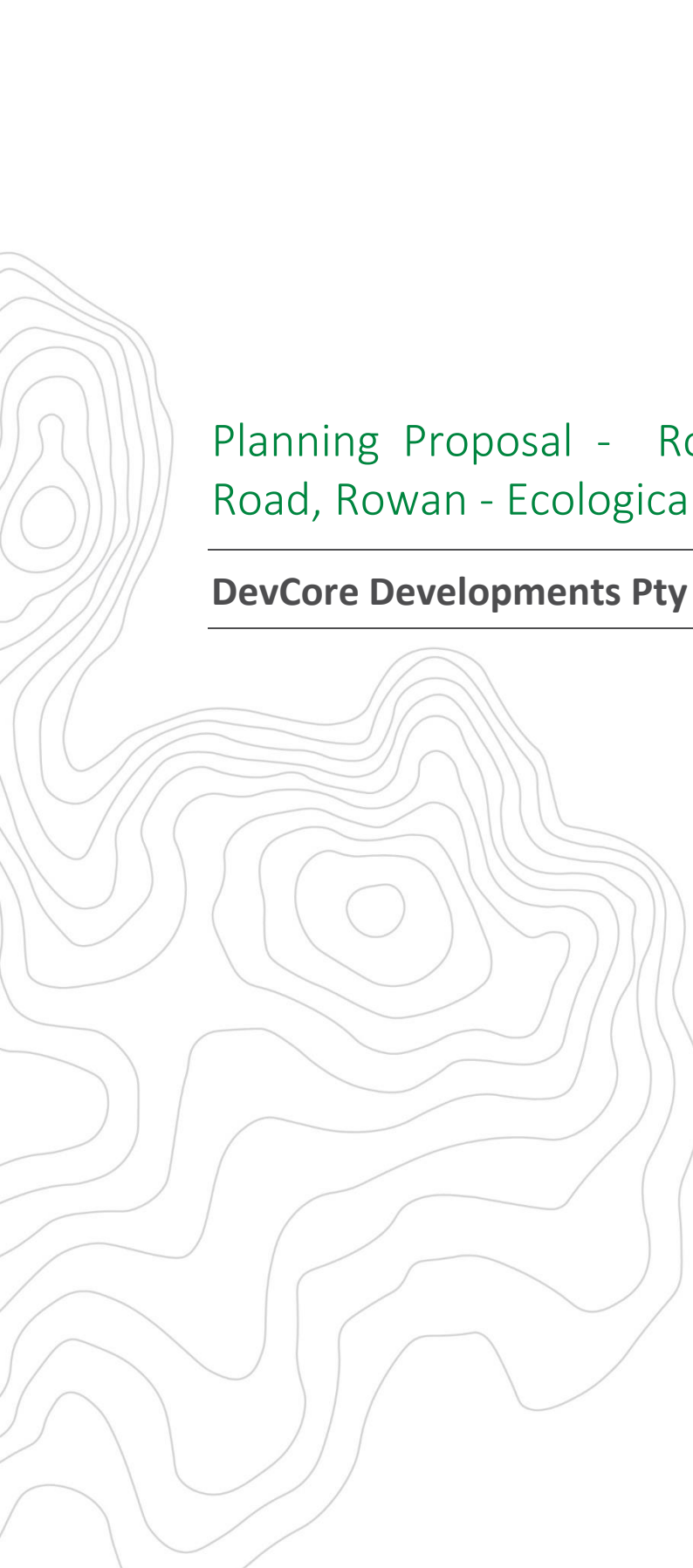


A stylized topographic map with green contour lines is positioned on the left side of the page, extending from the top left towards the bottom left.

Planning Proposal - Rowan Village, 7066 Holbrook Road, Rowan - Ecological Assessment

DevCore Developments Pty Ltd

DOCUMENT TRACKING

Project Name	Rowan Village - Ecological Assessment Report to Accompany Planning Proposal
Project Number	22SYD - 1368
Project Manager	Geraint Breese
Prepared by	Alex Gorey, Geraint Breese
Reviewed by	Geraint Breese, Nicole McVicar
Approved by	David Bonjer
Status	Final
Version Number	V3
Last saved on	19 April 2022

This report should be cited as 'Eco Logical Australia 2022. *Rowan Village - Ecological Assessment Report to Accompany Planning Proposal* . Prepared for DevCore Developments Pty Ltd'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from DevCore Developments Pty Ltd and Urbis.

Disclaimer

This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Eco Logical Australia Pty Ltd and DevCore Developments Pty Ltd. The scope of services was defined in consultation with DevCore Developments Pty Ltd, by time and budgetary constraints imposed by the client, and the availability of reports and other data on the subject area. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information. Eco Logical Australia Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Information provided is not intended to be a substitute for site specific assessment or legal advice in relation to any matter. Unauthorised use of this report in any form is prohibited.

Template 2.8.1

Contents

1. Introduction	1
1.1 Project background.....	1
1.2 Study area.....	1
1.3 Terminology.....	1
2. Legislative Context	4
3. Methodology.....	6
3.1 Literature review and database search	6
3.2 Field survey.....	6
3.2.1 Ecology Field Survey	6
3.2.2 Weather Conditions.....	7
3.3 Survey Limitations.....	7
4. Results.....	9
4.1 Literature review	9
4.1.1 Soils and Typography.....	9
4.2 Field survey.....	10
4.2.1 Vegetation Communities	10
4.2.2 Threatened Ecological Communities	11
4.3 Flora Species	18
4.3.1 Threatened Flora Species.....	18
4.4 Fauna and fauna habitat.....	18
4.5 Waterways.....	19
4.5.1 Hydro Line and Key Fish Habitat Data.....	19
4.5.2 Field Survey Observations of Watercourses	19
5. Ecological Assessment	21
5.1 Potential Impacts.....	21
5.2 Biodiversity Conservation Act 2016	22
5.2.1 Biodiversity Offsets Scheme – Area Threshold	22
5.2.2 Offset Scheme Thresholds – Biodiversity Values Land Map	22
5.2.3 Test of Significance (BC Act)	22
5.2.4 Serious and Irreversible Impacts (SAIL)	23
5.2.5 Avoid and minimise principles	23

5.3 Significance Assessment (EPBC Act)	24
5.4 State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021	24
5.5 Watercourses and aquatic habitat.....	24
6. Conclusion	26
7. References.....	28
Appendix A Likelihood of Occurrence	29
Appendix B Species Lists	36

List of Figures

Figure 1: Location of the planning proposal	1
Figure 2 Current Land Zoning.....	2
Figure 3: Indicative Layout Plan with	3
Figure 4 Survey Methods (Please note meander data was corrupted, however random meanders were undertaken across the site apart from freshly cropped fields in the east).....	8
Figure 5: PCT 277 in poor condition in the study area	13
Figure 6: Exotic cover in the study area	13
Figure 7: Harvested wheat crop in the study area.....	14
Figure 8 Derived Native Grassland	14
Figure 9: Previous vegetation mapping (EES, 2017).....	15
Figure 10: Threatened species previously recorded within 5 km of the study area (BioNet 2021)	16
Figure 11: Validated vegetation communities (ELA 2021).....	17
Figure 12 Farm dam located in north of the study area	19
Figure 13 Watercourses	20

List of Tables

Table 1: Legislative context	4
Table 2: Weather conditions	7
Table 3 Soil Landscapes.....	9
Table 4: Vegetation zone descriptions	10
Table 5 Potential Vegetation Impacts of Future Development	21
Table 6: Area clearing threshold	22
Table 7: Flora species recorded within the study area	36

Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
BV Map	Biodiversity Values Map
DAWE	Department of Agriculture, Water and the Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EPA Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FFA	Flora & Fauna Assessment
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NRAR	Natural Resources Access Regulator
NW Act	<i>Noxious Weeds Act 1993 (NSW)</i>
OEH	NSW Office of Environment and Heritage
PW	Priority Weed
TEC	Threatened Ecological Community
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW) (now repealed)</i>
WM Act	<i>Water Management Act 2000</i>
WoNS	Weeds of National Significance

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by DevCore Property Group to prepare this ecological assessment to support a Planning Proposal to rezone 7066 Holbrook Road, Rowan (the study area) from RU1 Primary Production to R1 General Residential, R5 Large Lot Residential, B2 Local Centre and RE1 Public Recreation. The proposed zoning change is anticipated to support 2,100 new dwellings.

This report describes the ecological values present within the study area, provides an assessment of threatened flora and fauna species likely to occur and outlines the requirements for additional survey and reporting at the development application stage. Impacts to ecological values that could occur were assessed in relation to State and Commonwealth legislation, namely the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The assessment concluded that the majority of the area proposed for rezoning was highly modified and predominantly cleared of native vegetation. One Plant Community Type (PCT) was identified in the study area: *PCT 277 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes bioregion* which corresponds to the threatened ecological community *White-Box Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. This community is listed as critically endangered under the BC Act and EPBC Act. This community occurred in numerous patches across the study area and occurred in three condition states: poor, moderate and derived native grassland condition.

Large areas of exotic pasture and recently harvested wheat crops were also present within the study area. These areas did not conform to a PCT.

No threatened flora or fauna species were identified during survey. The study area could provide potential habitat for the following threatened fauna species, in the form of hollow bearing trees and native vegetation:

- *Anthochaera phrygia* (Regent Honeyeater) – species credit species
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – ecosystem credit species
- *Falco hypoleucos* (Grey Falcon) – ecosystem credit species
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – ecosystem credit species
- *Glossopsitta pusilla* (Little Lorikeet) – ecosystem credit species
- *Lathamus discolor* (Swift Parrot) – species credit species
- *Phascolarctos cinereus* (Koala) – species credit species
- *Polytelis swainsonii* (Superb parrot) – dual credit species
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) – ecosystem credit species
- *Pteropus poliocephalus* (Grey-headed Flying-fox) – dual credit species.

No threatened flora species are considered likely to occur due to the high level of ongoing disturbance throughout the study area.

Any future development would need to consider the requirements of section 7.9 of the BC Act. Should the Biodiversity Offsets Scheme (BOS) be triggered, a Biodiversity Development Assessment Report (BDAR) would need to be prepared, consistent with the NSW Biodiversity Assessment Method 2020.

Preliminary assessment of watercourses indicates the mapped 1st order watercourses within the study area are considered unlikely to meet the definition of a 'river' under the WM Act. A riparian assessment should be prepared for the development assessment (DA) stage and submitted to the Natural Resource Access Regulator (NRAR) to confirm.

The 2nd and 3rd order watercourses which transects the site from south west to north east is considered likely to meet the definition of a 'river' under the WM Act. As such, a controlled activity approval (CAA) will be required at the DA stage if there are any impacts to waterfront land. Guidelines for Riparian Corridors on Waterfront Land (NRAR, 2018) recommend revegetation of degraded riparian zones.

1. Introduction

Eco Logical Australia Pty Ltd (ELA) was commissioned by DevCore Property Group to prepare an ecological assessment to support a Planning Proposal to rezone the 7066 Holbrook Road Rowan (the study area).

1.1 Project background

The study area is primarily used for agricultural purposes with some remnant vegetation, planted vegetation, a riparian corridor, drainage lines and three dams. The proponent is seeking to rezone the entire study area from land zoned from RU1 Primary Production to R1 General Residential, R5 Large Lot Residential, B2 Local Centre and RE1 Public Recreation. The proposal is consistent with the zoning changes identified in the *Local Strategic Planning Statement Planning for the future: Wagga Wagga 2040* (Wagga Wagga LSPS) (Wagga City Council, 2021). Furthermore, the proposal is aligned to the *Riverina Murray Regional Plan 2036* (DPIE, 2016) as it is providing growth in regional cities and increasing housing diversity and choice.

1.2 Study area

The study area has a total area of 225.02 hectares and is located approximately eight km south of central Wagga Wagga. The study area has frontage to Hobrook Road to the west and has another connection to Lloyd Road to the north; the rest of the Lloyd Road frontage is large lot residential. To the east of the study area is 456 and 474 Plumpton Road, Rowan, a large parcel of land that is currently undertaking the Planning Proposal process and is known as “Sunny Side”. The land to the south of the study area is predominantly used for agricultural purposes. The study area contains some remnant native vegetation, planted native and exotic vegetation, a riparian corridor, three farms dams, and ephemeral drainage lines.

1.3 Terminology

The following key terms and definitions are used in this ecological assessment:

- Planning Proposal – the proposed rezoning and reclassification of lands within the study area.
- Study area – the area directly affected by the proposal and the area assessed during field survey (Figure 1).



Figure 1: Location of the planning proposal



Figure 2 Current Land Zoning

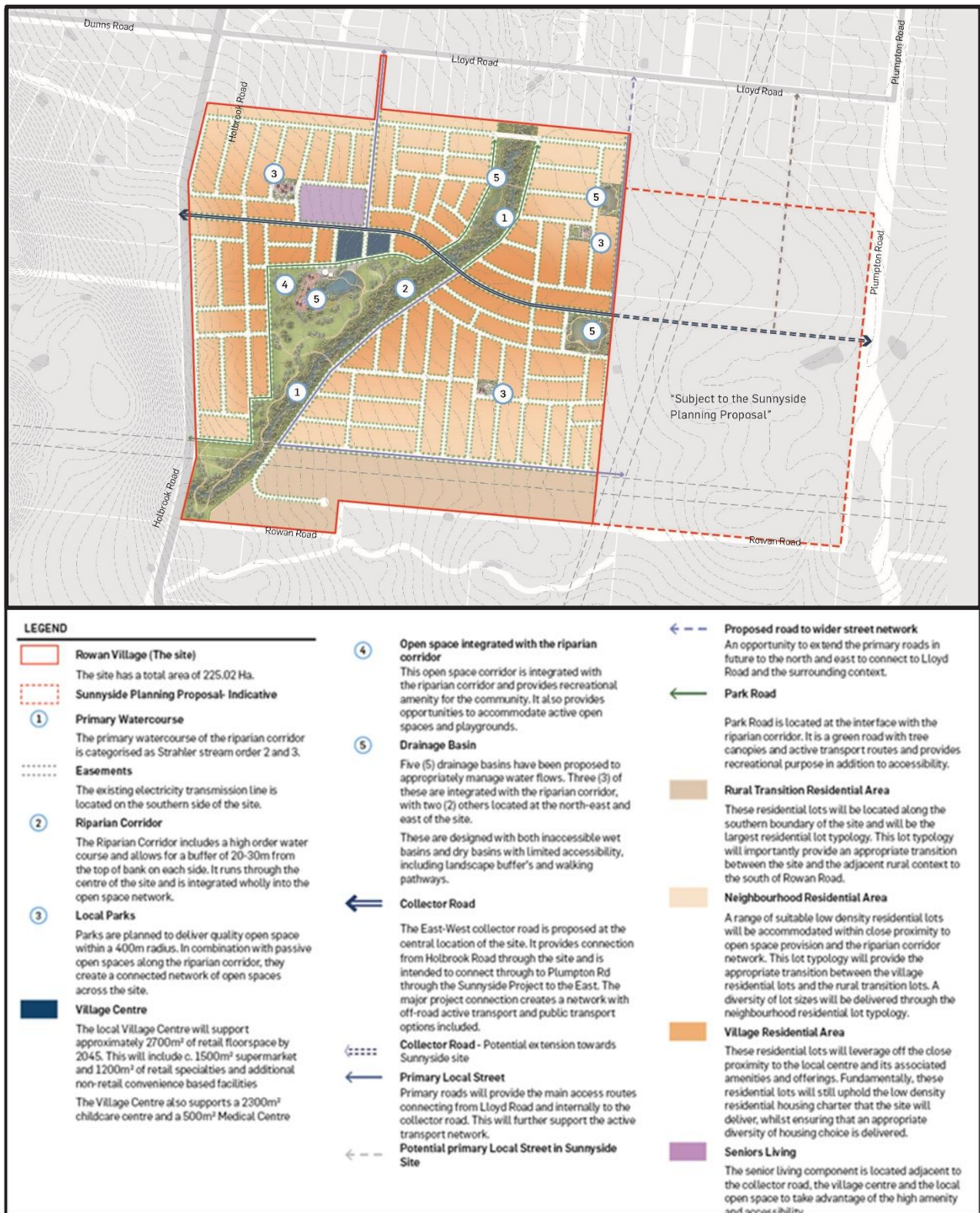


Figure 3: Indicative Layout Plan

2. Legislative Context

Table 1 below provides a description of the relevant legislative context for the ecological assessment. Approvals and/or legislative consideration will be required for the development of the study area. This report addresses the objectives and requirements of the legislation as it relates to biodiversity and ecological values.

Table 1: Legislative context

Name	Relevance to the project	Section in this report
Commonwealth		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified as having a potential to occur within the locality. An action that has a significant impact on MNES will be a Controlled Action and require approval from the Minister for the Environment. Whilst a Planning Proposal is not an 'action' under the EPBC Act, this report, describes the potential presence of MNES in the study area.	Section 5.3
State		
<i>Biodiversity Conservation Act 2016</i> (BC Act)	Section 7.3 of the BC Act outlines the assessment requirements to determine whether the proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The Biodiversity Assessment Method (BAM) is established under section 6.7 of the BC Act. The BC Act, together with the <i>Biodiversity Conservation Regulation 2017</i> provides the framework for the Biodiversity Offsets Scheme (BOS). Whilst Planning Proposals (i.e. rezoning land) do not trigger the BOS, this report lists the potential impacts that may trigger entry into the BOS at the development application stage.	Section 5.2
<i>Biodiversity Conservation Regulation 2017</i> (BC Regulation)	The BC Regulation provides the framework for the Biodiversity Offsets Scheme. The NSW Government Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the BC Regulation. The study area does not contain land identified on the Biodiversity Values Map (accessed 18/03/2022).	Section 5.2.2
<i>Biosecurity Act 2015</i>	Under this Act, priority weeds have been identified for local government areas and assigned strategies to contain, remove or manage. Occupiers of land (this includes owners of land) have responsibility for taking appropriate action for priority weeds on the land they occupy. The study area contains one weed listed as a priority weed for the central west; <i>Rubus fruticosus</i> spp. aggregate (Blackberry).	Section 4.3
<i>Local Land Services Act 2013</i> (LLS Act)	The LLS Act is responsible for administering controls on clearing of native vegetation in rural areas. Under Section 600 of the LLS Act clearing of native vegetation is authorised if it is authorised under a development consent under part 4 of the EP&A Act.	N/A
<i>Fisheries Management Act 1994</i> (FM Act)	The FM Act provides for the protection, conservation and recovery of threatened species defined under the FM Act. It also makes provisions for the management of threats to threatened species, populations and ecological communities defined under the Act, as well as the protection of fish and fish habitat in general.	Section 4.5

Name	Relevance to the project	Section in this report
	A portion of the 2 nd order and 3 rd order watercourse within the study area is mapped as Key Fish Habitat (KFH) by Department of Primary Industries (DPI) Fisheries, therefore a permit under Part 7 of the FM Act may be required for works to the watercourse within the study area. KFH is presented in Figure 13.	
<i>Water Management Act 2000 (WM Act)</i>	The WM Act aims to provide for the sustainable and integrated management of water resources for NSW. The Act requires developments on waterfront land to be ecologically sustainable and recognises the benefits of aquatic ecosystems to agriculture, fisheries, and recreation. The WM Act is administered by the Natural Resources Access Regulator (NRAR) and establishes an approval regime for activities within waterfront land, defined as the land 40 m from the highest bank of a river, lake or estuary. Whilst the WM Act does not contain any provisions for Planning Proposals, it is prudent to consider the objectives of the Act when preparing a Planning Proposal.	Section 5.5
Planning Instruments		
<i>State Environmental Planning (Biodiversity Conservation) 2021 (Biodiversity Conservation SEPP)</i>	The aim of the Biodiversity and Conservation SEPP was to repeal a range of SEPP's relating to biodiversity and conservation, and then reinstate them in a concise document. One of the SEPP was the <i>State Environmental Planning Policy (Koala Habitat Protection) 2021</i> (Koala SEPP). The planning instrument is intended to help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process. The Koala SEPP only applies to development applications and is not relevant to the Planning Proposal, however the presence of potential Koala Habitat is discussed. Consideration of the Koala SEPP will be required at the DA stage.	Section 5.4
Wagga Wagga Local Environmental Plan 2010	The study area contains land zoned as RU1 – Primary Production and R5 – Large Lot Residential. The Proposal is seeking to rezone the land within the study area for the purpose of facilitating residential and commercial development in the area. The LEP planning controls do not direct any further ecological assessment in regard to a planning proposal.	N/A

3. Methodology

3.1 Literature review and database search

A review of readily available databases pertaining to the ecology and environmental features of the study area and surrounding area, and existing vegetation mapping was conducted to identify records of threatened species, populations and communities and their potential habitat. Databases and vegetation mapping that were reviewed included:

- BioNet (Atlas of NSW Wildlife) database search (5 km) threatened species, populations and ecological communities listed under the BC Act (accessed February 2022).
- EPBC Act Protected Matters Search Tool (5 km) for threatened and migratory species, populations and ecological communities listed under the Commonwealth EPBC Act (Department of Agriculture, Water and the Environment (DAWE) 2022)
- Biodiversity Values Map (Land Management and Biodiversity Conservation (LMBC) 2022 18/03/2022)
- State Vegetation Type Map; Riverina Region Version 1.2 – VIS_ID 4469 (DPIE)
- Transitional Native Vegetation Regulatory Map Viewer (DPIE 2022)
- Aerial photography (NearMap) of the study area and surrounds were also used to investigate the extent of vegetation cover and landscape features including Interim Biogeographic Regionalisation for Australia (IBRA) region and subregion.
- *Wagga Wagga Local Environmental Plan 2010*
- Soil Landscapes (Hazelton 1990)
- Water Management (General) Regulation 2018 hydroline spatial data

Species from both the NSW BioNet Atlas and DAWE online search were combined to produce a list of threatened species, populations and communities that may occur within the study area. The likelihood of occurrences for threatened species, populations and communities in the study area was then determined based on location of database records, the likely presence or absence of suitable habitat in the study area, and knowledge of the species' ecology. This information informed the subsequent field surveys.

After the field inspections were completed the likelihood of occurrence of each species, population and communities was reassessed. This provided an informed assessment on the extent and type of habitats, and species that could be present within the study area. The likelihood of occurrence of species, populations and communities based on the field surveys is presented within the likelihood table (Appendix A).

3.2 Field survey

3.2.1 Ecology Field Survey

The field survey was conducted by ELA ecologist Alex Gorey and Tim Maher on 2 and 3 March 2022 for a total of 20 person hours. The study area was traversed using the random meander method (Cropper 1993) to verify the presence of native vegetation, threatened ecological communities, and threatened

species and / or their habitat. Where the boundaries of vegetation communities differed from existing vegetation mapping, these were recorded using ArcCollector on a smart phone.

All vegetation within the study area was mapped and all native vegetation was assigned to a best fit Plant Community Type (PCT). Exotic cover and harvested crops were not assigned to a PCT. The best fit PCT was determined by reviewing the previous vegetation mapping, noting all flora species present, the geographical location and the landform. General notes on species composition and condition were also taken.

Two full floristic vegetation integrity plots (Figure 4) were completed in the study area to assess the composition, structure and function components of the vegetation zone consistent with the Biodiversity Assessment Method (BAM).

Bird species and other fauna were recorded opportunistically. Targeted surveys were not undertaken for any threatened species.

3.2.2 Weather Conditions

Weather during the survey was sunny with some cloud and no rain (BOM 2022; Table 2).

Table 2: Weather conditions

Weather Station	Maximum Temp (°C)	Minimum Temp (°C)	Rainfall mm
Wednesday 2 March 2022	26.1	18.6	0
Thursday 3 March 2022	31.2	14.8	0

3.3 Survey Limitations

This assessment was not intended to provide an inventory of all species present across the study area but instead an overall assessment of the terrestrial and aquatic ecological values of the study area with particular emphasis on threatened species, endangered ecological communities and key fauna habitat features. It is important to note that some species may not have been detected in the study area during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. In this case the likelihood of their occurrence in the study area has been assessed based on the presence of potential habitat.

No trapping of aquatic or terrestrial fauna species was completed.



Figure 4 Survey Methods (Please note meander data was corrupted, however random meanders were undertaken across the site apart from freshly cropped fields in the east)

4. Results

4.1 Literature review

A review of previous vegetation mapping within the study area (State Vegetation Type Map; Riverina Region Version 1.2 – VIS_ID 4469) identified one vegetation community as being present; PCT 277 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes bioregion (Figure 9). The majority of the study area was not assigned to a vegetation community.

The NSW BioNet and EPBC Act protected matters search tool results identified three threatened ecological communities, 26 threatened fauna and five threatened flora species either known or predicted as having potential to occur within a 5 km radius of the study area (Figure 10). An assessment of the likelihood of occurrence of threatened flora species within the study area is provided in Appendix A.

4.1.1 Soils and Topography

The study area's soil landscape is defined as Redbank (rb), Gregadoo (gr), and Becks Lane (bk) on the Soil Landscapes of the Wagga Wagga 1:100,000 Sheet. Table 3 summaries the characteristics of these soil landscapes.

Table 3 Soil Landscapes

Soil Landscape	Landscape	Soils	Limitations
Redbank (rb)	Very gently inclined long piedmont slopes. Long undulating slopes and narrow drainage lines. Almost completely cleared tall woodland.	Moderately deep (80 – 120 cm) Eutrophic Brown Chromosols on slopes, moderately deep (80 - 120 cm) Mottled Subnatic Brown Sodosols in drainage lines.	High erosion hazard, foundation hazard (localised), waterlogging (localised), strong acidity, low fertility soil.
Gregadoo (gr)	Gently inclined midslopes of adamellite and granite hills. Long slopes and mostly parallel shallow drainage lines. Rare rock outcrops. Almost completely cleared tall open-forest and woodland.	Moderately deep (80 – 120 cm) Mottled Hypernatic Brown Sodosols and Mottled Subnatic Red Sodosols..	High erosion hazard, mass movement (localised), foundation hazard (localised); strong acidity, sodicity (localised), low fertility soil with hardpans (localised).
Becks Lane (bk)	Gently inclined footslopes adjacent to hills of Ordovician metasedimentary rocks. Long (>300 m) waning slopes and mostly parallel, shallow drainage lines. Almost completely cleared tall woodland.	Moderately deep (80 - 100 cm) Haplic and Bleached Red and Brown Chromosols on slopes, and moderately deep (80 - 150 cm) Bleached Mottled and Bleached Brown Dermosols near drainage lines.	High erosion hazard, foundation hazard (localised), acidity and locally hardsetting soil.

The landscape is generally characterised by gently undulating and rolling hills, ranging from 200m – 300m above sea level. Soil pH in the region ranges from pH 6.0-7.0 in the top soil and pH 6.0-9 in the sub soil.

4.2 Field survey

4.2.1 Vegetation Communities

The field survey confirmed the presence of two vegetation communities within the study area (Figure 11):

- *PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*
- Exotic pasture.

Areas mapped as exotic pasture were not mapped to a PCT as they were assessed as not conforming to a PCT (Table 4).

Table 4: Vegetation zone descriptions

Vegetation Zone	Vegetation Community	Plant Community Type	Condition	BC status	Act status	EPBC Act status	Area (ha)
1	Blakely's Red Gum – Yellow Box open-woodland of the tablelands	PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Poor		CE	N/A – does not meet condition thresholds for listing under the EPBC Act	19.21
2	Blakely's Red Gum – Yellow Box open-woodland of the tablelands	PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate		CE	N/A – does not meet condition thresholds for listing under the EPBC Act	9.48
3	Blakely's Red Gum – Yellow Box open-woodland of the tablelands*	PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*	DNG		CE	Potential further assessment required –	42.51
2	Harvested wheat crop	N/A	N/A		N/A	N/A	88.86
3	Exotic cover	N/A	N/A		N/A	N/A	61.80

CE = Critically Endangered, DNG = Derived Native Grassland *Potential Further Survey Required to Confirm

4.2.1.1 PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland

PCT 277 was present in the central portion of the study area and formed a band running west to east. The canopy was dominated by *Eucalyptus melliodora* (Yellow Box), *Eucalyptus blakelyi* (Blakely's Red Gum), and *Eucalyptus microcarpa* (Grey Box). The midstorey was absent in patches mapped as poor condition and the groundcover, where present, was sparse and dominated by exotic species including *Paspalum dilatatum* (Paspalum), *Phalaris* sp., *Eleusine indica*, *Chenopodium album*, *Lolium perenne* and *Triticum* sp.

Native species, where present, were low in abundance and included *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Bothriochloa macra* (Wallaby Grass), *Rytidosperma* sp. and *Austrostipa aristiglumis*. The groundcover showed high levels of ongoing disturbance associated with cattle grazing and pasture improvement (Figure 5).

Patches in moderate condition contained the same canopy species as the poor condition patches of the community. The midstorey contained scattered occurrences of *Bursaria spinosa* (native Blackthorn) and *Acacia baileyana* (Cootamundra Wattle).

Where the community occurred as a derived native grassland, the canopy and midstorey layers were absent. The groundcover was dominated by native species including *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Bothriochloa macra* (Wallaby Grass), *Rytidosperma* sp. and *Austrostipa aristiglumis*.

The areas of Blakely's Red Gum – Yellow Box open-woodland of the tablelands were assigned to PCT 277 because:

- the study area is within the South Western Slopes IBRA region and Inland Slopes subregion
- the study area occurs on gentle slopes to flats
- the floristic composition and community structure is consistent with PCT 277.

4.2.1.2 Exotic cover

Exotic cover was present over the majority of the study area and comprised of *Phalaris* sp., *Panicum capillare*, *Triticum* sp., *Lolium perenne* and *Paspalum dilatatum*. The areas mapped as exotic cover were previously tilled and cropped for agricultural purposes and were pasture improved. Some paddocks had been recently sown and harvested with *Triticum* sp. (Wheat) (Figure 7).

4.2.2 Threatened Ecological Communities

PCT 277 within the study area conformed to the Threatened Ecological (TEC) *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. This community is listed as critically endangered under the BC Act and may also meet the Commonwealth listing of *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* as critically endangered if certain condition threshold are met.

In the BioNet Vegetation Classification PCT 277 is classified as 'wholly a subset' of *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*.

PCT 277 in low and moderate condition in the study area met the BC Act definition of the threatened ecological community due to:

- Geographic location (located within the correct IBRA region and subregion)
- Landscape position (lower slopes to flats)
- Species composition (see above description).

There are no numerical or quantitative thresholds for DNG to meet the BC Act listing of the community, however the Final Determination (TSSC 2011) states the following:

Disturbed remnants are still considered to form part of the community including remnants where the vegetation, either understorey, overstorey or both, would, under appropriate management, respond to assisted natural regeneration, such as where the natural soil and associated seed bank are still at least partially intact.

An area of grassland, indicate in Figure 11, has the potential to conform to the PCT 227 DNG. However, further detailed survey is required to determine whether the 'potential DNG' could be considered to still contain a native seedbank, and therefore meet the BC Act definition of the community. Further survey would include the collection of full floristic vegetation integrity plot data within the area.

PCT 277 did not meet the EPBC Act definition of the community because the groundcover layer did not contain at least 12 native non-grass species (Listing and conservation advice 2006). The policy statement for this community also includes criteria that can be used to determine whether you have a patch of EPBC Act listed *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland*. The EPBC Act policy statement requires assessment of most common overstorey species, percentage and number of native species in the groundcover layer and the patch size. The policy statement requires the groundcover to contain at least 50% native groundcover species (Commonwealth of Australia 2006). The patch did not contain at least 50% native groundcover species. The estimated native groundcover throughout the patch was <10%.



Figure 5: PCT 277 in poor condition in the study area



Figure 6: Exotic cover in the study area



Figure 7: Harvested wheat crop in the study area



Figure 8 Derived Native Grassland

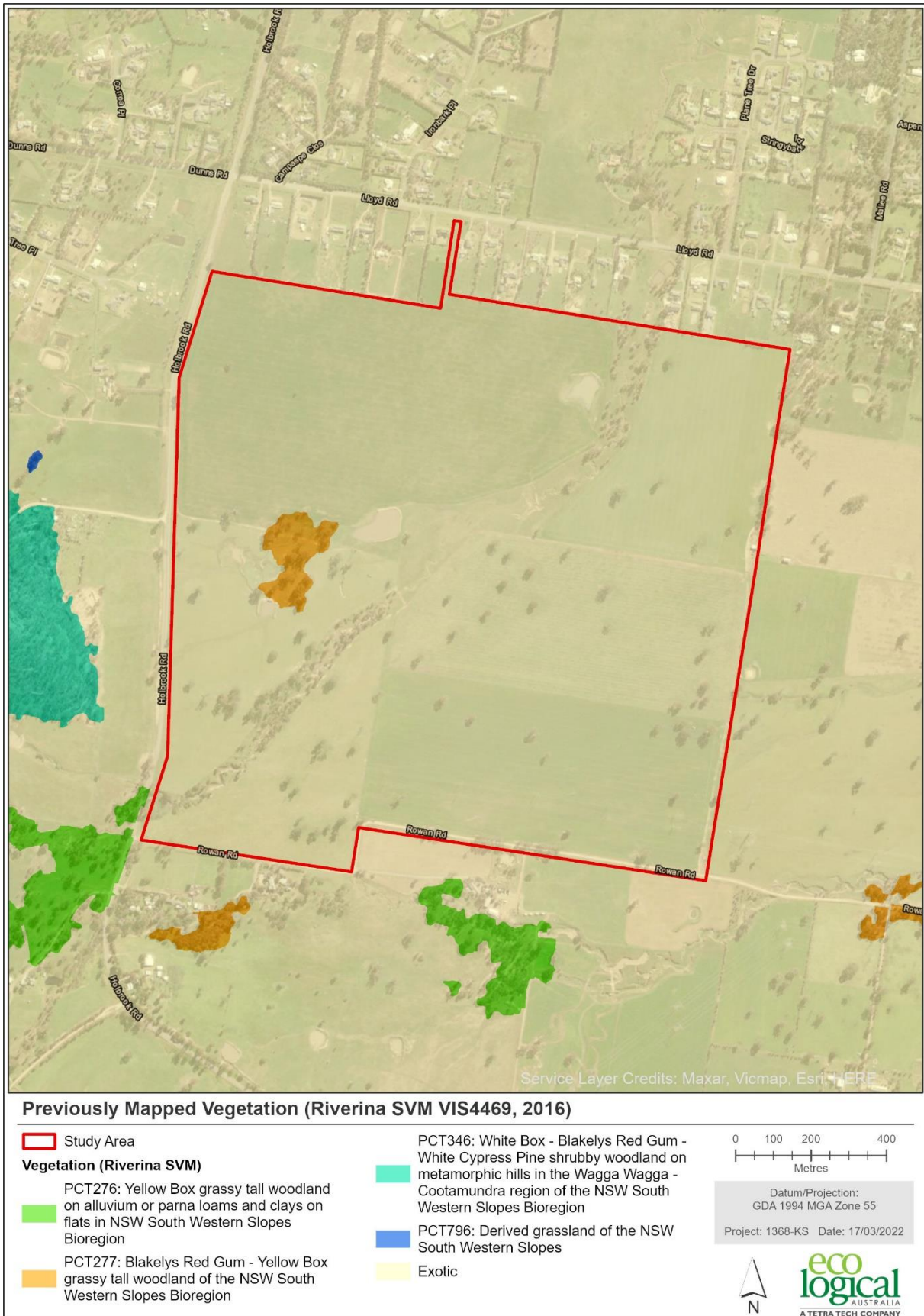


Figure 9: Previous vegetation mapping (EES, 2017)

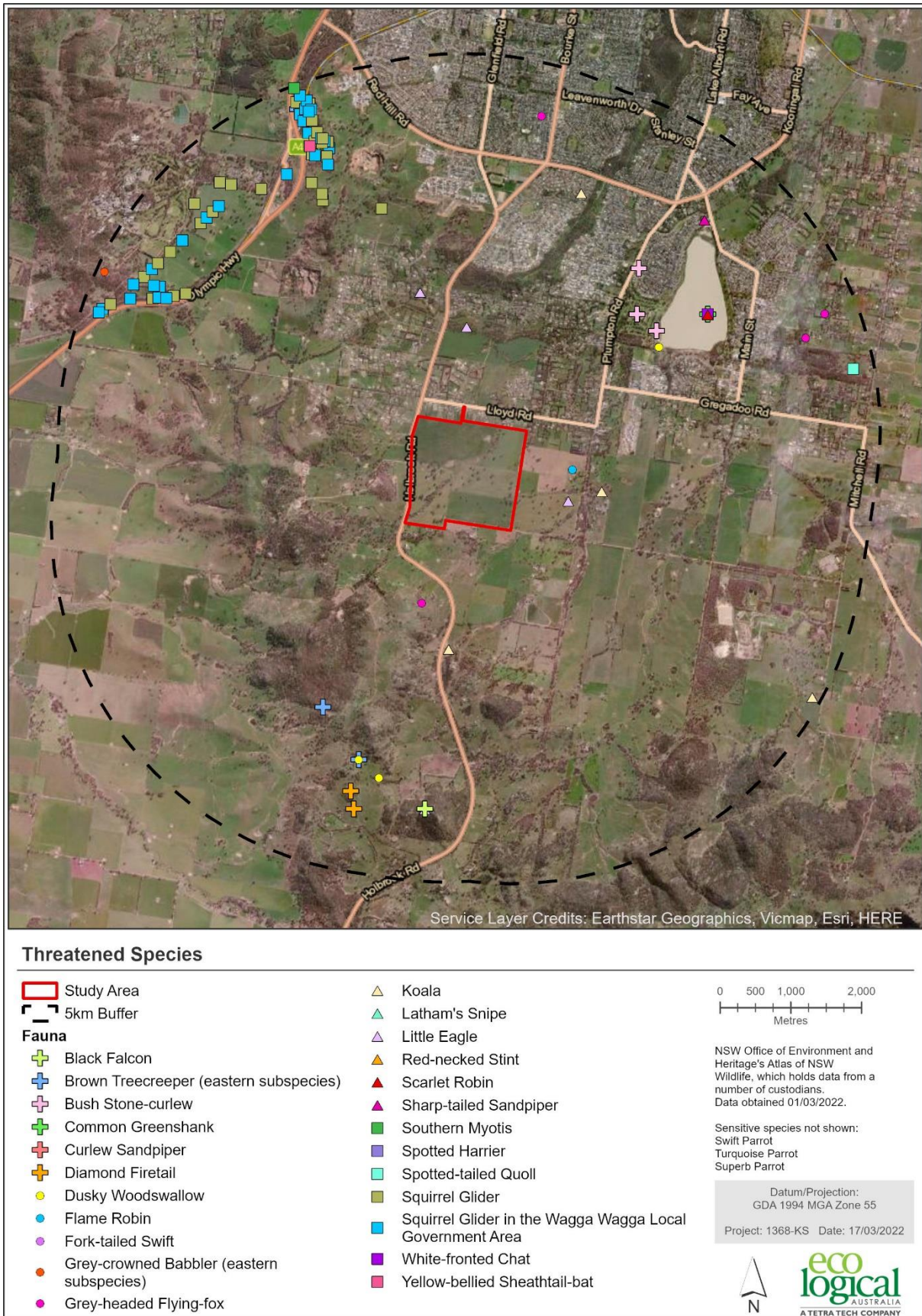


Figure 10: Threatened species previously recorded within 5 km of the study area (BioNet 2021)



Figure 11: Validated vegetation communities (ELA 2021)

4.3 Flora Species

A total of 38 flora species were identified during the full floristic plots within the study area (Appendix B). Exotic flora species were high in abundance, particularly within the understorey. A total of 22 exotic species were identified within the study area including one declared as a priority weed under the *Biosecurity Act 2015* in the Central West Sydney Regional Strategic Weed Management Plan 2017-2022. The one priority weed in the study area is *Rubus fruticosus* spp. aggregate (Blackberry) which requires management and containment. There were several small patches of Blackberry within the study area.

4.3.1 Threatened Flora Species

No threatened flora species were opportunistically recorded during survey. The study area is unlikely to provide habitat for threatened flora species due to the high level of historical disturbance, identified through the dominance of exotic pasture grasses, evidence of ongoing cattle grazing and mostly poor condition of the remnant native vegetation.

4.4 Fauna and fauna habitat

A total of six birds were opportunistically recorded during the field survey. A full list of fauna species recorded during the field survey is shown in Appendix B. No threatened fauna species were identified in the study area during survey.

Hollow bearing trees were opportunistically mapped during the field survey. The presence of hollow bearing trees was considered when determining the potential presence of threatened species. Some areas of the study area were not assessed, due to limited access associated to being cropped recently, and will require survey.

An assessment of the habitat features was used to determine the suitability of the study area to support threatened fauna species. The study area contained hollow bearing trees which provided small to medium sized hollows. The native vegetation in the study area may also provide foraging habitat for some threatened fauna species. Of the threatened fauna species either known or predicted as having potential to occur, 10 were considered as likely or with potential to utilise the study area:

- *Anthochaera phrygia* (Regent Honeyeater) – species credit species
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – ecosystem credit species
- *Falco hypoleucos* (Grey Falcon) – ecosystem credit species
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – ecosystem credit species
- *Glossopsitta pusilla* (Little Lorikeet) – ecosystem credit species
- *Lathamus discolor* (Swift Parrot) – species credit species
- *Phascolarctos cinereus* (Koala) – species credit species
- *Polytelis swainsonii* (Superb Parrot) – dual credit species
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) – ecosystem credit species
- *Pteropus poliocephalus* (Grey-headed Flying-fox) – dual credit species.

A likelihood of occurrence table is provided in Appendix A.

4.5 Waterways

4.5.1 Hydro Line and Key Fish Habitat Data

The *Water Management (General) Regulation 2018* hydro line spatial data is presented in Figure 13, and indicates that there are four 1st order (Strahler stream order) watercourses, two 2nd order watercourses and one 3rd order watercourse located within the study area. A portion of one of the 2nd order watercourses and the 3rd order watercourse is mapped as KFH, see Figure 13.

4.5.2 Field Survey Observations of Watercourses

Brief observations during the field survey indicated that all first order watercourse within the study area have been significantly modified to provide drainage to agricultural land. In addition, three farm dams have been created within the study area. The location of these farm dams is shown in Figure 11.

At the time of the field survey no water was observed flowing through the study area, however farm dams were estimated to be over three quarters full, see Figure 12. A riparian assessment will need to be completed during the development assessment process to determine that the watercourses meet the definition of a 'river' under the WM Act.



Figure 12 Farm dam located in north of the study area



Figure 13 Watercourses

5. Ecological Assessment

5.1 Potential Impacts

Whilst the rezoning of land itself does not result in impacts to biodiversity, the rezoning is proposed to allow for future use of the study area for residential development and commercial uses. The proposed rezoning has potential to impact the following threatened ecological values:

- PCT 277 (Corresponds to White Box Yellow Box Blakely's Red Gum – BC Act only)
- Potential foraging habitat is available across the study area for :
 - *Anthochaera phrygia* (Regent Honeyeater) – species credit species
 - *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – ecosystem credit species
 - *Falco hypoleucos* (Grey Falcon) – ecosystem credit species
 - *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – ecosystem credit species
 - *Glossopsitta pusilla* (Little Lorikeet) – ecosystem credit species
 - *Lathamus discolor* (Swift Parrot) – species credit species
 - *Phascolarctos cinereus* (Koala) – species credit species
 - *Polytelis swainsonii* (Superb parrot) – dual credit species
 - *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) – ecosystem credit species
 - *Pteropus poliocephalus* (Grey-headed Flying-fox) – dual credit species.

Potential impacts of future development have been quantified by overlaying the proposed Indicative Layout Plan (ILP) over the validated vegetation, see

Table 5 Potential Vegetation Impacts of Future Development

Veg Type	Local Park/Open Space	Development Footprint	Total
PCT 277 - Blakely's Red Gum – Yellow Box open-woodland of the tablelands - Poor	4.49	14.73	19.21
PCT 277 - Blakely's Red Gum – Yellow Box open-woodland of the tablelands - Moderate	9.32	0.16	9.48
Potential - PCT 277 - Blakely's Red Gum – Yellow Box open-woodland of the tablelands - DNG	14.96	27.55	42.51
Harvested wheat crop	3.90	84.96	88.86
Exotic pasture	2.64	59.17	61.80
Dam	0.68	0.46	1.13
Road	NA	0.55	0.55
Total	35.98	187.58	223.56

When assessing impacts, the proponent at the DA stage will need to consider direct impacts such as removal of vegetation and potential foraging habitat for threatened species as well as indirect impacts such as:

- Changes to hydrology through run off, sedimentation and erosion from construction works.
- Spread of priority weeds to the study area or from the study area – if not managed accordingly.
- Noise, vibration and light impacts of activity in close proximity to fauna habitat.

- Weed management to minimise the edge effect.

5.2 Biodiversity Conservation Act 2016

Impacts to threatened species and threatened ecological communities listed under the BC Act are required to be assessed in accordance with Section 7.3 of the BC Act, known as 'test(s) of significance'. For a development under Part 4 of the EPA Act, the Biodiversity Offsets Scheme (BOS) and BAM may be triggered by the following means:

- Area Criteria - exceeding the clearing threshold for the minimum lot size (Table 6)
- Impacting native vegetation mapped on the Biodiversity Values Map (LMBC, 2021)
- Conclusion through the application of a test of significance (5 part test) that a significant impact to a threatened ecological value would occur.

5.2.1 Biodiversity Offsets Scheme – Area Threshold

The area threshold is triggered when the clearing of native vegetation is above the clearing threshold for the minimum lot size (see Table 6). The minimum lot size for the study area is currently 100 ha. After the land is rezoned, the minimum lot size would likely to be less than 1 ha.. Any proposed development that clears >0.25 ha of native vegetation would trigger the Biodiversity Offsets Scheme and a BDAR would be required.

There is approximately 71 ha of native vegetation within the study area. If more than 0.5 ha of this is cleared for a subsequent development, a BDAR will be required.

Table 6: Area clearing threshold

Minimum lot size associated with the property	Threshold for clearing native vegetation, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

*** Note:** native vegetation is defined in Section 1.6 of the BC Act (and has the same meaning as in Part 5A of the *Local Land Services Act 2013*); essentially encompasses any species native to NSW and does not necessarily conform to a PCT.

5.2.2 Offset Scheme Thresholds – Biodiversity Values Land Map

The BV Map identifies land considered to have high biodiversity value as defined by the BC Regulation. The study area is not mapped on the BV Map (17 March 2022) .

5.2.3 Test of Significance (BC Act)

If either the area threshold criteria is exceeded, or development is proposed within areas mapped on the BV Map, Tests of Significance under the BC Act are not required. However, if this is not the case, Tests of Significance will need to be undertaken on threatened species likely to occur within the study area. If a test of significance concludes that a significant impact to a threatened ecological value is likely to occur, then the BOS would be triggered and a BDAR would be required.

5.2.4 Serious and Irreversible Impacts (SII)

If the BOS is triggered, then the BDAR must consider impacts to any candidate SII. *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* is a SII candidate. The BC Act imposes various obligations on decision-makers in relation to impacts on biodiversity values that are at risk of a SII. These obligations generally require a decision-maker to determine whether or not any of the residual impacts of a proposed development on biodiversity values are serious and irreversible. To assist a decision-maker with this task, the BC Act provides a framework to make this determination. The framework consists of a series of principles defined in the BC Regulation and supporting guidance, provided for under section 6.5 of the BC Act, to interpret these principles. If a consent authority determines that the impact is serious and irreversible, the DA must be refused.

5.2.5 Avoid and minimise principles

If the BOS is triggered and a BDAR is prepared, the BDAR must demonstrate how impacts to biodiversity values have been avoided and minimised. This can include areas of native vegetation that have been avoided and are proposed for retention across the study area. Various design iterations that were considered can be used to demonstrate how impacts have been avoided and minimised.

5.3 Significance Assessment (EPBC Act)

A number of threatened species listed under the EPBC Act have potential habitat in the study area listed in Appendix A:

- *Anthochaera phrygia* (Regent Honeyeater)
- *Lathamus discolor* (Swift Parrot)
- *Phascolarctos cinereus* (Koala)
- *Polytelis swainsonii* (Superb parrot)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

These species will require a more in-depth assessment during the DA stage to assess the potential for a significant impact.

5.4 State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021

The aim of the Biodiversity and Conservation SEPP was to repeal a range of SEPP's relating to biodiversity and conservation, and then reinstate them in a concise document. One of the SEPP was the *State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP).

The Koala Habitat Protection SEPP commenced on 17 March 2021. The SEPP aims to *encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline*.

The provisions of Koala Habitat Protection SEPP applies to land zoned RU1, RU2, RU3 within the Wagga Wagga local government area. The Koala SEPP only applies to development applications and is not relevant to planning proposal. Three secondary Koala food tree species were identified on the site, these made up 100% of canopy trees across the site. In addition, there are four Koala records within 5km of the study area. As such, consideration of the Koala controls under the Biodiversity and Conservation SEPP will be required at the DA stage.

5.5 Watercourses and aquatic habitat

As outlined in Section 4.5, the mapped first order watercourses within the study appeared to be heavily modified for agricultural purposes. Because of this it is considered that they are unlikely to meet the definition of a 'river' under the WM Act, however a riparian assessment will need to be completed during the development assessment process. These watercourses are identified in Figure 13 as, 1A, 1B, 1C, and 1D. The ILP would result in the removal of the mapped 1st order streams.

A desktop assessment and observations during the field survey indicated that the 2nd order and 3rd order watercourses, identified in Figure 13 as 2A and 3A, is likely to meet the definition of a 'river' under the WM Act. As shown Figure 13, the indicative layout plan will retain the 2nd and 3rd order watercourses and their riparian zones. Where minor encroachments to the riparian buffer zone of these watercourses is necessary, offset requirements can be met with the current layout.

As such to be in accordance with the *NRAR's Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018)*, a vegetated riparian zone (VRZ) should be provided. The VRZ should be 20m from the top of both banks of the watercourse for the 2nd order watercourse and 30m for the 3rd. The Guidelines do allow for encroachments into the outer 50% of the VRZ (i.e. the outer 10m or 15 m either side) however, the area of encroachment into the VRZ must be offset through additional planting in a contiguous area connected to the VRZ. This is referred to as the averaging rule – refer to page 4 of the Guidelines.

Any development within waterfront land (40m from the top of bank) requires a controlled activity approval (CAA), unless exempt. Conditions of a CAA would outline the need for a Vegetation Management Plan (VMP) to rehabilitate and restore riparian corridors along rivers to a functioning native community. *NRAR's Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018)* require management and rehabilitation of the riparian land to a functional community, fully protected and vegetated with native endemic riparian plant species.

The farm dams may provide habitat for species commonly found in farm dams, including *Anguilla reinhardtii* (Long-finned Eel) and *Chelodina longicollis* (Eastern Long-necked turtle) as well as exotic species such as *Cyprinus carpio* (Carp). To ensure that there is no adverse impact on native aquatic species as a result of decommissioning the dams, a dam dewatering plan should be prepared that outlines safe handling and relocation procedures for fauna encountered during the dewatering process.

6. Conclusion

Eco Logical Australia Pty Ltd (ELA) was engaged by DevCore Property Group to prepare this ecological assessment to support a Planning Proposal to rezone 7066 Holbrook Road, Rowan (the study area) from RU1 Primary Production to R1 General Residential, R5 Large Lot Residential, B2 Local Centre and RE1 Public Recreation'. ELA understands that the Planning Proposal would be submitted to Wagga Wagga Council for approval under Part 3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report describes the ecological values present within the study area, provides an assessment of threatened flora and fauna species likely to occur and outlines the requirements for additional survey and reporting at the development application stage. Impacts to ecological values that could occur were assessed in relation to State and Commonwealth legislation, namely the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The assessment concluded that the majority of the area proposed for rezoning was highly modified and predominantly cleared of native vegetation. One threatened ecological community, *White-Box Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* which was assigned to Plant Community Type (PCT) 277 - *Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*. This community occurred in the central portion of the study area running west to east and was in poor condition. The patch contained a high proportion of exotic species in the groundcover layer and the midstorey was absent. Planted native and exotic vegetation and large areas of exotic cover in the form of pasture grass were also present in the study area. Planted native and exotic vegetation and exotic cover do not conform to a PCT.

No threatened flora or fauna species were identified during survey. The study area contains potential habitat for the following threatened fauna species, in the form of hollow bearing trees and native vegetation:

- *Anthochaera phrygia* (Regent Honeyeater) – species credit species
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow) – ecosystem credit species
- *Falco hypoleucos* (Grey Falcon) – ecosystem credit species
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – ecosystem credit species
- *Glossopsitta pusilla* (Little Lorikeet) – ecosystem credit species
- *Lathamus discolor* (Swift Parrot) – species credit species
- *Phascolarctos cinereus* (Koala) – species credit species
- *Polytelis swainsonii* (Superb parrot) – dual credit species
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) – ecosystem credit species
- *Pteropus poliocephalus* (Grey-headed Flying-fox) – dual credit species.

No threatened flora species are considered likely to occur due to the high level of ongoing disturbance throughout the study area.

Any future development would need to consider the requirements of section 7.9 of the BC Act. Should the Biodiversity Offsets Scheme be triggered, then a Biodiversity Development Assessment Report (BDAR) would need to be prepared, consistent with the Biodiversity Assessment Method. If future development, once the land has been rezoned, clears >0.25 ha of native vegetation, then it is likely that the BOS would be triggered and a BDAR would be required.

The mapped 1st order watercourses within the study area are considered unlikely to meet the definition of a 'river' under the WM Act. Field observations and desktop assessment indicated the watercourses have been impacted by agriculture work, and no defined bed or banks or evidence of geomorphic processes was present. A riparian assessment will have to be prepared for the development assessment (DA) stage of the proposal.

The 2nd and 3rd order watercourse which transects the site from south west to north east is considered likely to meet the definition of a 'river' under the WM Act. As such, a controlled activity approval (CAA) will be required at the DA stage. The CAA will likely require the revegetation of the riparian zone in accordance with *NRAR's Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018)

7. References

Australian Government Department of the Environment (DotE) 2013. The EPBC Act Significant impact guidelines 1.1 – Matters of National Environmental Significance.

Churchill, S. 2008. *Australian Bats, Second Edition*. New Holland Publishers.

Cropper, S.C. 1993. *Management of Endangered Plants*. CSIRO Australia, Melbourne.

Department of Agriculture, Water and the Environment Australian Government (DAWE) 2022. *SPRAT Profiles*. Available at <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>. Accessed March 2022

Department of Agriculture, Water and the Environment - Australian Government (DAWE) 2022b. *EPBC Act Protected Matters Report*. Available: <http://www.environment.gov.au/epbc/pmst/>. Accessed March 2022.

Department of Energy, Environment, and Conservation (DEEC) 2007. Threatened species assessment guidelines – The assessment of significance. Australian Government.

Department of the Environment (DotE) 2013. Significant Impact Guidelines. Available: <http://www.environment.gov.au/epbc/publications/significant-impact-guidelines-11-matters-national-environmental-significance>.

Department of Planning, Infrastructure and Environment (DPIE) 2020. *Biodiversity Assessment Method*. NSW Government, October 2020.

Department of Planning, Infrastructure and Environment (DPIE) 2010 *Soil Landscapes of the Wagga Wagga 1:100,000 Sheet*.

Department of Planning Infrastructure and Environment (DPIE) 2022. *Threatened Species Database* (5 km radius search). OEH Sydney, NSW. (Data viewed February 2022a).

Department of Planning, Infrastructure and Environment (DPIE, 2022b). *Threatened Species Profiles*. Available: <http://www.environment.nsw.gov.au/threatenedspecies>. Accessed February 2022.

Espade 2.1 - <https://www.environment.nsw.gov.au/eSpade2Webapp> - 14/03/2021

National Parks and Wildlife Services 2003, *The Bioregions of New South Wales - their biodiversity, conservation and history (NPWS, 2003)*

Royal Botanic Garden (RBG) 2015. NSW FloraOnline database (PlantNET). Available online: <http://plantnet.rbgsyd.nsw.gov.au/search/spatial.htm>.

Appendix A Likelihood of Occurrence

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal study area, results of the study area inspection and professional judgement. Some endangered populations outside their area of occurrence have been excluded from the assessment. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- “yes” - the species was or has been observed on the study area
- “likely” = a medium to high probability that a species uses the study area
- “potential” = suitable habitat for a species occurs on the study area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the study area
- “no” = habitat on study area and in the vicinity is unsuitable for the species.

An assessment of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the study area visit and that potential to be significantly impacted. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, an assessment of significance in reference to State or Commonwealth legislation was not considered necessary.

Note, that assessments for the likelihood of occurrence were made both prior to study area inspection and following study area inspection. The pre-survey assessments were performed to determine which species were “affected species”, and hence determine which sorts of habitat to look for during study area inspection. The post-survey assessments to determine “final affected species” were made after observing the available habitat in the study area and are depicted in the table below.

The records column refers to the number of records occurring within 5 km of the study area, as provided by the NSW BioNet database search.

Information provided in the habitat associations' column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database (DotEE 2017b) and the NSW Threatened Species Profiles (OEH 2017a).

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
<i>Threatened ecological communities</i>						
<i>White Gum Box-Yellow Gum</i>	<i>Box-Blakely's Red Woodland and Derived Native Grassland</i>	E	CE	"Occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. In NSW, it occurs in the Brigalow Belt South, Nandewar, New England Tableland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes and Riverina Bioregions. Areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m.	Yes – identified in the study area during survey	Yes
<i>Threatened fauna</i>						
<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of <i>Casuarina cunninghamiana</i> (River Oak).	Potential	Yes
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V	V	In NSW, only known from the Central and Southern Tablelands, and the South Western Slopes. Sloping, open woodland areas with predominantly native grassy groundlayers, rocky outcrops or scattered, partially-buried rocks.	Unlikely – suitable habitat present	No
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. (bullrushes) and <i>Eleocharis</i> spp. (spikerushes).	Potential – marginal habitat available at some dams	Yes
<i>Calidris ferruginea</i>	Curlew Sandpiper	E1	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including	No – no suitable habitat present	No

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
				intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.		
<i>Callocephalon fimbriatum</i>	Gang-gang Cuckatoo	V	-	In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.	Potential marginal foraging habitat available	– Yes
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	V	-	From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Eucalypt woodlands and dry open forest.	Potential marginal foraging habitat available	– Yes
<i>Crinia sloanei</i>	Sloane's Froglet	V	E	Floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in NSW. Periodically inundated areas in grassland, woodland and disturbed habitats.	Potential marginal foraging habitat available	– Yes
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – habitat in the study area and surrounding landscape is highly fragmented	No
<i>Falco hypoleucos</i>	Grey Falcon	E1	V	Arid and semi-arid zones. In NSW, found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands.	Potential	No
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Potential suitable foraging habitat available	– Yes

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.	Unlikely – lack of suitable habitat	No
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely – lack of suitable habitat	No
<i>Lathamus discolor</i>	Swift Parrot	CE	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	Potential – suitable foraging habitat available	Yes
<i>Leipoa ocellata</i>	Malleefowl	E1	V	Arid and semi-arid zones. In NSW, populations occur in the south west mallee centred on Mallee Cliffs NP and extending east to near Balranald; in the Scotia mallee west of the Darling River; and in the Goonoo forest near Dubbo. Recorded less recently in the Pilliga forests, around Cobar and Goulburn River NP. Predominantly mallee communities. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands, or other woodlands dominated by Mulga or native Cypress Pine species.	No - suitable vegetation communities not present	No
<i>Litoria raniformis</i>	Growling Frog	Grass E1	V	In NSW, only known to exist in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few recent unconfirmed records have also been made in the Murray Irrigation Area. Permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. Also found in irrigated rice crops.	No - suitable habitat not present	No
<i>Neophema pulchella</i>	Turquoise Parrot	V		Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.	Potential – suitable foraging habitat available	Yes

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
<i>Numenius madagascariensis</i>	Eastern Curlew		CE	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	No – lack of suitable habitat	No
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	Distribution coincides approximately with the Murray Darling Basin; the Pilliga Scrub region is the distinct stronghold for this species. Mallee, <i>Allocasuarina luehmannii</i> (bulloke) and box eucalypt- dominated communities, especially box/ironbark/cypress-pine vegetation.	Potential – suitable foraging habitat available	Yes
<i>Petroica phoenicea</i>	Flame Robin	V	-	In NSW, breeds in upland areas, and in winter many birds move to the inland slopes and plains, or occasionally to coastal areas. Likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands. In winter uses dry forests, open woodlands, heathlands, pastures and native grasslands. Occasionally occurs in temperate rainforest, herbfields, heathlands, shrublands and sedgeland at high altitudes.	Potential – suitable foraging habitat available	Yes
<i>Phascolarctos cinereus</i>	Koala	E	E	Known from, and in the immediate vicinity of, the towns of Hawks Nest and Tea Gardens in the Great Lakes Local Government Area. Eucalypt forest and woodland communities, including coastal forests, rainforest, riparian areas, swamp sclerophyll forests, heathland and shrubland.	Unlikely – habitat in the study area and surrounding landscape is highly fragmented	No
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	In NSW, occurs on inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems. Box-gum woodland, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Likely – suitable habitat available and nearby records	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria.	Likely – suitable habitat available and nearby records	Yes

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
				Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.		
<i>Rostratula australis</i>	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	No – lack of suitable habitat	No
Threatened flora						
<i>Austrostipa wakoolica</i>		E	E	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. Floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils.	Unlikely – study area in poor condition. Suitable habitat not present	No
<i>Brachyscome muelleroides</i>	Claypan Daisy	V	V	In NSW found in the Wagga Wagga, Narranderra, Tocumwal and Walbundrie areas. Margins of claypans in moist grassland with <i>Pycnosorus globosus</i> , <i>Agrostis avenacea</i> and <i>Austrodanthonia duttoniana</i> ; margins of lagoons in association with <i>Calotis anthemoides</i> .	Unlikely – study area in poor condition. Suitable habitat not present	No
<i>Caladenia arenaria</i>	Sand-hill Spider Orchid	V	V	Found only in NSW, in only two populations, north of Narranderra, on the south-western slopes of NSW, and near Lake Urana, on the south western plains of NSW. Woodland with sandy soil, especially that dominated by <i>Callitris glaucophylla</i> (White Cypress Pine).	Unlikely – study area in poor condition. Suitable habitat not present	No
<i>Prasophyllum petilum</i>	Tarengo Leek-orchid	E	E	Four sites in NSW: at Boorowa, Captains Flat, Ilford and Delegate. Also experimentally introduced at Bowning Cemetery NSW. Natural Temperate Grassland, grassy woodland, and Box-Gum woodland.	Unlikely – study area in poor condition. Suitable habitat not present	No
<i>Swainsona recta</i>	Small Purple-pea	E1	E	Queanbeyan and Wellington-Mudgee areas. Historically also recorded at Carcoar, Culcairn and Wagga Wagga. Grassland, open woodland and open	Unlikely – study area in poor	No

Scientific name	Common name	BC Act status	EPBC Act status	Distribution and habitat	Likelihood of occurrence	Future consideration recommended
				forests dominated by <i>Eucalyptus blakelyi</i> (Blakely's Red Gum), <i>E. melliodora</i> (Yellow Box), <i>E. rubida</i> (Candlebark Gum) and <i>E. gonicalyx</i> (Long-leaf Box).	condition. Suitable habitat not present	

Appendix B Species Lists

Table 7: Flora species recorded within the study area

Species Name	Common Name	Native / exotic	Priority Weed/WoNS
<i>Acacia</i> sp.		N	
<i>Allocasuarina</i> sp.		N	
<i>Bothriochloa macra</i>	Red Grass	N	
<i>Bromus catharticus</i>	Prairie grass	E	
<i>Carthamus lanatus</i>	Saffron Thistle	E	
<i>Chenopodium album</i>	Fat Hen	E	
<i>Conyza bonariensis</i>	Flax-leaf Fleabane	E	
<i>Cyperus gracilis</i>		N	
<i>Einadia trigonos</i>		N	
<i>Enteropogon</i> sp.		N	
<i>Eragrostis curvula</i>	African Lovegrass	E	WoNS
<i>Eucalyptus stellulata</i>	Black Sally	N	
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	N	
<i>Eucalyptus albens</i>	White Box	N	
<i>Eucalyptus melliodora</i>	Yellow Box	N	
<i>Eucalyptus rubida</i>	Candlebark	N	
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	N	
<i>Geranium solanderi</i>	Native Geranium	N	
<i>Hypochaeris radicata</i>	Catsear	E	
<i>Juncus usitatus</i>		N	
<i>Liquidambar styraciflua</i>	Liquidambar	E	
<i>Malva parviflora</i>	Small-flowered allow	E	
<i>Melaleuca armillaris</i>	Cream Paperbark	N	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	N	
<i>Modiola caroliniana</i>	Red-flowered Mallow	E	
<i>Oxalis perennans</i>		N	
<i>Paspalidium distans</i>		N	
<i>paspalum dilatatum</i>	Paspalum	E	
<i>Phalaris</i> sp.		E	
<i>Populus alba</i>	White Poplar	E	
<i>Rubus fruticosus</i> spp. aggregate	Blackberry	E	Priority weed and WoNS
<i>Rumex brownii</i>	Swamp Dock	N	
<i>Setaria parviflora</i>	Pigeon Grass	E	

Species Name	Common Name	Native / exotic	Priority Weed/WoNS
<i>Solanum nigrum</i>	Blackberry Nightshade	E	
<i>Urtica incisa</i>	Stinging Nettle	N	
<i>Xanthium spinosum</i>	Bathurst Burr	E	

Table 8: Fauna species recorded within the study area

Scientific Name	Common Name	Observation Type
<i>Ardea alba</i>	Cattle Egret	Observed
<i>Corvus coronoides</i>	Raven	Observed
<i>Crinia signifera</i>	Common Froglet	Heard
<i>Eolophus roseicapillus</i>	Galah	Observed
<i>Grallina cyanoleuca</i>	Magpie Lark	Observed
<i>Gymnorhina tibicen</i>	Australian Magpie	Observed
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	Observed
<i>Platycercus eximius</i>	Eastern Rosella	Observed