

West Nyangay Solar Farm

Biodiversity Constraints Assessment

Australian Solar Farms/Urbis

1 August 2024

Final



Report No. 24062RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
1	24/06/2024	DS/GK	Final report to support scoping report
2	1/08/2024	GK	Final – updates for DPHI comments on NVR map

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Glossary

Abbreviation	Definition
ASF	Australian Solar Farms (the client)
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BCD	Biodiversity Conservation Division
BoM	Bureau of Meteorology
BV Map	Biodiversity Values Map
CEEC	Critically Endangered Ecological Community
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPHI	NSW Department of Planning, Housing and Infrastructure
EAH	Environment Agency Head
EEC	Endangered Ecological Community
EHG	Environment and Heritage Group (part of NSW Department of Climate Change, Energy, the Environment and Water)
EIS	Environmental Impact Statement
EP&A Act	NSW <i>Environmental Planning & Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environmental Protection and Biodiversity Conservation Act 1999</i>
FM Act	NSW <i>Fisheries Management Act 1994</i>
GDE	Groundwater Dependent Ecosystem
gw	gigawatts
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	Local Environment Plan
LGA	Local Government Area
LLS Act	NSW <i>Local Land Services Act 2013</i>
MNES	Matters of National Environmental Significance
mw	megawatts
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NVR Map	Native Vegetation Regulatory Map
PCT	Plant Community Type
PMST	Protected Matters Search Tool
REZ	Renewable Energy Zone
SAII	Serious And Irreversible Impacts

Abbreviation	Definition
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened ecological community
WM Act	NSW <i>Water Management Act 2000</i>



1. Introduction

1.1. Purpose

Cumberland Ecology has been engaged by Urbis Pty Limited (Urbis), on behalf of Australian Solar Farms Pty Ltd (ASF), to provide an ecological assessment for the proposed West Nyangay Solar Farm (the Project). The capital investment value of the Project is valued at over \$30 million and the project is considered State Significant Development (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *State Environmental Planning Policy (Planning Systems 2021)* (Planning Systems SEPP). Therefore, the Project will require the issue of the Planning Secretary's Environmental Assessment Requirements (SEARs) by the Department of Planning, Housing and Infrastructure (DPHI).

The purpose of this biodiversity constraints assessment is to provide preliminary biodiversity information to inform the scoping report currently being prepared by Urbis to support the Request for SEARs for the Project.

While this report is not designed to satisfy the legislative and statutory requirements of the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), NSW *Biodiversity Conservation Act 2016* (BC Act) and other relevant legislation (refer **Section 1.4** of this report), it nonetheless provides discussion of the legislative requirements for the future development of the Project and identification of the likely assessment pathways under both Commonwealth and NSW legislation.

1.2. Background

1.2.1. Project Overview

Australian Solar Farms (ASF) propose to develop the West Nyangay Solar Farm (the Project) to provide a reliable and affordable source of energy for the people of New South Wales (NSW) and contribute to reducing greenhouse gas emissions associated with energy generation.

The Project is located along the Cobb Highway near Booroorban in the Riverina region of NSW. The Project is located in the Edward River Council Local Government Area (LGA), which was formed in 2016 as an amalgamation of Conargo LGA and Deniliquin LGA (**Figure 1**). The Project Area is the maximum spatial extent of the Project defined by all current land access available to ASF and covers approximately 5,502 hectares (ha).

The Project Area is zoned as RU1 Primary Production under the Conargo Local Environmental Plan (LEP) 2013. The majority of land that surrounds the Project Area is also zoned RU1 Primary Production. (**Figure 2**).

The topography of the Project Area is consistently flat, being approximately 80 m AHD across the Project Area.

1.2.2. Renewable Energy Zone (REZ)

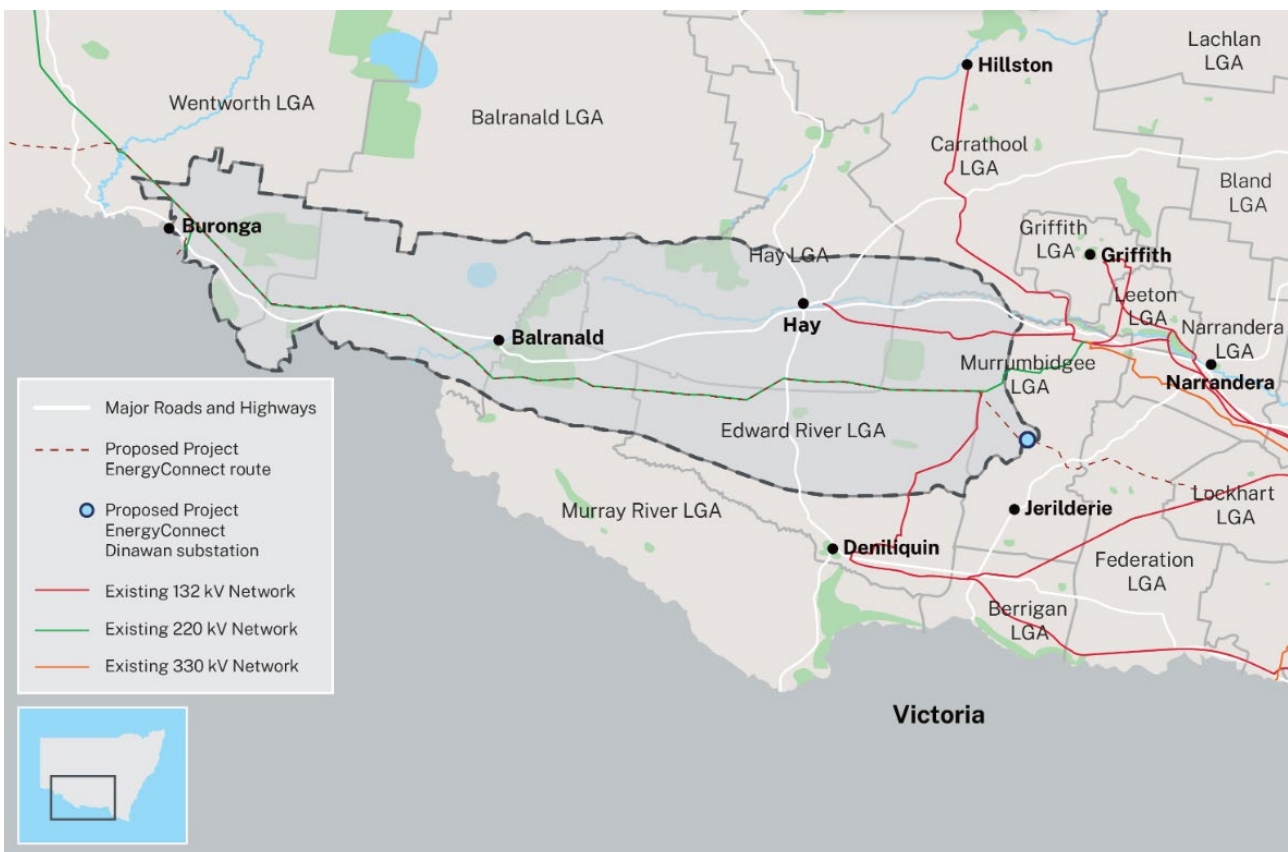
The NSW Government, as part of their 'Electricity Strategy' and 'Electricity Infrastructure Roadmap' designated multiple Renewable Energy Zones (REZs), these being the Central-West Orana, New England, South-West, Hunter-Central Coast and Illawarra REZs. The purpose of the REZs is to group new wind and solar power generation into locations where it can be efficiently stored and transmitted across NSW.

The Project Area is located entirely within the South West REZ. The indicative location of the South West REZ was chosen following a detailed statewide geospatial mapping exercise undertaken by the NSW Government

in 2018. The initial analysis sought to identify optimal locations to host renewable energy generation around the State, including areas with strong renewable energy resource potential, proximity to the existing electricity network, and consideration of potential interactions with existing land uses, including agricultural lands and biodiversity conservation. The South West REZ was chosen due to an abundance of high-quality wind and solar resources, proximity to existing and planned high voltage transmission, relative land use compatibility and a strong pipeline of proposed projects.

EnergyCo NSW is responsible for planning and is continuing to refine the geographical extent of REZs. However, based on current mapping prepared in 2021, the proposed Project is within the boundaries of the REZ. **Image 1** below shows the location of the current proposed South West REZ.

Image 1 South West Renewable Energy Zone



1.2.3. Indicative Project Design

The West Nyangay Solar Farm will have a solar capacity of approximately 796 megawatts (MWac) and a storage capacity of 504MWac/2078MWh. The project will connect into the national electricity grid via connection into the 220kV Transgrid line that traverses west to east- through the northern portion of the Project Area. The Project will include the construction of solar arrays, a battery energy storage system (BESS), inverters and ancillary infrastructure, internal access roads, a switch yard, an office and amenities building (s). The Project will contribute to NSW's transition to renewable energy generation.

1.3. Statutory Considerations

Commonwealth and State Legislation relevant to this biodiversity constraints assessment report is described in **Table 1**.

Table 1 Legislation relevant to the project

Relevant legislation	Governing Agency	Summary
Commonwealth legislation		
<i>Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW)	<p>The EPBC Act prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas of national significance. It also provides a mechanism for national environment protection and biodiversity conservation.</p> <p>The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and provides protection for listed Matters of National Environmental Significance (MNES) including:</p> <ul style="list-style-type: none"> Listed species and communities (e.g. listed threatened species and ecological communities and migratory species); Protected areas (e.g. World Heritage properties, Ramsar wetlands of international significance, conservation zones); and National, Commonwealth and Indigenous Heritage. <p>Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES must be referred to the Commonwealth Minister for DCCEEW. The significance of the proposed action on MNES can be determined through self assessment using Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (insert REF from endnote).</p> <p>In accordance with the Bilateral Agreement reached between the NSW and Commonwealth Governments, an Environmental Impact Statement (EIS) and associated documentation under the NSW <i>Environmental Planning & Assessment Act 1979</i> (EP&A Act, see below) for State Significant Development (SSD) can also be used for an EIS under the EPBC Act. This is possible for a "controlled action" and if directed by the Commonwealth Minister.</p>
State legislation		
<i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i>	Department of Planning, Housing and Infrastructure	The Environmental Planning & Assessment Act 1979 (EP&A Act) is the overarching planning legislation in NSW that provides for the

Relevant legislation	Governing Agency	Summary
<i>Assessment Act 1979</i> (EP&A Act)	Infrastructure (DPHI)	creation of planning instruments that guide land use. The EP&A Act also provides for the protection of the environment, including the protection and conservation of native animals and plants. This includes threatened species, populations and ecological communities, and their habitats of biodiversity values as listed in the <i>Biodiversity Conservation Act 2016</i> (BC Act) and <i>NSW Fisheries Management Act 1994</i> (FM Act). The EIS anticipated to be prepared for the Project will meet the necessary environmental assessment requirements under the relevant provisions of the EP&A Act.
<i>Biodiversity Conservation Act 2016</i> (BC Act)	NSW Department of Climate Change, Energy, the Environment and Water: Environment and Heritage Group (EHG)	<p>The BC Act is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is supported by several regulations, including the <i>Biodiversity Conservation Regulation 2017</i> (BC Regulation).</p> <p>A key component of the BC Act is the introduction of the Biodiversity Offsets Scheme (BOS). The BOS is intended to simplify biodiversity assessment and improve biodiversity outcomes by creating consistent assessment requirements to measure the likely biodiversity loss of development proposals and gains in biodiversity value achieved at offset sites through active management. The BOS has several triggers for entry into the scheme for local development while SSD and SSI automatically enter the scheme unless a waiver is granted. Projects that enter the BOS are assessed via a Biodiversity Development Assessment Report (BDAR) prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) established under Section 6.7 of the BC Act.</p> <p>The potential impacts associated with the Project are such that a BDAR will be required.</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	NSW Department of Climate Change, Energy, the Environment and Water: National Parks	The <i>National Parks and Wildlife Act 1974</i> (NPW Act) provides for the protection of Aboriginal sites and designated conservation areas as well as the flora and fauna within conservation areas. The objective of the NPW Act is to consolidate and amend the law relating to the establishment, preservation and management of national parks, historic sites, certain other areas, and the protection of certain fauna, native plants and Aboriginal objects.

Relevant legislation	Governing Agency	Summary
	and Wildlife Services (NPWS)	There are no conservation areas declared under the NPW Act that are within Project Area. However, the South West Woodland nature reserved is located about 10m south-west of the Project Area. Oolambeyan National Park is located further to the east of the Project Area while Murrumbidgee Valley National Park is located further to the north-west of the Project Area.
<i>Fisheries Management Act 1994</i> (FM Act)	Department of Primary Industries (DPI)	<p>The FM Act protects threatened fish species and marine vegetation and identifies associated threatening processes and is administered by the DPI (Fisheries).</p> <p>The FM Act has the objective to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. In particular, this Act includes measures to conserve fish stocks and key fish habitats, to conserve threatened species, populations and ecological communities of fish and marine vegetation, and to promote ecologically sustainable development, including the conservation of biological diversity.</p> <p>Assessments under the FM Act are required to assess potential impacts to areas mapped as Key Fish Habitat and/or indicative distributions of threatened freshwater species.</p>
<i>Water Management Act 2000</i> (WM Act)	NSW Department of Climate Change, Energy, the Environment and Water: Water (NSW Water)	<p>The objectives of the WM Act are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations. In regard to biodiversity, the WM Act focuses on Ecologically sustainable development, protecting, enhancing and restoring water resources and management of water sources with other aspects of the environment including native vegetation and native fauna.</p> <p>Assessments under the WM Act are required to assess the presence of 'waterfront' land and provide suitable riparian buffers based on the ranking of the watercourse</p>
<i>Local Land Services Act 2013</i> (LLS Act)	Local Land Services (LLS)	<p>The <i>Local Land Services Act 2013</i> (LLS Act), supported by the Local Land Services Regulation 2014 (LLS Regulation), established 11 regional Local Land Services organisations to provide biosecurity, natural resources management and agricultural advisory services. Under Part 5A of the LLS Act and the supporting regulation, a Native Vegetation Regulatory (NVR) map showing the extent of categorised land in NSW is to be published. The NVR map underpins the legislative framework for native vegetation clearing in rural areas by categorising land in NSW. However, the map applies only to the following zones (if they are not in an excluded LGA): Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU5 Primary Production Small Lots and Zone RU6 Transition. Currently, various map categories have been released under staged transitional arrangements. The online NVR map viewer currently displays a) Category 1 exempt land, b) Category 2</p>

Relevant legislation	Governing Agency	Summary
		regulated land, c) Category 2 – Vulnerable regulated land and d) Category 2 – Sensitive regulated land.
<i>Biosecurity Act 2015</i>	DPI	<p>The Biosecurity Act is a wide-ranging legislation that outlines the requirements of government, councils, private landholders, and public authorities in the management of biosecurity matters. Priority weeds are regulated under the Biosecurity Act with a general biosecurity duty to prevent, eliminate or minimize any biosecurity risk they may pose. Some priority weeds have additional management obligations which may apply generally, or under specific circumstances. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised as is reasonably practicable.</p>
State Environmental Planning Policy (Biodiversity and Conservation) – 2021:	EHG	<p>State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) came into force on 1 March 2022 and consolidates and repeals the provisions of multiple SEPPs. The consolidation is purely administrative and the provisions of the previous SEPPs - now chapters of the Biodiversity and Conservation SEPP - continue to apply to relevant land. The relevance/application of the various chapters of the Biodiversity and Conservation SEPP to the Project are detailed below:</p> <p><i>Chapter 2 Vegetation in non-rural areas:</i> This Chapter does not apply to the Project as it is not located within any of the local government areas (LGAs) listed in Clause 2.3.</p> <p><i>Chapter 3 Koala Habitat Protection 2020:</i> This Chapter potentially applies to the Project as it is located within a LGA listed in Schedule 2 of the SEPP. However, the development control provisions mainly apply to local development as granted by the relevant council. As Project comprises State Significant Development, the provisions of Chapter 3 do not apply to the Project as Chapter 3 does not establish any specific obligations, considerations or provisions for SSDs.</p> <p><i>Chapter 4 Koala Habitat Protection 2021:</i> This Chapter does not apply to the Project as it is not located within any of the local government areas (LGAs) as specified in Clause 4.4 (3) (d).</p> <p><i>Chapter 5 River Murray Lands:</i> This Chapter does not apply to the Project as the site is not within the land shown on the map depicting riverine land of the River Murray as specified in Clause 5.3.</p>

Relevant legislation	Governing Agency	Summary
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Chapter 6 Water catchments: This Chapter does not apply to the Project as the site is not located within any of the catchments listed in Clause 6.1

Chapters 7 – 12: Repealed

Chapter 13 Strategic conservation planning: This Chapter does not apply to the Project as the site is not located within land shown on the Land Application Map as specified in Clause 13.1

2. Methodology

2.1. Desktop Assessment

Database analysis was conducted for the locality using the Environment and Heritage Group (EHG) BioNet Atlas (EHG, 2024a) and the Commonwealth Protected Matters Search Tool (PMST) (DCCEEW, 2024). The locality is defined as the area within a 10 km buffer around the Project Area. The BioNet Atlas and PMST outputs were examined for records of any threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within the locality.

The following databases and datasets were also interrogated:

- BioNet Vegetation Classification database (EHG, 2024b) ;
- Threatened Biodiversity Data Collection (TBDC) (EHG, 2024d);
- NSW Biodiversity Values Map (DCCEEW (NSW), 2024);
- ePlanning Spatial Viewer – Land Zoning Maps (DPHI, 2024);
- Hydrological datasets (DPIE, 2021);
- Groundwater Dependent Ecosystems Atlas (BOM, 2024); and
- Probable Vegetation Groundwater Dependent Ecosystems in NSW (NSW - Water, 2024).

2.2. Vegetation Mapping

Mapping layers from the NSW State Vegetation Type Map (SVTM) (EHG, 2024c) which covers the Project Area and wider locality were reviewed to determine the potential vegetation communities within Project Area and Disturbance Area, including those that align to Threatened Ecological Communities (TECs).

2.3. Reconnaissance Surveys

Cumberland Ecology conducted preliminary reconnaissance surveys of the Project Area between 27 – 31 May 2024. The vegetation within the Project Area was ground-truthed to examine and verify the mapping of the condition and extent of the different plant communities with particular reference to Threatened Ecological Communities (TECs) listed under the BC Act and EPBC Act.

Mapping of plant communities within the Project Area was undertaken by random meander surveys through patches of vegetation, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Records of plant community boundaries were made using a hand-held Global Positioning System and mark-up of aerial photographs. The resultant information was synthesised using GIS to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the study area.

The vegetation mapping was supported by conduction of Vegetation Integrity assessments in accordance with the Biodiversity Assessment Method (BAM) (hereafter referred to as BAM plots). BAM plots surveys included establishment of 20 x 50 m plots, with an internal 20 x 20 m floristic plot. A total of 20 BAM plots were

conducted to support revised vegetation mapping with the following data being collected within each of the plots:

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

The presence of fauna habitat within the proposed Project Area was also noted. Specific attention was paid to the potential occurrence of waterbodies (including artificial dams), creek lines, rocky outcrops and presence of hollow bearing trees.

2.3.1. Limitations and Constraints

As the field surveys comprised preliminary reconnaissance surveys, not all vegetation patches or areas of fauna habitat within the proposed Project Area could be surveyed in detail in the time allowed. Reconnaissance surveys conducted between 27 – 31 May 2024 were mainly conducted in the southern half of the Project Area where the impact footprint is currently proposed to be located.

Within the southern half of the Project Area, representative areas were surveyed in detail with other vegetation patches assessed using Rapid Assessment Points during walking and driving surveys.

3. Existing Biodiversity Values

3.1. Landscape Context

The landscape context which describes attributes that are potentially relevant to the biodiversity occurring in the Project Area is outlined in **Table 2** and shown on **Figure 3** below.

Table 2 Landscape features of the Project Area

Landscape features	Landscape context
IBRA region	Riverina
IBRA subregion	Murrumbidgee
NSW (Mitchell) Landscapes	<ul style="list-style-type: none"> • Murrumbidgee Scalded Plains • Murrumbidgee Depression Plains
Land tenure, parks and reserves	<ul style="list-style-type: none"> • Private freehold • Public roads • Paper Crown roads and Crown Easements
Rivers, stream and estuaries	The Project Area and wider locality contain several streams that range from 1 st order (as per the Strahler System of ordering watercourses) to 6 th order streams. The main stream passing through the Project Area is Nyangay Creek which was dry at the time of the May 2024 surveys and therefore appears to be highly ephemeral in nature. The main watercourse through the Project Area is a drainage spillway from a large dam towards the western parts of the Project Area
Wetlands (within, adjacent to and downstream)	No important wetlands listed in the Directory of Important Wetlands in Australia are present in the Project Area and wider locality.
Areas of geological significance or soil hazard features	No acid sulphate soils as per the OEH Acid Sulfate Soils Risk mapping (OEH, 2016) have been mapped within the Project Area.
Connectivity	<p>The Project Area and wider locality is comprised of multiple agricultural properties. The historic land use of the locality has impacted on the presence of fauna corridors within the landscape as extensive land clearing has occurred for agricultural purposes.</p> <p>Within the wider locality, the vegetation corridors are somewhat fragmented due to historic land uses, with connectivity mainly limited to riparian corridors and waterways. The extent of wooded/shrubby areas in the locality varies from property to property depending on the individual land management practices of existing and previous land managers/owners.</p> <p>On a wider regional level there is patchy or ‘stepping-stone’ connectivity due to widespread clearing across agricultural lands.</p>

3.2. Native Vegetation Regulatory Map

The native vegetation regulatory map (NVR map) underpins the legislative framework for native vegetation clearing in rural areas by categorising land in NSW. The map applies only to the following zones if they are not in an excluded LGA: Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU5 Primary Production Small Lots and Zone RU6 Transition. As land within the project area is zoned as RU1 Primary Production under the Conargo Local Environmental Plan (LEP) 2013, the NVR map applies to the Project Area.

The NVR map designates areas of land where clearing of native vegetation is categorised as regulated or exempt under Part 5A of the LLS Act. The majority of the Project Area is mapped as Category 2 regulated land while the sections of Nyangay Creek that pass through the Project Area are mapped as Category 2 vulnerable regulated land (**Figure 4**). Clearing of native vegetation on regulated land may require authorisation from Local Land Services and may be limited under the Land Management (Native Vegetation) Code 2018.

However, Section 60O of the LLS Act states that clearing of vegetation in a regulated rural area can be authorised under other legislation, including Part 4 Development under the EP&A Act. The proposed development fits the criteria for a SSD under the EP&A Act and is to be assessed accordingly, including ecological assessment in accordance with the BC Act. Therefore, as any proposed vegetation clearing will be conducted as part of a Part 4 development approval, authorisation from Local Land Services or the Native Vegetation Panel under the LLS Act is not required.

3.3. Important Habitat Mapping

Important habitat maps identify areas that are considered essential to support critical life stages of specific species, for example breeding areas or locations important for foraging or over-wintering for migratory species. Important habitat maps, in accordance with Section 5.1.3 of the BAM, are provided for the following species:

- Regent Honeyeater (*Anthochaera phrygia*);
- Swift Parrot (*Lathamus discolor*);
- Plains-wanderer (*Pedionomus torquatus*); and
- Migratory Shorebirds.

Important habitat mapping for the Swift Parrot (*Lathamus discolor*), Regent Honeyeater (*Anthochaera phrygia*) and Migratory Shorebirds are not present within the Project Area. A small strip of vegetation towards the west to north- western parts of the Project Area are mapped as important habitat for the Plains-wanderer (**Figure 5**).

3.4. Biodiversity Values Map

The Biodiversity Values (BV) map identifies land with high biodiversity value that is especially sensitive to impacts from development and clearing.

Review of the Biodiversity Values Map (BV Map) confirmed that parts of the Project Area are mapped on the BV Map. The BV mapping within the Project Area largely follows the mapped hydrolines of Nyangay Creek and

other creeklines and therefore is largely based on presence of riparian lands (**Figure 5**). However, some areas of the BV map also constitute Important Habitat for the Plains Wanderer.

3.5. Vegetation Communities

3.5.1. Plant Community Types

Desktop assessments of the Eastern NSW State Vegetation Type Map (SVTM) and the reconnaissance surveys by Cumberland Ecology identified 13 Plant Community Types (PCTs) and one exotic community within the Project Area. The extent of these PCTs within the Project Area is summarised in **Table 3**. Note the values below includes remapping of the southern half of the Project Area following reconnaissance surveys by Cumberland Ecology.

Table 3 Plant Community Types present within the Project Area

Plant Community Type	Approximate extent (ha) within Project Area			PCT description
	SVTM mapping (ha)	Cumberland Ecology mapping (ha)	Total (ha)	
13 - Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	88.12	193.20	281.32	Woodland, open forest or open woodland averaging about 15 m high dominated by a sparse to dense stands of Lignum (<i>Muehlenbeckia florulenta</i>), Nitre Goosefoot (<i>Chenopodium nitrariaceum</i>) and River Cooba (<i>Acacia stenophylla</i>). The ground cover includes low shrubs such as <i>Sclerolaena muricata</i> var. <i>muricata</i> , <i>Enchylaena tomentosa</i> , <i>Einadia nutans</i> subsp. <i>nutans</i> and various saltbush species (<i>Atriplex</i> spp.).
15 - Black Box open woodland wetland with chenopod understorey mainly on the outer floodplains in southwestern NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	28.06	0.00	28.06	Woodland or open woodland dominated by Black Box (<i>Eucalyptus largiflorens</i>) with an understorey of chenopod shrubs such as Black Bluebush (<i>Maireana pyramidata</i>), Maireana decalvans, Nitre Goosefoot (<i>Chenopodium nitrariaceum</i>) and Old Man Saltbush (<i>Atriplex nummularia</i>) but the latter has mostly disappeared due to grazing. Small shrubs include Bladder Saltbush (<i>Atriplex vesicaria</i>) and Cotton Bush (<i>Maireana aphylla</i>) with a ground cover of annual or perennial saltbushes, copperburrs, grasses and forbs.
24 - Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains	49.61	0.00	49.61	Tall, tussock grassland dominated by Canegrass (<i>Eragrostis australasica</i>) growing to over 2 m high ranging in cover from dense to isolated plants. Sometimes growing with Glasswort (<i>Sclerostegia tenuis</i>) or samphire <i>Halosarcia pergranulata</i> . Depending which part of NSW a range of grass species may be present including Windmill Grass (<i>Chloris truncata</i>), Blown Grass (<i>Lachnagrostis filiformis</i>), Plains grass (<i>Austrostipa aristiglumis</i>), Neverfail (<i>Eragrostis setifolia</i>) and <i>Eragrostis parviflora</i> .

Plant Community Type	Approximate extent (ha) within Project Area			PCT description
	SVTM mapping (ha)	Cumberland Ecology mapping (ha)	Total (ha)	
28 - White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	355.46	12.30	367.76	Open woodland or a derived grassland with scattered trees up to 15 m high dominated by White Cypress Pine (<i>Callitris glaucophylla</i>). Associated small trees or tall shrubs include Buloke (<i>Allocasuarina luehmannii</i>), Needlewood (<i>Hakea leucoptera</i>), Hooked Needlewood (<i>Hakea tephrosperma</i>), Sugarwood (<i>Myoporum platycarpum</i>), <i>Pittosporum angustifolium</i> , Western Rosewood (<i>Alectryon oleifolius</i> subsp. <i>canescens</i>), Emu Bush (<i>Eremophila longifolia</i>) and Wilga (<i>Geijera parviflora</i>). Common chenopod shrub species include Black Bluebush (<i>Maireana pyramidata</i>), <i>Maireana enchylaenoides</i> and Thorny Saltbush (<i>Rhagodia spinescens</i>).
46 - Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	111.39	7.72	119.11	Open to closed tussock grassland generally about 0.3 m high dominated by Curly Windmill Grass (<i>Enteropogon ramosus</i>), corkscrew grass (<i>Austrostipa nodosa</i> and/or <i>Austrostipa scabra</i>) and a number of wallaby grass species (<i>Austrodanthonia</i> spp.) with a range of forbs including <i>Rhodanthe corymbiflora</i> , <i>Crassula colorata</i> var. <i>acuminata</i> , <i>Erodium crinitum</i> , <i>Bulbine semibarbata</i> and <i>Daucus glochidiatus</i> . Occurs on medium brown to grey clays and loams on level alluvial plains on the western Riverine Plain (Hay Plain) near Hay and north-east of Deniliquin in the Riverina Bioregion. Contains a high proportion of annual exotic species in Spring dominated by Wimmera Rye Grass (<i>Lolium rigidum</i>) and Wild Oats (<i>Avena fatua</i>).
70 - White Cypress Pine woodland on sandy loams in central NSW wheatbelt	109.19	0.00	109.19	Tall or mid-high woodland to about 18 m high dominated by White Cypress Pine (<i>Callitris glaucophylla</i>) that may occupy >90% of the canopy cover. The canopy structure alters depending on degree of

Plant Community Type	Approximate extent (ha) within Project Area			PCT description
	SVTM mapping (ha)	Cumberland Ecology mapping (ha)	Total (ha)	
				clearing, thinning or regrowth. Various box eucalypts may be present including Poplar Box (<i>Eucalyptus populnea</i>) and Western Grey Box (<i>Eucalyptus microcarpa</i>). In dry times the ground may be nearly bare. Occurs on red, brown or yellow sandy or loamy soils on flats and rises on alluvial plains. Vegetation structure varies depending on the history of disturbance including logging. Dense regrowth of young Pines may be present.
153 - Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	3.98	0.00	3.98	Mid-high open shrubland generally less than one meter high dominated by Black Bluebush (<i>Maireana pyramidata</i>) which may be dominant. Scattered low trees of Black Oak (<i>Casuarina pauper</i>) or Western Rosewood (<i>Alectryon oleifolius</i> subsp. <i>canescens</i>) may be present. Tall shrubs are rare or absent and may include <i>Eremophila sturtii</i> .
157 - Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion	878.08	1754.34	2632.42	Low to mid-high to 90cm high, open to sparse chenopod shrubland dominated by Bladder Saltbush (<i>Atriplex vesicaria</i>) often with Desert Glasswort (<i>Pachycornia triandra</i>), Three-spined Copperburr (<i>Sclerolaena tricuspis</i>), <i>Sclerolaena intricata</i> and Pigface (<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>). Other commonly occurring small shrubs include Slender Glasswort (<i>Sclerostegia tenuis</i>), <i>Sclerolaena brachyptera</i> , <i>Sclerolaena tenuis</i> . In the Riverina it grades into bluebush and other chenopod shrublands, glasswort/samphire forblands (e.g. ID18), native grasslands, Myall woodlands, and Black Box woodland near watercourses.

Plant Community Type	Approximate extent (ha) within Project Area			PCT description
	SVTM mapping (ha)	Cumberland Ecology mapping (ha)	Total (ha)	
159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	18.92	0.00	18.92	Tall shrubland up to 2.5 metres high, dominated by Old Man Saltbush (<i>Atriplex nummularia</i>) with a lower chenopod shrub layer dominated by bluebushes such as <i>Maireana microcarpa</i> , <i>Maireana appressa</i> , <i>Maireana pyramidata</i> and <i>Maireana brevifolia</i> , Thorny Rhagodia (<i>Rhagodia spinescens</i>), Bladder Saltbush (<i>Atriplex vesicaria</i>) and Nitre Goosefoot (<i>Chenopodium nitrariaceum</i>). Low ground shrubs include <i>Dissocarpus biflorus</i> , <i>Atriplex lindleyi</i> and a number of copperburr species (<i>Sclerolaena</i> spp.).
160 - Nitre Goosefoot shrubland wetland on clays of the inland floodplains	170.86	74.59	245.45	Tall shrubland to two metres high, dominated by Nitre Goosefoot (<i>Chenopodium nitrariaceum</i>) often with Black Roly Poly (<i>Sclerolaena muricata</i>). Low shrubs include <i>Sclerolaena stelligera</i> , Soft Horns (<i>Malacocera tricornis</i>) and <i>Atriplex semibaccata</i> ; forb species include <i>Omphalolappula concava</i> , <i>Harmsiodoxa blennodioides</i> and <i>Oxalis perennans</i> . In some places this community may be derived from a previous Old Man Saltbush shrubland as it generally occurs in highly disturbed sites. Grades into Lignum communities in wetter sites where drainage is impaired.
163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	785.75	0.00	785.75	Low to mid-high open to sparse shrubland dominated by Dillon Bush (<i>Nitraria billardierei</i>) with Cotton Bush (<i>Maireana aphylla</i>) and Thorny Saltbush (<i>Rhagodia spinescens</i>). The ground cover may be sparse or dense depending on the season.
164 - Cotton Bush open shrubland of the semi-arid (warm) zone	107.25	729.93	837.18	Low to mid-high sparse to mid-dense shrubland usually about 0.8 m high dominated by Cotton Bush (<i>Maireana aphylla</i>) with occasional

Plant Community Type	Approximate extent (ha) within Project Area			PCT description
	SVTM mapping (ha)	Cumberland Ecology mapping (ha)	Total (ha)	
				remnant shrubs of Bladder Saltbush (<i>Atriplex vesicaria</i> s.l.). Smaller shrubs include copperburrs (<i>Sclerolaena muricata</i> , <i>Sclerolaena tricuspis</i> and <i>Sclerolaena bicornis</i>) and annual saltbushes (<i>Atriplex lindleyi</i> , <i>Atriplex leptocarpa</i>).
216 - Black Roly Poly low open shrubland of the Riverina Bioregion and Murray Darling Depression Bioregion	4.45	0.00	4.45	Low or mid-high open chenopod shrubland dominated by Black Roly Poly (<i>Sclerolaena muricata</i> var. <i>semiglabra</i>), with other low shrubs such as <i>Sclerolaena diacantha</i> , <i>Maireana microphylla</i> , <i>Leiocarpa panaetioides</i> and <i>Teucrium racemosum</i> . Scattered Black Box trees (<i>Eucalyptus largiflorens</i>) may be present. The ground cover is sparse and includes forbs such as <i>Atriplex semibaccata</i> , <i>Vittadinia cuneata</i> , <i>Rhodanthe corymbiflora</i> , <i>Sida trichopoda</i> , and grass species such as <i>Austrostipa scabra</i> subsp. <i>scabra</i> , <i>Austrodanthonia caespitosa</i> , and <i>Chloris truncata</i> .
Exotic/not classified	16.75	2.03	18.78	
Total	2727.88	2774.11	5501.99	

The reconnaissance surveys confirmed the presence of the following PCTs within the Project Area:

- PCT 13_Black Box - Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion);
- PCT 28_White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone;
- PCT 46_Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion;
- PCT 157_Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion;
- PCT 160_Nitre Goosefoot shrubland wetland on clays of the inland floodplains; and
- PCT 164_Cotton Bush open shrubland of the semi-arid (warm) zone.

The distribution of PCTs within the Project Area is shown in **Figure 6**.

It should be noted that this mapping is preliminary and require further surveys and refinement as part of the biodiversity assessments carried out to support any EIS prepared as part of the SSD planning approvals process.

3.5.2. Threatened Ecological Communities

Of the 13 PCTs of the Eastern NSW SVTM mapping present in the Project Area, seven (7) are associated with a TEC under the BC Act and/or EPBC Act.

A summary of TEC associations for the PCTs, as per the Eastern NSW SVTM mapping, is provided in **Table 4**.

It should be noted that while PCTs may be associated with specific TECs, the presence of a particular PCT does not equate to the presence of the TEC as further assessment against Final Determination criteria are required to determine the presence of a TEC. In some cases, a PCT may be widely distributed across multiple IBRA bioregions while the associated TEC may have a highly limited geographic distribution to specific areas or IBRA bioregions.

As outlined in **Table 4**, three PCTs (PCT 24, PCT 160 and PCT 163) are associated with the BC Act listed Critically Endangered Ecological Community (CEEC) 'Artesian Springs Ecological Community in the Great Artesian Basin' which is also listed as a candidate Serious and Irreversible Impact (SAIL) entity. The Final Determination for this CEEC (NSW Scientific Committee, 2015) states '*The assemblage of species listed in Part 1.1 above which characterises the Artesian Springs Ecological Community is known from the Mulga Lands, Cobar Peneplain, Darling Riverine Plains, Channel Country and Brigalow Belt South Bioregions, but may occur within other bioregions within the Great Artesian Basin.*' The mapped extent of the Great Artesian Basin is shown in **Image 2** below.

Image 2 Mapped Extent of the Great Artesian Basin



The Project Area is within the Riverina IBRA bioregion, which is not located within the mapped extent of the Great Artesian Basin. Therefore, while a similar assemblage of species may be present, the CEEC is not considered to occur within the Project Area as it is outside of the defined geographic extent of the CEEC.

Also, as outlined in Table 4, PCT 46 is associated with the EPBC Act listed CEEC 'Natural Grasslands of the Murray Valley Plains'. As per the listing advice (Threatened Species Scientific Committee, 2012), the ecological community occurs predominately across the southern parts of the Riverina IBRA bioregion and extends into parts of the Murray Darling Depression and NSW South-Western Slopes IBRA bioregions. Therefore, the Project Area, being in the Riverina Bioregion is located within the general mapped distribution of the CEEC. However,

Section 5 - Key Diagnostic Characteristics of the Listing Advice (Threatened Species Scientific Committee, 2012) acknowledges that the CEEC may be superficially similar to grasslands derived from former *Acacia pendula* woodlands or chenopod shrublands, chiefly with *Atriplex nummularia* (Old man saltbush) and/or *Atriplex vesicaria* (Bladder saltbush). The Listing Advice also provides a table listing several species that are characteristic of the CEEC as well as species that occur in derived grasslands which do not form part of the CEEC. The areas confirmed as comprising PCT 46 during the reconnaissance surveys were dominated by the grasses *Austrostipa scabra* (Rough Speargrass) and *Sporobolus caroli* (Fairy Grass) which occur in grassland vegetation that is not considered to be part of the ecological community in NSW. Therefore, the occurrence of PCT 46 within the Project Area is not considered to conform to the CEEC Natural Grasslands of the Murray Plains as listed under the EPBC Act.

One Endangered Ecological Community (EEC), as listed under the BC Act, i.e Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions was recorded as occurring within the surveyed areas. These areas are mapped as PCT 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone. As per the Final determination for the EEC (NSW Scientific Committee, 2008, 2011), the community is characterised by an open tree stratum, dominated by *Callitris glaucophylla* (White Cypress Pine) which may be reduced to isolated individuals or may be absent as a result of past clearing. Other infrequently recorded species characteristic of the community include *Acacia melvillei*, *Acacia oswaldii* or *Alectryon oleifolius subsp. canescens*. Although no *Callitris glaucophylla* individuals were recorded, the mapped occurrences of PCT 28 were dominated by *Alectryon oleifolius*. Therefore, the mapped occurrences of PCT 28 are considered to comprise the EEC as listed under the BC Act, albeit in a highly degraded form. An example of the occurrence of this EEC within the surveyed area is provided as **Photograph 1**.

Photograph 1 Example of mapped occurrence of PCT 28



The mapped distribution of TECs within the Project Area is shown in **Figure 7**. As per Table 4, PCT 28, PCT 153 and PCT 159 are all associated with TEC as listed under the BC Act. As the mapped occurrences of PCT 28, PCT 153 and PCT 159, as per the SVTM mapping, in the northern parts of the Project Area were not surveyed, these areas have been retained as TECs as a conservative measure for the purposes of this constraints assessment.

Table 4 Threatened ecological communities in the Project Area

Plant Community Type	BC Act Association(s) of PCT	EPBC Act Association of PCT	Candidate Serious and Irreversible Impact Entity	TEC Recorded within Indicative Development Footprint
24 - Canegrass swamp tall grassland wetland of drainage depressions, lakes and pans of the inland plains	Artesian Springs Ecological Community in the Great Artesian Basin (Part)	-	Yes	No
28 - White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone	Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions (Part); Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions (Part)	Sandhill Pine Woodland nominated – assessment due April 2025	No	Yes. Also potentially present in wider Project Area
46 - Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion	-	Natural Grasslands of the Murray Valley Plains (Part)	No	No
153 - Black Bluebush low open shrubland of the alluvial plains and sandplains of the arid and semi-arid zones	Acacia loderi shrublands (Part)		No	No but potentially present in wider Project Area
159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-	Weeping Myall Woodlands (Part)	No	No but potentially

Plant Community Type	BC Act Association(s) of PCT	EPBC Act Association of PCT	Candidate Serious and Irreversible Impact Entity	TEC Recorded within Indicative Development Footprint
	Darling Depression, Riverina and NSW South Western Slopes bioregions (Part)			present in wider Project Area
160 - Nitre Goosefoot shrubland wetland on clays of the inland floodplains	Artesian Springs Ecological Community in the Great Artesian Basin (Part)		Yes	No
163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Artesian Springs Ecological Community in the Great Artesian Basin (Part)		Yes	No

*** (Part) indicates that the PCT may not always conform to the definition of the TEC and is to be further assessed against the legal definition of the TEC under the BC Act or EPBC Act

The Commonwealth PMST database search indicated the following TECs as listed under the EPBC Act as having potential to occur:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (EEC);
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EEC);
- Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions (CEEC); and
- Weeping Myall Woodlands (EEC).

The reconnaissance surveys confirmed that none of these TECs are present within the Indicative Development Footprint. Based on the results of the reconnaissance surveys, as well as desktop assessments of aerial imagery, the TECs as per the PMST search are considered unlikely to occur within parts of the wider Project Area.

3.5.3. Riparian Corridors

The Project Area contains riparian corridors that drain into Nyangay Creek. The watercourses within the study area comprise 1st, 2nd and 6th orders streams under the Strahler ranking (**Figure 3**).

Under the NSW *Water Management Act 2000* (WM Act) approval is required for carrying out a 'controlled activity' that takes place on 'waterfront land' to ensure that the activity to ensure negative impacts upon waterfront land and other water users are avoided or minimised. In this instance, the relevant definition of waterfront land per the WM Act is: *"the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river...where the prescribed distance is 40m or (if the regulations prescribe a lesser distance...) that lesser distance"*.

As the project comprises a SSD, it is exempt from the requirement for a controlled activity approval. Nonetheless, consideration should be given to avoidance/minimisation of work within areas that would comprise a vegetated riparian zone (VRZ) buffer for the watercourse.

The NSW Office of Water's guidelines state that the following VRZ buffers apply as 'prescribed distances' based on the watercourse order as classified under the Strahler System of ordering watercourses:

- 1st order watercourse: 10 m each side of watercourse (20 m + channel width);
- 2nd order watercourse: 20 m each side of watercourse (40 m + channel width);
- 3rd order watercourse: 30 m each side of watercourse (60 m + channel width); and
- 4th order watercourse and greater (including estuaries, wetlands, and any parts of rivers influenced by tidal waters): 40 m (80 m + channel width).

As Nyangay Creek is classified as a 6th order stream, a 40 m setback from the top of banks will be required for any future development.

3.5.4. Key Fish Habitat

Under the FM Act, Key Fish Habitats are considered to include all marine and estuarine habitats up to highest astronomical tide level (i.e. reached by 'king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank. Based on the presence of watercourses, parts of the study area have been mapped as Key Fish Habitat (**Figure 5**). Therefore, crossings across watercourses should be avoided/minimised where feasible to limit impacts on Key Fish Habitat.

Habitat for the Silver Perch (Vulnerable under the FM Act) has been mapped as occurring within waterways to the south of the Project Area (**Figure 5**)

3.5.5. Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are defined as “any ecosystem that uses groundwater at any time or for any duration in order to maintain its composition and condition” (Serov, Kuginis, & Williams, 2012)

The GDE Atlas (BOM, 2024) delineates GDEs into the following types:

- Aquatic ecosystems – this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands, and springs.
- Terrestrial ecosystems – this includes all vegetation ecosystems that rely on the subsurface presence of groundwater; and
- Subterranean ecosystems – this includes cave and aquifer ecosystems.

As per the GDE Atlas (BOM, 2024), the Project Area is mapped as containing the following types of GDEs:

- Aquatic - Low Potential GDE (national assessment); and
- Terrestrial – Low Potential GDE (regional study).

This is supported by the NSW GDE mapping (NSW - Water, 2024) which maps low probable GDEs across the Project Area (**Figure 8**).

3.6. Threatened Flora

The NSW BioNet Wildlife Atlas search, Commonwealth PMST search and threatened flora species associations with recorded PCTs for the Murrumbidgee IBRA subregions identified 17 threatened flora species known or with potential to occur within a 10 km radius of the Project Area. An assessment of the likelihood of occurrence for these species based on records, known distributions and results of surveys conducted to date is provided in **Table 5**. Threatened flora species recorded within a 10km locality of the Project Area are shown in **Figure 9**.

Table 5 Threatened flora potentially occurring in the Project Area

Scientific name	Common name	BC Act	EPBC Act	Candidate SAI entity	Likelihood of occurrence
<i>Austrostipa wakoolica</i>	A spear-grass	E	E	No	Moderate
<i>Brachyscome muelleroides</i>	Claypan Daisy	V	V	Yes	Moderate
<i>Brachyscome papillosa</i>	Mossgiel Daisy	V	V	No	High
<i>Caladenia arenaria</i>	Sand-hill Spider Orchid	E	E	Yes	Low
<i>Calotis moorei</i>	A burr-daisy	E	E	Yes	Low
<i>Convolvulus tedmoorei</i>	Bindweed	E	-	Yes	Low
<i>Diuris tricolor</i>	Pine Donkey Orchid	V	-	No	Moderate
<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Yellow Gum	V	-	No	Low
<i>Lepidium monoplocoides</i>	Winged Peppergrass	E	E	No	High
<i>Leptorhynchos orientalis</i>	Lanky Buttons	E	-	No	Moderate
<i>Maireana cheelii</i>	Chariot Wheels	V	V	No	High
<i>Pilularia novae-hollandiae</i>	Austral Pillwort	E	-	Yes	Moderate
<i>Sclerolaena napiformis</i>	Turnip Copperburr	E	E	No	Low
<i>Solanum karsense</i>	Menindee Nightshade	V	V	No	Low
<i>Swainsona murrayana</i>	Slender Darling Pea	V	V	No	High
<i>Swainsona plagiotropis</i>	Red Darling Pea	V	V	No	Low
<i>Swainsona sericea</i>	Silky Swainson-pea	V	-	No	Low

3.7. Threatened Fauna

The NSW BioNet Wildlife Atlas search, Commonwealth PMST search and threatened fauna species associations with recorded PCTs for the Murrumbidgee IBRA subregion collectively identified 84 threatened fauna species (excluding fish) known or with potential to occur within a 10 km radius of the Project Area. Threatened fish, as per the PMST search, were assessed unlikely to occur in the Project Area and were not included in assessments for this constraints assessment.

An assessment of the likelihood of occurrence for these species based on records, known distributions and results of surveys conducted to date is provided in **Table 6**. Threatened fauna species recorded within a 10 km locality of the Project Area are shown in **Figure 10**.

Table 6 Threatened fauna species potentially occurring in the Project Area

Scientific name	Common name	BC Act	EPBC Act	Candidate SAIL entity	Likelihood of occurrence
Amphibians					
<i>Litoria raniformis</i>	Southern Bell Frog	E	V	No	Low
<i>Crinia sloanei</i>	Sloane's Froglet	E	E	No	Low
Birds					
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	V	No	High
<i>Ardeotis australis</i>	Australian Bustard	E	-	No	Low
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	No	High
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	No	Moderate
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	-	No	High
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	V	No	Unlikely
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Yes	Unlikely
<i>Circus assimilis</i>	Spotted Harrier	V	-	No	High
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	V	V	No	High
<i>Epthianura albifrons</i>	White-fronted Chat	V	-	No	High
<i>Falco hypoleucos</i>	Grey Falcon	V	V	No	Moderate
<i>Falco subniger</i>	Black Falcon	V	-	No	High
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	-	V	No	Unlikely
<i>Grantiella picta</i>	Painted Honeyeater	V	V	No	Low

Scientific name	Common name	BC Act	EPBC Act	Candidate SAIL entity	Likelihood of occurrence
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	No	Low
<i>Hieraetus morphnoides</i>	Little Eagle	V	-	No	Moderate
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Yes	Low
<i>Lophochroa leadbeateri</i>	Pink Cockatoo	V	E	No	Moderate
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	No	Moderate
<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin	E	E	No	Low
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V	V	No	High
<i>Ninox connivens</i>	Barking Owl	V	-	No	Low
<i>Pedionomus torquatus</i>	Plains-wanderer	E	CE	Yes	High
<i>Polytelis anthopeplus monarchoides</i>	Regent Parrot (eastern subspecies)	E	V	No	Moderate
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	No	High
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	No	High
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	No	Low
<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	No	High
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	No	Low
Fish					
<i>Galaxias rostratus</i>	Flathead Galaxias	To Check!	CE	n/a	Unlikely
<i>Maccullochella peelii</i>	Murray Cod	To Check!	V	n/a	Unlikely
<i>Macquaria australasica</i>	Macquarie Perch	To Check!	E	n/a	Unlikely
Mammals					

Scientific name	Common name	BC Act	EPBC Act	Candidate SAIL entity	Likelihood of occurrence
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	No	Low
<i>Phascolarctos cinereus</i>	Koala	E	E	No	Low
Reptiles					
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V	V	No	Moderate
<i>Hemiaspis damelii</i>	Grey Snake	E	E	No	Low

3.8. Migratory species

The Commonwealth PMST search identified eight migratory species with potential to occur within a 20 km radius of the Project Area. An assessment of the likelihood of occurrence for these species based on records, including known records within Bowmans Creek Stage 1 areas, and results of surveys conducted to date is provided in **Table 7**. Migratory fauna species recorded within a 20 km locality of the Project Area are shown in **Figure 10**.

Table 7 Migratory species potentially occurring in the Project Area

Scientific name	Common name	BC Act	EPBC Act	Likelihood of occurrence
Migratory (marine)				
<i>Apus pacificus</i>	Fork-tailed Swift	-	-	Low
Migratory (terrestrial)				
<i>Motacilla flava</i>	Yellow Wagtail	-	-	Moderate
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	-	Moderate
Migratory (wetland)				
<i>Actitis hypoleucos</i>	Common Sandpiper	-	-	Unlikely
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	V	Unlikely
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Unlikely
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	-	Unlikely
<i>Gallinago hardwickii</i>	Latham's Snipe	-	V	Unlikely

3.9. Matters of National Environmental Significance

The EPBC Act provides protection of the environment from actions proposed to have the potential to significantly impact on Matters of National Environmental Significance (MNES) or the environment of Commonwealth land. MNES protected under the EPBC Act include:

- World Heritage Properties.
- National Heritage Places.
- Ramsar Wetlands.
- Threatened species or ecological communities listed in the EPBC Act.
- Migratory species listed in the EPBC Act.
- Commonwealth marine environment.
- Nuclear actions.
- Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

A search of the Commonwealth PMST was undertaken on 14 May 2024. The search included a 10 km buffer around the Project Area. The search results are summarised below in **Table 8** and a record of the 14 May 2024 PMST report is provided in **Appendix A**.

Table 8 Matters of National Significance (MNES)

MNES	Within 20km Buffer
World Heritage Properties	None
National heritage properties	None
Wetlands of international importance	None
The Great Barrier Reef Marine Park	None
Commonwealth marine area	None
Threatened ecological communities	4
Threatened species	30
Migratory species	8

Assessments of TECs, threatened flora, threatened fauna and migratory species have been presented previously in **Section 3.4.2, Section 3.5, Section 3.6 and Section 3.7** respectively.

As potential for significant impacts on MNES are uncertain, it is recommended that the Project is considered for referral to DCCEEW as a separate process to the Scoping Report. The purpose of the referral is to determine whether the proposed action (i.e. the Project) comprises a Controlled Action, which would require formal assessment and approval under the EPBC Act. In the event of the proposed action being declared a Controlled Action, it is assumed that assessments for Commonwealth purposes will be conducted in accordance with the Bilateral Agreement between the Commonwealth and the State of NSW and the NSW Biodiversity Assessment Method (BAM).

4. Survey Requirements

Detailed assessments will be required under the BAM, which will require extensive field surveys comprising:

- Vegetation mapping delineating PCTs and vegetation condition zones;
- Completion of Vegetation Integrity Assessments or BAM plots; and
- Targeted surveys for species credit species and dual credit species (species for which breeding habitat is a species credit component).

The total number of BAM plots required is dependent on the final vegetation mapping and vegetation conditions zones. BAM plot survey effort will be stratified in accordance with the BAM based on extent of mapped vegetation condition zones.

Targeted species requirements are dependent on several factors such as PCTs, patch size, presence/absence of specified habitat constraints or extent of degradation of microhabitats (as determined by preliminary assessments). Targeted surveys for species credit species (or species components for dual credit species) are required to be conducted during survey periods specified in the Threatened Biodiversity Data Collection (TBDC).

Preliminary Biodiversity Assessment Method Calculator (BAM-C) assessments based on PCTs recorded, in conjunction with BioNet Atlas records, were conducted to determine preliminary lists of species credit species (or species components of dual credit species) that would likely require survey and assessment in accordance with the BAM. The survey requirements for species credit species are summarised in **Table 9** (flora) and **Table 10** (fauna).

Table 9 Threatened flora species credit species likely requiring survey

Scientific Name	Common Name	Habitat Constraints	Potential SAIL entity	Survey Period												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Austrostipa wakoolica</i>	A spear-grass	Alluvial plains and plains	-	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
<i>Brachyscome muelleroides</i>	Claypan Daisy	Floodplains on grey-brown or red-brown clays and claypans Semi-permanent/ephemeral wet areas; Wetland-grassland communities on grey-brown or red-brown clays and claypans	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
<i>Brachyscome papillosa</i>	Mossgiel Daisy	-	-	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
<i>Caladenia arenaria</i>	Sand-hill Spider Orchid	-	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	No
<i>Calotis moorei</i>	A burr-daisy	-	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
<i>Convolvulus tedmoorei</i>	Bindweed	-	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
<i>Diuris tricolor</i>	Pine Donkey Orchid	-	-	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No

Scientific Name	Common Name	Habitat Constraints	Potential SAll entity	Survey Period												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Yellow Gum	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Lepidium monoplocoides</i>	Winged Peppergrass	-	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
<i>Leptorhynchus orientalis</i>	Lanky Buttons	-	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	
<i>Maireana cheelii</i>	Chariot Wheels	Heavy grey clay soils and claypans or shallow depressions	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
<i>Pilularia novae-hollandiae</i>	Austral Pillwort	-	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
<i>Sclerolaena napiformis</i>	Turnip Copperburr	-	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
<i>Solanum karsense</i>	Menindee Nightshade	Semi-permanent/ ephemeral wet areas	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	
<i>Swainsona murrayana</i>	Slender Darling Pea	-	-	No	No	No	No	No	No	No	No	Yes	No	No	No	
<i>Swainsona plagiotropis</i>	Red Darling Pea	-	-	No	No	No	No	No	No	No	No	Yes	No	No	No	
<i>Swainsona sericea</i>	Silky Swainson-pea	-	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	

Table 10 Threatened fauna species credit species likely requiring survey

Scientific Name	Common Name	Habitat Constraints	Potential SAIL entity	Survey Period												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	Rocky areas or within 50m of rocky areas	-	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
<i>Ardeotis australis</i>	Australian Bustard	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Burhinus grallarius</i>	Bush Stone-curlew	Fallen/standing dead timber including logs	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Calidris ferruginea</i>	Curlew Sandpiper	As per Important Habitat Map	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<i>Hieraaetus morphnoides</i>	Little Eagle	Nest trees - live (occasionally dead) large old trees within vegetation.	-	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No
<i>Lathamus discolor</i>	Swift Parrot	As per Important Habitat Map	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<i>Litoria raniformis</i>	Southern Bell Frog	-	-	Yes	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
<i>Lophochroa leadbeateri</i>	Pink Cockatoo	Hollow bearing trees; Living or dead tree with hollows greater than 10cm diameter	-	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Scientific Name	Common Name	Habitat Constraints	Potential SAIL entity	Survey Period												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Lophoictinia isura</i>	Square-tailed Kite	Nest trees		Yes	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
<i>Myotis macropus</i>	Southern Myotis	Waterbodies; Waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200m of the site.	-	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes
<i>Ninox connivens</i>	Barking Owl	Hollow bearing trees, a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
<i>Pedionomus torquatus</i>	Plains-wanderer	As per Important Habitat Map	Yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<i>Phascolarctos cinereus</i>	Koala	Presence of koala use trees	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Polytelis anthopeplus monarchoides</i>	Regent Parrot (eastern subspecies)	Hollow bearing trees; Living or dead E. camaldulensis with hollows greater than 5		No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No

Scientific Name	Common Name	Habitat Constraints	Potential SAIL entity	Survey Period												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
		cm diameter, greater than 5 m above the ground OR trees with DBH of greater than 40cm, within 1 km of watercourses or billabongs. Trees can be isolated but within 20 km of mallee.														
<i>Polytelis swainsonii</i>	Superb Parrot	Hollow bearing trees; Living or dead E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta, E. bridgesiana with hollows greater than 5cm diameter that are greater than 4m above ground or trees with a DBH of greater than 30cm.		No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No
<i>Tyto novaehollandiae</i>	Masked Owl	Hollow bearing trees, a living or dead tree with a hollow >20 cm diameter	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No

Scientific Name	Common Name	Habitat Constraints	Potential SAll entity	Survey Period											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		that occurs >4 metres above the ground													

5. Potential Impacts

5.1. Biodiversity Assessment Method

Under the BAM, assessment of various types of impacts on biodiversity values as a result of any proposed development is required for construction and operational phases. The types of impacts, as defined in the BAM, requiring assessment include:

- **Direct impacts:** impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation.
- **Indirect impacts:** impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish).
- **Prescribed impacts:** means the prescribed impacts identified in clause 6.1 of the BC Regulation. Prescribed impacts can be direct or indirect impacts.
- **Serious and irreversible impacts (SAIL):** impacts likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct in accordance with the principles set out in clause 6.7(2) of the BC Regulation.

Based on the findings of the desktop assessment and site inspection, the potential impacts to biodiversity from the Project are detailed in **Table 11** below.

Table 11 Potential impacts associated with the Project

Impact Type	Potential Impact
Direct Impact	Removal of native vegetation Removal of threatened species and their habitat
Indirect impacts	Inadvertent impacts on adjacent habitat or vegetation Reduced viability of adjacent habitat due to edge effects Reduced viability of adjacent habitat due to noise, dust, or light spill Transport of weeds and pathogens from the site to adjacent vegetation
Prescribed impacts	Impacts to water bodies, water quality and hydrological processes Impacts to habitat connectivity Impacts from vehicle strike
Serious and Irreversible Impacts (SAIL)	Clearing of vegetation or impacts to habitat for species comprising candidate SAIL entities such as the Plains Wanderer

5.2. Other State Assessments

5.2.1. Riparian Corridors

Under the NSW *Water Management Act 2000* (WM Act) approval is required for carrying out a 'controlled activity' that takes place on 'waterfront land' to ensure that the activity to ensure negative impacts upon

waterfront land and other water users are avoided or minimised. In this instance, the relevant definition of waterfront land per the WM Act is: *“the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river...where the prescribed distance is 40m or (if the regulations prescribe a lesser distance...) that lesser distance”*.

As the project comprises a SSD, it is exempt from the requirement for a controlled activity approval *per se*. Nonetheless, consideration is required to be given to avoidance/minimisation of work within areas that would comprise a vegetated riparian zone (VRZ) buffer for the watercourse.

The NSW guidelines state that the following VRZ buffers apply as ‘prescribed distances’ based on the watercourse order as classified under the Strahler System of ordering watercourses:

- 1st order watercourse: 10 m each side of watercourse (20 m + channel width);
- 2nd order watercourse: 20 m each side of watercourse (40 m + channel width);
- 3rd order watercourse: 30 m each side of watercourse (60 m + channel width); and
- 4th order watercourse and greater (including estuaries, wetlands, and any parts of rivers influenced by tidal waters): 40 m (80 m + channel width).

5.2.2. Key Fish Habitat

The Department of Primary Industries (DPI) has created a fish habitat sensitivity ranking which is used within policy and guideline statements to differentiate between permissible and prohibited activities or developments related to the importance of the type of key fish habitat (Fairfull, 2013). These types are defined as follows:

- Type 1 – Highly sensitive key fish habitat;
- Type 2 – Moderately sensitive key fish habitat; and
- Type 3 – Minimally sensitive key fish habitat.

Key fish habitat is also defined in terms of “waterway class” for the purposes of impact assessment by DPI. The waterway class scheme is also used to make management recommendations to minimise impacts on different fish habitats. The waterway classification system identified by DPI is presented in **Table 2** below.

Table 12 Classification of waterways for fish passage

Classification	Characteristics of waterway class
CLASS 1 Major key fish habitat	Marine or estuarine waterway or permanently flowing or flooded freshwater waterway (e.g. river or major creek), habitat of a threatened or protected fish species or ‘critical habitat’.
CLASS 2 Moderate key fish habitat	Non-permanently flowing (intermittent) stream, creek or waterway (generally named) with clearly defined bed and banks with semi-permanent to permanent waters in pools or in connected wetland areas. Freshwater aquatic vegetation is present. TYPE 1 and 2 habitats present.

Classification	Characteristics of waterway class
CLASS 3 Minimal key fish habitat	Named or unnamed waterway with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or other CLASS 1-3 fish habitats.
CLASS 4 Unlikely key fish habitat	Waterway (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present).

Surveys of the mapped watercourses will need to be conducted to determine the sensitivity and classification of Key Fish Habitat that may be present within the study area. While assessments of aquatic habitats, such as Key Fish Habitat do not form part of a BDAR, the aquatic assessments can be included as a separate section within any BDAR prepared to support the Project.

6. Avoidance Strategy

The BOS is underpinned by the hierarchy of ‘avoid-minimise-offset’. Consequently, the BAM requires proponents to demonstrate how impacts on biodiversity have been avoided and minimised through project development and design, including during the process of selecting project location. All projects must demonstrate that that reasonable steps to avoid and minimise impacts to biodiversity values have been carried out as part of project development. Impacts must be avoided and minimised before offsets are proposed to compensate for any residual impacts. Justifications for residual impacts must be provided within the BDAR.

An avoid-minimise hierarchy to assist with avoiding and minimising impacts during project development is summarised in **Table 12**. The hierarchy ranks biodiversity values recorded during this biodiversity constraints assessment in order of priority for avoidance and minimisation during the early stages of project development. As the project progresses, the ranking of different biodiversity values for avoidance and minimisation may need to be reviewed and revised based on new information, such as data from future on-ground biodiversity surveys.

Table 13 Potential impacts and associated avoidance measures associated with the Project

Avoid – minimise hierarchy (from highest to lowest priority)	Relevant strategy
SAIL Candidate Entities	<p>Impacts to entities with the potential for SAIL should be avoided and minimised as a priority.</p> <p>To date one candidate SAIL entity, important habitat for the Plains Wanderer has been recorded in close proximity to the Indicative Development Footprint.</p>
Threatened Ecological Communities (Woody vegetation)	<p>Where feasible impacts to TECs comprising of woody vegetation should be avoided or minimised. Large patches of TEC or patches of TECs which are contiguous with large tracts of non-threatened woody vegetation should be prioritised for retention over smaller, fragmented patches or scattered trees. Impacts to these smaller patches or scattered trees may be avoided or minimised at a later stage of project development.</p>
Non-threatened woody vegetation	<p>Where feasible impacts to woody vegetation not conforming to a TEC but comprising habitat for a large variety of threatened species should be avoided or minimised. Large tracts of non-threatened woody vegetation should be prioritised for retention over smaller, fragmented patches or scattered trees. Impacts to these smaller patches or scattered trees may be avoided or minimised at a later stage of project development.</p>
Biodiversity Corridors	<p>Where feasible, impacts to biodiversity corridors should be avoided and/or minimised. Examples of biodiversity corridors include riparian vegetation, significant roadside vegetation and corridors mapped by Councils, LLS, EHG etc for conservation purposes.</p>
Threatened species and their habitat	<p>Where feasible, impacts to known locations of threatened species should be avoided and/or minimised. The feasibility of avoiding/minimising impacts may be species dependent, with flora species more easily avoided. It should be noted that the importance of avoiding impacts to threatened species and their habitat will become more important once detailed</p>

Avoid – minimise hierarchy (from highest to lowest priority)	Relevant strategy
	biodiversity surveys for the project commence, and more accurate on-ground data is available.
Riparian land	Impacts to riparian corridors (width dependent on Strahler stream order) should be avoided (with exception of creek crossings). Where feasible avoid locating WTGs, roads, ancillaries within 40 m of creeklines (riparian land as per WM Act).

Where feasible, PCTs that do not comprise a TEC, exotic vegetation and established access tracks and internal roads should be prioritised for development as part of the Project.

7. References

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APPENDIX A :

PMST search results



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 14-May-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	30
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [[Resource Information](#)]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	300 - 400km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	150 - 200km upstream from Ramsar site	In feature area
Riverland	300 - 400km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered	Community may occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [[Resource Information](#)]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area

FISH

Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area

FROG

Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
Litoria raniformis Southern Bell Frog,, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area

MAMMAL

Scientific Name	Threatened Category	Presence Text	Buffer Status
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area	In feature area

PLANT

Austrostipa wakoolica [66623]	Endangered	Species or species habitat may occur within area	In buffer area only
Brachyscome papillosa Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat known to occur within area	In feature area
Maireana cheelii Chariot Wheels [8008]	Vulnerable	Species or species habitat known to occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat known to occur within area	In feature area

REPTILE

Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited Commonwealth Land - Australian Telecommunications Corporation [15298]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [15297]	NSW	In buffer area only

Listed Marine Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]	
Protected Area Name	Reserve Type	State	Buffer Status	
South West Woodland	Nature Reserve	NSW	In buffer area only	
EPBC Act Referrals			[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
EnergyConnect NSW - Eastern Section	2020/8766		Post-Approval	In feature area
The Plains Solar Farm	2023/09584		Assessment	In buffer area only
The Plains Wind Farm	2022/09404		Assessment	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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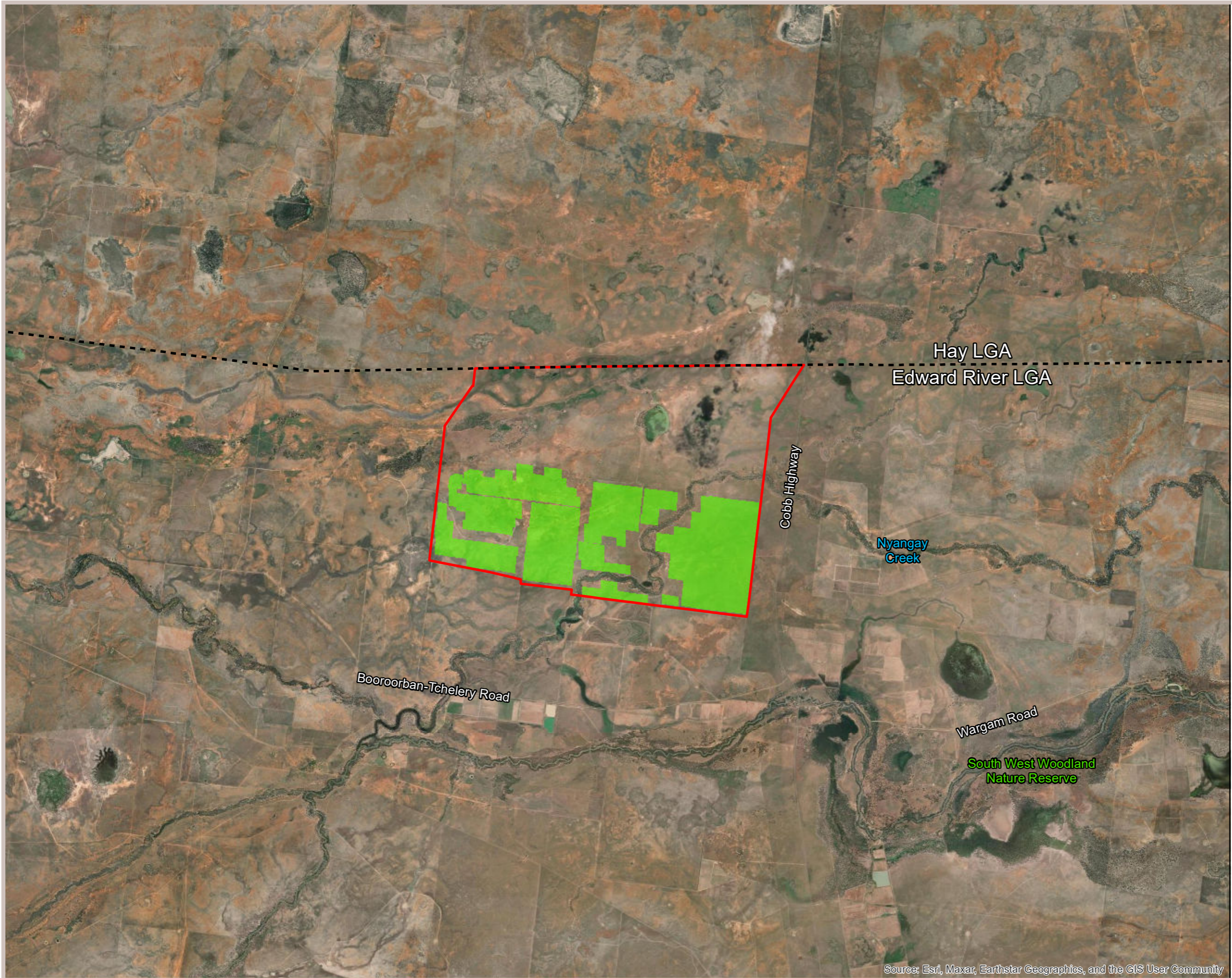
Department of Climate Change, Energy, the Environment and Water

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Canberra ACT 2601 Australia

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FIGURES



- Legend**
- Project Area
 - Indicative Development Footprint
 - Local Government Area Boundaries

Hay LGA
Edward River LGA

Cobb Highway

Nyangay Creek

Booroorban-Tchelery Road

Wargam Road

South West Woodland Nature Reserve

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship'
Edward River LGA



Coordinate System: MGA Zone 56 (GDA 94)



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

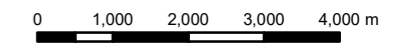


Figure 1. Project Location

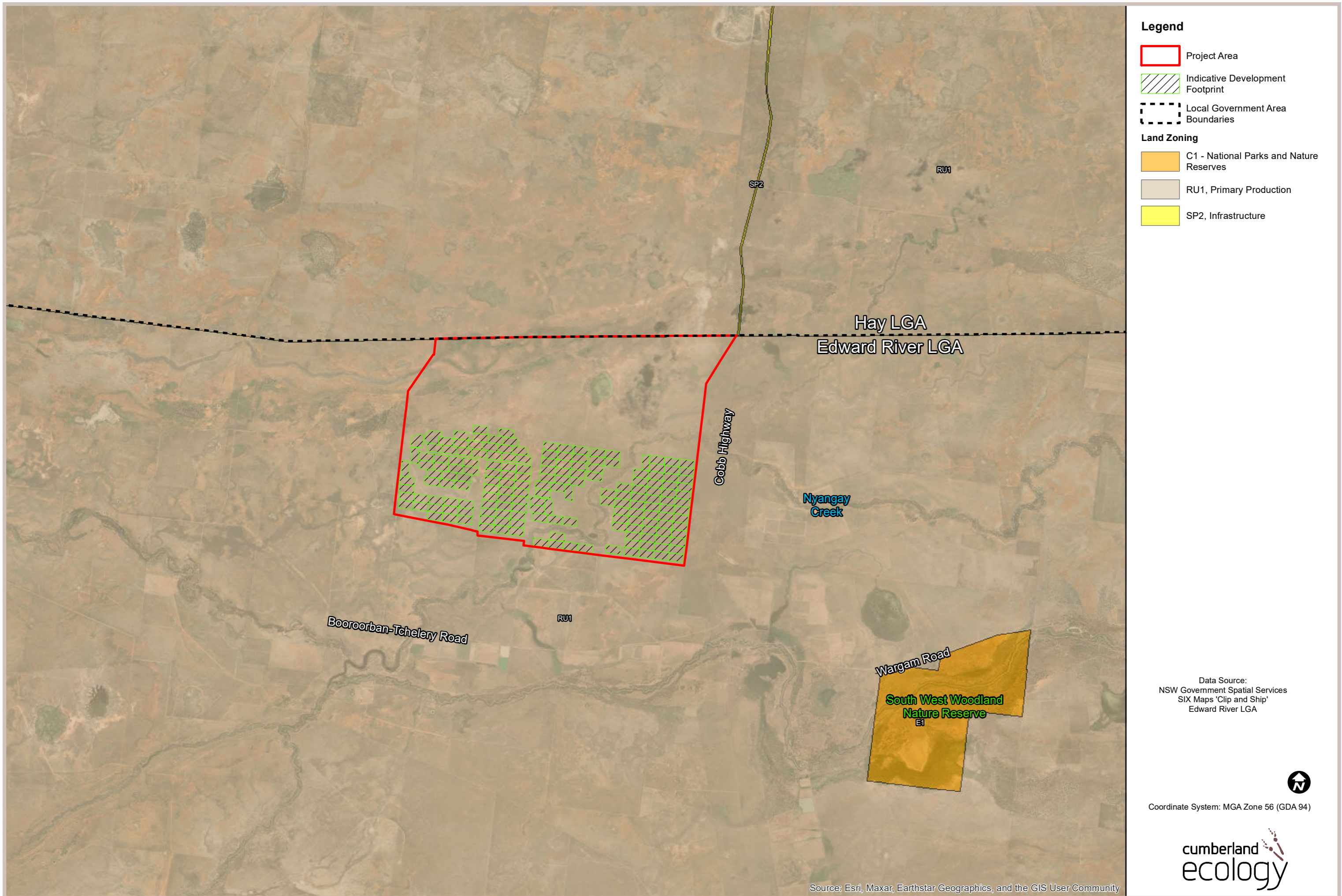


Figure 2. Land Zoning

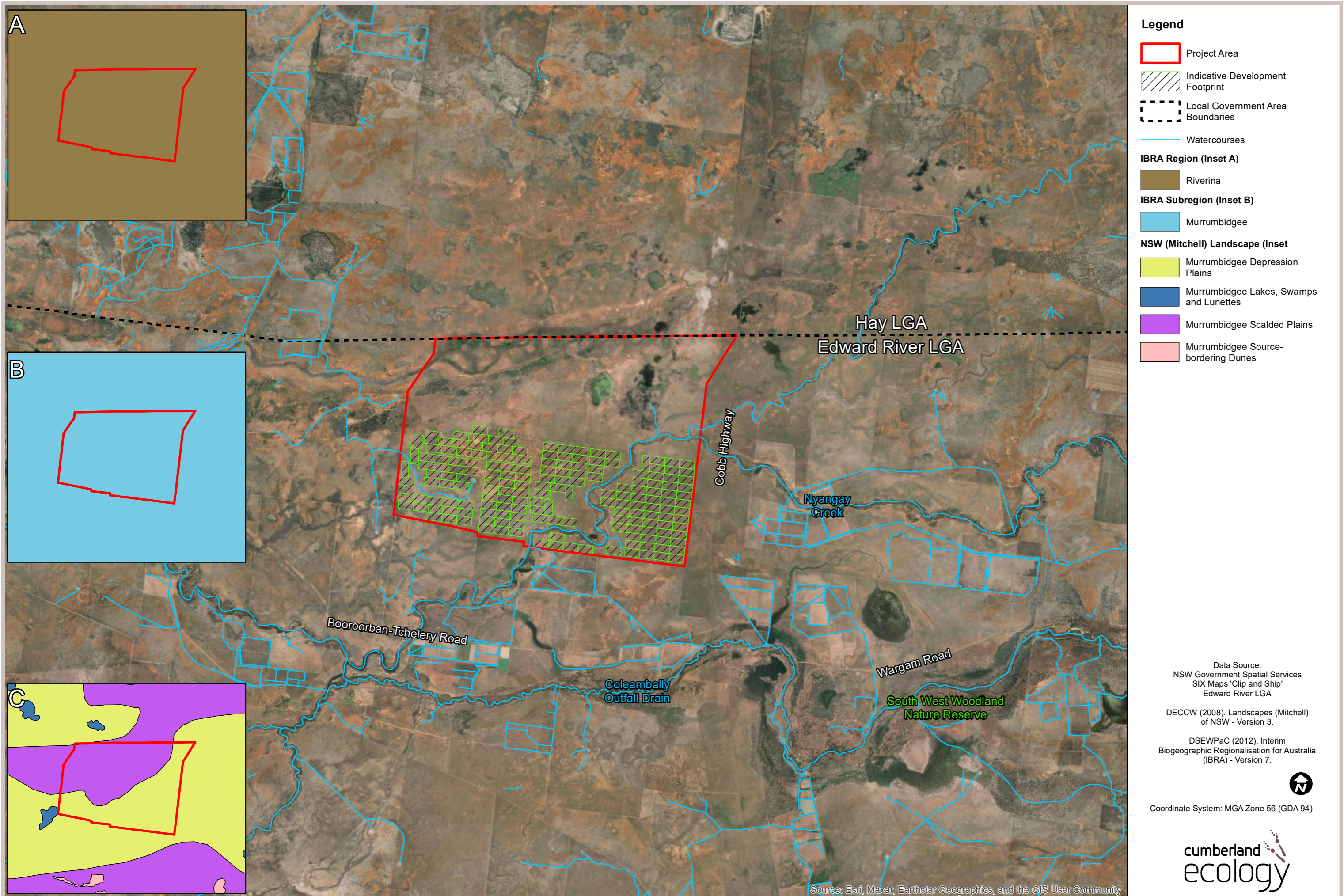


Figure 3. Landscape Features

0 1,000 2,000 3,000 4,000 m

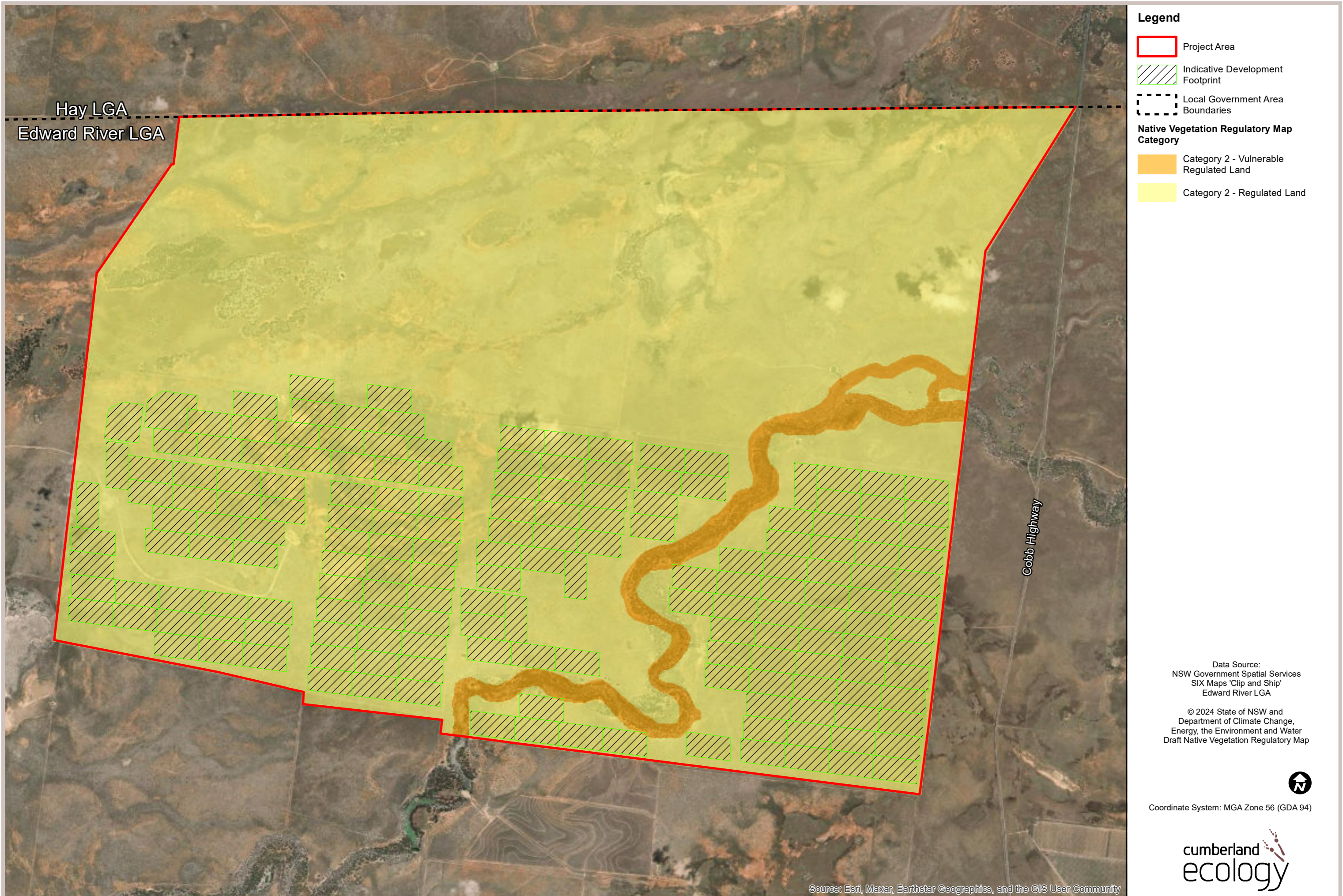
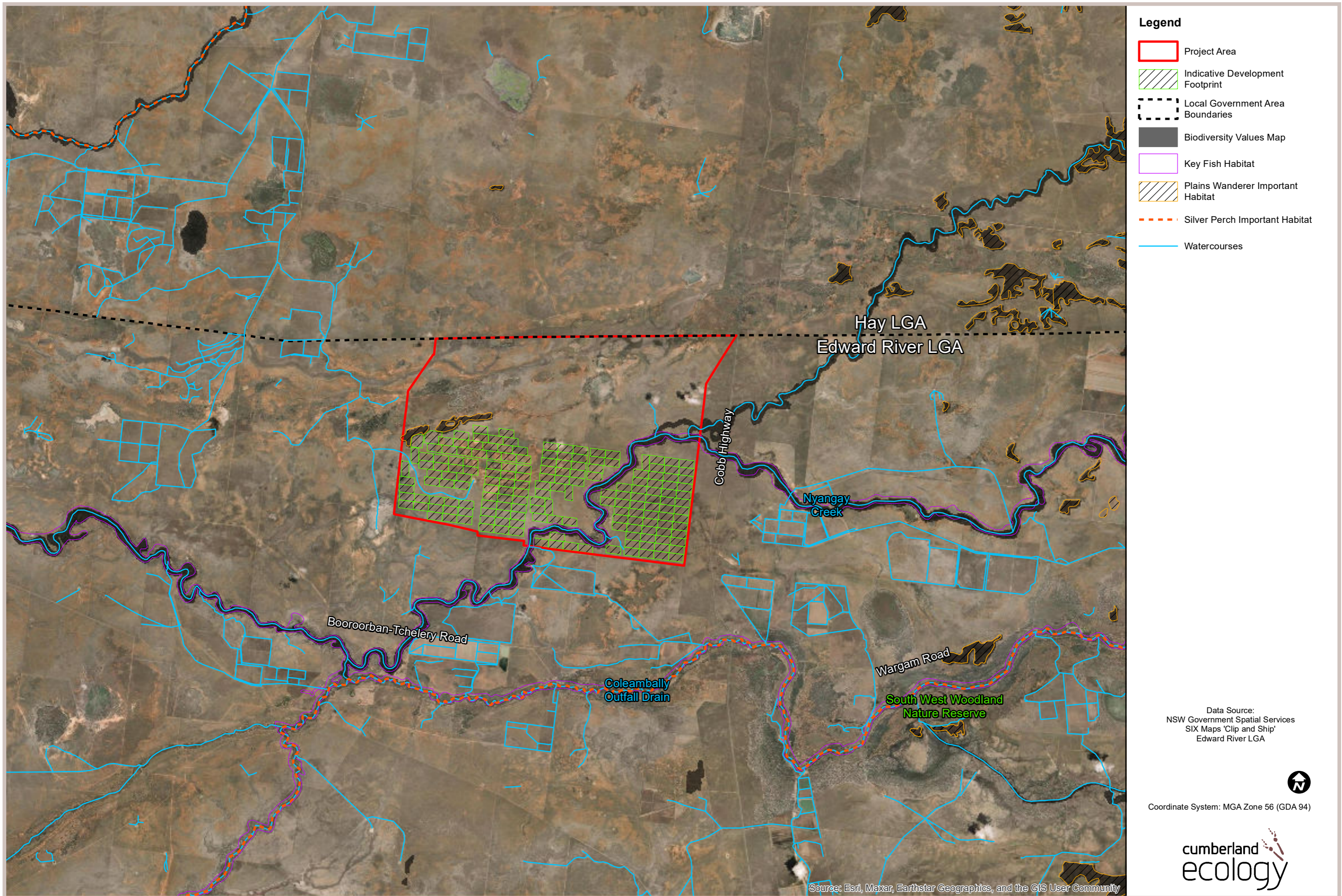


Figure 4. Draft Native Vegetation Regulatory Map Categories within the Project Area



- Legend**
- Project Area
 - Indicative Development Footprint
 - Local Government Area Boundaries
 - Biodiversity Values Map
 - Key Fish Habitat
 - Plains Wanderer Important Habitat
 - Silver Perch Important Habitat
 - Watercourses

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship'
Edward River LGA



Coordinate System: MGA Zone 56 (GDA 94)



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

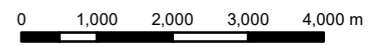


Figure 5. Biodiversity Values mapped within the Project Area

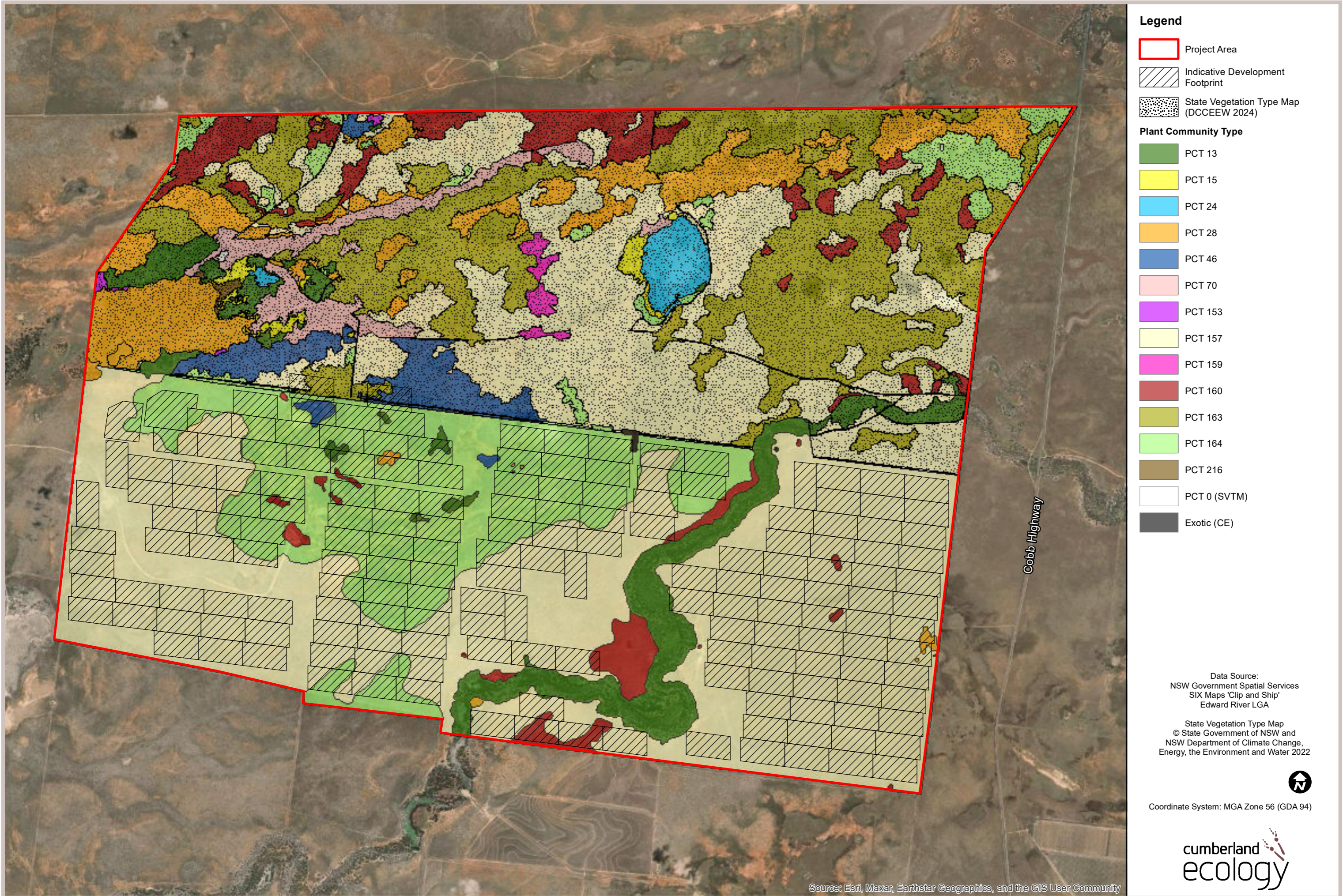


Figure 6. Plant Community types within the Project Area

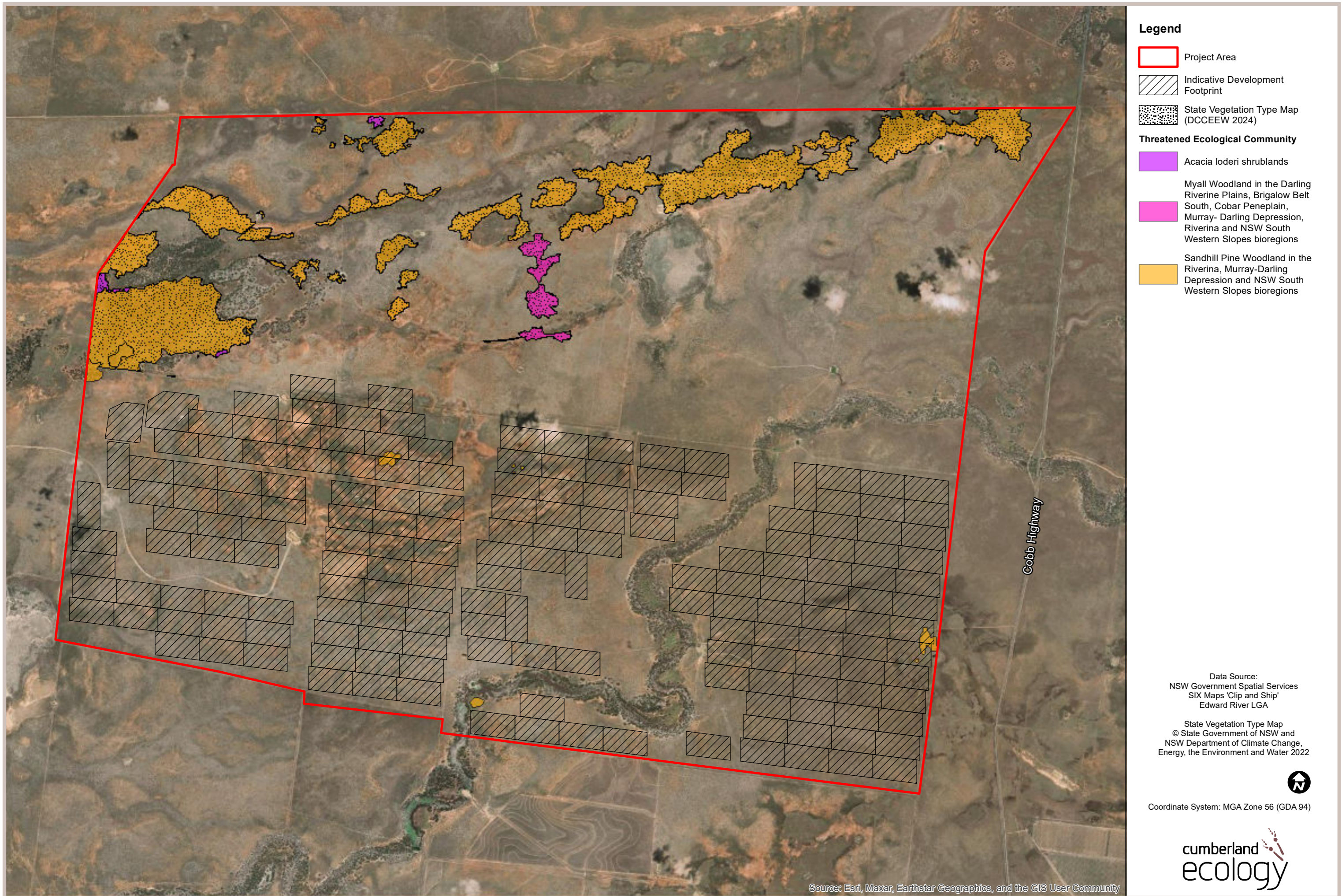
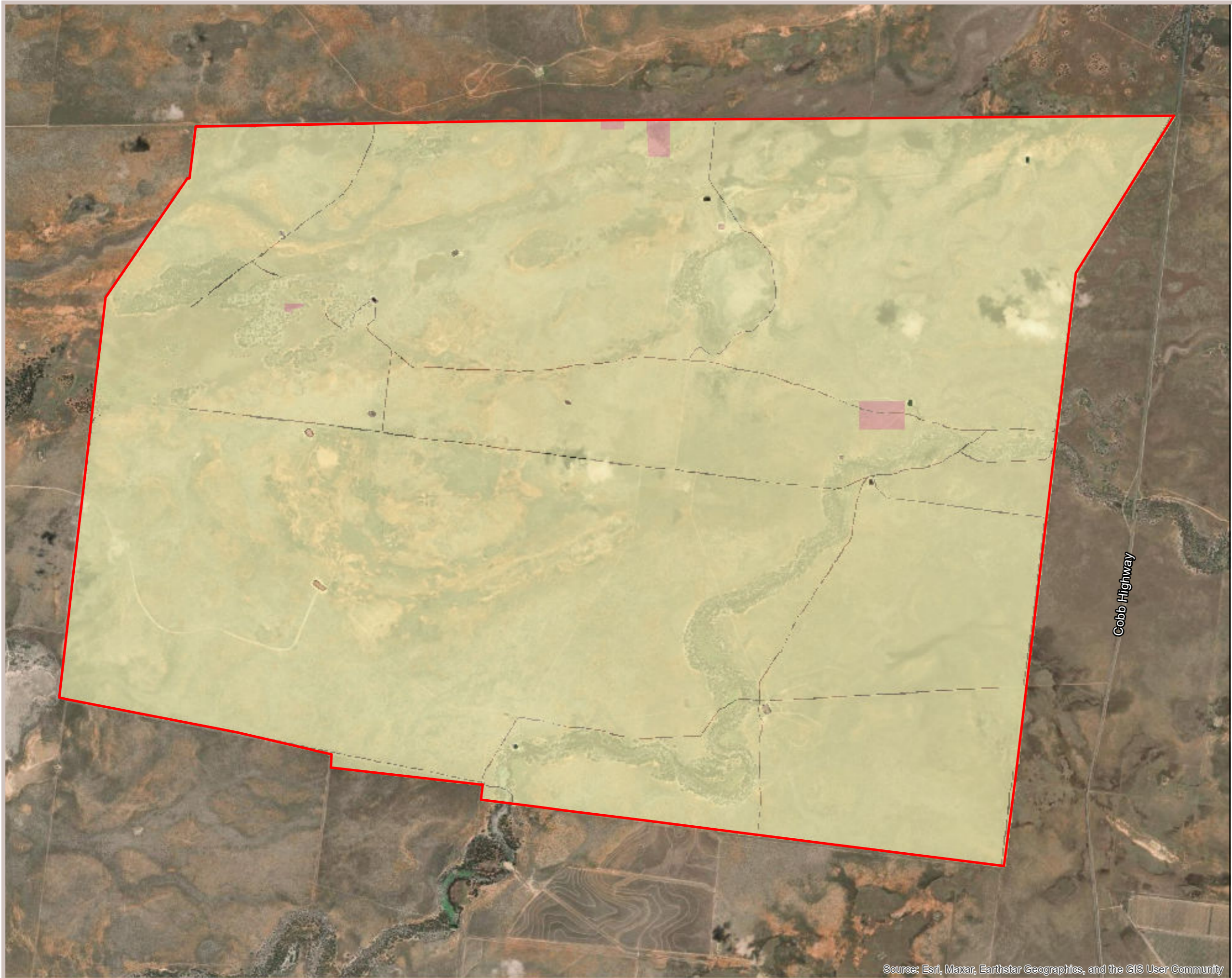


Figure 7. Threatened Ecological Communities within the Project Area



Legend


- Project Area

Groundwater Dependent Ecosystems - Probability

- Low
- Non GDE

Data Source:
 NSW Government Spatial Services
 SIX Maps 'Clip and Ship'
 Edward River LGA

GDE Probability
 © State Government of NSW and
 NSW Department of Climate Change,
 Energy, the Environment and Water 2022


 Coordinate System: MGA Zone 56 (GDA 94)



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

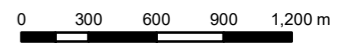


Figure 8. Probable Vegetation Groundwater Dependent Ecosystems within the Project Area

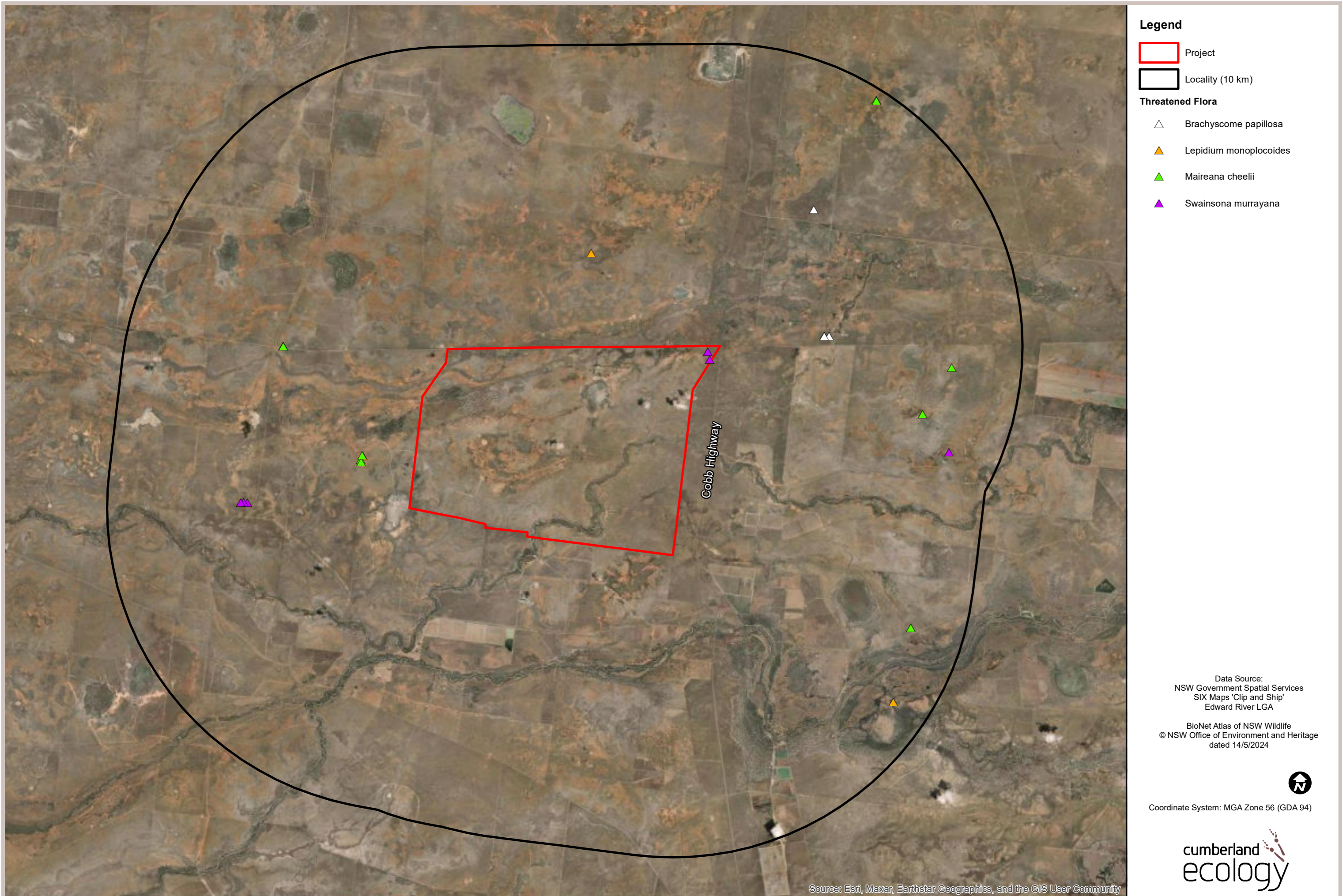


Figure 9. Threatened Flora species recorded within 10km of the Project Area

0 2,000 m



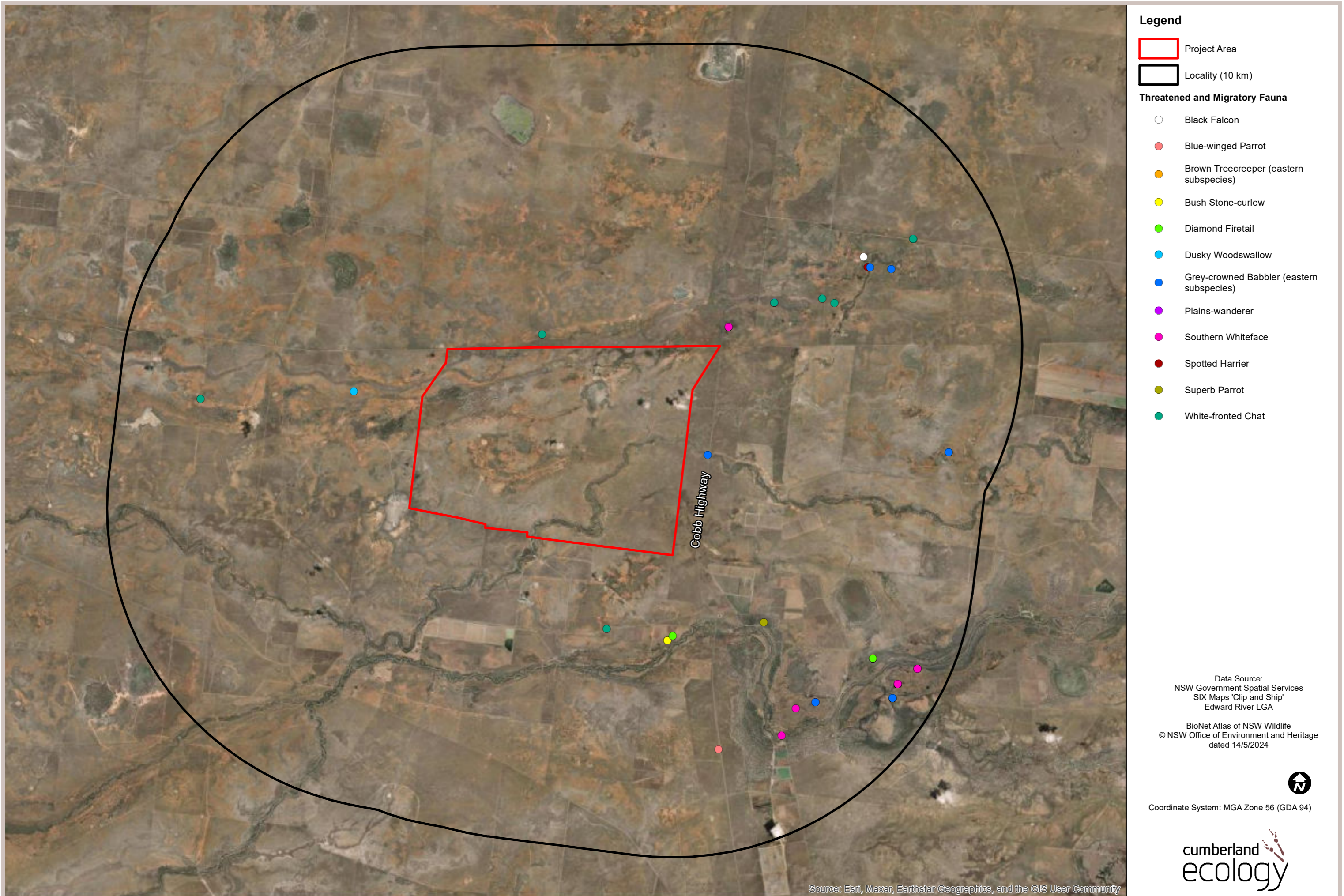


Figure 10. Threatened and Migratory Fauna species recorded within 10km of the Project Area