further clarification on anything above, please get in touch with me via the contact info below

Kind Regards

Ben Ellis
A/ Senior Team Leader Planning North West
Biodiversity, Conservation & Science | Department of Planning and Environment
T 02 8275 1838 | **M** 0472 875 194 | **E** ben.ellis@environment.nsw.gov.au
www.dpie.nsw.gov.au

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From: Cecilia Phu <cphu@emmconsulting.com.au>
Sent: Wednesday, 31 August 2022 2:48 PM
To: Helen Knight <Helen.Knight@environment.nsw.gov.au>
Cc: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Subject: RE: Wellington BESS project

Hi Helen,

No worries, thanks for returning my email; I will make sure to direct any future enquiries to the central mailbox.

Appreciate you putting me in touch with Ben.

Kind regards,
Cecilia

Cecilia Phu
Associate Ecologist | Team Leader – Ecology (NSW&ACT)
Bushfire, Ecology, Heritage and Spatial Solutions Division

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M 0460 010 040

www.emmconsulting.com.au

From: Helen Knight <Helen.Knight@environment.nsw.gov.au>
Sent: Wednesday, 31 August 2022 2:44 PM
To: Cecilia Phu <cphu@emmconsulting.com.au>
Cc: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Subject: RE: Wellington BESS project

Hi Cecilia,
I have just passed your request on to Ben Ellis who is the acting STL of our team as he would be best placed to assist you with your enquiry or allocate another planning officer in our team to assist
Enquiries are best sent to our central mailbox at rog.nw@environment.nsw.gov.au so then they would be allocated and save you having to get the run around
As I am not a planning officer I can't really help you with your request
Kind regards, Helen

Helen Knight
Conservation Assessment Data Officer (GIS), Planning North West

Biodiversity, Conservation & Science Directorate| **Department of Planning and Environment**
T 02 6883 5327 | **E** helen.knight@environment.nsw.gov.au

Level 1, 48-52 Wingewarra Street, Dubbo NSW 2830
PO Box 2111, Dubbo NSW 2830

dpie.nsw.gov.au
The DPE Spatial Data Portal site is https://www.seed.nsw.gov.au/

I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

From: Cecilia Phu <cphu@emmconsulting.com.au>
Sent: Wednesday, 31 August 2022 2:17 PM
To: Helen Knight <Helen.Knight@environment.nsw.gov.au>
Cc: Bianca Seal <bseal@emmconsulting.com.au>
Subject: RE: Wellington BESS project

Hi Helen,

I am part of the ecology team working on the biodiversity assessment for the Wellington BESS project; the EIS was submitted for adequacy review not too long ago and we have received comments back. The project team is looking to lodge the EIS very soon.

I received your contact details from Elisha Dunn at Planning and was hoping to consult with you rather urgently regarding the addition of Key's Matchstick Grasshopper to the BAM calculator assessment. In reopening the BAM calculator to make final changes for lodgement, Key's Matchstick Grasshopper has been added to the list of candidate species requiring survey due to the recent data updates. I understand that there is currently no guidance for survey of this species.

Just wanted to get your advice about how we should proceed – my understanding is that the EIS is so close to lodging and as such we do not currently have the opportunity to seek guidance and then survey for these species. If we assume presence for this species, is there an opportunity for surveying after lodgement, once survey requirements are better understood?

Looking forward to speaking with you.

Kind regards,
Cecilia

Cecilia Phu
Associate Ecologist | Team Leader – Ecology (NSW&ACT)

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M 0460 010 040
D 02 4907 4843
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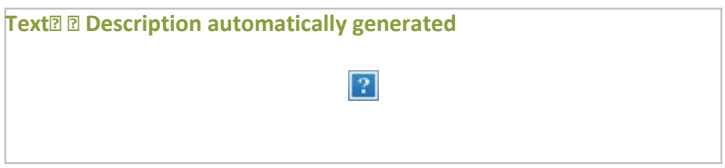

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From: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Sent: Tuesday, 11 October 2022 12:55 PM
To: Cecilia Phu
Cc: Bianca Seal
Subject: RE: SAII consultation request: Wellington BESS project

Hi Cecilia,

Apologies for my late reply. I haven't managed to dig up my neat list of case law examples. Its hidden somewhere in my library, but will keep looking when I find it.

The following two websites give something of a run down of the most high profile and precedent setting cases tested in L&E however:

- https://www.ecoaus.com.au/news/the-mitigation-hierarchy-and-avoidance-under-the-nsw-biodiversity-conservation-act
- https://www.lindsaytaylorlawyers.com.au/in_focus/avoid-minimise-offset-and-saii-under-the-biodiversity-conservation-act-2016-more-teeth-than-appreciated/

Please see below for some suggestions on Keys Matchstick Grasshopper:

Survey

- Survey time between 10am and 4pm, warm sunny days. Avoid wind in less active periods of August
- Focus on open woodland, derived native grassland and grassland that include relatively undisturbed *Themeda triandra* and/or dense patches of *Chrysocephalum apiculatum*. Less likely in denser woodland with significant shading.
- Surveys methodology involves meandering slowly through preferred habitat, observing the preferred flora species and disturbing the vegetation slightly to enhance detectability of the species if present by encouraging movement. (note, maybe waving vegetation with a bit of dowel, or slowly shuffling the feet or something similar may be of use). Transects 5m apart and up to 100m long spatially covering all potential habitat.
- Take photos of facial features, antennae and thorax. Have identification confirmed by an expert to avoid confusion with *Acrida conica* (in the autumn nymph phase) and other *Morabine* grasshoppers if uncertain.

Other comments

Individuals will hop small distances (<40cm), but due to the lack of wings do not fly like typical grasshoppers.

Preferred habitat gets direct sunlight at some point in the day. The species does not occur in areas of dense overstory which is predominantly shady. Small breaks in habitat (eg rural roads) can create inhospitable gaps, with individuals being recorded on one side of a road but not the other.*

*Preferred habitat not to be confused with a verified habitat constraint

Any queries please call or email.

Regards

Ben Ellis
Principal Project Officer (North West Region)

Biodiversity, Conservation & Science | Department of Planning and Environment
T 02 8275 1838 | **M** 0472 875 194 | **E** ben.ellis@environment.nsw.gov.au
www.dpie.nsw.gov.au

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From: Cecilia Phu <cphu@emmconsulting.com.au>
Sent: Tuesday, 4 October 2022 11:34 AM
To: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Cc: Bianca Seal <bseal@emmconsulting.com.au>
Subject: RE: SAII consultation request: Wellington BESS project

Hi Ben,

Thanks very much for your time last week, appreciate the advice and discussion regarding SAII.

I got a lot from our discussion and have shared these insights with the project team. My key take home message from our chat was that the EIS and BDAR needs to demonstrate how the project has taken reasonable steps to avoid and mitigate potential impacts on potential SAII at the site scale.

Could you provide the case law examples you referred to in our discussion?

Also, you mentioned that you could also provide the survey advice for Key's Matchstick Grasshopper?

Kind regards,
Cecilia

Cecilia Phu
Associate Ecologist | Team Leader – Ecology (NSW&ACT)
Bushfire, Ecology, Heritage and Spatial Solutions Division

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M 0460 010 040

www.emmconsulting.com.au

I work flexibly. I'm sending you this message now because it's a good time for me, but do not expect you to read, respond or action it outside your regular hours.

From: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Sent: Thursday, 29 September 2022 6:35 AM
To: Cecilia Phu <cphu@emmconsulting.com.au>
Cc: Bianca Seal <bseal@emmconsulting.com.au>
Subject: RE: SAII consultation request: Wellington BESS project

---

Hi Cecilia,

Happy to chat. My contact info is below if this just warrants a quick phone call.

If you want to set up a formal meeting, availabilities this week and next are:

- Friday September 30: 10am-12am
- Friday September 30: 1pm-2:30pm
- Friday October 7: 10-12am

Any queries please call or email.

Regards

Ben Ellis
A/ Senior Team Leader Planning North West
Biodiversity, Conservation & Science | Department of Planning and Environment
T 02 8275 1838 | **M** 0472 875 194 | **E** ben.ellis@environment.nsw.gov.au
www.dpie.nsw.gov.au

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From: Cecilia Phu <cphu@emmconsulting.com.au>
Sent: Wednesday, 28 September 2022 12:44 PM
To: OEH ROGHD ROG North West Mailbox <rog.nw@environment.nsw.gov.au>
Cc: Bianca Seal <bseal@emmconsulting.com.au>
Subject: SAII consultation request: Wellington BESS project

Hi,

I was hoping to speak with a planning officer or subject matter expert regarding the assessment of SAII (Box Gum Woodland) on the Wellington BESS project.
I have previously consulted with Ben Ellis regarding assessment requirements for Keys Matchstick Grasshopper in relation to this project, would Ben be the best person to talk to?

Kind regards,
Cecilia

Cecilia Phu
Associate Ecologist | Team Leader – Ecology (NSW&ACT)
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From: Ben Ellis <Ben.Ellis@environment.nsw.gov.au>
Sent: Wednesday, 18 January 2023 12:49 PM
To: Cecilia Phu; Bianca Seal
Cc: Candice Larkin
Subject: Pink-tailed Worm Lizard

Hi Cecilia,

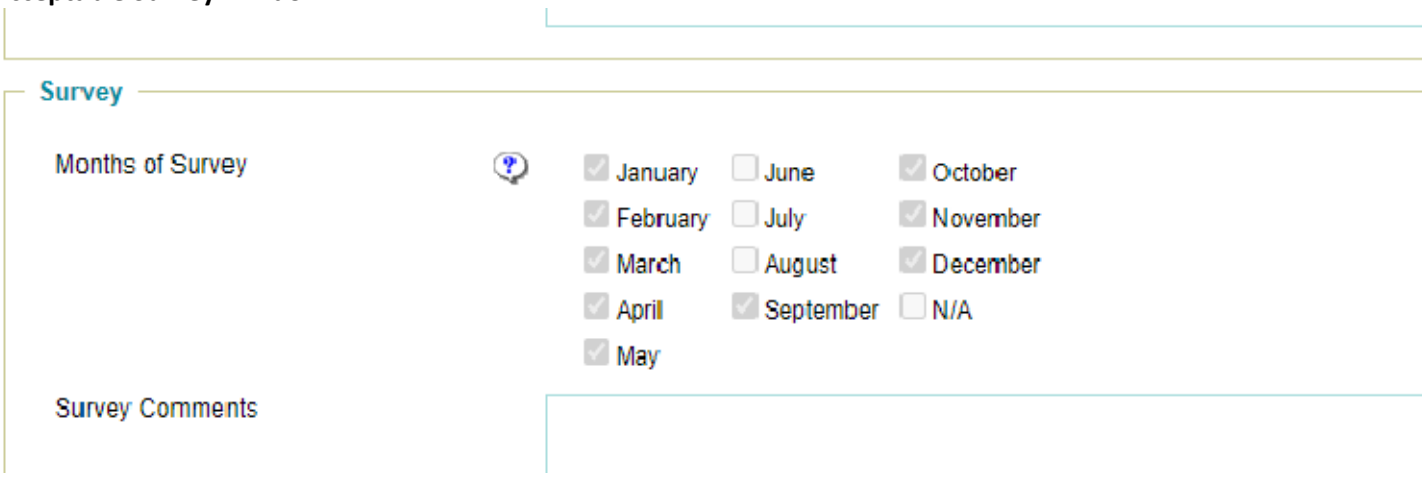
Thanks for the chat and sharing your beautiful view of the harbour today.

As discussed, North-West Planning is happy to accept an alternative survey window for this project for Pink-tailed Worm Lizard. In this case, surveying within optimal climatic conditions for detection rather than specific months (with the notable exception of June-August when it simply gets too cold to detect this species).

As discussed today, it is also no problem if you wish to assume presence of the species and prepare a polygon over the habitat constraints for the species present within your site. As we discussed, since it has been found immediately adjacent to your site it would be a surprise if it is not present in your site as well, given the contiguous habitat + vegetation.

Please see below the acceptable survey window which may be followed, on the prevision that the climatic conditions referenced below are also adhered to.

Acceptable Survey Window



Survey Approach for detection within optimal climatic conditions
Peak activity is likely to be late spring and early summer under warm, but not overly dry, conditions. It is not active on the ground surface by day and would only be active between sheltering sites at night. The following survey methodology is recommended:

(1) search success appears to be highest in spring and early summer on warm but not hot days – note that detection probability is increased after a period of rainfall extending over several days.
(2) restrict searches to an area of relatively homogeneous habitat within each site and a search beneath all rocks that can be turned is made.

(3) rock cover density rather than fixed area size determines a survey area, and 200 rocks need to be turned to be reasonably confident of determining the species' presence.
(4) during summer months surveys are carried out in the mornings or on cloudy days (at least 6/8 cover) when soil temperatures beneath the rocks are not too high.
(5) during late autumn surveys are carried out on clear sunny days as warming of the rocks appears to attract individuals to the soil surface beneath the rocks.
(6) when turning rocks, ensure careful placement to maintain the seal between rock and ground – not doing this is highly detrimental to species dwelling under rock surfaces.

Please note, this information has been provided for the context of both your site and project. And it does not represent an officially accepted approach for all sites and all landscapes.

If you have other projects in which you would like to follow the survey method above, I strongly recommend that you get in touch in the first instance to confirm that this survey approach is acceptable.

Any queries please call or email.

Regards

Ben Ellis
A/ Principal Project Manager (North West Region)
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Appendix H

Weather conditions for Pink-tailed Legless Lizard surveys

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Table H.1 Weather conditions recorded during Pink-tailed Legless Lizard surveys (9 March 2023) (Willy Weather 2023)

Time	Temperature (˚C)	Rain (mm)	Humidity (%)	Wind (km/h)
7:44 am	10.2	0	81	0
8:55 am	16	0	59	3.7
9:51 am	19.8	0	50	13
10:44 am	20.8	0	48	11.1
11:20 am	22.2	0	44	1.8

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Canberra City ACT 2601

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Adelaide SA 5000
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Melbourne VIC 3000
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Perth WA 6000
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