NSW GOVERNMENT | Regional NSW

South Jerrabomberra Regional Job Precinct

Biodiversity Report

11 September 2023

Project No.: 0621304

The business of sustainability

ERM

Document details	
Document title	South Jerrabomberra Regional Job Precinct
Document subtitle	Biodiversity Report
Project No.	0621304
Date	11 September 2023
Version	5.0
Author	Jye Dalton
Client Name	Department of Regional NSW

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	A	Jye Dalton	Matt Davis	Karie Bradfield	28.01.2022	Draft for client review
Draft	B	Jye Dalton	Matt Davis	Karie Bradfield	22.04.2022	Final Draft for client review
Final	1.0	Jye Dalton	Matt Davis	Karie Bradfield	19.08.2022	Final for agency review
Final	2.0	Jye Dalton	Matt Davis	Karie Bradfield	24.11.2022	Revised based on comments received
Final	3.0	Laura Steiniger	Matt Davis	Karie Bradfield	28.02.2023	Revised final to address additional comments
Final	4.0	Jye Dalton	Matt Davis	Karie Bradfield	26.05.2023	Update to figures
Final	5.0	Matt Davis	Jo Woodhouse	Karie Bradfield	11.09.2023	Updated with field data from Poplars precinct

Signature Page

11 September 2023

South Jerrabomberra Regional Job Precinct

Biodiversity Report

Jye Dalton
Ecologist

Matt Davis
Principal Ecologist

Joanne Woodhouse
Project Manager

Karie Bradfield
Partner

Environmental Resources Management Australia Pty Ltd
Level 14, 207 Kent Street
Sydney NSW 2000

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Department of Regional NSW (DRNSW) to undertake a program of environmental and heritage studies to support the development of the South Jerrabomberra Regional Job Precinct (RJP) Master Plan, including the preparation of this Biodiversity Report. This report is based on a desktop review, as well as field investigations completed across Environa and portions of Poplars land. It presents a description of key biodiversity values within the Investigation Area and immediate surrounds, as well as an assessment of the opportunities and impacts associated with the final RJP Master Plan.

The biodiversity analyses will also identify opportunities to enhance environmental values of the precinct, along with opportunities to avoid or minimise any future impacts. This report provides an assessment of the Investigation Area's environmental values and any impacts that may affect vegetation condition and habitat suitability for EPBC-listed species and communities. Conservation management recommendations will be made in relation to priority mitigation and adaption measures.

The objective of the report is to identify and describe key biodiversity values within the Investigation Area. The South Jerrabomberra RJP development zone is the focus of investigation for the South Jerrabomberra RJP and is approximately 950 hectares in size. It is located to the south of the Jerrabomberra, and east of the Monaro Highway on the border of the Australian Capital Territory and New South Wales in Queanbeyan. Tompsitt Drive bisects the Investigation Area from East to West in the northern section of the development zone. This area is referred to as the **Investigation Area**.

The Investigation Area as shown in Figure 1-1 is located in the Queanbeyan-Palerang Region Local Government Area (LGA) and includes:

- Sections of suburbs Jerrabomberra, Tralee and Environa;
- Jerrabomberra Creek;
- Dogtrap Gully;
- First phase of Poplars Development including:
  - Aldi Australia Jerrabomberra;
  - Food outlets; and
  - 7-Eleven service station.
- Rural/Semi Rural Land and agricultural land; and
- To the west of the Investigation Area is a commercial/industrial cluster located in the Australian Capital Territory (ACT).

Biodiversity values are defined as those species and communities listed as vulnerable, endangered or critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act), and/or the *Biodiversity Conservation Act 2016 (NSW)* (BC Act).

A total of three threatened flora species have been recorded in the database searches within the Investigation Area:

- Button Wrinklewart;
- Hoary Sunray; and
- Silky Swainson-pea.

From existing databases, a total of seven threatened fauna species have been recorded within the Investigation Area:

- Diamond Firetail;
- Dusky Woodswallow;
- Gang-gang Cockatoo;
- Scarlet Robin;

- Flame Robin;
- Golden Sun Moth;
- Striped Legless Lizard;
- Grassland Earless Dragon; and
- Pink-tailed Worm Lizard.

Several field surveys have also been completed across the Investigation Area and have contributed to the identification of biodiversity values presented in this report. This includes field surveys completed in accordance with the NSW Biodiversity Assessment Method (BAM) across the Poplars precinct by Capital Ecology between September 2019 and May 2022 and an additional survey in the Environa Precinct by ERM in May 2022.

Records of the threatened fauna species indicate that they are generally found in the areas in the north of the Investigation Area, such as adjacent to Tompsitt Drive and Lanyron Drive, Jerrabomberra Creek and areas to the east of the Investigation Area also have a higher density of recorded threatened species, although it is noted that substantially greater field survey effort has been applied in the Poplars Precinct as part of previous and ongoing assessments to support Biodiversity Certification of this development.

Golden Sun Moth records are clustered towards the north of the Investigation Area, in the Poplars area, with dense clusters found to the north and south Tompsitt Drive.

Grassland Earless Dragon has been recorded to the north of the Poplars precinct and Investigation Area, primarily to the west Pink-tailed Legless Lizard is also known to occur in the Poplars Precinct, with records concentrated on the western side of this precinct.

Golden Sun Moths were recorded during the November- December 2022 field survey period in the southern end of the Poplars precinct and have also been recorded in the east of this Precinct.

The May 2022 field survey period completed across Environa recorded potential habitat for six (6) threatened species (Gang Gang Cockatoo, Superb Parrot, Grassland Earless Dragon, Striped Legless Lizard, Pink-tailed Worm Lizard and the Golden Sun Moth). Incidental observations of four threatened fauna species were observed at the site including Gang Gang Cockatoo, Pink-tailed Worm Lizard, Diamond Firetail and Flame Robin.

Field validation of the existing vegetation mapping has determined that five plant community types (PCTs) are present within the Investigation Area. Other areas included heavily modified environments such as cropping and pastured areas:

- PCT 1334 - Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion;
- PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion;
- PCT 320 - Kangaroo Grass - Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion;
- PCT 1202 - Speargrass grassland of the South Eastern Highlands Bioregion; and
- PCT 1289 - Wallaby Grass - Red-grass - Tall Speargrass - Kangaroo Grass dry tussock grassland of the North-western and Eastern Southern Tablelands in the South Eastern Highlands Bioregion.

Surveys to date have identified two TECs that are known to occur within the Investigation Area:

- Natural Temperate Grassland, a critically endangered PCT and TEC is present in the north-western part of the investigation area (South West Poplars) and is consistent with PCT 320. The TEC was in good condition and the area was floristically diverse evidenced by observation of 54 flora species and some locally uncommon species such as Zornia dyctiocarpa and lobe seed daisy (Brachyscome dentata). This area of Native Temperate Grassland is threatened by the incursion of serrated tussock. Surveys at Environa did not observe Native Tussock Grassland; and

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland was present within the Environa portion of the investigation area in small patches. Environa appears to have been woodland in the past however has been degraded through improved pastures, woody weed incursion and land clearing. Further investigation is required to ground truth the extent of the TEC within this area.

Landscape Connectivity

The South Jerrabomberra Regional Job Precinct Investigation Area and surrounds contain a range of habitat corridors, characterised as areas that link vegetation to form wildlife habitat. Corridors can also contribute to the resilience of the landscape in a changing climate and help to reduce future greenhouse gas emissions by storing carbon in native vegetation. They can also support multiple land uses such as conservation, farming and forestry.

Movement between remnant habitats is vital for the survival of both flora and fauna species. By facilitating the movement of different species across a landscape, each remnant habitat can receive the necessary processes that it requires in order to function correctly and thus maintain an adequate level of ecosystem health. These corridors can function at both a local and regional level.

There are a range of benefits that come from the retention or creation of ecological linkages across a landscape. Molloy et al., (2009) outlines the following benefits:

- Increased ecological effectiveness;
- Increased migration rates;
- Increased foraging and home range areas for species;
- Provision of cover for escape from predators between large patches;
- Provision of alternative refuge from major disturbances; and
- Provision of green belts to limit the effects of urbanisation on species and ecological communities.

Important local habitat corridors identified in this report include continuous patches of habitat large enough to sustain viable populations of threatened flora and fauna and to facilitate dispersal movement. These include a combination of:

- Jerrabomberra Creek;
- Dogtrap Gully;
- There is potential habitat linkage to the Jerrabomberra Mountain Reserve through the northern boundary of the RJP and Jerrabomberra Creek through the eastern boundary;
- Large areas of vegetation that facilitate dispersal and movement between adjacent habitats, such as vegetation to south of the Investigation Area; and
- Areas of mapped TEC.

The Monaro Rail Trail is a proposed cycle tourism project linking Queanbeyan and Bombala. While the primary objective

of this project is human recreation, the project offers additional opportunities to enhance ecological connectivity between the important habitat patches identified in this report and those beyond the projects scope. The preservation of landscape heritage along the proposed trail is likely to also preserve important habitat characteristics for species persistence and dispersal. The identification of specific opportunities to enhance the habitat value of the Investigation Area through restoration along the proposed Monaro Rail Trail is beyond the scope of this report, it is likely to be beneficial.

Summary of Biodiversity Values

The Investigation Area has select areas of high biodiversity values that must be considered in the planning process. Key criteria that have been applied in this assessment to determine the preliminary conservation values (based on desktop review of available data and survey findings) include:

- Patch size and connectivity to existing conservation reserves;
- Occurrence within identified habitat corridor;

- Status of the vegetation community; and
- Consideration of matters of national environmental significance (MNES) protected under the Environment Protection and *Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act).

Based on these criteria, the following ecological features within the Investigation Area have been identified as having high biodiversity conservation value:

- High Values Biodiversity Mapping;
- Existing Conservation Reserves;
- Areas of mapped Threatened Ecological Communities including Box Gum Woodland and Natural Temperate Grasslands;
- Golden Sun Moth habitat;
- Pink Tailed Legless Lizard habitat;
- Grassland Earless Dragon habitat;
- Vegetated habitat corridors and linkages; and
- Potential Serious and Irreversible Impacts (SAII) entities, including:
  - Mauve Burr-daisy *Calotis glandulosa*;
  - Pale Pomaderris Pomaderris pallida;
  - Regent Honeyeater *Anthochaera Phrygia*;
  - Curlew Sandpiper *Calidris ferrug*inea (Breeding);
  - Swift Parrot Lathamus discolour;
  - Eastern Curlew Numenius madagascariensis;
  - Yellow-spotted Tree Frog *Litoria castanea*;
  - Golden Sun Moth *Synemon plana*;
  - Large-eared Pied Bat *Chalinolobus dwyeri*; and
  - Brush-tailed Rock Wallaby *Petrogale penicillata*.

CONTENTS

List of Tables

List of Figures

Acronyms And Abbreviations

Name	Description
ALA	Atlas of Living Australia
AOBV	Area of Outstanding Biodiversity Value
ARKS	Areas of Regional Koala Significance
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016 (NSW)*
BOS	Biodiversity Offset Scheme
BOSET	Biodiversity Offsets Scheme Entry Threshold
CKPoM	Comprehensive Koala Plan of Management
DCS	Department of Customer Service
DoEE	Department of Environment and Energy
DPE	Department of Planning and Environment
DRNSW	Department of Regional NSW
EAAF	East Asian-Australasian Flyway
EECs	Endangered Ecological Community. EEC is a category of Threatened Ecological Community.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
ERM	Environmental Resources Management Australia Pty Ltd
Fisheries Act	*Fisheries Management Act 1994 (NSW)*
IBAs	Important Bird and Biodiversity Areas
Investigation Area	The Investigation Area for the purposes of this biodiversity report have been defined by the proponent and includes 950 ha of land within Queanbeyan-Palerang Region LGA. Location and extent of the Investigation Area is illustrated in Figure 1-1.
IUCN	International Union for Conservation of Nature
Koala Habitat SEPP	State Environmental Planning Policy (Koala Habitat Protection) 2021
KHSM	Koala Habitat Suitability Model
KLM	Koala Likelihood Map
KoRV	Koala Retrovirus
KTSI	Koala Tree Suitability Index
LGA	Local Government Area
LLS Act	*Local Land Services Act 2013 (NSW)*
MNES	Matter of Nation Environmental Significance
MSES	Matter of State Environmental Significance
NP&W Act	*National Parks and Wildlife Act 1974 (NSW)*
NSW TSSC	NSW Threatened Species Scientific Committee
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type

Name	Description
PMST	Protected Matters Search Tool
Precincts - Regional SEPP	*State Environmental Planning Policy (Precincts - Regional) 2021*
RJP	Regional Job Precinct
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
SAP	Special Activation Precinct
SOS	Save our Species
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community. In Australia three categories exist for listing threatened ecological communities: critically endangered, endangered and vulnerable.
WONS	Weeds of National Significance

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Department of Regional NSW (DRNSW) to undertake a program of environmental and heritage studies to support the development of the South Jerrabomberra Regional Job Precinct (RJP) Master Plan, including the preparation of this Biodiversity Report.

This report has been based on a desktop review as well as field surveys and presents a description of key biodiversity values within the Investigation Area and immediate surrounds.

This technical report has been designed to assess the final Master Plan for the RJP that was developed as part of a series of Integration Workshops.

This document is for design purposes only and has not been prepared to support any development application process. Field survey and reporting methodologies have been adapted from the Biodiversity Assessment Method; however, this report is not a Biodiversity Development Assessment Report (BDAR) and the results provided are indicative only.

1.1 Project Background

The Regional Job Precincts (RJPs) have been identified as areas of land that are of local significance based on economic enables. The intention of the RJPs is to encourage private investment and to generate jobs. The RJPs aim to preserve, enhance and protect the natural environment. This will include identification of key biodiversity values, as well as integration of strategies for greening the locality, maintaining or enhancing habitat connections, and improving riparian corridors.

The South Jerrabomberra RJP will leverage opportunities associated with the Poplars Innovation Precinct to create a hub of defence, space, cyber-security, information technology and scientific research sectors. This will be done through improvements to the local planning framework and better collaboration across different parts of state and local government. The precinct will build upon the $23 million investment by the NSW Government to improve infrastructure within the business park thanks to the Growing Local Economies Fund.

Queanbeyan-Palerang Regional Council's 2018-2022 Economic Development Strategy states the Council's focus is on facilitating cluster development for its high skill, high value-add activities. Maintaining a steady supply of suitable land for businesses to establish and grow is vital to the economic prosperity of the region.

Existing EBPC Act Approval and Biobanking Agreement (Poplars)

A mixed-use commercial development at ‘the Poplars’ precinct (referral number 2020/8801) has been approved with conditions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These conditions should be considered in future planning and actions within the precinct and RJP.

Conditions specific to the action include:

- Approval holder must not clear outside the development footprint;
- The approval holder must not clear inside the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area; and
- Within the development footprint, the approval holder must not clear more than: a. 13.51 hectares of Golden Sun Moth habitat; and b. 0.42 hectares of White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland.

Mitigation and management measures include:

- A Construction Environmental Management Plan (CEMP) must be submitted, approved and implemented and must prevent impacts to protected matters in areas adjacent to the development footprint; and

- For the protection of the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area the approval holder must undertake on-ground management activities throughout the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area consistent with those specified in the North Poplars BioBanking Agreement.

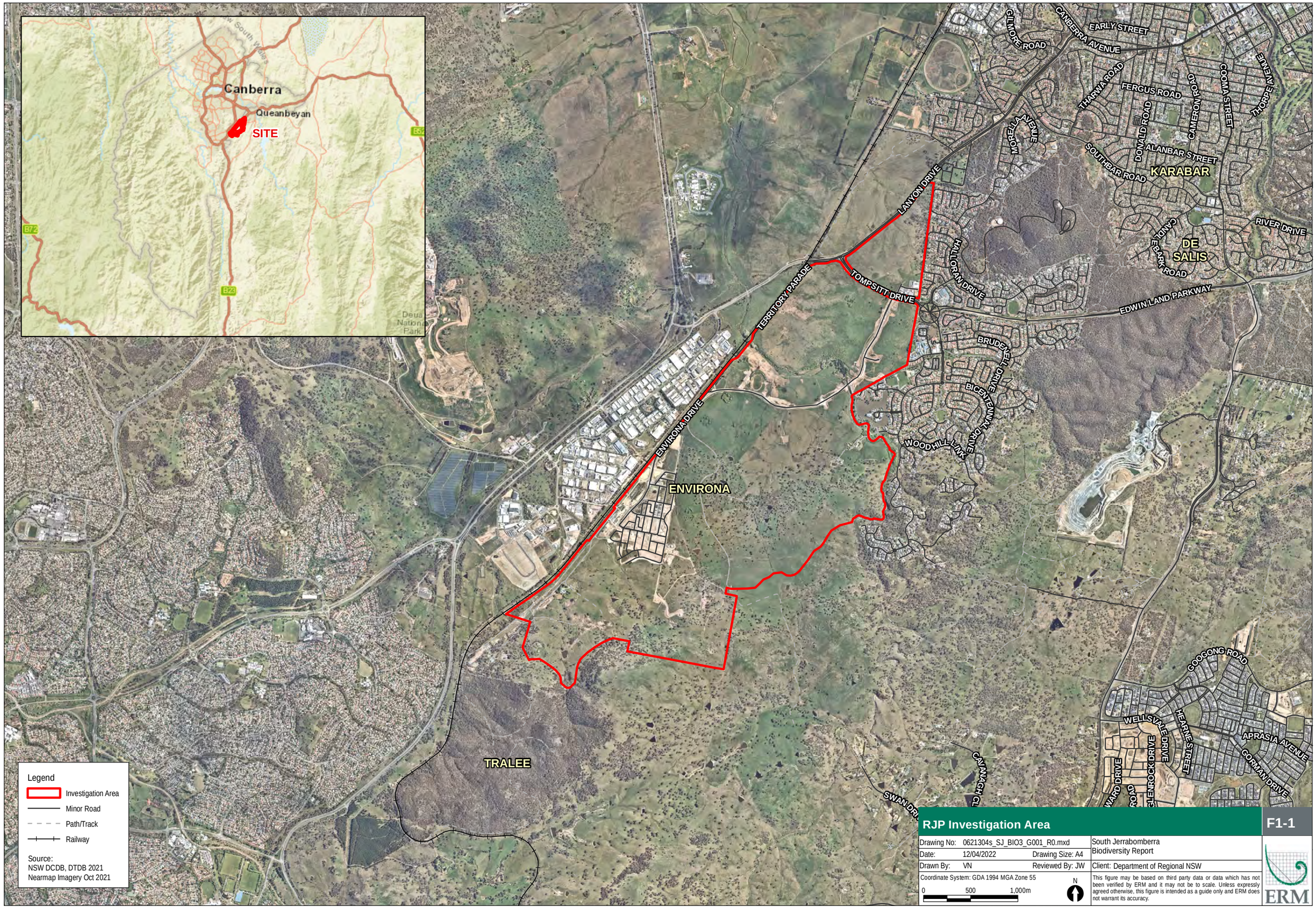
An existing Biobanking Agreement is in place within the 'Poplars' precinct located within the Investigation Area. The Biobanking Agreement covers areas in both the North and South Poplars sites, approximately 55ha and 42ha respectively.

The Biobanking Agreement credited the following species and Plant Community Types (PCT):

- Wallaby Grass - Red-grass - Tall Speargrass - Kangaroo Grass dry tussock grassland of the North-western and Eastern Southern Tablelands in the South Eastern Highlands Bioregion;
- Speargrass grassland of the South Eastern Highlands Bioregion;
- Yellow Box – Blakely's Red Gum grassland woodland on the tablelands, South Eastern Highlands Bioregion;
- Golden Sun Moth (*Synemon plana*);
- Grassland Earless Dragon (*Tympanocryptis pinguicolla*); and
- Pink-tailed Worm-lizard (*Aprasia parapulchella*).

1.2 Investigation Area

The South Jerrabomberra RJP development zone is the focus of investigation for this RJP and is approximately 950 hectares in size. It is largely located to the south of the suburb of Jerrabomberra, and east of the Monaro Highway on the border of the Australian Capital Territory and New South Wales in Queanbeyan. Tompsitt Drive bisects the Investigation Area from east to west in the northern section of the development zone. The investigation area, preferred Master Plan and development areas are outlined in Figure 1-1 and Figure 1-2.



RJP Investigation Area

F1-1

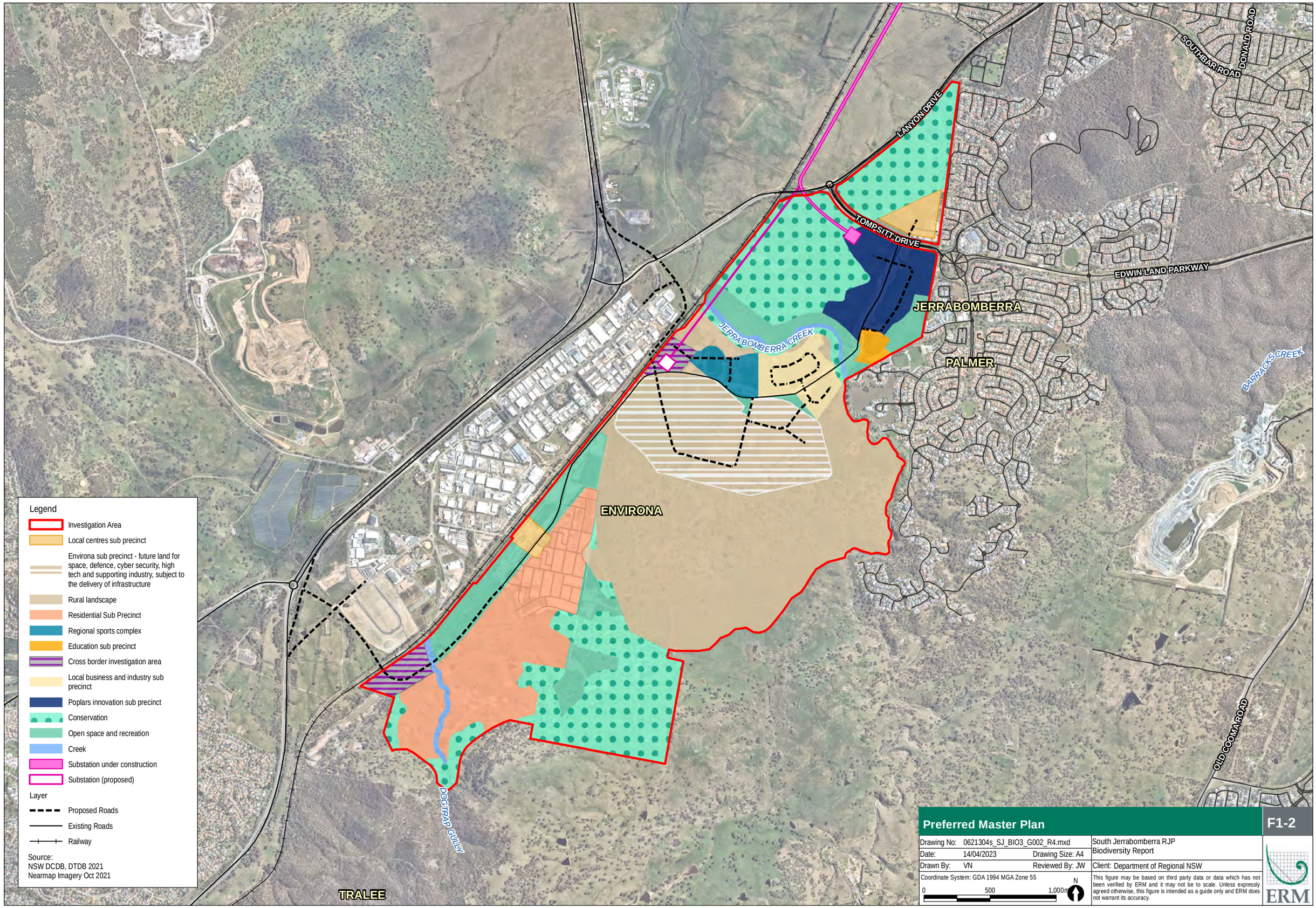
Drawing No:	0621304s_SJ_BIO3_G001_R0.mxd		South Jerrabomberra Biodiversity Report
Date:	12/04/2022	Drawing Size: A4	
Drawn By:	VN	Reviewed By: JW	Client: Department of Regional NSW

Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000m

N

ERM



Preferred Master Plan

F1-2

Drawing No:	0621304s_SJ_BIO3_G002_R4.mxd		South Jerrabomberra RJP Biodiversity Report
Date:	14/04/2023	Drawing Size: A4	
Drawn By:	VN	Reviewed By: JW	Client: Department of Regional NSW

Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000m

N

ERM

1.3 Summary of Key Findings from Previous Projects and Studies

A review of previous projects and studies completed within the Investigation Area was undertaken as part of this assessment. Relevant information and key findings from resources used are summarised below.

A Natural Heritage Assessment of "The Poplars" Queanbeyan, NSW (Biosis Research, 2003)

- Concentrated studies in 'Poplars' section of RJP;
- Mapped vegetation communities present as:
  - Degraded Grassland;
  - Native Grassland (Natural Temperate Grassland);
  - Gum-box Woodland (White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.);
  - Stony Knoll Shrubland;
  - Rocky Outcrop Shrubland/Herbfield Mosaic; and
  - Cleared/Degraded Grassland.
- Identified three threatened species that rely on habitats existing within the Investigation Area (Grassland Earless Dragon, Golden Sun Moth, Pink-tailed Worm Lizard).

Ecological Constraints for 'Tralee' Release Area (URS, 2005)

- Golden Sun Moth presence recorded;
- Diamond Firetail presence recorded;
- Mapping extent of Native Grassland and Box-Gum Woodland communities;
- Mapping extent of Pasture/Introduced Grassland communities; and
- Recorded Red Box-Drooping She-oak cleared open forest on the upper slopes of 'South Tralee'.

Survey of The Grasslands on South Tralee (Kevin Mills & Associates, 2004)

- 109 plant species recorded (57 native, 52 exotic); and
- Assessed quality and extent of Natural Temperate Grassland and Box-Gum Woodland.

Jerrabomberra Creek Catchment Plan (GrassRoots Environmental, 2021)

- Focused on Jerrabomberra Creek;
- Determined riparian vegetation condition to be poor, and dominated by exotic species;
- Determined main threats to the creek is a lack of native riparian vegetation and dominance of exotic vegetation, recommendations include:
  - Vegetation Enhancement (revegetation);
  - Groundcover/biomass Management (assisted regeneration); and
  - Weed control and fostering native regeneration.

Report for Dunns Creek Road (GHD, 2009)

- Recorded presence of the following vegetation communities:
  - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland;
  - White Box Yellow Box Blakely's Red Gum Grassy Woodland; and
  - Natural Temperate Grassland.

- Threatened Flora species recorded:
  - Silky Swainson-pea; and
  - Hoary Sunray.
- Threatened Fauna species recorded:
  - Pink-tailed Worm-lizard;
  - Brown Treecreeper;
  - Diamond Firetail;
  - Golden Sun Moth; and
  - Speckled Warbler.

"The Poplars"– Review of previous ecological studies and rationale behind the allocation of land for development or conservation (Capital Ecology, 2020)

- Found that vegetation within the Investigation Area is highly modified and is now dominated by exotic grasses and forbs;
- Patches of native vegetation that are dominated by native grass or contain native canopy species remain including:
  - PCT 1334 Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion; and
  - PCT320 Kangaroo Grass Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion.
- Golden Sun Moth recorded including in exotic dominated grassland zones\Pink-tailed Worm-lizard recorded in PCT 320; and
- Hoary Sunray recorded in PCT 1334.

The Poplars Development, Jerrabomberra, NSW Biodiversity Certification Assessment Report

- Confirmation of two PCTs across the Poplars Precinct
  - PCT320 – Kangaroo Grass - Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion.
  - PCT1334 – Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion.
- The occurrence of one Threatened Ecological Communities (TEC) listed under the BC Act, the critically endangered White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Two listed TECs under the EPBC Act including:
  - Critically endangered Natural Temperate Grassland of the South Eastern Highlands; and
  - Critically endangered White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Confirmed presence and suitable habitat for threatened flora and fauna species, including:
  - Hoary Sunray Leucochrysum albicans var. tricolor, listed as endangered under the BC Act and the EPBC Act
  - Button Wrinklewort Rutidosis leptorrhynchoides, listed as listed as endangered under the BC Act and the EPBC Act
  - Golden Sun Moth Synemon plana, listed as vulnerable under the BC Act and the EPBC Act

- Grassland Earless Dragon Tympanocryptis pinguicolla, listed as critically endangered under the BC Act and EPBC Act
- Pink-tailed Legless Lizard Aprasia parapulchella, listed as vulnerable under the BC Act and the EPBC Act

1.4 Draft Master Plan

A draft Master Plan has been developed in consultation with industry, governments, and professional consultants to foster development that is both sustainable and environmentally conscious. (Figure 1-2).

Planning for biodiversity by structuring large scale developments such as the South Jerrabomberra RJP to incorporate habitat linkages, enhancement of vegetated areas and creation of nature reserves is key to creating sustainable developments and maintaining biodiversity movement and fauna populations throughout urban and peri urban areas.

The Draft Master Plan incorporates protections of existing vegetation by proposing the creation of conservation and rural landscape zones throughout the RJP area. The Draft Master Plan proposes to utilise areas currently zoned as Zone C3 (Environmental Management) alongside newly proposed rural landscape zones to act as a potential mechanism for additional protection of habitat corridors, vegetation linkages and conservation areas through state and local planning measures. These zones have been proposed only as part of the RJP planning process and have not been endorsed through a formal planning scheme process.

1.5 Objectives

The objective of this Biodiversity report is to identify and describe key biodiversity values within the Investigation Area. Biodiversity values are defined as those species and communities listed as vulnerable, endangered or critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act), and/or the *Biodiversity Conservation Act 2016* (NSW) (BC Act). This report is informed by field surveys and desktop assessment, including a review of previous field investigations and reports undertaken across the Investigation Area.

The Report includes:

- Identification of actual and potential biodiversity values within 10km of the Investigation Area, including the presence of listed threatened species (and their habitats) and ecological communities;
- Identification of major environmental factors that are a threat to the natural environment of the region including habitat isolation and fragmentation, climate change, erosion, groundwater dependant ecosystems and invasive species;
- Presentation of results from field surveys and ground truthed Plant Community Type (PCT) mapping from the two completed field survey efforts conducted in November - December 2021 and May 2022;
- Identification of areas of high, medium and low environmental value, relative to vegetation condition and habitat suitability for threatened species; and
- Identification of priority areas to be considered for buffers stewardship sites, linkages or corridors, as well as areas to be considered for restoration, regeneration and/or revegetation.

This technical report has been designed to test the preferred structure plan that was developed as part of a series of Enquiry by Design Workshops and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

This report does not address the full requirements of the Biodiversity Assessment Method (BAM 2020), a requirement to support either a development application or a biocertification application. The desktop and fieldwork results presented in this Biodiversity Report do have the potential to be used as part of a future Biodiversity Development Assessment Report (BDAR) or Biodiversity Certification Assessment Report (BCAR). In particular, the vegetation zone and Plant Community Type mapping and threatened species habitat assessments and surveys can be utilised, as these assessments have been completed with reference to Stage 1 of the BAM 2020 and focuses on the identification and mapping of biodiversity values. Further targeted survey and vegetation integrity plots are required to support any formal application for development approval or biocertification.

1.6 Next Steps

Preliminary ecological fieldwork, including vegetation community mapping, ground-truthing of habitat suitability and assessments of hollow bearing trees was commenced in November – December 2021, with an additional field assessment in May 2022. Results from these field surveys are included in this report.

Further field surveys will be required for threatened species that could not be surveyed during the November – December or May survey periods due to optimal seasonal survey timing. This includes the Grassland Earless Dragon as it is a cryptic species that is very difficult to detect and contains a labour intensive survey methodology. Naturally persisting in relatively low population densities, it is unlikely that the absence of Grassland Earless Dragons can be assumed after a single survey season. Detection is further impacted by a sensitivity to climatic variations. To overcome these limitations, surveys will need to be conducted between February and March to maintain the highest confidence of detection. The most practical survey methodology involves installing artificial arthropod burrows to provide shelter in order to detect occupancy. Artificial burrows require inspection periodically over a six week period in order to maintain confidence in detection.

Areas of Native Temperate Grassland that appear to meet the condition thresholds for protection under the Act, should be assessed in late spring/early summer to confirm that the patch meets the required floristic diversity/Floristic Value Score requirements.

Where surveys cannot be completed within the seasonal requirements for some species (i.e. spring flowering period for threatened orchids, seasonal migratory patterns of birds and reptile activity) and potential habitat is available within the selected precinct, the assessment will either be supported by an expert report, or species presence will be assumed.

2. LEGISLATIVE AND POLICY CONTEXT

This biodiversity report has been undertaken with consideration of Commonwealth, State and Local regulatory frameworks and associated legislation. Table 2-1 summarises the relevant legislation and policies applicable to this biodiversity baseline assessment. Potential impacts to these values will be addressed as the RJP project progresses to the selection of a preferred precinct and development of the structure and master plan.

Table 2-1 Key Legislation and Policies

Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act requires approval of the Commonwealth Minister for the Environment for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES) as assessed in accordance with the EPBC Significant Impact Guidelines 1.1. The EPBC Act is administered by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and lists threatened species, ecological communities and other MNES. Any proposed action that is expected to have an impact on MNES must be referred to the Minister for assessment under the EPBC Act, or assessed under the existing bilateral agreement, or accredited process between the Commonwealth and the State of New South Wales (NSW).

MNES	Application to the Investigation
World heritage properties	Not identified within the Investigation Area
National heritage places	Identified in Buffer Area: ■ Australian War Memorial and the Memorial Parade; ■ High Court – National Gallery Precinct; and ■ Old Parliament House and curtilage.
Ramsar wetlands of international importance	There are no Ramsar wetlands within, or adjacent to the Investigation Area. The nearest Ramsar wetlands are: ■ Banrock station wetland complex - 800 – 900km downstream; ■ Hattah-kulkyne lakes - 600 – 700km downstream; ■ Riverland - 700 – 800km downstream; and ■ The Coorong, and Lakes Alexandrina and Albert Wetland - 800 – 900km downstream.
Listed threatened species and communities	PMST search identified potential for these matters to occur within the Investigation Area. Refer to Section 5.3 and Section 6.1 of this report
Internationally protected migratory species	PMST search identified potential for these matters to occur within the Investigation Area. Refer to Section 6.4
Commonwealth marine areas	Not identified within the Investigation Area
The Great Barrier Reef Marine Park	Not identified within the Investigation Area
Nuclear actions	Not identified within the Investigation Area
A water resource, in relation to coal seam gas development and large coal mining development	Not identified within the Investigation Area

NSW Statutory Legislation and Guidelines

Biodiversity Conservation Act 2016 (BC Act)

The BC Act came into effect on 25 August 2017. The BC Act replaced the NSW *Threatened Species Conservation Act 1995*, the NSW *Nature Conservation Trust Act 2001* and parts of the NSW *National Parks and Wildlife Act 1974* (NP&W Act). The BC Act establishes mechanisms for:

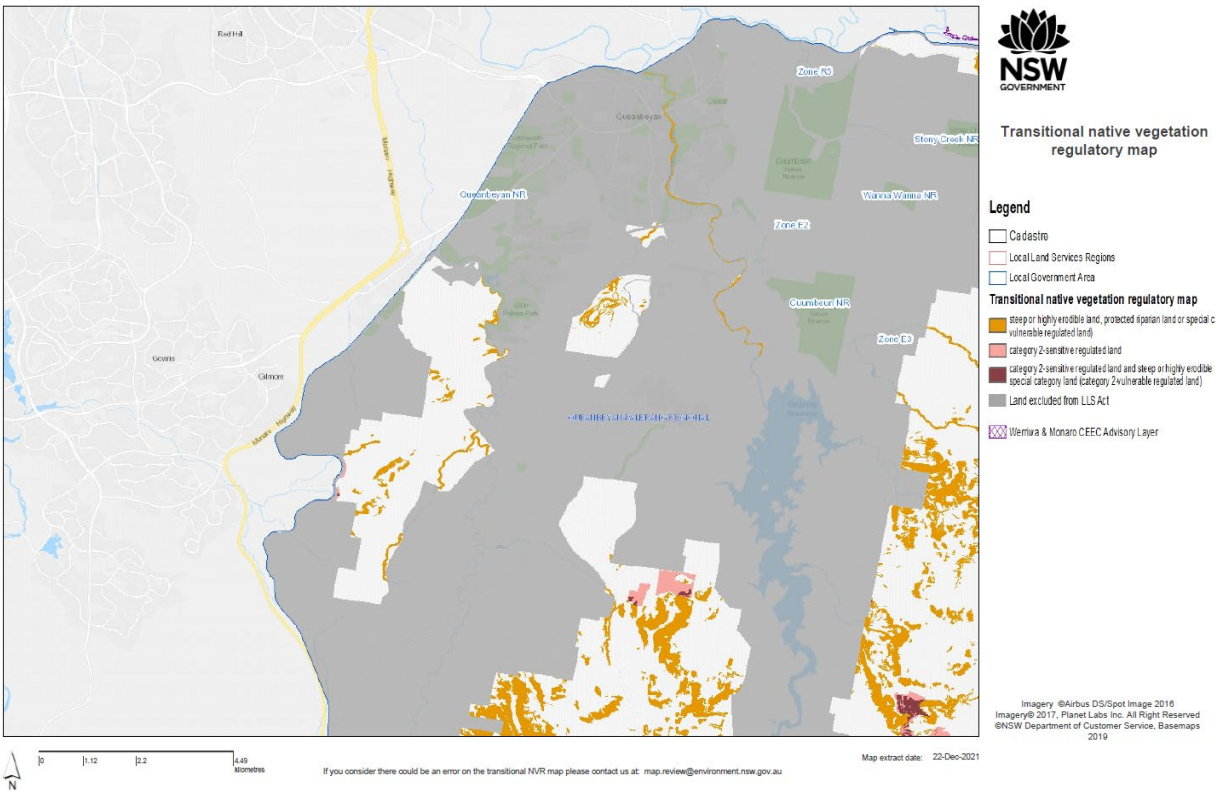
- The management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TECs);
- The listing of threatened species, TECs and key threatening processes;
- The development and implementation of recovery and threat abatement plans;
- The declaration of critical habitat;
- The consideration and assessment of threatened species impacts in development assessment process; and
- Biodiversity Offsets Scheme (BOS), including the Biodiversity Values Map and Biodiversity Assessment Method (BAM) to identify serious and irreversible impacts (SAII).

The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments. Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the BAM. A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold (BOSET) tool are available to identify the presence of mapped biodiversity values within land proposed for development as well as the clearing thresholds that would trigger application of the BAM.

Local Land Services Act 2013

The *Local Land Services Act 2013* (LLS Act) regulates the management of vegetation on rural land. The amendments to the LLS Act have resulted in a change to the criteria for native vegetation clearing. There are now three different land categories for clearing on rural land, which are shown in the Native Vegetation Regulatory Land Map provided below in this table:

- Category 1 Exempt land is land where native vegetation can be cleared without approval from Local Land Services;
- Category 2 land is divided into:
  - Category 2 Regulated land is Category 2 land that is not Vulnerable or Sensitive regulated land. You may need authorisation from Local Land Services to clear native vegetation from rural zoned land in this category;
  - Category 2 Vulnerable regulated land is land where clearing of native vegetation may not be permitted under the Land Management (Native Vegetation) Code 2018, and a limited range of allowable activities are permitted; and
  - Category 2 Sensitive regulated land is land where clearing is not permitted under the Land Management Code (Native Vegetation) Code 2018, and a limited range of allowable activities is permitted.
- Excluded land is land where the Land Management (Native Vegetation) Code 2018 and allowable activities do not apply.



Native Vegetation Regulatory Land Map

Biosecurity Act 2015

The NSW *Biosecurity Act 2015* came into effect on 1 July 2017, effectively replacing the *Noxious Weeds Act 1993*, and 13 other Acts, with a single Act. Under the Noxious Weeds Act all landowners had a responsibility to control noxious weeds on their property. Under the Biosecurity Act broadly the same responsibility will apply and will be known as a General Biosecurity Duty.

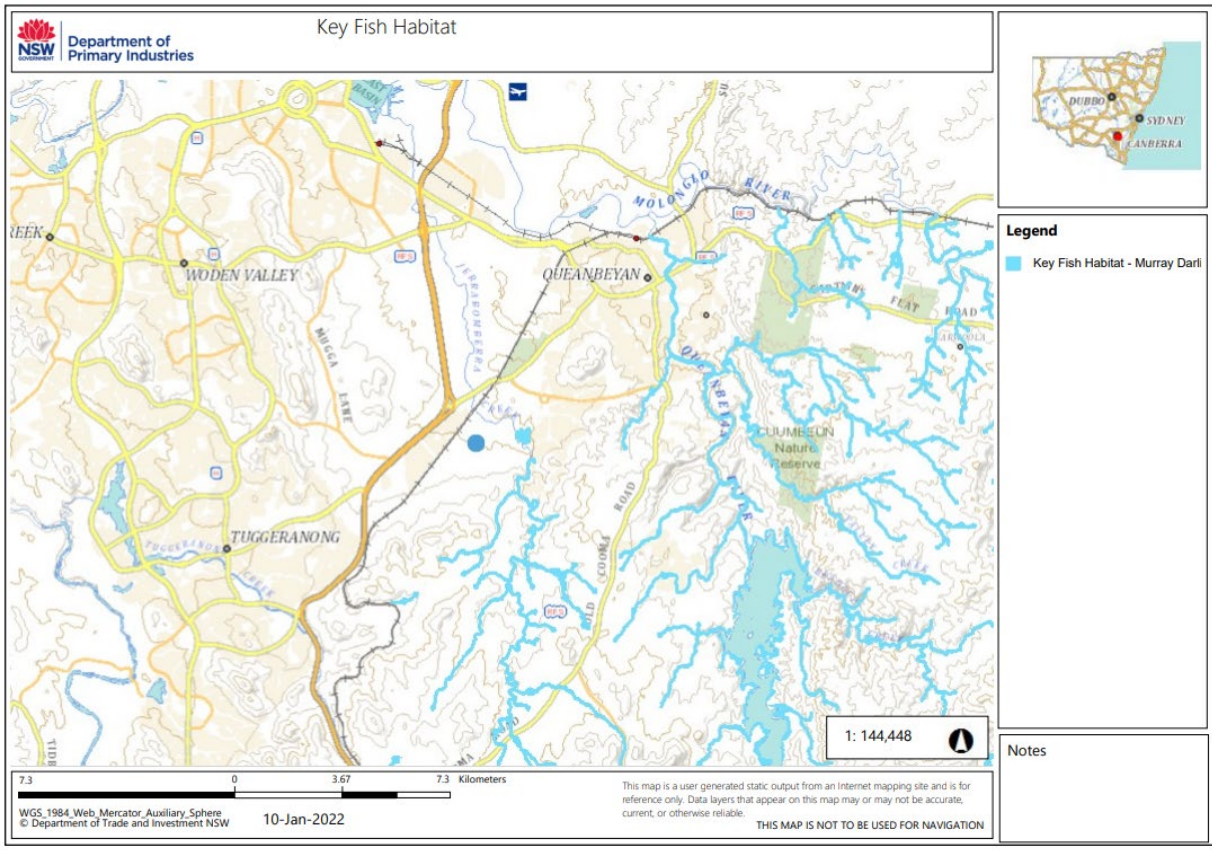
The General Biosecurity Duty states "*Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised*." The general biosecurity duty applies to all weeds listed in Schedule 3 of the Biosecurity Act.

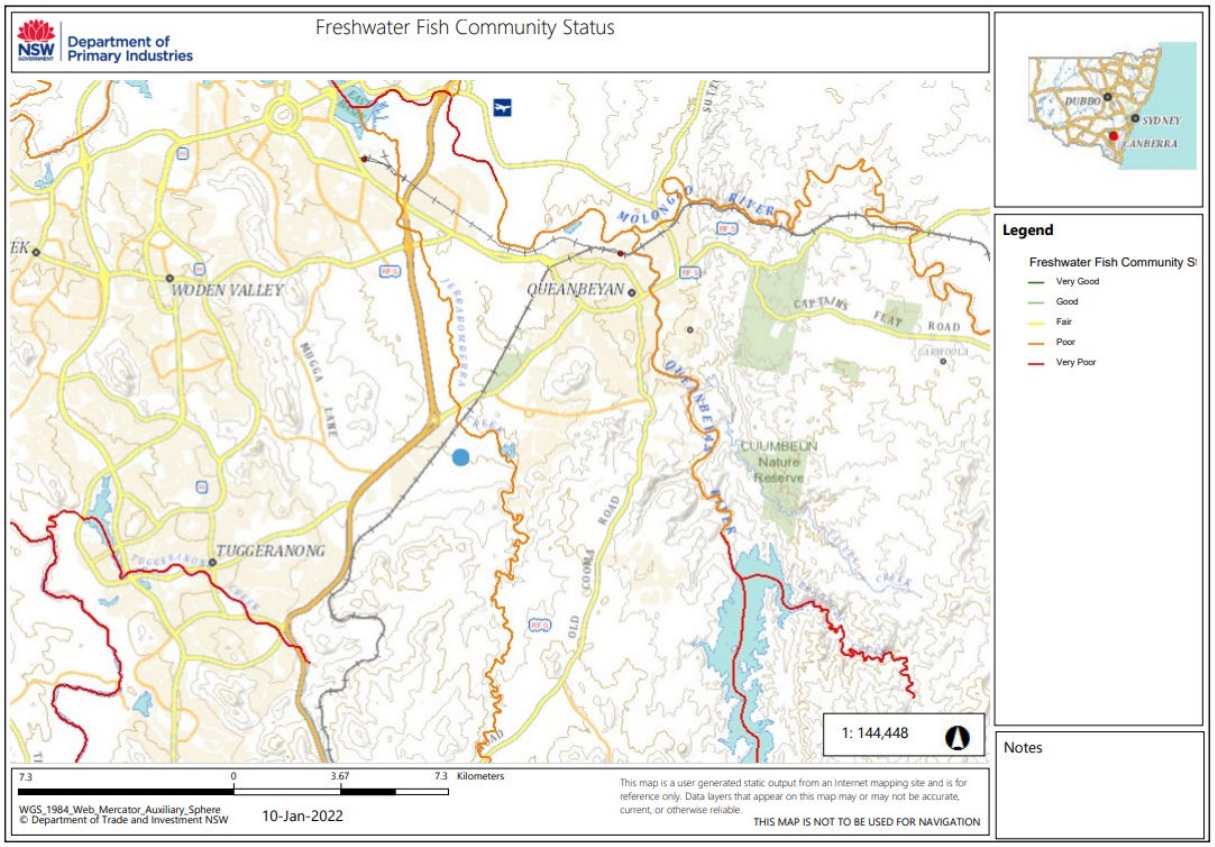
Primary weeds have been identified in different Local Government Areas (LGA) due to the level of threat infestation they represent, some of the Weeds of National Significance (WoNS) are also listed as Primary Weeds in LGAs.

Fisheries Management Act 1994

The *Fisheries Management Act 1994* provides for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Similar to the BC Act, the *Fisheries Management Act 1994* lists threatened species, populations and ecological communities of fish and marine vegetation.

Key fish habitat mapped for the Queanbeyan-Palerang Region Local Government Area (LGA) is shown below, with the location of the RJP indicated by a blue dot. It can be seen that this includes Queanbeyan River and Jerrabomberra Creek and waterways feeding into Googong Dam.


Department of Primary Industries
Key Fish Habitat
WODEN VALLEY
QUEANBEYAN
TUGGERANONG
MOLONGLO RIVER
CUUMBEUN Nature Reserve
DUBBO
SYDNEY
CANBERRA
Legend
Key Fish Habitat - Murray Darli
1: 144,448
Notes
7.3 0 3.67 7.3 Kilometers
WGS_1984_Web_Mercator_Auxiliary_Sphere
© Department of Trade and Investment NSW
10-Jan-2022
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION


Department of Primary Industries
Freshwater Fish Community Status
WODEN VALLEY
QUEANBEYAN
TUGGERANONG
MOLONGLO RIVER
CUUMBEUN Nature Reserve
DUBBO
SYDNEY
CANBERRA
Legend
Freshwater Fish Community St
Very Good
Good
Fair
Poor
Very Poor
1: 144,448
Notes
7.3 0 3.67 7.3 Kilometers
WGS_1984_Web_Mercator_Auxiliary_Sphere
© Department of Trade and Investment NSW
10-Jan-2022
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Schedule 6 of the *Fisheries Management Act 1994* also lists the following key threatening process that may be relevant to masterplan design process:

- Degradation of native riparian vegetation along New South Wales watercourses;
- Human-caused climate change; and
- Removal of large woody debris from New South Wales rivers and streams.

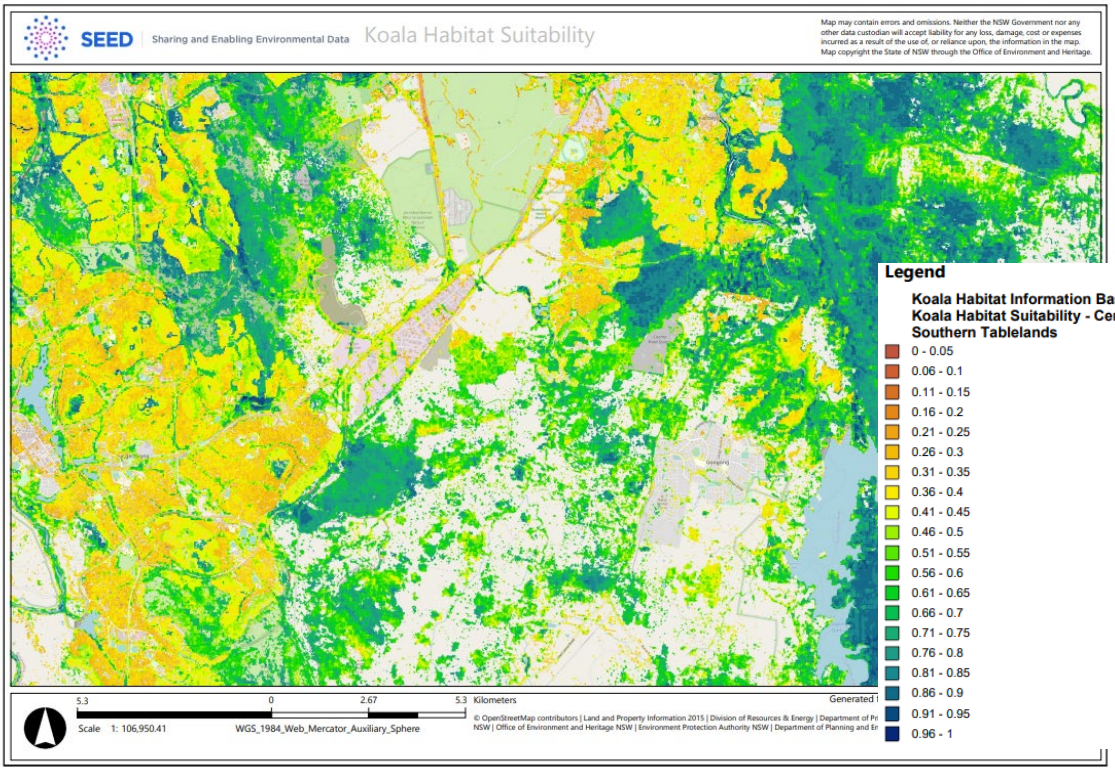
Any waterway crossings will need to consider an appropriately designed structure that does not obstruct fish passage and will be designed in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management and the Policy and Guidelines for Fish Friendly Waterway Crossings.

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

The State Environmental Planning Policy (Koala Habitat Protection) 2021 was made and commenced on 17 March 2021. This SEPP is now contained in Chapter 4 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021. The Koala SEPP 2021 reinstates the policy framework of SEPP Koala Habitat Protection 2019 to 83 Local Government Areas (LGA) in NSW. The Koala Habitat SEPP aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline. The key changes to the Koala Habitat SEPP relate to the definitions of Koala habitat; list of tree species; list of councils; and development assessment process.

Key changes include:

- The number of tree species considered important to Koalas has expanded from 10 species to up to 65 species across nine distinct regions of NSW; and
- A new 'Core Koala Habitat' definition being:
  - an area of land where Koalas are present;
  - or an area of land which has been assess by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable Koala habitat; and
  - where Koalas have been recorded as being present in the previous 18 years.



Koala Habitat SEPP –Koala Habitat Suitability

The SEPP 2021 applies to the Queanbeyan-Palerang Region LGA. It is anticipated that the masterplan would, as far as practicable, aim to be consistent with the objectives of the SEPP 2021.

3. ASSESSMENT METHODOLOGY

3.1 Overview

Relevant information collated during preparation of the Biodiversity Baseline Assessment Report (ERM 2021) was used to inform the field surveys and has been incorporated into this report. These information sources are provided in Table 3-1, along with additional information sources reviewed specifically for this report. This section describes the methodology to undertake the assessment. This includes a desktop review as described below.

3.2 Desktop Review

A number of desktop sources were reviewed to identify ecological values that may occur within the Investigation Area. The databases and other key sources considered are listed in Table 3-1.

A search area containing the Investigation Area and a 10km buffer was used to identify potential significant biodiversity features to be considered as part of this biodiversity report. The Protected Matters Search Tool (PMST) and BioNet results were cross-checked using Atlas of Living Australia (ALA) database locations of records in the context of the actual Investigation Area boundary.

This desktop review provides information on species known or likely to occur within the Investigation Area only, based on species records, the availability of suitable habitat, breeding and roosting sites for bats, and RAMSAR sites for water birds.

Table 3-1 Databases and Sources Reviewed for Desktop Analysis

Information Source	Name	Search Date	Data Description
DAWE	PMST	22/12/2021	The search tool provides predictive results of Matters of National Environmental Significance based on mapping of known and potential species distribution, habitat, ecological communities and wetlands. The outputs are based on modelling results and do not necessarily reflect known records of species or communities. The features highlighted by the search are considered further through a likelihood of occurrence assessment (see Section 6.3). Shapefile of Investigation Area was used with a 10 km buffer applied.
DAWE	Species Profile and Threats Database (SPRAT)	22/12/2021	The SPRAT profiles and associated conservation advice documents were consulted for the following reasons: They provide detailed information for the Likelihood of Occurrence assessment on: ■ Species distribution; and ■ Species habitat preferred and general. The conservation advice documents are particularly important for assessing TECs found in field surveys, against the listed TEC guidelines.
ala.org.au	ALA	22/12/2021	Australia national biodiversity database (supported by the National Collaborative Research Infrastructure Strategy, CSIRO). Database contains records accessed through an interactive spatial portal. Threatened species are searched to identify known records in proximity to the Investigation Area.
DPE	BioNet	22/12/2021	Data from the BioNet Atlas website [North:-35.37 West: 149.19 East: 149.15 South: 35.41]
Department of Planning and Environment (DPE)	BAM Calculator	August 2022	An initial run of the BAM Calculator, based on available vegetation mapping, was undertaken to provide a list of threatened species to be considered for the field survey and reporting.

Information Source	Name	Search Date	Data Description
Capital Ecology	The Poplars Development, Jerrabomberra, NSW Biodiversity Certification Assessment Report	August 2023	Technical report prepared to support the proposed Biodiversity Certification of the Poplars Precinct, applying the BAM to map Plant Community Types (PCTs), vegetation zones and habitat for candidate threatened flora and fauna species.

3.3 Field Surveys

Initial field surveys were completed between 29th November and 3rd December and 7th – 31st December 2021, applying methods that could be completed during the summer seasonal window. It is noted that much of the targeted survey work and collection of vegetation integrity plot data is limited to spring in this region, so surveys were limited to assessment of Golden Sun Moth presence and habitat and high-level verification of vegetation communities with a focus on identifying BC Act and EPBC Act TECs. Field survey locations are presented in Figure 3-1 Field surveys included:

- Targeted surveys for Golden Sun Moth in suitable habitat within the South West Poplars precinct;
- Survey and mapping for areas that meet the requirements of Natural Temperate Grassland TEC; and
- Survey and mapping for areas that meet the requirements of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC.

The fauna survey methodology followed standardised survey guidelines, including DEC (draft 2004) and Biodiversity Assessment Method survey requirements (DPIE, 2020) where seasonal requirements allowed.

The Commonwealth Golden Sun Moth survey guidelines to determine presence/absence require four surveys in suitable weather during the adult flying season (usually November to mid-December). Surveys were carried out one to two weeks after flying was confirmed in local GSM populations. Flying adult survey results are supplied transect segments with male GSM numbers. Habitat assessments were completed using 100 metre step-point measurements of relevant habitat parameters. Mapping of habitat is provided in Figure 7-1.

Additional field surveys were completed between 11 – 13 May 2022 applying methods that could be completed during the autumn seasonal window. Autumn surveys are impacted by the same seasonal data collection limitations as summer surveys and so surveys were limited to ground-truthing habitat suitability and vegetation communities. Field surveys included:

- Vegetation Community Verification and Mapping;
- Scattered Tree Assessment; and
- Fauna Habitat Assessment.

3.3.1 Vegetation Community Verification and Mapping (Rapid Vegetation Assessment Points)

Following desktop information reviews, Rapid Data Point (RDP) surveys were undertaken within each vegetation type throughout the Environa site. A total of 22 RDP's was completed, field data collected by rapid survey includes the latitude and longitude of the survey point, dominant canopy, sub canopy, shrub and ground cover species within the immediate vicinity of the survey point. Desktop PCT mapping was also validated.

Areas of Box Gum Woodland TEC were assessed to determine whether woodland areas contain the box-gum eucalypts typical of this community. The ground layer of areas containing these tree species (or where they appear likely to have originally been) will be assessed to determine if the ground layer is native-dominated, and if so, if 0.1 ha patches contain sufficient floristic diversity (as defined in the EPBC Act Conservation Listing) to qualify as the TEC as defined by the EPBC Act.

3.3.2 Fauna Habitat Assessments

Portions of the Investigation Area which form potentially suitable habitat for other threatened species the Pink-tailed Worm Lizard, Striped Legless Lizard, Gang Gang Cockatoo, Grassland Earless Dragon, Golden Sun Moth, and Superb Parrot were recorded. Future surveys for these species will need to follow seasonal survey timing as specified in the BAM. Fauna habitat assessments during the autumn survey period focused on identifying suitable habitat for the same six threatened species. Habitat found to contain suitable requirements for each species was mapped.

The site was traversed systematically, with effort made to cover as much ground as possible. Any areas containing the suitable habitat requirements for each species were identified and mapped. The RDPs outlined above also informed the habitat assessment, particularly with regard to identifying and mapping areas dominated by native groundcover vegetation and/or rocks (for the reptiles) and determining the general abundance and suitability if tree hollows in each VZ (for the birds). Rocky habitat was considered to be any areas where rock cover was approximately >20% and satellite imagery was also used to assist in ground-truthing of those areas. Any tree hollows deemed to be of suitable size and height for Gang Gang and Superb Parrot were recorded by handheld GPS.

3.3.3 Scattered Tree Assessment

A ‘scattered tree assessment’, in accordance with the scattered tree assessment module in Appendix B of the BAM, was undertaken within any areas that met the module’s definition of scattered trees. The GPS locations and genus and species of trees identified using the assessment methodology was recorded. Trees were separated into Class groups based on DBH measurements and hollow counts in relation to the PCT benchmark.

3.3.4 Weather Conditions

Weather conditions during the survey periods are presented in Table 3-2 with data collected from station number 070351 (Bureau of Meteorology 2022).

Table 3-2 Weather conditions during field surveys

Date	Min. Temp °C	Max. Temp °C	Rel. Hum. 9am	Rel. Hum 3pm	Wind Speed (km/hr) and Direction		Rainfall (mm) 24 hrs
					9 am	3 pm	
29th November 2021	4.6	24.2	67	37	N 11	NNW 11	0
30th November 2021	8.3	26.4	65	43	SSW 7	S 11	0
1st December 2021	13.1	25.4	75	51	N 7	WSW 15	0
2nd December 2021	10.6	28.5	61	38	SSW 2	N 15	0
3rd December 2021	12.2	30.2	67	43	NNE 6	N 22	0
7th December 2021	5.9	20.1	66	60	ENE 19	NE 15	0
8th December 2021	9.8	25.7	75	50	N 7	NW 24	0
9th December 2021	13.8	19.7	87	66	ESE 6	NE 19	0.4
10th December 2021	11.6	20.2	91	60	SSW 9	SSE 11	9.6
11th December 2021	9.8	14.1	79	74	SSW 37	S 33	34
12th December 2021	9.7	19.5	63	51	S 30	SSE 19	1.8
13th December 2021	7.7	23.2	55	42	SE 13	ESE 6	0
14th December 2021	7.3	26.3	90	46	N 6	NNW 7	0
15th December 2021	10.2	28.4	68	35	SW 9	N 9	0
16th December 2021	10.2	30.2	62	35	N 2	WNW 17	0
17th December 2021	11.7	25.7	75	42	NE 6	N 13	3.8
18th December 2021	13.3	27	75	39	NE 9	NW 20	0.2
19th December 2021	14.4	30.8	68	44	SE 6	NNW 30	0
20th December 2021	15.8	22.7	66	97	NW 9	NNW35	22.4
21st December 2021	13.2	26	48	44	NNW 13	NNW 28	7.8
22nd December 2021	7.7	28.6	59	38	NNW 4	N 28	0
23rd December 2021	10.8	30.1	61	25	Calm	N 20	0
24th December 2021	15.9	29	78	42	SSE 2	WNW 17	0
25th December 2021	15.1	28.2	72	48	N 7	N 15	0
26th December 2021	17.3	30.5	75	25	N 9	SW 24	0
27th December 2021	15.3	24.6	72	73	E 7	ENE 30	0
28th December 2021	11.7	17.5	95	62	E 13	ESE 24	2.4
29th December 2021	7.8	20.3	63	47	SSE 22	ESE 26	0
30th December 2021	4.8	25.6	60	30	WNW 4	SSE 13	0
31st December 2021	8.9	29	71	33	Calm	NE 13	0
11th May 2022	10.1	15	88	87	SSE 9	E 9	0.8
12th May 2022	11.8	15.6	99	99	SSE 9	Calm	18.2
13th May 2022	13.3	20.9	100	71	Calm	Calm	27

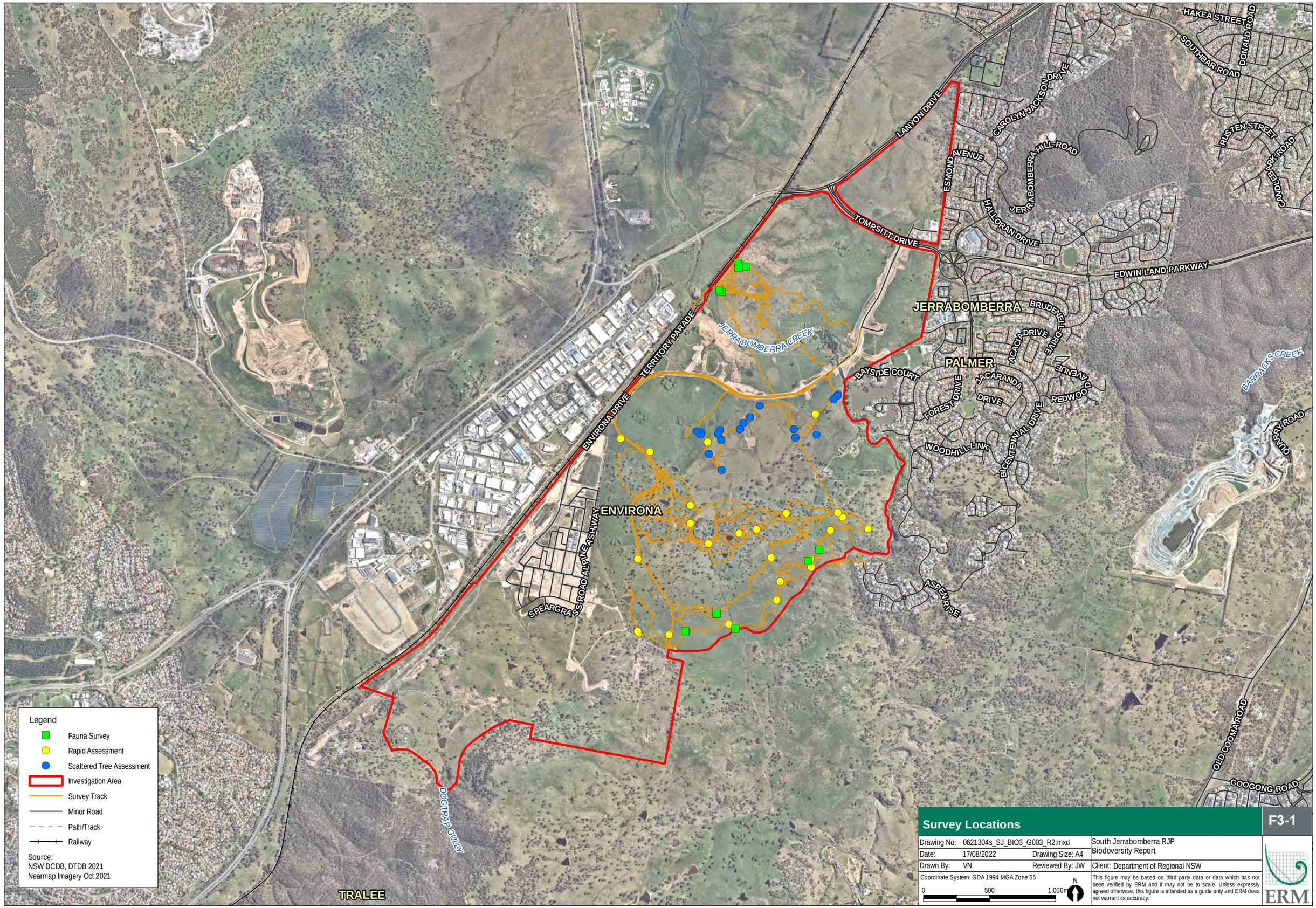
3.4 Assumptions and Limitations

The absence of a species from a database list or observational studies does not confirm its absence from the Investigation Area. The lack of existing records from databases is more likely to be reflective of targeted sampling effort, as opposed to the absence of threatening processes and species. Species detection is influenced by environmental factors such as temperature and rainfall. High biomass production following above average rainfall may reduce the probability of detection for important feed species of the Golden Sun Moth that may impact the estimation of habitat suitability.

Initial habitat suitability surveys have identified and mapped potentially suitable habitat where Grassland Earless Dragons may be present and should be prioritised for protection. Where it is not possible to protect suitable habitat, targeted surveys will be needed to establish presence/absence. The Grassland Earless Dragon is a cryptic species that is very difficult to detect and contains a labour intensive survey methodology. Naturally persisting in relatively low population densities, it is unlikely that the absence of Grassland Earless Dragons can safely be assumed after a single survey season. Detection is further impacted by a sensitivity to climatic variations. To overcome these limitations BAM survey guidelines have suggested a survey period between October and April should be conducted, with focus on the warmest period of the required survey window to maintain the highest confidence of detection. The most practical survey methodology involves installing artificial arthropod burrows to provide shelter in order to detect occupancy. Artificial burrows require inspection periodically over a six week period in order to maintain confidence in detection.

Areas of Native Temperate Grassland that appear to meet the condition thresholds for protection under the Act, should be assessed in late spring/early summer to confirm that the patch meets the required floristic diversity/Floristic Value Score requirements.

Further field surveys will be required for threatened species that could not be surveyed during the November to December or May survey periods.


HAKEA STREET
SOUTHBAR ROAD
DONALD ROAD
LANYON DRIVE
CAROLYN JACKSON DRIVE
RUSTEN STREET
CAMDEN PARK ROAD
ESMOND AVENUE
JERRABOMBERRA HILL ROAD
HALLORAN DRIVE
TOMPSITT DRIVE
EDWIN LAND PARKWAY
JERRABOMBERRA
BRUDENELL DRIVE
ACACIA DRIVE
PALMER
BAYSIDE COURT
JACARANDA DRIVE
FOREST DRIVE
REDWOOD AVENUE
WOODHILL LINK
BICENTENNIAL DRIVE
BARRACKS CREEK
QUARRY ROAD
TERRITORY PARADE
ENVIRONA DRIVE
JERRABOMBERRA CREEK
ENVIRONA
SPEARGRASS ROAD
ALPINE ASHWAY
ASPEN RISE
OLD COOMA ROAD
GOOGONG ROAD
DOGTRAP GULLY
TRALEE
Legend
Fauna Survey
Rapid Assessment
Scattered Tree Assessment
Investigation Area
Survey Track
Minor Road
Path/Track
Railway
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021
Survey Locations
F3-1
Drawing No: 0621304s_SJ_BIO3_G003_R2.mxd
Date: 17/08/2022
Drawing Size: A4
Drawn By: VN
Reviewed By: JW
South Jerrabomberra RJP
Biodoversity Report
Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55
N
0
500
1,000m
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

4. BIODIVERSITY VALUES

The following section presents the biodiversity values of the Investigation Area based on the findings from the desktop review.

The specific landscape feature requirements of Section 3 of the BAM are provided in Table 4-1 below and will be used in any future Biodiversity Development Assessment Report (BDAR) prepared to support the Master Plan. A summary of matters of state and national significance relevant to the Investigation Area is also provided.

Table 4-1 Landscape Features

Landscape Feature	Summary Notes
IBRA Bioregion	NSW South Eastern Highlands Murrumbateman and Monaro IBRA Subregions
(NSW) Mitchell Landscapes	Molonglo Ranges Canberra Plains
Rivers and Streams	Jerrabomberra Creek
Wetlands	There are no Ramsar wetlands located at the Investigation Area or within the surrounding 10km buffer.
Current Land use	A detailed description is provided in Section 3.1
Landscape Connectivity	Important local habitat corridors identified in this report include continuous patches of habitat large enough to sustain viable populations of threatened flora and fauna and to facilitate dispersal movement. These include a combination of: ■ Jerrabomberra Creek; ■ Dogtrap Gully; ■ Monaro Rail Trail; ■ Potential habitat linkage to the Jerrabomberra Mountain Reserve through the northern boundary of the RJP and Jerrabomberra Creek through the eastern boundary; ■ Large areas of vegetation that facilitate dispersal and movement between adjacent habitats, such as vegetation to south of the Investigation Area; and ■ Areas of mapped TEC.
Native Vegetation Cover	Estimated to be 45%. This estimate is applicable to the entire RJP area. The cover for a future BDAR would be calculated in relation to the development areas only.
National Parks Estate and Conservation Areas	No conservation areas protected under the NP&W Act are present within the Investigation Area.
Patch Size: (the area of intact native vegetation that occurs on the Site and the vegetation within 100 m of the next area of native vegetation in moderate to good condition. It is used to determine the habitat suitability of the Site for threatened species).	100ha The maximum patch size has been used at 100ha due to the presence of several patches of native vegetation within 100m of the next area of native vegetation
Vegetation	As described in Section 5, the 950 ha Investigation Area is known to contain a range of vegetation communities. The vegetation communities range from semi-arid woodlands and dry sclerophyll to pasture and grasslands.

Landscape Feature	Summary Notes
Threatened ecological communities	Surveys to date have identified two TECs have been identified as potentially occurring within the investigation area: Critically Endangered: ■ Natural Temperate Grassland of the South Eastern Highlands; and ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. A detailed description is provided in Section 5.2.
Threatened species	Searches of relevant databases and a literature review have list a total of 17 threatened flora species and 29 threatened fauna species recorded or potentially present within the Investigation Area. A detailed description is provided in Section 5.3 and Section 6. Targeted Fauna Habitat Assessment was conducted throughout the Investigation Area and potentially suitable habitat for six (6) threated species were ground-truthed and mapped: Endangered: ■ Grassland Earless Dragon; and ■ Gang Gang Cockatoo. Vulnerable: ■ Striped Legless Lizard; ■ Pink-tailed Worm Lizard; ■ Golden Sun Moth; and ■ Superb Parrot. Incidental observations have been made of four (4) threatened species within the Investigation Area: Endangered: ■ Gang Gang Cockatoo. Vulnerable: ■ Flame Robin; ■ Pink-tailed Worm Lizard; and ■ Diamond Firetail.
Areas of Geological Significance	Areas of Geological Significance include karst, caves, crevices and cliffs. None of these features are expected to occur within the Investigation Area.
Areas of Outstanding Biodiversity Value (AOBV)	An area of outstanding biodiversity value (AOBV) is an area with irreplaceable biodiversity values that is of state, national or global importance. AOBVs identify the most valuable sites for biodiversity conservation in NSW outside of the national reserve system. No AOBV have been identified within the Investigation Area.
Serious and Irreversible Impact (SAII)	SAII have potential to occur within the Investigation Area and is described in Section 8.
Existing Threats	There are a large number and diverse range of existing threats to the natural environment of the region including habitat isolation and fragmentation, climate change, land clearing, impacts to groundwater dependant ecosystems and invasive species. Climate change is expected to have a major impact on biodiversity, including on the distribution of species. Climate change impacts will add to, and potentially exacerbate, the range of pressures already adversely impacting on ecosystem function. Therefore, to increase the resilience of ecosystems to the added impacts of climate change, it will be important to effectively manage the range of other human-induced impacts, including inappropriate fire regimes, consideration of groundwater dependant ecosystems and reduce habitat fragmentation.

4.1 Current Land Use

Land use zoning manages the land uses and development types for the Investigation Area. The zoning identified in *Queanbeyan-Palerang Regional Local Environmental Plan 2022* will determine the permissibility of any development type within the specified zone. Should the development type be 'prohibited' for a given zone, a planning proposal would be required to rezone land to formally amend the zoning of the *LEPs.* Queanbeyan-Palerang Regional Council are currently developing a comprehensive LEP to consolidate previous LEPs prior to local government amalgamations.

The Environa site within the Investigation Area is zoned as a RU2 (rural landscape) within the Queanbeyan LEP 2022. The primary land use of the area is sparsely populated industrial/commercial and environmental areas, with little residential area present.

4.2 Environmental Values

The Investigation Area has select areas of high environmental values that must be considered in the planning process. Figure 4-1 presents environmental values classified as High, Medium and Low, within the RJP. These environmental values have been identified via desktop assessments, supplemented and ground truthed by the field surveys conducted in November, December 2021 and May 2022. These surveys included mapping vegetation communities, threatened species habitat and hollow bearing trees. Key criteria that have been applied in this assessment to determine conservation values include:

- Patch size and connectivity to existing conservation reserves;
- Occurrence within identified habitat corridor;
- Records of threatened fauna and identified habitat suitability;
- Status of the vegetation community; and
- Consideration of matters of national environmental significance (MNES) protected under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act).

Based on these criteria, the following ecological features within the Investigation Area have been identified as having high environmental value:

- High Values Biodiversity Mapping;
- Existing Conservation Reserves;
- Areas of mapped Threatened Ecological Communities including Box Gum Woodland and Natural Temperate Grasslands;
- Golden Sun Moth habitat;
- Pink Tailed Legless Lizard habitat;
- Grassland Earless Dragon habitat;
- Vegetated habitat corridors and linkages; and
- Potential Serious and Irreversible Impacts (SAII) entities, including:
  - Mauve Burr-daisy *Calotis glandulosa*;
  - Pale Pomaderris Pomaderris pallida;
  - Regent Honeyeater *Anthochaera Phrygia*;
  - Curlew Sandpiper *Calidris ferrug*inea (Breeding);
  - Swift Parrot Lathamus discolour;
  - Eastern Curlew Numenius madagascariensis;
  - Yellow-spotted Tree Frog *Litoria castanea*;
  - Golden Sun Moth *Synemon plana*;

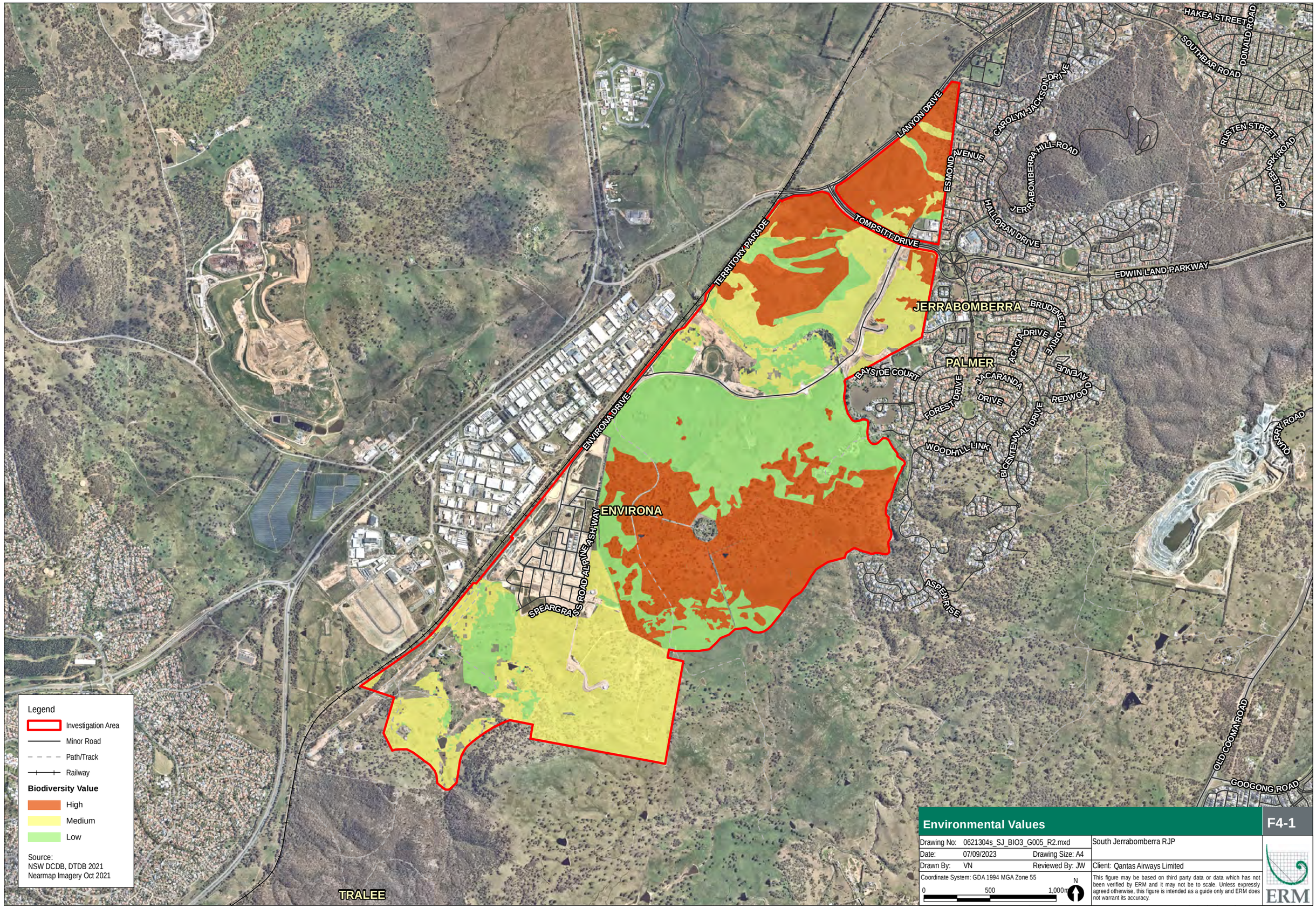
- Large-eared Pied Bat *Chalinolobus dwyeri*; and
- Brush-tailed Rock Wallaby *Petrogale penicillate*.

The following ecological features within the Investigation Area have been identified as having medium environmental value:

- Areas of non-threatened PCTs;
- Hollow bearing trees; and
- Broad habitat types classified as native, including native grassland.

The following ecological features within the Investigation Area have been identified as having low environmental values:

- Scattered trees; and
- Broad habitat types classified as non-native, including exotic grassland and mature exotic trees.


HAKEA STREET
SOUTHBAR ROAD
DONALD ROAD
CAROLYN JACKSON DRIVE
RUSTEN STREET
CANDLEBARK ROAD
LANYON DRIVE
ESMOND AVENUE
JERRABOMBERRA HILL ROAD
HALLORAN DRIVE
TOMPSITT DRIVE
TERRITORY PARADE
EDWIN LAND PARKWAY
JERRABOMBERRA
BRUDENELL DRIVE
ACACIA DRIVE
PALMER
BAYSIDE COURT
JACARANDA DRIVE
REDWOOD AVENUE
FOREST DRIVE
WOODHILL LINK
BICENTENNIAL DRIVE
ENVIRONA DRIVE
ENVIRONA
SPEARGRASS ROAD
ALPINE ASHWAY
ASPEN RISE
OLD COOMA ROAD
GOOGONG ROAD
TRALEE
Legend
Investigation Area
Minor Road
Path/Track
Railway
Biodiversity Value
High
Medium
Low
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021
Environmental Values
F4-1
Drawing No: 0621304s_SJ_BIO3_G005_R2.mxd
South Jerrabomberra RJP
Date: 07/09/2023
Drawing Size: A4
Drawn By: VN
Reviewed By: JW
Client: Qantas Airways Limited
Coordinate System: GDA 1994 MGA Zone 55
0
500
1,000m
N
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

5. NATIVE VEGETATION

5.1 Native Vegetation Extent

The extent of native vegetation within the RJP boundary is approximately 465 ha. This was determined through initial analysis of aerial photography, historical surveys and reports and refined via walking meanders, and Rapid Vegetation Assessments during initial field survey events.

Much of the landscape is grasslands and improved pasture. The understorey of wooded areas (old growth or planted) was predominately close to 100% non-native in composition, very similar to the adjoining improved pastures.

5.2 Vegetation Communities and Threatened Ecological Communities

State Vegetation Type Mapping (SVTM) is currently under development for the region that encompasses the Investigation Area. Due to these historical surveys and reports were used to assist in the determination of the Vegetation Communities present within the Investigation Area.

Field validation of the existing vegetation mapping has determined that five plant community types (PCTs) are present within the Investigation Area. Other areas included heavily modified environments such as cropping and pastured areas. PCTs located within the Investigation Area are presented in Table 5-1 and displayed in Figure 5-1 alongside TECs.

A 2019 Stage 1 BAM Assessment performed by Capital Ecology identified PCT1334 White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and PCT 320 Natural Temperate Grassland of the South Eastern Highlands as present within the Poplars region of the Investigation Area. Field surveys conducted in late 2021 on behalf of ERM also confirmed the presence of Natural Temperate Grassland.

Vegetation communities recorded within the Investigation Area include:

- Box-Gum Woodland (present as PCT1334 and 1330);
- Stony Knoll Shrubland (fits within description of Box-Gum Woodland);
- Native Grasslands (present as PCT 1289, 1202, 320 and includes secondary grassland);
- Rocky Outcrop Shrubland/Herbfield Mosaic;
- Exotic grassland;
- Mature exotic trees;
- Garden plantings; and
- Cleared/Degraded Grassland.

Field surveys determined that present within the Investigation Area was eucalypt woodland (Box Gum Woodland and Blakeley's Red Gum Woodland), pastures and native grasslands, including Kangaroo Grass - Redleg Grass Forb-rich Temperate Tussock Grassland and areas of shrubland herb field mosaic and exotic shrubland.

Surveys to date have identified two TECs have been identified as potentially occurring within the investigation area:

- Natural Temperate Grassland, a critically endangered PCT and TEC is present in the north-western part of the investigation area (South West Poplars) and is consistent with PCT 320. The TEC was in good condition and the area was floristically diverse evidenced by observation of 54 flora species and some locally uncommon species such as *Zornia dyctiocarpa* and lobe seed daisy (*Brachyscome dentata*). This area of Native Temperate Grassland is threatened by the incursion of serrated tussock. Surveys at Environa did not observe Native Tussock Grassland; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland was present within the Environa portion of the investigation area in small patches. Environa appears to have been woodland in the past however has been degraded through improved pastures, woody weed incursion and land clearing. Further investigation is required to ground truth the extent of the TEC within this area.

The Assessment of Native Grassland report (Biosis, 2003) also identified two Threatened Ecological Communities (TEC) present on the mid and upper slopes of the South Tralee precinct: Box-Gum Woodland and Natural Temperate Grassland.

As identified in Table 5-1 and Figure 5-1, the most widely mapped vegetation community within the Investigation Area is grassy woodlands, box-gum woodlands and native grasslands.

Table 5-1 also identifies the corresponding vegetation class which has been used to map the broad habitat types as shown in Figure 5-1.

Table 5-1 Vegetation Communities Mapped within the Investigation Area

Broad Habitat Type	PCT Name	TEC (BC Act)	Threatened Ecological Communities (TEC) (EPBC Act)
Grassy Woodland	1334 - Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	White Box – Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.
	1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	White Box – Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland.
Grasslands	320 - Kangaroo Grass - Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion		Natural Temperate Grassland of the South Eastern Highlands
	1202 - Speargrass grassland of the South Eastern Highlands Bioregion		Natural Temperate Grassland of the South Eastern Highlands
	1289 - Wallaby Grass - Red-grass - Tall Speargrass - Kangaroo Grass dry tussock grassland of the North-western and Eastern Southern Tablelands in the South Eastern Highlands Bioregion		Natural Temperate Grassland of the South Eastern Highlands
Non-Native	0 – Non-native grassland		
	Exotic shrubland		

5.3 Threatened Flora Species

A total of 17 threatened flora species have been recorded in the database searches within a 10km buffer around the Investigation Area, as detailed in Table 5-2. Of these 17 species, Silky Swainson-Pea (*Swainsona serica*), Hoary Sunray (*Leucochrysum albicans var. tricolor*) and Button Wrinklewort (*Rutidosis leptorrhynchoides*) have been recorded within the Investigation Area.

These records are based on database searches only. No threatened flora species were observed during field survey efforts. A brief description of their known habitat and any key threats that pose a risk to species conservation are provided in Table 5-2. These matters will need to be considered throughout the Master Planning process.

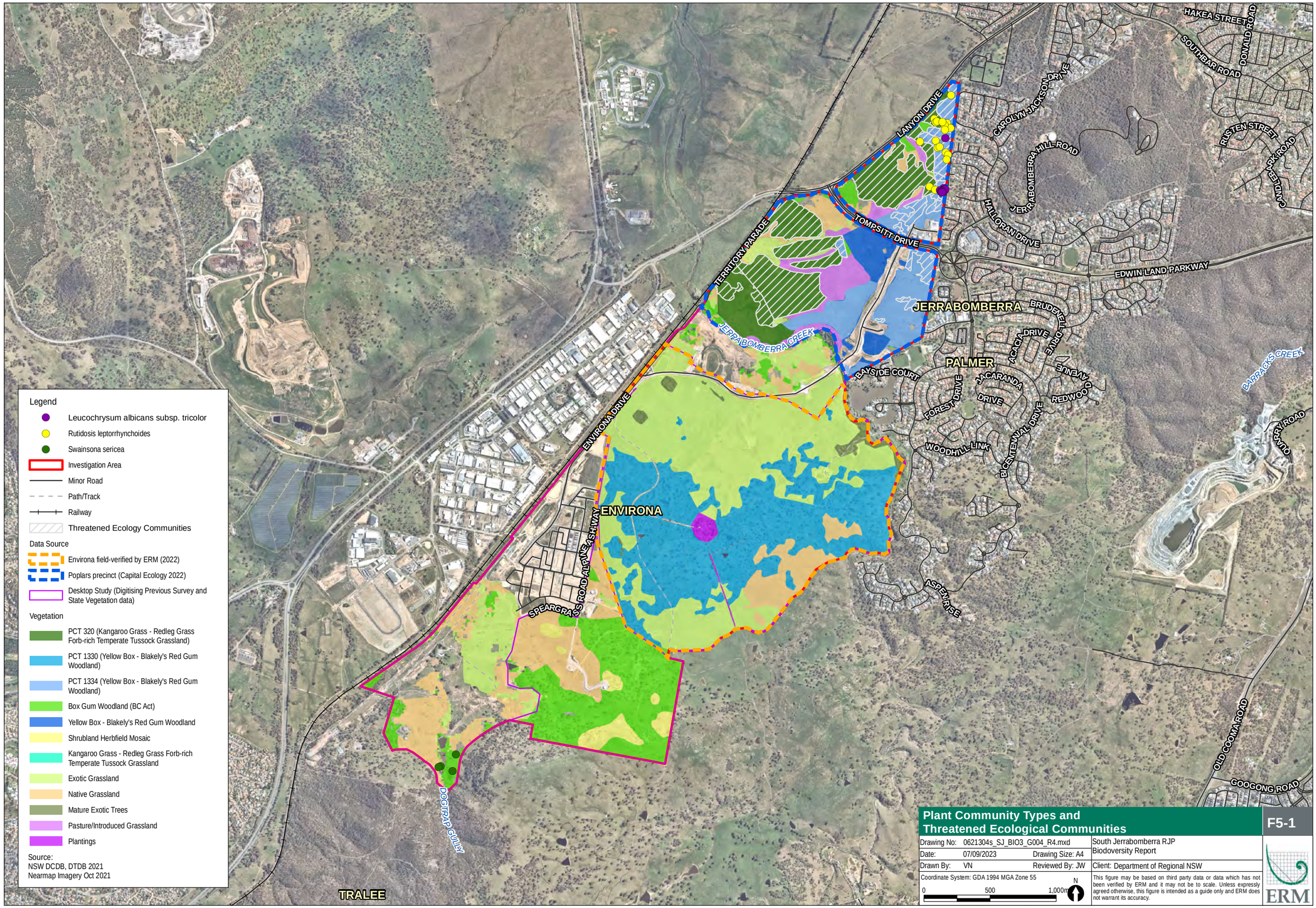

HAKEA STREET
SOUTHBAR ROAD
DONALD ROAD
CAROLYN JACKSON DRIVE
LANYON DRIVE
RUSTEN STREET
JERRABOMBERRA HILL ROAD
CANDLEBARK ROAD
HALLORAN DRIVE
TOMPSITT DRIVE
TERRITORY PARADE
EDWIN LAND PARKWAY
JERRABOMBERRA
BRUDENELL DRIVE
JERRABOMBERRA CREEK
ACACIA DRIVE
PALMER
BAYSIDE COURT
JACARANDA DRIVE
REDWOOD AVENUE
FOREST DRIVE
BARRACKS CREEK
WOODHILL LINK
BICENTENNIAL DRIVE
QUARRY ROAD
ENVIRONA DRIVE
ENVIRONA
SPEARGRASS ROAD
ALPINE ASHWAY
ASPEN RISE
OLD COOMA ROAD
GOOGONG ROAD
DOGTRAP GULLY
TRALEE
Legend
Leucochrysum albicans subsp. tricolor
Rutidosis leptorrhynchoides
Swainsona sericea
Investigation Area
Minor Road
Path/Track
Railway
Threatened Ecology Communities
Data Source
Environa field-verified by ERM (2022)
Poplars precinct (Capital Ecology 2022)
Desktop Study (Digitising Previous Survey and State Vegetation data)
Vegetation
PCT 320 (Kangaroo Grass - Redleg Grass Forb-rich Temperate Tussock Grassland)
PCT 1330 (Yellow Box - Blakely's Red Gum Woodland)
PCT 1334 (Yellow Box - Blakely's Red Gum Woodland)
Box Gum Woodland (BC Act)
Yellow Box - Blakely's Red Gum Woodland
Shrubland Herbfield Mosaic
Kangaroo Grass - Redleg Grass Forb-rich Temperate Tussock Grassland
Exotic Grassland
Native Grassland
Mature Exotic Trees
Pasture/Introduced Grassland
Plantings
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021
Plant Community Types and Threatened Ecological Communities
F5-1
Drawing No: 0621304s_SJ_BIO3_G004_R4.mxd
Date: 07/09/2023
Drawing Size: A4
Drawn By: VN
Reviewed By: JW
Coordinate System: GDA 1994 MGA Zone 55
0
500
1,000m
N
South Jerrabomberra RJP
Biodoversity Report
Client: Department of Regional NSW
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

Table 5-2 Listed Threatened Flora Species Recorded Within 10km of the Investigation Area (based on database records only)

Scientific Name	Common Name	Status[1]		Description[2]	Key Threats to be Considered[2]
		EPBC Act	BC Act		
Leucochrysum albicans var. tricolor	Hoary Sunray	E	-	Hoary Sunray is a perennial everlasting daisy. Stems are 10–15 cm tall, with narrow leaves 2–10 cm long, covered in white cottony hairs. Yellowish flowerheads are 2–5 cm in diameter, surrounded by numerous papery, white, overlapping ovate-oblong bracts, with the outer layers tinged red, pink, purple or brown. Fruits are brown, ovoid, 2–3 mm long, with 14–20 pappus bristles.	■ Clearing and habitat destruction ■ Weeds ■ Poor representation in conservation reserves ■ Lack of appropriate biomass reduction ■ Inappropriate fires regimes ■ Grazing by livestock ■ Risk of local extinction because populations are small
Rutidosis leptorrhynchoides	Button Wrinklewort	E	E	The Button Wrinklewort is a perennial, multi-stemmed herb, sometimes with narrow basal leaves and with leafy flower stems to 35 cm tall. Basal leaves are to 3.5 cm long and 1.5 mm wide. Flower-heads are bright yellow, slightly domed and button-like, to 2 cm wide.	■ Loss, degradation and fragmentation of habitat and/or populations for residential and other developments. ■ Loss and degradation of habitat and/or populations by intensification of grazing regimes. ■ Loss and degradation of habitat and/or populations by invasion of weeds. ■ Increased competition from other native grassland species within the habitat because of adverse increases of biomass due to absence of fire or grazing and the resultant closing up of the inter-tussock spaces that this species requires. ■ Loss and degradation of habitat and/or populations from rail reserve maintenance and road works (particularly widening or rerouting roads). Competition from native trees that will shade the species .Although kangaroos do not consume this species, a high density of kangaroos at Queanbeyan Nature Reserve is likely to change the species composition of the native groundcover. Kangaroos are also likely to trample young seedlings.

Scientific Name	Common Name	Status[1]		Description[2]	Key Threats to be Considered[2]
		EPBC Act	BC Act		
Eucalyptus aggregata	Black Gum		V	Black Gum is a small to medium-sized woodland tree growing to 18 m tall. The bark on the trunk and main branches is dark greyish-black, deeply fibrous or flaky. The bark does not shed annually. Only the uppermost branches and twigs have smooth whitish, cream or greyish bark that sheds yearly. The juvenile leaves are narrow or oval-shaped, dull green and arranged opposite to one another. The adult leaves are slightly curved and round-ended, about 12 cm long and 1 to 2 cm wide.	■ Clearing for cropping and grazing. ■ The naturally small area and patchiness of its habitat is under pressure from further reduction in area. ■ Lack of recruitment, especially as older trees are gradually being removed by wind-storms and natural attrition. ■ Lack of recruitment under current grazing. ■ Lack of recruitment because of competition by weeds, particularly Blackberry (Rubus spp.), Phalaris (Phalaris aquatica), Cocksfoot (Dactylis glomerata), willows (Salix spp.) and Scotch Broom (Cytisus scoparius)
Eucalyptus macarthurii	Paddys River Box, Camden Woollybutt		E1	Paddy's River Box is a tall tree reaching up to 40 metres high. The grey-brown, shortly fibrous, thick bark is persistent on the trunk and larger branches. Above this the bark is smooth, grey and sheds in short ribbons. Juvenile leaves opposite, dull green and heart-shaped with the point away from the stem. Adult leaves are dull-green, 8-16 cm long, 0.8-1.5 cm wide	■ Loss of habitat through development and clearing. ■ Weed invasion leading to reduced recruitment. ■ Lack of recruitment due to a combination of grazing, weed invasion (grasses) and potentially fire.
Pomaderris pallida	Pale Pomaderris		V	Pale Pomaderris is a compact, rounded shrub to 1.5 m tall. Its small leaves may be narrow or oval in shape, and up to 18 mm long and 7 mm wide. Both leaf-surfaces are covered in a dense mat of soft, star-shaped hairs. The upper surface is pale green and the lower surface is greyish-white. The flowers are pale yellow, small, and have five sepals which are petal-like structures (there are no true petals). Flowering occurs from mid September to December.	■ The Queanbeyan River population is threatened by rural residential development. ■ Feral browsers including deer, goats and potentially horses. ■ Invasion of habitat by weeds. ■ Isolated small populations are likely to have low genetic diversity, and be at higher risk of loss from stochastic events. ■ Smaller riparian populations may be subject to loss of mature individuals through flood damage. Frequent flooding may disrupt the lifecycle to the extent that the soil seedbank may be affected.

Scientific Name	Common Name	Status[1]		Description[2]	Key Threats to be Considered[2]
		EPBC Act	BC Act		
Swainsona recta	Small Purple-pea		E1	Small Purple-pea is a slender, erect perennial herb growing to 30 cm tall. The leaves are divided into up to six pairs of 10 mm long, very narrow leaflets, each with a pointed tip. There is also a single leaflet at the end of each divided leaf. It bears one to several sprays of between 10 and 20 purple, pea-shaped flowers, between late September and early December. Flowers are followed by pods up to 10 mm long in summer.	■ Loss, degradation and fragmentation of habitat and/or populations for residential and agricultural developments. ■ Loss and degradation of habitat and/or populations by weed invasion. ■ Increased competition from other native grassland species within the habitat because of reduced fire frequency.
Caladenia tessellata	Thick Lip Spider Orchid		E1,P,2	The Thick Lip Spider Orchid is from a group of orchids characterised by five long spreading petals and sepals around a broad down-curled labellum ('lip'). It has cream-coloured petals with reddish stripes, and the yellowish labellum is broad with a few darker stripes. The long, sparsely-hairy, narrow leaf is about 6 cm long and 5 mm wide. Column base with two prominent yellow glands.	■ At risk from catastrophic events because of small number of extant populations and low number of plants. ■ Possibly threatened by long-term absence of fire. ■ Browsing by macropods.
Swainsona sericea	Silky Swainson-pea		V	The Silky Swainson-pea is a prostrate or erect perennial, growing to 10 cm tall. The stems and leaves are densely hairy. The leaves are up to 7 cm long, composed of 5 - 13 narrow, pointed leaflets, each up to 15 mm long. The purple pea-shaped flowers are to 11 mm long and are held in groups of up to 8 flowers, on a stem to 10 cm tall.	■ Loss and degradation of habitat and/or populations for residential developments. ■ Populations exhibit variations in ploidy level indicating that they are separate taxa. ■ Loss and degradation of habitat and/or populations by invasion of weeds. ■ Loss and degradation of habitat and/or populations by intensification of grazing regimes. ■ Loss and degradation of habitat and/or populations for agricultural developments.

[1] Conservation status of each species under the EPBC Act and BC Act are defined as follows: CE=critically endangered species, E=endangered species, and V=vulnerable species.

[2] Descriptions and Key Threats sourced from OEH Species Profile and DAWE Species Profile and Threats Database (SPRAT)

Note: Application of the BAM will be considered within the scenario reports and applied in full for the final selected precinct. ERM acknowledge that this will require consideration of all threatened species within the Murrumbateman and Monaro IBRA Subregions and the final list of candidate species with potential habitat available in the final precinct may differ from that above which is based on known records only.

6. NATIVE FAUNA

6.1 Threatened Fauna Species

A total of 29 threatened fauna species have been recorded within 10km of the Investigation Area as identified in Table 6-1. A brief description of their habitat requirements and key threats that will need to be considered are provided in Appendix C. Threatened fauna records are displayed in Figure 6-1.

Threatened fauna species records are generally found in the areas in the North of the Investigation Area, such as adjacent to Tompsitt Drive and Lanyon Drive, Jerrabomberra Creek and areas to the east of the investigation area also have a higher density of recorded threatened species.

These records are based on database searches and supplemented with field based work. While all of these species are considered to be significant and will be addressed within the final precinct plans, for the purposes of this biodiversity report, ERM have provided additional baseline review and mapping of core habitat for the Golden Sun Moth, Grassland Earless Dragon and Pink-tailed Worm-lizard.

The Golden Sun Moth was recorded during the December 2021 field surveys and opportunistic observations recoded of Pink-tailed Worm Lizard in the May 2022 field surveys.

Migratory species are considered further in Section 6.4.

Threatened fauna species profiles are presented in Appendix C.

Table 6-1 Listed Threatened Fauna Species Known to Occur within 10km of the Investigation Area

Scientific Name	Common Name	Status	
		BC Act	EPBC Act
Frogs			
Litoria aurea	Green and Golden Bell Frog	E1,P	V
Litoria raniformis	Southern Bell Frog	E1,P	V
Insects			
Synemon plana	Golden Sun Moth	E	V
Reptiles			
Tympanocryptis pinguicolla	Grassland Earless Dragon	E1,P	E
Aprasia parapulchella	Pink-tailed Worm-Lizard	V,P	V
Varanus rosenbergi	Rosenberg's Goanna	V,P	
Delma impar	Striped Legless Lizard	V	V
Birds			
Botaurus poiciloptilus	Australasian Bittern	E1,P	E
Rostratula australis	Australian Painted Snipe	E1,P	E
Limosa lapponica	Bar-tailed Godwit	P	C,J,K
Falco subniger	Black Falcon	V,P	
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P	
Oxyura australis	Blue-billed Duck	V,P	

Scientific Name	Common Name	Status	
		BC Act	EPBC Act
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	
Hydroprogne caspia	Caspian Tern	P	J
Stagonopleura guttata	Diamond Firetail	V,P	
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P	
Petroica phoenicea	Flame Robin	V,P	
Apus pacificus	Fork-tailed Swift	P	C,J,K
Stictonetta naevosa	Freckled Duck	V,P	
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3	
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2	
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P	
Gallinago hardwickii	Latham's Snipe	P	J,K
Hieraaetus morphnoides	Little Eagle	V,P	
Glossopsitta pusilla	Little Lorikeet	V,P	
Calidris subminuta	Long-toed Stint	P	C,J,K
Tringa stagnatilis	Marsh Sandpiper	P	C,J,K
Pachycephala olivacea	Olive Whistler	V,P	
Grantiella picta	Painted Honeyeater	V,P	V
Calidris melanotos	Pectoral Sandpiper	P	J,K
Ninox strenua	Powerful Owl	V,P,3	
Calidris ruficollis	Red-necked Stint	P	C,J,K
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE
Petroica boodang	Scarlet Robin	V,P	
Calidris acuminata	Sharp-tailed Sandpiper	P	C,J,K
Chthonicola sagittata	Speckled Warbler	V,P	
Circus assimilis	Spotted Harrier	V,P	
Polytelis swainsonii	Superb Parrot	V,P,3	V
Lathamus discolor	Swift Parrot	E1,P,3	CE
Neophema pulchella	Turquoise Parrot	V,P,3	
Daphoenositta chrysoptera	Varied Sittella	V,P	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	
Epthianura albifrons	White-fronted Chat	V,P	
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K
Chlidonias leucopterus	White-winged Black Tern	P	C,J,K

Scientific Name	Common Name	Status	
		BC Act	EPBC Act
Mammals			
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V
Phascolarctos cinereus	Koala	V,P	V
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P	
Myotis macropus	Southern Myotis	V,P	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E

Note: Application of the BAM will be considered within the scenario reports and applied in full for the final selected precinct. ERM acknowledge that this will require consideration of all threatened species within the Murrumbateman and Monaro IBRA Subregions *and the final list of candidate species with potential habitat available in the final precinct may differ from that above.*

6.2 Ecosystem Credit Species

Threatened species assigned to ecosystem credits are those that can be reliably predicted to occur based on the vegetation and/or landscape features within the RJP boundary (also referred to as the 'subject land' within the BAM). It also includes species with a low probability of detection using targeted surveys. They are also known as predicted species and do not require targeted survey.

The eight ecosystem credit species predicted to occur in the development areas of the RJP boundary are presented in Table 6-2 These species have been identified, by record, as occurring within the investigation area.

The following ecosystem credit species were recorded during the May 2022 field surveys:

- Gang Gang cockatoo (*Callocephalon fimbriatum*); and
- Diamond firetail (*Stagonopleura guttata*).

Table 6-2 Ecosystem Credit Species

Species	PCT - 1334	PCT-1330	PCT-320	PCT-1202
Artamus cyanopterus cyanopterus	✓	✓	✓	✓
Callocephalon fimbriatum	✓	✓	-	-
Leucochrysum albicans var. tricolor	✓	✓	✓	✓
Petroica boodang	✓	✓	✓	✓
Rutidosis leptorrhynchoides	✓	✓		✓
Stagonopleura guttata	✓	✓	✓	✓
Swainsona sericea	✓	✓	✓	✓
Synemon plana	✓	✓	-	✓

6.3 Species Credit Species

Threatened species assigned to species credits are those that cannot be confidently predicted to occur by vegetation and landscape features. They are also known as candidate species. The candidate species predicted to occur in the Environa area by the BAM Calculator is shown in Table 6-4, with a summary of the likelihood of occurrence assessment also presented. This information has been used to determine if these species require further consideration in accordance with method for identifying candidate threatened species as defined in the BAM.

A number of these species are only classed as candidate species in relation to their breeding habitat, i.e. the species only requires targeted survey if suitable breeding habitat occurs at the RJP boundary. The criteria used to determine likelihood of occurrence in detailed in Table 6-3 below.

Table 6-3 Likelihood of Occurrence Criteria

Factor	Preferred habitat exists	Suitable habitat exists[1]	Habitat does not exist[2]
Records within Project Area	Known	Known	Known
Records in the locality[3]	Likely	Potential	Unlikely
No records in the locality, but Project Area is within known distribution	Potential	Unlikely	Unlikely
No records in the locality, and Project Area is outside of distribution	Unlikely	Unlikely	Unlikely

1. *Habitat may be considered suitable, but not preferred.*
2. *Based on sources reviewed and/or field survey results.*
3. *'Locality' refers to a 10 km buffer of the Investigation Area.*

Table 6-4 Species Credit Species

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
Ammobium craspedioides	Yass Daisy	V	V	Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in association with a large range of eucalypts (*Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida*).	Potential	No	
Anthochaera Phrygia (breeding)	Regent Honeyeater	CE	CE	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.	Potential	Yes – locality – (Bionet record)	Vegetated areas which could provide roosting or foraging habitat for the Regent Honeyeater have been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Aprasia parapulchella	*Pink-tailed Legless Lizard*	*V*	*V*	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Sites where the species is found generally include rocky outcrops or scattered partly buried rocks.	Known	Yes	Pink-tailed Legless Lizard habitat has been identified within the Investigation Area. These habitat areas are wholly encompassed within conservation or rural landscape sub precincts/land use zones.
Callocephalon fimbriatum	*Gang-gang Cockatoo*	*V*	*E*	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests.	Potential	Yes – Locality (Bionet Record)	Areas of Box Gum Woodland and Yellow Box – Blakely's Red Gum Woodland which could provide foraging and roosting habitat for the Gang-gang Cockatoo has been identified within the Investigation Area. The majority of this habitat is located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Cercartetus nanus	Eastern Pygmy-possum	V	-	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to	Potential	No	

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
				be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.			
Delma impar	Striped Legless Lizard	V	V	The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.	Potential	No	Striped Legless Lizard habitat has been identified within the Investigation Area. These habitat areas are wholly encompassed within conservation or rural landscape sub precincts/land use zones.
Grevillea iaspicula	Wee Jasper Grevillea	CE	E	The Wee Jasper Grevillea is found only in the Wee Jasper area and on the shores of Lake Burrinjuck near Burrinjuck village on the border of the Southern Tablelands and South Western Slopes	Unlikely	No	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest)	Potential	Yes – Locality (Bionet Record)	Vegetated areas which could provide roosting habitat for the White-bellied Sea-eagle have been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
Hieraaetus morphnoides	Little Eagle	V	-	This species occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used.	Potential	Yes – Locality (Bionet Record)	Areas of Eucalypt woodland which could provide foraging and roosting habitat for the Little Eagle has been identified within the Investigation Area. The majority of this habitat is located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Keyacris scurra	Key's Matchstick Grasshopper	E	-	Key's Matchstick Grasshopper is usually found in native grasslands but it has also been recorded in other vegetation associations containing a native grass understory (especially kangaroo grass *Themeda triandra*) and known food plants (particularly Asteraceae).	Potential	No	
Lathamus discolor	Swift Parrot	E	CE	The Swift Parrot is endemic to south-eastern Australia, breeding only in Tasmania during spring and summer. It migrates to mainland Australia in the autumn and winter months. Within the Hunter and Mid Coast regions, Swift Parrots have been found to forage regularly in Spotted Gum and Swamp Mahogany forests.	Potential	Yes – Locality (Bionet Record)	Areas of Box Gum Woodland and Yellow Box – Blakely's Red Gum Woodland which could provide foraging and roosting habitat for the Swift Parrot has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Leucochrysum albicans var. tricolour	Hoary Sunray	-	E	Endemic to south-eastern Australia, where it is currently known from three geographically separate areas in Tasmania, Victoria and south-eastern NSW and ACT. In NSW it currently occurs on the Southern Tablelands adjacent areas in an area roughly bounded by Albury, Bega and Goulburn, with a few scattered localities know from beyond this region. Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils.	Potential	Yes – within RJP – (Bionet record)	Areas of woodland and native grassland which could provide habitat for the Hoary Sunray has been identified within the Investigation Area. Much of this habitat is located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Litoria booroolongensis	Booroolong Frog	E	E	The Booroolong Frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from much of the Northern Tablelands, however several populations have recently been recorded in the Namoi catchment. The species is rare throughout most of the remainder of its range.	Unlikely	No	

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures	Unlikely	Yes – Locality (Bionet Record)	Areas of woodland which could provide foraging resources for the Large Bent-winged Bat has been identified within the Investigation Area. Much of this habitat is located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Myotis macropus	Southern Myotis	V	-	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Potential	Yes – Locality (Bionet Record)	Areas of woodland which could provide foraging resources for the Southern Myotis has been identified within the Investigation Area. Much of this habitat is located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct
Ninox stenua	Powerful Owl	V	-	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Breeding occurs in the hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators.	Potential	Yes – locality – (Bionet record)	Areas of Box Gum Woodland and Yellow Box – Blakely's Red Gum Woodland which could provide foraging and roosting habitat for Powerful Owl has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Paralucia spinifera	Purple Copper Butterfly	E	V	Until very recently purple copper butterfly was only known to occur on the Central Tablelands of NSW however in August 2021 the species was discovered flying within Namadgi National Park, ACT. This species has highly specific habitat requirements and only occurs where Bursaria spinosa subsp. lasiophylla and an attendant is present	Unlikely	No	

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
Petaurus norfolcensis	Squirrel Glider	V	-	The species is widely though sparsely distributed in eastern Australia. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites.	Potential	Yes (Bionet Record)	Areas of woodland which could provide foraging and roosting habitat for the Squirrel Glider has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Petaurus volans	Greater Glider	-	V	The greater glider (southern and central) occurs in eastern Australia, where it has a broad distribution from around Proserpine in Qld, south through NSW and the ACT, to Wombat State Forest in central Vic.	Unlikely	No	
Phascolarctos cinereus	Koala	V	E	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.	Potential	Yes – Locality (Bionet Record)	Areas of Eucalypt woodland which could provide habitat for the Koala has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Polytelis swainsonii	Superb Parrot	V	V	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild.	Potential	Yes – Locality (Bionet Record)	Areas of woodland which could provide foraging and roosting habitat for the Superb Parrot has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Natural populations are known from a total of five sites in NSW. These are near Boorowa, Queanbeyan area, Ilford, Delegate and a newly recognised population 10 km west of Muswellbrook	Unlikely	No	
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Likely	Yes – Locality (Bionet Record)	Areas of eucalypt woodland which could provide foraging habitat for the Grey-headed Flying Fox has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub

Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
				Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.			precincts/land use zones, some small areas are located within the proposed local business – industry sub precinct.
Swainsona recta	*Small Purple-pea*	*E*	*E*	The small purple-pea occurs in the ACT, the central slopes of NSW and in the Mt Chiltern area of Victoria. It was once widespread across south-eastern Australia, however, this small herb with bright purple flowers is now restricted to a few locations. It is associated with the Box Gum Grassy Woodland Threatened Ecological Community. Small Purple-pea occurs predominantly in grassy woodlands, but sometimes extends into grassy open-forest. The tree cover usually includes one or more of the following species:- *Eucalyptus blakelyi* (Blakely's Red Gum), *E. melliodora* (Yellow Box), *E. goniocalyx* (Long-leaved Box) and *E. albens* (White Box).	Potential	Yes – Locality (Bionet record)	Areas of Box Gum Woodland and Yellow Box – Blakely's Red Gum Woodland which could provide foraging and roosting habitat for the Small Purple-pea has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Swainsona sericea	Silky Swainson-pea	V	-	Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes.	Potential	Yes – within RJP (Bionet record)	Areas of Box Gum Woodland and Yellow Box – Blakely's Red Gum Woodland which could provide foraging and roosting habitat for the Silky Swainson Pea has been identified within the Investigation Area, with the majority of this habitat located within conservation or rural landscape sub precincts/land use zones. Some small areas are located within the proposed local business – industry sub precinct.
Synemon plana	Golden Sun Moth	E	CE	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses Austrodanthonia spp. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males	Known	Yes – November 2021	Golden Sun Moth Habitat has been identified within the Investigation Area. These habitat areas are wholly encompassed within conservation or rural landscape sub precincts/land use zones.

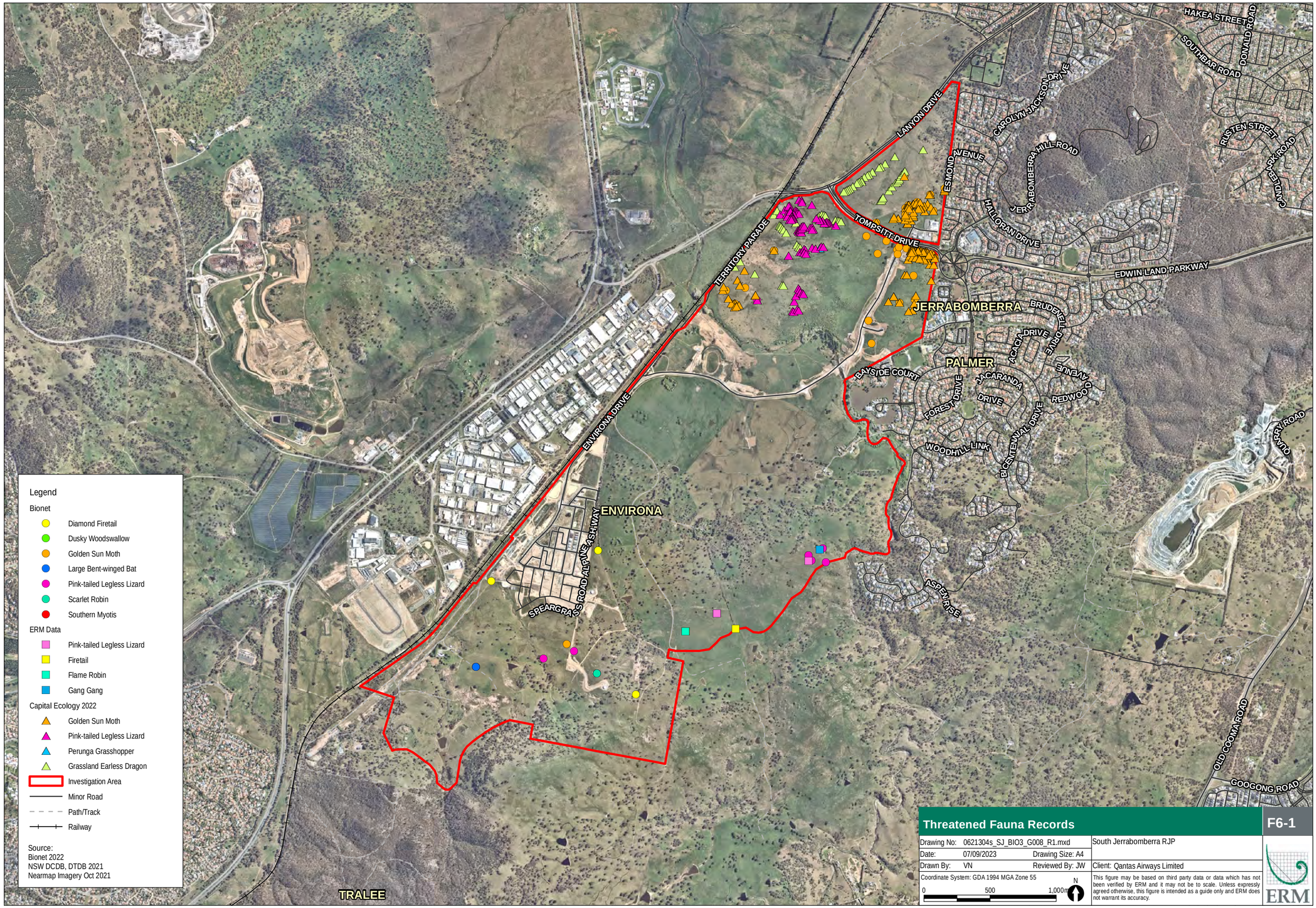
Scientific name	Common name	BC Act	EPBC Act	Description	Likelihood of Occurrence	Recorded Within RJP or Locality	Consideration Within the Master Plan
Thesium austral	Austral Toadflax	V	V	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely	No	

6.4 Migratory Species

Migratory species are protected under international agreements to which Australia is signatory, including the Japan Australia Migratory Bird Agreement (JAMBA), the China Australia Migratory Bird Agreement (CAMBA), the Republic of Korea Migratory Bird Agreement (ROKAMBA). Migratory species are also considered Matters of National Environmental Significance under the EPBC Act.

Few of Australia's birds are truly migratory and patterns of movement tend to be associated with levels of aridity and rainfall. Those species that are true migrants typically move north from southern regions in autumn and return in spring. Several species which breed in Tasmania cross the Bass Strait to winter on the Australian mainland. These include the Swift Parrot *Lathamus discolor* and the Orange-bellied Parrot *Neophema chrysogaster*. Very few of New Zealand's breeding birds are migratory, however the Double-banded Plover *Charadrius bicinctus* is one of a handful that do cross the Tasman Sea to spend their non-breeding season in Australia. The Regent Honeyeater is also referred to below although it is only partly migratory and its movements are based on the seasonal flowering of a small selection of eucalypts.

Within the Investigation Area, there is important habitat for migratory species, specifically seasonal foraging resources (flowering Box-Gum Woodland) for both the Swift Parrot and Regent Honeyeater.



Legend

Bionet
- Diamond Firetail
- Dusky Woodswallow
- Golden Sun Moth
- Large Bent-winged Bat
- Pink-tailed Legless Lizard
- Scarlet Robin
- Southern Myotis

ERM Data
- Pink-tailed Legless Lizard
- Firetail
- Flame Robin
- Gang Gang

Capital Ecology 2022
- Golden Sun Moth
- Pink-tailed Legless Lizard
- Perunga Grasshopper
- Grassland Earless Dragon
- Investigation Area
- Minor Road
- Path/Track
- Railway

Source:
Bionet 2022
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021

Threatened Fauna Records

F6-1

Drawing No:	0621304s_SJ_BIO3_G008_R1.mxd		South Jerrabomberra RJP
Date:	07/09/2023	Drawing Size: A4	
Drawn By:	VN	Reviewed By: JW	Client: Qantas Airways Limited

Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000m N

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

7. THREATENED SPECIES HABITAT

Threatened species habitat has been identified through desktop assessment and field-based surveys for six threatened species. Threatened species, records of occurrence and potential habitat within the RJP are presented in Figure 7-1. Hollow bearing trees, which may provide habitat for the Superb Parrot or Gang Gang Cockatoo, within the Environa area have been presented in Figure 7-2.

7.1 Golden Sun Moth (*Synemon plana*)

Male Golden Sun Moths were observed during surveys conducted in the November – December survey season within the South West Poplars portion of the investigation area. However, Golden Sun Moths were observed in small numbers, only six, over four separate surveys. Although Native Temperate Grassland was observed in good condition within this portion of the investigation area, food species for Golden Sun Moth were uncommon, which could account for the low observation count.

Potential habitat is considered to be any areas with a native-dominant groundcover where trees were either absent or very sparse. This includes areas of mapped native grassland and areas of PCT 1330, with a sparser canopy, no shrub layer and a ground layer with native dominant species.

It is notable that while the important feed species *Rytidosperma sp*. was not found to be dominant anywhere on the site, the survey was not undertaken during its flowering period. Thus, the abundance of *Rytidosperma sp*. in the site could not be confidently assessed. The exotic feed species *Nassella trichotoma* and N. *nessiana* were not found on the site. It was also observed that grassland on the site was very dense, with virtually no bare spaces between tussocks. This would negatively affect habitat value for *S. plana* on the site; however, it should be acknowledged that the higher-than-average rainfall in recent times is likely to have caused a much higher groundcover biomass than what would usually be observed on the site. There is a high number of recent (2019) BioNet records just north of the site, and there is indeed the potential for *S. plana* to occur in the site.

Habitat for golden sun moth may be present within this area during periods of favourable conditions. Biomass was low at time of survey and short wallaby grass (*Rytidosperma carphoides*), a grassland species commonly associated with golden sun moth, was common although large patches of area were cobbled. Further surveys within this portion of the study area will be required to detect presence of golden sun moth in suitable conditions.

7.2 Pink-tailed Worm Lizard (*Aprasia parapulchella*)

Evidence of Pink Tailed Worm Lizard, a skink, was observed during surveys in the South West Poplars Area conducted by Capital Ecology in 2019 and in the Environa area in the May 2022 field surveys. No observations of this species were made during the November – December Surveys.

Habitat was considered to be the sloping, rocky areas in the southern and south-eastern end of the site, as well as any areas within 50 m of these rocky areas (listed habitat constraints for *A. parapulchella* in BioNet include ‘rocky areas or 50 m within rocky areas’). The majority of these rocky areas occurred within the mapped native grassland (PCT 1289) and woodland (PCT 1330) areas, however some occurred within exotic grassland areas. These latter areas were also considered potential habitat, as they were close to native-dominant areas and native grass abundance tended to increase wherever there were rocks.

7.3 Grassland Earless Dragon (*Tympanocryptis pinguicolla*)

Habitat requirements for *Tympanocryptis pinguicolla* include Natural Temperate Grassland, derived grassland or grassy woodland dominated by *Rytidosperma sp.*, *Austrostipa sp.*, *Poa sp.*, *Bothriochloa macra* and *Themeda australis*, although it can sometimes be found in introduced pasture grasses (Robertson and Evans, 2009/2012). It prefers areas with a more open structure, characterised by small patches of bare ground between the grasses and herbs and importantly requires partially embedded surface rocks and arthropod holes for shelter. The presence of surface rocks and arthropod holes are potentially more important (for determining habitat value) than the structure or floristics of the grasslands (Robertson and Evans, 2009/2012).

As *T. pinguicolla* is sometimes found in habitat dominated by introduced pasture grasses, there is potential for it to occur anywhere on the site, as indeed the mapped exotic grassland contained occasional rocks and arthropod holes. The approach therefore was to identify the higher value areas of habitat. These were considered to be any areas of PCT 1289 and PCT 1330, as these areas were less disturbed, generally rockier and would more likely contain a more open ground layer structure.

7.4 Striped Legless Lizard (*Delma impar*)

Delma impar has similar habitat requirements to *T. pinguicolla* and may also occur within exotic-dominant grasslands, if they contain sheltering habitat components (i.e., rocks, arthropod burrows and cracks in the soil). Therefore, the same approach was taken whereby the higher value areas of habitat on the site were identified. These were also considered to be any areas of PCT 1289 and PCT 1330.

Historic land clearing and pasture improvement within the area may impact the presence of this species. These areas will need further investigation in future surveys for occurrence of Striped Legless Lizard.

7.5 Superb Parrot (*Polytelis swainsonii*)

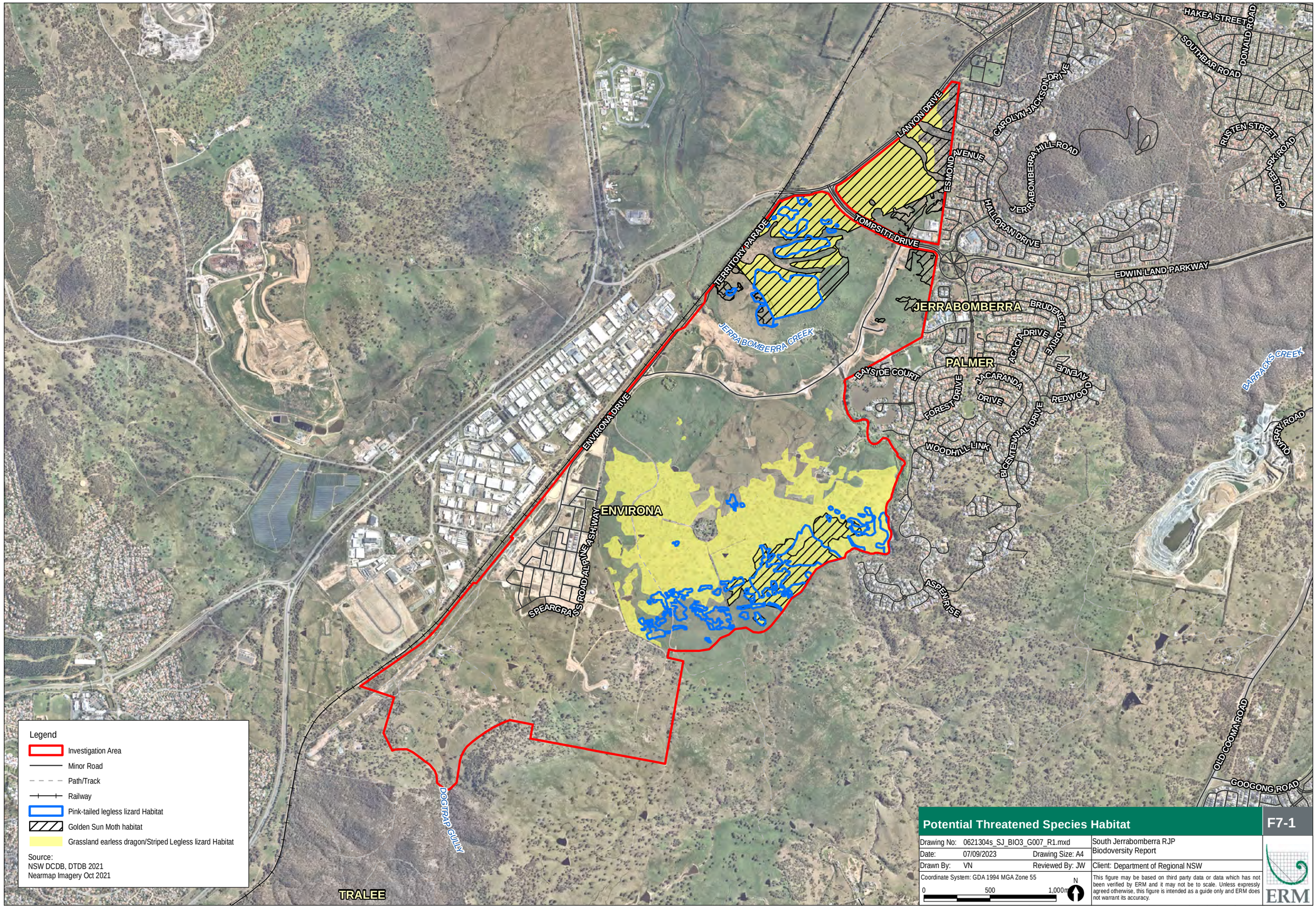
Breeding habitat requirements for *Polytelis swainsonii* are hollows within large trees (dead or alive) mainly in tall riparian river red gum forest or woodland, but also in open box gum woodland. Potential breeding habitat for *P. swainsonii* was considered to be any vegetation zones that contained suitable tree hollow characteristics. Any scattered trees with suitable hollows (within the exotic grassland) were also identified, as *P. swainsonii* is known to nest in paddock trees, as long as they are near water and within 10 km of large tracts of foraging habitat.

7.6 Gang Gang Cockatoo (*Callocephalon fimbriatum*)

Breeding habitat requirements for *Callocephalon fimbriatum* are old growth forest or woodland with hollows in eucalyptus trees. Hollows chambers need to be approx. 20 cm in floor diameter, 22–90 cm deep and 5–9.4 m above the ground. Nesting sites are often near water and breeding aggregations are reliant on stands of multiple suitable hollow-bearing trees, within a few hundred metres of each other. Breeding pairs utilise multiple nest trees over different years, which may be a way of minimising nest parasitism or predation (Department of Agriculture, Water and the Environment (DAWE, 2022).

Potential breeding habitat for *C. fimbriatum* was considered to be any vegetation zones that contained suitable tree hollow characteristics. Any scattered trees with suitable hollows (within the exotic grassland) were also identified, as *C. fimbriatum* has been known to occasionally nest in parks, gardens and paddock trees, particularly in areas near water.

Exotic grassland habitat throughout the investigation area has not been adequately surveyed to date for cryptic grassland reptiles such as Grassland Earless Dragon and Striped Legless Lizard to conclude their presence. Areas along the southern and eastern boundary of the investigation area have not been surveyed and therefore cannot be discounted as containing the aforementioned threatened species. Fauna survey locations and surveyed areas from the November- December 2021 and May 2022 surveys are outlined in Section 3.3.



Potential Threatened Species Habitat

F7-1

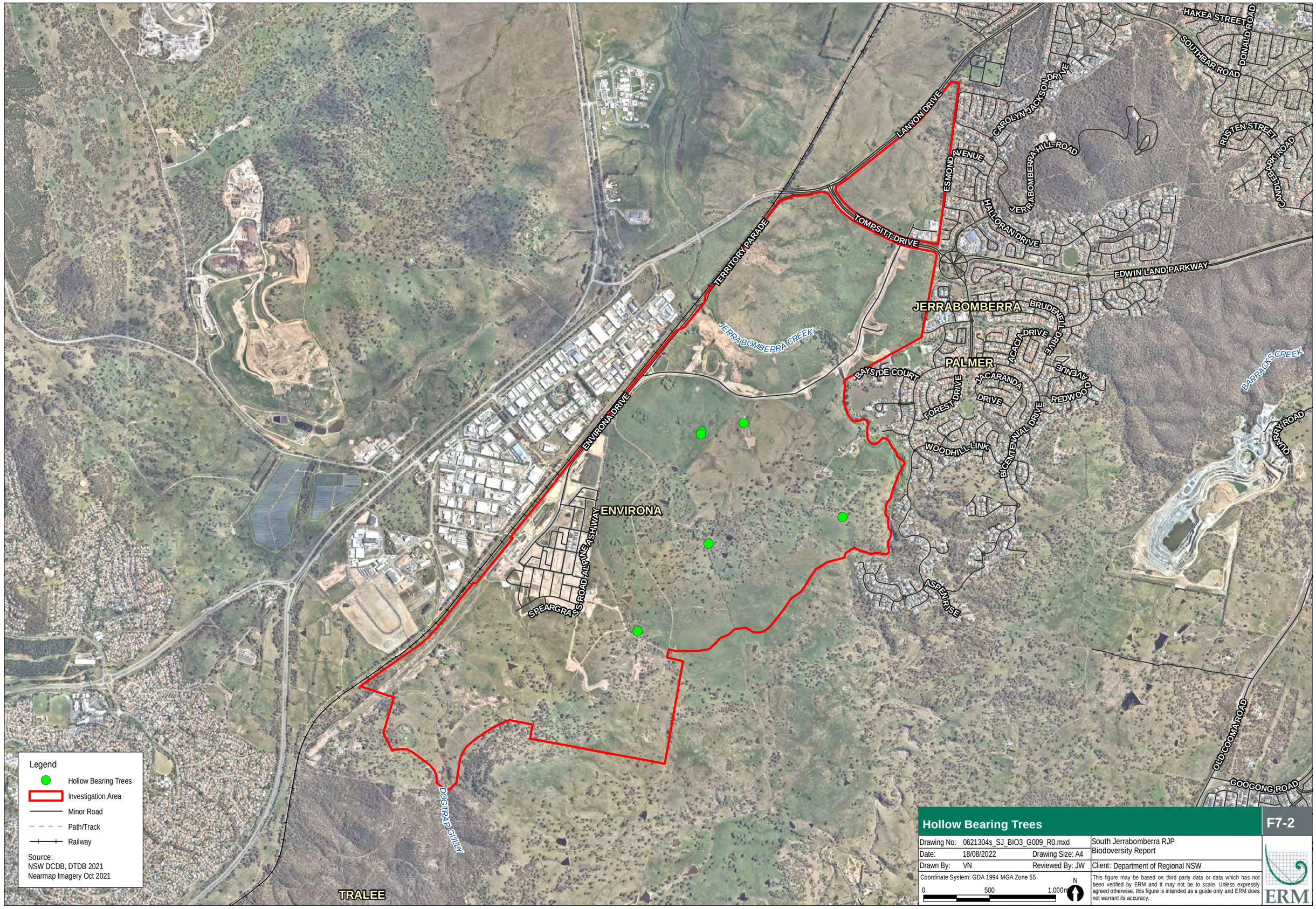
Drawing No:	0621304s_SJ_BIO3_G007_R1.mxd		South Jerrabomberra RJP Biodoversity Report
Date:	07/09/2023	Drawing Size: A4	
Drawn By:	VN	Reviewed By: JW	Client: Department of Regional NSW

Coordinate System: GDA 1994 MGA Zone 55

0 500 1,000m

N

ERM


HAKEA STREET
SOUTHBAR ROAD
DONALD ROAD
CAROLYN JACKSON DRIVE
LANYON DRIVE
RUSTEN STREET
CAMPLEJOHN PARK ROAD
ESMOND AVENUE
JERRABOMBERRA HILL ROAD
HALLORAN DRIVE
TOMPSITT DRIVE
TERRITORY PARADE
EDWIN LAND PARKWAY
JERRABOMBERRA
BRUDENELL DRIVE
JERRABOMBERRA CREEK
ACACIA DRIVE
PALMER
BAYSIDE COURT
JACARANDA DRIVE
REDWOOD AVENUE
FOREST DRIVE
BARRACKS CREEK
WOODHILL LINK
BICENTENNIAL DRIVE
ENVIRONA DRIVE
ENVIRONA
SPEARGRASS ROAD
ALPINE ASHWAY
ASPEN RISE
OLD COOMA ROAD
GOOGONG ROAD
DOGTRAP GULLY
TRALEE
Legend
Hollow Bearing Trees
Investigation Area
Minor Road
Path/Track
Railway
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021
Hollow Bearing Trees
F7-2
Drawing No: 0621304s_SJ_BIO3_G009_R0.mxd
Date: 18/08/2022
Drawing Size: A4
Drawn By: VN
Reviewed By: JW
South Jerrabomberra RJP
Biodoversity Report
Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55
0
500
1,000m
N
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

8. LANDSCAPE CONNECTIVITY

As identified in Section 4, the South Jerrabomberra RJP area contains a range of habitat corridors, characterised as areas that link vegetation to form wildlife habitat. Corridors can also contribute to the resilience of the landscape in a changing climate and help to reduce future greenhouse gas emissions by storing carbon in native vegetation. They can also support multiple land uses such as conservation, farming and forestry (DAWE, 2020).

Movement between remnant habitats is vital for the survival of both flora and fauna species. By facilitating the movement of different species across a landscape, each remnant habitat can receive the necessary processes that it requires in order to function correctly and thus maintain an adequate level of ecosystem health. These corridors can function at both a local and regional level.

There are a range of benefits that come from the retention or creation of ecological linkages across a landscape. Molloy et al., (2009) outlines the following benefits:

- Increased ecological effectiveness;
- Increased migration rates;
- Increased foraging and home range areas for species;
- Provision of cover for escape from predators between large patches;
- Provision of alternative refuge from major disturbances; and
- Provision of green belts to limit the effects of urbanisation on species and ecological communities.

Landscape elements that contribute to wildlife corridors include:

- Native grasslands provide habitat and pasture;
- Linear strips of roadside and fence line vegetation form important links in the landscape;
- 'Stepping stones' of native vegetation such as paddock trees link larger patches;
- Sensitively designed urban parks and gardens contribute habitat for native species;
- Free-flowing rivers transport nutrients and sediment to the sea;
- Fish travel between fresh and saltwater environments at different lifecycle stages;
- Migratory bird species rely on important wetland and shore habitats;
- Fauna moving through the landscape disperse pollen and seed;
- Floodplain inundation triggers plant regeneration and provides habitat for aquatic species;
- Large patches of native vegetation provide core habitat;
- 'Buffers' around natural areas protect them from external threats; and
- Long distance movement of migratory species (DAWE, 2020).

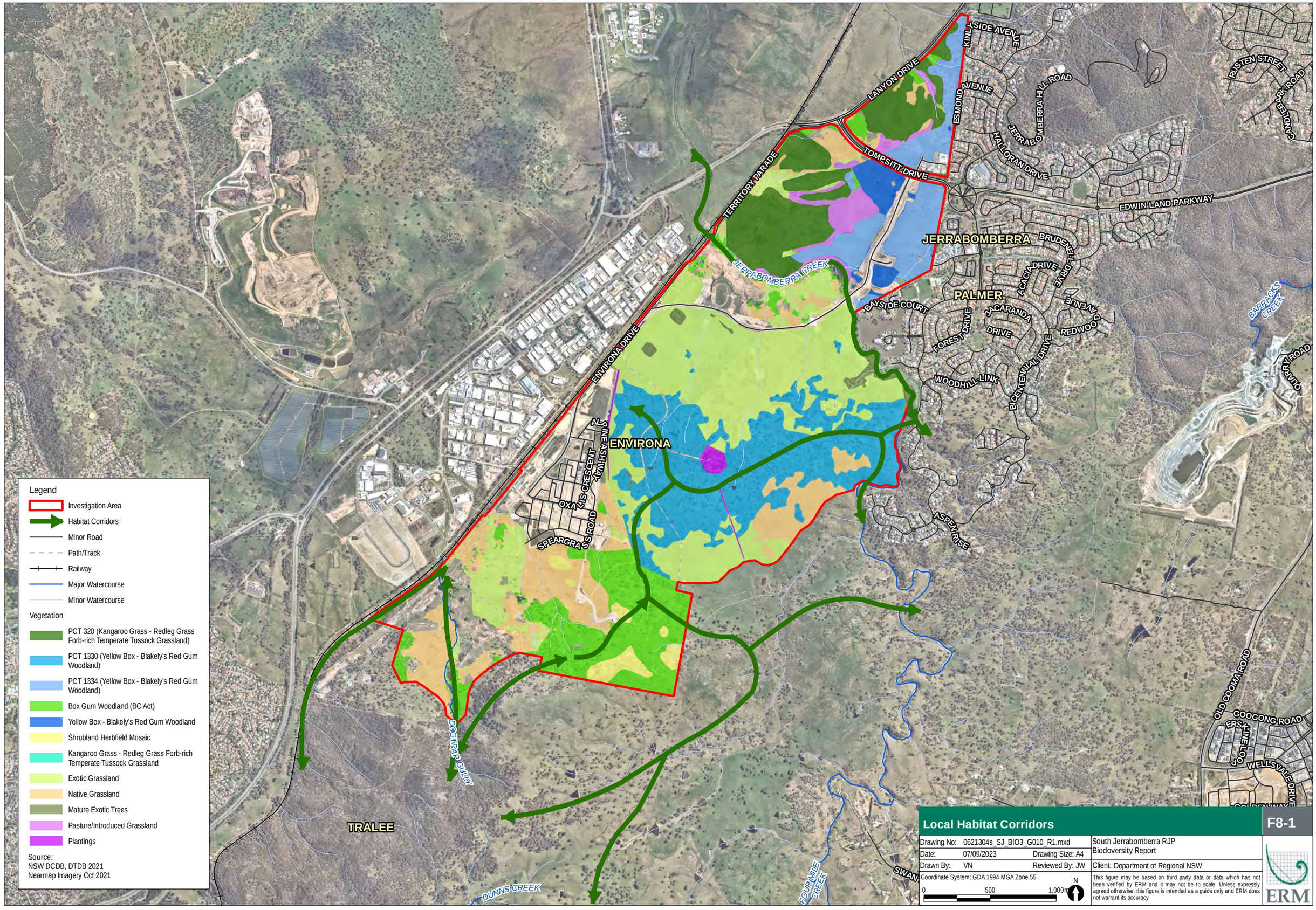
8.1 Local Habitat Corridors

Important local habitat corridors identified in this report include continuous patches of habitat large enough to sustain viable populations of threatened flora and fauna and to facilitate dispersal movement (refer to Figure 8-1). These include a combination of:

- Jerrabomberra Creek;
- Dogtrap Gully;
- Monaro Rail Trail;
- Large areas of vegetation that facilitate dispersal and movement between adjacent habitats, such as vegetation bordering the RJP boundary to south of the Investigation Area; and
- Areas of mapped TEC.

There is potential habitat linkage to the Jerrabomberra Mountain Reserve through the northern boundary of the RJP and Jerrabomberra Creek through the eastern boundary.

The Monaro Rail Trail is a proposed cycle tourism project linking Queanbeyan and Bombala. While the primary objectives of this project is human recreation, the project offers additional opportunities to enhance ecological connectivity between the important habitat patches identified in this report and those beyond the projects scope. The preservation of landscape heritage along the proposed trail is likely to also preserve important habitat characteristics for species persistence and dispersal. The identification of specific opportunities to enhance the habitat value of the Investigation Area through restoration along the proposed Monaro Rail Trail is beyond the scope of this report, it is likely to be beneficial.


Legend
Investigation Area
Habitat Corridors
Minor Road
Path/Track
Railway
Major Watercourse
Minor Watercourse
Vegetation
PCT 320 (Kangaroo Grass - Redleg Grass Forb-rich Temperate Tussock Grassland)
PCT 1330 (Yellow Box - Blakely's Red Gum Woodland)
PCT 1334 (Yellow Box - Blakely's Red Gum Woodland)
Box Gum Woodland (BC Act)
Yellow Box - Blakely's Red Gum Woodland
Shrubland Herbfield Mosaic
Kangaroo Grass - Redleg Grass Forb-rich Temperate Tussock Grassland
Exotic Grassland
Native Grassland
Mature Exotic Trees
Pasture/Introduced Grassland
Plantings
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery Oct 2021
TERRITORY PARADE
LANYON DRIVE
TOMPSITT DRIVE
ESMOND AVENUE
KINLOCH AVENUE
JERRABOMBERRA HILL ROAD
HALLORAN DRIVE
RUSTEN STREET
CANBERRA AVENUE
EDWIN LAND PARKWAY
JERRABOMBERRA
JERRABOMBERRA CREEK
BRUDENELL DRIVE
ACACIA DRIVE
PALMER
BAYSIDE COURT
JACARANDA DRIVE
FOREST DRIVE
REDWOOD AVENUE
WOODHILL LINK
BICENTENNIAL DRIVE
BARRACKS CREEK
OURIMBAH ROAD
ENVIRONA DRIVE
ENVIRONA
OXALIS CRESCENT
ASHWAY
SPEARGRASS ROAD
ASPEN RISE
OLD COOMA ROAD
GOOGONG ROAD
WELLSVALE DRIVE
TRALEE
DOGTRAP GULLY
DUNNS CREEK
FOURMILE CREEK
SWAN
Local Habitat Corridors
F8-1
Drawing No: 0621304s_SJ_BIO3_G010_R1.mxd
Date: 07/09/2023
Drawing Size: A4
Drawn By: VN
Reviewed By: JW
Coordinate System: GDA 1994 MGA Zone 55
0
500
1,000m
N
South Jerrabomberra RJP
Biodoversity Report
Client: Department of Regional NSW
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

9. SERIOUS AND IRREVERSIBLE IMPACTS

The desktop and field surveys completed to support this report have confirmed the presence of the critically endangered White Box Yellow Box Blakely's Red Gum Woodland TEC within the Environa section of the RJP Investigation Area.

Two flora species that may be present within the Investigation Area are currently listed as potentially being at risk of a serious and irreversible impact (SAII):

- Mauve Burr-daisy *Calotis glandulosa*; and
- Pale Pomaderris *Pomaderris pallida*.

Eight fauna species that occur or may be present within the Investigation Area are currently listed as potentially being at risk of a serious and irreversible impact (SAII).

- Regent Honeyeater *Anthochaera Phrygia*;
- Curlew Sandpiper *Calidris ferruginea* (Breeding);
- Swift Parrot *Lathamus discolour*;
- Eastern Curlew *Numenius madagascariensis*;
- Yellow-spotted Tree Frog *Litoria castanea*;
- Golden Sun Moth *Synemon plana*;
- Large-eared Pied Bat *Chalinolobus dwyeri*; and
- Brush-tailed Rock Wallaby *Petrogale penicillata*.

Areas of PCT identified through desktop assessment have the potential to be the critically endangered. These include Natural Temperate Grassland of the South Eastern Highlands and White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The approval authority is responsible for deciding whether an impact is serious and irreversible. This decision is to be made in accordance with principles set out in clause 6.7 of the *Biodiversity Conservation Regulation 2017*. The approval authority must take any impacts to these species into consideration and determine whether there are any additional and appropriate measures that will minimise those impacts if approval is to be granted.

10. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act requires approval of the Commonwealth Minister for the Environment for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES) as assessed in accordance with the EPBC Significant Impact Guidelines 1.1. Any proposed action that is expected to have an impact on MNES must be referred to the Minister for assessment under the EPBC Act, or assessed under the existing bilateral agreement, or accredited process between the Commonwealth and the State of New South Wales (NSW).

Based on our assessment to date, it is likely that the Master Plan will be referred to the Commonwealth for potential impacts to MNES species and communities based on the following listed MNES provided in Table 10-1.

The majority of the MNES species and communities can be retained and protected in the proposed Rural Landscape zoning to the south of the Environa precinct. However, there are some areas of Box Gum Woodland TEC and habitat for threatened reptiles and Golden Sun Moth within the proposed zones for increased development. It is likely that smaller impacts to these areas of MNES will require referral and approval as a controlled action, however the extent of these impacts will need to be assessed against the EPBC Act significant impact guidelines.

Table 10-1 Summary of MNES Within the Investigation Area

Matter of National Environmental Significance	Impact
World Heritage Properties There are no World Heritage Properties located at the Investigation Area or within the surrounding 10km buffer.	Nil
National Heritage Places There are no National Heritage Places located at the Investigation Area or within the surrounding 10km buffer.	Nil
Wetlands of International Significance (Ramsar) There are no Ramsar wetlands located at the Investigation Area or within the surrounding 10km buffer.	Nil
Threatened Species or Ecological Communities listed in the EPBC Act Threatened species have been recorded within the Investigation Area. Two EPBC listed TECs have been recorded within the Investigation Area.	Refer to and Section 5.2, Section 5.3 and Section 6.1
Migratory Species listed in the EPBC Act Migratory species have been recorded within the Investigation Area.	Refer to Section 6.4
Commonwealth Marine Environment There are no Commonwealth marine areas located within the Investigation Area or within the surrounding 10km buffer.	Nil
Nuclear Actions The Investigation Area does not involve nuclear actions and is not located within a 5km buffer of an area of nuclear action.	Nil
Great Barrier Reef Marine Park The Investigation Area is not located within the Great Barrier Reef Marine Park or within a 10km buffer.	Nil
A water resource, in relation to coal seam gas development and large coal mining development The Investigation Area is not associated with coal seam gas development and is not a coal mining activity.	Nil

11. SUMMARY AND RECOMMENDATIONS

The Preferred Master Plan for the South Jerrabomberra RJP has been produced and informed by environmental concepts that foster the preservation of local biodiversity and threatened species. The South Jerrabomberra project area contains a number of key biodiversity values which include five PCTs with two of these PCTs corresponding with TECs under the EPBC Act and NSW BC Act. Further site surveys, in the form of BAM surveys, will be required to ground truth all PCTs within the Investigation Area.

Although fauna surveys were mostly opportunistic, with exception of Golden Sun Moth, four threatened fauna species were incidentally observed in the Investigation Area (Gang Gang Cockatoo, Pink-tailed Worm Lizards, Diamond Firetail, Flame Robins). No threatened flora was observed during the previous surveys conducted within the South Jerrabomberra RJP and no targeted threatened flora surveys or BAM plots were surveyed.

High threat weeds and WoNS (eg *Rubus fruticosus*) were detected within the Investigation Area and will require treatment and or removal prior to disturbance of these areas to prevent further spread and resultant degradation and loss of biodiversity. Control of invasive weeds is largely a construction-phase mitigation measures, with appropriate controls to be included as part of environmental management measures during construction.

11.1 Areas for Identified for Conservation

Vegetated areas within the RJP boundary that contain areas of high biodiversity value that have been targeted for conservation include:

- Occurrence of NSW and federally listed Threatened Ecological Communities;
- Vegetated habitat corridors and linkages;
- Threatened species habitat; and
- Potential Serious and Irreversible Impacts (SAII):
  - Mauve Burr-daisy (*Calotis glandulosa*);
  - Pale Pomaderris (*Pomaderris pallida*);
  - Regent Honeyeater (*Anthochaera Phrygia*);
  - Curlew Sandpiper (*Calidris ferruginea*) (Breeding);
  - Swift Parrot (Lathamus discolour);
  - Eastern Curlew (Numenius madagascariensis);
  - Yellow-spotted Tree Frog (*Litoria castanea);*
  - Golden Sun Moth (*Synemon plana);*
  - Large-eared Pied Bat (Chalinolobus dwyeri); and
  - Brush-tailed Rock Wallaby (*Petrogale penicillata)*.

The desktop and field surveys completed to support this report have confirmed the presence of the critically endangered White Box Yellow Box Blakely's Red Gum Woodland TEC within the Environa section of the RJP Investigation Area.

11.2 Areas for Further Investigation

Areas of high habitat value for threatened species have been ground-truthed and mapped in the most recent field survey season (May 2022). Habitat identified as high value should be targeted for conservation actions and avoided by any construction within the Investigation Area where possible. If not possible then targeted species surveys for the Grassland Earless Dragon, Golden Sun Moth and other threatened species will need to be carried out to ensure confidence of species absence.

Eight ecosystem credit species have been identified as linked to PCTs within the project area:

- Dusky Wood Swallow (*Artamus cyanopterus cyanopterus);*
- *Gang Gang Cockatoo* (*Callocephalon fimbriatum*);
- Hoary Sunray (*Leucochrysum albicans var. tricolor*);
- Scarlet Robin (*Petroica boodang*);
- Button Wrinklewort (*Rutidosis leptorrhynchoidesl*);
- Diamond Firetail (*Stagonopleura guttata*);
- Silky Swainson Pea (*Swainsona sericea); and*
- Golden Sun Moth (*Synemon plana*).

Direct and indirect impacts to threatened species resultant of habitat clearance have been considered in the development of the Draft Master Plan, though further surveys are required to inform credit obligations in accordance with the BAM. Proposed field surveys will:

- Confirm PCTs and presence of TECs using BAM;
- Map TEC extents where present;
- Survey and record fauna species present with in the locality; and
- Nocturnal spotlighting and call playback for threatened nocturnal species.

11.3 Avoidance and Mitigation Measures

The BAM requires that the avoid, minimise, offset hierarchy is applied to development projects and therefore, any future BDAR or BCAR will be required to outline measures taken to avoid impacts to biodiversity and provide justification where avoidance is not applied. This approach has also been applied through the Master Planning and Design process and workshops undertaken to inform a final Master Plan for the RJP development.

Impacts to high biodiversity values, particularly in areas that support multiple threatened species, including potential Serious and Irreversible Impacts associated with the Box Gum Woodland TEC should be identified and avoided where possible. These areas will potentially contribute significantly to the offset obligation and cost associated with the development and therefore, further avoidance would reduce the ecosystem and species credit requirements and costs.

The current draft Master Plan provides opportunities for the protection of the majority of the areas of critically endangered Box Gum Woodland TEC within the Environa property, as well as areas of confirmed or likely habitat for Grassland Earless Dragon, Striped Legless Lizard and Pink-tailed Worm-lizard. This protection is provided through the maintenance of the existing RU2 zoning across the Environa lands, which will limit opportunities for intensification of land uses and development across these areas. This approach maintains the current land use zoning under the *Queanbeyan-Palerang Regional Local Environmental Plan 2022.*

11.4 Next Steps & Options for Consideration

Any future development application within these areas will require a BDAR which will need to demonstrate how areas of TEC and threatened species habitat is protected and impacts avoided. This BDAR will be triggered due to the potential for significant impacts to biodiversity, specifically areas of TEC and threatened species habitats.

Despite the larger areas of Box Gum Woodland TEC and threatened species habitat being retained in the proposed Rural Landscape sub-precinct across Environa, there are some smaller patches of Box Gum Woodland and habitat trees located in the precincts designated for changes in land use zoning to encourage development. Further avoidance of biodiversity values may be achievable through refinement of the Master Plan Design, including identification and protection of habitat trees in the areas zoned for Local Activity Centres and Local Business + Industry precincts. There are smaller, isolated and lower quality areas of TEC and threatened species habitat in these precincts, which should be considered for retention and inclusion into the detailed design of these precincts. This should also consider options to retain these features as part of the urban design layout, with retention of habitat trees in the streetscape or local parks.

Options for establishing stewardship sites and applying for biodiversity certification across the RJP could also be considered as part of the implementation of the master plan, to offset the loss of areas of native vegetation, TEC and threatened species habitats. Areas to be investigated as potential stewardship sites include locations within the proposed Rural Landscape zoned areas in the Environa precinct that contain lower quality Box Gum Woodland TEC. These areas have a greater potential to respond to management, improving the ecological value and generating offset credits through gains in vegetation integrity and condition.

The benefits of applying and gaining biodiversity certification across the RJP is that areas designated for intensification of development, such as the Local Activity Centres and Local Business + Industry precincts, can be developed with increased certainty of offset obligations being delivered within the RJP. Under the scenario, suitable stewardship sites for the generation of required offset credits can be established within the RJP and these credits used to cover required offsets for impacts. This option will still need to consider options to avoid and minimise impacts to native vegetation, TECs and threatened species habitat before relying on offsets.

12. REFERENCES

Biosis Research. (2003). *A Natural Heritage Assessment of "The Poplars" Queanbeyan, NSW.*

BirdLife International. (2020). *East Asia/Australasia Flyway Factsheet.* Retrieved from https://www.birdlife.org/sites/default/files/attachments/8_East_Asia_Australasia_Factsheet.pdf

Capital Ecology. (2020). *"The Poplars"– Review of previous ecological studies and rati.*

Carter, O. (n.d.). *National recovery plan for the Trailing Hop-bush (Dodonaea procumbens) .*

Clulow, S., Anstis, M., Keogh, S., & Catullo, R. (2016). A new species of Australian frog (Myobatrachidae: Uperoleia) from the New South Wales mid-north coast sandplains. *Zootaxa*, 285-315.

Commonwealth of Australia. (2009). *National Koala Conservation and Management Strategy 2009-2014.* Retrieved from https://www.environment.gov.au/system/files/resources/165139fc-3ab5-4c96-8b15-d11a1ad882ab/files/koala-strategy.pdf

Department of Customer Service. (2020). *Biodiversity Values Map and Threshold Tool*. Retrieved from https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

Department of the Environment. (2015). *Wildlife Conservation Plan for Migratory Shorebirds.* Retrieved from https://www.environment.gov.au/system/files/resources/9995c620-45c9-4574-af8e-a7cfb9571deb/files/widlife-conservation-plan-migratory-shorebirds.pdf

Department of the Environment. (2022, Jan 12). *Synemon plana in Species Profile and Threats Database*. Retrieved from https://www.environment.gov.au/sprat

Department of the Environment, Water, Heritage and the Arts. (2009). *Background Paper to EPBC Act Policy Statement 3.12 – Nationally Threatened Species and Ecological Communities Significant Impact Guidelines for the Critically Endangered Golden Sun Moth (Synemon plana).*

Department of the Environment, Water, Heritage and the Arts. (2009). *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana).*

DPIE. (2019). *NSW Koala Habitat Information Base.* Retrieved from Sharing and Enabling Environmental Data (SEED): https://datasets.seed.nsw.gov.au/dataset/koala-habitat-information-base

DPIE. (2020). *Hunter Wetlands National Park: Plan of Management.* Parramatta: Departmemt of Planning, Industry and Environment.

Everett, J. (1992). *Flora of New South Wales* (Vol. 3). Kensington: New South Wales University PRess.

GHD. (2009). *Report for Dunns Creek Road.*

GrassRoots Environmental . (2021). *Jerrabomberra Creek Catchment Plan.*

Harden, G. (2000). *Flora of New South Wales.* UNSW Press.

Jones, D., Clements, M. A., Sharma, I., & Mckenzie, A. (2001). *A New Classsification of Caladenia R.BR. (Orchidaceae).* The Orchadian.

Kevin Mills & Associates. (2004). *Survey of The Grasslands on South Tralee.*

Molloy, S., Wood, J., Hall, S., Walldrodt, S., & Whisson, G. (2009). *South West Regional Ecological Linkages Technical Report.* Perth: Western Australian Local Government Association and Department of Environment and Conservation .

NSW Office of Environment & Heritage. (2018). *Biobanking Agreement ID: BA309 - Poplars South.*

NSW Scientific Committee. (2008). *Sloane's Froglet Crinia sloanei - Vulnerable species determination - final.*

Office of Environment & Heritage. (2019). *Sloane's Froglet Profile*. Retrieved from https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20088

Queanbeyan City Council. (1995). *Draft Local Environmental Plan For "The Poplars" Report on Public Hearing.*

Rowell, A. (1994). *A study of the native grasslands of the Monaro district : a report for the New South Wales National Parks and Wildlife Service and the Department of Planning (Heritage Assistance Program).* National Parks and Wildlife Service.

Threatened Species Scientific Committee. (2018). *Conservation Advice Crinia sloanei (Sloane's Froglet).*

URS. (2005). *Ecological Constraints for ‘Tralee’.*

APPENDIX A PMST RESULTS

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

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

Report created: 21-Dec-2021

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:	3
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	45
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	265
Commonwealth Heritage Places:	51
Listed Marine Species:	21
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:	26
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	152
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places		[Resource Information]
Name	State	Legal Status
Historic		
Australian War Memorial and the Memorial Parade	ACT	Listed place
High Court - National Gallery Precinct	ACT	Listed place
Old Parliament House and Curtilage	ACT	Listed place

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Banrock station wetland complex	800 - 900km upstream from Ramsar site
Hattah-kulkyne lakes	600 - 700km upstream from Ramsar site
Riverland	700 - 800km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site

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
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within 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
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
FISH		
[Bidyanus bidyanus](#) Silver Perch, Bidyan [76155]	Critically Endangered	Translocated population known to occur within area
[Maccullochella macquariensis](#) Trout Cod [26171]	Endangered	Species or species habitat known to occur within area
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat known to occur within area
FROG		
[Litoria aurea](#) Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
[Litoria booroolongensis](#) Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
[Litoria castanea](#) Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area
[Litoria raniformis](#) Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area
INSECT		
[Synemon plana](#) Golden Sun Moth [25234]	Vulnerable	Species or species habitat known to occur within area
MAMMAL		

Scientific Name	Threatened Category	Presence Text
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within 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]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
Amphibromus fluitans		
River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area
Caladenia actensis		
Canberra Spider Orchid [76138]	Critically Endangered	Species or species habitat known to occur within area
Calotis glandulosa		
Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area
Dodonaea procumbens		
Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus aggregata		
Black Gum [20890]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lepidium ginninderrense Ginninderra Peppercress [78474]	Vulnerable	Species or species habitat may occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area
Muehlenbeckia tuggeranong Tuggeranong Lignum [64934]	Endangered	Species or species habitat likely to occur within area
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	Endangered	Species or species habitat may occur within area
Pomaderris pallida Pale Pomaderris [13684]	Vulnerable	Species or species habitat known to occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Rutidosis leptorhynchoides Button Wrinklewort [67251]	Endangered	Species or species habitat known to occur within area
Senecio macrocarpus Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat likely to occur within area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		

Scientific Name	Threatened Category	Presence Text
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area
Tympanocryptis pinguicolla Grassland Earless Dragon [66727]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within 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
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Corporation [12324]	NSW
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian Telecommunications Commission [12321]	NSW
Commonwealth Land - Australian Telecommunications Commission [12322]	NSW
Commonwealth Land - Telstra Corporation Limited [12320]	NSW

Commonwealth Land Name	State
Defence	
Defence - 10 WHYALLA ST - FYSHWICK [80001]	ACT
Defence - 139 CANBERRA AVE - FYSHWICK [80004]	ACT
Defence - 139 CANBERRA AVE - FYSHWICK [80003]	ACT
Defence - 139 CANBERRA AVE - FYSHWICK [80002]	ACT
Defence - 169 GLADSTONE ST - FYSHWICK [80005]	ACT
Defence - AUSTRALIAN DEFENCE FORCE ACADEMY [80104]	ACT
Defence - CAMPBELL PARK [80040]	ACT
Defence - CHURCHES CENTRE - TUGGERANONG [80041]	ACT
Defence - DEAKIN OFFICES [80042]	ACT
Defence - DEFENCE ARCHIVES - QUEANBEYAN [10097]	NSW
Defence - DEFENCE ARCHIVES - QUEANBEYAN [10098]	NSW
Defence - HMAS HARMAN - SYMONSTOWN [80105]	ACT
Defence - HMAS HARMAN - SYMONSTOWN [80106]	ACT
Defence - HMAS HARMAN - SYMONSTOWN [80107]	ACT
Defence - MAJURA FIELD FIRING RANGE [80011]	ACT
Defence - MAJURA FIELD FIRING RANGE [80019]	ACT
Defence - MAJURA FIELD FIRING RANGE [80013]	ACT
Defence - MAJURA FIELD FIRING RANGE [80012]	ACT
Defence - MAJURA FIELD FIRING RANGE [80022]	ACT
Defence - MAJURA FIELD FIRING RANGE [80021]	ACT
Defence - MAJURA NAVIGATION BEACON [80033]	ACT
Defence - MAWSON OFFICE ACCOMM [80045]	ACT
Defence - MT JERRABOMBERRA OBSTRUCTION WARNING [80046]	NSW
Defence - MT JERRABOMBERRA OBSTRUCTION WARNING [80047]	NSW
Defence - NAVAL COMBAT DATA SYSTEM CENTRE - FYSHWICK [80007]	ACT
Defence - NAVAL COMBAT DATA SYSTEM CENTRE - FYSHWICK [80006]	ACT

Commonwealth Land Name	State
Defence - NORTHCOTT DRIVE PLAYING FIELDS (Addison Rd) [80048]	ACT
Defence - PHYSICS FIELD TESTING STATION - CANBERRA [80103]	ACT
Defence - RAAF BASE FAIRBAIRN [80061]	ACT
Defence - RAAF BASE FAIRBAIRN [80053]	ACT
Defence - RAAF BASE FAIRBAIRN [80080]	ACT
Defence - RAAF BASE FAIRBAIRN [80068]	ACT
Defence - RAAF BASE FAIRBAIRN [80081]	ACT
Defence - RAAF BASE FAIRBAIRN [80082]	ACT
Defence - RAAF BASE FAIRBAIRN [80069]	ACT
Defence - RAAF BASE FAIRBAIRN [80083]	ACT
Defence - RAAF BASE FAIRBAIRN [80049]	ACT
Defence - RAAF BASE FAIRBAIRN [80072]	ACT
Defence - RAAF BASE FAIRBAIRN [80062]	ACT
Defence - RAAF BASE FAIRBAIRN [80063]	ACT
Defence - RAAF BASE FAIRBAIRN [80060]	ACT
Defence - RAAF BASE FAIRBAIRN [80066]	ACT
Defence - RAAF BASE FAIRBAIRN [80067]	ACT
Defence - RAAF BASE FAIRBAIRN [80064]	ACT
Defence - RAAF BASE FAIRBAIRN [80065]	ACT
Defence - RAAF BASE FAIRBAIRN [80055]	ACT
Defence - RAAF BASE FAIRBAIRN [80054]	ACT
Defence - RAAF BASE FAIRBAIRN [80052]	ACT
Defence - RAAF BASE FAIRBAIRN [80051]	ACT
Defence - RAAF BASE FAIRBAIRN [80059]	ACT
Defence - RAAF BASE FAIRBAIRN [80058]	ACT
Defence - RAAF BASE FAIRBAIRN [80057]	ACT
Defence - RAAF BASE FAIRBAIRN [80056]	ACT

Commonwealth Land Name	State
Defence - RAAF BASE FAIRBAIRN [80050]	ACT
Defence - RAAF BASE FAIRBAIRN [80079]	ACT
Defence - RAAF BASE FAIRBAIRN [80074]	ACT
Defence - RAAF BASE FAIRBAIRN [80077]	ACT
Defence - RAAF BASE FAIRBAIRN [80076]	ACT
Defence - RAAF BASE FAIRBAIRN [80071]	ACT
Defence - RAAF BASE FAIRBAIRN [80070]	ACT
Defence - RAAF BASE FAIRBAIRN [80073]	ACT
Defence - RAAF BASE FAIRBAIRN [80075]	ACT
Defence - RAAF BASE FAIRBAIRN [80078]	ACT
Defence - ROYAL MILITARY COLLEGE - DUNTROON [80085]	ACT
Defence - ROYAL MILITARY COLLEGE - DUNTROON [80084]	ACT
Defence - RUSSELL HILL COMPLEX [80088]	ACT
Defence - RUSSELL HILL COMPLEX [80089]	ACT
Defence - RUSSELL HILL COMPLEX [80086]	ACT
Defence - RUSSELL HILL COMPLEX [80087]	ACT
Defence - RUSSELL HILL COMPLEX [80100]	ACT
Defence - RUSSELL HILL COMPLEX [80101]	ACT
Defence - RUSSELL HILL COMPLEX [80091]	ACT
Defence - RUSSELL HILL COMPLEX [80092]	ACT
Defence - RUSSELL HILL COMPLEX [80097]	ACT
Defence - RUSSELL HILL COMPLEX [80090]	ACT
Defence - RUSSELL HILL COMPLEX [80099]	ACT
Defence - RUSSELL HILL COMPLEX [80093]	ACT
Defence - RUSSELL HILL COMPLEX [80098]	ACT
Defence - RUSSELL HILL COMPLEX [80096]	ACT
Defence - RUSSELL HILL COMPLEX [80095]	ACT

Commonwealth Land Name	State
Defence - RUSSELL HILL COMPLEX [80094]	ACT
Defence - WERRIWA DEPOT [80108]	ACT
Defence - Defence Housing Authority	
Commonwealth Land - Defence Housing Authority [16078]	NSW
Commonwealth Land - Defence Housing Authority [16079]	NSW
Commonwealth Land - Defence Housing Authority [16293]	NSW
Commonwealth Land - Defence Housing Authority [16074]	NSW
Commonwealth Land - Defence Housing Authority [16292]	NSW
Commonwealth Land - Defence Housing Authority [16075]	NSW
Commonwealth Land - Defence Housing Authority [12301]	NSW
Commonwealth Land - Defence Housing Authority [16023]	NSW
Commonwealth Land - Defence Housing Authority [16024]	NSW
Commonwealth Land - Defence Housing Authority [15412]	NSW
Commonwealth Land - Defence Housing Authority [16246]	NSW
Commonwealth Land - Defence Housing Authority [16022]	NSW
Commonwealth Land - Defence Housing Authority [12315]	NSW
Commonwealth Land - Defence Housing Authority [16259]	NSW
Commonwealth Land - Defence Housing Authority [12314]	NSW
Commonwealth Land - Defence Housing Authority [12317]	NSW
Commonwealth Land - Defence Housing Authority [12316]	NSW
Commonwealth Land - Defence Housing Authority [15925]	NSW
Commonwealth Land - Defence Housing Authority [12305]	NSW
Commonwealth Land - Defence Housing Authority [15924]	NSW
Commonwealth Land - Defence Housing Authority [15927]	NSW
Commonwealth Land - Defence Housing Authority [15926]	NSW
Commonwealth Land - Defence Housing Authority [16113]	NSW
Commonwealth Land - Defence Housing Authority [16110]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [16244]	NSW
Commonwealth Land - Defence Housing Authority [16114]	NSW
Commonwealth Land - Defence Housing Authority [16112]	NSW
Commonwealth Land - Defence Housing Authority [16258]	NSW
Commonwealth Land - Defence Housing Authority [16297]	NSW
Commonwealth Land - Defence Housing Authority [16294]	NSW
Commonwealth Land - Defence Housing Authority [16295]	NSW
Commonwealth Land - Defence Housing Authority [16111]	NSW
Commonwealth Land - Defence Housing Authority [16492]	NSW
Commonwealth Land - Defence Housing Authority [16296]	NSW
Commonwealth Land - Defence Housing Authority [16561]	NSW
Commonwealth Land - Defence Housing Authority [16298]	NSW
Commonwealth Land - Defence Housing Authority [15904]	NSW
Commonwealth Land - Defence Housing Authority [12296]	NSW
Commonwealth Land - Defence Housing Authority [15905]	NSW
Commonwealth Land - Defence Housing Authority [12294]	NSW
Commonwealth Land - Defence Housing Authority [15908]	NSW
Commonwealth Land - Defence Housing Authority [16565]	NSW
Commonwealth Land - Defence Housing Authority [16359]	NSW
Commonwealth Land - Defence Housing Authority [16202]	NSW
Commonwealth Land - Defence Housing Authority [12309]	NSW
Commonwealth Land - Defence Housing Authority [16358]	NSW
Commonwealth Land - Defence Housing Authority [16229]	NSW
Commonwealth Land - Defence Housing Authority [16228]	NSW
Commonwealth Land - Defence Housing Authority [16208]	NSW
Commonwealth Land - Defence Housing Authority [16205]	NSW
Commonwealth Land - Defence Housing Authority [16200]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [16203]	NSW
Commonwealth Land - Defence Housing Authority [16207]	NSW
Commonwealth Land - Defence Housing Authority [16201]	NSW
Commonwealth Land - Defence Housing Authority [16226]	NSW
Commonwealth Land - Defence Housing Authority [15697]	NSW
Commonwealth Land - Defence Housing Authority [15696]	NSW
Commonwealth Land - Defence Housing Authority [15695]	NSW
Commonwealth Land - Defence Housing Authority [16257]	NSW
Commonwealth Land - Defence Housing Authority [16076]	NSW
Commonwealth Land - Defence Housing Authority [16077]	NSW
Commonwealth Land - Defence Housing Authority [16234]	NSW
Commonwealth Land - Defence Housing Authority [16235]	NSW
Commonwealth Land - Defence Housing Authority [12299]	NSW
Commonwealth Land - Defence Housing Authority [15907]	NSW
Commonwealth Land - Defence Housing Authority [15906]	NSW
Commonwealth Land - Defence Housing Authority [16242]	NSW
Commonwealth Land - Defence Housing Authority [15617]	NSW
Commonwealth Land - Defence Housing Authority [16227]	NSW
Commonwealth Land - Defence Housing Authority [16206]	NSW
Commonwealth Land - Defence Housing Authority [16225]	NSW
Commonwealth Land - Defence Housing Authority [15684]	NSW
Commonwealth Land - Defence Housing Authority [16223]	NSW
Commonwealth Land - Defence Housing Authority [16224]	NSW
Commonwealth Land - Defence Housing Authority [16221]	NSW
Commonwealth Land - Defence Housing Authority [16222]	NSW
Commonwealth Land - Defence Housing Authority [16220]	NSW
Commonwealth Land - Defence Housing Authority [16360]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [12306]	NSW
Commonwealth Land - Defence Housing Authority [12302]	NSW
Commonwealth Land - Defence Housing Authority [12303]	NSW
Commonwealth Land - Defence Housing Authority [16095]	NSW
Commonwealth Land - Defence Housing Authority [16096]	NSW
Commonwealth Land - Defence Housing Authority [12307]	NSW
Commonwealth Land - Defence Housing Authority [16094]	NSW
Commonwealth Land - Defence Housing Authority [12300]	NSW
Commonwealth Land - Defence Housing Authority [12308]	NSW
Commonwealth Land - Defence Housing Authority [16241]	NSW
Commonwealth Land - Defence Housing Authority [16240]	NSW
Commonwealth Land - Defence Housing Authority [16243]	NSW
Commonwealth Land - Defence Housing Authority [16245]	NSW
Commonwealth Land - Defence Housing Authority [16247]	NSW
Commonwealth Land - Defence Housing Authority [16097]	NSW
Commonwealth Land - Defence Housing Authority [16493]	NSW
Commonwealth Land - Defence Housing Authority [16098]	NSW
Commonwealth Land - Defence Housing Authority [12318]	NSW
Commonwealth Land - Defence Housing Authority [12319]	NSW
Commonwealth Land - Defence Housing Authority [12312]	NSW
Commonwealth Land - Defence Housing Authority [12313]	NSW
Commonwealth Land - Defence Housing Authority [12311]	NSW
Commonwealth Land - Defence Housing Authority [12310]	NSW
Commonwealth Land - Defence Housing Authority [16299]	NSW
Commonwealth Land - Defence Housing Authority [12325]	NSW
Commonwealth Land - Defence Housing Authority [12327]	NSW
Commonwealth Land - Defence Housing Authority [12326]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [12323]	NSW
Commonwealth Land - Defence Housing Authority [16260]	NSW
Commonwealth Land - Defence Housing Authority [16265]	NSW
Commonwealth Land - Defence Housing Authority [16266]	NSW
Commonwealth Land - Defence Housing Authority [16264]	NSW
Commonwealth Land - Defence Housing Authority [16199]	NSW
Commonwealth Land - Defence Housing Authority [16198]	NSW
Commonwealth Land - Defence Housing Authority [16196]	NSW
Commonwealth Land - Defence Housing Authority [16301]	NSW
Commonwealth Land - Defence Housing Authority [15726]	NSW
Commonwealth Land - Defence Housing Authority [15728]	NSW
Commonwealth Land - Defence Housing Authority [16253]	NSW
Commonwealth Land - Defence Housing Authority [15594]	NSW
Commonwealth Land - Defence Housing Authority [12298]	NSW
Commonwealth Land - Defence Housing Authority [16230]	NSW
Commonwealth Land - Defence Housing Authority [16213]	NSW
Commonwealth Land - Defence Housing Authority [16210]	NSW
Commonwealth Land - Defence Housing Authority [16211]	NSW
Commonwealth Land - Defence Housing Authority [16216]	NSW
Commonwealth Land - Defence Housing Authority [16197]	NSW
Commonwealth Land - Defence Housing Authority [12295]	NSW
Commonwealth Land - Defence Housing Authority [16194]	NSW
Commonwealth Land - Defence Housing Authority [16215]	NSW
Commonwealth Land - Defence Housing Authority [16217]	NSW
Commonwealth Land - Defence Housing Authority [16195]	NSW
Commonwealth Land - Defence Housing Authority [16193]	NSW
Commonwealth Land - Defence Housing Authority [16233]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [16231]	NSW
Commonwealth Land - Defence Housing Authority [16239]	NSW
Commonwealth Land - Defence Housing Authority [16238]	NSW
Commonwealth Land - Defence Housing Authority [15934]	NSW
Commonwealth Land - Defence Housing Authority [15699]	NSW
Commonwealth Land - Defence Housing Authority [15540]	NSW
Commonwealth Land - Defence Housing Authority [12297]	NSW
Commonwealth Land - Defence Housing Authority [15935]	NSW
Commonwealth Land - Defence Housing Authority [15932]	NSW
Commonwealth Land - Defence Housing Authority [16204]	NSW
Commonwealth Land - Defence Housing Authority [15746]	NSW
Commonwealth Land - Defence Housing Authority [16106]	NSW
Commonwealth Land - Defence Housing Authority [15747]	NSW
Commonwealth Land - Defence Housing Authority [15965]	NSW
Commonwealth Land - Defence Housing Authority [16109]	NSW
Commonwealth Land - Defence Housing Authority [16108]	NSW
Commonwealth Land - Defence Housing Authority [16107]	NSW
Commonwealth Land - Defence Housing Authority [16212]	NSW
Commonwealth Land - Defence Housing Authority [16219]	NSW
Commonwealth Land - Defence Housing Authority [16218]	NSW
Commonwealth Land - Defence Housing Authority [16261]	NSW
Commonwealth Land - Defence Housing Authority [16262]	NSW
Commonwealth Land - Defence Housing Authority [16263]	NSW
Commonwealth Land - Defence Housing Authority [12328]	NSW
Commonwealth Land - Defence Housing Authority [15931]	NSW
Commonwealth Land - Defence Housing Authority [15933]	NSW
Commonwealth Land - Defence Housing Authority [15595]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [15593]	NSW
Commonwealth Land - Defence Housing Authority [16237]	NSW
Commonwealth Land - Defence Housing Authority [16256]	NSW
Commonwealth Land - Defence Housing Authority [16254]	NSW
Commonwealth Land - Defence Housing Authority [16255]	NSW
Commonwealth Land - Defence Housing Authority [15409]	NSW
Commonwealth Land - Defence Housing Authority [15727]	NSW
Commonwealth Land - Defence Housing Authority [15745]	NSW
Commonwealth Land - Defence Housing Authority [16214]	NSW
Commonwealth Land - Defence Housing Authority [16232]	NSW
Commonwealth Land - Defence Housing Authority [16209]	NSW
Transport and Regional Services - Airservices Australia	
Commonwealth Land - Airservices Australia [16011]	NSW
Commonwealth Land - Airservices Australia [12293]	NSW
Unknown	
Commonwealth Land - [16559]	NSW
Commonwealth Land - [16236]	NSW
Commonwealth Land - [12304]	NSW
Commonwealth Land - [16524]	NSW
Commonwealth Land - [12335]	NSW
Commonwealth Land - [12336]	NSW
Commonwealth Land - [12337]	NSW

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Anzac Memorial Chapel of St Paul	ACT	Listed place
Apostolic Nunciature	ACT	Listed place
Apple Shed Asset C58	ACT	Listed place
Australian American Memorial and Sir Thomas Blamey Square	ACT	Listed place

Name	State	Status
Australian War Memorial	ACT	Listed place
Blundells Farmhouse, Slab Outbuilding and Surrounds	ACT	Listed place
Captains Quarters Assets B1 to B4	ACT	Listed place
Carillon	ACT	Listed place
Casey House and Garden	ACT	Listed place
Changi Chapel	ACT	Listed place
Commandants House Asset B9	ACT	Listed place
Commencement Column Monument	ACT	Listed place
Communications Centre	ACT	Listed place
Duntroon House and Garden	ACT	Listed place
East Block Government Offices	ACT	Listed place
Edmund Barton Offices	ACT	Listed place
General Bridges Grave	ACT	Listed place
High Court - National Gallery Precinct	ACT	Listed place
High Court of Australia	ACT	Listed place
John Gorton Building	ACT	Listed place
King George V Memorial	ACT	Listed place
National Gallery of Australia	ACT	Listed place
National Library of Australia and Surrounds	ACT	Listed place
National Rose Gardens	ACT	Listed place
Old Parliament House and Curtilage	ACT	Listed place
Old Parliament House Gardens	ACT	Listed place
Parade Ground and Associated Buildings Group	ACT	Listed place
Parliament House Vista	ACT	Listed place
Parliament House Vista Extension - Portal Buildings	ACT	Listed place
Patent Office (former)	ACT	Listed place

Name	State	Status
Redwood Plantation	ACT	Listed place
Residence Asset B5	ACT	Listed place
Residence Asset B7	ACT	Listed place
Residence Asset C12	ACT	Listed place
Residence Asset C13	ACT	Listed place
Residence Asset C14	ACT	Listed place
Residence Asset C15	ACT	Listed place
Residence Asset C7	ACT	Listed place
Residence Asset C8	ACT	Listed place
RMC Duntroon Conservation Area	ACT	Listed place
Russell Cafeteria	ACT	Within listed place
Russell Precinct Heritage Area	ACT	Listed place
Sculpture Garden National Gallery of Australia	ACT	Listed place
The Lodge	ACT	Listed place
The Surveyors Hut	ACT	Listed place
Three Wartime Bomb Dump Buildings	ACT	Listed place
West Block and the Dugout	ACT	Listed place
York Park North Tree Plantation	ACT	Listed place
Indigenous		
Aboriginal Embassy Site	ACT	Within listed place
Natural		
Majura Valley Natural Temperate Grassland	ACT	Listed place
State Circle Cutting	ACT	Listed place

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Bullen Range	Nature Reserve	ACT
Callum Brae	Nature Reserve	ACT
Cooleman Ridge	Nature Reserve	ACT
Cuumbeun	Nature Reserve	NSW
Farrer Ridge	Nature Reserve	ACT
Isaacs Ridge	Nature Reserve	ACT
Jerrabomberra Wetlands	Nature Reserve	ACT
Kowen Escarpment	Nature Reserve	ACT
McQuoids Hill	Nature Reserve	ACT
Melrose	Nature Reserve	ACT
Molonglo Gorge	Nature Reserve	ACT
Mt Ainslie	Nature Reserve	ACT
Mt Mugga Mugga	Nature Reserve	ACT
Mt Pleasant	Nature Reserve	ACT
Mt Taylor	Nature Reserve	ACT
Oakey Hill	Nature Reserve	ACT
Queanbeyan	Nature Reserve	NSW
Red Hill	Nature Reserve	ACT
Rob Roy	Nature Reserve	ACT
Stony Creek	Nature Reserve	NSW

Protected Area Name	Reserve Type	State
Tuggeranong Hill	Nature Reserve	ACT
Unnamed	Nature Reserve	ACT
Urambi Hills	Nature Reserve	ACT
Wanna Wanna	Nature Reserve	NSW
Wanniassa Hills	Nature Reserve	ACT
West Jerrabomberra	Nature Reserve	ACT

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State
Southern RFA	New South Wales

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Jerrabomberra Wetlands	ACT

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
132kV Sub-Transmission Line, Tuggeranong	2008/4621	Controlled Action	Post-Approval
ANZAC Park East and ANZAC Park West sale - Parkes, ACT	2016/7766	Controlled Action	Post-Approval
Australian War Memorial Redevelopment	2019/8574	Controlled Action	Post-Approval
Beatty Hill, Royalla - 5 Lot Residential Subdivision	2021/8974	Controlled Action	Further Information Request
Blocks 3 and 15, Section 22, Barton, ACT Divestment	2017/8028	Controlled Action	Post-Approval
Campbell Station 5 Development	2012/6292	Controlled Action	Post-Approval
City to Commonwealth Park Light Rail 2A	2019/8582	Controlled Action	Post-Approval
Commonwealth Park to Woden Light Rail Project, ACT	2019/8491	Controlled Action	Assessment Approach
Development of Block 18 Section 86 Yarralumla, ACT	2016/7812	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Development of part Block 20 Section 86 Yarralumla, ACT	2016/7813	Controlled Action	Post-Approval
Development of the Narrabundah Long Stay Caravan Park Land Swap Site	2007/3554	Controlled Action	Post-Approval
Divestment of York Park North	2004/1426	Controlled Action	Completed
Edwin Land Parkway Stage 2 - Jerrabomberra to Kambah	2009/5162	Controlled Action	Post-Approval
Ellerton Drive Extension, East Queanbeyan, NSW	2014/7304	Controlled Action	Post-Approval
Expansion of the Mugga Lane Resource Management Centre	2011/5808	Controlled Action	Post-Approval
Extension of Taxiway Bravo	2008/4170	Controlled Action	Post-Approval
Federal Golf Club Retirement Village Project, ACT	2018/8277	Controlled Action	Assessment Approach
Googong Township Urban Development & associated infrastructure Project	2011/5829	Controlled Action	Post-Approval
Hotel and Carpark Development	2012/6606	Controlled Action	Post-Approval
Infrastructure Upgrade and Construction at Canberra Airport	2009/4748	Controlled Action	Post-Approval
Malcolmvale West Detention Basin	2011/6218	Controlled Action	Further Information Request
Monaro Highway - Lanyon Drive Upgrade Package 1C	2020/8768	Controlled Action	Direction to Publish
Mugga Quarry overburden expansion project, ACT	2018/8151	Controlled Action	Post-Approval
Refurbishment of the SE Wing of Old Parliament House	2008/4325	Controlled Action	Post-Approval
Removal of Trees on National Land	2009/5204	Controlled Action	Post-Approval
School for Special Purposes at Karabar High School, Queanbeyan, NSW	2019/8418	Controlled Action	Post-Approval
The Poplars, Jerrabomberra, NSW	2020/8801	Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Transfer of Defence Land at Majura	2007/3756	Controlled Action	Post-Approval
Urban Development of part Block 5 Section 10 Greenway, ACT	2016/7781	Controlled Action	Completed
Not controlled action			
Angel of the North Installation	2010/5591	Not Controlled Action	Completed
Anzac Park West Building - perimeter security works	2004/1511	Not Controlled Action	Completed
Benjamin Offices Redevelopment	2001/317	Not Controlled Action	Completed
Bomber Command Memorial	2004/1353	Not Controlled Action	Completed
Bowen Place Crossing	2011/6203	Not Controlled Action	Completed
Calwell Estate Development	2000/38	Not Controlled Action	Completed
Canberra Primary Mains Extension Gas Pipeline Project	2000/15	Not Controlled Action	Completed
Conder 4A - Templestowe Avenue Connection, Ponds and Floodway	2001/361	Not Controlled Action	Completed
Conder 9-Banks 3 Residential Estate, Tuggeranong	2000/39	Not Controlled Action	Completed
construct addition to Admin Annex	2004/1891	Not Controlled Action	Completed
Construction of a link road on Marjura Parkway, Pialligo, ACT	2015/7483	Not Controlled Action	Completed
Construction of an Advanced Instrumentation and Technology Centre at the Mt Stro	2004/1748	Not Controlled Action	Completed
Construction of a New Cooling Tower Enclosure	2008/4457	Not Controlled Action	Completed
Construction of a New Office Building	2009/4814	Not Controlled Action	Completed
Construction of a short haul road	2013/6802	Not Controlled Action	Completed
construction of new admin bldg	2004/1731	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Construction of New Australian Government Offices and On-Site Parking	2008/4158	Not Controlled Action	Completed
Construction of office building and associated activities	2005/2383	Not Controlled Action	Completed
Construction of public housing units within Block 29, Section 36, Mawson, ACT.	2017/8013	Not Controlled Action	Completed
Construction of the IKEA Canberra Northern Access Road, ACT	2016/7742	Not Controlled Action	Completed
Construction of Two Office Buildings on Block 1 Section 3, Barton	2010/5367	Not Controlled Action	Completed
Cyclepath extension	2000/75	Not Controlled Action	Completed
Development of a Diplomatic Mission	2007/3520	Not Controlled Action	Completed
Development of area for Diplomatic Mission Lease	2007/3644	Not Controlled Action	Completed
Development of Block 8 S48 for commercial purposes	2006/2570	Not Controlled Action	Completed
Development of John Gorton Building Basement	2001/453	Not Controlled Action	Completed
Development of residential estate, 47 Mowatt Street	2005/2368	Not Controlled Action	Completed
Dunlop 4 West Residential Development	2003/1055	Not Controlled Action	Completed
Eastern Precinct Development and National Service Memorial	2008/4629	Not Controlled Action	Completed
East O'Malley Residential Estate	2003/1163	Not Controlled Action	Completed
Edmund Barton Building Upgrade and Refurbishment Works	2007/3712	Not Controlled Action	Completed
establishment of a prison on part Block 6 Section 24 and part Block 12 Section 1	2004/1723	Not Controlled Action	Completed
Extension to cooling towers at the rear of Old Parliament House	2004/1625	Not Controlled Action	Completed
Ext of overhead powerline to western end of Googong Water Treatment Plant, NSW	2014/7366	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Fairbairn Avenue Upgrade, Anzac Parade to Northcott Drive	2003/1257	Not Controlled Action	Completed
Fairlane Estate Subdivision	2001/205	Not Controlled Action	Completed
fixing banner holders (top and bottom) to the fascia	2007/3299	Not Controlled Action	Completed
Gallery Development, Stage 2	2006/2829	Not Controlled Action	Completed
Gungaderra Trunk Sewer Stage 1	2003/1259	Not Controlled Action	Completed
Gungahlin Drive Extension	2003/1156	Not Controlled Action	Completed
Humanities and Science Campus	2007/3525	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Installation of interceptors on stormwater outlets	2003/998	Not Controlled Action	Completed
Installation of passive distributed antenna system in the Robert Garran Offices	2005/2363	Not Controlled Action	Completed
Installation of traffic lights at the intersection of Anzac Parade	2010/5704	Not Controlled Action	Completed
Jerrabomberra Heights Residential Estate	2000/70	Not Controlled Action	Completed
Jim Pike Avenue Extension	2000/64	Not Controlled Action	Completed
John Gorton Building Safety Fence & Overhead Protection, Parks, ACT	2013/7017	Not Controlled Action	Completed
Jumping Creek Estate Project, Queanbeyan, NSW	2019/8486	Not Controlled Action	Completed
Kingston Foreshore Development - Harbour Civil Works	2007/3492	Not Controlled Action	Completed
Kingston Foreshore Development - Reclamation and Filling Lake Burley Griffin	2004/1383	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Land Divestment, Block 13, Section 9, Barton, ACT (bounded by Blackall Street, B	2005/2453	Not Controlled Action	Completed
minor alterations to NE corner OPH	2004/1824	Not Controlled Action	Completed
Mixed Use Redevelopment of 1 Dairy Road, Fyshwick, ACT	2021/9062	Not Controlled Action	Completed
Monaro Highway - Lanyon Drive Upgrade Package 1B, Hume, ACT	2020/8767	Not Controlled Action	Completed
Mugga Lane Solar Development	2012/6670	Not Controlled Action	Completed
National Gallery of Australia upgrade	2007/3335	Not Controlled Action	Completed
National Gallery Upgrade	2001/295	Not Controlled Action	Completed
Navigational aid facility upgrade	2005/2459	Not Controlled Action	Completed
North and South Poplars Residential Development	2003/1136	Not Controlled Action	Completed
North Watson Residential Estate	2003/1231	Not Controlled Action	Completed
Observatory Restoration Works	2004/1691	Not Controlled Action	Completed
Old Cooma Road Realignment and Duplication	2010/5663	Not Controlled Action	Completed
Old Parliament House Lift Upgrade Project, Parkes, ACT	2019/8506	Not Controlled Action	Completed
Old Parliament House South-East Wing Refurbishment	2008/3949	Not Controlled Action	Completed
Permanent Access Ramp, Old Parliament House	2004/1485	Not Controlled Action	Completed
Podium Refurbishment, National Library of Australia	2006/3038	Not Controlled Action	Completed
Point Hut Pond,Floodway and Pedestrian Bridges	2000/93	Not Controlled Action	Completed
Protection, Horticultural and Upgrading Works of York Park North Oak Plantation	2008/4637	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Redevelopment of Anzac Park East and West	2004/1470	Not Controlled Action	Completed
Refurbishment of The Royal Australian Mint	2005/2122	Not Controlled Action	Completed
Refurbishment Works at The Lodge, Deakin	2012/6504	Not Controlled Action	Completed
refurbishment works to upper floor SW Wing, OPH, ACT	2007/3538	Not Controlled Action	Completed
Residential subdivision and construction works	2003/1197	Not Controlled Action	Completed
Revocation of National Land status of Block 588 at Barton Hwy and Gundaroo Drive	2004/1527	Not Controlled Action	Completed
Sale of Block 4 Section 13 Greenway	2002/659	Not Controlled Action	Completed
Sale of Blocks 7 & 8 Section 66	2002/835	Not Controlled Action	Completed
Sale of Macquarie Hotel, 18 National Circuit	2002/836	Not Controlled Action	Completed
Sale of part of Blkl3/Sct19 ACT Water Police HQ	2003/1057	Not Controlled Action	Completed
Site Preparation of Inner Asset Protection Zone in three Canberra Nature Parks	2007/3531	Not Controlled Action	Completed
South Canberra Memorial Park	2019/8595	Not Controlled Action	Completed
Telecommunication Work, Block 2 Section 364, Fadden, ACT	2012/6411	Not Controlled Action	Completed
Transfer of Building R9 in Russell ACT to Dept of Defence for demolition	2021/8898	Not Controlled Action	Completed
Upgrade existing power-lines and installation of a new underground power-line	2010/5594	Not Controlled Action	Completed
upgrade mechanical services Reps & Senate Press Offices	2005/1933	Not Controlled Action	Completed
Upgrade of Captains Flat Road between Kings Highway and Wanna Wanna Road	2007/3401	Not Controlled Action	Completed
Wells Station Drive Extension Stages 1A & 1B	2007/3420	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action Not controlled action (particular manner)			
ActewAGL - upgrade to 132kv transmission line Theodore to Gilmore, ACT	2012/6443	Not Controlled Action (Particular Manner)	Post-Approval
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval
Canberra Centenary Trail Project	2012/6645	Not Controlled Action (Particular Manner)	Post-Approval
Capital Metro - Russell Extension Project, ACT	2015/7576	Not Controlled Action (Particular Manner)	Post-Approval
Carpark Access Road, Block 12, Section 22, Barton	2010/5548	Not Controlled Action (Particular Manner)	Post-Approval
Commonwealth Place Forecourt, Stage 2 Works	2005/2007	Not Controlled Action (Particular Manner)	Post-Approval
Construct, operate and decommission a 40MWac photovoltaic array plu associated coonections and ancillary infrastructure	2012/6431	Not Controlled Action (Particular Manner)	Post-Approval
Construct Bioscience Lab and assoc works	2005/2143	Not Controlled Action (Particular Manner)	Post-Approval
Construction and operation of new National Portrait Gallery	2005/2327	Not Controlled Action (Particular Manner)	Post-Approval
Construction of a four lane dual carriageway road from Monaro Hwy to Federal Hwy, Majura ACT	2009/5057	Not Controlled Action (Particular Manner)	Post-Approval
Construction of a New Office Building	2009/4871	Not Controlled Action (Particular Manner)	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
construction of shoulder and taxiway fillet	2001/307	Not Controlled Action (Particular Manner)	Post-Approval
Construct signalised bridge and underpass & remove trees	2008/4547	Not Controlled Action (Particular Manner)	Post-Approval
Defence Headquarters, Bungendore to HMAS Harman and Russell Defence Offices fibr	2007/3507	Not Controlled Action (Particular Manner)	Post-Approval
Duntroon Residential Development	2001/374	Not Controlled Action (Particular Manner)	Post-Approval
East Lake Electrical Infrastructure Relocation and Upgrade	2009/5253	Not Controlled Action (Particular Manner)	Post-Approval
Fyshwick East Industrial Estate, Block 2223, District of Jerrabomberra	2009/4850	Not Controlled Action (Particular Manner)	Post-Approval
Ground floor works, Edmund Barton Building, Canberra	2009/5038	Not Controlled Action (Particular Manner)	Post-Approval
Hume West Industrial Estate Development	2009/4766	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Majura Road Upgrade	2002/825	Not Controlled Action (Particular Manner)	Post-Approval
Refurbishment of former Patent Office & demolition of Robert Garran link office	2009/4777	Not Controlled Action (Particular Manner)	Post-Approval
Replacement of poplars at the National Library of Australia Forecourt, ACT	2021/8950	Not Controlled Action (Particular	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		Manner)	
Temporary display of bridge sections from HMAS Brisbane	2005/2379	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
City to Commonwealth Park Light Rail Project, ACT	2019/8490	Referral Decision	Completed
Construction of Majura Park Precinct Including Access Road, Warehouses, and Asso	2004/1425	Referral Decision	Completed
Construction of two 15m height memorials	2012/6269	Referral Decision	Completed
Demolition of the Robert Garran Office Annex Building	2009/5189	Referral Decision	Completed
Development of Symonston Stage 2	2012/6320	Referral Decision	Completed
Handrail installation, Treasury Building, Parkes Place West	2006/2832	Referral Decision	Completed
Re-development of forecourt to create the Humanities and Science Campus Square,	2006/2759	Referral Decision	Completed
Refurbishment works to the SE wing of Old Parliament House	2007/3778	Referral Decision	Completed
South Jerrabomberra urban development project	2010/5708	Referral Decision	Completed
Symonston Residential Estate Stage 2, Symonston, ACT	2014/7327	Referral Decision	Completed
West Block Hotel Adaptation, Queen Victoria Terrace	2021/9083	Referral Decision	Completed

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.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

APPENDIX B LISTED THREATENED AND MIGRATORY SPECIES KNOWN TO OCCUR WITHIN THE LOCALITY

Table B-1: Listed Threatened Species Known To Occur Within The Locality

Class	Scientific Name	Common Name	BC Act Status	EPBC Status	Records within search area*	Recorded within Investigation Area
Amphibia	*Litoria aurea*	Green and Golden Bell Frog	E1,P	V	1	
Amphibia	*Litoria raniformis*	Southern Bell Frog	E1,P	V	1	
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	1	
Aves	*Rostratula australis*	Australian Painted Snipe	E1,P	E	9	
Aves	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	1	
Aves	*Falco subniger*	Black Falcon	V,P		1	
Aves	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		1	
Aves	*Oxyura australis*	Blue-billed Duck	V,P		147	
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		86	
Aves	*Hydroprogne caspia*	Caspian Tern	P	J	4	
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P		54	4
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		231	1
Aves	*Petroica phoenicea*	Flame Robin	V,P		45	
Aves	*Apus pacificus*	Fork-tailed Swift	P	C,J,K	2	
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		98	
Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3		215	1
Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		6	
Aves	*Melanodryas cucullata cucullata*	Hooded Robin (south-eastern form)	V,P		19	
Aves	*Gallinago hardwickii*	Latham's Snipe	P	J,K	199	
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		190	
Aves	*Glossopsitta pusilla*	Little Lorikeet	V,P		1	
Aves	*Calidris subminuta*	Long-toed Stint	P	C,J,K	5	
Aves	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	10	
Aves	*Pachycephala olivacea*	Olive Whistler	V,P		2	
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	1	
Aves	*Calidris melanotos*	Pectoral Sandpiper	P	J,K	13	

Class	Scientific Name	Common Name	BC Act Status	EPBC Status	Records within search area*	Recorded within Investigation Area
Aves	*Ninox strenua*	Powerful Owl	V,P,3		1	
Aves	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	6	
Aves	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	5	
Aves	*Petroica boodang*	Scarlet Robin	V,P		153	2
Aves	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	78	
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		112	
Aves	*Circus assimilis*	Spotted Harrier	V,P		17	
Aves	*Polytelis swainsonii*	Superb Parrot	V,P,3	V	9	
Aves	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	12	
Aves	*Neophema pulchella*	Turquoise Parrot	V,P,3		2	
Aves	*Daphoenositta chrysoptera*	Varied Sittella	V,P		58	
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		40	
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		1	
Aves	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K	27	
Aves	*Chlidonias leucopterus*	White-winged Black Tern	P	C,J,K	1	
Flora	*Eucalyptus aggregata*	Black Gum	V	V	3	
Flora	*Rutidosis leptorrhynchoides*	Button Wrinklewort	E1	E	57	3
Flora	*Leucochrysum albicans var. tricolor*	Hoary Sunray		E	110	5
Flora	*Eucalyptus macarthurii*	Paddys River Box, Camden Woollybutt	E1	E	1	
Flora	*Pomaderris pallida*	Pale Pomaderris	V	V	10	
Flora	*Swainsona sericea*	Silky Swainson-pea	V		210	4
Flora	*Swainsona recta*	Small Purple-pea	E1	E	13	
Flora	*Caladenia tessellata*	Thick Lip Spider Orchid	E1,P,2	V	2	
Insecta	*Synemon plana*	Golden Sun Moth	E1	CE	213	3
Mammalia	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		3	
Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	43	
Mammalia	*Phascolarctos cinereus*	Koala	V,P	V	8	

Class	Scientific Name	Common Name	BC Act Status	EPBC Status	Records within search area*	Recorded within Investigation Area
Mammalia	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		18	
Mammalia	*Myotis macropus*	Southern Myotis	V,P		2	
Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	4	
Reptilia	*Tympanocryptis pinguicolla*	Grassland Earless Dragon	E1,P	E	3	
Reptilia	*Aprasia parapulchella*	Pink-tailed Legless Lizard	V,P	V	130	

** from the BioNet Atlas website [North: -35.89 West: 146.85 East: 147.13 South: -36.12] Report generated on 26/11/2021 3:15 PM*

Table B-2: Listed Migratory Species Known To Occur Within The Locality

Class	Scientific Name	Common Name	BC Act Status	EPBC Status	Records within search area*	Recorded within Investigation Area
Aves	Botaurus poiciloptilus	Long-toed Stint	P	C,J,K	5	
Aves	Rostratula australis	Marsh Sandpiper	P	C,J,K	10	
Aves	Limosa lapponica	Red-necked Stint	P	C,J,K	6	
Aves	Falco subniger	Sharp-tailed Sandpiper	P	C,J,K	78	
Aves	Melithreptus gularis gularis	White-winged Black Tern	P	C,J,K	1	
Aves	Hieraaetus morphnoides	Latham's Snipe	P	J,K	199	
Aves	Glossopsitta pusilla	Pectoral Sandpiper	P	J,K	13	
Aves	Chthonicola sagittata	White-throated Needletail	P	V,C,J,K	27	

** from the BioNet Atlas website [North: -35.89 West: 146.85 East: 147.13 South: -36.12]. Report generated on 26/11/2021 3:15 PM*

NSW Codes		Commonwealth Code	
Code	**Description**	**Code**	**Description**
P	Protected	C	CAMBA (Migratory Species)
V	Vulnerable	CD	Conservation Dependent
E1	Endangered	CE	Critically Endangered
E2	Endangered Population	E	Endangered
E4	Extinct	J	JAMBA (Migratory Species)
E4A	Critically Endangered Species	K	ROKAMBA (Migratory Species)
2	Category 2 sensitive species	KTP	Key Threatening Process
3	Category 3 sensitive species	V	Vulnerable
		X	Extinct
		XW	Extinct in the Wild

APPENDIX C THREATENED FAUNA SPECIES PROFILES

Golden Sun Moth

The Golden Sun Moth is a medium-sized, diurnal moth. The wingspan of females and males is approximately 3.1 cm and 3.4 cm respectively. The smaller wingspan of the female is unique within the *Synemon* genus. In the female, the upper-side of the forewing is dark grey with patterns of paler grey scales, and the hindwing is bright orange with black spots along the edges of the wings. The underside of both wings is white with small black spots along the edge of the wings. In the male, the upper-side of the forewing is dark brown with patterns of pale grey scales and the hindwing is bronze/brown with dark brown patches. The underside of both wings is pale grey with dark brown spots. Both males and females have clubbed antennae. The female has a long extensible ovipositor, which is an elongated organ extending from the posterior abdomen used to lay eggs. Adults are short-lived (one to four days) and do not feed - having no functional mouthparts; the larvae are thought to feed exclusively on the roots of wallaby grasses. (Department of the Environment, 2022), (DEC 2007).

The key threats to the Golden Sun Moth are:

- the loss and degradation of Wallaby Grass-dominated native temperate grasslands within the species historical range;
- the loss and degradation of open grassy woodlands where the ground layer is dominated by Wallaby Grass; and
- soil disturbance.

Native temperate grasslands and open grassy woodlands containing suitable Golden Sun Moth habitat are found within the Investigation Area, with sightings recorded within and adjacent to the Investigation Area.

Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males

Historically, the distribution of the Golden Sun Moth corresponded with native temperate grasslands across NSW, the ACT, Victoria and South Australia. These grasslands covered approximately 2,000,000 ha of south-eastern Australia. It is probable the moth occurred wherever there were high densities of wallaby grasses within these grasslands. Less than 1% of these temperate native grasslands remain. As a result, the remaining Golden Sun Moth populations are highly reduced and fragmented (Clarke & O'Dwyer 2000).

From post 1990 it is known to occur in 48 sites in NSW. The majority of the known sites are smaller than 5 ha. The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. (Department of the Environment, 2022).

Grassland Earless Dragon

The Grassland Earless Dragon has a maximum adult head and body length of around 7 cm, and a maximum overall length of 16 cm. It has three thin white lines running from the neck, along the body and down the tail. These lines divide an irregular pattern of light and dark brown or reddish cross-bands on the back. This patchy pattern gives it very good camouflage in its grassland habitat. This species has no external ear openings.

The only populations now known are in the ACT and adjacent NSW at Queanbeyan, and on the Monaro Basalt Plains between Cooma and south-west of Nimmitabel.

Pink-tailed Worm-Lizard

The Pink-tailed Worm-lizard grows to approximately 25cm in length. They are worm-like, with a dark-brown head and nape, gradually merging with the pale grey or grey-brown body. The tail is pink or reddish-brown towards the tip. Its snout and tail are both rounded. There are no external ear openings. The broad, non-forked tongue and the presence of small hind-limb flaps, distinguishes it from a juvenile snake.

The Pink-tailed Worm-lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region.

Black-chinned Honeyeater

The Black-chinned Honeyeater is the largest of its genus, reaching 17 cm in length. It has two subspecies, with *Melithreptus gularis gularis* occurring in NSW. They breed solitarily or co-operatively, with up to five or six adults, from June to December.

The Black-chinned Honeyeater typically inhabits upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Studies have shown that it tends to be present in the largest woodland patches in the landscape as the Black-chinned Honeyeater can have a home range of over large hectares.

Diamond Firetail

The Diamond Firetail is a large finch with a length 10 to 12 cm. It is endemic to south-eastern Australia, with a wide distribution in NSW. Diamond Firetails have been recorded in the recent field study nesting along Eight Mile Creek.

Inhabits grassy eucalypt woodlands and is often found in riparian areas, they feed exclusively on the ground. The Diamond Firetail breeds between August and January.

Dusky Woodswallow

The usky woodswallow is a medium-sized bird that is 16-19.5 cm in length. Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales. Most breeding activity occurs on the western slopes of the Great Dividing Range.

The Dusky Woodswallow inhabit dry, open eucalypt forests and woodlands, they are also found in farmland, usually at the edges of forest or woodland.

Flame Robin

The Flame Robin is a small robin that reaches 14 cm in length, it is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas in tall moist eucalypt forests and woodlands. In winter, many birds move to the inland slopes and plains.

Grey Falcon

A medium sized, pale falcon, smaller than the Peregrine Falcon though similar in shape and flight. The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin.

The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left.

Grey-headed Flying Fox

The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle. They are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia.

They inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Breeding begins in January, with young typically born around October or November.

Koala

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

They inhabit eucalypt woodlands and forests and feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.

Little Lorikeet

A small bright green parrot measuring approximately 18 cm in length. The Little Lorikeet s distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury.

Food sources are primarily from open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Nests in hollows in limbs or trunks of smooth barked Eucalypts. Nesting season occurs from May to September

Scarlet Robin

The Scarlet Robin is a small robin that reaches 13 cm in length. The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes.

Inhabits dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs and breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions. They mainly breed between the months of July and January.

Squirrel Glider

Squirrel Gliders have a body approximately 20cm in length and a tail that is 27cm. Squirrel Gliders are up to twice the size of Sugar Gliders, they nest in bowl-shaped, leaf lined nests in tree hollows.

The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.

Swift Parrot

A small parrot about 25 cm long. One of most distinctive features from a distance is its long (12 cm), thin tail, which is dark red. This distinguishes it lorikeets which can look similar.

Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes.

Turquoise Parrot

The male Turquoise Parrot is a highly distinctive bird with bright green upperparts and a turquoise-blue crown and face. Females and immature individuals are generally duller. The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range.

They live on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Nests in tree hollows, logs or posts, from August to December.

Table C-3: Listed Threatened Fauna Species Known to Occur within the Investigation Area

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
Amphibians												
Litoria aurea	Green and Golden Bell Frog	E1,P	V	Large frog ranging in size from approximately 45 mm to approximately 100 mm snout to vent length. With a gold or creamish white stripe running along the side, extending from the upper eyelids almost to the groin, with a narrow dark brown stripe beneath it, from nostril to eye. It also has blue or bluish-green colour on the inside of the thighs.	■ Alteration of drainage patterns and stormwater runoff. ■ Frog Chytrid Fungus, a fungal pathogen. ■ Predation by feral animals such as foxes. ■ Herbicides and other chemical weed-control measures. ■ Road mortality, where populations are already small due to other threats. ■ Loss of suitable breeding habitat through alteration by infilling and destruction of wetlands.Small population size. ■ Drying of breeding and refuge habitat as a result of increased temperatures and more frequent droughts, potentially leading to wetlands becoming hypersaline. ■ Lack of landscape connectivity leading to isolation of small populations.	✓						
Litoria raniformis	Southern Bell frog	E1	V	One of the largest frog species in Australia, these animals may reach up to 104 mm in length, with females usually larger than males. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. The species has been known to breed anytime from early spring through to late summer/early autumn (Sept to April) following a rise in water levels.	■ Removal of ground cover, fallen timber, leaf litter, etc as a result of either fire, direct clearing, overgrazing, trampling, etc. ■ Lack of appropriate flooding regime i.e. flooding at the wrong time of the year, infrequent flooding e.g. once every 5 or 10 years, waterbodies not lasting long enough for tadpoles to develop, etc. ■ Alteration to natural flooding regimes from irrigation and river regulation, which may either divert water away from previously flooded wetlands or cause some areas to become permanently flooded and no longer receive rising water levels to trigger breeding. ■ Predation on eggs and tadpoles from exotic fish species such as carp, goldfish and mosquito fish. ■ Possible introduction of amphibian diseases such as Chytrid fungus, which is a waterborne pathogen. ■ Introduction of chemicals (pesticides, defoliants, etc) either into waterbodies or directly onto animals. ■ Loss of aquatic and/or terrestrial habitat through draining of waterbodies or clearing for agricultural development. ■ Degradation of aquatic and/or terrestrial habitat from pollution or salinisation of waterbodies, removal of shelter sources, removal of aquatic vegetation (e.g. from farm dams), disturbance to waterside vegetation and decreased water quality from stock and pest animals (e.g. pigs rooting up vegetation and muddying up the water).	✓				✓	✓	

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
Insects												
Synemon plana	Golden Sun Moth	E	V	The Golden Sun Moth is a medium-sizeddiurnalmoth. Females have a wing-span of 31 mm; the male's wingspan is 34 mm. The female has a reduced hind-wing and is a very poor flyer. The female's upperside of the fore-wing is dark grey, patterned with paler grey, and the hindwing is bright orange with black spots near the edge. The undersides of both wings is white with small black spots near the edges. The male's upperside of the fore-wing is dark brown, patterned with pale grey, and the hind-wing is bronzy-brown with dark brown patches. The undersides of both wings is pale grey with dark brown spots. Both males and females have clubbed antennae. Functional mouthparts are lacking in both sexes	■ Loss and degradation of habitat by urban, residential, infrastructure and agricultural development.Modifications to agricultural practices (e.g. fertiliser application, ploughing and inappropriate grazing). ■ nvasion of habitat by weeds, particularly exotic pasture species (e.g. Phalaris aquatica, Paspalum dilatatum and Avena spp.). ■ Colonisation of wallaby grass grassland habitat by dense Kangaroo Grass tussocks. ■ Fragmentation and small size of remnants.						✓	✓
Raptors												
Falco subniger	Black Falcon	V,P		Large (45-55 cm in length), very dark falcon with pale grey cere, eye-rings and feet. It is uniformly dark brown to sooty black, with a pale throat and an indistinct black streak below each eye. Some individuals have faint, narrow barring under the wings and tail.	■ Loss of large old trees from the landscape, a resource that is critical for nesting and hunting. ■ Potential for secondary poisoning via prey such as rabbits. ■ Disturbance to nesting activity from over-abundant ravens and cockatoos.			✓		✓	✓	
Falco hypoleucos	Grey Falcon	E1,E2		The Grey Falcon is a medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. It is smaller than the Peregrine Falcon but similar in shape and flight, although with longer wings. The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	■ Grazing and clearing of arid and semi-arid zone rangelands. ■ Secondary poisoning through mouse and locust control programs. ■ Taking of eggs and young for collections and falconry. ■ Insufficient understanding of distribution.	✓				✓	✓	
Hieraaetus morphnoides	Little Eagle	V,P		The Little Eagle is a medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive underwing pattern of rufous leading edge, pale ‘M’ marking and black-barred wingtips.	■ Secondary poisoning from rabbit baiting ■ Clearing and degradation of foraging and breeding habitat						✓	
Circus assimilis	Spotted Harrier	V,P		The Spotted Harrier is a medium-sized, slender bird of prey having an owl-like facial ruff that creates the appearance of a short, broad head, and long bare yellow legs. The upperparts are blue-grey with dark barring, and the wingtips are black. The face, innerwing patch, and underparts are chestnut. The long tail is boldly banded, with a wedge-shaped tip.	■ Loss of foraging and breeding habitat, particularly that which affects prey densities ■ Loss of mature trees from rural landscapes						✓	✓
Birds												
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	The Australasian Bittern is a large, stocky bird, reaching up to 75 cm in length. It has a long, thick neck and a straight, brownish-yellow bill. Its upper surface is mottled brown and its undersurface is buff, with dark brown stripes, except for a pale throat. The eyes are yellow and there is a pale eyebrow. The feet and legs are pale green.	■ Drainage of wetlands and ponds and alteration of natural flow regimes (including accelerated erosion and siltation). ■ Reduced water quality due to siltation, pollution and salinity. ■ Predation by foxes, pigs and cats. ■ nappropriate grazing and associated frequent burning of wetland areas. ■ Loss and degradation of wetland habitat, including artificial wetland habitat in rice growing areas, due to changes in water management and cropping practises.	✓						

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
Rostratula australis	Australian Painted Snipe	E1,P	E	The Australian Painted Snipe is small freshwater wader, with a long bill that droops slightly at the tip. The female has a chestnut-black hood with a bold white eye-patch and a cream stripe along the middle of the crown. The back and wings are patterned bronzy-greenish-grey with a few cream streaks and the underparts are white. The male is slightly smaller and has greyer, less contrasting patterns, but also has large cream spots on the wings.	■ Drainage of breeding sites in wetlands. ■ Reduced water quality from siltation and pollution. ■ Predation by foxes and feral cats. ■ Use of herbicides, insecticides and other chemicals near wetlands. ■ Grazing and associated frequent burning of wetlands. ■ Exotic weeds and invasive native plants degrading wetland habitat. ■ Poor understanding of the species' breeding ecology.			✓				
Limosa lapponica	Bar-tailed Godwit	P	C,J,K	large sandpiper reaching 44 cm long, with a wingspan of 63 - 75 cm. It has a distinctive long, straight bill that is pink with a black tip. The wing has a white wing-bar across the dark flight feathers, and white underwing coverts. There is a sharp demarcation between the white rump and the black tail. Legs are greenish-black, long and trailing.	■ Hydrological changes to inland lakes and estuaries may modify or remove important areas of suitable habitat for individuals remaining in Australia over winter.Human disturbance at roosting and foraging sites ■ Habitat loss due to development. ■ Weed invasion of key habitat.	✓	✓					
Melithreptus gularis gularis	Black-chinned Honeyeater	V		The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW. The Black-chinned Honeyeater is the largest of its genus, reaching 17 cm in length. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts.	■ Clearing of remnant open forest and woodland habitat. ■ Poor regeneration of open forest and woodland habitats because of intense grazing. ■ May be excluded from smaller remnants by aggressive species such as the Noisy Miner (Manorina melanocephala). ■ Fragmentation of woodland habitat. ■ Infestation by invasive weeds. ■ Inappropriate fire regimes. ■ Climate change and reduction in resources due to drought.					✓	✓	
Oxyura australis	Blue-billed Duck	V,P		The Blue-billed Duck is one of only two Australian species of stiff-tailed ducks - diving ducks with spine-like tail-feathers. It is a small and compact duck, with a length of 40 cm. The male's head and neck are glossy black, and the back and wings are a rich, chestnut to dark-brown.	■ Destruction or degradation of breeding habitat through drainage, flood mitigation works and ground water extractionFrequent burning which reduces the floristic diversity and simpifies the structure of the breeding and foraging habitatRegulation of river flows and water harvesting schemes can poses a major threat to flooding regimes of wetland breeding areas.ncreased salinity can result in degradation and loss of tall dense wetland vegetation used for nesting.	✓						
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		The Brown Treecreeper, Australia's largest treecreeper, is a grey-brown bird with black streaking on the lower breast and belly and black bars on the undertail. Pale buff bands across the flight feathers are obvious in flight. The face is pale, with a dark line through the eye, and a dark crown.	■ Historical loss of woodland, forest and mallee habitats as a result of agriculture, forestry, mining and residential development. ■ Fragmentation of woodland and forest remnants which isolates populations and causes local extinctions. ■ Ongoing degradation of habitat, particularly the loss of tree hollows and fallen timber from firewood collection and overgrazing. ■ Lack of regeneration of eucalypt overstorey in woodland due to overgrazing and too-frequent fires. ■ Loss of ground litter from compaction and overgrazing. ■ Loss of understorey habitat. ■ Competition from invasive weeds.						✓	
Stagonopleura guttata	Diamond Firetail	V,P		The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Cental and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter	■ Clearing and fragmentation of woodland, open forest, grassland and mallee habitat for agriculture and residential development, and firewood collection. ■ Poor regeneration of open forest and woodland habitats. ■ Invasion of weeds, resulting in the loss of important food plants.					✓	✓	

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
				Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River.	■ Modification and destruction of ground- and shrub layers within habitat through: removal of native plants, litter and fallen timber; introduction of exotic pasture grasses; heavy grazing and compaction by stock; and frequent fire. ■ Predation of eggs and nestlings by increased populations of native predators such as the Pied Currawong Strepera graculina. ■ Risk of local extinction due to small, isolated populations. ■ Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.							
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		The dusky woodswallow is a medium-sized bird (16-19.5 cm, 35 g), with a longish tail. Mostly dark grey-brown, merging to blackish on the tail, with a small black-brown mask. Bluish bill with a black tip. Upper-wings are a dark blue-grey with a white leading edge. Conspicuous white corners on the tail. In flight the dark grey-brown under-body contrasts with the whitish under-wing.	■ Historical and ongoing loss of woodlands and dry open sclerophyll forests, including mallee because of agriculture, mining, forestry and residential development. ■ Reduction in area, and increased isolation of patches of remnant woodland and open forest. ■ Ongoing degradation of habitat through the loss of dead timber, removal of coarse woody debris and other disturbances of the ground layer. ■ Reduction in the availability of food resources due to overgrazing and loss of leaf litter.						✓	
Petroica phoenicea	Flame Robin	V,P		The Flame Robin is a small Australian robin that reaches 14 cm in length. The male has a dark grey head and upperparts, a small white forehead patch, and white wing stripes and white tail-edges. The male has a bright orange-red throat, breast and upper-belly. The lower belly is white. The female is brown, darker above, and has a whitish throat and lower belly.	■ Clearing and degradation of breeding and wintering habitats. ■ Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris from depletion by grazing, firewood collection and ‘tidying up’ of rough pasture. ■ Habitat for the Scarlet Robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances.Isolation of patches of habitat, particularly where these patches are smaller than 10 haReduction of size of remnant patches.						✓	
freStictonetta naevosa	Freckled Duck	V,P		The Freckled Duck is a dark, greyish-brown bird with a large head that is peaked at the rear, and a distinctive narrow, slightly up-turned bill. Their dark brownish-black plumage is evenly freckled all over with white or buff. During the winter-spring breeding season, the male’s bill becomes crimson at the base.	■ Draining and clearing of wetland and swamp habitat. ■ Changes to natural river flows and flood patterns as a result of dams, weirs and irrigation. ■ Grazing and trampling of wetland habitat by grazing stock or vertebrate pests.							
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		Primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly. They range in length from 32 to 37 cm, with a wingspan of 62 to 76 cm.	■ Loss of key breeding and foraging habitat from intensive wildfire events and inappropriate hazard reduction burns ■ Loss and degradation of breeding and foraging habitat from rural and urban development ■ Climate change impacts to habitat suitability and distributionnfestation of habitat by invasive weeds.							
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina	■ Reduction of suitable habitat through clearing for development. ■ Decline of hollow bearing trees over time due to land management activities. ■ Excessively frequent fire which eliminates sheoaks from areas, prevents the development of mature sheoak stands, and destroys nest trees. ■ Firewood collection resulting in loss of hollow-bearing trees, reduced recruitment of hollow-bearing trees, and disturbance of breeding attempts. ■ Decline in extent and productivity of sheoak foraging habitat due to feral herbivores.							

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
					■ Reduced access to surface water in close proximity to foraging and nesting habitat. ■ Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat. ■ Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts. ■ Decline in extent and productivity of sheoak foraging habitat caused by moisture stress due to climate change. ■ Forestry activity resulting in loss of hollow-bearing trees, reduced recruitment of hollow-bearing trees, degradation of foraging habitat, and disturbance of breeding attempts. ■ Degradation of foraging habitat and reduced regeneration of sheoak stands due to grazing by domestic stock. ■ Loss of foraging habitat due to slashing/underscrubbing. ■ Change in the spatial and temporal distribution of resources due to global warming. ■ Illegal bird smuggling and egg-collecting. ■ Habitat infestation by weeds such as African boxthorn, Gazania, buffel grass and other invasive grasses.						
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V,P		The Hooded Robin is a large Australian robin reaching 17 cm in length. The male is strikingly marked in black and white, with a bold black hood extending down a white breast. The back is black with distinct white shoulder and wing-bar. The tail is black, with prominent white side-panels.	■ Clearing of woodlands, resulting in loss and fragmentation of habitat. ■ Modification and destruction of ground habitat through heavy grazing and compaction by stock, removal of litter and fallen timber, introduction of exotic pasture grasses and frequent fire.						✓	
Glossopsitta pusilla	Little Lorikeet	V		The Little Lorikeet is a small (16-19 cm; 40 g) bright green parrot, with a red face surrounding its black bill and extending to the eye. The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pair.	■ Given that large old Eucalyptus trees on fertile soils produce more nectar, the extensive clearing of woodlands for agriculture has significantly decreased food for the lorikeet. ■ The loss of old hollow bearing trees has reduced nest sites, and increased competition with other native and exotic species. ■ Infestation of habitat by invasive weeds. ■ Inappropriate fire regimes.					✓	✓	
Pachycephala olivacea	Olive Whistler	V,P		The Olive Whistler is a small, stocky bird with a large head and strong sharp bill. It grows up to 22 cm long, including the 10 cm tail. It has a dark grey head, olive-brown upperparts, a grey throat and buff-brown underparts.	■ Clearing and fragmentation of habitat. ■ Predation by foxes and cats. ■ Loss of understorey and midstorey habitat via grazing or other disturbances. ■ Climate change impacts including reduction in resources due to drought.						✓	
Grantiella picta	Painted Honeyeater	V,P	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests	■ Clearing of woodlands and open forests. ■ Removal of large, old trees with heavy mistletoe infestations. ■ Degradation of open forest and woodland remnants, including thinning of trees bearing mistletoe. ■ Heavy grazing of grassy woodlands. ■ Habitat infestation by weeds such as African boxthorn, Gazania and invasive grasses. ■ Inappropriate fire regimes. ■ Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners. ■ Degradation and simplification of habitat due to overgrazing	✓				✓	✓	

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
Ninox strenua	Powerful Owl	V,P,3		The Powerful Owl is the largest owl in Australasia. It is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings.	■ Historical loss and fragmentation of suitable forest and woodland habitat from land clearing for residential and agricultural development.Loss of hollow-bearing trees reduces the availability of suitable nest sites and prey habitat.Can be extremely sensitive to disturbance around the nest site, particularly during pre-laying, laying and downy chick stages. Disturbance during the breeding period may affect breeding success.Road kills.						✓	
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wings-pan of 30 cm. Its head, neck, throat, upper breast and bill are black and the back and lower breast are pale lemon in colour with a black scalloped pattern. Its flight and tail feathers are edged with bright yellow. There is a characteristic patch of dark pink or cream-coloured facial-skin around the eye.	■ Historical loss, fragmentation and degradation of habitat from clearing for agricultural and residential development, particularly fertile Yellow Box-White Box-Blakely's Red Gum Woodlands. ■ Continuing loss of key habitat tree species and remnant woodlands from major developmentsand residential developments.Key habitats continue to degrade from lack of recruitment of key forage species and loss of paddock trees and small remnants increasingly fragmenting the available habitat. ■ Suppression of natural regeneration of overstorey tree species and shrub species from overgrazing. ■ Disturbance at nesting sites leading to reduced nesting success by recreational users. ■ Loss of key foraging resources as a result of inappropriate fire regimes.						✓	
Petroica boodang	Scarlet Robin	V,P		The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	■ Historical habitat clearing and degradation. ■ Habitat modification due to overgrazing. ■ Reduction of size of remnant patches. ■ Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter. ■ Reduction in native ground cover from invasion by weeds including exotic grasses and woody weeds. ■ Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris, from depletion by grazing, firewood collection and 'tidying up' of rough pasture. ■ Isolation of patches of habitat, particularly where these patches are smaller than 10 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing. ■ Habitat for the scarlet robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances.						✓	
Chthonicola sagittata	Speckled Warbler	V,P		The Speckled Warbler is a small well-camouflaged very heavily streaked ground-dwelling bird related to the scrubwrens, reaching a length of 13cm. The back, wings and tail are grey-brown, with soft dark streaks. The black crown is distinctively streaked with buff. The underparts are pale and particularly heavily streaked. The face is off-white with streaking on the ear coverts. The male has a black upper margin to the brow, while the female has a rufous upper edge to the brow. The dark tail is held horizontally, although in flight the spread tail shows a wide black band above white tips of the outer tail feathers.	■ Due to the fragmented nature of the populations and their small size the species is susceptible to catastrophic events and localised extinction. ■ Clearance of remnant grassy woodland habitat for paddock management reasons and for firewood. ■ Poor regeneration of grassy woodland habitats. ■ Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire. ■ Habitat is lost and further fragmented as land is being cleared for residential and agricultural developments. In	✓				✓	✓	

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
					particular, nest predation increases significantly, to nest failure rates of over 80%, in isolated fragments. ■ Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats. ■ Infestation of habitat by invasive weeds. ■ Climate change impacts including reduction in resources due to drought.							
Polytelis swainsonii	Superb Parrot	V,P,3	V	The Superb Parrot is found throughout eastern inland NSW. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	■ Loss of living and dead hollow-bearing trees. ■ Loss of breeding and foraging habitat. ■ Poor regeneration of nesting trees and food resources. ■ Loss of habitat from private native forestry activities. ■ Loss of habitat trees from fire damage during hazard reduction and stubble burns. ■ Lack of knowledge about the breeding ecology and breeding success of this species.					✓	✓	
Lathamus discolor	Swift Parrot	E1	CE	The Swift Parrot is endemic to south-eastern Australia, breeding only in Tasmania during spring and summer. It migrates to mainland Australia in the autumn and winter months. Within the Hunter and Mid Coast regions, Swift Parrots have been found to forage regularly in Spotted Gum and Swamp Mahogany forests. Swift Parrots migrate the longest distance of any parrot in the world. The Swift Parrot is listed as endangered in NSW and critically endangered under Commonwealth legislation. In 2015, it was listed under the International Union for Conservation of Nature (IUCN) as critically endangered as research suggested it could become extinct by 2031.	■ Habitat loss and degradation, including the loss of preferred tree species ■ Lack of regeneration or seedlings of feed trees ■ Changes in available habitat and range due to climate change ■ Feral animals including cats and foxes ■ Collision mortality with vehicles and houses (windows) ■ Weed impacts on native vegetation					✓	✓	
Neophema pulchella	Turquoise Parrot	V,P,3		The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. The male Turquoise Parrot is a highly distinctive bird with bright green upperparts and a turquoise-blue crown and face. Females and immature individuals are generally duller.	■ Clearing of grassy-woodland and open forest habitat. ■ Loss of hollow-bearing trees and critical habitat feature degradation. ■ Degradation of habitat through heavy grazing, firewood collection and establishment of exotic pastures. ■ Inappropriate fire regimes.						✓	
Daphoenositta chrysoptera	Varied Sittella	V,P		The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.	■ Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement. ■ Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection. ■ Infestation of habitat by invasive weeds. ■ Inappropriate fire regimes. ■ Climate change impacts including reduction in resources due to drought. ■ Overgrazing by stock impacting on leaf litter and shrub layer.	✓		✓		✓	✓	

Scientific Name	Common Name	Status		Description (source: OEH Species Profiles)	Key Threats to be considered in the Master planning process	Key Habitat Type*						
		BC Act	EPBC Act			Freshwater Wetland	Estuarine	Wallum Swamps	Coastal Heath	Swamp Forest	Forest	Grassland
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		The White-bellied Sea-Eagle is a large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey, and the undersides are greyish-black with a smaller area of white along the leading edge. The tail is grey at the base, and has a white tip. The large, hooked bill is grey with a darker tip, and the eye is dark brown. The legs and feet are cream-white, with long black talons.	■ Land clearing reduces the amount of suitable habitat available and this can force birds to nest in sub-optimal habitats where their breeding success is greatly reduced ■ The White-bellied Sea-eagle is sensitive to disturbance when nesting, especially during the early stages of the breeding season, and may desert nests and young if confronted by humans or exposed to human activity.	✓						
Epthianura albifrons	White-fronted Chat	V,P		The White-fronted Chat is an endemic Australian passerine bird, 12 cm in length and weighing approximately 13 g. It has a short slender bill, long spindly legs, a short square-tipped tail and rounded wings.	■ Reduction in habitat size and quality. ■ Human disturbance (particularly in urban areas) and elevated nest-predation levels. ■ Much of their natural habitat is prone to alteration due to modification of river flows and floodplains.	✓						✓
Mammals												
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		The Eastern False Pipistrelle is relatively large with a head-body length of about 65 mm. It weighs up to 28 grams. It is dark to reddish-brown above and paler grey on its underside. It has long slender ears set well back on the head and some sparse hair on the nose.	■ Disturbance to winter roosting and breeding sites. ■ Loss of roosting habitat, primarily hollow-bearing eucalypts. ■ Loss and fragmentation of foraging habitat, particularly extensive areas of continuous forest and areas of high productivity.						✓	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young.	■ Loss of roosting and foraging sites. ■ Electrocution on powerlines, entanglement in netting and on barbed-wire. ■ Heat stress.					✓	✓	
Phascolarctos cinereus	Koala	V,P	V	The Koala has a fragmented distribution throughout eastern Australia. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	■ Loss, modification and fragmentation of habitat ■ Vehicle strike ■ Predation by roaming or domestic dogs ■ Intense prescribed burns or wildfires that scorch or burn the tree canopy ■ Koala disease ■ Heat stress through drought and heatwaves ■ Human-induced climate change					✓	✓	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	The Spotted-tailed Quoll is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown fur above, with irregular white spots on the back and tail, and a pale belly.	■ Loss, fragmentation and degradation of habitat. ■ Roadkill					✓	✓	
Microchirpoteran Bats												
Myotis macropus	Southern Myotis	V							✓	✓	✓	

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Senegal
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's Brisbane Office
Level 9, 260 Queen Street
Brisbane QLD 4000

GPO Box 2892
Brisbane QLD 4000

T: +61 7 3839 8393
F: +61 7 3839 8381

www.erm.com

The business of sustainability

ERM