Devlins Bridge Wind Farm: Preliminary Biodiversity Assessment

Prepared for Stromlo Energy

9 July 2024

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- Felicity Williams and Caragh Heenan (zoological technical input).
- Astrid Mackegard (GIS and mapping).

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Glossary

Term	Definition
BAM	*Biodiversity Assessment Method*
BC Act	*NSW Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	*Biosecurity Act 2015*
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPI	Department of Primary Industries
DPHI	NSW Department of Planning, Housing and Infrastructure
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation for Australia
Indicative development footprint	Equivalent to the approximate development footprint to be assessed in the future BDAR
LGA	Local Government Area
LLS	*Local Land Services Amendment Act 2016*
LLS Act	*Local Land Services Act 2013*
Locality	A 10 km radius of the Subject land/Project area for less mobile species and a 25 km radius for mobile species
MNES	Matters of National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1974*
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
NSW	New South Wales
PCT	Plant Community Type

Term	Definition
Devlin's Bridge Wind Farm	Wind Farm project for which an Application will be made
Project	The proposed Devlins Bridge Wind Farm
Project area	The properties / land that relate to the Project and will be subject to the state and Commonwealth applications
SIC	Significant Impact Criteria
Subject land	The properties / land upon which the Project is situated, and to where the BAM will be applied
TEC	Threatened Ecological Community
WM Act	*Water Management Act 2000*
WTG	Wind turbine generator

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Devlins Bridge Wind Farm Holdco Pty Ltd (referred to as Stromlo Energy hereafter), to undertake a preliminary biodiversity assessment for the proposed Devlins Bridge Wind Farm (the Project).

The Project involves the construction, operation, maintenance and decommissioning of a new wind farm with up to 94 wind turbine generators (WTGs) with a blade tip height of up to 290 metres and associated electrical infrastructure. The proposed generating capacity of the wind farm is approximately 680 megawatts (MW).

The Project is proposed to connect to the National Electricity Market (NEM) via a cut-in to the existing Transgrid 330 kilovolt (kV) Darlington Point to Wagga Wagga transmission line, located on the southern and western boundary of the Project area.

The Subject land (referred to as the Project area throughout this report) is defined as the boundary of all lots that are hosting the Project; and is located south of the Sturt Highway, about 22 kilometres west of the Narrandera township, within the Narrandera Local Government Area (LGA) in south-western New South Wales, part of Wiradjuri Country. The Project area is located on multiple rural agricultural properties, comprising a total area of approximately 7,300 hectares.

This preliminary biodiversity assessment report describes the biodiversity values and constraints associated with the Project, within the Project area and indicative development footprint (approximate footprint of wind farm and associated infrastructure, with a buffer for potential micro-siting) as shown on Figure 1. This report will facilitate the preparation of the Project's Scoping Report to obtain Secretary's Environmental Assessment Requirements (SEARs) and support an application under Part 9 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A separate report addressing Matters of National Environmental Significance (MNES) has been prepared and submitted with the Project's EPBC Act referral.

The objectives of this preliminary biodiversity assessment report are to determine the biodiversity values and potential presence of any threatened flora, fauna, populations or ecological communities (entities) listed under the EPBC Act, NSW *Biodiversity Conservation Act 2016* (BC Act) and *Fisheries Management Act 1994* (FM Act) within the Project area and indicative development footprint; and to provide guidance on means of avoiding and minimising potential impacts to those entities.

This report supports the Scoping Report and has informed early project design to avoid, minimise and mitigate biodiversity impacts likely to arise from the Project.

1.2 Scope of assessment

The scope of this preliminary biodiversity assessment is to identify high level constraints and describe biodiversity values within the Project area. This preliminary assessment allows for recommendations to be provided in terms of avoidance, mitigation and/or further detailed assessments of biodiversity values. Following a thorough review of publicly available information, previous environmental reports for the Project area, the results of a rapid field investigation conducted by Jacobs in December 2023, and two seasons of bird and bat utilisation surveys, the primary objectives of this report are to:

- Describe the biodiversity values present within the Project area based on best available desktop and ground validated data.

- Identify potential constraints for a wind farm development with respect to turbine collision risk for bird and bat species, and barrier effects for aerial species.
- Identify potential constraints for the Project with respect to remnant vegetation, Threatened Ecological Communities (TECs), threatened species habitat, potential turbine collision risk, and flow on effects on approvability and potential/likely impacts with respect to the NSW Biodiversity Offset Scheme (BOS).
- Provide details of any other high-risk issues that may be likely to arise in the approvals process and the Commonwealth or state-based planning regime more broadly.
- Provide recommendations on activities and an associated scope of work to support a future State Significant Development (SSD) application with respect to biodiversity values.

1.3 Relevant terminology

The following terms are used throughout this assessment, within the scoping report and across other relevant specialist studies.

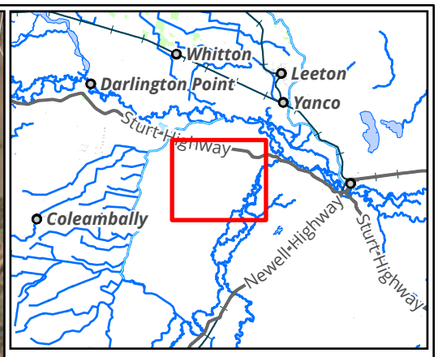
- Subject land: The entire lot area(s) upon which the Project is situated. This includes the indicative development footprint as well as areas that will not be subject to development, operational agriculture areas and residential dwellings.
- Project area: The Subject land in relation to this assessment that is the subject of the application for SEARs and the EPBC Act referral.
- Indicative development footprint: Equivalent to the approximate development footprint to be assessed in the future Biodiversity Development Assessment Report (BDAR). This area is currently indicative due to the Project being in the early stages of design. The indicative development footprint sits within the Project area and the Project area (Figure 1 and Figure 5).

1.4 Location of the Project area

The Project area is located south of the Sturt Highway in the locality of Euroley approximately 22 kilometres west of Narrandera, 28 kilometres east of Darlington Point, and approximately 110 kilometres north-west of Wagga Wagga. It encompasses approximately 7,300 hectares of private land, predominantly used for dryland agriculture. It is zoned RU1 primary production. The Project area is within the:

- Riverina Interim Biogeographic Regionalisation for Australia (IBRA) region and Murrumbidgee subregion.
- Murrumbidgee Scaled Plains, Murrumbidgee Source-bordering Dunes and Murrumbidgee Channels and Floodplains Mitchell landscapes.
- Murrumbidgee catchment.
- Narrandera Local Land Services (LLS) Management Area.
- Narrandera Local Government Area (LGA).
- Leeton and District Local Aboriginal Land Council.
- The Project area is adjacent to existing transmission line infrastructure.

- The Project area does not support significant waterways or creeks with only minor drainage lines and irrigation channels present. One exception is a second order ephemeral drainage line in the south-east corner of the Project area which drains to Washpen Creek.



Legend

- Project area
- Murrumbidgee National Park - Benandra Precinct
- Wind turbine location
- Mast
- Terminal station easement
- Access easement
- Terminal station compound
- Terminal station
- Terminal station access easement
- Overhead transmission easement
- Construction compound
- Collector station
- Batching plant
- Staging area

Figure 1 Project area

0 0.5 1 1.5 2 2.5

Kilometers

Scale: 1:55,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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Matter: 40518,
Date: 08 July 2024 ,
Prepared for: NL, Prepared by: AM, Last edited by: lharley
Layout: 40518_F1_ProjectArea
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2 Legislative Context

2.1 Environmental Planning and Assessment Act 1979 and Biodiversity Conservation Act 2016 (NSW)

The Project is considered a State Significant Development (SSD) under section 2.6(1)(b) and Schedule 1, section 20 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP), and requires assessment in accordance with Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The consent authority for Project is the Minister for Planning and Public Spaces under Division 4.7 of the EP&A Act or if referred, the Independent Planning Commission.

The BC Act relates to the protection of biodiversity. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community consistent with the principles of ecological sustainable development. The BC Act holds specific requirements for biodiversity survey, assessment and offset methodologies. It also requires specific consideration for the potential of serious and irreversible impacts (SAIIs). The Project will likely impact on native vegetation and biodiversity values. State Significant Development projects must enter the BOS and a BDAR will be required to assess biodiversity impacts following the Biodiversity Assessment Method (BAM). This is anticipated to trigger biodiversity offset liabilities for the Project in accordance with the BC Act (and potentially EPBC Act), with any offset obligations achieved by:

- Acquiring or retiring credits that are publicly available or setting up an onsite or offsite Biodiversity Stewardship Site under the BOS.
- Making payments into the Biodiversity Conservation Fund (generally only suitable for smaller credit liabilities due to risk and premium associated costs), or
- Funding certain biodiversity conservation actions that benefit the threatened entity(ies) impacted by the development.

2.2 Local Land Services Act Amendment Act 2016

A preliminary review of land categorisation under the *Local Land Services Act Amendment Act 2016* (LLS Act) to clarify the native vegetation management regime has been undertaken. Where applicable to do so, on land applicable to the LLS Act (i.e. rural lands), the potential for land to be mapped as Category 1 - exempt land was evaluated. Land mapped or determined as Category 1 - exempt land can be excluded from the BAM and direct impacts are not required to be assessed under the BC Act, with exception to BAM prescribed impacts, in reference to relevant legislation is provided below:

- **BC Act s6.8(3):** The BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1 - exempt land (within the meaning of Part 5A of the LLS Act 2013), other than any impacts prescribed by the regulations under section 6.3.
- **BAM cl1.5:** Biodiversity values not assessed under the BAM include: (d) biodiversity values associated with the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1 - exempt land (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts in accordance with clause 6.1 of the BC regulation; (that being prescribed impacts).

Where development consent is required under the EP&A Act, to meet the Category 1 - exempt land requirement, land must be:

- Legally cleared at or since 01 January 1990 (Woody vegetation only); and/or
- Significantly disturbed or modified since 1990 (Non-woody vegetation).

Confirmation of the land categories relevant to the Project (especially for derived native grasslands) will be included within the BDAR prepared to support the EIS and have been included where possible as part of constraints definition.

2.3 Fisheries Management Act 1994

Key fish habitat is defined under FM Act as aquatic habitat important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species.

Any proposed waterway crossings as well as clearing and excavation near key fish habitat must consider impacts on aquatic habitat, have pollution risks mitigated and be designed in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management and the Policy and Guidelines for Fish Friendly Waterway Crossings.

The Project does not involve any waterway crossings and or work near key fish habitat.

2.4 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) establishes the fundamental functions of the NSW National Parks and Wildlife Service (NPWS). These include the conservation of nature, objects, features, places and management of land reserved under the Act. Specifically, the conservation of nature includes:

- Landforms of significance, including geological features and processes.
- Landscapes and natural features of significance including wilderness and wild rivers.

Animal and plant provisions of the NPW Act have been repealed and replaced by the BC Act. *Guidelines for developments adjacent to National Parks and Wildlife Service lands* (DPIE 2020) are also relevant to the Project. The Project area directly adjoins the Banandra Precinct of the Murrumbidgee Valley National Park and a portion of the South West Woodland Nature Reserve (Figure 1) and the following matters would need to be considered; erosion control, storm and wastewater, pest and weed management, fire and access requirements including aerial and ground measures, visual, noise and other amenity impacts, connectivity impacts, impacts to groundwater dependant ecosystems and cultural heritage.

A Plan of Management for the Banandra Precinct is not available. Statements of Management Intent exist for the Murrumbidgee Valley National Park and South West Woodland Nature Reserve (OEH 2014a; OEH 2014b), and a fire management strategy exists for the Banandra Precinct (NPWS 2012). The Statements of Management Intent provide no specific information or management objectives for the Banandra Precinct. The NPWS (2012) fire management strategy provides limited information on the natural values of the Banandra Precinct, other than indicating that the site was mostly long unburnt when the strategy was produced in 2012. The outcomes of a recent meeting between the proponent and NPWS indicates the Banandra Precinct, adjacent to the Project area, does not receive active management or conservation works by NPWS, does not allow for public access, and is used for licenced livestock grazing.

2.5 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW). Under the EPBC Act, if the Minister determines that an action is a 'controlled action' which would have or is likely to have a significant impact on a MNES or Commonwealth land, then the action may not be undertaken without prior approval of the Minster.

The EPBC Act identifies the following nine MNES:

- World Heritage properties.
- National heritage places.
- Ramsar wetlands of international significance.
- Threatened 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 development and large coal mining development).

Further flora and fauna studies will confirm residual biodiversity impacts during the preparation of an Environmental Impact Statement (EIS). At this stage, given the potential nature and scale of the Project, an EPBC Act Referral, documenting potential significant impacts on threatened species, ecological communities and migratory species has been submitted. The potential presence of listed TECs, and birds and bats are the primary focus for describing potential impacts.

It is anticipated that the Project will be declared a controlled action under the EPBC Act based on potential for significant impacts to threatened species and ecological communities. As a controlled action the Project will be assessed via the Commonwealth-NSW bilateral agreement using the NSW BOS accredited assessment pathway. It is intended to align the issuing of SEARs by the NSW government with the Commonwealth's environmental assessment requirements under the bilateral agreement.

3 Methods

3.1 Database Searches

Information provided by both Stromlo Energy and Jacobs, as well as other key information was reviewed. This includes:

- Protected Matters Search Tool (PMST) for MNES protected by the EPBC Act.
- NSW BioNet Atlas of NSW Wildlife, for items listed under the BC Act within 10 km (flora) (study locality) and 25 km (fauna) of the Project area.
- The NSW Department of Primary Industries (DPI) Spatial Data Portal for FM Act listed threatened species, populations and communities.
- NSW DPI *Biosecurity Act 2015* for Priority listed weeds for the Narrandera LLS area.
- Review of the NSW Biodiversity Values Map and Threshold Tool.
- Establishment of a Project BAM Calculator to determine the requirements for threatened species survey.
- Review BAM Important Areas mapping for areas of habitat mapped for threatened entities considered potentially be subject to SAIIs.
- Preliminary vegetation mapping provided by Jacobs.
- Review of Birdata and Birdlife Australia databases.
- Cotemporary Scoping Reports and EIS' for other wind farm projects nearby (within the South-West Renewable Energy Zone).
- Preliminary biodiversity reporting:
  - Jacobs 2024a. Preliminary Site Constraints Report – Devlins Bridge Wind Farm, prepared for Stromlo Energy by Jacobs, 15 January 2024 (Document no: IS481700, version Rev C).
  - Jacobs 2024b. Biodiversity Constraints Assessment Memo – Devlins Bridge Wind Farm, prepared for Stromlo Energy by Jacobs, 14 February 2024.
  - Biosis 2024c. Devlin's Bridge Wind Farm: Bird and bat utilisation study program Initial study design and Summer 2024 results, prepared for Stromlo Energy, 3 May 2024.

3.2 Literature review (South West REZ)

A review of relevant literature was undertaken to provide local context for threatened species occurrence and contemporary information relating to relevant threatened species, and, where possible, their interaction with relevant wind farm projects. A review of the following key documents related to other wind farms in the region was undertaken:

- Wilan Wind Farm Scoping Report (203 kilometres west of the Project area) (Biosis and Kilara Energy 2022).
- Dinawan Wind Farm Scoping Report (48 kilometres south-west of the Project area) (EMM 2022).

- Pottinger Wind Farm Preliminary Biodiversity Assessment (100 kilometres west of the Project area) (Biosis 2023).
- Bullawah Wind Farm Scoping Report (82 kilometres west of the Project area) (Umwelt 2022).

3.3 Preliminary land category assessment

In order to pre-emptively exclude highly utilised and/or modified areas from assessment under the BC Act, a desktop review of land categorisation under the LLS Act was undertaken. This assessment identifies the native vegetation management and land use regime of the Project area and the potential for land to be mapped as 'Category 1 - exempt land'. Land mapped or determined as Category 1 - exempt can be excluded from the BAM and is not required to be assessed, with the exception of prescribed impacts. Note, the land category assessment does not remove the requirement to address matters under the EPBC Act.

The results of the preliminary land category assessment are provided in Figure 2. Note that the assessment utilises the Draft Native Vegetation Regulatory Map mapping and will be subject to further refinement as discussed in the results section (Section 4.2) below. As the land categorisation mapping is still in draft form, land categories remain defined by the criteria in the legislation. The categories of mapping are summarised as follows:

- **Category 1 – exempt land (draft):** native vegetation clearing is allowed without approval from Local Land Services. Additionally, no assessment of native vegetation and loss of habitat (direct impacts) is required under the BAM.
- **Category 2 – regulated land (draft):** authorisation may be required from Local Land Services for native vegetation clearing. This may include clearing under the Land Management (Native Vegetation) Code 2018. Landholders also have a range of allowable clearing activities available for use without approval from Local Land Services.
- **Category 2 – vulnerable regulated land (in-force):** land mapped as steep or highly erodible lands, protected riparian land or special category land. Use of the Land Management (Native Vegetation) Code 2018 and allowable clearing activities are restricted in these areas.
- **Category 2 – sensitive regulated land (in-force):** land mapped as environmentally sensitive. Clearing under the Land Management (Native Vegetation) Code 2018 is not permitted in these areas, although there is a limited list of allowable clearing activities available.
- **Excluded land:** land managed outside the land management framework. Other clearing controls may exist in these areas.

3.4 Preliminary field investigation, SVTM validation and summer BBUS

Jacobs undertook a preliminary field validation survey campaign of the Project area between 18 and 22 December 2023 (Jacobs 2024). Early mapping and validation of PCTs and TECs will ensure informed ongoing design decisions and biodiversity risk assessments can be considered from the beginning of the Project, with biodiversity impacts avoided and minimised from the outset. The field investigations included:

- Preliminary vegetation mapping of PCTs across the Project area, including validation of the Riverina SVTM (OEH 2016) vegetation modelling.
- Identification of any TECs listed under the EPBC Act and/or BC Act with the potential to occur within the Project area.

- Consideration of broad vegetation condition states to determine vegetation zones.
- Preliminary habitat assessment in accordance with the BAM to determine the potential for threatened species identified under the BAM as 'ecosystem credit species' and 'species credit species', and well as MNES to occur.
- Indicative mapping of ecological constraints such as habitat trees, wetlands, waterways and nearby areas supporting potential habitat for threatened species.
- Fauna species inventory.

Further to the above PCT mapping and habitat assessment work, Biosis completed the first two seasonal replicates of the Bird and Bat Utilisation Surveys (BBUS) that will inform the BDAR, and the Bird and Bat Adaptive Management Plan (BBAMP). Surveys for the summer and autumn 2024 seasons were completed between 26 February and 1 March and 6 and 10 May 2024 by Biosis Zoologists Wyn Russel and Joel Nicholson.

A total of 20 bird utilisation survey (BUS) points, comprising 15 impact points and five control points, were sampled over four (impact) and five (control) replicates each, with impact / control points stratified and paired on the basis of habitat types aligned to vegetation classes present across the Project area. It should be noted that one control point is located on Devlins Bridge Road, approximately 2.3 kilometres east of the Project area, to ensure the control points are outside any future influence of wind turbine generators (WTGs). The remaining four control points within the Project area are located away from proposed WTG locations.

A met mast was established in April 2024 and is being used for at-height ultrasonic microbat call data collection from autumn 2024 onwards.

A total of seven microbat survey points were established across the Project area, with survey points generally co-located with BUS points, again stratified by vegetation class habitats.

3.5 Biodiversity constraints mapping

Table 1 below provides an overview and explanation of the biodiversity constraints parameters used to develop a site-specific biodiversity constraints GIS model and GIS outputs. This constraints model will be used for ongoing refinement of project design to achieve avoidance and minimisation of impacts (see Section 5.2 for more detail), and will continue to form the basis for impact minimisation thought the design and assessment phases of the Project. GIS outputs layers include specific 'WTG constraints' and 'Civil constraints', based on the various parameters and specific project constraints and opportunities each presents to the different components.

Key biodiversity constraints of the Project area, which will require consideration throughout the Project, include but are not limited to:

- New South Wales Department of Planning and Environment (DPE) mapped Important Areas of Plains Wanderer *Pedionomus torquatus* habitat to the immediate west of the Project area, a species potentially subject to SAII under the BAM, and is listed as Critically Endangered under the EPBC Act.
- The occurrence of any ephemeral or seasonal wetlands within the Project area and indicative development footprint, which during high rainfall (flood) years are likely to attract migrating waterbirds to the Riverina region, and Project area specifically.
- The occurrence, or potential occurrence, of the following BC Act and/or EPBC Act TECs:

- *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions* (Endangered Ecological Community [EEC], BC Act and EPBC Act).
- *Natural Grasslands of the Murray Valley Plains* (Critically Endangered Ecological Community [CEEC], EPBC Act).
- *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions* (EEC, BC Act and EPBC Act).
- *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* (CEEC, BC Act and EPBC Act).
- *Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions* (EEC, BC Act).

- The presence of potential habitat for threatened flora and fauna species listed under the BC Act and/or EPBC Act (as provided in Table 3).

In order to assess the constraints presented by vegetation and species' habitat present within the Project area, areas were identified and mapped into the four constraint categories outlined in Table 1 below. Landscape features and mapped biodiversity values present outside the Project area were considered to ensure the influence of any values beyond the site were captured. Various landscape habitat features and mapped biodiversity values are considered to result in different levels of constraint for potential wind developments (with highest constraints largely relating to potential turbine strike by birds and/or bats) as opposed to civil works associated with wind projects. As such, details of the constraints values relevant to each constraint category for both wind and civil impact components are provided separately below.

The data input into the constraints model is based on best available desktop GIS data, combined with preliminary ground validated PCTs determined during Jacobs' December 2023 field survey, as described above.

Table 1 Biodiversity constraint model outputs definitions, justifications and management / mitigation approach

Constraint category	Definition	WTG operation constraint value *(predominantly in regards to bird and bat collision risk)*	Civil constraint value *(includes WTGs, site reticulation and access etc.)*	Suggested management / mitigation approach
Very High Constraint (Constraint score – 4)	These are areas that should be avoided and if not, may impact regulatory approval of the Project (i.e. regulators may require significant redesign to reduce impacts, or impose further impact minimisation/mitigation measures at approval).	• DPE mapped Important Areas of Plains Wanderer habitat, with an additional 100 m buffer of these mapped Important Areas applied, to reduce potential for direct impacts and SAII to areas of highest potential habitat. Plains Wanderer is a species potentially subject to SAIIs under the BAM, and is listed as Critically Endangered under the EPBC Act.	• DPE mapped Important Areas of Plains Wanderer habitat, with an additional 100 m buffer to reduce potential for direct impacts to areas of highest potential habitat.	• Avoid placing infrastructure in mapped Very High areas. • Minor encroachment may be acceptable, but increases the risk of future redesign and protracted approvals timeframes.
High Constraint (Constraint score – 3)	These are areas where impacts should be avoided wherever possible, with any unavoidable residual impacts likely to be subject to impact minimisation/mitigation measures. Justification for unavoidable impacts will be required in the BDAR. Likely to be subject to operational impact minimisation strategies for WTGs, and/or include areas that are likely to generate high biodiversity credit per hectare requirements at offsetting.	• Additional 200 m buffer on No-Go areas associated with mapped Plains Wanderer habitat to reduce the potential for indirect impacts, generally during the operational phase of the Project. • Mapped wetlands, woodland/wetlands and riparian vegetation, including a 200 m WTG exclusion buffer on mapped polygons to reduce the potential for WTG collisions. These comprise areas of highest potential habitat for waterbirds, raptors and microbats, with wetland areas in particular likely to provide habitat for a large number of waterbirds in flood years. Temporal/seasonal mitigation may be required to minimise potential operational impacts.	• Additional 200 m buffer on No-Go areas associated with mapped Plains Wanderer habitat to reduce the potential for indirect impacts, during the construction and operational phases of the Project. • Mapped potential TECs listed under the BC Act or EPBC Act. This includes Sand Hill Pine Woodland, Weeping Myall Woodland, Box Gum Woodland and Natural Grasslands of the Murray Valley Plains communities. • Threatened species populations and habitat (*note this potential constraint has not been included in the current GIS model due to difficulties relating to scale, and constraints generally being associated with PCTs and landscape features. Threatened species are to be considered further during*	• Minimise project infrastructure in High Constraint areas to reduce direct and indirect impacts. • Operational WTGs within wetland and woodland/wetland habitat areas (and buffers) in particular, may be subject to mitigation strategies (such as seasonal curtailment) in high rainfall/flood years when waterbirds migrate to the Riverina region generally, and the Project area specifically. • Impact minimisation strategies including maintenance of WTG-free zones (flyways) between wetlands / woodlands (as stepping-stones) and other habitat feature should be employed during Project design. • Operational WTGs are considered likely to be 'high risk' and monitoring and

Constraint category	Definition	WTG operation constraint value *(predominantly in regards to bird and bat collision risk)*	Civil constraint value *(includes WTGs, site reticulation and access etc.)*	Suggested management / mitigation approach
		• Mapped woodland vegetation, including a 200 m WTG exclusion buffer on mapped polygons to reduce the potential for WTG collisions. These comprise areas of highest potential breeding habitat for microbats, raptors, parrots and owls.	*future design stages, and after further surveys have been completed*).	adaptive management will be required to trigger suitable mitigation strategies. • Implement measures in designing WTGs to dissuade perching and minimise the diameter of the rotor swept area. • In average rainfall (or drier) years operational WTGs in these areas may be less likely to be subject to impact minimisation strategies. • Direct and indirect impact to TECs should be avoided and minimised and all impacts will require justification for state and Commonwealth approvals.
Moderate Constraint (Constraint score – 2)	Suitable for development, however being predominantly native vegetation (and associated habitats) will be subject to legislative requirements to demonstrate application of avoid and minimise principles. Areas likely to generate a moderate biodiversity credit per hectare that require offsetting.	• N/A	• All native vegetation (not subject to the above constraints) remains a moderate constraint due to the legislative requirements to avoid and minimise impacts, and the potential for threatened species to occur. Areas of draft Category 1 land that are potentially native grassland are also captured in this constraints level.	• Consider the overall design requirements of the Project and how that relates to impact minimisation from the outset. • Operational WTGs may be considered to be 'moderate risk' and monitoring and adaptive management may be required to trigger suitable mitigation strategies. • Locate as much infrastructure as possible in areas of non-native vegetation and/or Category 1 exempt land (further detailed below). • Avoidance of threatened species populations and habitat (or minimisation of impacts) can be undertaken during future design stages.

Constraint category	Definition	WTG operation constraint value *(predominantly in regards to bird and bat collision risk)*	Civil constraint value *(includes WTGs, site reticulation and access etc.)*	Suggested management / mitigation approach
Low Constraint (Constraint score – 1)	Best suited for development. These areas are unlikely to generate biodiversity credits (exotic/cultivated areas) or may have low biodiversity credit requirements per hectare.	• N/A	• Non-native vegetation or areas likely to meet the definition of Category 1 exempt land and where prescribed impacts are considered negligible (except where areas are still draft Category 1 land mapping).	• Preferentially locate project infrastructure in areas of non-native vegetation and/or Category 1 exempt land. • Category 1 exempt land (assessed under the LLS Act) is excluded from assessment under the BAM, with the exceptions of Prescribed Impacts (i.e. WTG collision), and impacts to BC Act listed critically endangered entities. EPBC Act considerations must also be addressed in regards to development on Category 1 exempt land. • Category 1 exempt land assessments are still subject to finalisation after detailed mapping.
Items considered but not subject to specific constraints	• Where present, mapped watercourses are not subject to specific constraints as mapped vegetation provides and prescribes suitable constraints levels and setbacks. • Threatened species habitat and/or presence cannot be incorporated into the constraints model (at this scale), and relevant constraints/recommendations and captured by those relating to native vegetation.			

3.6 Limitations and assumptions

Biodiversity constraints outlined above are based on desktop assessment of best available spatial mapping data, with refinement during ground validation surveys by Jacobs in December 2023. Vegetation surveys and subsequent mapping by Jacobs was conducted via initial site assessment and, therefore, should be treated as preliminary only, subject to refinement and/or change. A final land category assessment using ground validated detailed vegetation mapping will be undertaken during the EIS phase, especially to determine the presence and extent of native grassland vegetation (both natural and derived grasslands).

The constraints mapping contained herein is based on modelled interpretation of this data using the rulesets outlined Table 1 above using a GIS processing model, and no substantial interpretation of aerial imagery has been undertaken to determine any inconsistencies between the existing datasets and observable on-ground conditions. The above presented constraints relate to biodiversity values and related approvals only, and does not consider other environmental assessment requirements such as cultural heritage values, flooding or geotechnical constraints.

4 Results

4.1 Site description and values

The principal land uses in the Project area include dryland cropping, modified and native pasture grazing as well as minor irrigated cropping. The contemporary landscape is dominated by grazing and dryland cropping paddocks, including the physical structures associated with agricultural management such as roads, fences and farm infrastructure. Grazing with sheep (predominantly) and cattle has had a significant negative effect on the structure and diversity of vegetation communities in some instances. The Project area contains areas conducive to natural and derived native grasslands and various forms of woodland wetlands and woodlands.

Based on preliminary vegetation mapping (Jacobs 2024), non-native vegetation associated with dryland cropping and grazing occupy approximately 1600 hectares of the Project area. Using the preliminary mapping, it is estimated that native grasslands (derived or natural) cover approximately 3000 hectares of the Project area and are of varying conditions dependent on time since woodland clearing or dryland cropping. The precise extent of native and non-native vegetation cover will be confirmed through detailed mapping and land categorisation assessments as biodiversity investigations progress.

Most of these areas may be 'derived' grasslands of woodland PCTs (PCT 26 Weeping Myall open woodland and PCT 74 Yellow Box – River Red Gum tall grassy riverine woodland for example), where trees and shrubs were historically cleared. Much of the *Rytidosperma* grasslands of the Riverina may be derived from *Acacia pendula* woodlands (DPE 2023a). Remnant natural grasslands (PCT 44 Forb-rich Speargrass - Windmill Grass - White Top grassland, PCT 45 Plains Grass grassland and PCT 46 Curly Windmill Grass - speargrass - wallaby grass grassland) may be present in the south of the Project area. The Project area is located in a transitional zone between indicative distributions of natural grasslands (including the EPBC Act TEC, *Natural Grasslands of the Murray Valley Plains* (Critically Endangered), PCTs 44, 45 and 46), and *Acacia pendula* and Box Gum Woodland derived grasslands (Threatened Species Scientific Committee 2012). The Natural Grasslands of the Murray Valley Plains TEC is known to occur in the southern Riverina of NSW, whereas derived grasslands occur more to the centre and north of the Riverina; the Project area is in the central-eastern of the Riverina Bioregion (Threatened Species Scientific Committee 2012). Therefore, Jacobs' preliminary mapping of PCTs 26, 44, 45, 46 and 74 was selected considering surrounding landscape features and floristic attributes such as the presence of remnant trees and woodlands in adjacent areas. The delineation between natural and derived grasslands within this transitional zone will be confirmed by detailed floristic assessments to be undertaken during preparation of the Project's BDAR.

There are several woodland communities present across the Project area. These are generally restricted to riparian corridors, road corridors, patches in grazing lands and shelter belts where trees are either remnant or planted. Most of the open grassy woodlands are dominated by *Acacia pendula* (PCT 26). There is also considerable open to closed woodland wetlands of Black Box *Eucalyptus largiflorens* (PCT 13 Black box-lignum woodland wetland and PCT 16 Black Box grassy open woodland wetland) and River Red Gum *Eucalyptus camaldulensis* (PCT 10 River Red Gum – Black Box woodland wetland), particularly in frequently inundated areas. In slightly higher areas (with a typical elevational increase of <10 metres), or areas with sandy or loamy freely-draining soils, grassy woodlands with White Cypress Pine *Callitris glaucophylla* and Yellow Box *Eucalyptus melliodora* are dominant, comprising PCT 19 Cypress Pine woodland, PCT 28 White Cypress Pine open woodland, PCT 74 and PCT 75 Yellow Box – White Cypress Pine grassy woodland.

Some woodland vegetation comprises shelterbelts of planted natives. These areas were assigned a 'best-fit' PCT by Jacobs (2024b), however are in separate vegetation zones as they are not naturally occurring communities.

Grassy woodlands and grasslands provide habitat for various birds, reptiles, ground-dwelling and arboreal mammals. Hollow-bearing trees and small stick nests were observed across grassy woodland communities by Jacobs (2024b).

The Project area does not support significant waterways or creeks with only minor drainage lines and irrigation channels present. The only exception is a Strahler Order 2 stream in the south-east corner of the Project area which drains to Washpen Creek. Yanco Creek occurs to the east of the Project area and is a significant distributary channel of the Murrumbidgee River. Yanco Creek has a broad floodplain and riparian zone dominated by River Red Gum woodland and floodplain wetlands. The Project area supports several seasonally inundated depressional treed wetlands, comprising Black Box and River Red Gum. These seasonal woodland wetlands fill during periods of heavy local rainfall and are likely to support waterbirds, frogs and semi-aquatic fauna. Farm dams are scattered across the Project area and provide aquatic habitat, water sources for local wildlife populations and foraging areas for microbats.

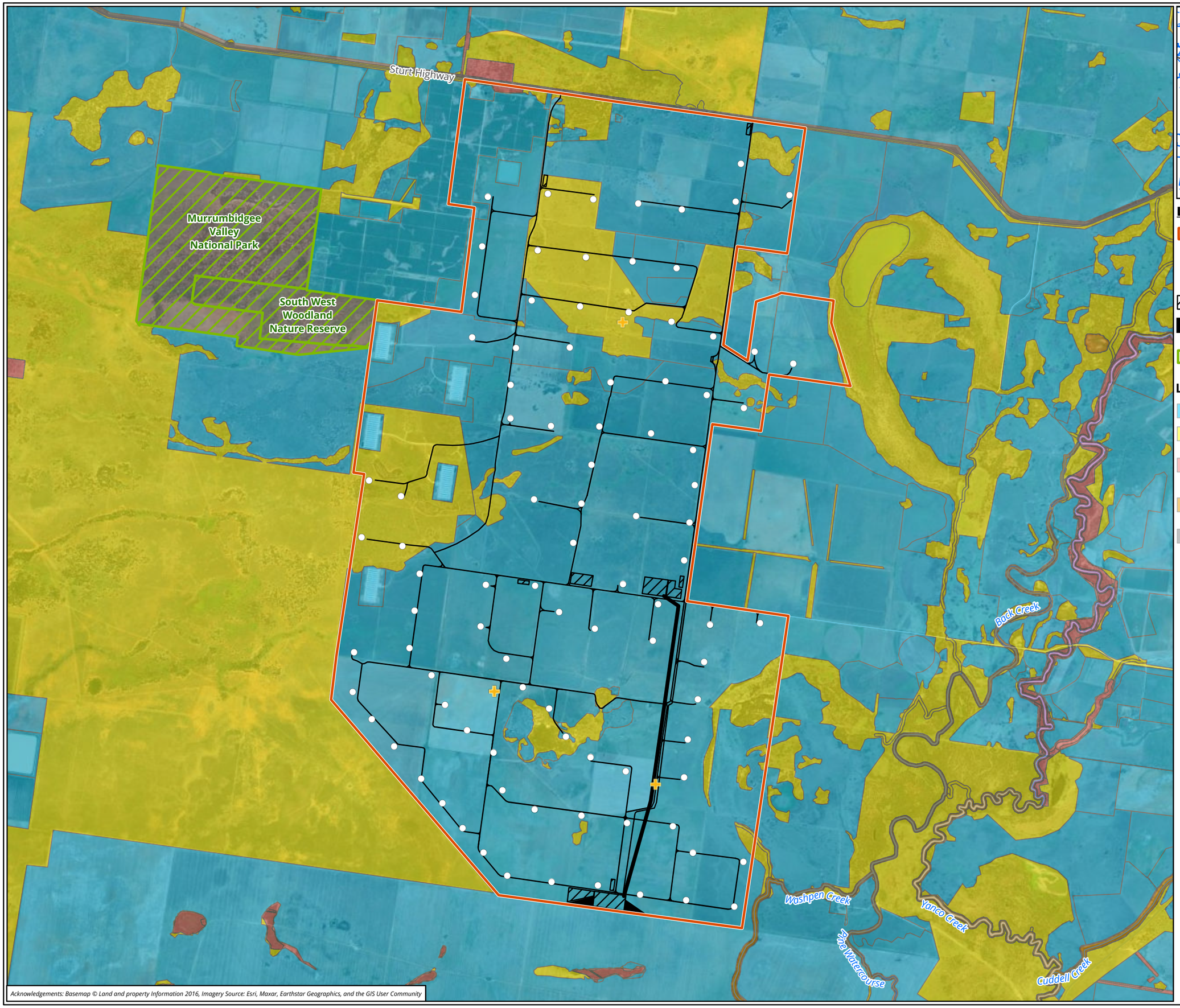
The Banandra Precinct of the Murrumbidgee Valley National Park occurs directly adjacent to the western boundary of the Project area. Based on SVTM and NSW Bionet data, this reserve supports various woodland and native grassland PCTs with records of threatened woodland birds. As indicated previously, a recent meeting with NPWS indicates the Banandra Precinct does not receive active management, public visitation or conservation works by NPWS, and is used for licenced livestock grazing.

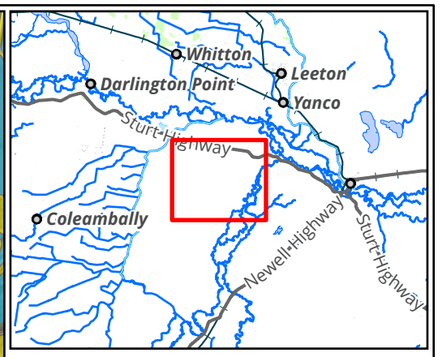
4.2 Land category assessment

The majority of the Project area is mapped as Category 1 - exempt land according to the draft Land Categorisation mapping (Figure 2). These areas are generally on cropped land, derived and (potentially) natural native grasslands, and areas of existing tracks, fire breaks, farm dams and infrastructure. These areas are likely to have been cleared of native vegetation prior to 01 January 1990, as per the requirement of section 60H of the LLS Act. Some of these areas have since been cropped, evidence of which can be seen by cropping lines in aerial imagery. Areas of Category 1 – exempt land are exempt from direct assessment under the BOS and only require assessment of prescribed impacts.

During Jacobs field investigations, much of the land mapped as Category 1 - exempt land was found to contain native grasslands which are unlikely to be low conservation value grasslands, as defined by the 'Interim Grasslands and other Groundcover Assessment Method' (OEH 2017). The presence of native grasslands was due to the observed dominance of native grasses, particularly Wallaby Grasses *Rytidosperma* spp. Therefore, as the Native Vegetation Regulatory Map is in draft form, further consultation with NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) will be undertaken prior to commencing further assessment. This would ensure that the NSW DCCEEW is satisfied with the level of assessment that is being undertaken within draft mapped areas considering the presence of native grasslands (either natural or derived). It is possible that some of these areas not subject to ongoing cropping or heavy grazing will be re-categorised as Category 2 – regulated land. Whether these areas also qualify as the EPBC Act listed threatened grassland community will also need to be resolved, as the EPBC Act considerations sit outside of the NSW land categorisation process.

A small area at the north of the Project area (immediately south of the Sturt Highway) is mapped as Category 2 – sensitive regulated land due to being part of an existing land management agreement.





Legend

- Project area
- Wind turbine location
- Mast
- Ancillary infrastructure
- Easements
- Murrumbidgee National Park - Benandra Precinct

Land categories

- Cat 1 - Exempt Land (draft)
- Cat 2 - Regulated Land (draft)
- Cat 2 - Regulated Land - Sensitive/ Sensitive and Vulnerable (in-force)
- Cat 2 - Regulated Land - Vulnerable (in-force)
- Excluded Land

Figure 2 Land category assessment

0 0.5 1 1.5 2 2.5

Kilometers

Scale: 1:55,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

N

biosis

Matter: 40518,
Date: 08 July 2024 ,
Prepared for: NL, Prepared by: AM, Last edited by: lharley
Layout: 40518_F2_LandCat
Project: P:\40500s\40518\Mapping\
40518_Devlin's Bridge WF Prelim Biodiversity Assessment.aprx

Acknowledgements: Basemap © Land and property Information 2016, Imagery Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

4.3 Vegetation communities

Desktop mapping and analysis confirmed 13 potential PCTs being modelled as occurring within and immediately surrounding the Project area (Riverina SVTM, OEH 2016). Preliminary field investigations by Jacobs (2024b) identified 12 PCTs to occur within the Project area (Table 2; Figure 3). Vegetation condition ranged from low condition in areas of ongoing disturbance from agricultural activities to high condition in areas less subject to historical pressures such as clearing and grazing. Precise ecological condition for PCTs within the Project area will be quantified within the BDAR.

Up to eight TECs (four EPBC Act listed and four BC Act listed, including equivalent TECs) have been assessed as likely to be present within the Project area (Appendix 1):

Commonwealth TECs listed under the EPBC Act

- Weeping Myall Woodlands (Endangered) – associated with PCT 26.
- Natural Grasslands of the Murray Valley Plains (Critically Endangered) – associated with PCTs 44, 45 and 46.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered) – associated with PCTs 74 and 75.
- Grey Box (*Eucalyptus microcarpa)* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Endangered) – associated with PCT 80 Western Grey Box – White Cypress Pine tall woodland.

NSW TECs listed under the BC Act

- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions (Endangered) – associated with PCTs 19, 28 and 75.
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered) – associated with PCT 26.
- 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) – associated with PCTs 74 and 75.
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Endangered) – associated with PCT 80.

A summary of ground validated PCTs and associated TECs within the Project area is provided in Table 2, and illustrated on Figure 3. Assessments of the likelihood for TECs to occur within the Project area are provided in Appendix 1.

Table 2 Summary of ground validated PCTs and associated TECs within the Project area

PCT	Corresponding habitat type	EPBC Act	BC Act	SAII
10: River Red Gum - Black Box woodland wetland of the semi-arid (warm) climatic zone	Riparian woodland / wetland.	N/A	N/A	N/A
13: Black box-lignum woodland of the inner floodplains in the semi-arid zone	Riparian woodland / wetland.	N/A	N/A	N/A
16: Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW	Woodland / wetland.	N/A	N/A	N/A
19: Cypress Pine woodland of source-bordering dunes mainly on the Murray and Murrumbidgee River floodplains	Riverine sandhill woodlands.	N/A	EEC - Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions.	N/A
26: Weeping Myall open woodland of the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine plain woodlands.	EEC - Weeping Myall Woodlands.	EEC - Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions.	N/A
28: White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Riverine sandhill woodlands.	N/A	EEC - Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions. EEC - *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions (unlikely).	N/A
44: Forb-rich Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion	Riverine plain grassland.	CEEC - Natural Grasslands of the Murray Valley Plains (potential).	N/A	N/A
45: Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	Riverine plain grassland.	CEEC - Natural Grasslands of the Murray Valley Plains (potential).	N/A	N/A

PCT	Corresponding habitat type	EPBC Act	BC Act	SAII
46: Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	Riverine plain grassland.	CEEC - Natural Grasslands of the Murray Valley Plains (potential).	N/A	N/A
74: Yellow Box – River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Floodplain Transition Woodlands.	CEEC - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	CEEC - White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	Yes
75: Yellow Box – White Cypress Pine grassy woodland on deep sandy-loam alluvial soils of the eastern Riverina Bioregion and western NSW South Western Slopes Bioregion	Riverine Sandhill Woodlands.	CEEC - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.	CEEC - White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. EEC - Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions.	Yes
80: Western Grey Box – White Cypress Pine tall woodland on loam soil on alluvial plains of NSW South Western Slopes Bioregion and Riverina Bioregion	Floodplain Transition Woodlands.	EEC - Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	EEC - Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.	N/A

PCT	Corresponding habitat type	EPBC Act	BC Act	SAII
Modified land (non-PCT)	Irrigated cropping land, Dryland cropping, grazing land, disturbed areas.	N/A	N/A	N/A

4.4 Threatened ecological communities

4.4.1 Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands is a BC Act EEC and EPBC Act EEC dominated or co-dominated by Grey Box *Eucalyptus microcarpa* or a derived native grassland where Grey Box was once the dominant or co-dominant overstorey species. The community generally comprises an open, grassy woodland with the understorey comprising varying proportions of shrubs, grasses and herbs.

Widespread shrubs include wattles *Acacia* spp., Sweet Bursaria *Bursaria spinosa*, *Cassinia* spp., hop-bushes *Dodonaea* spp., emu bushes *Eremophila* spp., and blue-bushes *Maireana* spp. Common grasses and grass-like plants where this ecological community is present include wallaby grasses *Rytidosperma* spp., spear grasses *Austrostipa* spp., Wheat-grass *Elymus scaber*, windmill grasses *Enteropogon* spp., flax-lilies *Dianella* spp., and mat-rushes *Lomandra* spp.

Within the Project area, this TEC is likely to be associated with a patch of PCT 80 on the northern perimeter of the Project area (Figure 3).

4.4.2 Weeping Myall Woodlands

Weeping Myall Woodlands is a BC Act and EPBC Act listed EEC dominated by Weeping Myall *Acacia pendula*. The community structure can vary from low woodland and low open woodland to low sparse woodland or open shrubland, depending on disturbance history, soils, and topographical and ecological influence. The tree layer grows up 10 metres with Weeping Myall as either a dominant species or the only tree species present. The understorey consists of an open chenopod shrub layer including other woody plant species with an open to complete groundcover of herbs and grasses.

Myall Woodland occurs on alluvial plains on red-brown earths and heavy textured grey and brown alluvial soils. This community occurs across the majority of the Project area as PCT 26 in moderately large patches, smaller isolated stands and derived native grasslands ranging from high to low/moderate condition. 'High' and 'Moderate' condition zones of PCT 26 are likely to meet the listing criteria for this TEC (Figure 3).

4.4.3 Natural Grasslands of the Murray Valley Plains

Natural Grasslands of the Murray Valley Plains is an EPBC Act listed CEEC dominated by Spear Grasses *Austrostipa* spp., Wallaby Grasses *Rytidosperma* spp. and Curly Windmill Grass *Enteropogon ramosus*. The ecological community may also be dominated or co-dominated by a range of forb species (McDougall et al 1994), depending on seasonality and disturbance history. The ecological community ranges from open to closed tussock grassland. In areas where grasses are sparse, the community may be a herbland/forbland. In other areas, the community may be an open grassy shrubland where low chenopod shrubs are co-dominant with grasses (DSE 2004).

Natural Grasslands of the Murray Valley Plains occurs generally within a mosaic of woodlands and naturally occurring grasslands on flat alluvial lowland plains with heavy-textured grey, brown and red clays. Extant grasslands derived from the historical removal of open woodlands or chenopod shrublands (through clearing or overgrazing) do not represent an occurrence of the CEEC. Within the Project area, the community could potentially occur across areas mapped as PCT 44, 45 and 46 in 'Moderate' and 'High' condition. However, confirmation of this TEC within the Project area must be made through detailed vegetation assessments in accordance with the TEC listing during appropriate seasonal conditions.

4.4.4 Sandhill Pine Woodland

Sandhill Pine Woodland is a BC Act EEC dominated by White Cypress Pine *Callitris glaucophylla*. The community is characterised by an open cover of trees, which may be reduced to isolated individuals or may be absent as a result of past clearing and regenerative failure. The tree layer is dominated by White Cypress Pine, primarily in pure stands but sometimes with a range of less abundant trees or tall shrubs. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall.

Sandhill Pine Woodland occurs on aeolian stream source-bordering dunes on red-brown loam sands with alkaline sub-soils. This TEC is associated with PCT 19 and 28 and occurs on Sand-hill patches across the north-west and south-west extent of the Project area (Figure 3).

4.4.5 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is a EPCT Act and BC Act CEEC occurring as either a woodland or a derived grassland. It has a ground layer of native tussock grasses and herbs, and a sparse, scattered shrub layer. White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi* dominate the ecological community where a tree layer still occurs. The shrub species present vary in response to disturbance such as grazing. Western Wattle *Acacia decora* and Silver Wattle *A. dealbata* have been suggested as indicators of very high condition sites.

Where Yellow Box trees are dominant or co-dominant, this TEC is associated with PCT 74 and 75 mapped within the Project area. As this TEC can be present as a derived grassland community as well as a woodland, most of the mapped areas of PCT 74 and 75 within the Project area (except the 'Planted natives' zone) may be consistent with this TEC (Figure 3).

4.5 Aquatic habitats

Hydrological features occur within the Project area and include channels, waterways and farm dams. Only one small waterway is present within the Project area, comprising a tributary of Washpen Creek (1st order stream) flowing south on the southern-eastern side of the Project area. There are several small farm dams across the Project area, some of which are connected by narrow artificial irrigation channels. There is no Key Fish Habitat mapped within the Project area. Of the farm dams observed by Jacobs during the field investigations, few had any emergent vegetation. Farms dams that contained emergent vegetation were small and were generally fragmented across large open paddocks.

Within 3 kilometres to the east of the Project area are Washpen Creek, Back Creek and Yanco Creek. Dry Lake is also located within 2 kilometres east of the Project area and covers about 70 hectares. Dry Lake comprises part of a floodplain connected to Yanco Creek. These waterways/waterbodies are mapped as Key Fish Habitat, however, all are outside the Project area.

Washpen Creek and Yanco Creek are mapped as having 'poor' fish community status and Back Creek has a 'very poor' status. Washpen Creek and Yanco Creek are also mapped habitat for two threatened species, Flathead Galaxias *Galaxias rostratus* and Silver Perch *Bidyanus bidyanus*. Mapped habitat for the threatened Murray Crayfish *Euastacus armatus* is present further downstream in Yanco Creek and in the Murrumbidgee River.

There is limited habitat for aquatic species within the Project area, however, considerable aquatic habitat is present within the locality which may support local populations of aquatic species as well as terrestrial species (as food and water sources). It may also increase water availability (via flooding) to the Project area in high rainfall periods. No threatened aquatic species are considered to have suitable habitat within the subject

and, however, they should be considered in the future detailed assessment in regard to potential indirect impacts associated with runoff and erosion.

Waterway locations are shown on Figure 1.

4.6 Threatened species

Background searches identified 12 threatened flora species recorded (EES 2023) or predicted to occur (Commonwealth of Australia 2023) within 10 kilometres of the Project area and 95 threatened fauna species within 25 kilometres of the Project area (the locality). Assessments of the likelihood for threatened species to occur within the Project area are provided in Appendix 1 (flora) and Appendix 2 (fauna).

Furthermore, based on the PCTs confirmed present within the Project area, a total of 39 candidate threatened species credit species have been generated as potentially occurring within the Project area.

4.6.1 BAM species credit species

Table 3, below, provides a preliminary assessment of potential occurrence of candidate species credit species within the Project area. This assessment is based on the PCTs preliminarily confirmed present within the Project area. It provides a list of relevant habitat or geographic constraints not present at the Project area (or outside the locality of the Project area), as well as a brief analysis of species records. A preliminary likelihood of occurrence is then provided for each candidate species credit species. This has been based on Jacobs' preliminary habitat assessments undertaken in December 2023, the BBUS surveys undertaken to date and each species' known extent of occurrence based partly on existing records. It should be noted that a lack of records may be a product of lack of official survey in the locality, as opposed to non-occurrence.

Those candidate species credit species concluded to have a medium or higher likelihood of occurrence within the Project area are considered to have a higher likelihood of being impacted by the Project.

Table 3 Preliminary assessment of potential occurrence of candidate species credit species within the Project area

Scientific name	Common Name	PCT ID - Ground validated											Relevant habitat / geographic information	BioNet and other relevant record notes	Preliminary likelihood of occurrence within Project area (species credit habitat only)
		10	13	16	19	26	28	44	45	46	74	75	80			
Flora																
Austrostipa metatoris	A Spear-grass	X			X		X	X			X			n/a	n/a	Low
Austrostipa wakoolica	A Spear-grass	X			X	X	X	X			X		X	Plains and alluvial plains.	Single record (2023) within 40 km of the Project area.	Medium
Brachyscome muelleroides	Claypan Daisy							X	X	X				Flood plains or semi-permanent or ephemeral wet areas.	Multiple records in claypan on Morundah Station, within 40 km of the Project area.	Medium
Brachyscome papillosa	Mossgiel Daisy		X	X	X			X	X	X			X	n/a	Dated records within 20 km of the Project area.	Low
Caladenia arenaria	Sand-hill Spider Orchid						X					X	X	n/a	n/a	Medium
Convolvulus tedmoorei	Bindweed			X	X	X		X	X	X		X		n/a	n/a	Medium
Cullen parvum	Small Scurf-pea						X	X			X			n/a	Recorded within 10 km of the Project area in 2014.	Medium
***Diuris* sp. (Oaklands, D.L. Jones 5380)**	Oaklands Diuris											X	X	Only known around Oaklands, NSW.	n/a	Low
Diuris tricolor	Pine Donkey Orchid	X	X	X		X	X		X	X	X	X	X	n/a	n/a	Low
Eucalyptus leucoxylon* subsp. *pruinosa	Yellow Gum		X	X	X									n/a	No nearby records.	Low
Lepidium aschersonii	Spiny Peppercress			X	X	X					X			Between Moree and Leeton.	n/a	Medium

Scientific name	Common Name	PCT ID - Ground validated												Relevant habitat / geographic information	BioNet and other relevant record notes	Preliminary likelihood of occurrence within Project area (species credit habitat only)
		10	13	16	19	26	28	44	45	46	74	75	80			
Lepidium monoplocoides	Winged Peppercress	X	X	X	X	X	X	X	X	X	X	X	X	n/a	n/a	Medium
Leptorhynchos orientalis	Lanky Buttons					X		X	X	X				n/a	n/a	Low
Maireana cheelii	Chariot Wheels		X	X		X		X		X				Shallow depressions and claypans on heavy clay soils.	No nearby records.	Low
Pilularia novae-hollandiae	Austral Pillwort	X	X	X		X		X	X	X	X		X	Fragmented populations. Closest known population in Oolambeyan National Park.	n/a	Low
Sclerolaena napiformis	Turnip Copperburr					X		X		X					n/a	Low
Solanum karsense	Menindee Nightshade		X	X										Semi-permanent/ephemeral wet areas.	n/a	Medium
Swainsona murrayana	Slender Darling Pea	X	X	X	X	X	X	X	X	X		X	X	n/a	n/a	Medium
Swainsona plagiotropis	Red Darling Pea			X		X		X	X	X				n/a	n/a	Low
Swainsona sericea	Silky Swainson-pea	X	X	X	X	X	X	X	X	X	X	X	X	n/a	Not seen recently nearby. Closest and most recent record is 3.8 km away, recorded in 2000.	High

Scientific name	Common Name	PCT ID - Ground validated												Relevant habitat / geographic information	BioNet and other relevant record notes	Preliminary likelihood of occurrence within Project area (species credit habitat only)
		10	13	16	19	26	28	44	45	46	74	75	80			
Fauna																
Anthochaera phrygia	Regent Honeyeater	X	X	X	X	X	X	X	X	X	X	X	X	As per Important Habitat Map.	n/a	Low
Ardeotis australis	Australian Bustard	X	X	X	X	X	X	X	X	X	X	X				Low
Burhinus grallarius	Bush Stone-curlew	X	X	X	X	X	X	X	X	X	X	X	X	Fallen/standing dead timber including logs.	3 records within 10 km of the Project area. Not recorded nearby since 2005	Medium
Callocephalon fimbriatum	Gang-gang Cockatoo	X	X	X	X	X	X	X	X	X	X	X	X	Hollows greater than 7 cm wide in eucalypts greater than 3 m above ground.	Single recent (2019) record within 10 km of the Project area.	Medium
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	X	X	X	X	X	X	X	X	X	X	X	X	Presence of Allocasuarina or Casuarina species. Also reliant on hollows a minimum of 15 cm wide and 8 m above ground.	n/a	Low
Crinia sloanei	Sloane's Froglet	X					X			X	X		X	Semi-permanent or ephemeral wet areas with submerged vegetation.	Single dated (2002) record approximately 10 km from the Project area.	Medium
Haliaeetus leucogaster	White-bellied Sea-Eagle	X	X	X	X	X	X	X	X	X	X	X	X	Water bodies and mature trees within suitable vegetation close by.	Numerous records within 10 km of the Project area, as recently as 2023.	High
Hieraaetus morphnoides	Little Eagle	X	X	X	X	X	X	X	X	X	X	X	X	Large nesting trees within vegetation.	Few records within 10 km of the Project area. Not recorded nearby since 2008.	High

Scientific name	Common Name	PCT ID - Ground validated												Relevant habitat / geographic information	BioNet and other relevant record notes	Preliminary likelihood of occurrence within Project area (species credit habitat only)
		10	13	16	19	26	28	44	45	46	74	75	80			
Lathamus discolor	Swift Parrot	X	X	X	X	X	X	X	X	X	X	X	X	As per Important Habitat Map.	n/a	Low
Litoria raniformis	Southern Bell Frog	X	X	X	X		X	X	X		X	X	X	n/a	Over 100 records within 10 km of the Project area. Not recorded nearby since 2002. Common throughout nearby Coleambally Outfall Drain.	High
Lophochroa leadbeateri	Major Mitchell's Cockatoo	X	X	X	X	X	X	X	X	X	X	X	X	Trees bearing hollows greater than 10 cm wide.	n/a	Medium
Lophoictinia isura	Square-tailed Kite	X	X	X	X	X	X	X	X	X	X	X	X	Nest trees.	Single recent record (2021) within 1.5 km of the Project area.	High
Myotis macropus	Southern Myotis	X	X	X	X	X	X	X	X	X	X	X	X	Waterbodies with a minimum stretch of 3 m.	n/a	Medium
Ninox connivens	Barking Owl	X	X	X	X	X	X	X	X	X	X	X	X	Trees bearing hollows greater than 20 cm wide and more than 4 m above ground.	Single record within 10 km of the Project area. Not recorded nearby since 2004	Low
Pedionomus torquatus	Plains-wanderer			X				X		X				As per Important Habitat Map.	Recorded twice within 10 km of the Project area. Not recorded nearby since 2000	High
Phascolarctos cinereus	Koala	X	X	X	X	X	X	X	X	X	X	X	X	Presence of Koala use trees.	Several recently recorded (2022)	Medium

Scientific name	Common Name	PCT ID - Ground validated												Relevant habitat / geographic information	BioNet and other relevant record notes	Preliminary likelihood of occurrence within Project area (species credit habitat only)
		10	13	16	19	26	28	44	45	46	74	75	80			
															within 10 km of the Project area.	
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	X	X	X										Mature River Red Gums bearing hollows greater than 5 cm wide and 5 m above ground, or mature trees with a DBH of 40 cm and within 1 km of a waterbody. Trees can be isolated but must be within 20 km of mallee.	n/a	Low
Polytelis swainsonii	Superb Parrot	X	X	X	X	X	X	X	X	X	X	X	X	Large eucalypt trees (>30 cm DBH) hearing hollows greater than 5 cm wide and more than 5 m above ground.	Hundreds of nearby records, including multiple in the Project area, as recently as 2022. Recorded during BBUS program.	High
Tyto novaehollandiae	Masked Owl	X	X	X	X	X	X	X	X	X	X	X	X	Trees bearing hollows greater than 20 cm wide and more than 4 m above ground.	n/a	Low

4.6.2 Bird and bat species with potential collision risk

Threatened bird and bat species, especially aerial species and migrating wetland species, are at risk of impact from the Project operation based on potential turbine collision and mortality. Higher risk species for wind farms are considered to be those with potential for ongoing population impacts once turbines are operational, such as:

- Raptors which may manoeuvre close to turbine blades to prey on carrion below. These species generally occur at low density in the landscape and removal of even one breeding pair may be significant at a local level.
- Flocking birds e.g., parrots, pelicans, cockatoos.
- Migrating or nomadic waterbirds, which may be less able to manoeuvre around operational turbine blades and may also affect breeding viability, inclusive of large colonial nesting events. These species may be internationally migratory species that use broad flyways in southern-eastern Australia, or regionally migratory species that move between wetlands and other habitat types on a seasonal basis.
- Resident or colonial roosting bats that may fly within the Rotor Swept Area.

Generally, most woodland birds and bats forage and move within tree canopies at lower than the proposed Rotor Swept Area height and are considered a lower risk of impact. Migratory and nomadic species represent an increased risk as one migratory movement through the operational wind farm may have a local population-level impact on the species. Ongoing collisions may affect the population as a whole.

Collision risk is assessed as an operational and prescribed impact under the NSW BAM. The results of the preliminary threatened bird and bat risk assessments are summarised below in Table 4. Detailed likelihood of occurrence assessments and collision risks are provided in Appendix 2 (Table 10). Table 4 only includes threatened birds and bats that have a high or moderate collision risk. There are other threatened bird and bat species that may occur within the Project area but have a low or negligible risk of turbine collision.

Non-threatened bird and bat species are also at risk of collision especially raptors, waterbirds and migratory species moving between habitat and aerial species that forage on insects well above the tree canopy (e.g. some Woodswallow species). Non-threatened species have not been assessed for the purpose of this preliminary report.

Species listed as Migratory under the EPBC Act are included in the assessment below.

Table 4 Preliminary collision risk assessment for listed birds and bats only showing high and moderate risk species, **see Appendix 2 for full risk assessment details and low risk species.

Scientific Name	Common Name	EPBC Act status	BC Act status	Overall species risk**
Birds				
Anseranas semipalmata	Magpie Goose		VU	Moderate
Apus pacificus	Fork-tailed Swift	Migratory		High
Artamus cyanopterus cyanopterus	Dusky Woodswallow		VU	High
Botaurus poiciloptilus	Australasian Bittern	EN	EN	Moderate
Circus assimilis	Spotted Harrier		VU	High
Callocephalon fimbriatum	Gang-gang Cockatoo	EN	VU	Moderate
Falco hypoleucos	Grey Falcon	VU	VU	Moderate
Falco subniger	Black Falcon		VU	High
Gallinago hardwickii	Latham's Snipe	Migratory	VU	High
Grus rubicunda	Brolga		VU	High
Haliaeetus leucogaster	White-bellied Sea-Eagle		VU	High
Hieraaetus morphnoides	Little Eagle		VU	High
Hirundapus caudacutus	White-throated Needletail	VU, Migratory		Moderate
Lophochroa leadbeateri leadbeateri	Major Mitchell's Cockatoo	EN	VU	Moderate
Lophoictinia isura	Square-tailed Kite		VU	High
Ninox connivens	Barking Owl		VU	Moderate
Polytelis swainsonii	Superb Parrot	VU	VU	High
Tyto novaehollandiae	Masked Owl		VU	Moderate
Bats				
Chalinolobus picatus	Little Pied Bat		VU	Moderate
Myotis macropus	Southern Myotis		VU	Moderate to low
Nyctophilus corbeni	Corben's Long-eared Bat	VU	VU	Moderate to low
Pteropus poliocephalus	Grey-headed Flying-fox	VU	VU	Moderate
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat		VU	High
Vespadelus baverstocki	Inland Forest Bat		VU	High

4.7 Matter of National Environmental Significance

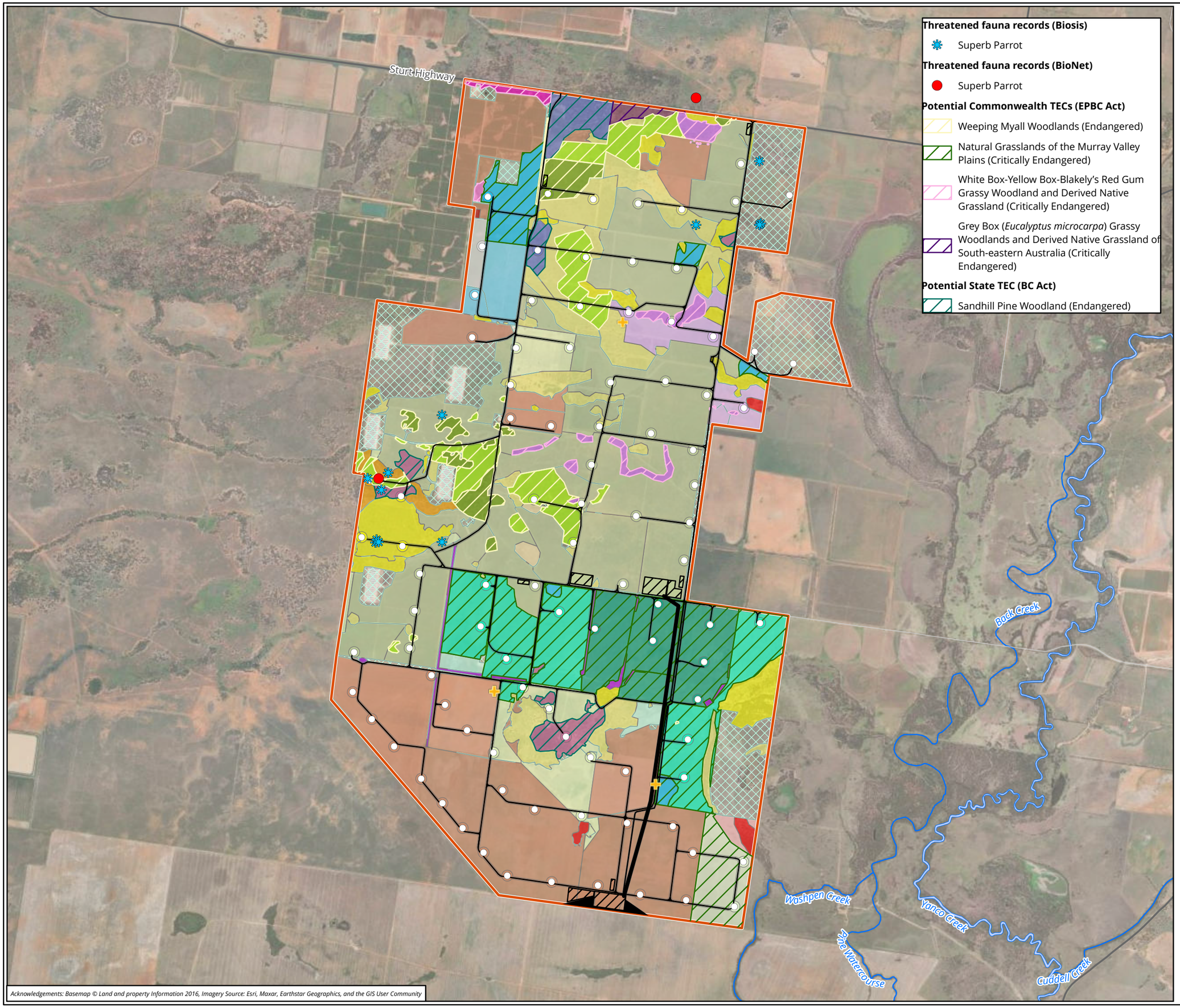
Based on the results of the Protected Matters Search Tool run in May 2024, and the findings of the preliminary field investigations by Jacobs and Biosis, relevant MNES are provided in Table 5 and where spatial data is available are mapped in Figure 3. Relevant MNES below are solely based off 10 kilometre PMST results. Additional Nationally threatened species and communities predicted to occur from larger search buffers (e.g. 25 kilometres for highly mobile fauna), NSW BioNet Atlas of NSW Wildlife database and expert opinions are described separate to Table 5. A separate report addressing MNES has been prepared and submitted with the Project's EPBC Act referral.

Table 5 MNES of relevance to the Project

MNES	Relevance to the Project
World Heritage Properties	Not identified within the Project area or a 10 km radius of the Project boundary.
National Heritage Places	Not identified within the Project area or a 10 km radius of the Project boundary.
"Wetlands of International Importance (Ramsar Wetlands)	There are no Wetlands of International Importance within the Project area. One Ramsar Wetland was predicted to occur within the search area of the PMST: • Fivebough and Tuckerbil Swamps: this site consists of two separate wetlands and is approximately 20 km north of Project area (north of the Murrumbidgee River). This site is not physically or hydrologically connected to the Project area. The remaining closest Ramsar Wetlands, based on a PMST search include: • Hattah-Kulkyne Lakes (300 – 400 km downstream). • Riverland (400 – 500 km downstream). • Banrock station wetland complex (500 – 600 km downstream). • The Coorong, and Lakes Alexandrina and Albert Wetland (600 – 700 km downstream).
Great Barrier Reef Marine Park	Not identified within the Project area or a 10 km radius of the Project boundary.
Commonwealth Marine Area	Not identified within the Project area or a 10 km radius of the Project boundary.
Listed Threatened Ecological Communities	A total of five Commonwealth listed TECs are predicted to occur within the Project area and/or 10 km buffer of the Project boundary. Those TECs include: • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered) - Likely to be present within the Project area. • Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Endangered) – Likely to be present within the Project area. • Weeping Myall Woodlands (Endangered) – Likely to be present within the Project area. • Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Endangered) – Not recorded within the Project area and not expected to occur. • Poplar Box Grassy Woodland on alluvial Plains (Endangered) - Not recorded within the Project area and not expected to occur.
Listed Threatened Species	A total of nine EPBC Act listed threatened flora species are predicted to occur within the Project area and/or 10 km buffer. Those considered most likely to occur include: • Spear Grass *Austrostipa wakoolica* (EPBC Act Endangered; BC Act Endangered).

MNES	Relevance to the Project
	• Sand-hill Spider-orchid *Caladenia arenaria* (EPBC Act Endangered; BC Act Endangered). • Winged Pepper-cress *Lepidium monoplocoides* (EPBC Act Endangered; BC Act Endangered). • Mueller Daisy *Brachyscome muelleroides* (EPBC Act Vulnerable; BC Act Vulnerable). • Slender Darling-pea *Swainsona murrayana* (EPBC Act Vulnerable; BC Act Vulnerable). A total of 32 EPBC Act listed threatened fauna species are predicted to occur within the Project area and/or 10 km buffer. Those considered most likely to occur and are at risk of direct or indirect habitat impacts and/or collision risk include: • Plains Wanderer *Pedionomus torquatus* (EPBC Act Critically Endangered; BC Act Endangered, not recorded within the Project area during preliminary assessments). • Australian Bittern *Botaurus poiciloptilus* (EPBC Act Endangered; BC Act Endangered, not recorded within the Project area during preliminary assessments). • Major Mitchell's Cockatoo (eastern) *Lophochroa leadbeateri leadbeateri* (EPBC Act Endangered; BC Act Vulnerable, not recorded within the Project area during preliminary assessments). • Superb Parrot *Polytelis swainsonii* (EPBC Act Vulnerable; BC Act Vulnerable; recorded within the Project area during preliminary assessments). • Corben's Long-eared Bat *Nyctophilus corbeni* (EPBC Act Vulnerable; BC Act Vulnerable, species complex recorded within the Project area during preliminary assessments). • Grey-headed Flying-fox *Pteropus poliocephalus* (EPBC Act Vulnerable; BC Act Vulnerable, not recorded within the Project area during preliminary assessments). • Koala *Phascolarctos cinereus* (Endangered, not recorded within the subject land during preliminary assessments). • Southern Bell Frog *Litoria raniformis* (Vulnerable, not recorded within the subject land during preliminary assessments). • Sloane's Froglet *Crinia sloanei* (Endangered, not recorded within the subject land during preliminary assessments). • Diamond Firetail *Stagonopleura guttata* (Vulnerable, not recorded within the subject land during preliminary assessments). • South-eastern Hooded Robin *Melanodryas cucullata cucullata* (Endangered, not recorded within the subject land during preliminary assessments). • Brown Treecreeper (Vulnerable, not recorded within the subject land during preliminary assessments). • Southern Whiteface *Aphelocephala leucopsis* (Vulnerable, not recorded within the subject land during preliminary assessments). • Latham's Snipe *Gallinago hardwickii* (Vulnerable and migratory, not recorded within the subject land during preliminary assessments). A search of the NSW Department of Primary Industries (DPI) threatened freshwater species indicative population mapping found one EPBC Act listed fish species has the potential to occur within waterways adjacent to the Project area (e.g. Yanco Creek): • Flathead Galaxias *Galaxias rostratus* (Critically Endangered) – mapped within Washpen Creek approximately 150 m east of the south-east corner of the Project area.
Listed Migratory Species	A total of nine listed migratory species are predicted to occur within the Project area and 10 km search buffer. Those considered most likely to occur and be subject to direct and/or indirect impacts include: • Fork-tailed Swift *Apus pacificus.* • Latham's Snipe *Gallinago hardwickii*.

Matters of National Environmental Significance listed above, along with any other MNES recorded or predicted as likely to occur within the Project area, will require consideration as part of ongoing ecological assessments. A referral of the Project to Cth DCCEEW will provide a determination as to whether the Project is considered a Controlled Action under the EPBC Act. The above listed MNES will form the basis of potential impacts (direct and indirect) included in the Referral.



Scale: 1:55,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

Figure 3 Biodiversity values

Matter: 40518,
Date: 08 July 2024 ,
Prepared for: NL, Prepared by: AM, Last edited by: lharley
Layout: 40518_F3_BiodiversityValues
Project: P:\40500s\40518\Mapping\
40518_Devlin's Bridge WF Prelim Biodiversity Assessment.aprx

5 Preliminary impact assessment and next steps

5.1 Biodiversity values and potential impacts

Biodiversity values and potential impacts presented herein are based largely on the ground validated results of the preliminary field investigations completed by Jacobs in December 2023 and the first two seasons of the BBUS program. The Project area supports a range of biodiversity values with a proportion of the site supporting native vegetation. The Project area also supports extensive areas of Category 1 - exempt land, however further detailed vegetation mapping and consultation with NSW DCCEEW is required for these areas as a large proportion of these areas are covered by native grasslands (derived and/or natural grasslands). Higher risk areas are associated with treed wetland habitats present across the Project area, woodland PCTs, and TECs represented by both wooded and (potentially) grassland vegetation types. Ongoing application of the principles of avoid, minimise and mitigate will be essential in development of the Project design with further detailed surveys to be completed as part of the BDAR.

There are however, opportunities to locate Project infrastructure in areas considered to be of lower risk to biodiversity values, albeit generally still within areas of native vegetation. Such areas include current cropping land and land where historical land management practices have led to lower condition grassy areas, less likely to support habitat for threatened species (fire breaks for example). Risks associated with WTG collisions are also not expected to be uniform in terms of their occurrence over the life of the operation of the wind farm.

Biodiversity constraints have been presented on a precautionary basis to allow for consideration of impact minimisation at project design and over the life of the Project. Mitigation strategies will be developed that balance impact minimisation while maximising the Project benefits.

5.1.1 Wind constraints

Modelled biodiversity constraints for the Project have been developed in accordance with the hierarchy and method outlined in Table 1 and are illustrated on Figure 4. Higher level constraints for wind farm projects generally relate to the risk of impact associated with turbine strike and overhead powerline collisions, particularly for threatened and protected bird and bat species. Impacts of this nature are generally considered to be significant by regulators and will need to be avoided and minimised by the Project.

Areas of highest constraint within the Project area, in relation to fauna collision impacts, are associated with woodland and treed wetland PCTs. Project infrastructure should avoid these habitats to the fullest extent possible to minimise the potential for impacts such as loss of breeding opportunities, and potential collision with WTGs or overhead powerlines by protected species. The Riverina is known to support a large number of significant wetlands, some of which are known to support over 20,000 waterbirds in ideal conditions (NPWS 2003). The Project area, and surrounding locality, support wetland habitats that can act as stepping stones between larger more significant wetlands, which creates an increased risk of collision and the potential for population scale impacts. This constraint is by no means unique to the Project, with other proposed wind farms nearby in the South-West Renewable Energy Zone (SW REZ) addressing similar issues. Impact minimisation strategies such as setback buffers and maintenance of flyways during Project design may be required to prevent Project specific and cumulative impacts.

Areas of additional high constraint occur where activity is considered likely to be higher with birds and bats moving between habitats as part of regular flights, or areas where the operation of WTGs has the potential to result in ongoing disturbance to breeding or other important habitats. Turbine exclusion areas within these buffer areas for a distance of 200 metres from the edge of the woodland wetlands, and/or treed PCTs (often associated with watercourses) should be implemented where practical (i.e. 200 metres to edge of rotor swept

area / blade tip). In excluding WTGs from these buffer areas, it will be ensured that a minimum setback from areas of potential high-use habitat will also remain free from turbine blades. This impact minimisation measure is noted as a material item of feedback from BCS on similar nearby SW REZ wind farm project BDARs. Turbines placed within these buffer areas may be subject to mitigation strategies. Turbines located within and surrounding treed PCTs will generally present an increased risk of collision to bird and bat species likely to be preferentially utilising this habitat type within the landscape. Minimisation of WTGs in these areas will reduce the potential for strikes to occur. Turbines located closer to treed areas also have the potential to impact on threatened bird species (raptors, parrots, owls) using tree hollows and/or large old trees as a nesting resource.

Areas within 100 to 300 meters of Mapped Important Areas of habitat for Plains Wanderer are also considered a high constraint for WTGs. However, only a very small extent of this buffer area is present within the Project area, on account of Mapped Important Areas of habitat located external to the Project area along south-west boundary. Development in these areas will need to be minimised to further minimise the potential to indirect impacts to the species.

Measures being implemented during early Project design, as detailed below in Section 5.2, will reduce the potential for the Project to result in the above higher risk impacts, and efforts will continue through future project design to further avoid and minimise impacts associated with potential WTG and powerline collision.

5.1.2 Civil works constraints

Modelled biodiversity constraints for civil works associated with the Project have been developed in accordance with the hierarchy and method outlined in Table 1 and are illustrated on Figure 4. Higher level constraints for civil works (i.e. roads, hardstands, WTG and transmission line towers, ancillary facilities etc.), generally relate to direct and indirect impacts to TECs, threatened species populations and habitats, and areas of native vegetation.

High constraints for civil works where proposed development are to be minimised, include areas within 100 to 300 metres of Mapped Important Areas of habitat for Plains Wanderer. However, only a small extent of this buffer area is present within the Project area, on account of Mapped Important Areas of habitat located external to the Project area along the south-west boundary. Further high level constraints are included for areas mapped as TECs (or potential TECs) listed under state or Commonwealth legislation. The Project should avoid these areas wherever practical to ensure the BC Act and EPBC Act requirements for avoidance and minimisation of impacts to biodiversity values are implemented.

Mapped (potential) TECs include areas of the EPBC Act listed Critically Endangered Natural Grasslands of the Murray Valley Plains, which has the potential to occur associated with natural grasslands across the Project area. Further detailed data collection will be undertaken to confirm the presence/absence of this TEC within the Project area. All areas of potential TEC have been conservatively mapped as the TEC, however, to ensure avoidance and minimisation of impacts is considered in these areas from the outset of project design.

The current biodiversity constraints model does not specifically attribute constraints to existing records of threatened flora and fauna species. This is due to issues with the scale at which the modelling was undertaken, the transient nature of threatened species records, and the use of native vegetation as suitable surrogates for threatened species related constraints during the early stages of Project design. Following further detailed field survey, existing populations of threatened species and/or higher condition habitats will form part of avoidance and minimise considerations and will represents specific biodiversity constraints to be considered.

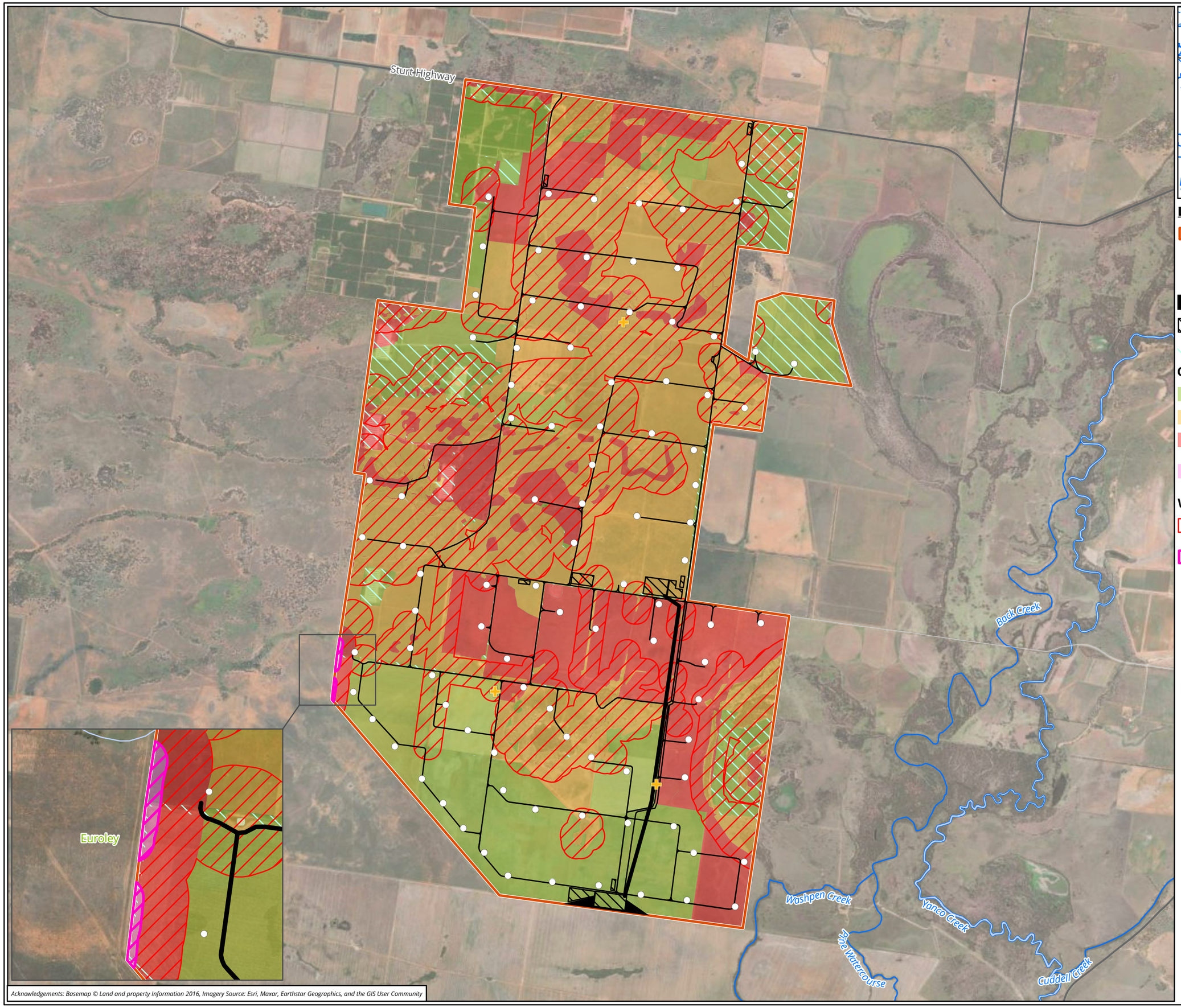
All native vegetation (not highlighted as part of the above constraints) remains a moderate constraint due to the legislative requirements to avoid and minimise impacts, and the potential for threatened species to occur. However, locating Project infrastructure within areas of moderate and low constraints is considered most

suitable and is likely to result in the least impacts to biodiversity values. In locating Project infrastructure in these areas, the potential for more significant or substantial impacts will be minimised and the operational phase of the wind farm is less likely to be subject to ongoing impact minimisation measures, such as curtailment strategies. Assessment of collision risk is required, however the potential for significant risk and impact will be reduced and mitigated against. Finalisation of land category mapping will assist in determining the lowest impact placement of Project infrastructure.

5.2 Avoidance and minimisation of impacts

As outlined above, the avoidance and minimisation of impacts to biodiversity values is a requirement under both State and Commonwealth legislation and will be implemented as the Project design evolves. Constraints mapping to inform design will be refined in winter-spring 2024 as the BDAR survey program commences. This refined mapping will ensure avoidance and minimisation principles are applied to the Project, including consideration of (see further detail in Section 6.1):

- Locating works and infrastructure in areas of Category 1 Land, subject to validation.
- Refinement in turbine numbers and locations.
- Avoiding Plains Wanderer mapped important habitat.
- Minimising WTG locations and civil works in High Constraint areas that support TECs, where practical.
- Providing appropriate WTG buffers and setbacks from wetland and woodland habitats, and the adjacent Banandra Precinct of the Murrumbidgee Valley National Park.
- Providing flight paths and movement corridors for aerial species to minimise the barrier effect of the Project.



Legend

- Project area
- Wind turbine location
- Mast
- Easement
- Ancillary infrastructure
- Not field validated

Civil constraint

- Low constraint
- Moderate constraint
- High constraint
- Very high constraint (Plains Wanderer mapped habitat)

WTG constraint

- High constraint
- Very high constraint (Plains Wanderer mapped habitat)

Figure 4 Avoid and minimise biodiversity constraints

0 0.5 1 1.5 2 2.5

Kilometers

Scale: 1:55,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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Matter: 40518,
Date: 08 July 2024 ,
Prepared for: NL, Prepared by: AM, Last edited by: lharley
Layout: 40518_F4_Constraints
Project: P:\40500s\40518\Mapping\
40518_Devlin's Bridge WF Prelim Biodiversity Assessment.aprx

Acknowledgements: Basemap © Land and property Information 2016, Imagery Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

5.3 SAII species and communities

Serious and Irreversible impacts (SAII) are defined by the BC Act as an impact that a consent authority considers likely to significantly increase the extinction risk of a threatened species or ecological community. Under section 9.1 of the BAM, the consent authority is responsible for determining if a SAII impact is likely to occur. This assessment includes:

- Identifying every potential SAII entity that may occur.
- Evaluating the nature of the impact on each entity.
- Documenting efforts to avoid and minimise impacts on biodiversity in accordance with the assessment criteria.

The BAM assessment pathway will determine the presence of SAII species and communities within the Project area. The SAII species and communities that have the potential to occur within the Project area. These include:

- Claypan Daisy.
- Sand-hill Spider Orchid.
- Plains Wanderer.
- White Box Yellow Box Blakely's Red Gum Woodland.

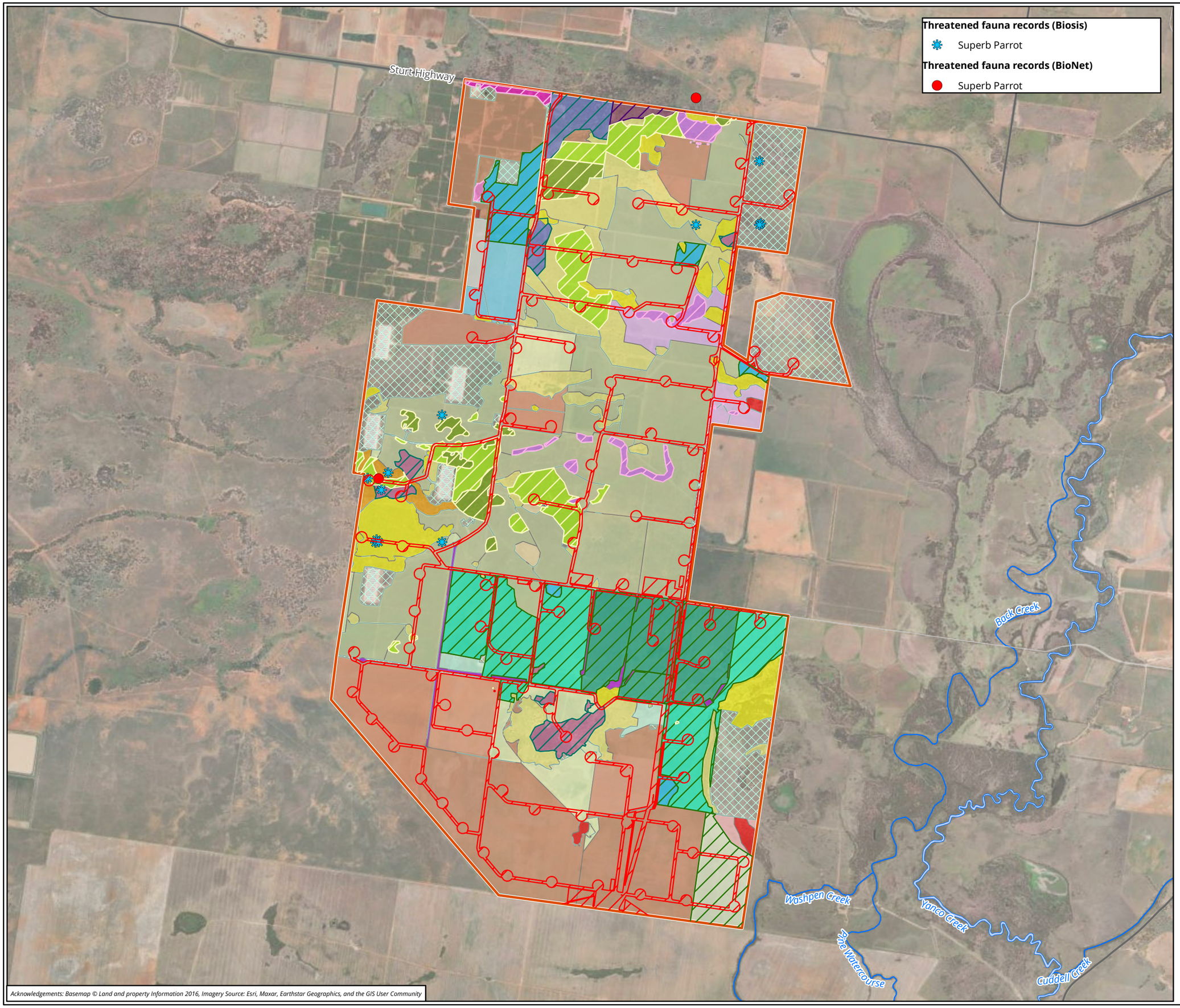
The potential for SAIIs will be further investigated as part of the preparation of a BDAR. Plains Wanderer Important Areas occur adjacent to the Project area, but not within the indicative development footprint (Figure 4).

5.4 Estimated direct impacts to biodiversity values

An indicative development footprint has been produced by applying a buffer to the preliminary Project design, such as roads, trenches and turbines. The resultant development footprint (approximately 640 hectares) has been assessed for preliminary impacts to vegetation, which are estimated in Table 6 below. These impacts are based on Jacobs' preliminary PCT mapping and Stromlo Energy's preliminary development footprint, both of which will be subject to further refinement throughout the BDAR process. It is important to note that the Project design is anticipated to represent less than 30% of the indicative development footprint, however, the final design remains undetermined until all site assessments are completed. The majority of the indicative development footprint, roughly 70%, is to be used as micro-siting allowance to provide flexibility in siting project infrastructure to avoid direct impacts. Accordingly, the final Project design should present a significantly lower impact than those estimated below (which consider the entire indicative development footprint). The development footprint considered includes ancillary infrastructure, a 40 metre diameter buffer on construction easements and an approximately 170 metre buffer on each WTG location (Figure 5).

Table 6 Estimated direct impacts of the Project

Biodiversity value	Estimated impacts indicative development footprint
Native vegetation	
• 12 PCTs (based on rapid field validation survey).	• 390.99 ha (approx.)
TECs	
• Weeping Myall Woodlands (PCT 26). • Sandhill Pine Woodland (PCTs 19 & 28). • Box Gum Woodland (PCTs 74 & 75). • Grey Box (*Eucalyptus microcarpa*) Grassy Woodland (PCT 80). • Potential Natural Grasslands of the Murray Valley Plains (PCTs 44, 45 & 46).	• 33.15 ha (approx.) • 12.48 ha (approx.) • 19.50 ha (approx.) • 0 ha • 108.21 ha (approx.)
Potential SAII candidate species habitat	
• Mueller Daisy. • Sand-hill Spider Orchid. • Plains Wanderer.	• 119.46 ha of potential habitat (approx.) • 5.68 ha of potential habitat (approx.) • 119.46 ha of potential habitat (approx.)



Legend

- Project area
- Indicative development footprint
- Vegetation to be confirmed

Vegetation zones (Jacobs)

- Introduced
- Non-native / cropping
- PCT 10, High
- PCT 10, Low
- PCT 10, Planted natives
- PCT 13, High
- PCT 13, Mod
- PCT 16, High
- PCT 16, Moderate
- PCT 19, High
- PCT 26, Derived
- PCT 26, High
- PCT 26, Low
- PCT 26, Moderate
- PCT 28, Mod
- PCT 44, High
- PCT 44, Low
- PCT 44, Moderate
- PCT 45, Low
- PCT 45, Moderate
- PCT 46, Moderate
- PCT 74, Derived
- PCT 74, Moderate
- PCT 74, Planted natives
- PCT 75, High
- PCT 75, Moderate
- PCT 80, Moderate

Potential Commonwealth TECs (EPBC Act)

- Weeping Myall Woodlands (Endangered)
- Natural Grasslands of the Murray Valley Plains (Critically Endangered)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered)
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grassland of South-eastern Australia (Critically Endangered)

Potential State TEC (BC Act)

- Sandhill Pine Woodland (Endangered)

Figure 5 Indicative development footprint

0 0.5 1 1.5 2 2.5

Kilometers

Scale: 1:55,000 @ A3

Coordinate System: GDA2020 MGA Zone 55

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Matter: 40518,
Date: 08 July 2024 ,
Prepared for: NL, Prepared by: AM, Last edited by: lharley
Layout: 40518_F5_IndDevFootprint
Project: P:\40500s\40518\Mapping\40518_Devlin's Bridge WF Prelim Biodiversity Assessment.aprx

Acknowledgements: Basemap © Land and property Information 2016, Imagery Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

5.5 Collison risk modelling and Bird/Bat operational management plans

The overall objectives of a Bird and Bat adaptive Management Plan (BBAMP) is to provide an effective monitoring program and strategy to manage and mitigate operational issues relating to bird and bat impacts for the Project. Guided by the collision risk modelling and assessment as well as the WTG risk assessment, and importantly, additional baseline data, a detailed BBAMP will be completed prior to Project approval (based on recent feedback from BCS on current wind farm development applications). The BBAMP will need to be developed in conjunction with relevant stakeholders, to inform adaptive management measures around the potential for collision mortality, barrier effects and behavioural displacement of resident, nomadic and migratory bird and bat species.

The BBAMP will include baseline data on at-risk threatened and non-threatened bird and bat species that could potentially be affected. One of the key objectives for the collection of detailed baseline data is to gather adequate information, that can be replicated, on the existing bird and bat species abundance prior to commencement of construction of the wind farm. This includes the setup of impact zones and control zones that would be monitored pre-construction and upon operation for an agreed amount of time. The data collected will be utilised to detect changes in the species use of the site (including changes in activity patterns such as avoidance) post-construction and during operation of the wind farm and allow for stringent mitigation measures to be implemented.

Bird and bat utilisation surveys commenced in February 2024 with the collection of the initial summer and autumn seasonal data that will be required to inform the biodiversity impacts assessment and preparation of the BBAMP. It is intended to continue this program for two years across eight seasons.

Construction and operational management plans will all contain an adaptive management component. Adaptive management strategies will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and is key to the successful implementation of crucial objectives yet also allow flexibility to changing dynamics and ongoing feedback and results. This includes measures to monitor predicted and uncertain impacts which will trigger adaptive management actions and allow for effective and quick responses.

An overall Environmental Management Strategy (EMS) will be developed with site specific sub management plans that will entail an adaptive management strategy component. Those sub management plans in relation to biodiversity will include but are not limited to a Biodiversity Management Plan (BMP) and BBAMP.

5.6 Indirect, prescribed and uncertain impacts

Targeted surveys will be undertaken for each of the candidate species as to assess all impacts, inclusive of indirect, prescribed and uncertain impacts. The targeted surveys will:

- Use methods appropriate for the species being targeted.
- Be performed at times of the year appropriate for identifying the species.
- Be based on a repeatable method for inclusion in any ongoing monitoring program post-approval.

Based on the outcomes of the targeted surveys, the BDAR will include:

- Maps of the predicted and habitual flight paths for nomadic and migratory species likely to fly over the Project area.
- Maps of the likely habitat for resident threatened aerial and raptor species.

Where a proposed project is a wind farm, prescribed impacts listed for collision risk in Section 6.1.5 of the BAM applies. During the preparation of the BDAR, a candidate list of species that may use the Project area as a flyway or migration route will be identified including:

- Resident threatened aerial species (such as Major Mitchell's Cockatoo, Little Eagle, Little Pied Bat).
- Resident raptor species (such as Black Kite, Spotted Harrier, Whistling Kite, Wedge-tailed Eagle, Brown Falcon).
- Nomadic and migratory species that are likely to fly over the Project area or periodically breed within the locality (such as Brolga, Curlew Sandpiper, White-throated Needletail, Latham's Snipe).

As outlined above there are potential seasonal risks associated with increased abundance of birds, particularly waterbirds in the region, and this may result in impact minimisation measures being required such as to curtail high risk WTGs seasonally or periodically.

The survey requirements pre-construction include the collection of baseline data. The survey requirements through operation can be intensive and will form a component of the biodiversity management of the approved Project.

6 Recommendations

6.1 Recommendations and design considerations

The results of preliminary and future field surveys will be used to continue to guide the design for the Project. Avoiding and minimising impacts to biodiversity will be considered further during detailed design revisions and will be developed in consultation with relevant stakeholders and government agencies. Specific considerations will include:

- Avoidance and minimisation of impacts to potential SAII entities.
- Clearing of native vegetation to the minimum extent necessary.
- Minimising Project infrastructure in High Constraint areas to reduce direct and indirect impacts such as:
  - Minimising WTGs in areas associated with treed wetlands (PCTs 10, 13 and 16) and woodlands (PCTs 19, 26 28, 74, 75 and 80) to minimise the potential for waterbird, bird and bat collisions, as well as to minimise the potential for impacts to breeding habitat.
  - Minimising placement of all infrastructure types in mapped TECs and threatened species habitat / populations, to reduce potential impacts to highly sensitive biodiversity values and to ensure application of the avoid and minimise principles.
- Development of impacts minimisation strategies including consideration of WTG-free buffer zones (flyways) through the Project area, between wetlands (stepping-stones), and other habitat feature during project design.
- Minimisation of impacts in areas of good condition native vegetation and habitats.
- Minimisation of impacts to habitat / paddock trees and hollow-bearing trees as far as practicable.
- Avoidance of areas of greater collision risk to resident birds and bats and migrating species as far as practicable.
- Cross reference with other site/value-based constraints – e.g. Aboriginal cultural heritage values and flood prone areas.

As part of the Project BDAR, detailed ecological surveys, investigations and assessments will be undertaken including:

- Refined PCT/vegetation condition mapping.
- Collection of floristic plot data.
- Refined mapping and confirmation of extent of all TECs present.
- Targeted surveys for candidate flora and fauna species.
- Full two-year seasonal bird and bat utilisation surveys.
- Assessment of all potential direct, indirect and prescribed impacts.
- Offset planning for any unavoidable residual impacts.

6.2 Biodiversity offsets

The BOS and EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012) will apply to the assessment, generating an offset requirement for the Project. Establishment of Biodiversity Stewardship Sites, in combination with purchasing credits from the Biodiversity Conservation Trust (BCT), may be the most appropriate offset strategy for the Project and for achieving local biodiversity outcomes. Biodiversity Stewardship Site establishment can be completed by procuring land that has the potential to generate the required biodiversity credits, or negotiating with landholders to manage an offset site on their land, on their behalf whilst the Project is operational. The Project offset strategy will be confirmed during the EIS process.

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Appendices

Appendix 1 Flora species and TEC likelihood of occurrences

Threatened flora species and ecological communities

The following table includes a list of the threatened flora species and ecological communities that have potential to occur within the Project area. The list of species is sourced from the NSW BioNet Wildlife Atlas and the Protected Matters Search Tool (DCCEEW; accessed on 06/05/2024).

Examples of criteria for determining the likelihood of occurrence for threatened biota as a guide for writing the rationale for likelihood have been listed below.

Likelihood of occurrence	Potential criteria
High	• Species/ecological communities recorded in Project area during current or previous assessment/s. • Aquatic species recorded from connected waterbodies in close proximity to the Project area during current or previous assessment/s. • Sufficient good quality habitat is present in Project area or in connected waterbodies in close proximity to the Project area (aquatic species). • Project area is within species natural distributional range (if known). • Species has been recorded within 10 km or from the relevant catchment/basin.
Medium	• Records of terrestrial biota within 10 km of the Project area or of aquatic species in the relevant basin/neighbouring basin. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within 10 km of the Project area or for aquatic species, the relevant basin/neighbouring basin. • Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in Project area. • Habitat for aquatic species not present in connected waterbodies in close proximity to the Project area. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Table 7 Threatened flora species recorded or predicted to occur within 10 km of the Project area

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in Project area	Rationale for likelihood ranking	Habitat description*
		EPBC	BC				
Austrostipa wakoolica	A Spear-grass	EN	EN	#	Medium	Habitat present however no records within 10 km of the Project area.	Densely-tufted perennial grass restricted to the Murray River tributaries of central-western and south-western NSW. Grows on floodplains, on the edges of lignum swamp, creek banks and lignum sandy-loam flats in a variety of communities including Western Slopes Dry Sclerophyll Forests, Floodplain Transition Woodlands, Riverine Plain Woodlands and Western Peneplain Woodlands. Grows in a variety of soils including silty clays and sandy loams.
Brachyscome muelleroides	Mueller Daisy	VU	VU	#	Medium	Habitat present however no records within 10 km of the Project area.	Annual herb distributed throughout the Wagga Wagga, Narrandera, Tocumwal and Walbundrie areas. Found growing in damp areas, depressions, claypan margins, and lagoon margins in Riverine Plain Grasslands and Inland Floodplain Swamps. Grows in muds derived from heavy clay.
Brachyscome papillosa	Mossgiel Daisy	VU	VU	#	Low	Habitat not present and no records within 10 km of the Project area. Project area is on the edge of species distribution.	Multistemmed perennial herb endemic to NSW, primarily distributed throughout the Riverina bioregion with one site occurring in the South Western Slopes. Grows on Saltbush plains in a variety of communities including Aeolian Chenopod Shrublands, Inland Floodplain Shrublands, Riverine Plain Grasslands and Inland Saline Lakes. Grows in clay soils.
Caladenia arenaria	Sand-hill Spider-orchid	EN	EN	#	Medium	Habitat present however no records within 10 km of the Project area.	Small orchid, found in the Riverina between Urana and Narrandera. Grows in woodland and on sandhills associated with White Cypress Pine Callitris glaucophylla in Floodplain Transition Woodlands and

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in Project area	Rationale for likelihood ranking	Habitat description*
		EPBC	BC				Riverine Sandhill Woodlands. Grows in sand soils.
Caladenia xanthochila	Yellow-lip Spider-orchid	EN		#	Low	Habitat present in Project area however only one record in NSW.	The Yellow-lip Spider-orchid is a terrestrial deciduous orchid endemic to southern Australia. This orchid grows in eucalypt woodland on sandy soils. This species flowers in late August and September and remains dormant through warmer months.
Cullen parvum	Small Scurf-pea		EN	2014	Medium	Records within 10 km of the Project area.	Small shrub recorded from two locations, once in 1884 in Wagga Wagga and the other in 1967 in Jindera near Albury. Found in grassland or understorey in areas that experience between 450 - 700mm of rainfall per year such as Inland Riverine Forests, Riverine Plain Grasslands, Floodplain Transition Woodlands and Western Slopes Grassy Woodlands.
Lepidium monoplocoides	Winged Pepper-cress	EN	EN	#	Medium	Habitat present however no records within 10 km of the Project area.	Erect, annual herb with populations sparsely scattered throughout a widespread distribution spanning the semi-arid western plains. Historical records are numerous although recent records are confined to two collections from Broken Hill, in 1915 and 1950. Grows in areas receiving between 300 mm to 500 mm annual rainfall on periodically inundated and waterlogged habitats in a variety of communities including Inland Floodplain Shrublands, Floodplain Transition Woodlands, Inland Saline Lakes, Sand Plain Mallee Woodlands and Western Peneplain Woodlands. Grows on waterlogged grey-brown clays
Maireana cheelii	Chariot Wheels	VU	VU	#	Low	Habitat not present within Project area.	Small perennial forb restricted to the southern Riverina region of NSW between

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in Project area	Rationale for likelihood ranking	Habitat description*
		EPBC	BC				
							Deniliquin and Hay. Also found on Fraser Island. Grows in shallow depressions, on eroded or scalded surfaces or on the edge of windswept claypans in association with Bladder Saltbush Atriplex vesicaria in a variety of communities including Riverine Chenopod Shrublands, Riverine Plain Grasslands, Gibber Transition Shrublands, North-west Floodplain Woodlands, and Inland Saline Lakes. Grows on heavy grey clays, brown to red-brown clay-loams, or hard cracking red clay soils.
Sclerolaena napiformis	Turnip Copperburr	EN	EN	#	Low	No records within 10 km of the Project area. Habitat theoretically present within Project area however distribution trends suggest species restricted to south-west of the Project area between Jerilderie and Moama.	Small subshrub known from a few populations in the southern Riverina between Jerilderie and Moama primarily in Travelling Stock Routes and Road Reserves and also in north-central Victoria. Found growing on level plains in remnant grassland habitats including those subject to grazing in Riverine Plain Grasslands and Riverine Plain Woodlands. Grows in clay loam soils.
Swainsona murrayana	Slender Darling-pea, Slender Swainson, Murray Swainson-pea	VU	VU	#	Medium	Habitat present however no records within 10 km of the Project area. Species distribution is generally widespread throughout the broader area.	Small sparsely downy forb distributed between Jerilderie and Deniliquin areas of the southern Riverine Plain as far north as Willandra National Park, near Broken Hill and between Dubbo and Mudgee. Found growing on level plains, floodplains and depressions in a variety of communities including Riverine Chenopod Shrublands, Semi-arid Floodplain Shrublands, Western Slopes Grasslands, Brigalow Clay Plain Woodlands, Riverine Plain Woodlands and Inland Saline Lakes. Grows in heavy clay based soils ranging from grey, red

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in Project area	Rationale for likelihood ranking	Habitat description*
		EPBC	BC				and brown cracking clays to red-brown earths and loams.
Swainsona plagiotropis	Red Darling-pea, Red Swainson-pea	VU	VU	#	Low	No records within 10 km of the Project area. Species more suited to semi-arid floodplain areas of the Hay Plains.	Small prostrate forb sparsely distributed between Jerilderie and the Louth-Bourke area with a disjunct population occurring in the north-western plains from Buttabone Stud Park ~35 kilometres west of Warren. Found growing on roadsides, rail reserves, stock routes, grasslands and in table drains in Riverine Plain Grasslands, Riverine Chenopod Shrublands, Semi-arid Floodplain Grasslands and Riverine Plain Woodlands. Grows in heavy red-brown clay-loam soils.
Swainsona sericea	Silky Swainson-pea		VU	2000	High	Records within 10 km of Project area. Habitat present within Project area and species known to occur in a wide variety of habitats.	Small prostrate or erect perennial herb with a distribution spanning from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains with an additional outlying population in the far north-west of NSW. Found growing in a variety of communities including Natural Temperate Grasslands, Snow Gum Eucalyptus pauciflora Woodlands on the Monaro, Box-Gum Woodland, New England Dry Sclerophyll Forests, North-west Slopes Dry Sclerophyll Woodlands, North-west Plain Shrublands, Western Slopes Grasslands, Floodplain Transition Woodlands and Subalpine Woodlands.

* - habitat descriptions have been adapted by qualified ecologists from the DCCEEW Species Profile and Threats (SPRAT) Database, Threatened Species online profiles and the NSW Scientific Committee final determinations for listed species, references within the above table are provided within the report reference list.

Table 8 Threatened ecological communities recorded or predicted to occur within 10 km of the Project area (including EPBC Act and BC Act equivalent TECs)

Scientific name	Conservation status		Likely occurrence in Project area	Rationale for likelihood ranking
	EPBC	BC		
Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions	Not Listed	Endangered Ecological Community	Low	No *Acacia melvillei* were observed during Jacobs' preliminary field investigations. PCT 28 is mapped within the Project area, however is unlikely associated with this PCT primarily due to the lack of *A. melvillei.*
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered Ecological Community	-	Low	No PCTs associated with this TEC were mapped within the Project area. *Allocasuarina luehmannii* was observed across the Project area, however only in association with other PCTs that are not consistent with this PCT.
Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions	-	Endangered Ecological Community	Low	No PCTs associated with this TEC were mapped within the Project area. *Allocasuarina luehmannii* was observed across the Project area, however only in association with other PCTs that are not consistent with this PCT.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered Ecological Community	-	High	PCT 80 is present in the north of the Project area. PCT 80 is likely associated with this TEC.
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	-	Endangered Ecological Community	High	PCT 80 is present in the north of the Project area. PCT 80 is likely associated with this TEC.
Weeping Myall Woodlands	Endangered Ecological Community	-	High	Much of the Project area is covered by PCT 26 in various conditions. It is possible that 'high' and 'moderate' condition vegetation zones within the Project area would meet the listing requirements of this TEC.
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	-	Endangered Ecological Community	High	Much of the Project area is covered by PCT 26 in various conditions. It is possible that 'high' and 'moderate' condition vegetation zones within the Project area would meet the listing requirements of this TEC.

Scientific name	Conservation status		Likely occurrence in Project area	Rationale for likelihood ranking
	EPBC	BC		
Natural Grasslands of the Murray Valley Plains	Critically Endangered Ecological Community	Not Listed	Medium (subject to mapping and assessment against key diagnostics)	PCTs 44, 45 and 46 are mapped within the Project area and are associated with this TEC. However confirmation of this TEC within the Project area must be made through detailed vegetation assessments in accordance with the TEC listing during late winter-spring.
Poplar Box Grassy Woodland on Alluvial Plains	Endangered Ecological Community	Not Listed	Low	The Project area is south of Leeton and no *Eucalyptus populnea* was recorded. The Project area is likely outside the described range and the key species is absent.
Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions	Not Listed	Endangered Ecological Community	High	PCT 19 and 28 are mapped within the Project area. It is likely that these vegetation zones would meet the listing requirements of this TEC.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered Ecological Community	-	High	PCT 74 and 75 are mapped within the Project area. As this TEC can be present as a derived community as well as woodland, most of the mapped areas (except those mapped as planted) may be consistent with this TEC.
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, South Western Slopes, South East Corner and Riverina Bioregions.	-	Critically Endangered	High	PCT 74 and 75 are mapped within the Project area. As this TEC can be present as a derived community as well as woodland, most of the mapped areas (except those mapped as planted) may be consistent with this TEC.

Appendix 2 Threatened and migratory fauna

Fauna species recorded from the Project area

Below is a list of fauna species recorded from the Project area during recent field assessments.

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

Notes to table:

Status – EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable MA - Marine	**Status – BC Act:** E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)
	Status – Non-indigenous species * pest species not native to the area

Table 9 Vertebrate fauna recorded from the Project area (Summer 2024 BBUS)

Scientific name	Common name	Commonwealth status	NSW status
Birds			
Anthus novaeseelandiae	Australasian Pipit	-	-
Aquila audax	Wedge-tailed Eagle	-	-
Ardea pacifica	White-necked Heron	-	-
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	VU
Artamus personatus	Masked Woodswallow	-	-
Barnardius zonarius	Australian Ringneck	-	-
Cacatua galerita	Sulphur-crested Cockatoo	-	-
Coracina novaehollandiae	Black-faced Cuckoo-shrike	-	-
Corcorax melanorhamphos	White-winged Chough	-	-
Corvus coronoides	Australian Raven	-	-
Corvus mellori	Little Raven	-	-
Cracticus nigrogularis	Pied Butcherbird	-	-
Cracticus torquatus	Grey Butcherbird	-	-
Elanus axillaris	Black-shouldered Kite	-	-
Eolophus roseicapilla	Galah	-	-
Falco berigora	Brown Falcon	-	-
Falco cenchroides	Nankeen Kestrel	-	-
Gavicalis virescens	Singing Honeyeater	-	-

Scientific name	Common name	Commonwealth status	NSW status
Grallina cyanoleuca	Magpie-lark	-	-
Gymnorhina tibicen	Australian Magpie	-	-
Haliastur sphenurus	Whistling Kite	-	-
Hirundo davurica	Red-rumped Swallow	-	-
Hirundo neoxena	Welcome Swallow	-	-
Manorina melanocephala	Noisy Miner	-	-
Merops ornatus	Rainbow Bee-eater	-	-
Milvus migrans	Black Kite	-	-
Northiella haematogaster	Blue Bonnet	-	-
Ocyphaps lophotes	Crested Pigeon	-	-
Pachycephala rufiventris	Rufous Whistler	-	-
Pardalotus striatus	Striated Pardalote	-	-
Platycercus elegans	Crimson Rosella	-	-
Platycercus eximius	Eastern Rosella	-	-
Polytelis swainsonii	Superb Parrot	VU	VU
Pomatostomus temporalis temporalis	Grey-crowned Babbler	-	VU
Psephotus haematonotus	Red-rumped Parrot	-	-
Rhipidura leucophrys	Willie Wagtail	-	-
Sturnus vulgaris	Common Starling	-	*

Table 10 **Likelihood of occurrence for threatened fauna and preliminary collision risk assessment for threatened birds and bats, overall risk is based on expert opinion using a combination of the species' predicted occurrence within the Project area and current understanding of each species' habitat use and vulnerability to wind turbine collisions.**

Scientific Name	Common Name	Conservation status		Most recent record	Credit type (candidate, ecosystem, dual)	SAII	Migratory, nomadic, vagrant	Likely occurrence in Project area	Collision risk	Overall species risk	Rationale for likelihood ranking	Habitat description*
		EPBC	BC									
Birds												
Actitis hypoleucos	Common Sandpiper	Mi		1990#		n/a	Migratory	Low	Moderate	Low	Mainly coastal, Project area inland with limited wetland habitat, may occur occasionally, or fly over during migration or between waterbodies surrounding Project area, recorded nearby.	Inhabits a wide range of coastal and inland wetlands, often with muddy or rocky margins. Also known to occur at estuaries, billabongs, dams, pools and lakes, often associated with mangroves.
Aphelocephala leucopsis	Southern Whiteface	VU	VU	#		n/a		High	Low	Low	Suitable woodland habitat present.	Southern whitefaces occupy open acacia or eucalypt-dominated woodlands and shrublands on ranges, foothills, lowlands, and plains. This species favours open woodlands and shrublands with low tree densities and a herbaceous litter cover or grassy understory.
Anseranas semipalmata	Magpie Goose		VU	2023	Ecosystem credit (Predicted)	No	Nomadic	Low	High	Moderate	Project area with limited wetland habitat, may occur occasionally, or fly over during migration or between waterbodies surrounding Project area, recorded nearby.	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. They are often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level. Nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.
Anthochaera phrygia	Regent Honeyeater	CR	CR	2016	Dual credit (Predicted and Candidate)	Yes	Nomadic	Low	Low	Low	Some potentially suitable foraging habitat, records nearby.	Regent Honeyeaters are semi-nomadic, occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. Nectar and fruit from mistletoes are also eaten. This species usually nests in tall mature eucalypts and sheoaks.
Apus pacificus	Fork-tailed Swift	Mi		2000#		n/a	Migratory, nomadic	Medium	High	High	Highly mobile, can occur throughout much of Australia. There are records of this species east of Narrandera along the Murrumbidgee River, and west of the Project area near Coleambally.	Almost exclusively aerial (foraging). The Fork-tailed Swift breeds in Asia but migrates to Australia from September to April. Individuals or flocks can be observed hawking for insects at varying heights from only a few metres from the ground and up to 300 metres high.
Arenaria interpres	Ruddy Turnstone	Mi		1992#		n/a	Migratory	Low	Moderate	Low	Coastal species, may flyover on migration.	Inhabits tidal reefs, sandy beaches mudflats and exposed or shallow seaweed beds.
Artamus cyanopterus cyanopterus	Dusky Woodswallow		VU	2017	Ecosystem credit (Predicted)	No	Nomadic	High	High	High	Suitable habitat present, recorded within Project area during BBUS.	Primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.
Botaurus poiciloptilus	Australasian Bittern	EN	EN	2023#	Ecosystem credit (Predicted)	No		Medium	High	Moderate	Mainly coastal, Project area inland with limited wetland habitat, may occur occasionally, may fly across the Project area between wetland habitats and when moving seasonally between inland and coastal habitats, breeding nearby in Coleambally and Leeton.	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including Typha spp. and *Eleocharis* spp. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.

Scientific Name	Common Name	Conservation status		Most recent record	Credit type (candidate, ecosystem, dual)	SAII	Migratory, nomadic, vagrant	Likely occurrence in Project area	Collision risk	Overall species risk	Rationale for likelihood ranking	Habitat description*
		EPBC	BC									
Burhinus grallarius	Bush Stone-curlew		EN	2005	Species credit (Candidate)	No		Medium	Low	Low	Potential habitat, nearby records.	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south east it is either rare or extinct throughout its former range. Occurs in lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present.
Calidris acuminata	Sharp-tailed Sandpiper	Mi		2023#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	This species is a migratory visitor to Australia and spends its breeding season in Siberia. In the non-breeding season, the Sharp-tailed Sandpiper is known to occur mostly in the south-east of Australia, but has been found on coastlines all throughout the country.
Calidris canutus	Red Knot	EN, Mi		1997		No	Migratory	Low	Moderate	Low	Coastal species, may flyover on migration.	Typically located within intertidal mudflats, sandflats and sandy beaches of sheltered coasts. Occasionally found on sandy open beaches or shallow pools, or in saline wetlands close to the coast.
Calidris ferruginea	Curlew Sandpiper	CR, Mi	EN	2018#	Dual credit (Predicted and Candidate)	Yes	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Inhabits sheltered intertidal mudflats. Also non-tidal swamps, lagoons and lakes near the coast. Infrequently recorded inland.
Calidris melanotos	Pectoral Sandpiper	Mi		2018#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration, uncommon.	Scarce, but regular visitor, usually recorded in summer from November to March. Widespread but scattered records in Australia. Usually found in fresh to saline wetlands, floodplains, swamps, estuaries and lagoons, sometimes with emergent or fringing vegetation such as grass.
Calidris ruficollis	Red-necked Stint	Mi		2017#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Inhabits mainly coastal environments; saltmarshes, tidal mudflats, saline and freshwater wetlands, sandy or shelly beaches and sewage ponds.
Calidris subminuta	Long-toed Stint	Mi		1992#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration, uncommon.	Inhabit coastal and inland shallow wetlands, sewage ponds and tidal mudflats.
Callocephalon fimbriatum	Gang-gang Cockatoo	EN	VU	2019	Dual credit (Predicted and Candidate)	n/a	Nomadic	Medium	Moderate	Moderate	May occasionally use woodland habitats on the site or move through the Project area.	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine Snow Gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.

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Calyptorhynchus lathami	Glossy Black-Cockatoo	VU	VU	#	Species credit (Candidate)	n/a	Nomadic	Low	Moderate	Low	Limited suitable habitat, most occurrence records north and of the Project area in forested habitats.	Inhabits forest with low nutrients, characteristically with key Allocasuarina species. Tends to prefer drier forest types. Often confined to remnant patches in hills and gullies. Breed in hollows stumps or limbs, either living or dead.
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	VU	VU	2007		No	Nomadic	Low	Moderate	Low	Limited suitable habitat, most occurrence records north and of the Project area in forested habitats.	#N/A
Certhionyx variegatus	Pied Honeyeater		VU	2023	Dual credit (Predicted and Candidate)	No	Nomadic	Low	Moderate	Low	Some potentially suitable foraging habitat, most records to the north and west of Project area.	Mainly inhabits shrublands, often dominated by or including Eremophila and grevilleas, and sometimes with an overstorey of eucalypt woodland (mallee or bloodwood) or mulga. They feed on nectar, predominately from Eremophila, but also from mistletoe and Brachysema and Grevillea shrubs. Additionally, they eat saltbush fruit, berries, seed, flowers and some insects.
Chlidonias leucopterus	White-winged Black Tern	Mi		1995		n/a	Migratory	Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly over when moving between waterbodies surrounding Project area.	Irregular summer visitor from northern Eurasia to coastal and subcoastal grassy swamps and fresh or saline wetlands of western, northern and eastern mainland Australia. Rarely recorded inland or at sea except during migration.
Chrysococcyx osculans	Black-eared Cuckoo		No match in fauna master list	#		N/A		Medium	Low	Low	Potential habitat	
Chthonicola sagittata	Speckled Warbler		VU	1994	Ecosystem credit (Predicted)	No		Low	Low	Low	Suitable habitat limited.	*Chthonicola sagittata* occurs on the hills and tablelands of the Great Dividing Range. Found in eucalypt and cypress woodlands with a grassy understorey, often on ridges or gullies. The species nests on the ground in grass tussocks, dense litter and fallen branches. They forage on the ground for arthropods and seeds.
Circus assimilis	Spotted Harrier		VU	2021	Ecosystem credit (Predicted)	No		High	Moderate	High	Suitable habitat present and likely to be extensive.	#N/A
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	VU	VU	2021#	Ecosystem credit (Predicted)	No		High	Low	Low	Suitable habitat present.	Lives in eucalypt woodlands, especially areas of relatively flat open woodland typically lacking a dense shrub layer, with short grass or bare ground and with fallen logs or dead trees present.
Daphoenositta chrysoptera	Varied Sittella		VU	2004	Ecosystem credit (Predicted)	No		High	Low	Low	Suitable habitat present, nearby records.	The Varied Sittella is a sedentary species which inhabits a wide variety of dry eucalypt forests and woodlands, usually with either shrubby understorey or grassy ground cover or both, in all climatic zones of Australia. Usually inhabit areas with rough-barked trees, such as stringybarks or ironbarks, but also in mallee and acacia woodlands, paperbarks or mature Eucalypts. The Varied Sittella feeds on arthropods gleaned from bark, small branches and twigs. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

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Epthianura albifrons	White-fronted Chat		VU	2022	Ecosystem credit (Predicted)	No		High	Low	Low	Suitable habitat present, nearby records.	In NSW it occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state. The White-fronted Chat is found in damp open habitats, particularly wetlands containing saltmarsh areas that are bordered by open grasslands or lightly timbered lands. Along the coastline, they are found in estuarine and marshy grounds with vegetation less than 1 m tall. The species is also observed in open grasslands and sometimes in low shrubs bordering wetland areas. Inland, the species is often observed in open grassy plains, saltlakes and saltpans that are along the margins of rivers and waterways. In Victoria White-fronted Chats have been observed breeding from late July through to early March. Nests are built in low vegetation and in the Sydney region nests have also been observed in low isolated mangroves. An Endangered Population occurs in the Sydney Metropolitan CMA area, at Newington Nature Reserve near Homebush and at Towra Point Nature Reserve.
Falco hypoleucos	Grey Falcon	VU	VU	1996#	Ecosystem credit (Predicted)	No		Low	High	Moderate	Occasionally wide-ranging, may on rare occasion use the Project area, or fly over.	Found over open country and wooded lands of tropical and temperate Australia. Mainly found on sandy and stony plains of inland drainage systems with lightly timbered acacia scrub.
Falco subniger	Black Falcon		VU	2019	Ecosystem credit (Predicted)	No		High	High	High	Widely ranging, nearby records	Mainly occur in woodlands and open country where can hunt. Often associated with swamps, rivers and wetlands. Nest in tall trees along watercourses.
Gallinago hardwickii	Latham's Snipe	VU, Mi	VU	2018#		n/a	Migratory	Medium	High	High	Project area with limited wetland habitat, may occur occasionally, or fly over when moving between waterbodies surrounding Project area, recorded nearby.	Typically found on wet soft ground or shallow water with good cover of tussocks. Often found in wet paddocks, seepage areas below dams.
Gelochelidon nilotica	Gull-billed Tern	Mi		2018		n/a	Migratory	Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly over when moving between waterbodies surrounding Project area, recorded nearby.	The Gull-billed Tern breeds in small colonies on small islands of shallow inland lakes. These migratory species are rarely seen over the ocean. They often nest close to inland waters, especially temporary waters on mudflats, claypans, saltpans, salt marshes and open floodplains.
Grantiella picta	Painted Honeyeater	VU	VU	2018#	Ecosystem credit (Predicted)	No		Low	Low	Low	Limited suitable habitat within Project area.	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.
Grus rubicunda	Brolga		VU	2023	Ecosystem credit (Predicted)	No		Medium	Moderate	High	Project area with limited wetland habitat, may occur occasionally, or fly over when moving between waterbodies surrounding Project area. These species has been recorded nearby along Yanco Creek, near Morundah and in the Coleambally Irrigation Area.	The Brolga has been recorded on open wetlands, shallow swamps, floodplains, paddocks, farmland and salt flats. This species nest in shallow wetlands where there is shelter such as Canegrass, Lignum or sedge swamp. They feed in or near water and have often been observed foraging in grassland, dry wetlands and cultivated areas.
Haliaeetus leucogaster	White-bellied Sea-Eagle		VU	2023#	Dual credit (Predicted and Candidate)	No		High	High	High	Project area with limited wetland habitat, may fly over when moving between waterbodies surrounding Project area, recorded nearby.	A migratory species that is generally sedentary in Australia, although immature individuals and some adults are dispersive. Found in terrestrial and coastal wetlands; favouring deep freshwater swamps, lakes and reservoirs; shallow coastal lagoons and saltmarshes. It hunts over open terrestrial habitats. Feeds on birds, reptiles, fish, mammals, crustaceans and carrion. Roosts and makes nest in trees.

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Hieraaetus morphnoides	Little Eagle		VU	2018	Dual credit (Predicted and Candidate)	No		High	High	High	Widely ranging, nearby records	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.
Hirundapus caudacutus	White-throated Needletail	VU, Mi		1996#	Ecosystem credit (Predicted)	No	Migratory	Medium	High	Moderate	Highly mobile, can occur throughout much of Australia. There are records of this species along the Murrumbidgee River just west of Narrandera within 10 km of the Project area.	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. This species roosts in trees in forests and woodlands and feeds on insects. The White-throated Needletail breeds in forests and sparse hills in Asia.
Hydroprogne caspia	Caspian Tern	Mi		2017		n/a	Migratory	Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly over when moving between waterbodies surrounding Project area, recorded nearby.	Usually coastal, with a preference for sheltered estuaries, inlets, bays, harbours, lagoons with muddy or sandy shores. Keeps close inshore, not out beyond reef line. Also extends well inland on fresh or salt lakes, temporary floodwaters, large rivers, reservoirs, sewage ponds.
Lathamus discolor	Swift Parrot	CR	EN	#	Dual credit (Predicted and Candidate)	Yes		Low	Moderate	Low	Limited suitable habitat within Project area.	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
Leipoa ocellata	Malleefowl	VU	EN	#	Ecosystem credit (Predicted)	No		Low	Low	Low	Limited suitable habitat within Project area.	The Malleefowl occurs in tall, dense mallee with a mean annual rainfall of 300 to 450mm (NPWS 1996). This species prefers areas with a light sandy to sandy loam soil, a dense but discontinuous canopy cover, dense and variable herb layer and open ground for easy of movement (NPWS 1996).
Limosa lapponica	Bar-tailed Godwit	Mi		2017#		n/a	Migratory	Low	Moderate	Low	Mainly coastal, Project area inland with limited wetland habitat, may occur occasionally, or fly over during migration or between waterbodies surrounding Project area, recorded nearby.	Coastal species, usually inhabiting intertidal sandflats, spits and banks. Less frequently found in mudflats, estuaries, coastal lagoons and harbours.
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	VU		#		No		Low	Moderate	Low	Mainly coastal, Project area inland with limited wetland habitat, may occur occasionally, or fly over during migration or between waterbodies surrounding Project area, recorded nearby.	The Bar-tailed Godwit (northern Siberian) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.

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Limosa limosa	Black-tailed Godwit	Mi	VU	2018#	Dual credit (Predicted and Candidate)	No	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. In NSW, it is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. The species has been recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state.
Lophochroa leadbeateri	Major Mitchell's Cockatoo		VU	2022	Dual credit (Predicted and Candidate)	No		Medium	Moderate	Moderate	Potential habitat likely to be present.	Found mainly in semi-arid and arid regions, in dry woodlands, particularly mallee - casuarina assemblages. They breed in the hollows of large trees, often near watercourse.
Lophochroa leadbeateri leadbeateri	Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo	EN	VU	#	Dual credit (Predicted and Candidate)	No		Medium	Moderate	Moderate	Potential habitat likely to be present.	Found mainly in semi-arid and arid regions, in dry woodlands, particularly mallee - casuarina assemblages. They breed in the hollows of large trees, often near watercourse.
Lophoictinia isura	Square-tailed Kite		VU	2021	Dual credit (Predicted and Candidate)	No		High	High	High	Potential habitat, may fly between wetland habitats.	Typically inhabits coastal forested and wooded lands of tropical and temperate Australia. In NSW it is often associated with ridge and gully forests dominated by *Eucalyptus longifolia, Corymbia maculata, E. elata*, or *E. smithii*. Individuals appear to occupy large hunting ranges of more than 100 km2. They require large living trees for breeding, particularly near water with surrounding woodland /forest close by for foraging habitat. Nest sites are generally located along or near watercourses, in a tree fork or on large horizontal limbs.
Melanodryas cucullata cucullata	South-eastern Hooded Robin		EN	2019#	Ecosystem credit (Predicted)	No		Medium	Low	Low	Potential habitat may occur in Project area.	This species lives in a wide range of temperate woodland habitats, and a range of woodlands and shrublands in semi-arid areas.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)		VU	2023	Ecosystem credit (Predicted)	No		Medium	Low	Low	Potential habitat may occur in Project area.	Found mostly in open forests and woodlands dominated by box and ironbark eucalypts. It is rarely recorded east of the Great Dividing Range.
Motacilla flava	Yellow Wagtail	Mi		#		n/a	Migratory	Low	Moderate	Low	Vagrant, mostly occurs in northern Australia, unlikely to occur.	Regular spring-summer visitor in north of Australia, rare vagrant or occasional visitor farther south. Found in marshes, damp paddocks, airfields, cultivated fields, lawns and estuaries.
Myiagra cyanoleuca	Satin Flycatcher	Mi		#	n/a	n/a	Migratory	Low	Moderate	Low	Scattered records within 25 km of the site, may very occasionally move through the site to forage in woodlands during migration.	Migratory species that occurs in coastal forests, woodlands and scrubs during migration. Breeds in heavily vegetated gullies.

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		EPBC	BC									
Neophema chrysostoma	Blue-winged Parrot	VU	VU	2009#	n/a	No		Low	Moderate	Low	Limited potential habitat may occur.	The Blue-winged Parrot is a small parrot found in Tasmania and southeast mainland Australia. Some populations are known to migrate to Tasmania from the mainland during summer months. The species feeds predominantly on the ground, and occurs in savannah woodlands and grasslands.
Neophema pulchella	Turquoise Parrot		VU	2021	Ecosystem credit (Predicted)	No		Low	Moderate	Low	Limited potential habitat may occur.	Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs. Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies. Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies that are moist.
Ninox connivens	Barking Owl		VU	2004	Dual credit (Predicted and Candidate)	No		Low	Moderate	Moderate	Limited potential habitat may occur.	Generally found in open forests, woodlands, swamp woodlands, farmlands and dense scrub. Can also be found in the foothills and timber along watercourses in otherwise open country. Territories are typically 2000 ha in NSW habitats. Hunts small arboreal mammals or birds and terrestrial mammals when tree hollows are absent.
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	CR, Mi		#		n/a	Migratory	Low	Moderate	Low	Mainly coastal, Project area inland with limited wetland habitat, may fly over during migration or between waterbodies surrounding Project area, recorded nearby.	Occurs in sheltered coasts, especially estuaries, embayments, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats often with beds of seagrass.
Numenius minutus	Little Curlew	, Mi		1995		n/a	Migratory	Low	Moderate	Low	Can occur inland plains and wetlands, rare and uncommon in southern Australia, mostly occurs in northern Australia, coasts, estuaries and inland.	Short, dry grasslands and sedgelands, including dry floodplains and black soil plains, which have scattered, shallow freshwater pools. Mostly feed in dry grassland or sedgeland, either natural or artificial. Foraging sites usually occur within 5km of daytime roosting sites.
Oxyura australis	Blue-billed Duck		VU	2023	Ecosystem credit (Predicted)	No		Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly between waterbodies surrounding Project area, recorded nearby.	The Blue-billed Duck is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only seen in coastal areas during summer. Prefers large permanent wetlands, feeding on the bottom of swaps.
Pachycephala inornata	Gilbert's Whistler		VU	1982	Ecosystem credit (Predicted)	No		Low	Low	Low	Limited potential habitat may occur.	The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia. The preferred habitat for this species is mallee often in association with spinifex. It has also been recorded in Belah, Riverine Black Box and Lignum vegetation communities with a mixture of dense shrubs.
Pedionomus torquatus	Plains-wanderer	CR	EN	2014#	Dual credit (Predicted and Candidate)	Yes		High	Low	Low	Grassland habitat present	Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. Habitat structure appears to be more important than plant species composition. Preferred habitat typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. They have been recorded in some agricultural land including unimproved pasture, and cropping on long rotation.
Petroica boodang	Scarlet Robin		VU	2015	Ecosystem credit (Predicted)	No		Medium	Low	Low	Potential habitat may occur in Project area.	The Scarlet Robin inhabits dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. During autumn and winter it moves to more open and cleared areas. The Scarlet Robin forages amongst logs and woody debris for insects. The nest is an open cup of plant fibres and cobwebs, sited in the fork of a tree.

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Petroica phoenicea	Flame Robin		VU	2003	Ecosystem credit (Predicted)	No		Medium	Low	Low	Potential habitat may occur in Project area.	Flame Robins are found in a broad coastal band from southern Queensland to just west of the South Australian border. The preferred habitat in summer includes moist eucalyptus forests and open woodlands, in winter prefers open woodlands and farmlands. It is considered migratory. Diet consists mainly of invertebrates.
Pezoporus occidentalis	Night Parrot	EN	Presumed Extinct	#		No		Low	Low	Low	No mapped potential habitat	The Night Parrot is known to occur within Spinifex grasslands in stony or sandy areas and samphire and chenopod associations on floodplains, salt lakes and clay pans. Suitable habitat is characterized by the presence of large and dense clumps of Spinifex, and it may prefer mature spinifex that is long and unburnt. The Night Parrot builds its nest which consists of a few small sticks at the end of a 'tunnel' that is formed in a Spinifex tussock or a small bush. Up to four white eggs are laid in this nest. Some unconfirmed reports have claimed that the Night Parrot may nest or roost in caves, and one unverified source claimed that it may also excavate burrows in sandy soils.
Philomachus pugnax	Ruff	Mi		1986#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Rare migrant from northern Eurasia regularly visits fresh, brackish or saline wetlands with exposed mudflats at edges, usually terrestrial but sometimes found in sheltered coast habitats.
Pluvialis fulva	Pacific Golden Plover	Mi		2018#		n/a	Migratory	Low	Moderate	Low	Uses coastal habitats in Australia, may flyover on migration.	Migratory species that visits estuaries mudflats, saltmarshes and ocean shores as well as paddocks, grasslands and swamps near the coast.
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	VU	EN	2021	Dual credit (Predicted and Candidate)	No		Low	Moderate	Low	Limited suitable habitat, core distribution to the west along River Red Gum forests.	In southeast Australia they are found in riparian or littoral River Red Gum forests, adjacent Black Box woodlands, and in nearby open mallee woodland or shrubland, as well as Belah, Buloke or Slender Cypress Pine. Moves between the riverine nesting habitat and foraging sites along corridors of natural vegetation.
Polytelis swainsonii	Superb Parrot	VU	VU	2023#	Dual credit (Predicted and Candidate)	No		High	High	High	Suitable habitat, recorded within Project area during BBUS.	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Forages primarily in grassy box woodland, feeding in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)		VU	2022	Ecosystem credit (Predicted)	No		High	Low	Low	Recorded within Project area during BBUS.	The eastern sub-species occurs on the western slopes of the Great Dividing Range, the western plains, woodlands in the Hunter Valley and locations on the north coast of NSW. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine, open Box Woodlands on alluvial plains and woodlands on fertile soils in coastal regions. Feeds on invertebrates and builds dome-shaped nests.
Pyrrholaemus brunneus	Redthroat		VU	2023	Ecosystem credit (Predicted)	No		Low	Low	Low	No, to limited suitable habitat, core distribution to the west.	Occurs mostly in acacia and chenopod shrublands, often along watercourses or drainage lines in arid and semi-arid areas. Also in eucalypt woodlands (including mallee), Belah, Lignum, spinifex eucalypt regrowth, Tea-tree and bluebush.
Rostratula australis	Australian Painted Snipe	EN	EN	2014#	Ecosystem credit (Predicted)	No		Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly between waterbodies surrounding Project area.	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, but have been recorded in brackish waters. Forages on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.

Scientific Name	Common Name	Conservation status		Most recent record	Credit type (candidate, ecosystem, dual)	SAII	Migratory, nomadic, vagrant	Likely occurrence in Project area	Collision risk	Overall species risk	Rationale for likelihood ranking	Habitat description*
		EPBC	BC									
Stagonopleura guttata	Diamond Firetail	VU	VU	2008#	Ecosystem credit (Predicted)	No		High	Low	Low	Suitable habitat, nearby records	The Diamond Firetail is widely distributed, found in a range of habitat types including open eucalypt forest, mallee and acacia scrubs. Often occur in vegetation along watercourses. Feeds exclusively on the ground on ripe grass and herb seeds, green leaves and insects.
Stictonetta naevosa	Freckled Duck		VU	2018	Ecosystem credit (Predicted)	No		Low	Moderate	Low	Project area with limited wetland habitat, may occur occasionally, or fly over between waterbodies surrounding Project area, recorded nearby.	The Freckled Duck breeds in permanent fresh swamps that are heavily vegetated. Found in fresh or salty permanent open lakes, especially during drought. Often seen in groups on fallen trees and sand spits.
Tringa glareola	Wood Sandpiper	Mi		2018#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Freshwater swamps, lakes, flooded pasture; less frequently on brackish waters, occasionally in mangroves.
Tringa nebularia	Common Greenshank	Mi		2017#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Widely distributed throughout a range of inland wetlands and sheltered coastal habitats. Occurs in habitats with varying salinity.
Tringa stagnatilis	Marsh Sandpiper	Mi		2019#		n/a	Migratory	Low	Moderate	Low	Uses inland wetlands, limited wetland habitat in Project area, may occur occasionally when wetlands on site are inundated, may fly over when moving between wetland habitats and on migration.	Inhabits permanent or ephemeral wetlands, including swamps, billabongs, lagoons, saltmarshes and estuaries. Forages at the edge of wetlands in shallow water.
Tyto novaehollandiae	Masked Owl		VU	2024	Dual credit (Predicted and Candidate)	No		Low	Moderate	Moderate	Limited suitable habitat	The Masked Owl is found in range of wooded habitats that provide tall or dense mature trees with hollows suitable for nesting and roosting. It is mostly seen in open forests and woodlands adjacent to cleared lands. Prey includes hollow-dependent arboreal marsupials and terrestrial mammals.
Mammals												
Chalinolobus picatus	Little Pied Bat		VU	2015	Ecosystem credit (Predicted)	No		Medium	Moderate	Moderate	Woodland and open farmland habitat present	Occurs in mallee, dry open forest and woodland. This species roost mainly in tree hollows, but may also roost in abandoned buildings. It often occurs in areas of highly ephemeral surface water, and may travel up to 34 km in a night between the roost and water sources.
Myotis macropus	Southern Myotis		VU	2005	Species credit (Candidate)	No		Medium	Low	Moderate to low	Woodland and open farmland habitat present	Scattered, mainly coastal distribution extending to South Australia along the Murray River. Roosts in caves, mines or tunnels, under bridges, in buildings, tree hollows, and even in dense foliage. Colonies occur close to water bodies, ranging from rainforest streams to large lakes and reservoirs. They catch aquatic insects and small fish with their large hind claws, and also catch flying insects.
Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	VU	VU	#	Ecosystem credit (Predicted)	No		Medium	Low	Moderate to low	Black Box Woodland and open farmland habitat present	Restricted to the Murray-Darling basin and western slopes. Found in a range of habitats including tall Eucalypt forests, mallee, open savanna and Black Box woodland, preferring habitats with a distinct canopy and cluttered, dense understorey. Roost in tree hollows and fissures and under exfoliating bark.

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		EPBC	BC									
Pteropus poliocephalus	Grey-headed Flying-fox	VU	VU	2003#	Dual credit (Predicted and Candidate)	No		Medium	High	Moderate	Woodland and plantings habitat present that may provide foraging areas	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies, commonly in dense riparian vegetation.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat		VU	2015	Ecosystem credit (Predicted)	No		High	High	High	Woodland and open farmland habitat present	Found throughout NSW in habitats including wet and dry sclerophyll forest, open woodland, acacia shrubland, mallee, grasslands and desert. They roost in tree hollows in colonies and have also been observed roosting in animal burrows, abandoned Sugar Glider nests, cracks in dry clay, hanging from buildings and under slabs of rock. Forages for insects above the canopy in forests.
Vespadelus baverstocki	Inland Forest Bat		VU	2015	Ecosystem credit (Predicted)	No		High	High	High	Woodland and open farmland habitat present	The Inland Forest Bat is most numerous in south-west NSW, north from the Murray River to Menindee. The species inhabits a range of habitats including mallee, mulga, savanna, grassland and River Red Gum woodlands. It roosts in tree hollows and abandoned buildings in colonies. This species has a large foraging range, flying rapidly feeding upon flying insects.
Phascolarctos cinereus	Koala	EN	EN	2022#	Dual credit (Predicted and Candidate)	n/a		Medium	n/a	n/a	Woodland habitat with preferred feed trees	In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include Eucalyptus robusta, E. tereticornis, E. punctata, E. haemostoma and E. signata. They are solitary with varying home ranges.
Amphibians												
Crinia sloanei	Sloane's Froglet	EN	EN	2022#	Species credit (Candidate)	n/a	n/a	Medium	n/a	n/a	May occur in seasonal wetland habitats, farm dams and irrigation channels, nearby records from the last 20 years present.	Sloane's Froglet is a cryptic species, usually found only after rain. This species has a widely scattered distribution throughout the floodplains of the Murray-Darling Basin in NSW and has been recorded mostly in the Darling Riverine Plains, NSW South Western Slopes, and the Riverina bioregions. It is typically associated with periodically inundated grassland, woodland and disturbed areas.
Litoria raniformis	Southern Bell Frog	VU	EN	2022#	Species credit (Candidate)	n/a	n/a	High	n/a	n/a	May occur in seasonal wetland habitats, farm dams and irrigation channels, nearby recent records present.	In NSW the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral swamps or billabongs with an abundance of bulrushes and other emergent vegetation along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.
Reptiles												
Aprasia parapulchella	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	VU	VU	#	Species credit (Candidate)	n/a	n/a	Negligible	n/a	n/a	No suitable rocky habitat present,	Fossorial species, which lives beneath surface rocks and occupies ant burrows. It feed on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter. Key habitat features are a cover of native grasses, particularly Kangaroo Grass (Themeda australis), sparse or no tree cover, little or no leaf litter, and scattered small rock with shallow embedment in the soil surface.

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Hemiaspis damelii	Grey Snake	EN	EN	#		n/a	n/a	Low	n/a	n/a	Limited suitable floodplain habitat with cracking soils present, nearest records are over 100 km away	The Grey Snake is found to occur from south-east Queensland, down to central-west of NSW, although some small populations have also been found in the north-east of South Australia. This species inhabits dry sclerophyll forests and woodlands, largely throughout the Brigalow Belt, in habitats where bodies of water or gullies are present. These snakes shelter under rocks, logs, and in cracks in soil.
Fish												
Bidyanus bidyanus	Silver Perch, Bidyan	CE		#		n/a	n/a	Low	n/a	n/a	Limited aquatic, riverine and wetland habitat suitable for large-bodied native fish is present in the Project area but may occur in adjacent large waterways (e.g. Yanco Creek).	Silver perch are endemic to the Murray-Darling system (including all states and sub-basins). Hatchery-bred silver perch are also stocked out of their range in a number of impoundments on east coast river systems, where they seemingly fail to reproduce. However, a self-sustaining population of silver perch occurs in Cataract Dam in the Hawkesbury/Nepean system.
Craterocephalus fluviatilis	Murray Hardyhead	EN		#		n/a	n/a	Low	n/a	n/a	Limited aquatic, riverine and wetland habitat suitable for this species is present in the Project area but may occur in adjacent large waterways (e.g. Yanco Creek).	The Murray Hardyhead is endemic to the mid and lower Murray-Darling system in south-eastern Australia and has a large geographic distribution. Salinity may contribute to fragmentation of hardyhead populations in the River Murray. The Murray Hardyhead is known from 12 locations: nine in South Australia (in the Lower Murray Region and Lower Lakes Region), and three in Victoria (Round Lake, Woorinen North Lake and Cardross Lakes). All of these are considered to be important to the survival of the species.
Galaxias rostratus	Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow	CE		#		n/a	n/a	Medium	n/a	n/a	Suitable aquatic and wetland habitat may develop in the far south-eastern corner of the Project area along Washpen Creek during flood events in Yanco Creek system.	Flathead Galaxias are found in still or slow moving water bodies such as wetlands and lowland streams. The species has been recorded forming shoals. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation. Flathead Galaxias spawn in spring and lay slightly adhesive demersal eggs.
Maccullochella macquariensis	Trout Cod	EN		#		n/a	n/a	Low	n/a	n/a	Limited aquatic, riverine and wetland habitat suitable for large-bodied native fish is present in the Project area but may occur in adjacent large waterways (e.g. Yanco Creek).	The Trout Cod is endemic to the southern Murray-Darling river system, including the Murrumbidgee and Murray Rivers, and the Macquarie River in central NSW. Trout cod are often found close to cover and in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags). They tend to remain at the one site and have small home ranges.
Maccullochella peelii	Murray Cod	VU		#		n/a	n/a	Low	n/a	n/a	Limited aquatic, riverine and wetland habitat suitable for large-bodied native fish is present in the Project area but may occur in adjacent large waterways (e.g. Yanco Creek).	The Murray Cods natural distribution extends throughout the Murray-Darling basin ranging west of the divide from south east Queensland, through NSW into Victoria and South Australia. It is found in the waterways of the Murray–Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers, billabongs and large deep holes. Murray Cod is entirely a freshwater species and will not tolerate high salinity levels.
Macquaria australasica	Macquarie Perch	EN		#		n/a	n/a	Low	n/a	n/a	Limited aquatic, riverine and wetland habitat suitable for large-bodied native fish is present in the Project area but may occur in adjacent large waterways (e.g. Yanco Creek).	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both river and lake habitats, especially the upper reaches of rivers and their tributaries