Kerr's Creek Wind Farm

Preliminary Biodiversity Assessment

6 September 2023

Project No.: 0661059

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ERM

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6 September 2023

Kerr's Creek Wind Farm

Preliminary Biodiversity Assessment

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Acronyms and Abbreviations

Name	Description
ALA	Atlas of Living Australia
AOBV	Areas of Outstanding Biodiversity Value
BAM	Biodiversity Assessment Method
BAM-C	BAM Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOM	Bureau of Meteorology (Cth)
BOS	Biodiversity Offsets Scheme
BOSET	Biodiversity Offsets Scheme Entry Threshold
CEEC	Critically endangered ecological community
Cth	Commonwealth
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth)
DCS SS	NSW Spatial Services
DPE	Department of Planning and Environment (NSW)
DPI	Department of Primary Industries (NSW)
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERM	Environmental Resources Management Australia Pty Ltd.
GDE	Groundwater Dependent Ecosystem
Ha	hectares
IBRA	Interim Biographic Regionalisation of Australia
km	kilometres
kV	kilovolt
LGA	Local Government Area
LLS Act	NSW *Local Land Services Act 2013*
MNES	Matters of National Environmental Significance
NSW	New South Wales
NVR Map	Transitional Native Vegetation Regulatory Map
PCT	Plant Community Type
PMST	Protected Matters Search Tool
Preliminary Project boundary	The term preliminary Project boundary refers to an earlier iteration of the Project Area that was assessed for biodiversity values and was subsequently updated by the proponent.
Project Area	The term Project Area refers to all lots in which the Project may be located.
SAII	Serious and irreversible impact
SAT	Spot Assessment Technique
SEARs	Secretary's Environmental Assessment Requirements
SPRAT	Species Profile and Threats Database

Name	Description
SRD SEPP	State and Regional Development State Environmental Planning Policy 2011
SSD	State Significant Development
SSI	State Significant Infrastructure
SVTM	NSW State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened ecological community
The Project	In this report, the Project refers to the proposal by the proponent (RES) to construct and operate Kerr's Creek Wind Farm.
The Proponent	RES Australia Pty Ltd.
VIS	Vegetation Information System
WoNS	Weeds of National Significance

1. INTRODUCTION

RES (the Applicant) proposes to construct and operate the Kerr's Creek Wind Farm (the Project), a renewable energy development located within the New South Wales (NSW) Central-West Orana Renewable Energy Zone.

The Project comprises approximately 63 wind turbine generators and associated infrastructure such as access tracks, electrical reticulation/cabling, substation and an overhead transmission line to connect the Project to an existing 330 kilovolt (kV) transmission line. The Project layout is shown in Figure 1-1. The layout and disturbance footprint will be further refined and assessed during the preparation of the EIS and Biodiversity Development Assessment Report (BDAR).

A body of site knowledge is being established through desktop research and field investigation (i.e., surveys performed by NGH (2020), Nature Advisory (2020 and 2021) and ERM (2023). This Preliminary Biodiversity Assessment is based on the results of these investigations and desktop searches with ongoing investigation to be performed for relevant matters in accordance with the Biodiversity Assessment Method (BAM) and associated survey guidelines.

This Preliminary Biodiversity Assessment will be appended to the Kerr's Creek Wind Farm Scoping Report to support an application to the Secretary of the NSW Department of Planning and Environment (DPE) for the Secretary's Environmental Assessment Requirements (SEARs). The SEARs will guide the preparation of an Environmental Impact Statement (EIS) for the Project as part of a broader Development Application (DA). The information gained from all survey efforts would support the development of a BDAR using the BAM.

1.1 Project Overview

1.1.1 Location

The Project is within the Dubbo Regional Council Local Government Area (LGA) of NSW and is located between Mullions Creek and Euchareena, which is approximately 20 kilometres (km) north of Orange and 20 km north-east of Molong. The Project Area is accessed via Burrendong Way and Shepherds Creek Road, the Project Area.

1.1.2 Description

The key components of the Project include:

- Approximately 63 (3 blade) wind turbine generators with a total height (tip height) of approximately 280 m;
- Electrical connections between the proposed wind turbines consisting of a combination of underground cables and overhead power lines;
- One new substation and a transmission connection to connect the proposed wind farm to the electricity network;
- Other associated infrastructure including internal access roads and tracks, operation and maintenance buildings and construction facilities (all facilities subject to further detailed design);
- Temporary on-site concrete batching plant during the construction phase;
- Targeted road network upgrades to facilitate delivery of wind turbine components to the site as required; and
- Borrow pit to supply gravel for construction (subject to further assessment on suitability).

The new substation locations are planned near the centre of the Project Area due to its proximity to the proposed turbines and the point of connection into the grid is expected to be via the existing Wellington to Mount Piper 330kV transmission line.

The Project construction phase would be approximately 28 months with the peak construction period expected in months 7 – 14.

1.1.2.1 Permanent Footprint

The permanent footprint has been defined as the area in which Project infrastructure will occur and does not include any additional area that may be disturbed because of construction of the infrastructure. The permanent footprint has been defined using the following assumptions and is subject to change during detailed design in the EIS:

- Wind turbine generators and their handstands occupy 0.29 ha each;
- Road width of 6 m with an additional 2 m on either side for drainage batters;
- The overhead transmission line will have an easement of 30 m on either side; and
- Other infrastructure will require a 10 m buffer to accommodate asset protection zones.

1.1.2.2 Construction Disturbance Footprint

The construction disturbance footprint has been defined as the area that may be subject to disturbance during construction of Project infrastructure. This is the area that will be assessed to inform the BDAR and allows for micro-siting of Project infrastructure within this footprint. Note that the disturbance footprint does not represent the area that will be disturbed during construction of the Project. This area will be much smaller. Residual impacts associated with the final design will be substantially less. Conservatively, the potential disturbance footprint incorporates a 100 m buffer on either side of all Project infrastructure (i.e., the permanent footprint).

1.1.3 Tenure

The Project Area encompasses nine (9) freehold properties covering approximately 8,918 hectares (ha). These properties are primarily utilised for sheep and cattle grazing. The preliminary layout for the Project will be subject to further review and refinement as the economic, environmental and social impact assessment progresses.

1.2 Objectives

The objective of this Preliminary Biodiversity Assessment is to describe the biodiversity constraints that are known or that may occur within the Project Area. The results of this assessment will build upon desktop reviews, field surveys completed by NGH, Nature Advisory and ERM, and the preliminary reporting completed by NGH and Nature Advisory in 2020 and 2021 (NGH, 2021; NGH, 2021b). This assessment allows for the identification of significant biodiversity values associated with the Project Area and the provision of preliminary recommendations in terms of avoidance and mitigation measures to minimise biodiversity loss and/or the requirement for additional assessment of biodiversity values.

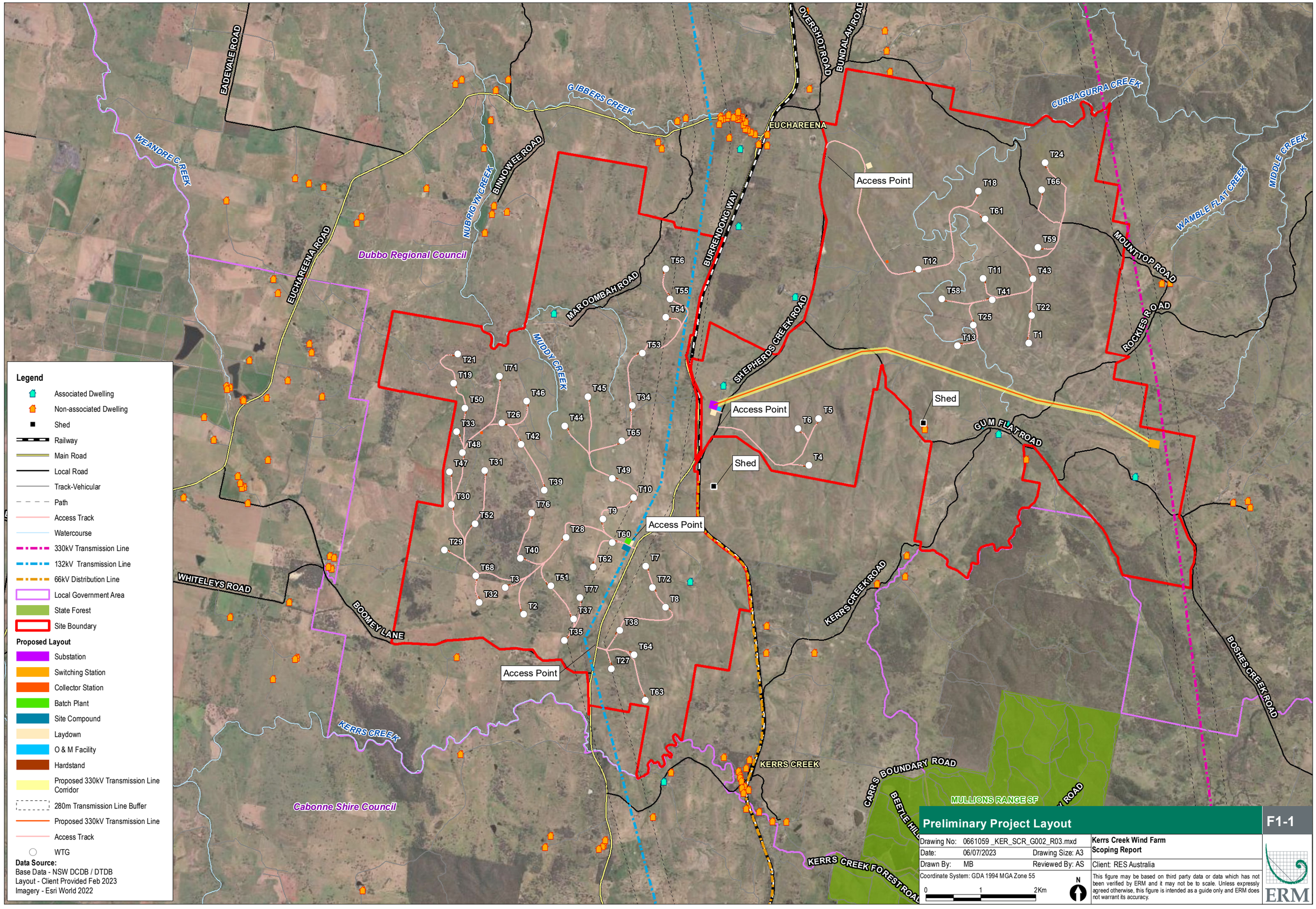
The biodiversity values that were the focus of this preliminary assessment include:

- Native species and communities with a particular focus on those listed as migratory, vulnerable, endangered or critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Biodiversity Conservation Act 2016* (BC Act);
- Fauna species susceptible to turbine strikes (e.g., raptors and bats); and
- Important habitat components (e.g., hollow-bearing trees) and landscape features (e.g., fauna corridors).

The preliminary assessment includes:

- Identification and mapping of threatened flora and fauna species records, important habitat components and landscape features, and fauna species susceptible to turbine strikes;
- Preliminary mapping of the type of native plant community types (PCTs) and threatened ecological communities (TECs) within the Project Area;
- Identification of the requirement of a referral to the Commonwealth for potential significant impact to Matters of National Environmental Significance (MNES) under the EPBC Act; and
- A description of outcomes and recommendations to support the ongoing project design and assessment process.

This preliminary biodiversity assessment will be presented as an Appendix to the Scoping Report to facilitate the issuance of the SEARs, a critical requirement prior to the development of the EIS and the associated BDAR.


EADEVALE ROAD
WEANDRE CREEK
GIBBERS CREEK
NUBRIGYN CREEK
BINNOWEE ROAD
EUCHAREENA ROAD
Dubbo Regional Council
EUCHAREENA
OVERSHOT ROAD
BUNDALAH ROAD
BURRENDONG WAY
MAROOMBAH ROAD
MUDDY CREEK
SHEPHERDS CREEK ROAD
CURRAGURRA CREEK
WAMBLE FLAT CREEK
MIDDLE CREEK
MOUNTTOP ROAD
ROCKIES R.O.AD
GUM FLAT ROAD
KERRS CREEK ROAD
WHITELEYS ROAD
BOOMEY LANE
KERRS CREEK
CARRS BOUNDARY ROAD
BEETLE HILL ROAD
KERRS CREEK FOREST ROAD
BOSHES CREEK ROAD
MULLIONS RANGE SF
Cabonne Shire Council
Access Point
Access Point
Access Point
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Shed
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Legend
Associated Dwelling
Non-associated Dwelling
Shed
Railway
Main Road
Local Road
Track-Vehicular
Path
Access Track
Watercourse
330kV Transmission Line
132kV Transmission Line
66kV Distribution Line
Local Government Area
State Forest
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
280m Transmission Line Buffer
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Base Data - NSW DCDB / DTDB
Layout - Client Provided Feb 2023
Imagery - Esri World 2022
Preliminary Project Layout
F1-1
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Date: 06/07/2023
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Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
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1
2Km
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Kerrs Creek Wind Farm
Scoping Report
Client: RES Australia
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

2. LEGISLATION

The Project is declared as State Significant Development (SSD) under Division 4.7, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). This requires consideration of the *Biodiversity Conservation Act 2016* (BC Act) (s1.7 of the EP&A Act), with s7.13 of the BC Act mandating the preparation of a Biodiversity Development Assessment Report (BDAR) unless otherwise dismissed through application of a BDAR Waiver application.

An application for a BDAR Waiver is not sought for the Project as the Project is likely to have a significant direct, indirect and prescribed impacts on biodiversity values.

A description of the relevant legislative context relating to biodiversity is provided in Table 2-1.

Table 2-1 Legislation Applicable to the Project

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 MNES as assessed in accordance with the EPBC Significant Impact Guidelines 1.1 (Department of the Environment, 2013). The EPBC Act is administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) 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 NSW. The ecological desktop review and field studies undertaken to date have determined the presence of MNES within the Project Area. A Significant Impact Assessment has been undertaken for MNES known or likely to be present (Appendix E) and will be further assessed within the EIS. The Project will need to be referred to the Commonwealth Minister for the Environment. The NSW Government and Australian Government have established the NSW Assessment Bilateral Agreement (the Agreement), streamlining the assessment process for major projects that require both NSW and Australian Government environmental approvals. Under the agreement, the Australian Government has formally endorsed the NSW Biodiversity Offsets Scheme (NSW BOS), allowing any proponent who needs an EPBC Act approval to use the NSW BOS to assess and meet their biodiversity offset requirements. The Australian Government remains the decision-maker for the EPBC Act approval, considering the assessment report prepared by NSW's Department of Planning and Environment.
NSW Statutory Legislation and Guidelines
Biodiversity Conservation Act 2016 (BC Act)
With reference to the Project, the BC Act establishes the following: ■ A list of threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TECs); ■ The declaration of Areas of Outstanding Biodiversity Values; and ■ The Biodiversity Offsets Scheme (BOS) including the 'no net loss' standard. This institutes a biodiversity offset requirement for development that is deemed to have a significant impact on biodiversity values (i.e., retirement of biodiversity credits). The type and number of biodiversity credits is determined by applying the Biodiversity Assessment Metho 2020 (BAM).

Commonwealth Legislation

A Biodiversity Values Map and Biodiversity Offsets Scheme Entry Threshold (BOSET) has identified the Project Area to contain Biodiversity Values requiring assessment (NSW Department of Customer Service, 2020). These areas are associated with creek lines within the Project Area, including Weandre Creek, Muddy Creek, Nubrigyn Creek, Curragurra Creek and Shepherd Creek. Refer to Figure 2-1 .

The BOS applies to SSD and state significant infrastructure (SSI) projects, unless the Secretary of the Department of Planning, Industry and Environment determines that the Project is not likely to have a significant impact on biodiversity values. An application for a BDAR Waiver is not sought for the Project as there is a real likelihood for the Project to have a significant impact on biodiversity values (i.e., direct, indirect and prescribed impacts).

Local Land Services Act 2013

The NSW *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 which determine clearing on rural land:

- Category 1 – 'Exempt land' which is not subject to clearing approval under the LLS Act;
- Category 2 – 'Regulated Land' on which clearing of native vegetation may be carried out with or without formal approval in accordance with an 'allowable activity' or 'code' under the LLS Act. Includes the categories of Category 2 - Vulnerable Regulated Land and Category 2 - Sensitive Regulated Land on which vegetation clearing is restricted; and
- 'Excluded Land' – Land not categorised on the Transitional Native Vegetation Regulatory (NVR) Map and to which the LLS Act does not apply.

A review of the NVR Map confirms that areas of Category 2 – Vulnerable Regulated Land, associated with some riparian areas and some steep, erodible areas, and areas of Excluded Land, associated with zone SP2 – Infrastructure, are present within the Project area (State Government of NSW and DPE, 2022). This will be further explored in a Land Category Assessment Report and as part of the EIS process. Refer to Figure 2-2.

Biosecurity Act 2015

The NSW *Biosecurity Act 2015* came into effect on 1 July 2017, effectively replacing the NSW *Noxious Weeds Act 1993*. Under the NSW *Biosecurity Act 2015,* landholders have a responsibility to control weeds on their property under the provisions of the 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 NSW *Biosecurity Act 2015.* Primary weeds have been identified in different LGAs based on the level of threat infestation they represent and, if the species presents a significant threat, they may be subject to a Biosecurity Control Order under which stricter provisions apply. Some Weeds of National Significance (WoNS), such as Chilean needle grass (*Nassella neesiana*) are also listed as primary weeds in LGAs.

Weeds identified within the Project Area may be subject to the General Biosecurity Duty or a Biosecurity Control Order and will need to be managed accordingly. A strategic plan for each WoNS identified in the Project Area will be required to define responsibilities and identify strategies and actions to control the weed species (Centre for Invasive Species Solutions, 2021).

Fisheries Management Act 1994

The NSW *Fisheries Management Act 1994* provides for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Like the BC Act, the NSW *Fisheries Management Act 1994* lists threatened species, populations and ecological communities of fish and marine vegetation. Consideration of the likely occurrence of threatened fish in the waterways in the Project Area will be provided within the EIS

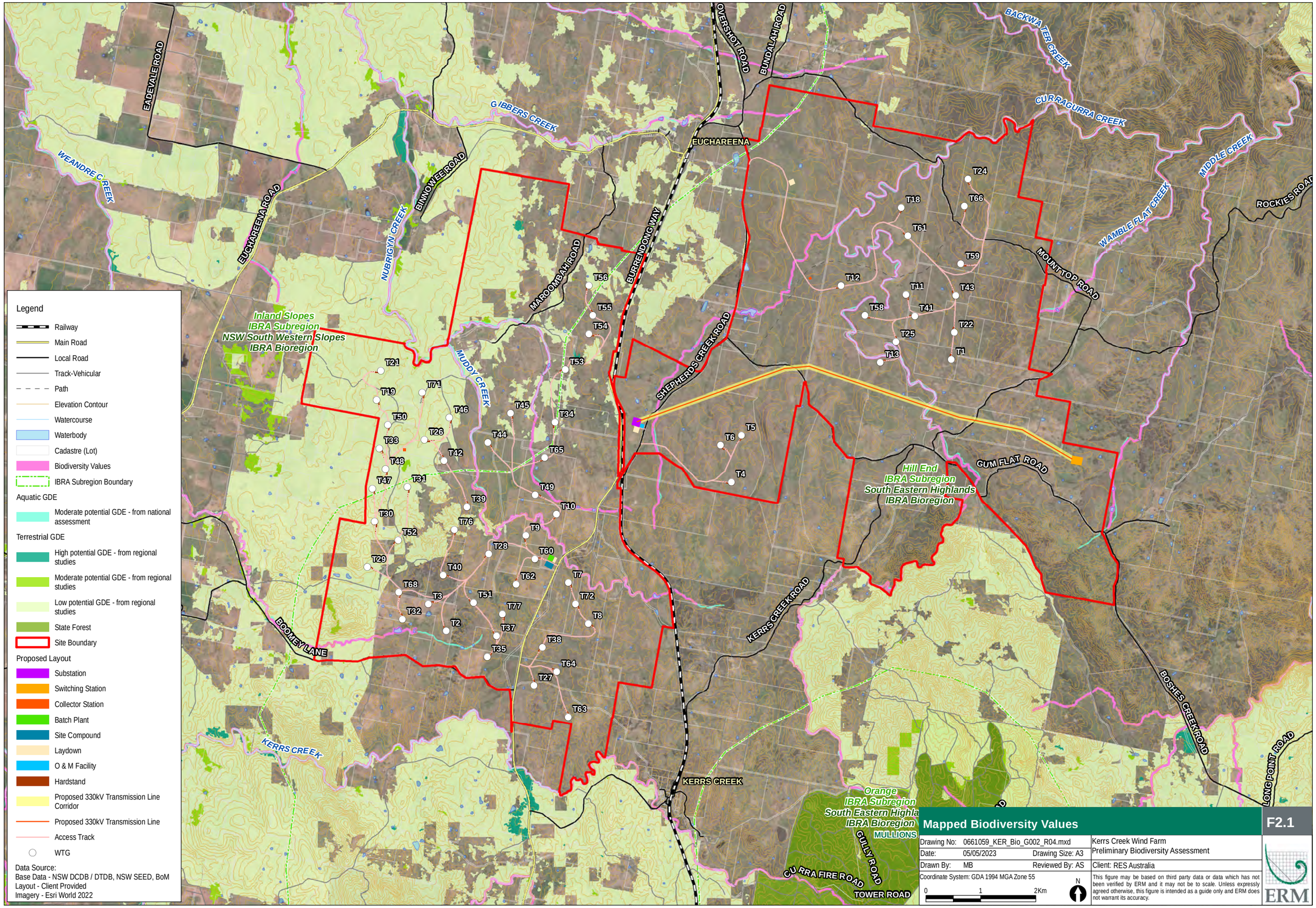
Commonwealth Legislation

although it is noted that the creek lines within the Project Area are mapped as habitat for the threatened Southern Purple Spotted Gudgeon (*Mogurnda adspersa*) and Key Fish Habitat is mapped within the Project Area associated with Weandre Creek, Muddy Creek, Nubrigyn Creek, Curragurra Creek and Shepherd Creek (NSW DPI, 2022). Refer to Figure 2-3.

Schedule 6 of the NSW *Fisheries Management Act 1994* also lists the following key threatening process that may be relevant to the Project and will be addressed within the EIS:

- Degradation of native riparian vegetation along New South Wales water courses;
- 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 (NSW DPI, 2013). Notwithstanding, it is noted that a permit under section 219 would not be required for waterway crossings as Section 5.23 of the EP&A Act excludes SSD projects from requiring 'a permit under section 201, 205 or 219 of the NSW *Fisheries Management Act 1994*'.



Mapped Biodiversity Values

F2.1

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Coordinate System: GDA 1994 MGA Zone 55

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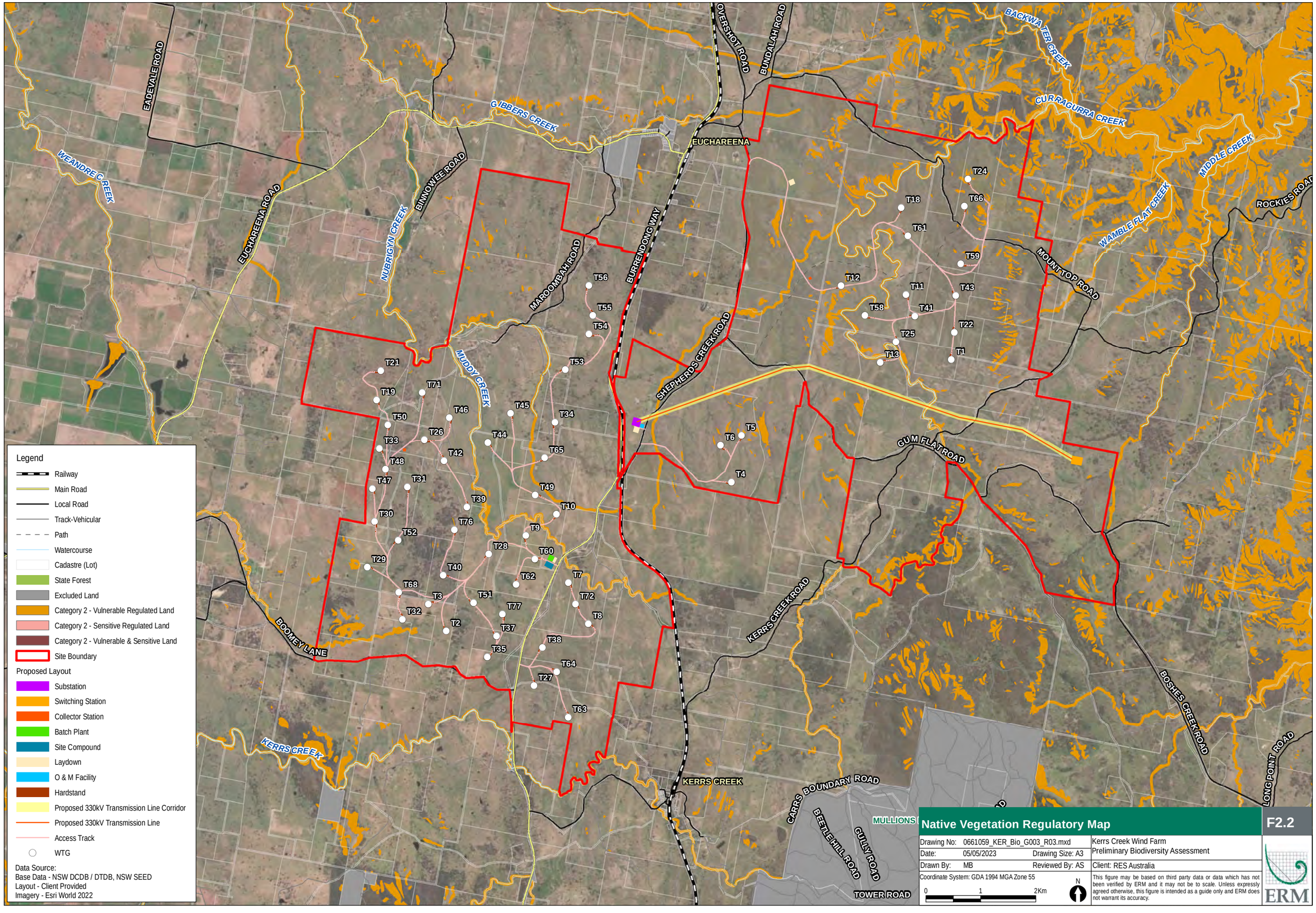

Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Excluded Land
- Category 2 - Vulnerable Regulated Land
- Category 2 - Sensitive Regulated Land
- Category 2 - Vulnerable & Sensitive Land
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Base Data - NSW DCDB / DTDB, NSW SEED
Layout - Client Provided
Imagery - Esri World 2022

Native Vegetation Regulatory Map

F2.2

Drawing No:	0661059_KER_Bio_G003_R03.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
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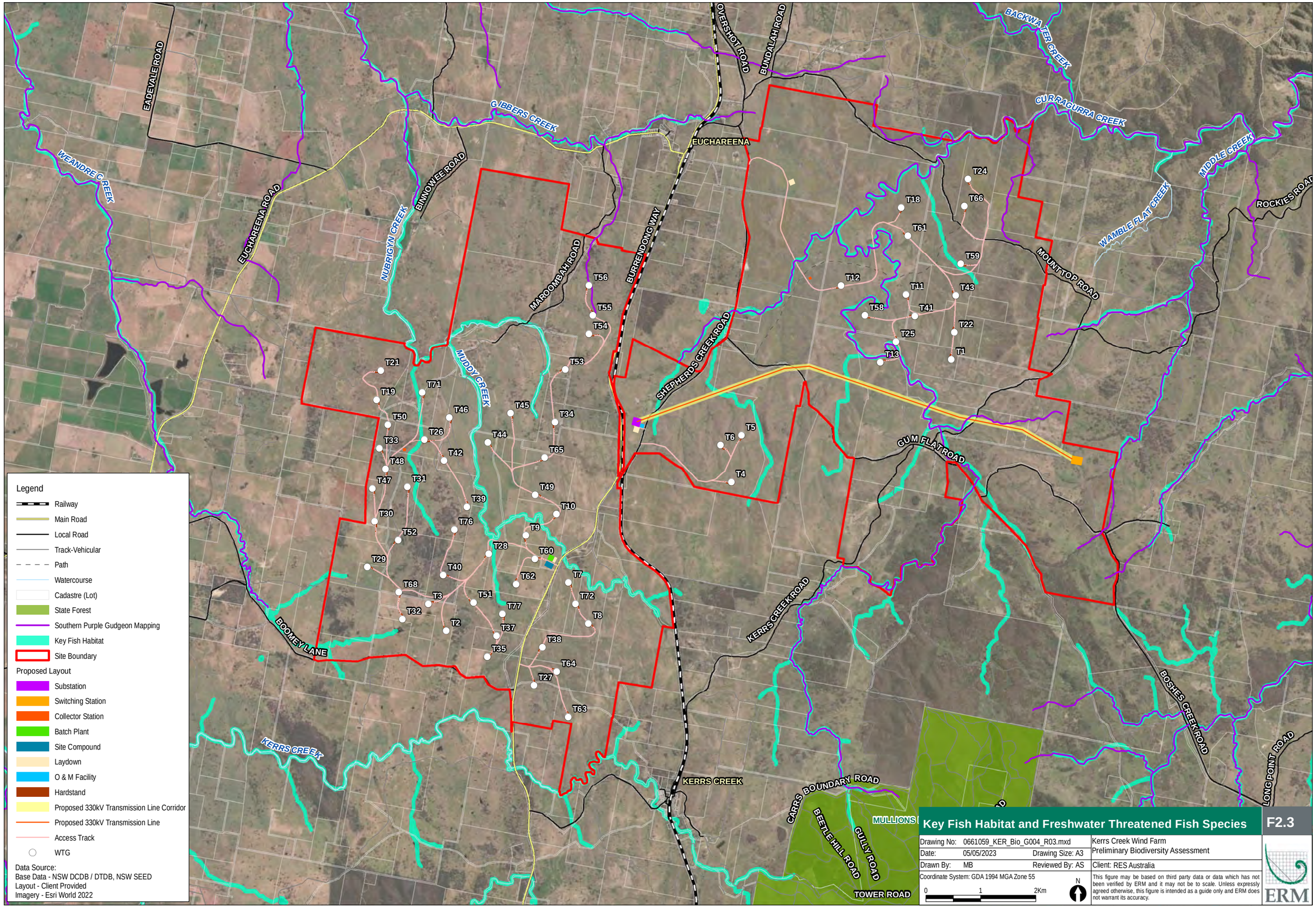

Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Southern Purple Gudgeon Mapping
- Key Fish Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Base Data - NSW DCDB / DTDB, NSW SEED
Layout - Client Provided
Imagery - Esri World 2022

Key Fish Habitat and Freshwater Threatened Fish Species

F2.3

Drawing No:	0661059_KER_Bio_G004_R03.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	05/05/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

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3. METHODOLOGY

3.1 Desktop Review

The following resources have been considered in preparing this Preliminary Biodiversity Assessment:

- Online Threatened Biodiversity Data Collection (TBDC), including NSW BioNet Atlas, Vegetation Information System (VIS) and threatened biodiversity profiles (State of New South Wales (DPE), 2022a);
- DCCEEW Protected Matters Search Tool (PMST) identifying threatened species and communities with the potential to occur within the locality (10 km buffer around the Project Area). (DCCEEW, 2022a);
- Species Profile and Threats Database (SPRAT) providing information on threatened species and communities listed under the EPBC Act with the potential to occur within the locality (DCCEEW, 2022b);
- NSW SEED Portal to visualise mapping layers available for the locality, including but not limited to mapped PCTs, TECs, threatened species records, Mitchell Landscapes and Interim Biographic Regionalisation of Australia (IBRA) version 7 bioregions and sub-regions (State of NSW and DPE, 2022b);
- NSW eSPADE Soil and Land Information (State of NSW and DPE, 2022c);
- NSW Department of Primary Industries Fisheries Spatial Data Portal for mapping of key fish habitat and threatened freshwater species with the potential to occur within the locality (NSW DPI, 2022);
- Bureau of Meteorology (BOM) Groundwater Dependent Ecosystem (GDE) Atlas (Commonwealth Bureau of Meterology, 2022) and NSW GDE mapping (State of NSW and DPE, 2022d);
- NSW BAM and supporting manuals, Biodiversity Offsets and Agreement Management System (BOAMS) and BAM Calculator (BAM-C) (accessed via login) (State of NSW and DPE, 2022e);
- Weeds of National Significance (Centre for Invasive Species Solutions, 2021) and Priority Weeds within Dubbo Regional LGA (NSW DPI, 2022a);
- Nature Advisory's Kerrs Creek Wind Farm Bird and Bat Risk Assessment. Report prepared for icubed Consulting Pty Ltd. on behalf of RES (Nature Advisory, 2021);
- NGH's draft Updated Scoping Report: Biodiversity Chapter for Kerr's Creek Wind Farm. Report prepared for icubed Consulting Pty Ltd. on behalf of RES (NGH, 2021);
- Spatial Collaboration Portal to analyse NSW spatial datasets including topographic data, waterways, waterbodies and infrastructure (NSW Spatial Services (DCS SS), a business unit in the Department of Customer Service, 2022);
- Atlas of Living Australia (CSIRO, 2022); and
- Local government databases.

The results of the PMST database search are included in Appendix A.

3.2 Field Surveys

Field surveys completed to date have contributed to a growing body of knowledge across the Project Area to inform this assessment and BDAR, which is to be submitted with the EIS.

A summary of the field surveys undertaken to date is provided in the following sections. It is noted that the 2020 and 2021 field investigations were undertaken across a larger area (i.e., preliminary Project boundary and the Project Area). The Proponent amended the preliminary Project boundary by excluding areas containing high value biodiversity following review of the 2020 - 2021 field survey results. Subsequent field surveys performed in 2023 have been limited to the Project Area only.

3.2.1 2020 Surveys

Field surveys completed across the preliminary Project boundary and the Project Area by NGH (NGH 2021), and Nature Advisory (2021) are summarised in the following sections. Survey locations are provided in Appendix B.

3.2.1.1 Autumn

NGH

Two Ecologists undertook preliminary site surveys between 12 and 15 May 2020. The methodology included a site walkover, undertaking rapid assessment of the vegetation communities (80 rapid assessment points) and observations of landscape and habitat features, such as rocky outcrops, when encountered. During this four-day survey, most of the preliminary Project boundary was accessed. Where access was not possible, observations were limited to visual observations from public roads. Where applicable, extrapolations were made based on the distribution of vegetation communities seen in accessible areas and from examination of topographic and aerial imagery.

Nature Advisory

During the Autumn 2020 field survey, Song Meters were deployed at four (4) sites over 34 consecutive nights from 19 April – 23 May 2020, totalling an equivalent of 136 survey detector nights (Nature Advisory, 2021). Bird utilisation surveys were undertaken by Nature Advisory between 21 to 26 May 2020.

3.2.1.2 Autumn/Winter

NGH

Diurnal and nocturnal surveys were undertaken by Ecologists across three (3) days and nights in May 2020. These surveys targeted potential threatened bird species with an optimal seasonal survey requirement during the late autumn and winter months. Potential threatened bird species included the Barking owl (*Ninox connivens*), Masked owl (*Tyto novaehollandiae*) and the Glossy black-cockatoo (*Calyptorhynchus lathami*). Additional diurnal woodland bird surveys and opportunistic recordings of observed fauna species were obtained during the May field survey.

3.2.1.3 Spring

NGH

Field surveys were undertaken across the preliminary Project boundary by six (6) NGH Ecologists between 12 and 16 October 2020. During this survey event, detailed mapping of the boundaries of all PCTs and their associated vegetation management zones was undertaken. Targeted fauna surveys were also completed with methods including rock rolling, nocturnal and diurnal surveys, call playback, scat surveys, Koala (*Phascolarctos cinereus*) Spot Assessment Technique (SAT) surveys, and camera trapping.

Nature Advisory

In Spring 2020 Nature Advisory undertook bat utilisation surveys across two survey periods. Initially, eight (8) Song Meters were deployed at eight sites from 22 October to 23 November 2020. An additional three (3) were deployed from 24 November to 8 December 2020. Nature Advisory reports that a total of 306 detector nights over 47 nights were undertaken for the Spring 2020 season (Nature Advisory, 2021).

3.2.2 2021 Surveys

3.2.2.1 Summer / Autumn 2021

Nature Advisory

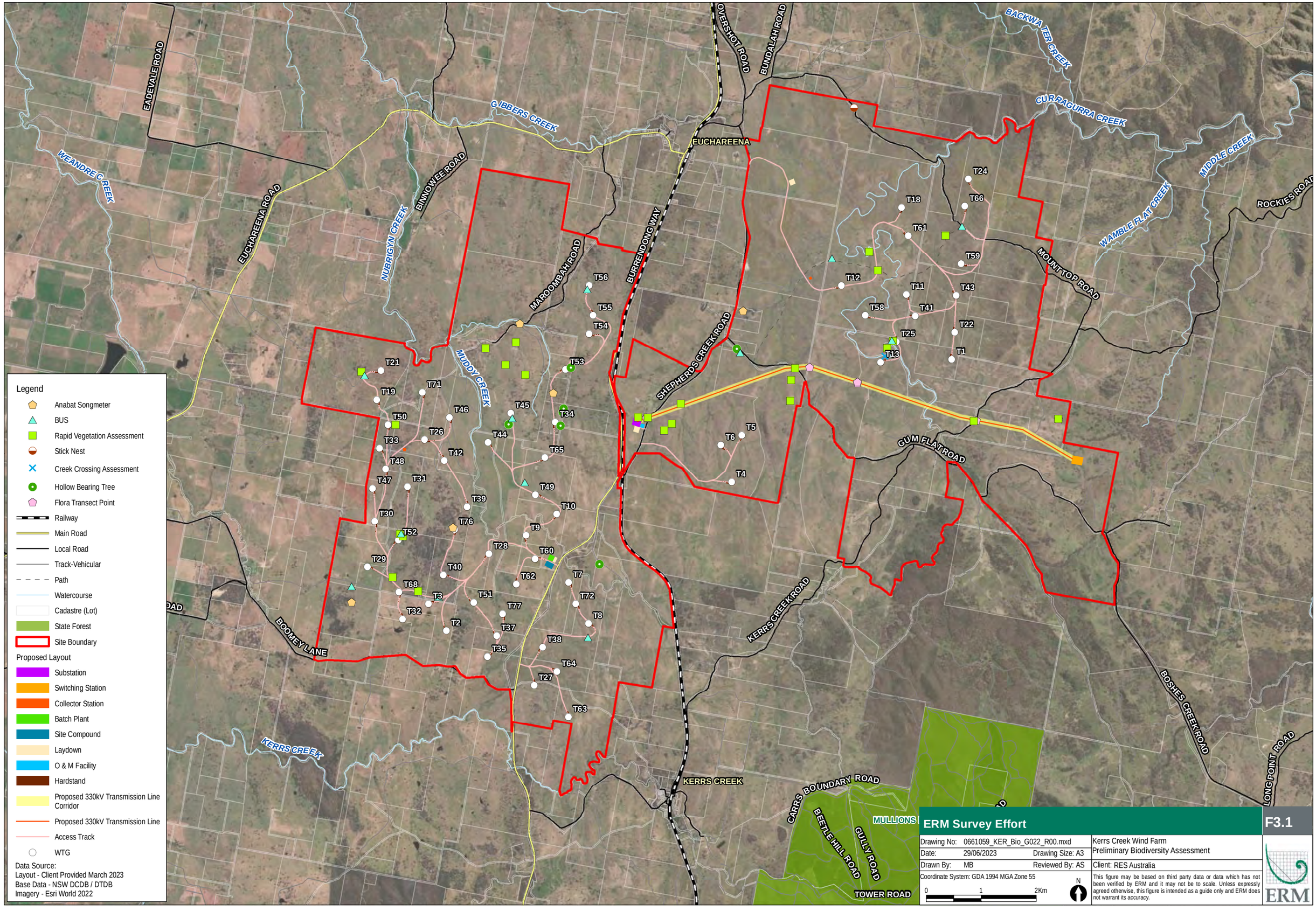
Song Meters to detect bat species were deployed at eight (8) sites over 42 consecutive nights from 24 February to 6 April 2021 and six (6) sites over 24 nights from 7 April to 3 May 2021, totalling an equivalent of 475 survey detector-nights (Nature Advisory, 2021).

3.2.3 2023 Surveys

ERM completed seasonal bird and bat utilisation surveys, targeted flora transects and habitat and vegetation surveys across the Project Area in Summer 2023, as detailed below and presented in Figure 3-1.

3.2.3.1 Summer 2023

Field surveys were undertaken across the updated Project Area by four (4) Ecologists between 6 and 10 March 2023. The event included rapid vegetation assessments (25 survey points) and additional observations of landscape and habitat features (10 survey points). Song Meters to detect bat species were deployed at five (5) locations across the Project Area for four (4) consecutive nights. Bird utilisation surveys were conducted at 12 points, each with one (1) repeat survey. Targeted flora transects were conducted for a total of eight (8) survey hours. These survey techniques were utilised to fulfil BAM assessment requirements, enabling the detection of candidate threatened species that have the potential to occur within the Project Area.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Creek Crossing Assessment
Hollow Bearing Tree
Flora Transect Point
Railway
Main Road
Local Road
Track-Vehicular
Path
Watercourse
Cadastre (Lot)
State Forest
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
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Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
ERM Survey Effort
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Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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.
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3.3 Likelihood of Occurrence

A likelihood of occurrence assessment was undertaken by ERM for the Project Area, informed by desktop sources (e.g., PMST and NSW BioNet search results within 10 km), entry of site-specific data into the BAM Calculator, and previous field survey results. Database interrogation identified several fauna and flora species listed under the EPBC Act and BC Act that have been previously recorded or are predicted to occur within a 10 km buffer of the Project Area. The likelihood of occurrence assessment has been completed to refine the desktop generated list using site-specific and species-specific habitat information.

The assessment ranks the likelihood of the species occurring within the Project Area through analysis of species distribution information and the presence of specific habitat attributes as identified through desktop analysis and field survey.

The criteria applied are outlined in Table 3-1. The preliminary likelihood of occurrence assessment is provided in Appendix C of this report.

Table 3-1 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 known 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 Project Area.*

3.4 Assumptions and Limitations

The field and desktop assessments provide an overview of the biodiversity values that exist within the Project Area. Surveys were undertaken at discrete locations to gain a general understanding of the types of species and habitat features that occur. It is noted that the Project Area has been revised based on preliminary field investigations, resulting in the avoidance of high biodiversity value areas, and the addition of areas that have been subject to a single round of targeted survey efforts.

The absence of a species from a database list or observational studies does not confirm its absence within the Project Area. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of a species.

Future targeted biodiversity surveys will be completed by ERM to inform the EIS.

4. BIODIVERSITY VALUES

This chapter summarises the results of the desktop review and field investigations used in combination to understand and assess the potential biodiversity values present within the Project Area. Key landscape features and a summary of biodiversity values within the Project Area are summarised in Table 4-1.

Table 4-1 Summary of Landscape and Biodiversity Features

Landscape feature	Summary notes
IBRA Bioregion IBRA Sub-region	The Project Area falls within two (2) Interim Biogeographic Regionalisation for Australia (IBRA) bioregions and sub-regions: ■ Southern Eastern Highlands IBRA bioregion: Hill End IBRA sub-region; and ■ NSW South Western Slopes IBRA bioregion: Inland Slopes IBRA sub-region. IBRA bioregion and sub-region mapping is visible in Figure 2-1 .
Land use and history of disturbance	Parts of the Project Area have been subject to extensive clearing for agricultural purposes including cropping and modified pastures for livestock grazing. Large areas of the lower slopes and flats have had the overstorey removed, except for riparian areas. Most of the higher ridgelines contain remnant vegetation and rocky outcrops that provide connectivity throughout the fragmented landscape; however, some of these areas have also been subject to historic woody vegetation clearing, albeit not as extensively as the lower slopes.
Vegetation	Based on the results of NSW State Vegetation Type Mapping (SVTM) and field surveys, 15 PCTs have been recorded within the Project Area (PCTs 266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734, 4063). Of the 15 PCTs mapped within the Project Area, eight (8) have an association with the following TECs: ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (PCTs 266, 277, 347, 3373, 3387, 3399 and 3406); and ■ Mt Canobolas Xanthoparmelia Lichen Community (PCT 3370). White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is listed as a critically endangered ecological community (CEEC) under the BC Act and EPBC Act. Based on analysis of BAM plot data, NGH (2021) identified PCT 277 as conforming to the BC Act listing criteria for the TEC, while only higher quality patches meet the EPBC criteria. Further surveys will be required during the EIS stage to confirm the extent of BC and EPBC Act forms of this TEC. The Mt Canobolas Xanthoparmelia Lichen Community is listed as an endangered ecological community (EEC) under the BC Act. Further surveys will be required during the EIS stage to confirm the extent of this TEC. Refer to Table 4-2 for more information.
Threatened species	Twenty-three (23) threatened species were identified within the Project Area during the field survey events. These include: ■ Barking Owl (*Ninox connivens*), listed as vulnerable under the BC Act; ■ Black Falcon (*Falco subniger*), listed as vulnerable under the BC Act; ■ Brown Treecreeper (Eastern subspecies) (*Climacteris picumnus victoriae*), listed as vulnerable under the BC Act and EPBC Act; ■ Diamond Firetail (*Stagonopleura guttata*), listed as vulnerable under the BC Act and EPBC Act; ■ Dusky Woodswallow (*Artamus cyanopterus*), listed as vulnerable under the BC Act; ■ Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), listed as vulnerable under the BC Act; ■ Glossy Black-cockatoo (*Calyptorhynchus lathami*), listed as vulnerable under the BC Act and EPBC Act; ■ Greater Broad-nosed Bat (*Scoteanax rueppellii*), listed as vulnerable under the BC Act;

Landscape feature	Summary notes
	■ Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*), listed as vulnerable under the BC Act and EPBC Act; ■ Koala (*Phascolarctos cinereus*), listed as endangered under the BC Act and EPBC Act; ■ Large Bent-winged Bat (*Miniopterus orianae oceanensis*), listed as vulnerable under the BC Act; ■ Large-eared Pied Bat (*Chalinolobus dwyeri*), listed as vulnerable under the BC Act and EPBC Act; ■ Little Lorikeet (*Glossopsitta pusilla*), listed as vulnerable under the BC Act; ■ Masked Owl (*Tyto novaehollandiae*), listed as vulnerable under the BC Act; ■ Speckled Warbler (*Chthonicola sagittata*), listed as vulnerable under the BC Act; ■ Spotted Harrier (*Circus assimilis*), listed as vulnerable under the BC Act; ■ Spotted-tailed Quoll (*Dasyurus maculatus*), listed as vulnerable under the BC Act and endangered under the EPBC Act; ■ Squirrel Glider (*Petaurus norfolcensis*), listed as vulnerable under the BC Act; ■ Superb Parrot (*Polytelis swainsonii*), listed as vulnerable under the BC Act and EPBC Act; ■ Turquoise Parrot (*Neophema pulchella*), listed as vulnerable under the BC Act; ■ Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*), listed as vulnerable under the BC Act; ■ Varied Sittella (*Daphoenositta chrysoptera*), listed as vulnerable under the BC Act; and ■ White-fronted Chat (*Epthianura albifrons*) listed as vulnerable under the BC Act and EPBC Act. A further eight (8) species are considered likely to occur within the Project Area based on the Likelihood of Occurrence Assessment (Appendix C): ■ *Acacia meiantha*, listed as endangered under the BC Act and EPBC Act; ■ Grey-headed Flying-fox (*Pteropus poliocephalus*), listed as vulnerable under the BC Act and EPBC Act; ■ Regent Honeyeater (*Anthochaera phrygia*), listed as critically endangered under the BC Act and EPBC Act; ■ Robertson's Peppermint (*Eucalyptus robertsonii subsp. hemisphaerica*); listed as vulnerable under the BC Act and EPBC Act; ■ Scarlet Robin (*Petroica boodang*), listed as vulnerable under the BC Act; ■ Silky Swainson-pea (*Swainsona sericea*), listed as vulnerable under the BC Act; ■ Small Purple-pea (*Swainsona recta*), listed as endangered under the BC Act and EPBC Act; and ■ Southern Myotis (*Myotis macropus*), listed as vulnerable under the BC Act. Further field surveys targeting threatened species will be conducted in accordance with the BAM to inform an EIS.
Areas of Geological Significance	There are no karst, caves, crevices, cliffs or other areas of geological significance within the Project Area.
Areas of Outstanding Biodiversity Value (AOBV)	No Areas of Outstanding Biodiversity Value (AOBV) are recorded within the Project Area.
Aquatic habitat	NSW Hydrography mapping shows the Project Area consists of creek lines, drainage lines and natural waterbodies. Farm dams are also present across the agricultural landscape. Creeks on site include: ■ Weandra Creek; ■ Mubrigyn Creek; ■ Curragurra Creek;

Landscape feature	Summary notes
	■ Shepherd Creek; and ■ Muddy Creek. Although largely ephemeral or semi-permanent, these creeks are likely to provide habitat for several amphibians and turtle species and provide an important water resource for fauna. Creek lines within the Project Area are mapped as habitat for the threatened Southern Purple Spotted Gudgeon (*Mogurnda adspersa*) and Key Fish Habitat is mapped within the Project Area associated with Weandre Creek, Muddy Creek, Nubrigyn Creek, Curragurra Creek and Shepherd Creek (NSW DPI, 2022). Refer to Figure 2-3. Indirect impacts and sensitive creek crossing designs will be considered as part of the EIS.
Habitat Values	Within many cleared areas there is limited value in terms of fauna habitat, except for scattered trees and isolated patches of woodland which provide important habitat, refuge and foraging opportunities for species such granivorous avifauna, raptors and macropod grazing. Remnant native vegetation is in moderate to good condition, along with areas of rocky outcrops that contain partially embedded rock and scattered loose rock surrounded by high cover of native grasses and diverse mid storey species. These areas contain suitable habitat for several native fauna species to occupy or move through the landscape.
Groundwater dependent ecosystems	Groundwater dependent ecosystems (GDEs) are defined as '*ecosystems that need access to groundwater to meet all or some of their water requirements to maintain the communities of plants and animals, ecological processes and ecosystem services*' (State of NSW and DPE, 2022d). Mapping indicates that there is a low probability of GDEs occurring in the north-west of the Project Area, and small patches where there is a medium probability of GDEs occurring in the west of the Project Area. Refer to Figure 2-1 .

4.1 Vegetation Communities

Preliminary vegetation mapping for the Project Area is presented in Figure 4-1. This comprises 15 PCTs that are confirmed or likely to occur within the Project Area (i.e., PCTs 266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734, 4063). Varying condition states are also expected due to the variable land use history of the Project Area. PCTs details are provided in Table 4-2. Legacy PCT identification is also provided in Table 4-2.

Field data indicates that majority of the lower slopes and flats have been subject to extensive modification of native vegetation, particularly along fence lines for the establishment of farm access tracks, and to create grazing lands and forage cropping areas, with sheep and cattle grazing the dominant land use. Large areas of the lower slopes and flats have had the overstorey removed, except for riparian areas. The groundcover has been modified through the application of herbicides and fertilisers, and in some paddocks has been seeded with exotic pasture species or sown for foraging crops. However, extensive areas of unimproved pasture used for livestock grazing occurs throughout the site varying condition states.

Remnant vegetation is largely restricted to the ridgelines and rocky outcrops, which provides most of the wildlife connectivity throughout the fragmented landscape. However, some of these areas have historically been subject to woody vegetation clearing, albeit not extensively. Dense remnant forest vegetation containing high quality habitat features occurs towards the southern end of the Project Area, as well as towards the undulating western and central areas. The latter have been more noticeably affected by the effects of adjacent agricultural land use practices.

4.2 Threatened Ecological Communities

Three (3) EPBC Act listed TECs were identified by the Protected Matters Search Tool (PMST) results as having the potential to occur within the Project Area. These TECs include:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of south-eastern Australia;
- Natural Temperate Grassland of the South Eastern Highlands; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Based on a review of the BioNet Vegetation Information System (BioNet VIS), PCT 3370, mapped in the south-east of the Project Area has potential to be associated with the following BC Act listed TEC:

- Mt Canobolas Xanthoparmelia Lichen Community.

During field survey to date, only one TEC has been assessed as likely present within the Project Area:

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

Subsequent surveys undertaken in accordance with the BAM and to inform the BDAR will determine the true extent and condition of this TEC within the Project Area, and construction and permanent disturbance areas.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is listed as critically endangered under both the BC Act and EPBC Act. Based on BioNet VIS, this community has potential to be associated with PCTs 266, 277, 347, 3373, 3387, 3399 and 3406 mapped within the Project Area.

Varying condition states of this TEC occur within the Project Area. It occurs as woodland and is variously present in a derived state (i.e., treeless grasslands) where floristics supports its occurrence (i.e., predominantly native and comprises characteristic species). Current vegetation mapping indicates that the permanent footprint (including buffers to account for potential direct construction impacts) contains 2.31 ha of potential White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC community. Figure 4-2 presents the potential extent of TECs within the Project Area.

Further surveys will be required during the EIS stage to confirm the impact extent of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland by condition type, and the presence or absence of the remaining potential TECs across the Project Area. In particular, the treeless grasslands are subject to further refinement through the Land Category Assessment process and vegetation integrity plots, to determine if criteria are met to confirm association with the TEC as a derived native grassland.

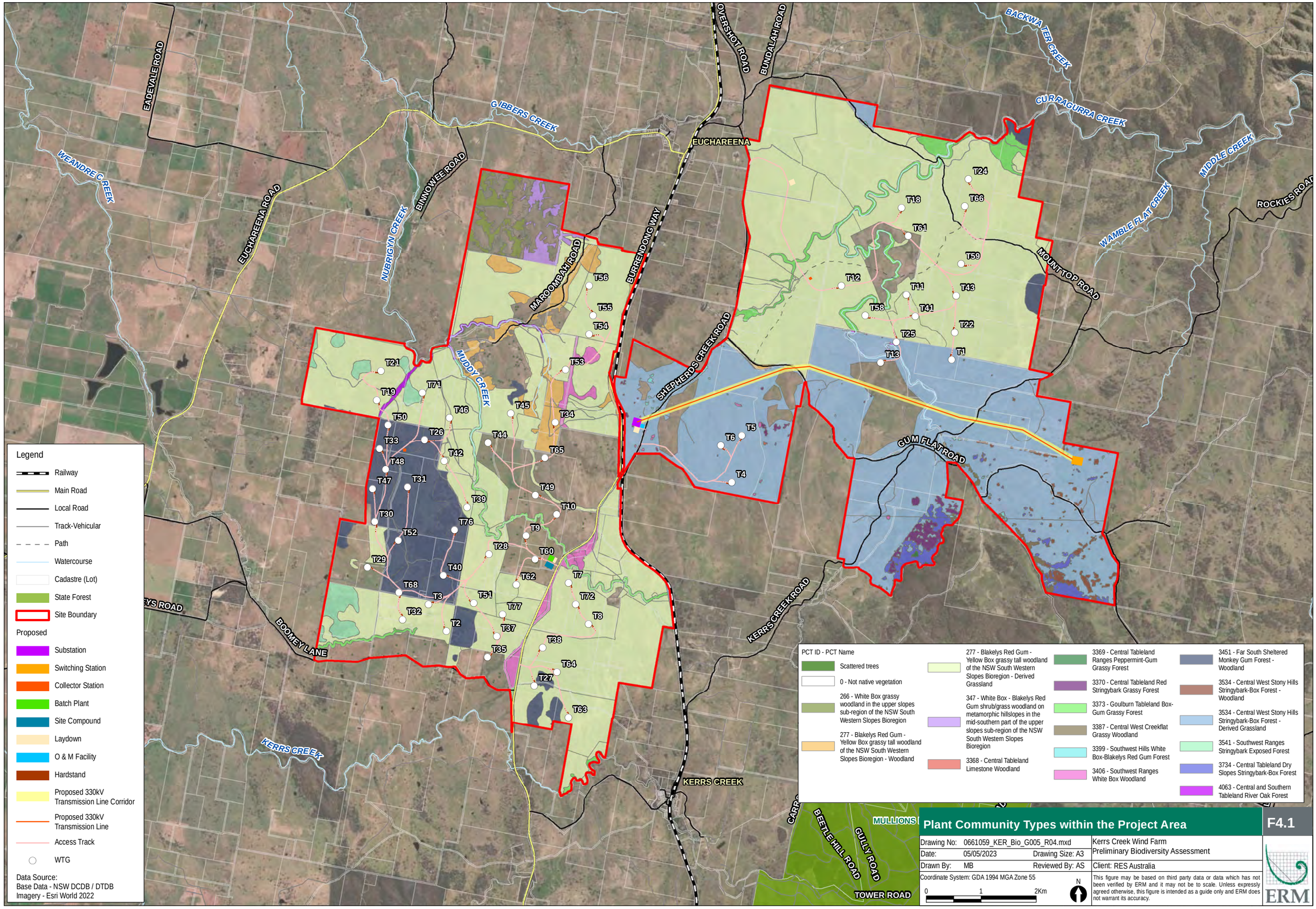
Table 4-2 Plant Community Types and Threatened Ecological Communities within the Project Area

PCT No.	PCT Name	Vegetation Class	Associated Threatened Ecological Community	Notes	Extent (ha) in Project Area	*Indicative total area impacted (ha) within the disturbance footprint.*
0	Not native vegetation	-	-	-	1252.20	44.00
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Western Slope Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as PCT 266 (in some areas)	56.83	-
277 (woodland)	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as PCT 277	156.57	-
277 (grassland)	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as PCT 797 - Derived grassland of the South Eastern Highlands Bioregion and South East Corner Bioregion	4208.32	-
277 (scattered trees)	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodland	Scattered trees will not meet the listing criteria (BC Act) or condition thresholds (EPBC Act) for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as paddock trees	6.52	-
347	White Box – Blakely's Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Lineage PCT 347	44.86	-

PCT No.	PCT Name	Vegetation Class	Associated Threatened Ecological Community	Notes	Extent (ha) in Project Area	*Indicative total area impacted (ha) within the disturbance footprint.*
3368	Central Tableland Limestone Woodland	Southern Tableland Grassy Woodlands	-	Lineage PCT 651	0.23	-
3369	Central Tableland Ranges Peppermint-Gum Grassy Forest	Southern Tableland Grassy Woodlands	-	Lineage PCT 742	1.19	-
3370	Central Tableland Red Stringybark Grassy Forest	Southern Tableland Grassy Woodlands	Mt Canobolas Xanthoparmelia Lichen Community	Lineage PCT 649	33.46	0.06
3373	Goulburn Tableland Box-Gum Grassy Forest	Southern Tableland Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion	211.22	0.85
3387	Central West Creekflat Grassy Woodland	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Lineage PCT 649	21.20	-
3399	Southwest Hills White Box-Blakelys Red Gum Forest	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Lineage PCT 278	10.92	0.19
3406	Southwest Ranges White Box Woodland	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Mapped as PCT 266 (in some areas). Lineage PCT 278.	72.89	1.27

PCT No.	PCT Name	Vegetation Class	Associated Threatened Ecological Community	Notes	Extent (ha) in Project Area	*Indicative total area impacted (ha) within the disturbance footprint.*
3451 (forest)	Far South Sheltered Monkey Gum Forest	Southern Hinterland Dry Sclerophyll Forests	-	Mapped as PCT 287 - Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW Southwestern Slopes Bioregion	274.20	
3451 (grassland)	Far South Sheltered Monkey Gum Forest	Southern Hinterland Dry Sclerophyll Forests	-	Mapped as PCT 287 - Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW Southwestern Slopes Bioregion	289.21	
3534 (forest)	Central West Stony Hills Stringybark-Box Forest	Upper Riverina Dry Sclerophyll Forests	-	Lineage PCT 345	29.96	0.37
3534 (grassland)	Central West Stony Hills Stringybark-Box Forest	Upper Riverina Dry Sclerophyll Forests	-	Lineage PCT 345	2051.96	59.54
3541	Southwest Ranges Stringybark Exposed Forest	Upper Riverina Dry Sclerophyll Forests	-	Mapped as PCT 957 - Mugga Ironbark - Red Stringybark - Long-leaved Box dry grass forest of the NSW South Western Slopes Bioregion	79.33	35.03
3734	Central Tableland Dry Slopes Stringybark-Box Forest	Southern Tableland	-	Lineage PCT 649	65.10	0.30

PCT No.	PCT Name	Vegetation Class	Associated Threatened Ecological Community	Notes	Extent (ha) in Project Area	*Indicative total area impacted (ha) within the disturbance footprint.*
		Dry Sclerophyll Forests				
4063	Central and Southern Tableland River Oak Forest	Eastern Riverine Forests	-	Mapped as lineage PCT 85 - River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion	21.46	0.23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Site Boundary
Proposed
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
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Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
PCT ID - PCT Name
Scattered trees
0 - Not native vegetation
266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
277 - Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion - Woodland
277 - Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion - Derived Grassland
347 - White Box - Blakelys Red Gum shrub/grass woodland on metamorphic hillslopes in the mid-southern part of the upper slopes sub-region of the NSW South Western Slopes Bioregion
3368 - Central Tableland Limestone Woodland
3369 - Central Tableland Ranges Peppermint-Gum Grassy Forest
3370 - Central Tableland Red Stringybark Grassy Forest
3373 - Goulburn Tableland Box-Gum Grassy Forest
3387 - Central West Creekflat Grassy Woodland
3399 - Southwest Hills White Box-Blakelys Red Gum Forest
3406 - Southwest Ranges White Box Woodland
3451 - Far South Sheltered Monkey Gum Forest - Woodland
3534 - Central West Stony Hills Stringybark-Box Forest - Woodland
3534 - Central West Stony Hills Stringybark-Box Forest - Derived Grassland
3541 - Southwest Ranges Stringybark Exposed Forest
3734 - Central Tableland Dry Slopes Stringybark-Box Forest
4063 - Central and Southern Tableland River Oak Forest
Plant Community Types within the Project Area
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Preliminary Biodiversity Assessment
Client: RES Australia
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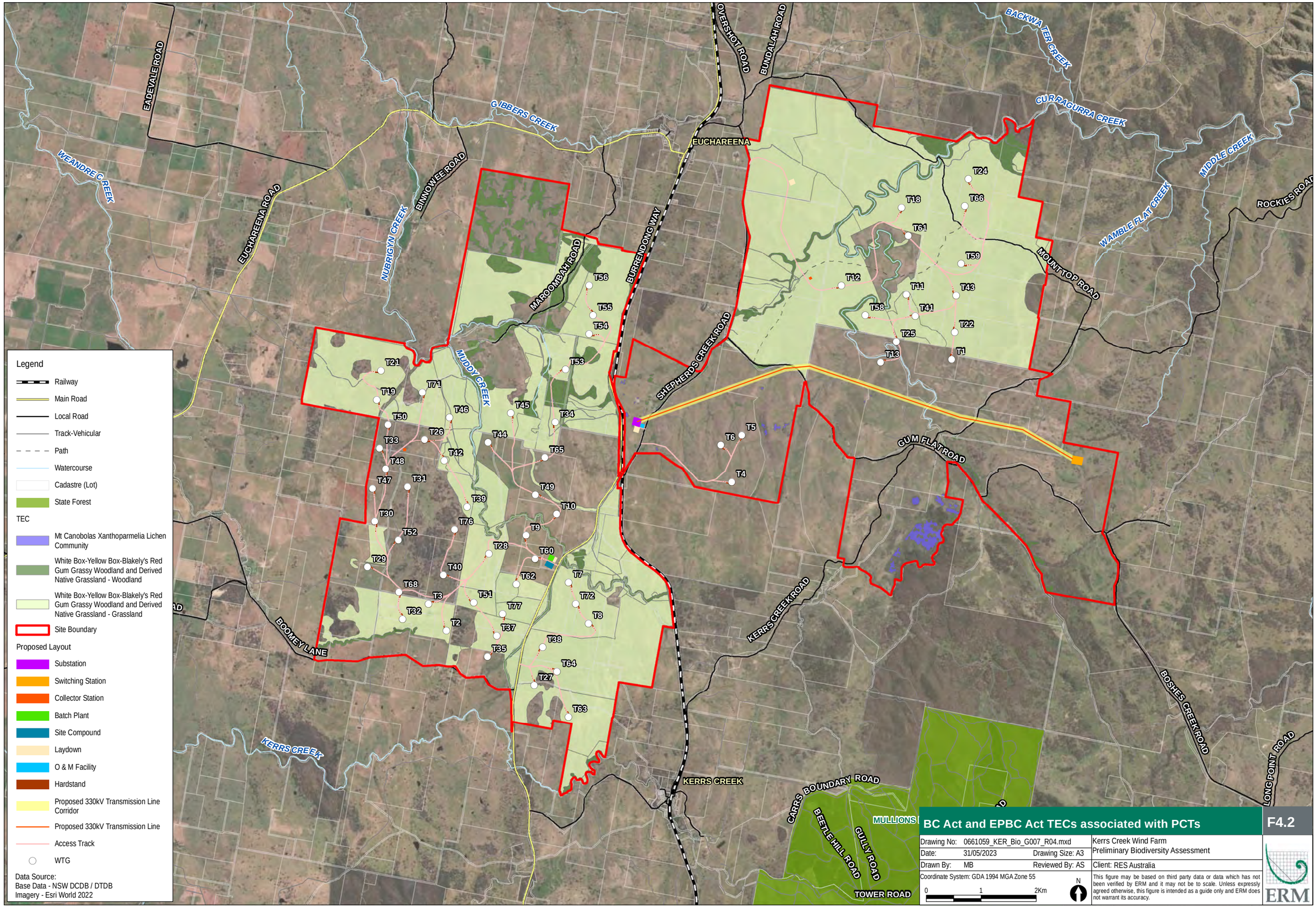
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T61
T62
T63
T64
T65
T66
T68
T71
T72
T76
T77
Legend
Railway
Main Road
Local Road
Track-Vehicular
Path
Watercourse
Cadastre (Lot)
State Forest
TEC
Mt Canobolas Xanthoparmelia Lichen Community
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Woodland
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Grassland
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
BC Act and EPBC Act TECs associated with PCTs
F4.2
Drawing No: 0661059_KER_Bio_G007_R04.mxd
Date: 31/05/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
0
1
2Km
N
Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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

4.3 Threatened Species

The field survey effort completed to date has resulted in the known presence of 23 threatened species across the Project Area with a further eight (8) threatened species considered likely to occur as indicated in the Likelihood of Occurrence Assessment presented in Appendix C. Further field surveys will be conducted by ERM in accordance with the BAM to inform an EIS, with details on preliminary predicted and candidate species provided in the following section.

4.3.1.1 BAM-C Predicted and Candidate Species

In accordance with the requirements of Section 5.2 of the BAM, the BDAR will identify the habitat suitability for threatened species within the Project Area. Species that meet all the relevant criteria will be automatically populated in the BAM-Calculator to be assessed either for ecosystem credits or species credits as outlined below:

- Ecosystem credit species (predicted species) are considered likely to have suitable habitat on the subject land and must be assessed for impacts, including measures taken to avoid, minimise and mitigate impacts. These threatened species are referred to as 'predicted species' in the BAM-Calculator and the assessor must calculate ecosystem credits to offset any residual impacts. These species can be predicted to occur based on the PCTs identified within the Project Area and do not require targeted survey; and
- Species credit species (candidate species) may have suitable habitat on the subject land. These threatened species are referred to as 'candidate species' in the BAM-Calculator and will require further targeted field assessment to determine whether they are present or not.

No further assessment is required for those species that are unlikely to occur or where the Project Area is considered as unsuitable habitat.

A preliminary list of predicted species is provided in Table 4-3 and a preliminary list of candidate species is provided in Table 4-4.

Table 4-3 Preliminary List of Predicted Species

Scientific Name	Common Name	Associated PCTs
Fauna		
Anthochaera phrygia (Foraging)	Regent Honeyeater	266, 277, 347, 3368, 3370, 3373, 3387, 3399, 3734, 3734, 4063
Artamus cyanopterus cyanopterus	Dusky Woodswallow	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Callocephalon fimbriatum (Foraging)	Gang-gang Cockatoo	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3734, 4063, 3406
Calyptorhynchus lathami (Foraging)	Glossy Black-cockatoo	266, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734, 4063
Chthonicola sagittata	Speckled Warbler	266, 277, 347, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3734, 4063, 3406
Circus assimilis	Spotted Harrier	266, 277, 347, 3399, 4063, 3406
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406

Scientific Name	Common Name	Associated PCTs
Daphoenositta chrysoptera	Varied Sittella	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Dasyurus maculatus	Spotted-tailed Quoll	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734, 4063
Falco subniger	Black Falcon	266, 277, 3373, 3451
Falsistrellus tasmaniensis	Eastern False Pipistrelle	266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 3406
Glossopsitta pusilla	Little Lorikeet	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063
Grantiella picta	Painted Honeyeater	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Haliaeetus leucogaster (Foraging)	White-bellied Sea-Eagle	266, 277, 347, 3373, 3399, 3451, 3534, 4063, 3406
Hieraaetus morphnoides (Foraging)	Little Eagle	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Hirundapus caudacutus	White-throated Needletail	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Lathamus discolor (Foraging)	Swift Parrot	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 3406
Lophoictinia isura (Foraging)	Square-tailed Kite	266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3541, 3734, 4063, 3406
Miniopterus orianae oceanensis (Foraging)	Large Bent-winged Bat	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3534, 3734, 4063, 3406
Neophema pulchella	Turquoise Parrot	266, 277, 347, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Ninox connivens (Foraging)	Barking Owl	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Ninox strenua (Foraging)	Powerful Owl	3368, 3369, 3370, 3373, 3387, 3451, 3534, 3734
Petaurus australis	Yellow-bellied Glider	3370, 3734
Petroica boodang	Scarlet Robin	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406

Scientific Name	Common Name	Associated PCTs
Petroica phoenicea	Flame Robin	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Polytelis swainsonii (Foraging)	Superb Parrot	266, 277, 347, 3369, 3373, 3399, 3406, 3451, 3541, 3734
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	266, 277, 347, 3399, 3451, 3541, 4063, 3406
Pteropus poliocephalus (Foraging)	Grey-headed Flying-fox	266, 277, 3368, 3369, 3370, 3373, 3399, 3451, 3534, 3541, 3734, 4063
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3451, 3534, 3541, 3734
Scoteanax rueppellii	Greater Broad-nosed Bat	3370, 3373, 3387, 3734
Stagonopleura guttata	*Diamond Firetail*	266, 277, 347, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063, 3406
Tyto novaehollandiae	Masked Owl	266, 277, 3368, 3369, 3370, 3373, 3387, 3451, 3534, 3734
Varanus rosenbergi	Rosenberg's Goanna	3370, 3373, 3387, 3399, 3534, 3541, 3734, 3406

Table 4-4 Preliminary List of Candidate Species

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Susceptible to Serious and Irreversible Impacts (SAII)	Recommended survey period
Fauna					
Anthochaera phrygia (Breeding)	Regent Honeyeater	Critically endangered	Critically endangered	Yes	All year
Aprasia parapulchella	Pink-tailed Legless Lizard	Vulnerable	Vulnerable	No	Sept - Nov
Burhinus grallarius	Bush Stone-curlew	Endangered	-	No	All year
Callocephalon fimbriatum (Breeding)	Gang-gang Cockatoo	Vulnerable	Endangered	No	Oct - Jan
Calyptorhynchus lathami (Breeding)	Glossy Black-cockatoo	Vulnerable	Vulnerable	No	Jan - Sept
Cercartetus nanus	Eastern Pygmy Possum	Vulnerable	-	No	Oct - Mar
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Vulnerable	Yes	Nov - Jan
Haliaeetus leucogaster (Breeding)	White-bellied Sea-Eagle	Vulnerable	-	No	Jul - Dec
Hieraaetus morphnoides (Breeding)	Little Eagle	Vulnerable	-	No	Aug - Oct
Keyacris scurra	Key's Matchstick Grasshopper	Endangered	-	No	Mar – May Aug - Dec
Lathamus discolor (Breeding)	Swift Parrot	Endangered	Critically endangered	Yes	All year

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Susceptible to Serious and Irreversible Impacts (SAII)	Recommended survey period
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable	No	Nov - Mar
Litoria booroolongensis	Booroolong Frog	Endangered	Endangered	No	Oct - Dec
Litoria castanea	Yellow-spotted Tree Frog	Critically endangered	Endangered	Yes	Nov - Dec
Lophoictinia isura	Square-tailed Kite	Vulnerable	-	No	Sept - Jan
Miniopterus orianae oceanensis (Breeding)	Large Bent-wing Bat	Vulnerable	-	Yes	Dec - Feb
Ninox connivens (Breeding)	Barking Owl	Vulnerable	-	No	May - Dec
Ninox strenua (Breeding)	Powerful Owl	Vulnerable	-	No	May - Aug
Paralucia spinifera	Purple Copper Butterfly, Bathurst Copper Butterfly	Endangered	Vulnerable	No	Sept, Oct and Dec
Petauroides volans	Greater Glider	Endangered	Endangered	No	All year
Petaurus norfolcensis	Squirrel Glider	Vulnerable	-	No	All year
Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable	-	No	Dec - Jun
Phascolarctos cinereus	Koala	Endangered	Endangered	No	All year
Polytelis swainsonii (Breeding)	Superb Parrot	Vulnerable	Vulnerable	No	Sept - Nov
Pteropus poliocephalus (Breeding)	Grey-headed Flying-Fox	Vulnerable	Vulnerable	No	Oct - Dec
Tyto novaehollandiae	Masked Owl	Vulnerable	-	No	May - Aug
Flora					
Acacia ausfeldii	Ausfeld's wattle	Vulnerable	-	No	Aug - Oct
Acacia meiantha	-	Endangered	Endangered	Yes	Jul - Oct
Eucalyptus cannonii		Vulnerable	-	No	All year
Eucalyptus pulverulenta	Silver-leafed Gum	Vulnerable	Vulnerable	No	All year
Eucalyptus robertsonii subsp. *hemisphaerica*	Robertson's Peppermint	Vulnerable	Vulnerable	Yes	All year
Grevillea divaricata	-	Endangered	-	Yes	April
Leucochrysum albicans var. tricolor	Hoary Sunray	Endangered	Endangered	No	Sept - Apr
Persoonia marginata	Clandulla Geebung	Vulnerable	Vulnerable	No	Jan - Mar
Swainsona recta	Small Purple-pea	Endangered	Endangered	No	Sept - Nov
Swainsona sericea	Silky Swainson-pea	Vulnerable	-	No	Sept - Nov
Veronica blakelyi	-	Vulnerable	-	No	Dec - Feb
Zieria obcordata	Granite Zieria	Endangered	Endangered	Yes	Sept - Oct

4.3.1.2 Habitat

The highly fragmented and modification landscape as well as the introduction of non-native vegetation has substantially diminished habitat across the Project Area. Most of the cleared (treeless) areas have limited fauna habitat value, except for scattered trees and isolated patches of woodland where refuge and foraging opportunities remain.

Remnant native vegetation is present within the Project Area and was observed in moderate to good condition, along with areas of rocky outcrops that contain partially embedded rock and scattered loose rock surrounded by high cover of native grasses and diverse mid storey species. These areas contained suitable habitat for several native fauna species for shelter or to facilitate movement through the landscape.

Waterways and riparian corridors are dominated by River Oak and Yellow Box on the valley flats, these areas provide aquatic habitat and likely fauna movement corridors. Although largely ephemeral or semi-permanent, creeks may provide habitat for several amphibians, turtle species, macroinvertebrates and fish (NGH, 2021).

4.3.1.3 Threatened Flora

Four (4) threatened flora species are considered likely to occur within the Project Area, as listed in Table 4-5.

Table 4-5 Threatened Flora Likely to occur within Project Area

Common Name	Scientific Name	BC Act Status	EPBC Act Status
-	*Acacia meiantha*	Endangered	Endangered
Robertson's Peppermint	*Eucalyptus robertsonii* subsp. *hemisphaerica*	Vulnerable	Vulnerable
Silky Swainson-pea	*Swainsona sericea*	Vulnerable	-
Small Purple-pea	*Swainsona recta*	Endangered	Endangered

All four threatened flora species are candidate species in the BAM-Calculator and will require additional targeted flora surveys during future field assessment to assess areas of suitable habitat and to refine species polygon mapping. Other candidate flora species requiring targeted survey are identified in Table 4-4.

4.3.1.4 Threatened Fauna

A total of 23 threatened fauna species have been recorded during field survey events by direct observation and call analysis (See Table 4-6). Eight (8) of these threatened species are classed as candidate species in the BAM-Calculator and will require additional targeted surveys during future field assessment.

Table 4-6 Threatened Fauna Identified within Project Area During Field Surveys

Scientific Name	Common Name	BC Act Status	EPBC Act Status
Artamus cyanopterus[1]	Dusky Woodswallow	Vulnerable	Not listed
Calyptorhynchus lathami[2]	Glossy Black-cockatoo	Vulnerable	Vulnerable
Chalinolobus dwyeri[3]	Large-eared Pied Bat	Vulnerable	Vulnerable
Circus assimilis[1]	Spotted Harrier	Vulnerable	Not listed
Climacteris picumnus victoriae[1]	Brown Treecreeper (Eastern subspecies)	Vulnerable	Not listed
Daphoenositta chrysoptera[1]	Varied Sittella	Vulnerable	Not listed
Dasyurus maculatus[1]	Spotted-tailed Quoll	Vulnerable	Endangered
Epthianura albifrons[1]	White-fronted Chat	Vulnerable	Not listed
Falco subniger[1]	Black Falcon	Vulnerable	Not listed
Falsistrellus tasmaniensis[1]	Eastern False Pipistrelle	Vulnerable	Not listed

Scientific Name	Common Name	BC Act Status	EPBC Act Status
Glossopsitta pusilla[1]	Little Lorikeet	Vulnerable	Not listed
Melanodryas cucullata cucullata[1]	Hooded Robin (South-eastern form)	Vulnerable	Endangered
Miniopterus orianae oceanensis[2]	Large Bent-winged Bat	Vulnerable	Not listed
Neophema pulchella[1]	Turquoise Parrot	Vulnerable	Not listed
Ninox connivens[2]	Barking Owl	Vulnerable	Not listed
Petaurus norfolcensis[3]	Squirrel Glider	Vulnerable	Not listed
Phascolarctos cinereus[3]	Koala	Endangered	Endangered
Polytelis swainsonii[2]	Superb Parrot	Vulnerable	Vulnerable
Pyrrholaemus sagittatus[1]	Speckled Warbler	Vulnerable	Not listed
Saccolaimus flaviventris[1]	Yellow-bellied Sheathtail Bat	Vulnerable	Not listed
Scoteanax rueppellii[1]	Greater Broad-nosed Bat	Vulnerable	Not listed
Stagonopleura guttata[1]	Diamond Firetail	Vulnerable	Vulnerable
Tyto novaehollandiae[2]	Masked Owl	Vulnerable	Not listed

[1] Ecosystem credit species only
[2] Species is both an ecosystem credit species and a species credit species
[3] Species credit species only

Note that Nature Advisory threatened species records are presented separately, within the Nature Advisory Bird and Bat Risk Assessment included in Appendix F.

The Likelihood of Occurrence Assessment (Appendix C) identified four (4) additional fauna species that have not been recorded within the Project Area yet are considered likely to occur based on records in the locality and the presence of species-specific habitat. These species are provided in Table 4-7.

Table 4-7 Threatened Fauna Species Likely to Occur in Project Area

Scientific Name	Common Name	BC Act	EPBC Act
Anthochaera phrygia	Regent Honeyeater	CE	CE
Myotis macropus	Southern Myotis	V	-
Pteropus poliocephalus	Grey-headed Flying-fox	V	V
Petroica boodang	Scarlet Robin	V	-

4.4 Preliminary Bird and Bat Utilisation Results

Prescribed impacts relating to wind farm development apply not only to threatened species but also to microchiropteran bat species, resident raptor species, and nomadic or migratory species whose flight paths are likely to cross the Project Area (Section 6.1.5 of the BAM).

A Bird and Bat Risk Assessment was undertaken to identify significant risks to avifauna utilising the Project Area, presented in Appendix F.

Two impact pathways were assessed:

- Collision with turbines; and
- Indirect effects (including both disturbance and barrier effects).

Impact consequence criteria were developed and applied to each impact pathway for each species or species' groups of concern. The species or groups of species were short-listed based on the

likelihood of occurrence at the site. The risk level for each species or group of species from the two impact pathways was then determined using a risk matrix. The risk levels included:

- Negligible: Occasional individuals lost but no reduction in local or regional population viability;
- Low: Repeated loss of small numbers of individuals but no reduction in local or regional population viability;
- Moderate: Moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years;
- High: Major loss in numbers of individuals, leading to reduction in regional or state population viability for between five and ten years; and
- Severe: Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least ten years.

For most species assessed, the risk associated with wind turbine collision and indirect effects within Project Area was rated as negligible. The Project was considered to present some risk to species presented in Table 4-.

A Bird and Bat Adaptive Management Plan (BBAMP) will be developed to support the EIS and associated BDAR and will prescribe monitoring programs and mitigation measures to reduce the Project's impact on bird and bat species.

Table 4-8 Preliminary Bird Utilisation and Bat Utilisation Results

Scientific Name	Common Name	BC Act Status*	EPBC Act Status*	Risk Rating	
				Collision with operating wind turbines	Indirect disturbance, including barrier effects
Birds					
Anthochaera phrygia	Regent Honeyeater	CE	CE	Negligible	Negligible
Apus pacificus	Fork-tailed Swift	-	Ma, Mi	Negligible	Negligible
Aquila audax	Wedge-tailed Eagle	-	-	Moderate	Negligible
Artamus cyanopterus	Dusky Woodswallow	V	-	Low	Low
Calyptorhynchus lathami	Glossy Black Cockatoo	V	V	Negligible	Negligible
Chthonicola sagittata	Speckled Warbler	V	-	Negligible	Negligible
Circus assimilis	Spotted Harrier	V	-	Low	Negligible
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	V	Negligible	Negligible
Daphoenositta chrysoptera	Varied Sittella	V	-	Negligible	Negligible

Scientific Name	Common Name	BC Act Status*	EPBC Act Status*	Risk Rating	
				Collision with operating wind turbines	Indirect disturbance, including barrier effects
Epthianura albifrons	White-fronted Chat	V	-	Negligible	Negligible
Falco subniger	Black Falcon	V	-	Low	Negligible
Glossopsitta pusilla	Little Lorikeet	V	-	Negligible	Negligible
Grantiella picta	Painted Honeyeater	V	V	Negligible	Negligible
Haliaeetus leucogaster	White-bellied Sea Eagle	V	Ma	Negligible	Negligible
Hieraaetus morphnoides	Little Eagle	V	-	Negligible	Negligible
Hirundapus caudacutus	White-Throated Needletail	-	V, Ma, Mi	Low	Negligible
Lathamus discolor	Swift Parrot	CE	CE	Negligible	Negligible
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	E	Negligible	Negligible
Myiagra cyanoleuca	Satin Flycatcher	-	Mi	Negligible	Negligible
Neophema pulchella	Turquoise Parrot	V	-	Negligible	Negligible
Ninox connivens	Barking Owl	V	-	Negligible	Negligible
Petroica multicolor	Scarlet Robin	V	-	Negligible	Negligible
Petroica phoenicea	Flame Robin	V	-	Negligible	Negligible
Polytelis swainsonii	Superb Parrot	V	V	Negligible	Negligible
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	-	Low	Negligible
Stagonopleura guttata	Diamond Firetail	V	V	Negligible	Negligible
Other raptor species recorded on site				Low	Negligible
Waterbirds recorded on site				Negligible	Negligible
Bats					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Low	Negligible
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Negligible	Negligible

Scientific Name	Common Name	BC Act Status*	EPBC Act Status*	Risk Rating	
				Collision with operating wind turbines	Indirect disturbance, including barrier effects
Miniopterus orianae oceanensis	(Eastern) Large Bent-wing Bat	V	-	Low	Negligible
Myotis macropus	Southern Myotis	V	-	Negligible	Negligible
Nyctophilus corbeni	South-eastern Long-eared Bat	V	V	Negligible	Negligible
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Low	Negligible
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V	-	Low	Negligible
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Negligible	Negligible

V = vulnerable, CE = critically endangered, Ma = marine, Mi = migratory

5. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

A preliminary assessment of Matters of National Environmental Significance (MNES) within the Project Area has been provided in Table 5-1. The results of the Protected Matters Search are provided in Appendix A. The Likelihood of Occurrence Assessment, including for Commonwealth-listed threatened entities is provided in Appendix C.

An Assessment of Significant Impact has been completed in accordance with *Significant Impact Guidelines 1.1- Matters of National Environmental Significance* (Department of the Environment, 2013) for EPBC Act listed entities considered known or likely to occur within the Project Area and is presented in Appendix E.

Table 5-1 Preliminary assessment of Matters of National Environmental Significance (MNES)

MNES	Relevance to the Project Area
World Heritage Properties	Not identified within the Project Area or within 50 km radius
National Heritage Places	Not identified within the Project Area or within 50 km radius
Wetlands of International Importance	There are no wetlands of international importance within the Project Area. The closest records (as identified within the Protected Matters Search Tool (PMST)) are: ■ Banrock Station wetland complex (800 - 900 km upstream); ■ The Macquarie Marshes (200 - 300 km upstream); ■ Riverland (700 - 800 km upstream); and ■ The Coorong, and Lakes Alexandrina and Albert Wetland (900 - 1000 km upstream). It is unlikely the Project will impact any Wetlands of International Importance.
Threatened Ecological Communities	The following EPBC Act listed TEC is known to occur within the Project Area in varying condition states: ■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (critically endangered) – present in woodland and derived native grassland condition states. An Assessment of Significance has been undertaken for this ecological community in both condition states (Appendix E). Further surveys will be required during the EIS stage to confirm the extent of the TEC. The following EPBC Act listed TECs have the potential to occur within the Project Area based on the PMST: ■ Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia; and ■ Natural Temperate Grassland of the South Eastern Highlands. These TECs are not associated with any mapped PCTs within the Project Area and are considered unlikely to occur.
Threatened Species	Eight (8) EPBC Act listed threatened species were identified within the Project Area during field surveys. These include: ■ Koala (*Phascolarctos cinereus*), listed as endangered under the EPBC Act; ■ Brown Treecreeper (Eastern subspecies) (*Climacteris picumnus victoriae*), listed as vulnerable under EPBC Act; ■ Diamond Firetail (*Stagonopleura guttata*), listed as vulnerable under the EPBC Act; ■ Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*), listed as Endangered under the EPBC Act; ■ Large-eared Pied Bat (*Chalinolobus dwyeri*), listed as vulnerable under the EPBC Act;

MNES	Relevance to the Project Area
	■ South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), listed as vulnerable under the EPBC Act; ■ Spotted-tailed Quoll (*Dasyurus maculatus*), listed as endangered under the EPBC Act; and ■ Superb Parrot (*Polytelis swainsonii*), listed as vulnerable under the EPBC Act. A further five (5) EPBC Act listed threatened species are considered likely to occur within the Project Area based on the Likelihood of Occurrence Assessment: ■ *Acacia meiantha*, listed as endangered under the EPBC Act; ■ Grey-headed Flying-fox (*Pteropus poliocephalus*), listed as vulnerable under the EPBC Act; ■ Robertson's Peppermint (*Eucalyptus robertsonii* subsp. *hemisphaerica*); listed as vulnerable under the EPBC Act; ■ Regent Honeyeater (*Anthochaera phrygia*), listed as critically endangered under the EPBC Act; and ■ Small Purple-pea (*Swainsona recta*), listed as endangered under the EPBC Act. An Assessment of Significant Impact has been completed for EPBC Act listed species considered known or likely to occur within the Project Area and is presented in Appendix E.
Migratory Species	No birds listed as Migratory under the EPBC Act were identified during the field surveys or were considered known or likely to occur within the Project Area based on the Likelihood of Occurrence Assessment presented in Appendix C.
Commonwealth Marine Area	Not identified within the Project Area or within 50 km radius
The Great Barrier Reef Marine Park	Not identified within the Project Area or within 50 km radius

An Assessment of Significant Impact was completed for 14 MNES biodiversity values (Appendix E). The assessment identified the Project as having the potential to cause significant impact to the following species and/or communities:

- Grey-headed Flying-fox (*Pteropus poliocephalus*), listed as vulnerable under the EPBC Act;
- Regent Honeyeater (*Anthochaera phrygia*), listed as critically endangered under the EPBC Act;
- Robertson's Peppermint (*Eucalyptus robertsonii* subsp. *hemisphaerica*); listed as vulnerable under the EPBC Act;
- Small Purple-pea (*Swainsona recta*), listed as endangered under the EPBC Act;
- South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), listed as vulnerable under the EPBC Act;
- Superb Parrot (*Polytelis swainsonii*), listed as vulnerable under the EPBC Act.;
- *Acacia meiantha*, listed as endangered under the EPBC Act; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; listed as critically endangered.

Under the EPBC Act, a referral is required to the Commonwealth for projects, or 'actions', that are likely to have a significant impact on a MNES, or the environment on Commonwealth land. The Australian Government Minister for the Environment determines whether the Project will need formal assessment and approval under the EPBC Act (i.e., Controlled Action).

The Project has the potential for significant impact to MNES that are known or likely to occur within the Project Area. Therefore, it is recommended that the Project be Referred to DCCEEW to determine if the Project is a Controlled Action.

6. PRELIMINARY IMPACT ASSESSMENT

The main potential impacts of the project (during construction and operation) that would need to be assessed include:

- Clearing of TECs;
- Loss of extant native vegetation communities and associated fauna habitat and the subsequent impacts to local populations of native species, particularly threatened and migratory species;
- Loss of and impact to resident raptor nesting sites;
- Increased habitat fragmentation;
- Mortality and injury of avian and microchiropteran species from turbine strike;
- Mortality and injury to fauna from vehicle strike and vegetation clearing; and
- Mortality and injury to fauna from barotrauma.

Candidate species will be subject to further targeted survey to determine how they and their habitat might be affected by the Project. A preliminary list has been presented in Section 4.3.

Mitigation measures relevant to threatened species, TECs, native vegetation communities, species vulnerable to turbine strikes, hydrological and construction impacts will be addressed within the EIS. There is also a risk that weeds may be transported within and off-site. Mitigation measures to reduce the chance of the spread of weeds will be considered within the EIS.

6.1 Serious and Irreversible Impacts

The principles used to determine if a development will have serious and irreversible impacts, include impacts that:

- Will cause a further decline of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to be in a rapid rate of decline, or
- Will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or
- Impact on the habitat of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very limited geographic distribution, or
- Impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

The following species and communities are listed by the NSW Department of Planning and Environment (DPE) as likely to be at risk of serious and irreversible impact (SAII) (if impacted by a development):

- *Acacia meiantha*;
- Granite Zieria (*Zieria obcordata*);
- *Grevillea divaricata*;
- Large Bent-winged Bat (*Miniopterus orianae oceanensi*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*);
- Regent Honeyeater (*Anthochaera phrygia*);
- Robertson's Peppermint (*Eucalyptus robertsonii subsp. hemisphaerica*);
- Swift Parrot (*Lathamus discolor);*
- Yellow-spotted Tree Frog (*Litoria castanea*); and

- White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland TEC.

All these threatened species and the TEC have the potential, are likely or known to occur within the Project Area. Under the BC Act, a determination from the approval authority of whether an impact is serious and irreversible must be made in accordance with the principles prescribed in *clause 6.7* of the *Biodiversity Conservation Regulation 2017* for a species or community with a potential for SAII trigger. Further assessment within the Project Area would be required to determine the presence or absence and / or extent of these threatened species and White Box-Yellow Box-Blakeley's Red Gum Grassy Woodland and Derived Native Grassland TEC in the Project Area.

6.2 MNES Significant Residual Impact

Preliminary significant impact assessments under the *Significant Impact Guidelines 1.1- Matters of National Environmental Significance* (Department of the Environment, 2013) are provided in Appendix E for the following MNES considered known or likely to occur within the Project Area:

- *Acacia meiantha*, listed as endangered under the EPBC Act;
- Brown Treecreeper (Eastern subspecies) (*Climacteris picumnus victoriae*), listed as vulnerable under EPBC Act;
- Diamond Firetail (*Stagonopleura guttata*), listed as vulnerable under the EPBC Act;
- Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*), listed as Endangered under the EPBC Act;
- Grey-headed Flying-fox (*Pteropus poliocephalus*), listed as vulnerable under the EPBC Act;
- Koala (*Phascolarctos cinereus*), listed as endangered under the EPBC Act;
- Large-eared Pied Bat (*Chalinolobus dwyeri*), listed as vulnerable under the EPBC Act;
- Regent Honeyeater (*Anthochaera phrygia*), listed as critically endangered under the EPBC Act;
- Robertson's Peppermint (*Eucalyptus robertsonii* subsp. *hemisphaerica*); listed as vulnerable under the EPBC Act;
- Small Purple-pea (*Swainsona recta*), listed as endangered under the EPBC Act;
- South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), listed as vulnerable under the EPBC Act;
- Spotted-tailed Quoll (*Dasyurus maculatus*), listed as endangered under the EPBC Act;
- Superb Parrot (*Polytelis swainsonii*), listed as vulnerable under the EPBC Act; and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC (Critically Endangered)

Habitat maps/extent of occurrence maps for these species and communities are also outlined in Appendix E.

A summary of significant residual impact for each species and the TEC has been outlined in Table 6-1. The Significant Impact Assessments use an area of impact based on the proposed Disturbance Footprint. This area is considered greater than the likely area of impact and allows for consideration of additional infrastructure components (access roads, electrical reticulation network etc.).

Table 6-1 MNES Significant Residual Impact Summary

Species	Impact Significance
Acacia meiantha	No significant impact
Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)	No significant impact
Diamond Firetail (*Stagonopleura guttata*)	No significant impact
Hooded Robin (South-eastern form) (*Melanodryas cucullata cucullata*)	No significant impact
Grey-headed Flying-fox (*Pteropus poliocephalus*)	No significant impact
Koala (*Phascolarctos cinereus*)	Potentially significant impact
Large-eared Pied Bat (*Chalinolobus dwyeri*)	No significant impact
Regent Honeyeater (*Anthochaera phrygia*)	No significant impact
Robertson's Peppermint (*Eucalyptus robertsonii* subsp. *hemisphaerica*)	Potentially significant impact
Small Purple-pea (*Swainsona recta*)	No significant impact
South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)	Potentially significant impact
Spotted-tailed Quoll (*Dasyurus maculatus*)	Potentially significant impact
Superb Parrot (*Polytelis swainsonii*)	Potentially significant impact
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – woodland	Potentially significant impact
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – derived native grassland	Potentially significant impact

6.3 Recommendations and Next Steps

The desktop assessment and field surveys undertaken to date have highlighted a range of known, likely and potential biodiversity constraints. The following steps are required to adequately assess biodiversity values:

- Prepare and submit an EPBC Act referral to the Commonwealth government for the Project to trigger the Bilateral arrangements for assessment;
- Conduct further targeted seasonal fauna and flora surveys for candidate species considered likely or that may potentially occur within the Project Area in accordance with relevant Commonwealth or State survey guidelines;
- Refine vegetation mapping to define condition states (i.e., vegetation zones) including allocation of TECs (e.g., detailed consideration of derived native grasslands);
- Prepare and submit a BDAR in accordance with the BAM; and
- Assess MNES identified by DCCEEW as requiring additional consideration (e.g., species listed on the EPBC Act but not on the BC Act).

Refinement in Project design is also recommended to avoid and minimise impacts. Guidance for this is provided as follows:

- Loss of existing native vegetation:
  - Areas of remnant and regrowth vegetation to be avoided at the design and micro siting stages, where practicable;
  - Where unavoidable, preferentially align Project design to areas with vegetation and habitat of lower vegetation integrity;
  - If vegetation clearing is required, a Vegetation Management Plan will be implemented to ensure that clearing is undertaken in accordance with legislative standards and requirements; and
  - To assist in the preservation of the threatened ecological community identified on site, it is recommended that a buffer zone of at least 30 metres be maintained from the outer edge of an identified patch.
- Threatened species:
  - Areas of threatened flora and fauna habitat to be avoided at the design and micro siting stages, where practicable;
  - Landscape features, such as wildlife corridors, stepping stones of vegetation, waterways and rocky outcrops to be preserved or enhanced, where practicable.
  - If loss of habitat features is required, actions are taken to provide alternative habitat, such as constructed hollows.
- Weed and pest control:
  - A Pest Management Plan will be developed and implemented for the Project. This will include measures such as vehicle wash downs, weed certification and obligations to stick to access tracks throughout the Project Area;
  - Weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, relevant landholder agreement or conduct and compensation agreements provisions, and local, state and national regulatory requirements;
  - Imported material able to transport weed seed will be assessed to ensure they are free of contamination, disease and invasive weeds; and
  - WoNS and Invasive species will be identified and monitored in the Project Area. Appropriate weed monitoring will occur to ensure new weed species are identified, recorded and managed appropriately.
- Mortality or injury to native fauna:
  - No driving will occur in unauthorised areas, and in other areas will be carried out at safe speeds adopted suitable for the road conditions; and
  - If vegetation clearing is required, injured, sick or dead fauna will be recorded and reported during construction. This can be carried out by a trained fauna spotter-catcher.
- Impacts from turbine collision to bats and birds:
  - Areas of bird habitat including known nests to be avoided in the design and then further avoided when micro siting occurs, where practicable;

    Development of a Bird and Bat Management Plan that considers the potential impacts to birds and mitigation measures to address these; and

Additional measures could include locating turbines away from key bird and bat habitats (waterways and drainage lines) and reducing turbine speeds at key times of day when avifauna are most active where practicable.

REFERENCES

Briggs, J.D. and Leigh, J.H. (1990). Delineation of Important Habitats of Threatened Plant Species in South-eastern New South Wales, 312 pp. Research Report to the Australian Heritage Commission. (Aust.Heritage Commission: Canberra.)

Centre for Invasive Species Solutions. (2021). *Weeds of National Significance (WONS)*. Retrieved December 15, 2022, from Weeds Australia: https://weeds.org.au/weeds-profiles/

Commonwealth Bureau of Meterology. (2022). *Groundwater Dependent Ecosystems Atlas*. Retrieved November 29, 2022, from http://www.bom.gov.au/water/groundwater/gde/

CSIRO. (2022). *Atlas of Living Australia*. Retrieved November 28, 2022, from https://www.ala.org.au/

DCCEEW. (2022a). *Protected Matters Search Tool*. Retrieved November 29, 2022, from https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool

DCCEEW. (2022b). *Species Profile and Threats Database*. Retrieved December 19, 2022, from http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Climate Change, Energy, the Environment and Water. (2023). *Conservation Advice for Climacteris picumnus victoriae (brown treecreeper (south-eastern))*. Retrieved from http://www.environment.gov.au/biodiversity/threatened/species/pubs/67062-conservation-advice-31032023.pdf

Department of Climate Change, Energy, the Environment and Water. (2023). *Conservation Advice for Melanodryas cucullata cucullata (hooded robin (south-eastern))*. Retrieved from http://www.environment.gov.au/biodiversity/threatened/species/pubs/67093-conservation-advice-31032023.pdf

Department of Climate Change, Energy, the Environment and Water. (2023). *Conservation Advice for Stagonopleura guttata (diamond firetail)*. Retrieved from http://www.environment.gov.au/biodiversity/threatened/species/pubs/59398-conservation-advice-31032023.pdf

Department of the Environment. (2013). *Matters of National Environmental Significance: Significant Impact Guidelines 1.1.* Canberra: Commonwealth of Australia.

Nature Advisory. (2021). *Bird and Bat Risk Assessment.* Hawthorn East, Victora: Nature Advisory.

NGH. (2021). *Draft Biodiversity Constraints Report: Kerrs Creek Wind Farm.* Unpublished.

NGH. (2021b). *Draft Land Category Assessment: Kerrs Creek Wind Farm.* Unpublished.

NSW Department of Customer Service. (2020). Biodiversity Values Map and Threshold Tool. Retrieved December 15, 2022, from https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

NSW DPI. (2013). *Policy and guidelines for fish habitat conservation and management.* Wollongbar: Department of Trade and Investment, Regional Infrastructure and Services.

NSW DPI. (2022). Fisheries Spatial Data Portal. Retrieved December 15, 2022, from https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

NSW DPI. (2022a). *NSW WeedWise*. Retrieved November 29, 2022, from https://weeds.dpi.nsw.gov.au/

NSW Spatial Services (DCS SS), a business unit in the Department of Customer Service. (2022). *Spatial Collaboration Portal*. Retrieved November 29, 2022, from https://portal.spatial.nsw.gov.au/portal/apps/sites/#/homepage

State Government of NSW and DPE. (2022). Transitional native vegetation regulatory (NVR) map. Retrieved December 15, 2022, from https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

State Government of NSW and DPE. (2022a). NSW State Vegetation Type Map. Retrieved November 28, 2022, from https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map

State of New South Wales (DPE). (2022a). *NSW BioNet*. Retrieved November 29, 2022, from https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet

State of NSW and DPE. (2022b). *NSW SEED Portal*. Retrieved November 29, 2022, from https://www.seed.nsw.gov.au/

State of NSW and DPE. (2022c). *eSPADE: NSW Soil and Land Information*. Retrieved November 29, 2022, from https://www.environment.nsw.gov.au/eSpade2Webapp/#

State of NSW and DPE. (2022d). *Groundwater dependent ecosystems (GDEs)*. Retrieved December 19, 2022, from https://water.dpie.nsw.gov.au/science-data-and-modelling/surface-water/environmental-outcomes-monitoring-and-research-program/groundwater-dependent-ecosystems

State of NSW and DPE. (2022e). *The Biodiversity Assessment Method 2020*. Retrieved November 29, 2022, from https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/accredited-assessors/biodiversity-assessment-method-2020

Webster R and Menkhorst P (1992). The Regent Honeyeater (Xanthomyza phrygia): population status and ecology in Victoria and New South Wales. Arthur Rylah Institute for Environmental Research, Technical Report Series Number 126. Department of Conservation and Environment, Melbourne.

APPENDIX A PROTECTED MATTERS SEARCH TOOL RESULTS

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: 05-Apr-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	42
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)	[Resource Information]
Ramsar Site Name	Proximity
Banrock station wetland complex	800 - 900km upstream from Ramsar site
Riverland	700 - 800km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream from Ramsar site
The macquarie marshes	200 - 300km 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
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to 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		

Scientific Name	Threatened Category	Presence Text
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely 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 likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo [82926]	Endangered	Species or species habitat may occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	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 likely to occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
FISH		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
INSECT		
Synemon plana Golden Sun Moth [25234]	Vulnerable	Species or species habitat may 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 likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may 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]	Endangered	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
PLANT		
Ammobium craspedioides		
Yass Daisy [20758]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus aggregata		
Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus robertsonii subsp. hemisphaerica		
Robertson's Peppermint [56223]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Zieria obcordata Granite Zieria [3240]	Endangered	Species or species habitat may occur within area
REPTILE		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may 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		

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat likely 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 likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
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 may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may 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 likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may 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 likely to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Not controlled action (particular manner)			
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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APPENDIX B SURVEY EFFORT MAPPING

Survey Effort (Flora) Map 1

Legend

- Site boundary
- Study area (200m buffer)
- Roads

Survey Methods

- Survey tracks
- Targeted flora surveys
- Rapid vegetation assessments
- BAM plots

Plant Community Types

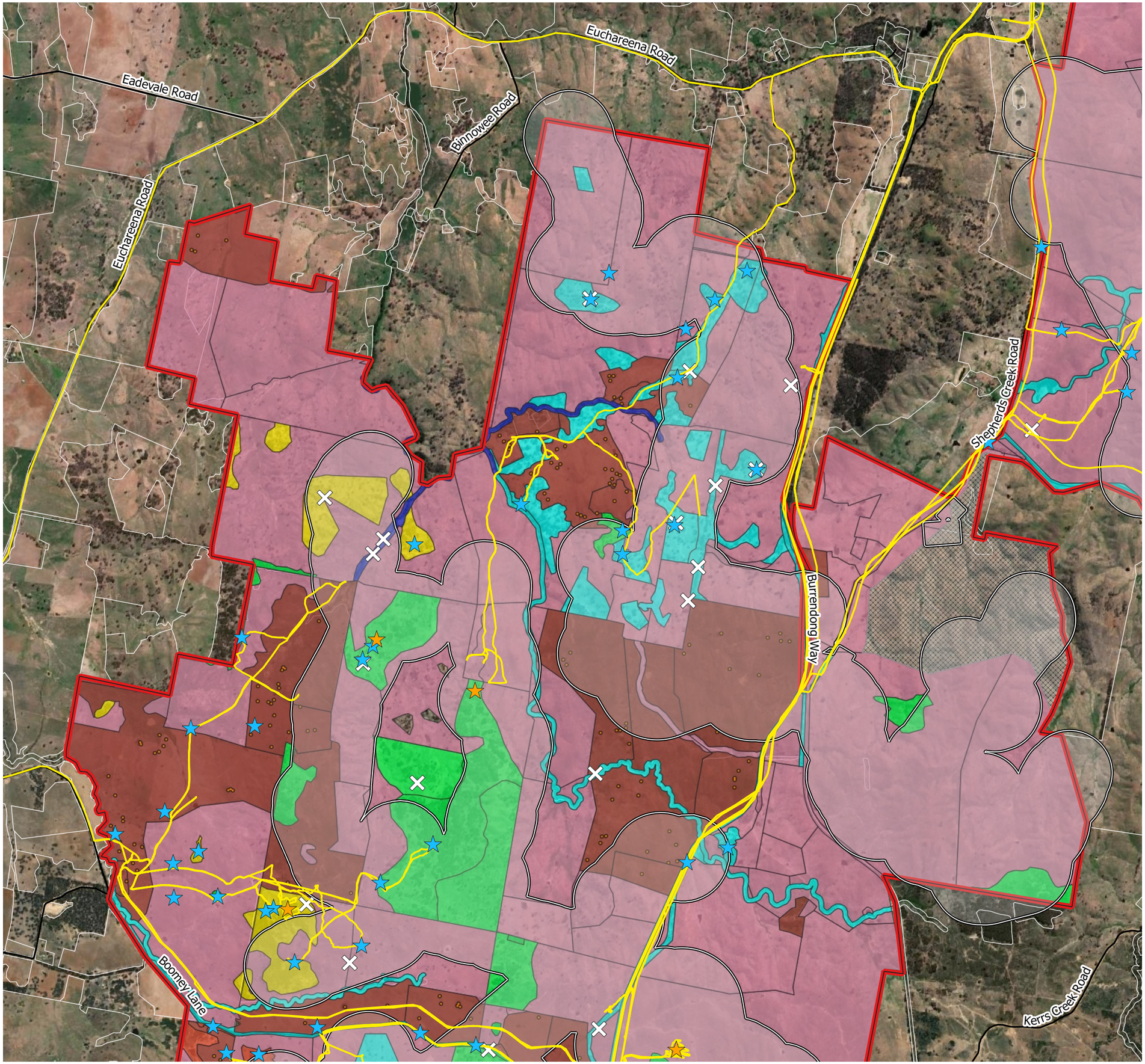
- PCT 272
- PCT 277
- PCT 287
- PCT 289
- PCT 797
- PCT 85
- Non native
- Scattered trees
- Not assessed

0 0.5 1 1.5 m

Ref: 19-531 Kerrs Creek Wind Farm BDAR
301020 \ Survey Effort (Flora)
Author: T.Hume
Date created: 04.08.2021
Datum: GDA94 / MGA zone 55

NGH

Survey Effort (Flora) Map 2



Legend

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- Study area (200m buffer)
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NGH

Survey Effort (Flora) Map 3

Legend

- Site boundary
- Study area (200m buffer)
- Roads

Survey Methods

- Survey tracks
- Targeted flora surveys
- Rapid vegetation assessments
- BAM plots

Plant Community Types

- PCT 272
- PCT 277
- PCT 287
- PCT 289
- PCT 797
- PCT 85
- Non native
- Scattered trees
- Not assessed

Boomey Lane
Burrendong Way
Kerrs Creek Road
Kerrs Creek Road
Burrendong Way
Callula Road

0 0.5 1 1.5 m

Ref: 19-531 Kerrs Creek Wind Farm BDAR
301020 \ Survey Effort (Flora)
Author: T.Hume
Date created: 04.08.2021
Datum: GDA94 / MGA zone 55

NGH

Survey Effort (Fauna) Map 1

Legend

- Site boundary
- Study area (200m buffer)
- Roads

Survey Effort

- Active search
- Diurnal bird survey
- Spotlight
- Call playback
- Camera
- Reptile survey
- Sat survey
- Scat survey
- Survey tracks

Plant Community Types

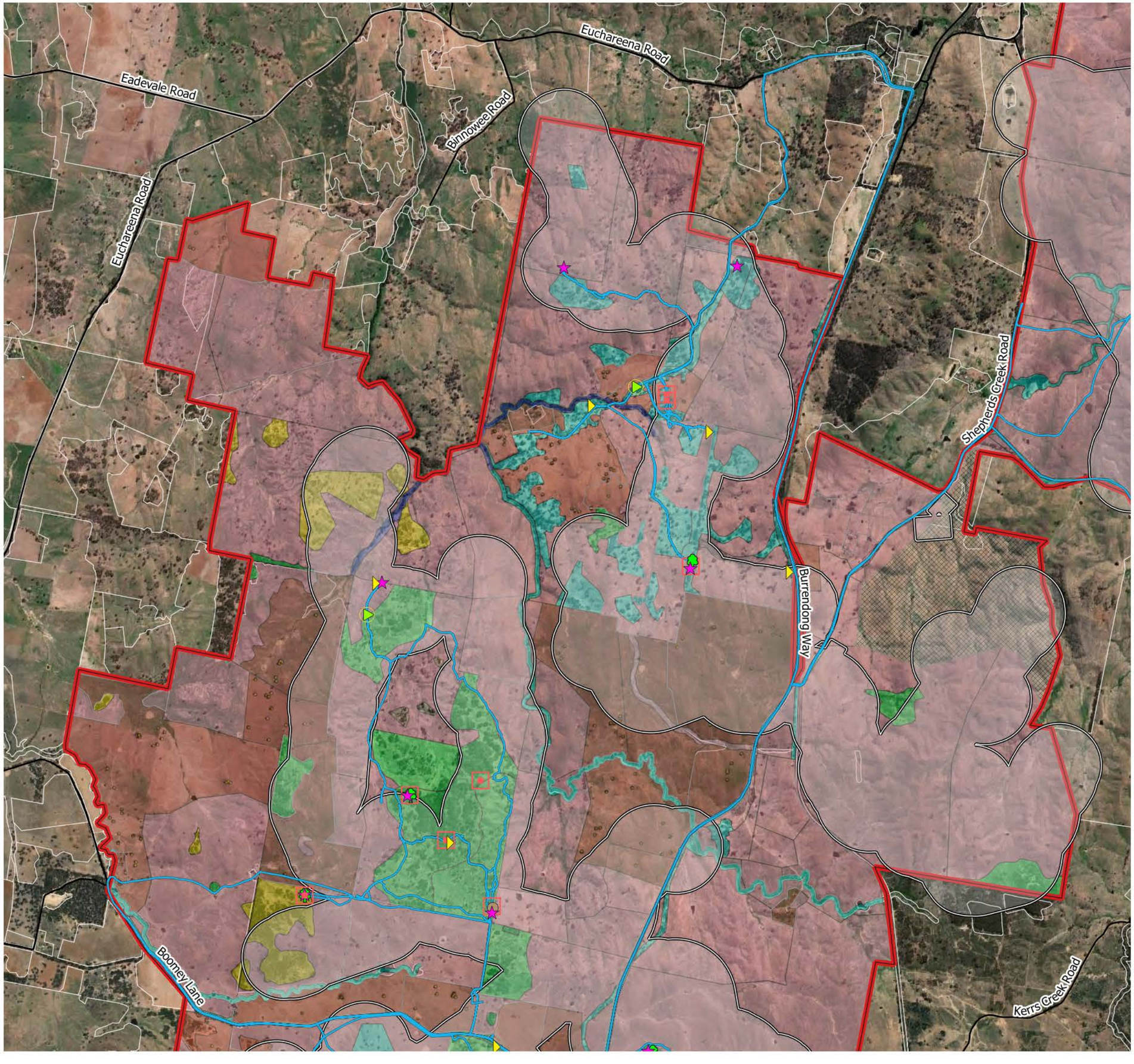
- PCT 272
- PCT 277
- PCT 287
- PCT 289
- PCT 797
- PCT 85
- Non Native
- Scattered trees
- Not assessed

0 0.5 1 1.5 m

Ref: 19-531 Kerrs Creek Wind Farm BDAR
301020 \ Survey Effort (Fauna)
Author: T.Hume
Date created: 03.08.2021
Datum: GDA94 / MGA zone 55

NGH

Survey Effort (Fauna) Map 2



Legend

- Site boundary
- Study area (200m buffer)
- Roads

Survey Effort

- Active search
- Diurnal bird survey
- Spotlight
- Call playback
- Camera
- Reptile survey
- Sat survey
- Scat survey
- Survey tracks

Plant Community Types

- PCT 272
- PCT 277
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Author: T.Hume
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NGH

Survey Effort (Fauna) Map 3

Boomey Lane
Burrendong Way
Kerrs Creek Road
Kerrs Creek Road
Calula Road
Burrendong Way

Legend

- Site boundary
- Study area (200m buffer)
- Roads

Survey Effort

- Active search
- Diurnal bird survey
- Spotlight
- Call playback
- Camera
- Reptile survey
- Sat survey
- Scat survey
- Survey tracks

Plant Community Types

- PCT 272
- PCT 277
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Author: T.Hume
Date created: 03.08.2021
Datum: GDA94 / MGA zone 55

NGH

APPENDIX C LIKELIHOOD OF OCCURRENCE ASSESSMENT

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
Birds								
Actitis hypoleucos	Common Sandpiper	-	Mi	-	The Common Sandpiper is found along all coastlines of Australia and in many areas inland. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The species has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks	**Unlikely:** The Project Area is within the known distribution, however there are no records within the Project Area or the locality. There may be limited suitable habitat for this species within the Project Area in the form of farm dams, waterholes and ephemeral pools.	No	No
Aphelocephala leucopsis	Southern whiteface	-	V	0	Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover.	**Potential:** The Project Area is within the known distribution for the species. There are no known records within the locality, with the closest record being from approximately 20 km from the site boundary, within the Ophir Reserve in 1997. Suitable habitat is present in the form of Eucalypt dominated woodlands with understory of grass.	No	Yes
Anthochaera phyrgia	Regent Honeyeater	CE	CE	✓	This species mainly inhabits temperate woodlands and open forest of the inland slopes of south-east Australia. Sometimes also sporadically found in drier coastal woodlands and forests. NSW distribution is very patchy and primarily confined to the two main breeding areas and surrounding fragmented woodlands.	**Likely**: The Project Area is within the known distribution and there exists the potential for preferred habitat to exist across the site in the form of key foraging species of yellow box, and white box. There is one record from 2005 within the	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					The species prioritises Box-ironbark woodlands that support a significantly high abundance and species richness of bird species. These woodlands require significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key foraging species include mugga ironbark, yellow box, white box and swamp mahogany.	locality, recorded along the Macquarie River, and closer historical records from 1978. However, the Project Area is not a mapped as an important breeding area for the species under the BAM.		
Apus pacificus	Fork-tailed Swift	-	Mi	-	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Dividing Range; however, a few populations have been found west of the Range. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs, mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The Fork-tailed Swift usually arrives in Australia around October and leaves southern Australia from mid-April.	**Unlikely:** The Project Area is within the known distribution, however there are no records within the Project Area or the locality. There may be limited suitable habitat for this species within the Project Area in the form of riparian woodland and open farmland.	No	No
Artamus cyanopterus	Dusky woodswallow	V	-	✓	The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
Burhinus grallarius	Bush Stone-curlew	E	-	-	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. However, it is still common only in northern Australia and in the south-east, it is either rare or extinct throughout its former range. It inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. It is largely nocturnal, being especially active on moonlit nights and it feeds on insects and small vertebrates, such as frogs, lizards and snakes. It nests on the ground in a scrape or small bare patch.	**Potential:** There are no records in the locality, however terrestrial habitat of open forests and woodland are present in the Project Area, with a sparse grassy ground layer and fallen timber in places.	Yes	Yes
Botaurus poiciloptilus	Australasian Bittern	E	E	-	In New South Wales, it occurs along the coast and is also frequently recorded in the Murray Darling Basin, notably in floodplain wetlands of the Murray, Murrumbidgee, Lachlan, Macquarie and Gwydir Rivers. The species occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g., *Phragmites, Cyperus*, *Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate.	**Unlikely:** The Project Area is within the known distribution, however there are no records within the Project Area or the locality. There is also a lack of preferred habitat in the Project Area.	No	No
Calidris acuminata	Sharp-tailed Sandpiper	-	Mi	-	The Sharp-tailed Sandpiper spends its non-breeding season in Australia. Most of the population migrates to Australia, mostly to the south-east, and are widespread in both inland and coastal locations and in both freshwater and saline habitats.	**Unlikely**: The Project Area is within the known distribution, however there are no records within the Project Area or the locality. There may be suitable habitat for this species within the Project Area in the form of freshwater habitats.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
Calidris ferruginea	Curlew Sandpiper	E	CE	-	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in salt works and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.	**Unlikely**: The Project Area is within the known distribution, however there are no records within the Project Area or the locality. There may be suitable habitat for this species within the Project Area in the form of farm dams, waterholes and ephemeral pools, and the occasional floodwater.	No	No
Callocephalon fimbriatum	Gang-gang cockatoo	V	E	-	The Gang-gang Cockatoo occurs in tall mountain forests and woodlands, particularly in those that are heavily timbered and mature. Often moves to drier more open eucalypt forests and woodlands (like box-gum and box-ironbark assemblages) or in dry forest in coastal areas and often in urban areas.	**Unlikely:** The Project Area is within the known distribution for the species, however there are no records within the Project Area or the locality. Given that the habitat on site is not heavily timbered it is unlikely to occur.	No	No
Calyptorhynchus lathami (Calyptorhynchus lathami lathami under EPBC Act)	(South-eastern) Glossy Black-Cockatoo	V	V	✓	This species inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Black she-oak and forest sheoak are important foods. Belah is also utilised for foraging resources. The species is also dependant on large-hollow bearing eucalypts for nesting sites.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	Yes
Chthonicola sagittata	Speckled Warbler	V	-	✓	This species lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	No
Circus assimilis	Spotted Harrier	V	-	-	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. It occurs in grassy open woodland including *Acacia* spp. and mallee remnants, inland riparian woodland, grassland and shrub steppe.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. It builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. It preys on terrestrial mammals (e.g., bandicoots, bettongs and rodents), birds and reptile, occasionally insects and rarely carrion.			
Climacteris picumnus victoriae	Brown Treecreeper (Eastern subspecies)	V	V	✓	This species is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Found in eucalypt woodlands (*including Box-Gum Woodland*) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses;	**Known:** This species was recorded on site by Nature Advisory in 2021.	Yes	No
Daphoenositta chrysoptera	Varied Sittella	V	-	✓	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. inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	**Known:** This species was recorded on site by NGH in 2020.	Yes	No
Epthianura albifrons	White-fronted Chat	V	-	-	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state.	**Known.** This species was recorded on site by NGH in 2020 and by Nature Advisory in 2021.	Yes	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas.			
Falco hypoleucos	Grey Falcon	E	V	-	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species frequents timbered lowland plains, particularly acacia shrub lands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter. Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	**Potential:** The Project Area is within the distribution for the species, however there are a lack of records within the locality but the Project Area contains preferred hunting habitat of treeless areas, tussock grassland and open woodland.	No	No
Falco subniger	Black Falcon	V	-	✓	The Black Falcon is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day.	**Known.** Recorded on site by Nature Advisory in 2021	Yes	Yes
Glossopsitta pusilla	Little Lorikeet	V	-	✓	NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g., paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	**Known:** This species was recorded on site by NGH in 2020.	Yes	No
Grantiella picta	Painted Honeyeater	V	V	-	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, Callitris spp., and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes.	**Potential:** There is a lack of records in the locality, however the Project Area contains preferred habitat of *Callitris* spp., and mature box-ironbark-yellow gum woodlands with potential to contain mistletoe.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					It is more common in wider blocks of remnant woodland than in narrower, although it breeds in quite narrow roadside strips if ample mistletoe fruit is available. The species appears to prefer mistletoe as a nest substrate and selects nest sites in habitats where mistletoe prevalence and parasitism rates are high.			
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	✓	This species is widespread along the coast of NSW and along major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water, including large rivers, swamps, lakes, and the sea. Terrestrial habitat includes coastal dunes, tidal flats, grassland, heathland, woodland and forest (including rainforest). Breeding habitat, like most large eagles, consists of mature tall open forest, tall woodland and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts. They feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.	**Potential:** There is a record of the species within the locality from 2017, recorded to the east of the Project Area along the Macquarie River. Preferred habitat of large areas of open water is absent from the Project Area, however terrestrial habitat of woodland and forests are present.	No	Yes
Hieraaetus morphnoides	Little Eagle	V	-	✓	The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. It occupies open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also utilised. Like most eagles, builds large stick nests in tall living trees within remnant patches.	**Potential:** There is a record of the species within the locality from 2008, recorded to the east of the Project Area along the Macquarie River. The site is within the known distribution for the species and suitable habitat is present.	No	Yes
Hirundapus caudacutus	White-throated Needletail	-	V	-	The white-throated needletail is a migratory species which is usually seen in Eastern Australia from October to April. It breeds in the northern hemisphere near Siberia, Mongolia and Korea. They are often seen in Australia before storms where they follow low pressure troughs and approaching cold fronts (sometimes bushfires) which lift insects for their foraging. The white-throated needletail is almost exclusively aerial and are typically recorded most often above wooded areas, including open forests and rainforest.	**Potential:** The Project Area is within the known distribution; however, there is a lack of records in the locality. This largely aerial species has the potential to fly over the site in the summer months, and potential to use open forests present for roosting.	No	Yes

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					This species may roost in these areas as well, both among dense foliage or hollows, though this is likely uncommon.			
Lathamus discolor	Swift Parrot	E	CE	-	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. On the mainland and in NSW they occur in areas where eucalypts are flowering in large numbers, or where there are abundant lerp (from sap-suckign bugs) infestations. Favoured trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood C. *gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*.	**Potential:** The Project Area is within the known distribution and preferred winter flowering species are present (Mugga Ironbark, Yellow Box, and White Box). However, there are a lack of records in the locality and the Project Area is not within a mapped important breeding area for the species under the BAM.	No	Yes
Leipoa ocellata	Malleefowl	E	V	-	The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. Much of the best habitat for Malleefowl has already been cleared or has been modified by grazing by sheep, cattle, rabbits and goats.	**Unlikely:** there is a lack of records in the locality and the Project Area does not contain preferred habitat.	No	No
Lophochroa leadbeateri	Major Mitchell's cockatoo	V	E	0	The Major Mitchell's cockatoo lives in arid and semi-arid woodlands dominated by mulga (*Acacia aneura*), mallee and box eucalypts, slender cypress pine (*Callitris gracilis*) or belah (*Casuarina cristata*). Within these vegetation types, the subspecies main requirements are fresh surface water, and trees with suitable nesting hollows.	**Potential:** The Distribution for the species extends into the western portion of the Project area, however doesn't cover the entire site. There is suitable habitat in the form of *Callitris spp.* present within the Project Area.	No	No

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						There are no records of the species in the locality, with the closest record being from 2013, 30.8 km north west of the Project.		
Lophoictinia isura	Square-tailed Kite	V	-	-	The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. It is found in a variety of timbered habitats including dry woodlands and open forests. The species shows a particular preference for timbered watercourses. In arid north-western NSW, it has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland.It is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. It appears to occupy large hunting ranges of more than 100 km^2. The species breeds from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	**Potential:** The Project Area is within the known distribution; however, there is a lack of records in the locality. Preferred habitat in the form of woodlands, open forests and timbered watercourses are present within the Project Area.	No	Yes
Melanodryas cucullata cucullata	Hooded robin (south-eastern form)	V	E	✓	This species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	No
Melithreptus gularis gularis	Black-chinned Honeyeater	V	-	-	This species extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state.	**Potential:** The Project Area is within the known distribution;	Yes	No

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	(eastern subspecies)				In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. It occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi)* and Forest Red Gum (*E. tereticornis*). It also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.	however, there is a lack of records in the locality. Preferred habitat in the form of box woodlands and river she-oaks on watercourses are present within the Project Area.		
Motacilla flava	Yellow Wagtail	-	Mi	-	This species breeds in much of temperate Europe and Asia. It is resident in the milder parts of its range, such as western Europe, but northern and eastern populations migrate to Africa, south Asia and northern Australia. This insectivorous bird inhabits open country near water, such as wet meadows. It nests in tussocks.	**Unlikely:** there is a lack of records in the locality and the Project Area does not contain preferred habitat.	No	No
Myiagra cyanoleuca	Satin Flycatcher	-	Mi	-	The Satin Flycatcher is found along the east coast of Australia in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. The Satin Flycatcher nests in loose colonies of two to five pairs nesting at intervals of about 20 m - 50 m apart. It builds a broad-based, cup-shaped nest of shredded bark and grass, coated with spider webs and decorated with lichen. The nest is placed on a bare, horizontal branch, with overhanging foliage, about 3 m - 25 m above the ground	**Unlikely:** there is a lack of records in the locality and the Project Area does not contain preferred habitat.	No	No

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Neophema chrysostoma	Blue-winged Parrot	-	V, Ma	0	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks.	**Potential:** The Project Area is within the species distribution, however the closest known record of the species is from 2001 near Coonabarabran, 190 km north of the Project. Suitable habitat is present in the form of grasslands and grassy woordlands, however preferred habitat in proximity to wetlands is not present.	No	No
Neophema pulchella	Turquoise Parrot	V	-	✓	This species lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for seeds or grasses and herbaceous plants, or browsing on vegetable matter.	**Known:** This species was recorded on site by NGH in 2020, and Nature Advisory in 2021.	Yes	No
Ninox connivens	Barking Owl	V	-	-	The Barking Owl is found throughout continental Australia except for the central arid regions. Although still common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some north-east coastal and escarpment forests. The species 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. It is 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. It roosts in shaded portions of tree canopies, including tall mid-storey trees with dense foliage such as *Acacia* and *Casuarina* species. Nesting occurs during mid-winter and spring, being variable between pairs and among years.	**Known:** This species was recorded on site by NGH in 2020.	Yes	Yes

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Ninox strenua	Powerful Owl	V	-	-	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW the Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments. Specific habitat requirements include eucalypt forests and woodlands on productive sites on gentle terrain; a mosaic of moist and dry types, with mesic gullies and permanent streams; presence of leafy sub-canopy trees or tall shrubs for roosting; presence of large old trees to provide nest hollows. Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal marsupials. Roosts in groves of dense mid-canopy trees or tall shrubs in sheltered gullies, typically on wide creek flats and at the heads of minor drainage lines, but also adjacent to cliff faces and below dry waterfalls. Species commonly used for roosting include *Allocasuarina* spp., rainforest species and eucalypts. Roosting sites are commonly among small groves of up to 2 ha of similar-sized trees with dense foliage in the height range 3-15 m. Nests in old hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines, with hollows.	**Unlikely:** No records within the locality, the species was not identified during targeted winter surveys, and preferred habitat is very limited within Project Area.	No	No
Numenius madagascariensis	Eastern Curlew	-	CE, Mi	-	Within Australia, the species is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (*Zosteraceae*). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal salt works and sewage farms.	**Unlikely:** No records within the locality, the Project Area is not within the distribution for the species and suitable habitat is not present within Project Area.	No	No
Petroica boodang	Scarlet robin	V	-	✓	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	**Likely:** There are records of the Scarlet Robin in the locality, with the most recent being from 2017	No	Yes

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					This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. It is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	recorded within the Mullions Range State Forest to the south east of the Project Area. Preferred habitat is present within the Project Area.		
Polytelis swainsonii	Superb Parrot	V	V	✓	This species 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. This species inhabits box-gum, box-cypress-pine and Boree Woodland and River Red Gum Forest.	**Known:** This species was recorded on site by NGH in 2020 and Nature Advisory in 2021.	Yes	Yes
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	-	This species occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands.	**Potential:** The Project Area is within the known distribution; however, there is a lack of records in the locality. Preferred habitat in the form of box-gum woodlands is present within the Project Area.	No	No

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					It inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains and woodlands on fertile soils in coastal regions. Birds are generally unable to cross large open areas. The species prefers to remain in flocks of around 15 birds and breeds between July and February.			
Pseudomys novaehollandiae	New Holland Mouse	-	V	0	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes	**Unlikely:** The distribution for the species extends into the eastern boundary of the Project Area, however doesn't cover the entire site. There are no known records within the locality, with the closest record being from 1997 in the Goobang National Park, 47 km west of the Project. Suitable habitat in the form of heathland vegetation is absent from the Project Area.	No	No
Pycnoptilus floccosus	Pilotbird	V	-	-	Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. Important habitat for the species includes wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and dry sclerophyll forests and woodlands occupying dry slopes and ridges.	**Unlikely:** There are a lack of records in the locality and the Project Area is outside the known distributions for the species.	No	No
Rhipidura rufifrons	Rufous Fantail	-	Mi		The Rufous Fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas.	**Unlikely:** There are a lack of records in the locality and preferred habitat is not present within the Project Area.	No	No
Rostratula australis	Australian Painted Snipe	E	E	-	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.	**Unlikely:** There are no records of the species in the locality, and preferred habitat is not present within the Project Area.	No	No

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					Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby.			
Stagonopleura guttata	Diamond Firetail	V	V	✓	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	**Known:** This species was recorded on site by Nature Advisory in 2021.	Yes	No
Tyto novaehollandiae	Masked Owl	V	-	-	The Masked Owl extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. It lives in dry eucalypt forests and woodlands from sea level to 1100 m. It is a forest owl, but often hunts along the edges of forests, including roadsides. Pairs of the species have a large home-range of 1000 ha or more, depending on prey availability. It roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	**Known:** This species was recorded near the Project Area by NGH in 2020.	Yes	Yes
Fish								
Macquaria australasica	Macquarie Perch	E	E	-	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks	**Unlikely**: There are a lack of records in the locality, and the Project Area is outside the known distribution, however within the 'May Occur' distribution for the species.	No	No

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						The site does not contain any mapped habitat on the Fisheries NSW Spatial Data Portal, with the closest habitat mapped 30 km east of the site within the Turon River.		
Mogurnda adspersa (listed as threatened under the NSW *Fisheries Management Act 1994*)	Southern Purple Spotted Gudgeon	-	-	-	The Southern Purple Spotted Gudgeon is a small freshwater fish native to Australia. Two populations of Southern Purple Spotted Gudgeon occur in NSW; an eastern population found in coastal catchments north of the Clarence River, and a western population found throughout Murray-Darling Basin. The western population is confined to small remnant populations in the Macquarie, Gwydir and Border Rivers catchments and a self-sustaining population created from captive-bred fish in the Castlereagh catchment. It is a benthic species that can be found in a variety of habitat types such as rivers, creeks and billabongs with slow-moving or still waters or in streams with low turbidity. Cover in the form of aquatic vegetation, overhanging vegetation from river banks, leaf litter, rocks or snags are important for the species. Most remnant populations in NSW occur in small to medium sized streams.	**Potential**: There are a lack of records in the locality, but the Project Area is within the known distribution. The site also contains mapped habitat on the Fisheries NSW Spatial Data Portal.	No	Yes
Frogs								
Litoria aurea	Green and Golden Bell Frog	E	V	-	The species inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.), Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available.	**Potential:** There are no records within the locality, however the Project Area is within the known distribution, and preferred habitat may be present (but this will require further investigation).	No	Yes
Litoria booroolongensis	Booroolong Frog	E	E	-	The Booroolong Frog occurs along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins, or near slow-flowing connected or isolated pools that contain suitable rock habitats. Streams range from small slow-flowing creeks to large rivers.	**Unlikely:** There is a lack of records in the locality and the Project Area is outside the known distribution for the species.	No	No

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Litoria castanea	Yellow-spotted Tree Frog	CE	E	-	The species requires large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation.	**Potential:** There are no records within the locality, however the Project Area is within the known distribution, and preferred habitat may be present (but this will require further investigation).	No	Yes
Reptiles								
Aprasia parapulchella	Pink-tailed Worm-lizard (or Pink-tailed Legless Lizard)	V	V	-	The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slope. Inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. The species is commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	Yes
Delma impar	Striped Legless Lizard	V	V	-	The Striped Legless Lizard is a grassland specialist. Potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands) across the historical range of the species, provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing. The species inhabit native grasslands dominated by species such as Spear Grass (*Austrostipa bigeniculata*), Kangaroo Grass (*Themeda triandra*) and in some areas inhabits areas dominated by introduced species such as *Phalaris aquatica*, Serated Tussock (*Nasella trichotoma*) and *Hypocharis radicata*, and at sites with a history of grazing and pasture improvement.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	Yes

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Varanus rosenbergi	Rosenberg's Goanna	V	-	-	Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. It is found in heath, open forest and woodland. It is associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	No
Insects								
Keyacris scurra	*Key's Matchstick Grasshopper*	E	-		Key's Matchstick grasshopper was originally distributed from Victoria to Orange (NSW) across the wheat/sheep belt, typically recorded in native grasslands and grassy woodland. It has been found in the following land-uses: cemeteries, along railway easements, travelling stock routes and more recently conservation reserves in the ACT. Disturbance appears to be an important determinant of site occupancy and it appears to be absent from sites that are disturbed during inappropriate times of the year (and interrupt the short non-overlapping lifecycle) or have been subjected to erratic management (e.g., periods of over and under grazing). More recently this species has been incidentally recorded within a wider range of habitats than were previously thought to be suitable and further research is required to determine the importance of these locations to the distribution and conservation status of this species. It is typically found in native grasslands and grassy woodlands but it has also been recorded in other vegetation associations usually containing a native grass understory (especially kangaroo grass *Themeda triandra*) and known food plants (particularly Asteraceae).	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
Paralucia spinifera	Purple Copper Butterfly, Bathurst Copper Butterfly	E	V		Until very recently the 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. It is highly possible where potential habitat occurs that additional locations will be identified and these again may lie outside the currently known distribution of the species. The species occurs above 850 m elevation, and the geology, soils, topographic position and dominant vegetation canopy species vary between habitat locations. However,r vegetation structure is consistent - commonly open woodland or open forest with a sparse understorey that is dominated by the shrub, Native Blackthorn *Bursaria spinosa* subsp. *lasiophylla*.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat possibly present. Further field survey will be required to determine whether *Bursaria spinosa* subsp. *lasiophylla* is present.	No	Yes
Synemon plana	Golden Sun Moth	V	V	-	Across the historical range of the Golden Sun Moth, habitat includes areas containing, or having once contained, native grassland, open grassy woodlands and secondary grasslands, that retain a component of larval food species. This includes degraded habitats that retain a component of native larval food species, or have been invaded by the exotic species, Chilean Needlegrass (*Nassella neesiana*), which the Golden Sun Moth is also known to feed on. Larval food plants include Wallaby Grasses and Speargrasses and Serrated Tussock (Nassella trichotoma.	**Unlikely:** There are a lack of records in the locality and the Project Area is outside the known distribution, although the southern portion of the property is within the 'May Occur' distribution for the species.	No	No
Mammals								
Cercartetus nanus	Eastern Pygmy Possum	V	-	-	The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	**Habitat Summary** (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					It is 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 be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of eucalypts alone is sufficient to support populations in low densities.			
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	✓	This species occurs primarily in areas with extensive cliffs and caves. The species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging. Roosts in caves, crevices in cliffs, old mines and in the mud nests of Fairy Martins (*Petrochiledon ariel*). Also found in well-timbered areas containing gullies.	**Likely:** This species was possibly (unresolved) recorded within the Project Area, with three calls in total being identified as possibly belonging to this species during the Nature Advisory Summer/Autumn 2021 survey. There is also a recent record of the species from 2020 located 4.7 km west of the Project Area, along Bell River. Suitable habitat is present in the form of box-gum woodland.	No	Yes
Dasyurus maculatus	Spotted-tail Quoll (south-eastern mainland population)	V	E	✓	This species is recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.	**Known:** The species was identified during the NGH field surveys This observation was made within the preliminary Project boundary which has since been updated. The record is now approximately 2.3 km south of the current Project Area, however as it is a highly mobile species, it is likely to utilise resources within the Project Area.	Yes	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	-	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania.	**Known:** This species was potentially recorded on site by Nature Advisory in 2021,	Yes	No

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					It prefers moist habitats, with trees taller than 20 m. It generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	however, records of this species were of the species complex (unresolvable) and in very low numbers.		
Miniopterus orianae oceanensis	Large Bent-winged Bat	V	-	✓	Caves are the primary roosting habitat for the Large Bent-winged Bat, but the species also use derelict mines, storm-water tunnels, buildings and other man-made structures. Populations disperse within about 300 km range of maternity caves. The species hunt in forested areas, catching moths and other flying insects above the tree tops.	**Known:** This species was recorded on site by Nature Advisory in 2021.	Yes	Yes
Myotis macropus	Southern Myotis	V	-	✓	The species generally rooss 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. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	**Likely:** There is a record of the Southern Myotis 4.7 km south west from the Project Area from 2020. It is likely the species would utilise habitat within the site for foraging.	No	Yes
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	-	The species is found in a wide range of inland woodland vegetation types. These include box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. The species inhabits a variety of vegetation types, but it is distinctly more common in box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland.	**Unlikely**: There is a lack of records of the species in the locality, and the species is outside of the known distribution, with the 'May Occur' distribution intersecting the western edge of the Project Area only.	No	No
Petauroides volans	Greater Glider (southern and central)	E	E	-	The greater glider (southern and central) is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows.	**Potential:** The Project Area contains areas within the known distribution for the species, and a record from 2002 was recorded 10.5 km south of the Project Area in the Mullion Range State Conservation Area.	No	Yes

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						The Project Area may contain limited potentially suitable habitat.		
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	V	-	The yellow-bellied glider (south-eastern) occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests. Abundance is highly dependent on habitat suitability, which is in turn determined by forest age and floristics. Mainly occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	**Unlikely:** There is a lack of records in the locality, and known habitat is not mapped within the Project Area.	No	No
Petaurus norfolcensis	Squirrel Glider	V	-	✓	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. Prefers mixed species stands with a shrub or *Acacia* spp. mid-storey. The species requires abundant tree hollows for refuge and nest sites.	**Known:** Two (2) gliders were captured on camera during 2 separate camera trap deploy nights in two different locations. The differentiation between squirrel glider and sugar glider is not 100% certain, however, it is considered likely to be squirrel glider as they are known in the area and the land is considered good habitat for this species.	Yes	Yes
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	-	The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. The species prefers dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. It also inhabits heath, swamps, rainforest and wet sclerophyll forest. It nests and shelters in tree hollows with entrances 2.5 - 4 cm wide and uses many different hollows over a short time span.	**Potential:** There is a lack of records into the locality. However, preferred habitat of dry sclerophyll open forest is present on site.	No	Yes
Phascolarctos cinereus	Koala	E	E	✓	Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species.	**Known:** During the NGH 2020 field surveys a Koala was heard from a call playback site.	Yes	Yes

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					Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.			
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	✓	Grey-headed Flying-Foxes are generally found within 200 km of the eastern coast of Australia. They 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. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	**Likely:** A flying-fox camp with observations of grey-headed flying-foxes as recently as 2020 exists 27 km south of the Project Area, in Orange. There are also records within the locality, dated 2022, approximately 9.4 km west. Preferred habitat does occur within the Project Area, and it is within the known distribution for the species.	No	Yes
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	-	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. The species roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. It forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	**Known:** This species was recorded on site by Nature Advisory in 2020 and 2021.	Yes	No
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	-	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England	**Known:** This species was recorded on site by Nature Advisory in 2021.	Yes	No

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					Tablelands, however does not occur at altitudes above 500 m. Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.			
Flora								
Acacia ausfeldii	Ausfeld's wattle	V	-	-	Found to the east of Dubbo in the Mudgee-Ulan-Gulgong area of the NSW South Western Slopes bioregion, with some records in the adjoining Brigalow Belt South, South Eastern Highlands and the Sydney Basin bioregions. Populations are recorded from Yarrobil National Park, Goodiman State Conservation Area and there is a 1963 record from Munghorn Gap Nature Reserve. A large population is also known from Tuckland State Forest to the northwest of Gulgong. Associated species include *Eucalyptus albens*, *E. blakelyi* and *Callitris* spp., with an understorey dominated by *Cassinia* spp. and grasses. *Acacia ausfeldii* is likely to have a dormant soil seedbank from which germination is stimulated by fire; a small number of seeds have been observed to germinate in the absence of fire.	**Potential:** No records within the locality, however the Project Area is within the known distribution, with preferred habitat present.	No	Yes
Acacia meiantha	-	E	E	✓	The species is only known from three disjunct locations, all within the Central Tablelands, Of the three populations, the majority (96%) are known to occur in Mullions Range State Forest occurring both within remnant native forest and in plantation forests. Where it occurs at both Carcalgong and Mullions Range State Forest, plants are among the tallest and most common shrub forming dense aggregates. In Mullions Range State Forest population, the dominant overstorey species include *Eucalyptus rossi, E. mannifera, E. dives* and *E. macrorhyncha*.	**Likely:** Numerous records of *Acacia meiantha* occur in the locality, the Project Area is within the species distribution and the species are known to be associated with PCTs present within the Project Area.	No	Yes

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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*). Apparently unaffected by light grazing, as populations persist in some grazed sites.	**Potential:** There is a lack of records into the locality. However, the known distribution for the species extends into the southern portion of the Project Area and preferred habitat of Box-gum woodlands is present on site.	No	Yes
Eucalyptus aggregata	Black Gum	V	V	-	Black Gum is found in the NSW Central and Southern Tablelands, with small isolated populations in Victoria and the ACT. In NSW it occurs in the South Eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands, for example in the Blayney, Crookwell, Goulburn, Braidwood and Bungendore districts. This species grows in the lowest parts of the landscape. It grows on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Often grows with other cold-adapted eucalypts, such as Snow Gum or White Sallee (*Eucalyptus pauciflora*), Manna or Ribbon Gum (*E. viminalis*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*) and Swamp Gum (*E. ovata*). Black Gum usually occurs in an open woodland formation with a grassy ground layer dominated either by River Tussock (*Poa labillardierei*) or Kangaroo Grass (*Themeda australis*), but with few shrubs. Also occurs as isolated paddock trees in modified native or exotic pastures. Many populations occur on travelling stock reserves, though stands and isolated individuals also occur on private land. There are very few stands in conservation reserves.	**Potential:** There are a lack of records in the locality. However, the known distribution extends into the southern portion of the Project Area and limited suitable habitat may be present.	No	No
Eucalyptus cannonii	Capertee Stringybark	V	-	-	The Capertee Stringybark is predominantly restricted to the central tablelands and slopes of NSW between the Golden Highway in the north, and the Mitchell Highway in the south.	**Potential:** There are a lack of records in the locality. However, limited suitable habitat may be present within the Project Area	No	Yes

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					The species' distribution is bounded from east of Bathurst, to Wallerwang near Lithgow, north along the western edge of Wollemi National Park and north-west to Mudgee; isolated occurrences are known from a short way north of Goulburn River National Park between Dunedoo and Merriwa. Within this area the species is often locally frequent. Associated eucalypt species are diverse: Eucalyptus viminalis, *Eucalyptus mannifera, Eucalyptus polyanthemos, Eucalyptus rossii, Eucalyptus blakelyi, Eucalyptus oblonga, Eucalyptus sparsifolia, Eucalyptus bridgesiana, Eucalyptus dalrympleana, Eucalyptus melliodora, Eucalyptus dives* and *Angophora floribunda*.	Further field investigations will be required.		
Eucalyptus pulverulenta	Silver-leafed Gum	V	V	-	The Silver-leafed Gum is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala). It grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (*Eucalyptus mannifera*), Red Stringybark (*E. macrorhynca*), Broad-leafed Peppermint (*E. dives*), Silvertop Ash (*E. sieberi*) and Apple Box (*E. bridgesiana*).	**Potential:** There are a lack of records in the locality. However, limited suitable habitat may be present within the Project Area Further field investigations will be required.	No	Yes
Eucalyptus robertsonii subsp. hemisphaerica	Robertson's Peppermint	V	V	✓	Robertson's Peppermint is found in closed grassy woodland in locally sheltered sites. Associated species include Red Stringy Bark (*Eucalyptus macrorhyncha*), Scribbly Gum (*E. rossii*), Broad-leaved Peppermint (E. dives), Brittle Gum (*E. mannifera*) and Mountain Gum (*E. dalrympleana*). It is found on lighter soils, often on granite or quartzite, which are often nutrient-poor	**Likely:** Numerous records of *Eucalyptus robertsonii subsp. hemisphaerica* occur in the locality, with the closest being 6.2 km south of the Project Area. The site is within the known species distribution and the species are known to be associated with PCTs present within the Project Area.	No	Yes
Euphrasia arguta	-	CE	CE	-	The *Euphrasia arguta* populations found in 2008 occur in eucalypt forest with a mixed grass and shrub understorey within Nundle State Forest. These sites have either been logged in the last few decades or appear to have regrown from past clearing.	**Unlikely:** There are a lack of records in the locality and the site is outside of the known species distribution, however it is within the 'May Occur' distribution.	No	No

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					Historical information from *Euphrasia arguta* collections suggest the species could be found in 'open forest country around Bathurst in subhumid places', 'on the grassy country near Bathurst' or more generally, in grassy areas near rivers at elevations up to 700 m above sea level, with an annual rainfall of 600 mm. As with other species of Euphrasia, this species is semi-parasitic and attaches to the roots of other associated plants.			
Grevillea divaricata	-	E	-		Known only from the type collection made in 1823 by Allan Cunningham, from "north of Bathurst". Specimen notes describe the plant as occurring frequently in dry open forest lands and as possibly growing on rocky river margins.	**Potential:** There are a lack of records in the locality. However, limited suitable habitat may be present within the Project Area Further field investigations will be required.	No	Yes
Lepidium aschersonii	Spiny Pepper-cress	V	V	-	Occurs on gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmannii*) and Grey Box (*Eucalyptus microcarpa*). Inhabit vegetation structure that varies from open to dense with sparse grassy understorey and occasional heavy litter.	**Unlikely**: The Project Area is outside of the known distribution for the species and there is a lack of records in the locality. Preferred dominant species are absent.	No	No
Leucochrysum albicans var. tricolor	Hoary Sunray	E	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 known from beyond this region. Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. It can occur in modified habitats such as semi-urban areas and roadsides.	**Potential:** There are a lack of records in the locality. However, suitable habitat may be present within the Project Area Further field investigations will be required.	No	Yes
Persoonia marginata	Clandulla Geebung	V	V	-	The Clandulla Geebung occurs between Kandos and Clarence in the western Blue Mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks.	**Potential:** There are a lack of records in the locality. However, limited suitable habitat may be present within the Project Area Further field investigations will be required.	No	Yes

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					It grows in dry sclerophyll forest and woodland communities on sandstone. It may initially respond favourably to disturbance, with greater densities found along the edges of tracks and in areas disturbed by forestry activities.			
Prasophyllum petilum	Tarengo Leek Orchid	E	E	-	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock *Poa labillardieri*, *Eucalyptus aggregata* and *Leptospermum* spp. near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford	**Potential:** The western portion of the Project Area intersects the state known distribution mapping for the species. There is a lack of records in the locality, however associated habitat of Kangaroo Grass under Box-Gum Woodland is present	No	Yes
Prasophyllum sp. Wybong	A leek-orchid	-	CE	-	A perennial orchid, appearing as a single leaf over winter and Spring. Flowers in Spring and dies back to a dormant tuber over summer and autumn. Known to occur in open eucalypt woodland and grassland. The distribution of this species overlaps with the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland EPBC Act-listed threatened ecological community. The NSW Herbarium considers *Prasophyllum sp. Wybong* (C. Phelps ORG5269) and *Prasophyllum petilum* to be synonyms (i.e., the same species). This taxonomic recognition will be released in the next Orchidaceae taxonomic update via the Australian Plant Census, which provides a list of currently accepted names. As it stands, the two species are treated as one for NSW regulatory purposes, with the distinction maintained under Commonwealth legislation.	**Potential:** There are no records within the vicinity, however the western portion of the Project Area is within the estimated state distribution for the species. There is potential for suitable habitat in the Project Area in the form of Eucalypt dominant woodland occurs.	No	Yes
Swainsona recta	Small Purple-pea (Mountain Swainson-pea)	E	E	✓	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by *Eucalyptus blakelyi, E. melliodora, E. rubida* and *E. goniocalyx.*	**Likely:** There is a record of a small cluster of Small Purple-peas 9 km north of the Project Area, along Burrendong Way, from 2020. The site is within the known distribution for the	No	Yes

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					Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, Poa tussocks *Poa* spp. and spear-grasses *Austrostipa spp*. Plants die back in summer, surviving as a rootstock until they shoot again in autumn. Flowers throughout Spring, with a peak in October.	species and preferred habitat is present.		
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. Sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains unknown.	**Likely:** There are two (2) recent records of the Silky Swainson-pea within 5 km of the Project Area. The site is within the known distribution for the species and there is preferred habitat within the Project Area in the form of Box Gum woodland and *Callitris* spp.	No	Yes
Thesium australe	Austral Toadflax, Toadflax	V	V	-	Austral Toadflax is semi-parasitic on roots of a range of grass species, notably Kangaroo Grass (*Themeda triandra*). It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams. It occurs in shrubland, grassland or woodland, often on damp sites. Vegetation types include open grassy heath dominated by Swamp Myrtle (*Leptospermum myrtifolium*), Small-fruit Hakea (*Hakea microcarpa*), Alpine Bottlebrush (*Callistemon sieberi*), Woolly Grevillea (*Grevillea lanigera*), Coral Heath (*Epacris microphylla*) and *Poa spp*; Kangaroo Grass grassland surrounded by *Eucalyptus* woodland; and grassland dominated by Barbed-wire Grass (*Cymbopogon refractus*).	**Unlikely:** There are a lack of records in the locality, and the species is outside of the known distribution for the species. The Project Area is within the 'May Occur' distribution and suitable habitat is present, however is still considered unlikely to occur.	No	No
Veronica blakelyi	-	V	-	-	Restricted to the western Blue Mountains, near Clarence, near Mt Horrible, on Nullo Mountain and in the Coricudgy Range. Over this range, occurrences are patchy and generally small in in size. Occurs in eucalypt forest, often in moist and sheltered areas.	**Unlikely** There are a lack of records in the locality, and the species is outside of the known distribution for the species.	No	No

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	**Habitat Summary** (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
					Associated canopy species include *Eucalyptus dives, E. dalrympleana, E. rossii and E. pauciflora*.			
Zieria obcordata	Granite Zieria	E	E	-	The species is known only from three sites, near Bathurst on the Central Tablelands of NSW and from near Wellington on the Central Western Slopes of NSW. The sites are moderately steep, rocky slopes with a westerly to north-westerly aspect. The plant grows in sandy loam soils in crevices and around the base of granite boulders, within *Eucalyptus, Callitris* and *Acacia*-dominated woodland with an open, low-shrub understorey.	**Potential:** There are a lack of records in the locality, and the species is outside of the known distribution for the species. However, the Project Area is within the 'May Occur' distribution and suitable habitat is present.	No	Yes
Vegetation communities								
Grey Box *(Eucalyptus microcarpa)* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		-	E	-	This community occupies a position in the landscape that is transitional between the temperate woodlands and forests of the lower slopes and tablelands of south-eastern Australia, and the semi-arid communities further inland. The ecological community typically occurs in landscapes of low-relief on productive soils derived from alluvial or colluvial materials but may occur on a range of substrates. The community tends to occupy drier sites of the belt of grassy woodlands in south-eastern Australia, within a rainfall zone of 375 -700 mm/year. A tree canopy dominated by *Eucalyptus microcarpa* (Grey Box) is typically present. A range of other associated tree species may be present but do not dominate the ecological community. The understorey comprises a sparse shrub layer and a species-rich ground layer of grasses and herbs. Chenopods are often present, particularly in drier parts of the range. The community includes patches of derived grassland where a tree canopy of Grey Box was known to have been present but has been removed, and the native ground layer remains largely intact.	**Potential:** The PCTs mapped on site are not associated with this community but further field investigations will be required to ground-truth State PCT Vegetation Type mapping.	No	Yes

Scientific Name	Common Name	Status (BC Act)	Status (EPBC Act) *	BioNet Atlas Records within Locality (10km)	Habitat Summary (Summarised from NSW BioNet, SPRAT and other sources)	Likelihood of Occurrence	Recorded during Field Surveys	Additional targeted survey and assessment likely to be required?
Natural Temperate Grassland of the South Eastern Highlands		-	CE	-	This community is a natural temperate grassland, typically dominated by perennial tussock grasses, and predominantly occurring on plains of the south eastern highlands. It occurs at altitudes up to approximately 1200 m in and around the South Eastern Highlands. It can also occur as low as 250 m in some parts of its distribution. The ecological community occurs on a wide range of topographic positions and on soils derived from a variety of substrates, including granites, basalts, sediments, colluvium and alluvium.	**Potential:** The PCTs mapped on site are not associated with this community but further field investigations will be required to ground-truth State PCT Vegetation Type mapping.	No	Yes
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE	CE	-	This community is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. This ecological community occurs in areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 metres to 1200 metres	**Known:** This community was recorded on site by NGH in 2020.	Yes	Yes
Mt Canobolas Xanthoparmelia Lichen Community		E	-	-	The community occurs at Mt Canobolas in central-western New South Wales, on rock faces and soils of the Mt Canobolas Tertiary volcanic complex. It is a foliose lichen community characterised by the following assemblage of terricolous (soil-dwelling) and saxicolous (rock-dwelling) species: *Cladia fuliginosa - Xanthoparmelia canobolasensis - Xanthoparmelia digitiformis - Xanthoparmelia metaclystoides - Xanthoparmelia metastrigosa - Xanthoparmelia multipartita - Xanthoparmela neorimalis - Xanthoparmelia sulcifera - Xanthoparmelia tasmanica*	**Potential:** The PCTs mapped on site are not associated with this community but further field investigations will be required to ground-truth State PCT Vegetation Type mapping.	No	Yes

* CE = critically endangered, E = endangered, V = vulnerable, Mi = migratory

APPENDIX D NGH MAPPING - EPBC ACT LISTED TEC

EPBC Listed TECs

Legend

- Site boundary
- Tracks and turbine layout
- Roads

EPBC Listed Threatened Ecological Community

- Confirmed White Box - Yellow Box - Blakelys Red Gum Grassy Woodland and Derived Native Grassland
- Potenial White Box - Yellow Box - Blakelys Red Gum Grassy Woodland and Derived Native Grassland
- No Associated TEC

0 1 2 km

Ref: 19-531 Kerrs Creek Wind Farm Biodiversity Constraints 301020 \ EPBC Listed TECs
Author: T.Hume
Date created: 10.08.2021
Datum: GDA94 / MGA zone 55

NGH

APPENDIX E MNES SIGNIFICANT IMPACT ASSESSMENTS

South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) – Vulnerable

The Project has the potential to have a significant impact to the South-eastern Glossy Black-cockatoo.

The South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) has recently been listed as Vulnerable under the EPBC Act (effective August 2022) and is listed as Vulnerable under the BC Act. The South-eastern Glossy Black-cockatoo has been observed within the Project Area.

Three (3) individuals were recorded near an isolated and degraded patch of Eucalyptus woodland, flying 15 m above the ground. NGH (2021) noted foraging resources for this species within the Project Area are minimal and sub-optimal, however suitable hollow bearing trees are present. The Project Area is out of the expected range for the species, along the dividing range over the NSW coast.

Nature Advisory (2021) and NGH (2021) suggest the observed birds were likely dispersing for food after habitat was lost to 2019 – 2020 summer bushfires. There are no records of this species being impacted by blade strikes, however they can fly at the Rotor Swept Area height (RSA). Further investigation will need to be conducted across the Project Area, particularly in relation to the presence of potential breeding habitat (suitable hollows).

Habitat for this species can be delineated into foraging and breeding habitat. South-eastern Glossy Black-cockatoo is a parrot that feeds almost exclusively on seeds of the she-oak *(Allocasuarina* spp. and *Casuarina* spp.). Foraging habitat in inland NSW typically comprises of drooping she-oak (*A. verticillata*), broombush she-oak (*A. diminuta*), mallee she-oak (*A. gymnanthera*), and Belah (*C. cristata*), although other species (e.g., buloke (*A. luehmannii*)) may be utilised in some years (DCCEEW, 2022).

Breeding habitat for this species consists of hollows within mature eucalypts. In NSW this has been found to include species such as Narrow-leaved Ironbark (*Eucalyptus crebra*), Blue-leaved Ironbark (*E. nubila*), Blakely's Red Gum (*E. blakelyi*) and River Red Gums (*E. camaldulensis*) (DCCEEW, 2022). However, all eucalypts may support this species, living or dead, and potential nesting hollows typically are defined with the following traits:

- >8 m above the ground;
- Located in branches >30 cm in diameter;
- Branch or stem no more than 45 degrees from vertical; and
- Minimum entrance diameter of >15 cm.

Habitat critical to the survival of this species is consistent with the above habitat definitions (breeding and foraging) and any other areas that support the SIG 1.1 definition of critical habitat. This includes considering areas not currently occupied by the subspecies, because they have been recently burnt, but are capable of supporting cockatoo populations in the future.

Within the Project Area, suitable breeding and opportunistic foraging habitat is associated with PCTs 266, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734 and 4063. The total area of potential direct impact to the South-eastern Glossy Black-cockatoo as a result of the Project is the disturbance of 381.02 ha of suitable habitat.

Associated PCT habitat across the Project Area for this species is mapped in **Figure E 1**.

This species has the potential to use the Project Area for breeding purposes where suitable hollows are present within mapped habitat. NGH (2021) observed suitable breeding hollows within the Project Area, however additional work will need to be undertaken to map suitable breeding hollows across the current Project Area and further assess foraging habitat for this species.

Given this species' distribution occurs around the Project Area and PCTs associated with preferred breeding habitat for this species are known to occur, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for breeding where hollows are present.

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and breeding sites. Additional bird surveys and habitat mapping are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

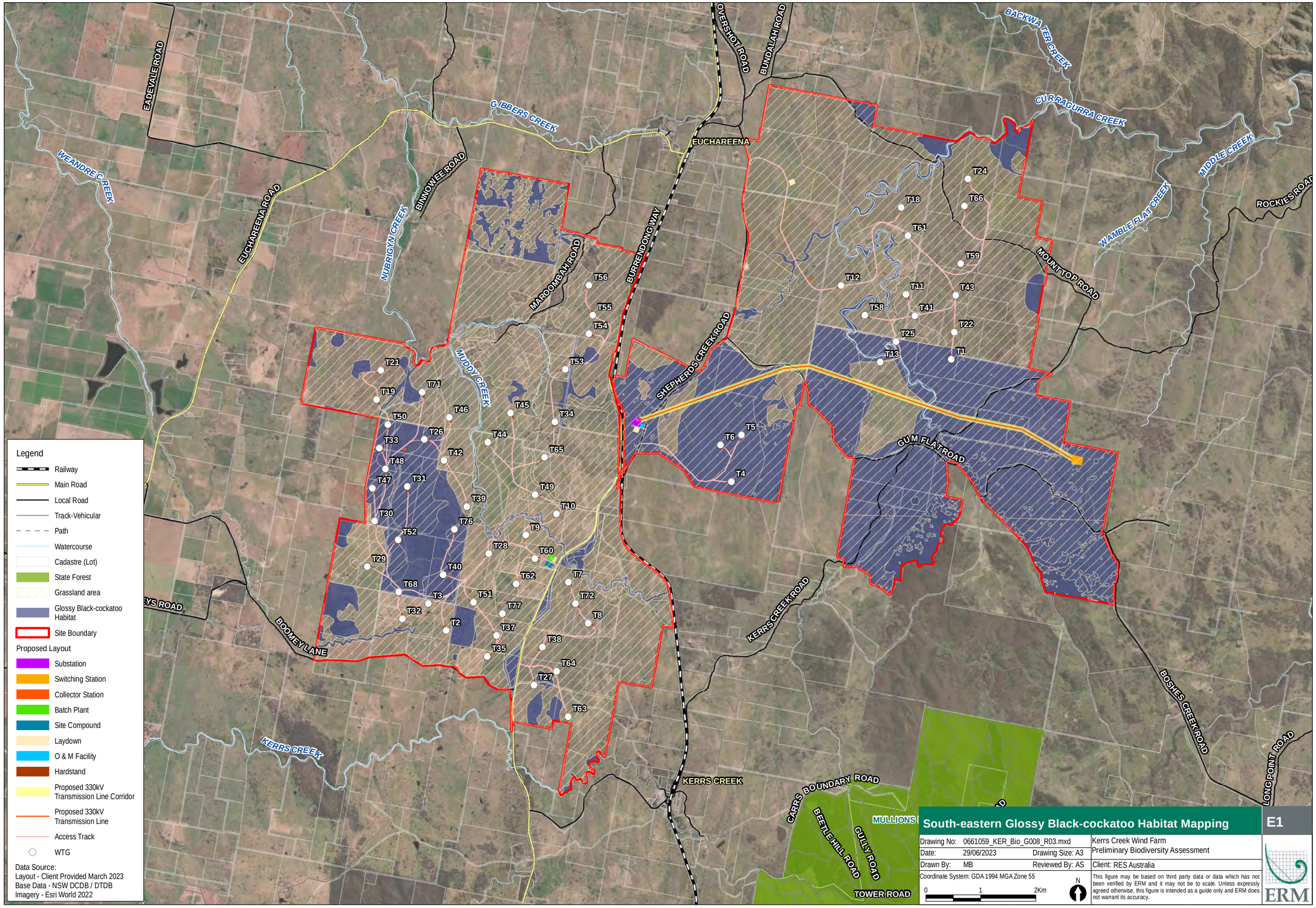
A significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 1 Significant Impact Assessment for the South-eastern Glossy Black-Cockatoo- Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The species has been identified within the Project Area and suitable breeding habitat has been observed. There is evidence that the Project may have the potential to support an important population, especially where breeding habitat (hollows within eucalypts that meet the identified traits) is present. The disturbance to 381.02 ha of potential breeding habitat within the Project Area has the potential to lead to a long-term decrease in the size of the population. However, the area of potential breeding habitat will be further assessed in future field survey efforts.	Potentially Assessment and mapping to be refined in the EIS.
Reduce the area of occupancy of an important population,	Given this species' has been recorded within the Project Area and preferred breeding habitat for this species is known to occur, as noted by NGH (2021), it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for breeding where hollows are present. The potential removal of breeding habitat and opportunistic foraging habitat, considered habitat critical to the survival of the species, within the Project Area is an action that would potentially interfere with the recovery of the species and reduce the current estimated area of occupancy for this species. However, the proposed disturbance is limited to only 381.02 ha of habitat, which represents only a small proportion of the overall Project site.	Potentially Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
Fragment an existing important population into two or more populations,	Given this species' has been recorded within the Project Area and preferred breeding habitat for this species is known to occur, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for breeding where hollows are present and for opportunistic foraging. It is unlikely that a population of South-eastern Glossy Black-Cockatoo will be fragmented due to the proposed development. The Project Area is currently characterised by fragmented woodlands, it is unlikely that the Project will further fragment any potential populations utilising this habitat.	Unlikely
Adversely affect habitat critical to the survival of a species,	Habitat critical to the survival of the species is present within the Project Area, including both breeding habitat (suitable hollows within eucalypt woodland) and opportunistic foraging habitat (*Casuarina spp.*). The removal of such habitat has the potential to adversely affect habitat critical to the survival of the species. However, the proposed disturbance is limited to only 381.02 ha of potential habitat and additional surveys will be undertaken to map the extent of suitable hollows within the Project Area, with potential for the retention of appropriate breeding hollows where identified.	Potentially Assessment and mapping to be refined in the EIS.
Disrupt the breeding cycle of an important population,	Given this species' has been recorded within the Project Area and preferred breeding habitat for this species is known to occur, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for breeding where hollows are present. Suitable breeding habitat for the species is considered as living or dead eucalyptus trees with hollows greater than 15cm diameter and greater than 8m above ground. NGH (2021) noted that foraging resources for this species were minimal and sub-optimal, however suitable hollow bearing trees were observed. The presence of suitable hollows will require further investigation in future survey efforts. There is potential for the Project to disrupt the breeding cycle of an important population.	Potentially Assessment and mapping to be refined in the EIS.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The Project Area is currently characterised by disturbed, fragmented woodlands. The proposed disturbance is unlikely to exceed 381.02 ha of potential habitat. It is unlikely that the Project would result in modification, destruction, removal, isolation or reduction in the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	This species conservation advice does not outline any particular invasive species that are known to be a key threat to the species. However, the Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	Unlikely
Introduce disease that may cause the species to decline, or	The South-eastern Glossy Black-Cockatoo is susceptible to Psittacine beak and feather disease (PBFD) which can be increased due to loss of nest hollows. As breeding habitat has been observed within the Project Area and has the potential to be disturbed, this could increase the species susceptibility to the disease. The presence of breeding hollows within the disturbance area will be confirmed during future survey efforts, with potential to be avoided. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases that may cause this species to decline.	Unlikely
Interfere with the recovery of the species.	There is evidence that the Project may have the potential to support an important population of this species and critical habitat is likely to be present within the associated mapped PCTs. The proposed removal of potential habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the species and reduce the area of occupancy, as outlined within the species conservation advice (DCCEEW, 2022a). However, the potential disturbance limited to only 85 ha of potential habitat. Additional surveys will be undertaken to refine habitat mapping and confirm extent of suitable hollows within the Project Area.	Potentially Assessment and mapping to be refined in the EIS.
Significant Impact: Potentially significant		


EADEVALE ROAD
WEANDRE CREEK
EUCHAREENA ROAD
GIBBERS CREEK
NUBRIGYN CREEK
BINNOWEE ROAD
OVERSHOT ROAD
BUNDALAH ROAD
EUCHAREENA
BURRENDONG WAY
MAROOMBAH ROAD
MUDDY CREEK
SHEPHERDS CREEK ROAD
BACKWATER CREEK
CURRAGURRA CREEK
MIDDLE CREEK
WAMBLE FLAT CREEK
ROCKIES ROAD
MOUNTTOP ROAD
GUM FLAT ROAD
KERRS CREEK ROAD
BOOMEY LANE
KERRS CREEK
BOSHES CREEK ROAD
LONG POINT ROAD
CARRS BOUNDARY ROAD
BEETLEHILL ROAD
GULLY ROAD
TOWER ROAD
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T65
T66
T68
T71
T72
T76
T77
Legend
Railway
Main Road
Local Road
Track-Vehicular
Path
Watercourse
Cadastre (Lot)
State Forest
Grassland area
Glossy Black-cockatoo Habitat
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
South-eastern Glossy Black-cockatoo Habitat Mapping
E1
Drawing No: 0661059_KER_Bio_G008_R03.mxd
Date: 29/06/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
0
1
2Km
N
Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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

Spotted-tailed Quoll (SE Mainland Population) (*Dasyurus maculatus maculatus*) – Endangered

The Project is unlikely to have a significant impact on the Spotted-tailed Quoll

Spotted-tailed Quoll is listed as Endangered under the EPBC Act and Vulnerable under the BC Act. The species was identified during the NGH 2021 field surveys. The Spotted-tailed Quoll was observed walking across a farm track into an adjacent property with dense rocky hillside. This observation was made within the preliminary Project boundary, which has since been updated. The record is now approximately 2.3 km south of the current Project Area, the species is considered likely to occur and utilise resources within the Project Area. Further investigation will need to be conducted to determine its presence and the extent of suitable habitat within the Project Area.

The Spotted-tailed Quoll is a carnivorous marsupial, their diet consists of small, prey species under 5 kg including mammals, birds, invertebrates, and reptiles. They are a solitary animal, occupying large home ranges, up to over 4,000 hectares for males, dependent on the quality of habitat available (OEH 2022a). They are considered a forest dependent species, although their habitats range from closed forests to open woodlands and coastal heathlands as well as grasslands adjacent to forested areas (TSSC, 2020a). The potential habitat within the Project Area is associated with PCTs 266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734 and 4063. the total area of potential direct impact to the Spotted-tailed Quoll as a result of the Project is 1,056.78 ha of suitable habitat.

Potential habitat for this species across the Project Area is mapped in **Figure E 2**.

Spotted-tailed Quolls utilise landscape features such as fallen logs, hollow trees, rocks and boulders as dens and, in their absence, they may occupy existing rabbit or wombat burrows (DELWP 2016). When necessary, a female will dig her own den. An individual will rotate between a number of dens, up to 20 has been observed, spending 1 to 4 days in each. Foraging and movement between dens is most common at night. Habitat critical to the survival of the Spotted-tailed Quoll includes large patches of forest with the adequate availability of denning resources and high densities of medium-sized mammalian prey. Their habitat will also include a "latrine site", a communal site utilised by multiple individuals for defecation, often situated among boulder fields, cliff-faces or stream beds (TSSC 2020a). The habitat present is not considered habitat critical to the survival of the species, however presence of landscape features within the Project Area will be further assessed in future field survey events.

Given the species observation and presence of suitable habitat within the Project Area, albeit largely in low condition, the Project has potential to host an 'important population' of the species.

Based on data obtained to date, habitat is not possible to map within the Project Area. Habitat for this species has instead been mapped utilising NSW's associated PCT mapping.

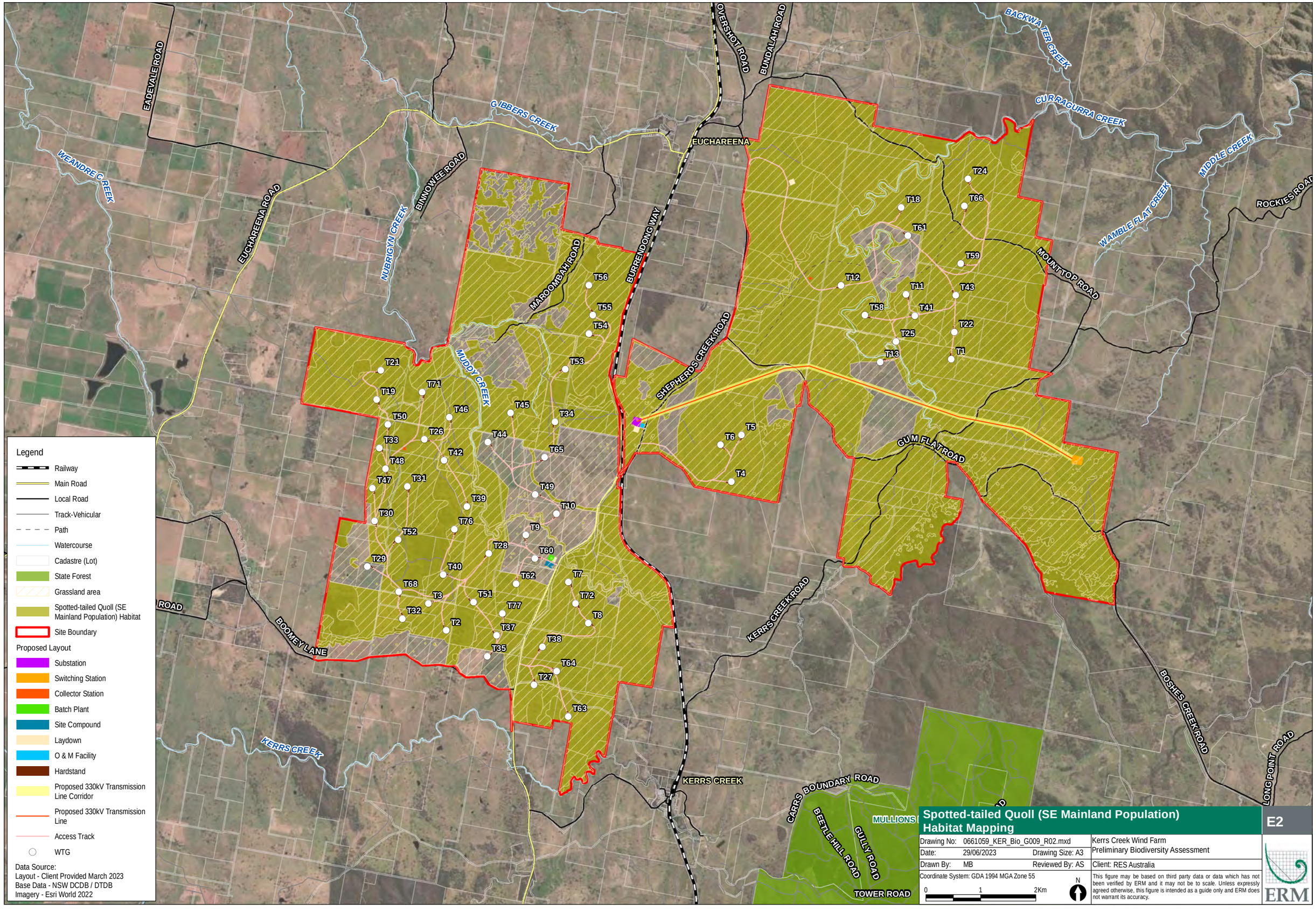
There is a potential for this species to be disturbed by the construction and maintenance of infrastructure within the Project Area through clearing of habitat. Additional surveys are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

Based on the proposed disturbance of up to 1,056.78 ha of the total potential Spotted-tailed Quoll habitat within the Project Area, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 2 Significant Impact Assessment for the Spotted-tailed Quoll– Endangered

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. The recent record by NGH (2021) suggests that the Project may be habitat of a single individual. Due to the large home range of the species, the potential disturbance of 1,056.78 ha of potential habitat is unlikely to lead to a long-term decrease in the size of a population.	Unlikely
Reduce the area of occupancy of the species	The extent of occurrence (EOO) is estimated at 596,344 km^2 and the area of occupancy (AOO) at 2,512 km^2 (TSSC 2020a). The Spotted-tailed Quoll has contracted at the northern and southern edges of their distribution, with any populations that are remaining being very fragmented (TSSC 2020a). The Project Area is located at the western extent of the known Spotted-tailed Quoll distribution, and any reduction in habitat or disturbance to this habitat may have an effect on the species' area of occupancy. The potential disturbance of 1,056.78 ha of potential habitat is 0.4% of the species AOO (based on total AOO of 2,512 km^2). It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	Unlikely
Fragment an existing population into two or more populations	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. The landscape within the Project Area is largely fragmented, the proposed disturbance of 1,056.78 ha of fragmented potential habitat is unlikely to further fragment an existing population.	Unlikely
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the Spotted-tailed Quoll includes large patches of forest with the adequate availability of denning resources and high densities of medium-sized mammalian prey. Their habitat will also include a "latrine site", a communal site utilised by multiple individuals for defecation, often situated among boulder fields, cliff-faces or stream beds (TSSC 2020a). The habitat present is not considered habitat critical to the survival of the species, however presence of landscape features within the Project Area will be further assessed in future field survey events. The presence of these landscape features will be further assessed in future field survey events and additional data will be obtained to inform ongoing management and potential impact for the species.	Unlikely
Disrupt the breeding cycle of a population	The Spotted-tailed Quoll is a solitary animal and often home ranges will not overlap more than one male and one female. Disturbance to the home range of a single individual has the potential to disconnect a female from the nearby males, decreasing her chance of reproduction. However, the habitat to be disturbed within the Project	Unlikely

Criteria	Description	Criteria Triggered?
	Area is mostly of low condition and is largely in a fragmented state. The Project is unlikely to result in the disconnection of breeding individuals nor disrupt the breeding cycle of a population.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The habitat present within the Project Area has historically been subject to disturbance and is largely fragmented. The proposed disturbance is unlikely to exceed 1,056.78 ha of potential habitat in this landscape. This potential habitat within the Project Area is unlikely to be decreased to the point where the species will experience decline.	Unlikely
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	There is evidence that other species of Quoll are susceptible to Cane Toad poisoning, and it is assumed that this would also apply to the Spotted-tailed Quoll. There is mention of foxes, feral cats and wild and domestic dogs that present as possible predators, but this is speculative and unknown. The Project and its related development are unlikely to introduce an invasive species within the Project Area or exacerbate the current invasive species presence.	Unlikely
Introduce disease that may cause the species to decline	There are no introduced diseases known to pose a threat against Spotted-tailed Quolls. It is known that they are sensitive to 1080 baiting and a small, fragmented population would be seriously impacted by exposure to 1080. The construction and operation of this proposed development will be undertaken in a manner that avoids/minimises the potential to introduce diseases or substances such as 1080 that may cause this species to decline.	Unlikely
Interfere with the recovery of the species	The Project has not been identified as an area of importance to the Spotted-tailed Quoll and it is unlikely the disturbance of 1,056.78 ha of low condition habitat as a result of the proposed development would impact the recovery of the species.	Unlikely
Significant Impact: Unlikely to be significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Spotted-tailed Quoll (SE Mainland Population) Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Spotted-tailed Quoll (SE Mainland Population) Habitat Mapping

E2

Drawing No:	0661059_KER_Bio_G009_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

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ERM

Superb Parrot (*Polytelis swainsonii*) – Vulnerable

The Project has the potential to have a significant impact to the Superb Parrot

The Superb Parrot (*Polytelis swainsonii*) is listed as Vulnerable under the EPBC Act and BC Act and has been identified within the Project Area. The species was recorded within the Project Area during surveys conducted by NGH in 2020 and Nature Advisory in 2021.

There are numerous records dating back from 2003 to as recently as 2017 for the Superb Parrot within the locality of the Project (10 km buffer of Project Area). The Superb Parrot is a herbivorous parrot that mostly feeds on the ground on seeds, seed pods and cereals, and at times from within the forest canopy on the flowers, fruits and lerps of eucalypts and the berries of mistletoe (TSSC, 2016). Superb Parrots usually utilise hollow branches or hollow trunks of eucalypts for nesting, preferring River Red Gum (*Eucalyptus camaldulensis)* and Blakely's Red Gum (*E. blakelyi)*, usually near a watercourse and within 10 km of breeding habitat (DAWE, 2021).

Nesting and breeding activity for the Superb Parrot often occurs directly within, or within a 10 km radius of, box-gum woodland featuring hollow branches of dead or living trees. The three main breeding areas in NSW are outlined below:

- An area of the south-west slopes, bounded by Molong, Rye Park, Yass, Coolac, Cootamnundra and Young,
- Along the Murrimbidgee River, between Wagga Wagga and Toganmain Station, and farther north at Goolgowi, and
- Along the Murray and Edward Rivers, from east Barmah and Millewa State Forest to south of Taylors Bridge.

One breeding area is located nearby the Project Area, with the bounding town, Moolong, located only 16.5 km south west of the site. Breeding habitat critical to the survival of this species is classified by the Recovery Plan for this species (DAWE, 2022) as:

- Riverine forests in the Riverina and box-gum woodlands in the tablelands and slopes of NSW (in the breeding areas outlined above), and
- Obligate hollows with a diameter at breast height of around 113 cm, and tree height between 12 to 24 m, a hollow with an entrance diameter of 8-12 cm, a depth of 59-122 cm, a floor diameter of 15-22 cm; and hollows that are located on a branch or stem with a diameter of 36-49 cm.

Foraging habitat is classified as:

- All preferred foraging habitat during both breeding and non-breeding season other than exotic feeding grounds (such as agricultural lands and non-native feeding grounds)

Habitat for the long-term maintenance of the species is classified as:

- All key biodiversity areas for this species, and
- Any potential suitable foraging and breeding habitat in the south-eastward range shift (the aforementioned bounding).

Within the Project Area, suitable foraging habitat is present associated with box-gum, grassland and other eucalypt PCTs. Given the proximity to a main breeding area for the species and the presence of box-gum woodlands, suitable breeding habitat is likely to be present, and subsequently the population is considered an 'important population'.

When not breeding, the species utilises a range of natural and non-natural habitats, preferring areas of high plant productivity. Given this species' distribution occurs around the Project Area and preferred habitat for this species is known to occur within the Project Area, it is possible that the Project has the potential to house an 'important population' which utilises habitat within the site for foraging and breeding.

PCTs associated with the species present within the Project Area include PCTs 266, 277, 347, 3369, 3373, 3399, 3406, 3451, 3541 and 3734. The total area of potential direct impact to the Superb Parrot as a result of the Project is 883.49 ha of suitable habitat.

Associated PCT habitat for this species across the Project Area is mapped in Figure E3**.**

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and nesting sites and when moving further north during winter. Additional bird surveys are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

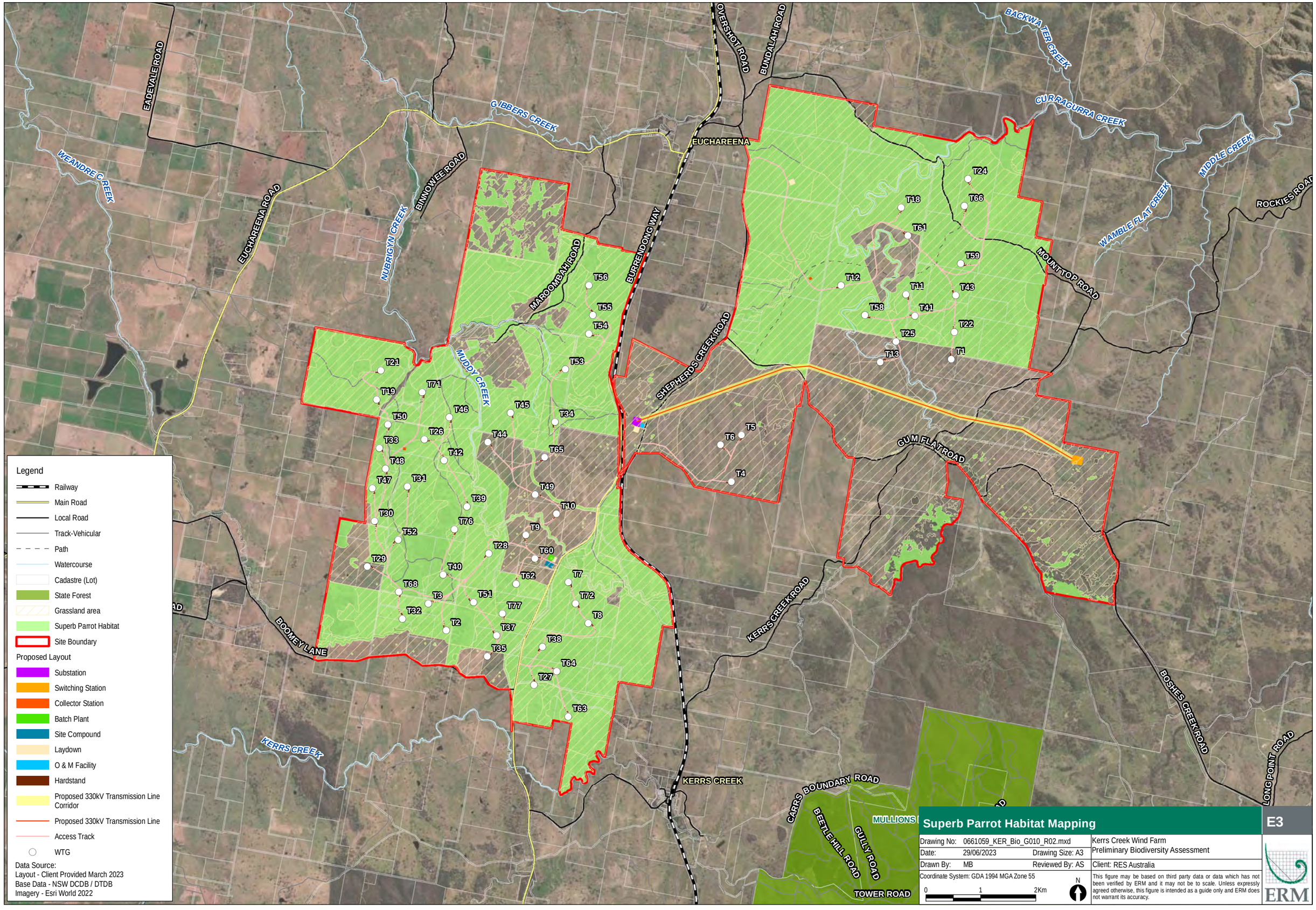
Based on the potential disturbance of up to 245 ha of potential Superb Parrot foraging and breeding habitat within the Project Area, a significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 3 Significant Impact Assessment for the Superb Parrot– Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	There is evidence that the Project may support a breeding population of Superb Parrot. The potential disturbance of 883.49 ha of potential foraging and breeding habitat within the Project Area may lead to a long-term decrease of the species. However, the area of potential habitat represents only a small proportion of the overall Project and higher quality habitat is present in surrounding areas.	Potential. Assessment and mapping to be refined in the EIS.
Reduce the area of occupancy of an important population,	There is evidence that the Project may support an important breeding population of Superb Parrot, further to this, foraging habitat critical to the survival of the species is likely present within the associated mapped PCTs (those with a composition of box-gum, grasslands and eucalypt). The proposed removal of foraging and breeding habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the Superb Parrot and reduce the area of occupancy, as outlined within the species recovery plan. (DAWE 2021). However, the proposed disturbance is limited to only 883.49 ha of habitat, which represents only a small proportion of the overall Project Area.	Potential. Assessment and mapping to be refined in the EIS.
Fragment an existing important population into two or more populations,	It is unlikely that a population of Superb Parrot will be fragmented due to the proposed development. Given that the Project Area is characterised by a fragmented landscape it is unlikely that the proposed development will further fragment the population present within the Project Area.	Unlikely

Criteria	Description	Criteria Triggered?
Adversely affect habitat critical to the survival of a species,	Given the proximity to a main breeding area for the species and the presence of box-gum woodlands, suitable breeding habitat present within the Project Area is likely to be present, and subsequently considered critical habitat. However, additional surveys will be required to confirm the species presence and presence of hollows with suitable attributes within the Project Area.	Potential. Assessment and mapping to be refined in the EIS.
Disrupt the breeding cycle of an important population,	Nesting occurs between September and December, and this species inhabit hollows that are specific in their classification. Further survey effort is required to confirm presence of these specific hollows throughout the Project Area; however, their total absence cannot be discounted at this stage as hollows have been previously observed. Given that primary breeding areas are in close proximity to the Project, and the presence of box-gum woodland consisting of preferred tree species, Blakely's Red Gum (*E. blakelyi*), it is likely that the species utilises the Project Area for breeding. The removal of 883.49 ha of habitat has the potential to contribute to breeding cycle impacts. Based on future survey findings, layout and design will potentially be refined throughout an iterative process to include the location of wind turbines away from remnant vegetation where practicable, reducing the potential for disruption to the breeding cycle.	Potential. Assessment and mapping to be refined in the EIS.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The habitat present within the Project Area has historically been subject to disturbance and is largely fragmented. The proposed disturbance is unlikely to exceed 883.49 ha of potential habitat in this landscape. This potential habitat within the Project Area is unlikely to be decreased to the point where the species will experience decline.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	This species conservation advice does not outline any particular invasive species that are known to be a key threat to the species. There is mention of competition for nesting hollows between the Superb Parrot and the Common Starling, Galah and Corella species, which is increased when nest hollows are removed from a site. Based on future survey findings, layout and design will potentially be refined throughout an iterative process to include the location of wind turbines away from remnant vegetation where practicable, reducing the potential for disruption to the breeding habitat, if confirmed present. The construction and operation of this proposed development will be undertaken in a manner that avoids/ minimises the introduction and spread of invasive species that will avoid harm to this species.	Unlikely
Introduce disease that may cause the species to decline, or	Superb Parrot is susceptible to Psittacine beak and feather disease (PBFD) which can be increased due to loss of nest hollows. Preferred breeding habitat is likely to occur within the Project Area, and there is a potential for loss of nesting hollows. Based on future survey findings, layout and design will potentially be refined throughout an iterative process to include the location of wind turbines away from remnant vegetation where practicable, reducing the potential for disruption to the breeding habitat, if confirmed present. The construction and operation of this proposed development will be undertaken in a manner that avoids /minimises the potential to introduce diseases that may cause this species to decline.	Unlikely
Interfere with the recovery of the species.	There is evidence that the Project supports habitat for the Superb Parrot, further to this, habitat critical to the survival of the species used for foraging and breeding is likely present within the associated mapped PCTs (those with a composition of box-gum, grasslands and eucalypt). The proposed removal of foraging and breeding habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the Superb Parrot and reduce the area of occupancy, as outlined within the species recovery plan.	Potential. Assessment and mapping to be refined in the EIS.
Significant Impact: Potentially significant		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OVERSHOT ROAD
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BACKWATER CREEK
CURRAGURRA CREEK
MIDDLE CREEK
ROCKIES ROAD
WAMBLE FLAT CREEK
EUCHAREENA
BURRENDONG WAY
MAROOMBAH ROAD
MUDDY CREEK
SHEPHERDS CREEK ROAD
MOUNTTOP ROAD
GUM FLAT ROAD
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Legend
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Main Road
Local Road
Track-Vehicular
Path
Watercourse
Cadastre (Lot)
State Forest
Grassland area
Superb Parrot Habitat
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
Superb Parrot Habitat Mapping
E3
Drawing No: 0661059_KER_Bio_G010_R02.mxd
Date: 29/06/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
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2Km
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Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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.
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Koala (*Phascolarctos cinereus*) – Endangered

The Project is unlikely to have a significant impact on the Koala

The Koala (*Phascolarctos cinereus*) is known to occur within the Project Area. There was detection of a Koala during field surveys, with a call heard during call playback by NGH in 2020. The koala is listed as Endangered under the EPBC Act at metapopulation level (combined populations of QLD, NSW and ACT) and Endangered under the BC Act. This metapopulation occurs over most of coastal and inland QLD and NSW, however its distribution is patchy.

Under the *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022a) habitat for the koala is described as:

Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Furthermore, habitat critical to the survival of the species has also been defined. Under the EPBC Act, the following factors and other relevant factors are considered when identifying habitat that is critical to the survival of the species:

(a) Whether the habitat is used during periods of stress (examples: flood, drought or fire);

(b) whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);

(c) the extent to which the habitat is used by important populations;

(d) whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;

(e) whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;

(f) whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;

(g) any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.

Koala food trees are typically considered to be those of the following genus: *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Melaleuca.*

This considered, the Project Area contains koala habitat which varies in amount and type. For the purposes of the Project, koala habitat has been delineated with associated PCTs.

The following PCTs comprise breeding and foraging habitat: PCTs 266, 277, 347, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3451, 3534, 3541, 3734 and 4063. These PCTs comprise koala food trees that are likely to be utilised for breeding and foraging, and subsequently are considered habitat critical to the survival of the species.

Associated PCT habitat for this species is mapped in Figure E 4.

It is unlikely that the removal of koala habitat within a largely disturbed landscape will significantly fragment koala habitat in the locality due to habitat connectivity within the Project Area and locality and constitutes low impact to dispersal and breeding koala habitat. While linear habitat loss will occur and result in small amounts of fragmentation, dispersal ability will likely not be impacted due to the connectivity within the Project Area and locality, and koalas' preference to traverse through tortuous connected vegetation paths even where fragmentation exists.

The proposed wind farm development will not reduce the ability for koalas to disperse across the landscape as the access tracks, overhead transmission lines and wind turbine towers will not cause a barrier to koala dispersal.

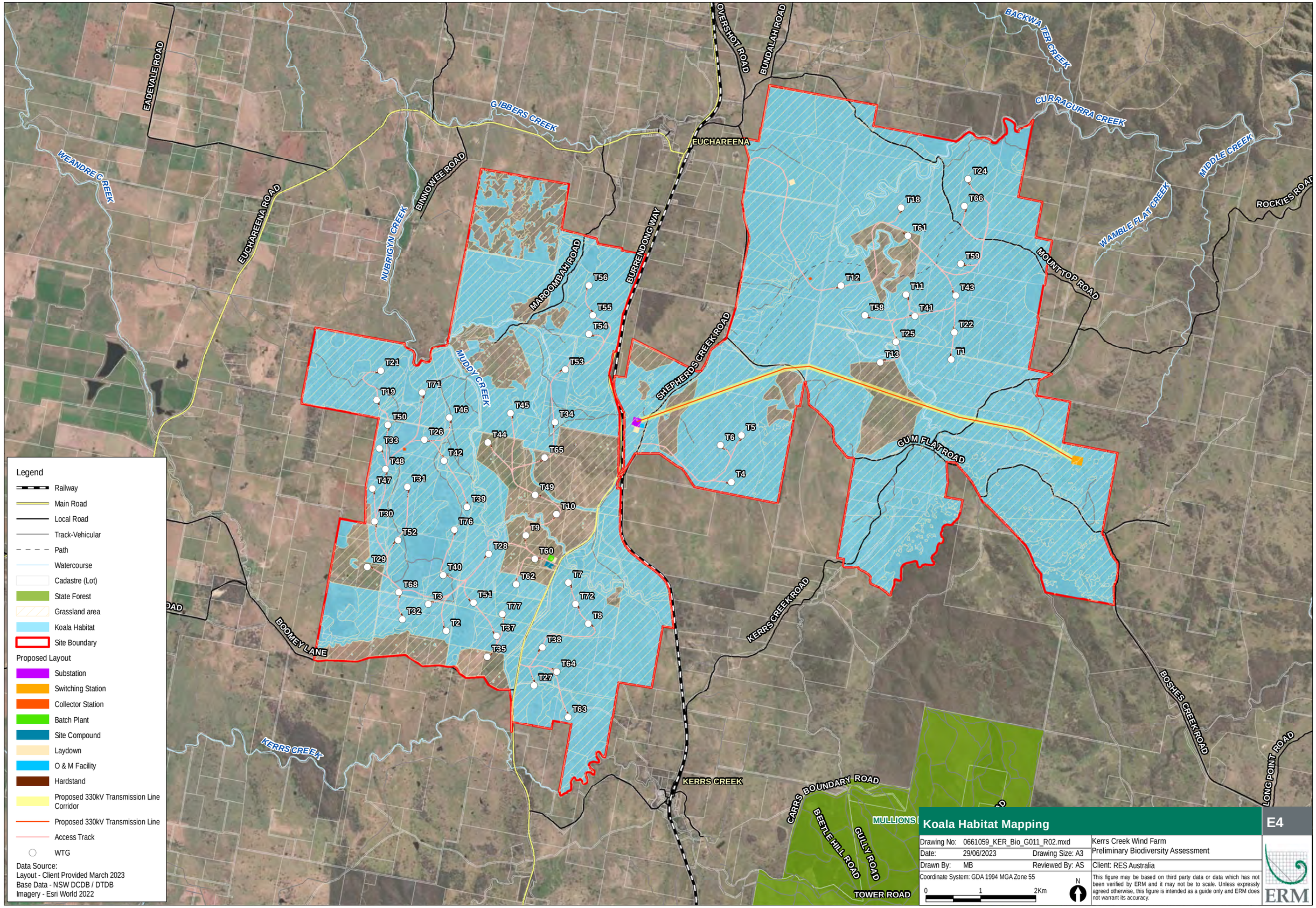
A significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 1 Significant Impact Assessment for the Koala

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	There is evidence that the Project supports Koalas. One Koala was heard calling during surveys by NGH in 2020. There are also numerous koala records within the locality of the Project Area according to BioNet. The Project Area contains vegetation considered suitable Koala foraging and breeding habitat based on associated PCTs. The impact from the clearing of small amounts of remnant vegetation and linear corridors for the construction of Project infrastructure is unlikely to lead to a long term-decrease of the species population. It is unlikely that the removal of koala dispersal habitat within the Project Area will lead to a decrease in the size of the koala population, as the wind farm will not cause a barrier to koala dispersal.	Unlikely
Reduce the area of occupancy of the species	There is evidence that the Project supports koalas. One koala was heard calling during surveys by NGH in 2020. There are also numerous koala records within the locality of the Project Area according to BioNet. The area of occupancy for the koala is 19,428 km^2 determined from mapping and records from state governments and CSIRO (DAWE, 2022a). The potential disturbance of suitable habitat for the species would result in a reduction in the area of occupancy of the species by <0.01%. Thus, the clearing of such a small area of habitat does not substantially reduce the area of occupancy for the species.	Unlikely
Fragment an existing population into two or more populations	The Project is currently in a fragmented condition, with isolated patches of potential habitat throughout modified landscapes and grasslands. Where populations do occur within these isolated habitats, clearing impact will primarily only remove small areas of habitat used by the species for dispersal and movement opportunities. The potential removal of koala habitat in this landscape is unlikely to fragment koala habitat within the Project Area, as fragmentation has already occurred for koala	Unlikely

Criteria	Description	Criteria Triggered?
	populations in this area Furthermore, given the infrastructure type, it is expected that the koala will still be able to disperse across tracks and small cleared areas once construction has finished, thus not removing the ability for populations to disperse.	
Adversely affect habitat critical to the survival of a species	Habitat for the koala within the Project Area has been determined as habitat critical to the survival of the species as it provides foraging, breeding and dispersal functions. Potential disturbance of habitat critical to the survival of the species, while representing a relatively small amount of habitat within the Project Area, may adversely affect the species. Mitigation measures such as refined disturbance footprint design will ensure impacts to the species are further mitigated to allow dispersal opportunities to persist as a result of the development.	Potential
Disrupt the breeding cycle of a population	Koalas breed once per year, however, if conditions are unsuitable and the population is facing lack of resources or disease, this can cause unsuccessful breeding. The home range for the koala is highly variable, they range between 10-100 ha (QLD DoE, 2022). The low density of koala records in the locality suggests the area is not integral for the breeding and genetic diversity of the species. If taking a very precautionary approach, it is recommended to remove trees outside of the Koala's breeding season being summer months (Nov-Feb) and gestation (March) for one month following (QLD DoE, 2022). The removal of habitat is unlikely to disrupt breeding cycles. Layout and design have been refined and is likely to undergo further iterative processes, reducing the potential for disruption to the breeding cycle.	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	This habitat comprises a small portion of the Project Area and is unlikely to cause the species to decline.	Unlikely

Criteria	Description	Criteria Triggered?
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species such as feral cats (*Felis catus*) and dogs (*Canis lupus)* are common pests encountered in NSW and are particularly harmful to native, threatened mammals. Both of these invasive species are known to occur in the Project Area and locality. The proposed development activities during construction and operation will adopt and follow biosecurity measures, including development of and adherence to a Biosecurity Management Plan, that will ensure that further invasive species are not introduced into the Project Area. It is also noted that one of the main threats to koalas is wild dogs. Wild dogs were not recorded from any of the field investigations but may be present. However, it is unlikely that the proposed development will increase the abundance of wild dogs to a level that would result in mortalities to koalas.	Unlikely
Introduce disease that may cause the species to decline	Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and Chlamydia (*Chlamydia pecorum*). There is no evidence to suggest the construction and/or operational activities would introduce a disease, such as Chlamydia, that would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, as detailed in a Biosecurity Management Plan. This includes following biosecurity measures and ensuring proper personal protection equipment is worn by construction workers and vehicle wash downs before entering any areas near koala habitat.	Unlikely
Interfere with the recovery of the species	The interim recovery objectives for the koala are: ■ Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility; and ■ Maintain the quality, extent and connectivity of large areas of koala habitat surrounding habitat refuges. The current indicative layout occurs predominately in modified and cleared areas, as well as fragmented remnant patches of koala habitat. The Project will only impact a small portion of koala habitat within the Project Area. Therefore, the development is unlikely to interfere with the above recovery objectives.	Unlikely
Significant Impact: Unlikely to be significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Koala Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Koala Habitat Mapping

E4

Drawing No:	0661059_KER_Bio_G011_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

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Acacia meiantha – Endangered

The Project has the potential to have a significant impact on Acacia meiantha

Acacia meiantha is listed as Endangered under the BC Act and EPBC Act. This species is an erect or sometimes straggling shrub to 1.5 m high (sometimes to 2.5 m) with a root suckering habit.

The species is only known from three disjunct locations within the Central Tablelands within 100 km of each other; Carcalgong, Clarence, and Mullions Range State Forest. Of the three populations, the majority (96%) are known to occur in Mullions Range State Forest occurring both within remnant native forest and in plantation forests (TSSC 2018). Where it occurs at both Carcalgong and Mullions Range State Forest, plants are among the tallest and most common shrub forming dense aggregates (TSSC 2018).

The Project Area is located adjacent to the Mullions Range State Forest, and BioNet Atlas records of the species are located 2.5 km from the Project Area. The Mullions Range State Forest population is present within open eucalypt forest or woodland in association with *Eucalyptus rossii, E. mannifera, E. dives* and *E. macrorhyncha* as well as *Acacia buxifolia, A. dealbata* and *A. gunnii* (OEH 2022c). Here, *A. meiantha* can be found on gravelly clay or brown loamy soil and is generally confined to areas above 860 m a.s.l. where it occurs in clumps due to its suckering habit. It is not found on rocky outcrops (TSSC 2018). A survey of this population has found that it consists of many widely distributed and disjunct stands covering around 5 ha.

The Project Area is within the known species distribution, in close proximity to the largest known population, and contains associated PCTs (PCTs 3370, 3534 and 3734) within the Project Area.

'Habitat critical to the survival of a species or ecological community' as defined within the SIG 1.1 guidelines includes areas that are necessary for the long-term maintenance of the species to maintain genetic diversity and long term evolutionary development, or for the reintroduction of populations or recovery of the species. Given the restricted distribution of the species, the suitable habitat likely to be present within the Project Area would be considered 'habitat critical' to the survival of the species. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species in future survey efforts.

Associated PCT habitat for this species is mapped in Figure E 5.

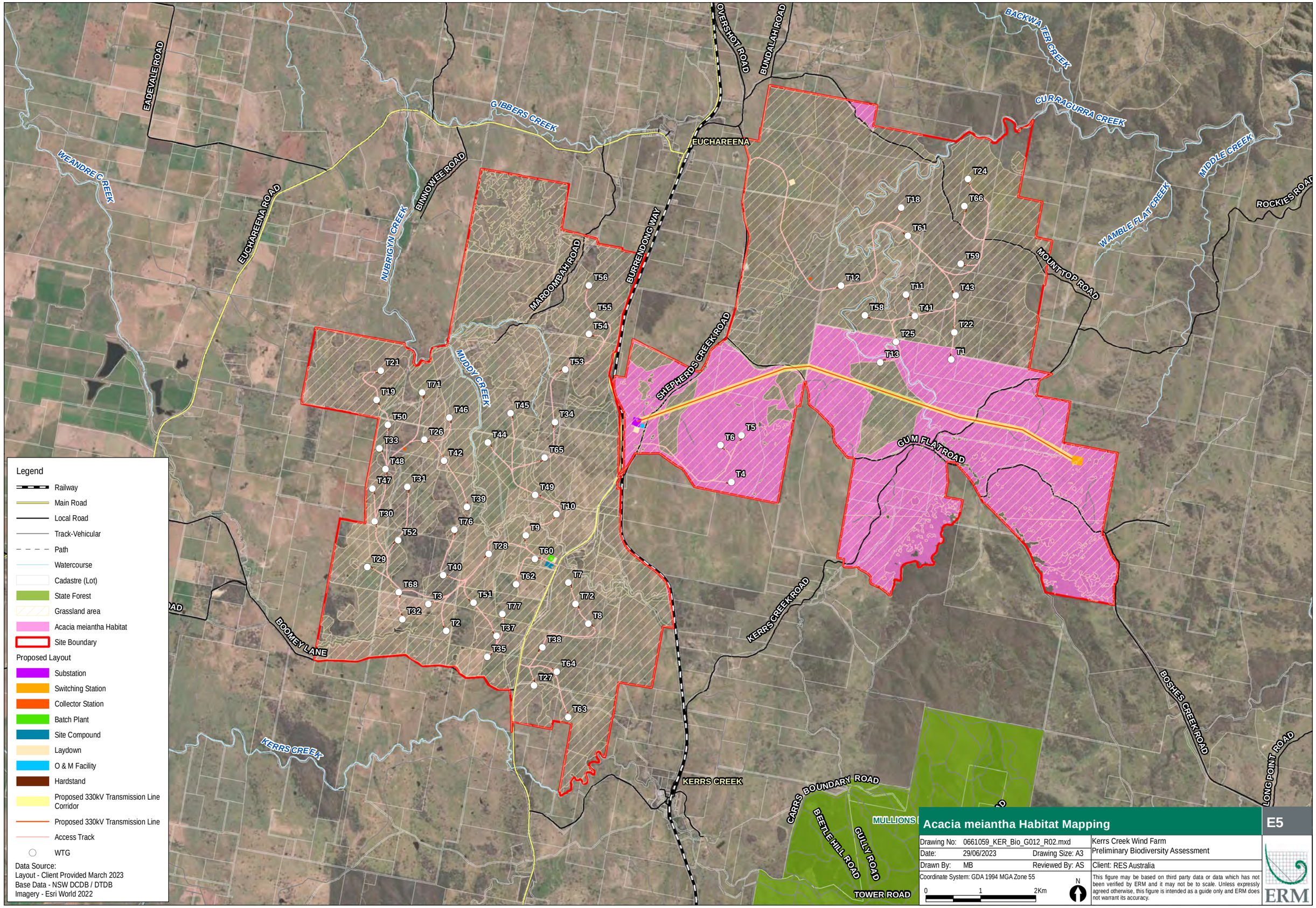
A significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 5 Significant Impact Assessment for *Acacia meiantha*

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population,	It is considered likely that a population of *A. meiantha* is present within Project Area. Due to the restricted distribution of the species, any decrease in a population has potential to lead to a long-term decrease in the size of a population. Further surveys will be completed to determine the presence of the species and suitable habitat features within the Project Area. Currently, no individuals have been recorded in the Project Area both during surveys and via BioNet.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
Reduce the area of occupancy of the species,	The current known distribution of the species is restricted to three populations only, with the largest situated in the adjacent Mullions Range National Park. Any disturbance to the likely population within the Project Area would have the potential to reduce the occupancy of the species.	Potential. Assessment and mapping to be refined in the EIS.
Fragment an existing population into two or more populations,	The habitat present across a majority of the Project Area is in a fragmented condition. It is unlikely that the proposed development will further fragment the habitat present, or the likely *A.meiantha* population.	Unlikely
Adversely affect habitat critical to the survival of a species,	Given the restricted distribution of the species, the suitable habitat likely to be present within the Project Area would be considered 'habitat critical' to the survival of the species. This habitat, currently based on associated PCTs. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species in future survey efforts.	Potential. Assessment and mapping to be refined in the EIS.
Disrupt the breeding cycle of a population,	Any removal of specimens has the potential to disrupt breeding cycles, however, processes critical to the species lifecycle, such as pollination and maintenance of genetic variability, will continue unimpeded in any remaining population.	Potential. Assessment and mapping to be refined in the EIS.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	Suitable habitat for the species is considered likely to occur, based on associated PCTs located within the Project Area. The adjacent Mullions Range National Park contains high quality habitat for the species and the largest known population. The potential disturbance of habitat based on the current Project layout is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat,	*A. meiantha* is susceptible to threats from invasion of weed species, including Invasion of pine wildlings African Lovegrass, St John's Wort and Blackberry (OEH, 2022c). The development will be managed in accordance with the NSW *Biosecurity Act 2015* and under a Pest Management Plan to ensure that weeds and feral/ invasive pest species are controlled. Weed management procedures will be undertaken to identify the mitigation measures and monitoring requirements to ensure the spread of weeds is prevented and that incursions are adequately managed.	Unlikely

Criteria	Description	Criteria Triggered?
	All the above-mentioned results in the unlikely result of an invasive species creating harm to any existing *Acacia meiantha* specimens or habitat.	
Introduce disease that may cause the species to decline, or	There are no recorded diseases associated with the species. However, the development will be managed in accordance with the *NSW Biosecurity Act 2015* to ensure that the spread of soil and plant disease are controlled. Equipment that is brought to site for use in the road construction works will be cleaned prior to site to ensure that spread of disease that may cause the species to decline is minimised.	Unlikely
Interfere with the recovery of the species.	The Project Area is in close proximity to the largest known population, and contains associated PCTs (PCTs 3370, 3534 and 3734) within the Project Area. Given the restricted distribution of the species, the suitable habitat likely to be present within the Project Area would be considered 'habitat critical' to the survival of the species. There is no recovery plan established for the species, however disturbance to critical habitat would have the potential to interfere with recovery of the species. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species in future survey efforts, with potential for survey design to avoid areas of impact.	Potential. Assessment and mapping to be refined in the EIS.
Significant Impact: Potentially Significant		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Acacia meiantha Habitat
Site Boundary
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Data Source:
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Acacia meiantha Habitat Mapping
E5
Drawing No: 0661059_KER_Bio_G012_R02.mxd
Date: 29/06/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
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Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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Robertson's Peppermint (*Eucalyptus robertsonii subsp. hemisphaerica*) – Vulnerable

The Project has the potential to have a significant impact to Robertson's Peppermint

Robertson's Peppermint is listed as vulnerable under the EPBC Act and BC Act. The species is considered likely to occur within the Project Area. There are numerous records in the locality, with the closest being 6.2 km south of the Project Area.

The species has experienced a reduction in distribution, and exists at a limited location with existing populations being localised (TSSC 2012). The site is within the restricted species distribution and the species is known to be associated with PCTs (PCTs 3370 and 3534) present within the Project Area.

Robertson's Peppermint is found in closed grassy woodland in locally sheltered sites. Associated species include Red Stringy Bark (*Eucalyptus macrorhyncha*), Scribbly Gum (*E. rossii*), Broad-leaved Peppermint *(E. dives*), Brittle Gum (*E. mannifera*) and Mountain Gum (*E. dalrympleana*). It is found on lighter soils, often on granite or quartzite, which are often nutrient poor. The distribution of this subspecies overlaps with the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland EPBC Act-listed threatened ecological community, also known to occur within the Project Area.

Provided the existing population of Robert's Peppermint exists at a limited location, any population could be considered an 'important population' for breeding, dispersal, and/or maintaining genetic diversity in accordance with the SIG 1.1. Further, considering the SIG 1.1 definition of 'habitat critical to the survival of a species', the suitable habitat likely to be present within the Project Area would be considered 'habitat critical' to the survival of the species. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species in future survey efforts.

Associated PCT habitat for this species is mapped in Figure E 6.

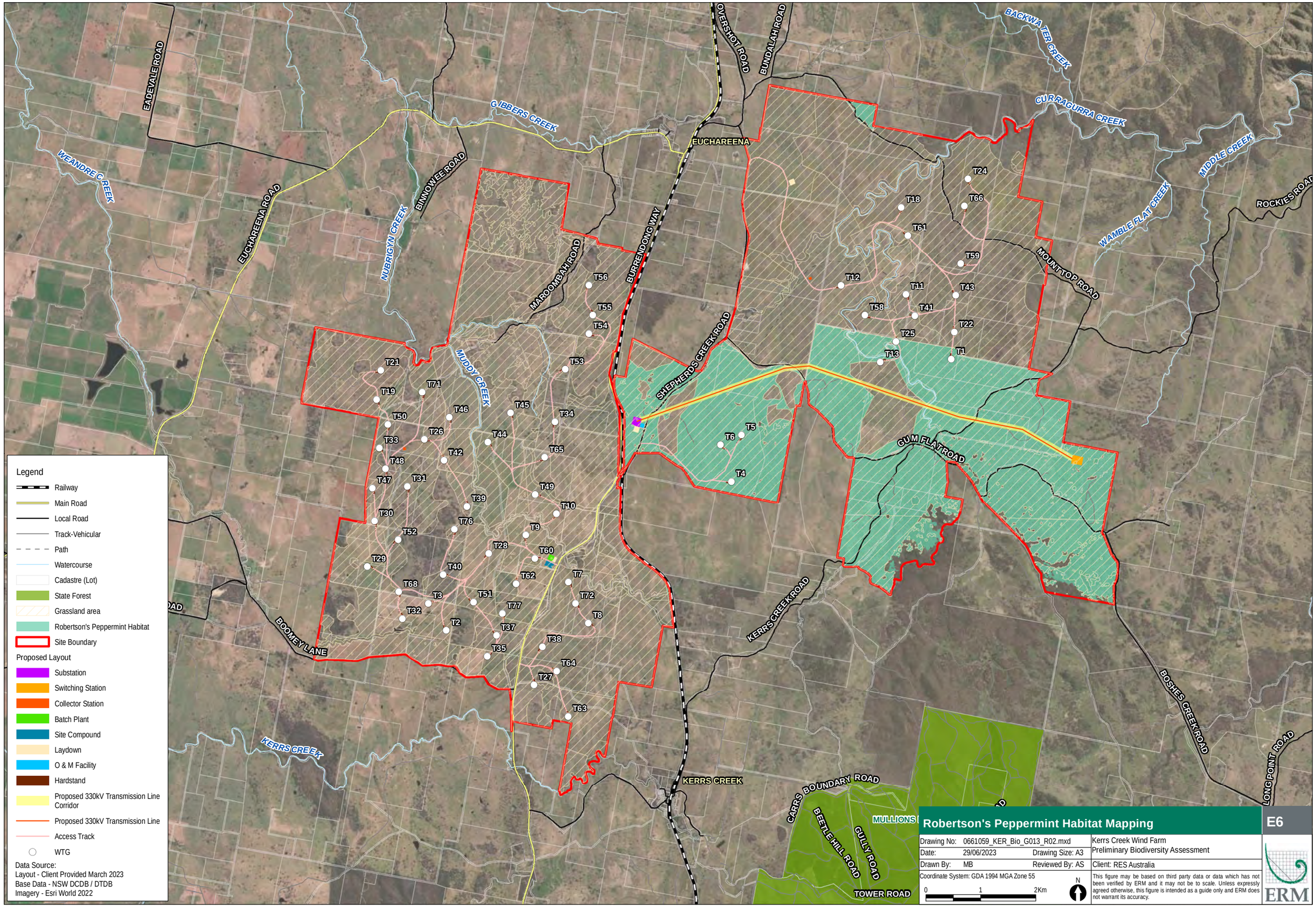
A significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 2 Significant Impact Assessment for Robertson's Peppermint – Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	Given the restricted distribution and the likely presence of the species within the Project Area based on the preferred habitat and records within the locality (10 km), the likely population is conservatively considered an important population. The Project has the potential to disturb an important population. This has the potential to lead to a long-term decrease in the size of an important population of a species. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species itself during future survey efforts.	Potential. Assessment and mapping to be refined in the EIS.
Reduce the area of occupancy of an important population,	Given the restricted distribution and the likely presence of the species within the Project Area based on the presence of preferred habitat and records within the locality (10km), the likely population is conservatively considered an important population. The current area of occupancy is restricted to areas of the north and north-east of Mullion Creek, Glengowan, Upper Meroo, west of Bocoble Mountain and Burraga NSW.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
	The Project has the potential to disturb suitable habitat for the species, which has potential to in turn reduce the area occupancy.	
Fragment an existing important population into two or more populations	Given the restricted distribution and the likely presence of the species within the Project Area based on the presence of preferred habitat and records within the locality (10 km), the likely population is conservatively considered an important population. The Project Area is characterised by a fragmented landscape, it is unlikely that the Proposed development would result in further fragmentation of the population.	Unlikely
Adversely affect habitat critical to the survival of a species,	Given the restricted distribution of the species, the suitable habitat likely to be present within the Project Area could be necessary for the long-term maintenance of the species to maintain genetic diversity and long term evolutionary development, or for the reintroduction of populations or recovery of the species. This habitat would be considered 'habitat critical' to the survival of the species. This habitat, currently based on associated PCTs. Targeted surveys will be undertaken to confirm presence of suitable habitat features and the species in future survey efforts.	Unlikely
Disrupt the breeding cycle of an important population,	Given the restricted distribution and the likely presence of the species within the Project Area based on the presence of preferred habitat and records within the locality (10 km), the likely population is conservatively considered an important population. The flowering period of Robertson's Peppermint is February to March, with seed dispersal occurring via wind or gravity. It is unlikely that the proposed development would interfere with this process.	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The removal of a relatively small amount of potential habitat within the Project Area is unlikely to decrease the availability or quality of habitat to the extent that the species is likely to decline. It is also unlikely to isolate or modify potential habitat for the species to the extent that the species is likely to decline through lack of regeneration, a major threat for the species. Potential impacts from the Project on potential habitat e.g., soil movement or weed spread will be managed.	Potential. Assessment and mapping to be refined in the EIS.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	The Project is unlikely to result in invasive weed species which are harmful to *E. robertsonii subsp. hemisphaerica;* however, control measures to avoid the spread of weeds will be implemented from pre-construction works, throughout construction and operation until decommissioning, thereby reducing potential impacts of the Project to potential habitat for this species.	Unlikely

Criteria	Description	Criteria Triggered?
Introduce disease that may cause the species to decline, or	*Eucalyptus robertsonii subsp. hemisphaerica* may be susceptible to Myrtle Rust (*Uredo rangelii*), a newly described fungus which is a serious pathogen affecting plants belonging to the family Myrtaceae. Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced or exacerbated in the Project Area	Unlikely
Interfere substantially with the recovery of the species.	The Project would not increase the occurrence of weeds, increase the intensity of grazing, or alter the fire regime in the Project Area. There is potential for the Project Area to include an important population, and critical habitat for *E. robertsonii subsp. hemisphaerica*. The action has potential to disturb potential habitat mapped within the Project Area for the species, which has potential to interfere with the recovery of the restricted species.	Potential. Assessment and mapping to be refined in the EIS.
Significant Impact: Potential significant Impact		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Robertson's Peppermint Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Robertson's Peppermint Habitat Mapping

E6

Drawing No:	0661059_KER_Bio_G013_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

N

ERM

Small Purple-pea (*Swainsona recta*) – Endangered

The Project has the potential to have a significant impact to the Small Purple-pea

The Small Purple-pea is listed as Endangered under the EPBC act and the BC Act. The species is a slender, erect perennial plant that produces several rigid stems 20-30 cm high. It has a thick taproot that can extend at least 60 cm below the soil surface. In the past, the Small Purple Pea was relatively widespread; it has been recorded in north-eastern Victoria and the South and Central Western Slopes and Tablelands of NSW (OEH, 2012). Over the past 80 years the known range of the species has declined considerably; its distribution is now fragmented into two clusters of populations, one in central eastern NSW (between Wellington and Mudgee) and the other in the Canberra – Williamsdale district (OEH, 2012). In NSW, the species survives in populations located at, Burrendong (160 plants), Mudgee (270 plants), Burra (100 plants), Mandurama (10 plants) and Guises Creek (50 plants) (Briggs and Leigh 1990, OEH 2012). The total known population in NSW is approximately 9,270 plants.

The Small Purple-pea was not recorded on the site during surveys or on BioNet Atlas, however there is a small cluster of the species 9 km to the north of the Project Area, along Burrendong Way, recorded in 2020. The site is within the known distribution for the species and preferred habitat is present. The PCTs over the Project Area associated with the Small Purple-pea are PCTs 266, 277, 3370, 3373 and 3399.

Associated PCT habitat for this species across the Project Area is mapped in Figure E 7.

Given the small number of extant populations, small area of occupancy and the reliance on in-situ protection for the conservation of the species, all populations and the habitat they occupy are considered critical to the survival of the Small Purple-pea (OEH 2012). For the purpose of this assessment all suitable habitat aligned with associated PCTs is considered habitat critical to the survival of the species. However, targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts.

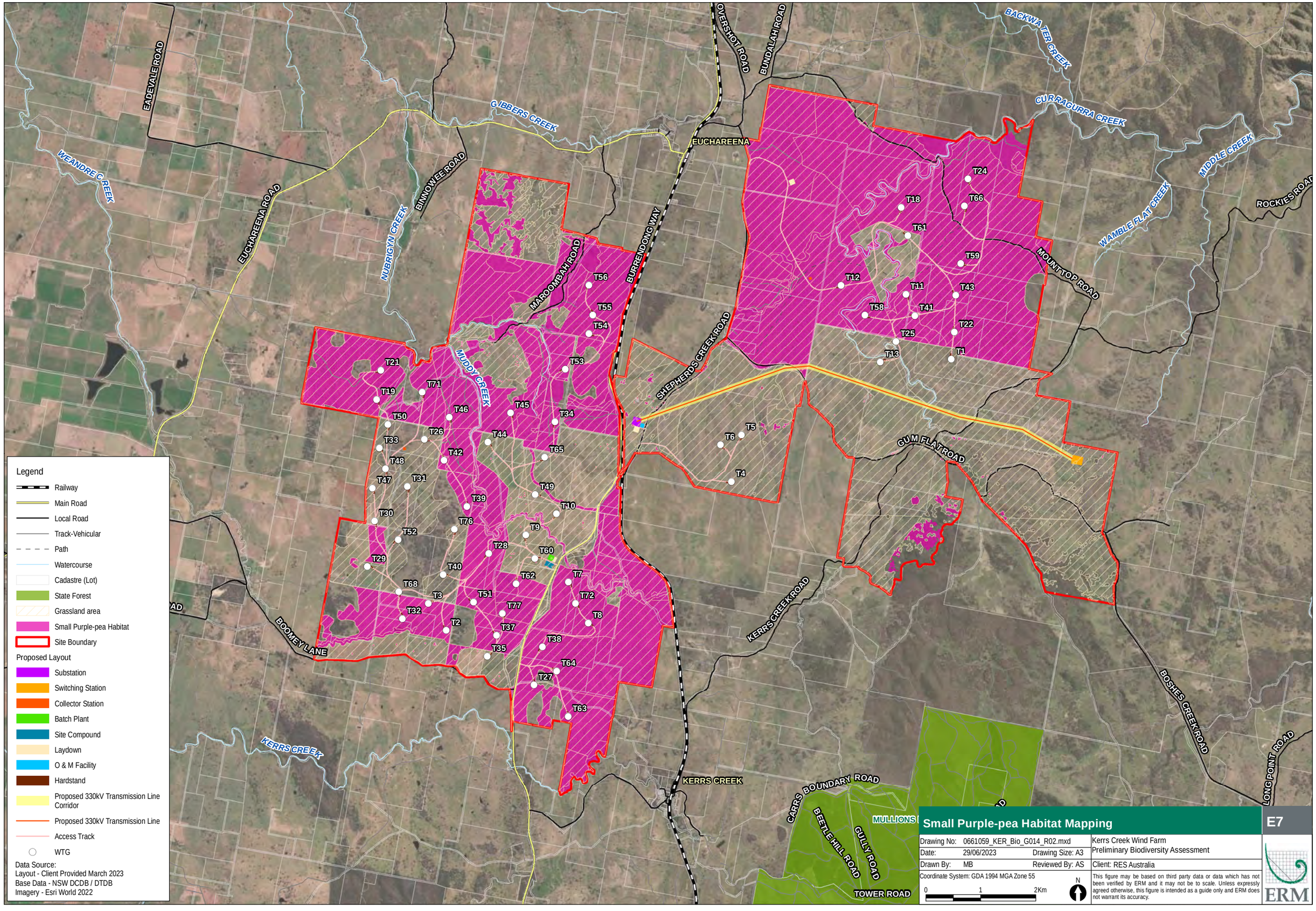
A significant impact assessment in accordance with the SIG 1.1 is presented in the following table.

Table E 3 Significant Impact Assessment for the Small Purple-pea – Endangered

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	The Project has the potential to disturb suitable habitat for the Small Purple-pea, with the majority of suitable habitat present within the Project Area remaining undisturbed. Known populations range in size from 1 to 3090 individuals. Given the small number of individuals making up known populations, disturbance of any individuals within the potential population has potential to lead to a long-term decrease in the size of the population. Targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
Reduce the area of occupancy of the species	Given the small number of extant populations, the species has a relatively small area of occupancy. The Project has the potential to disturb suitable habitat for the Small Purple-pea, with the majority of suitable habitat present within the Project Area remaining undisturbed. The Project has the potential to lead to a reduction in the area of occupancy for the species. However, targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts.	Potential. Assessment and mapping to be refined in the EIS.
Fragment an existing population into two or more populations	The Project Area is currently characterised by a fragmented landscape, it is unlikely that the Proposed development would result in further fragmentation of a potential population of the Small Purple-pea.	Unlikely
Adversely affect habitat critical to the survival of a species	Given the small number of extant populations, small area of occupancy and the reliance on in-situ protection for the conservation of the species, all populations and the habitat they occupy are considered critical to the survival of the Small Purple-pea (OEH 2012). For the purpose of this assessment all suitable habitat aligned with associated PCTs is considered habitat critical to the survival of the species. However, targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts. The Project has the potential to reduce potential habitat critical to the survival of the species by 686.50 ha.	Potential. Assessment and mapping to be refined in the EIS.
Disrupt the breeding cycle of a population	Pollination appears to be primarily by insects, although plants also appear to have capacity to self-pollinate (OEH, 2012). Any removal of specimens has the potential to disrupt breeding cycles, however, processes critical to the species lifecycle, such as pollination and maintenance of genetic variability, will continue unimpeded in any remaining population.	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the	The Project has the potential to disturb suitable habitat for the Small Purple-pea. However, targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts.	Unlikely

Criteria	Description	Criteria Triggered?
species is likely to decline	It is unlikely that the level of disturbance would decrease the availability or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Some of the main threats identified for the Small Purple-pea include grazing from native and feral herbivores and weed invasion. Project activities during construction and operation will adopt and follow Biosecurity measures that will aim to ensure that invasive species are not introduced or exacerbated in the Project Area.	Unlikely
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Small Purple-pea populations. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. However, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	Unlikely
Interfere with the recovery of the species	The recovery plan for the Small Purple-pea provides the following recovery objectives: 1. All natural populations are stable or increasing. 2. Maintain current genetic diversity across the range of the species. 3. Achieve formal protection for currently unprotected populations. The Project has the potential to disturb suitable habitat for the Small Purple-pea. This disturbance has the potential to result in a decrease in natural a population, if confirmed present, and in turn interfere with the recovery objectives for the species. Targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts.	Potential. Assessment and mapping to be refined in the EIS.
Significant Impact: Potential significant impact		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Small Purple-pea Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Small Purple-pea Habitat Mapping

E7

Drawing No:	0661059_KER_Bio_G014_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

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ERM

White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – Critically Endangered

The Project has the potential to have a significant impact on the TEC in both the woodland derived native grassland condition states

The White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Threatened Ecological Community (TEC) is listed as 'Critically Endangered' under the EPBC Act and BC Act and has been confirmed to be present within the Project Area. The TEC is associated with PCTs 266, 277, 347, 3373, 3387, 3399 and 3406 mapped within the Project Area.

The TEC is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs (where shrub cover comprises less than 30% cover), and a dominance or prior dominance of White Box (*Eucalyptus albens*) and/or Yellow Box (*E. melliodora*) and/or Blakely's Red Gum (*E. blakelyi*) trees (TSCC 2006). In the woodland state, tree cover is generally discontinuous and of medium height with canopies that are clearly separated.

To be considered part of the listed ecological community under the EPBC Act remnant areas must also:

- have a predominantly native understorey (i.e., more than 50% of the perennial vegetative ground layer must comprise native species), and
- be 0.1 ha or greater in size and contain 12 or more native understorey species (excluding grasses), including one or more identified important species; or
- be 2 ha or greater in size and have either natural regeneration of the overstorey species or an average of 20 or more mature trees per ha (DECCW 2012).

Fieldwork completed to date has identified areas of potential EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC within the Project Area in both woodland and derived native grassland condition states. The extent of the derived native grassland condition state is not yet delineated and requires further analysis.

The Project Area is also within range of the TEC, within the 'may occur' extent of its distribution. Gibbons and Boak (2002) estimated 7.4% of Yellow Box/Blakely's Red Gum woodland remaining in 30,000 ha on the NSW South West Slopes, which is reduced to 3.4% when isolated trees, remnants of less than one hectare and small, modified patches were excluded.

Potential habitat for this TEC has been associated with the following PCTs: PCT 266, 277, 347, 3373, 3387, 3399 and 3406. This habitat is mapped in Figure E8**.** Habitat associated with grasslands has been excluded at this stage as habitat without canopy cover in the form of derived native grassland is in low condition.

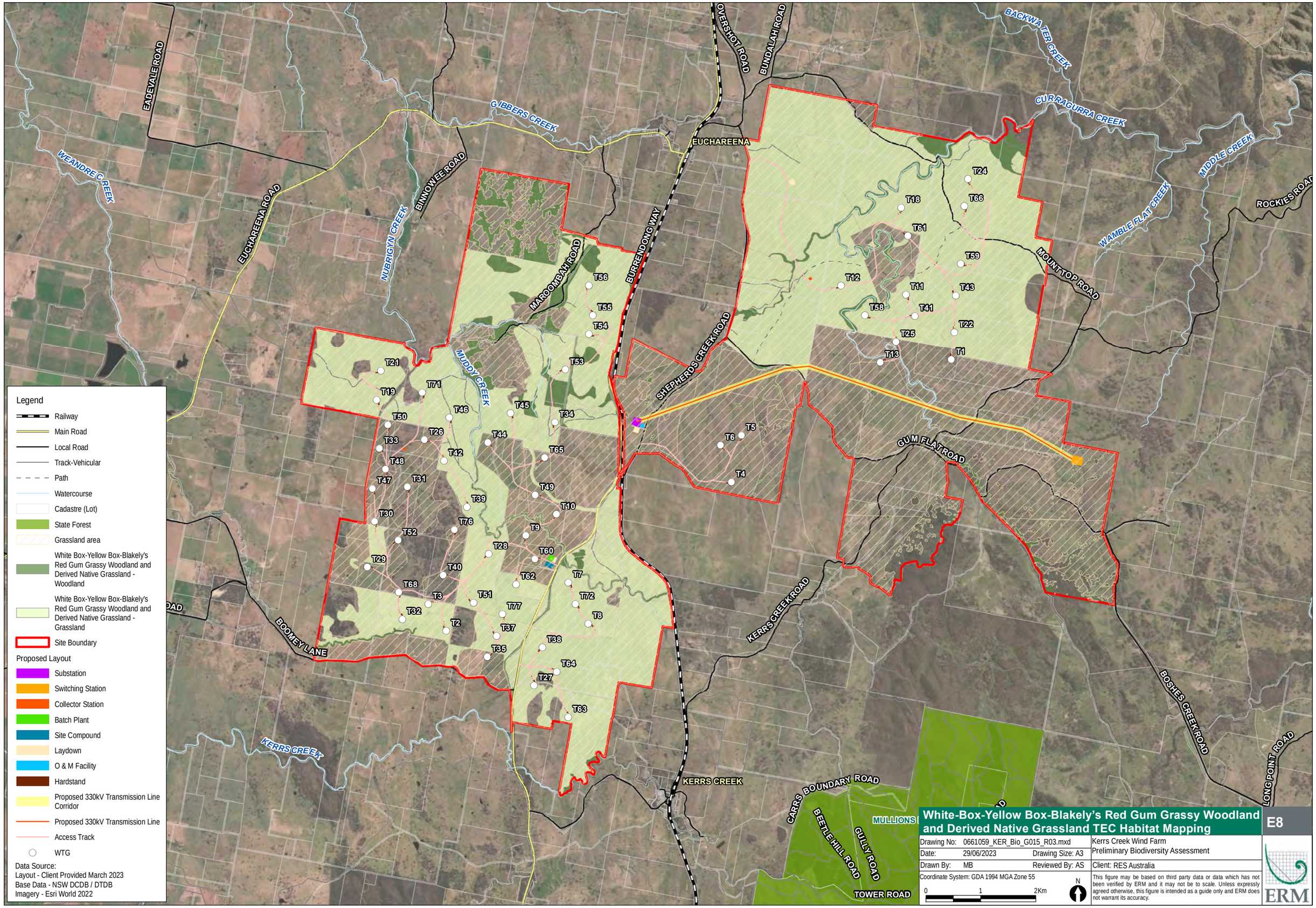
The extent to where this TEC occurs in its woodland and derived native grassland form will be continually refined and assessed through further field verification and assessment as part of the EIS process.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 8 Significant Impact Assessment for White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC – Critically Endangered

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
Reduce the extent of an ecological community,	The exact area of the TEC present within the Project Area is to be determined during future survey efforts. The area of the associated PCTs with a canopy with potential to be disturbed. Given that this TEC is severely restricted in range throughout this Bioregion, any reduction in its extent is likely to be considered significant, and therefore the proposed developed has the potential to cause a significant impact on the extent of the TEC.	Potential. Assessment and mapping to be refined in the EIS.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines,	The exact area of the patch present within the Project Area is to be determined during future survey efforts. There is the potential for as yet undetermined patches of this TEC to be fragmented by the proposed development as a result of the Projects potential disturbance. Further refinement of the TEC extent will be undertaken to ensure that areas of TEC are delineated, with potential for areas to be avoided by proposed development infrastructure.	Potential.
Adversely affect habitat critical to the survival of an ecological community,	Habitat critical to the survival of Box-Gum Grassy Woodland has been broadly defined as habitat on the moderate to highly fertile soils of the western slopes of NSW and Queensland, the northern slopes of Victoria, and the tablelands of the Great Dividing Range from southern Queensland through NSW and the ACT. Further, given the currently highly fragmented and degraded state of this ecological community, all areas of Box-Gum Grassy Woodland which meet the minimum condition criteria for the TEC should be considered critical to the survival of this ecological community (DECCW 2010). At current, all mapped potential TEC occurrence is classified as habitat critical to the survival.	Assessment and mapping to be refined in the EIS.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns,	Hydrology impacts as a result of the Project have not been explored as part of this assessment and will be considered in the EIS. However, given the nature of the Project and the limited area of impact to surface water and groundwater, it is not considered likely that there will be a significant impact to abiotic factors necessary for this TEC. Mitigation measures will also be included in the design to result in no changes to surface water or groundwater hydrology that could impact on the TEC area.	Unlikely

Criteria	Description	Criteria Triggered?
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	The area of the potential occurrence identified within the Project Area is to be determined during future survey efforts. Biosecurity requirements, particularly in relation to weed species, will be implemented to reduce the likelihood of changes to community composition. The Project is unlikely to cause substantial change to the species composition. Biosecurity measures will be implemented to reduce the introduction and establishment of invasive species. These measures will further explore the mitigation measures to be undertaken to minimise the impacts of chemicals utilised, if any, for weed management within the Project Area and the consideration of native vegetation including the TEC.	Unlikely
Interfere with the recovery of an ecological community	A National Recovery Plan for this TEC (DECCW, 2010) outlines the following objectives for recovery: ■ achieving no net loss in extent and condition of the ecological community throughout its geographic distribution; ■ increasing protection of sites with high recovery potential; ■ increasing landscape functionality of the ecological community through management and restoration of degraded sites; ■ increasing transitional areas around remnants and linkages between remnants; and ■ bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland. There is the potential that the proposed development will result in a net loss in the extent of the TEC, however, further refinement of the extent of the TEC will be undertaken through the EIS process.	Potential. Assessment and mapping to be refined in the EIS.
Significant Impact: Potentially significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Woodland
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Grassland
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC Habitat Mapping

E8

Drawing No:	0661059_KER_Bio_G015_R03.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

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ERM

Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered

The Project has the potential to have a significant impact to the Regent Honeyeater

The Regent Honeyeater (*Anthochaera Phrygia*) is listed as Critically Endangered under the EPBC Act and BC Act. No Regent Honeyeaters were observed over the site during surveys conducted by NGH in 2020 nor by Nature Advisory in 2020/21. However, there is one record from 2005 within the locality, recorded along the Macquarie River, and closer historical records from 1978. The site is within the known distribution of the species. The Regent Honeyeater Important Habitat Areas Map do not extend over the site, therefore, breeding in the site is unlikely. For the purpose of this assessment the species is considered likely to occur.

The Project Area does not support known core or good quality habitat for this species, as indicated by the habitat assessments undertaken on site and the lack of records known for the Project Area. The microhabitat requirements that were considered for Regent Honeyeaters during habitat assessments were mature trees and mistletoe abundance.

Foraging

The Regent Honeyeater is a nomadic/ migratory species that follows food availability across its range. The Recovery Plan (DoE, 2016) lists key feed species including Mugga Ironbark (*Eucalyptus sideroxylon*), Yellow Box (*Eucalyptus melliodora*), White Box (*Eucalyptus albens*), Yellow Gum (*Eucalyptus leucoxylon*), Spotted Gum (*Corymbia maculate*), Swamp Mahogany (*Eucalyptus robusta*), Needle-leaf Mistletoe (*Amyema cambagei*) on River Sheoak (*Casuarina cunninghamiana*), Box Mistletoe (*Amyema miquelii*) and Long-flower Mistletoe (*Dendropthoe vitellina*).

The Regent Honeyeater's diet primarily consists of nectar, but also includes invertebrates (mostly insects) and their exudates (e.g., lerps and honeydew), and occasionally fruit. It obtains nectar chiefly from eucalypts and mistletoe and appears reliant on select species which provide reliable nectar flows. It prefers taller and larger diameter trees for foraging, as these typically produce more nectar (Franklin et al., 1989; Menkhorst et al., 1999; Oliver, 2000; Webster and Menkhorst, 1992).

The potential foraging and breeding is likely to be present within the Project Area associated with PCTs 266, 277, 347, 3368, 3370, 3373, 3387, 3399, 3734, 3734 and 4063.

Habitat critical to the survival of the Regent Honeyeater includes any breeding or foraging areas where the species is likely to occur, and/or any newly discovered breeding or foraging locations. Based on the likely presence of the species, and suitable foraging habitat, all suitable habitat within the Project Area has been considered habitat critical to the survival of the species on a precautionary basis. Further surveys to assess habitat suitability will be completed.

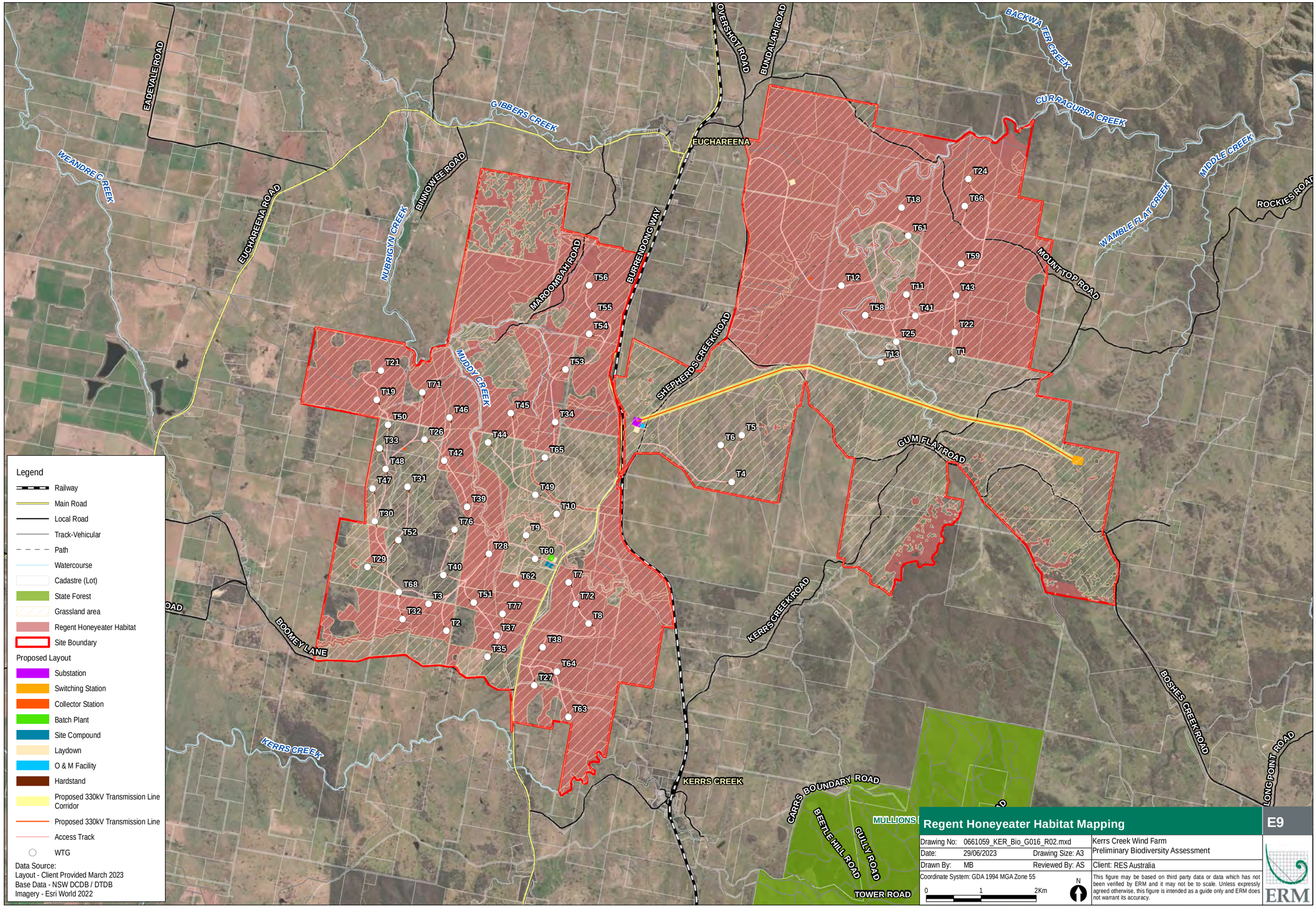
Associated PCT habitat for this species is mapped in **Figure E 9.**

A significant impact assessment in accordance with the SIG 1.1 is presented in **Table E 9.**

Table E 9 Significant Impact Assessment for the Regent Honeyeater

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population,	Direct mortality because of the proposed development is considered unlikely, given the high dispersal ability of Regent Honeyeater. Whilst the vegetation present within the Project area is considered likely to be utilised by individuals for foraging purposes (on occasion), it is not considered to support the population to the extent that impacts to this vegetation would lead to a long-term decrease in the size of the population.	Unlikely
Reduce the area of occupancy of the species,	The estimated area of occupancy (AOO) for the species is 300 km^2 (DoE 2015). It has been assumed that the potential direct impact to the species as a result of the Project. It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	Unlikely
Fragment an existing population into two or more populations,	The Regent Honeyeater is thought to be comprised of a singular population with exchange of genetic material occurring at regularly used areas (Kvistad et al., 2015). Habitat within the Project Area is likely to provide only limited foraging habitat for the Regent Honeyeater. Given the high dispersal capabilities of this species (OEH 2021), impacts to connectivity associated with the proposed development are unlikely.	Unlikely
Adversely affect habitat critical to the survival of a species,	The recovery plan of the Regent Honeyeater deems habitat critical to survival as any breeding or foraging areas where the species is likely to occur. Regent Honeyeater inhabits dry open forest and woodland, particularly Box-Ironbark woodland and riparian forests of River Sheoak which have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes (OEH, 2021). Based on the likely presence of the species, and presence of suitable foraging habitat, all suitable habitat within the Project Area is considered habitat critical to the survival of the species. The Project has the potential to disturb habitat critical to the survival of a species. Further refinement of the extent of this habitat will be undertaken to inform the EIS.	Unlikely. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
Disrupt the breeding cycle of a population,	Regent Honeyeater breeding habitat is geographically restricted, with breeding areas confined to two known locations in NSW – the Capertee Valley and Bundarra-Barraba regions (OEH, 2021). Given the distance from these known breeding locations, the proposed development is not considered likely to impact Regent Honeyeater breeding cycle.	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	Given the distance from known Regent Honeyeater breeding areas, the Project Area is considered to provide only limited foraging habitat. Relative to the available vegetation in the wider area, the Project Area is not considered likely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the Regent Honeyeater is likely to decline.	Unlikely
Result in invasive species that are harmful to an endangered species becoming established in the endangered or critically endangered species' habitat,	The Regent Honeyeater's reliance on nectar from a few key species predisposes it to competition from other nectivorous birds, such as native Noisy Miner (*Manorina melanocephala*). The occurrence of Noisy Miner has been linked to fragmentation of native vegetation patches, increasing the risk of competition with species such as Regent Honeyeater (Crates et al., 2018; Maron, 2007; Piper and Catterall, 2003). Given the availability of suitable nectar trees expected within vegetation over the Project Area, increases in Noisy Miner abundance as a result of the proposed development is not considered likely to result in competition which impacts species persistence.	Unlikely
Introduce disease that may cause the species to decline, or	Spread of Root-rot Fungus *Phytophthora cinnamomi* causing tree dieback is considered a potential threat to the Regent Honeyeater by reducing available foraging habitat. Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers.	Unlikely
Interfere with the recovery of the species.	The Project Area is not located within a known Regent Honeyeater breeding or regularly used subsidiary area. Habitat use within the Project Area is considered to be restricted to limited opportunistic foraging. Given the abundance of relatively contiguous forest vegetation, the loss of potential foraging habitat as a result of the proposed development is not considered likely to interfere with the recovery of Regent Honeyeater.	Unlikely
Significant Impact: Potentially Significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Regent Honeyeater Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Regent Honeyeater Habitat Mapping

E9

Drawing No:	0661059_KER_Bio_G016_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

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ERM

Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable

The Project has the potential to have a significant impact to the Grey-headed Flying-fox

The Grey-headed Flying-fox listed as Vulnerable under the EPBC Act and BC Act and is considered likely to occur within the Project Area. It is a canopy-feeding nectarivore and frugivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands (TSSC, 2001).

The Project is approximately 27 km north of the closest colony containing recent Grey-headed Flying-fox activity (as per the interactive flying-fox viewer maintained by DCCEEW). This colony is located near Orange. Grey-headed Flying-foxes are capable of nightly flights of up to 50 km from their roost to different feeding areas as food resources change (Eby unpubl. cited in Eby 1991). Thus, the Project Area has potential foraging habitat as it is within a 50 km range from the closest colony. There is a recent BioNet record in the locality from 2022 for the species, approximately 9.4 km west of the Project boundary and the site is situated within the known distribution of the species.

It is noted that many myrtaceous tree species that make up the diet of the Grey-headed Flying-fox flower at different times of the year. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera* (DAWE, 2021b). The Project Area contains a mixture of these myrtaceous species.

Where the existence of these important winter and spring flowering vegetation communities is verified in the field, they are considered habitat critical to the survival of the Grey-headed Flying-fox (DAWE, 2021b). Therefore, habitat within the Project Area is considered potential foraging habitat critical to the survival of the species. This potential Grey-headed Flying-fox foraging habitat has been mapped in line with the associated PCTs for this species, being PCTs 266, 277, 3368, 3369, 3370, 3373, 3399, 3406, 3451, 3534, 3541, 3734 and 4063.

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and breeding sites. Additional targeted surveys and habitat mapping are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

Associated PCT habitat is displayed in **Figure E 10**.

A significant impact assessment is provided in the SIG 1.1, is presented the following table.

Table E 10 Significant Impact Assessment for Grey-headed Flying-fox– Vulnerable

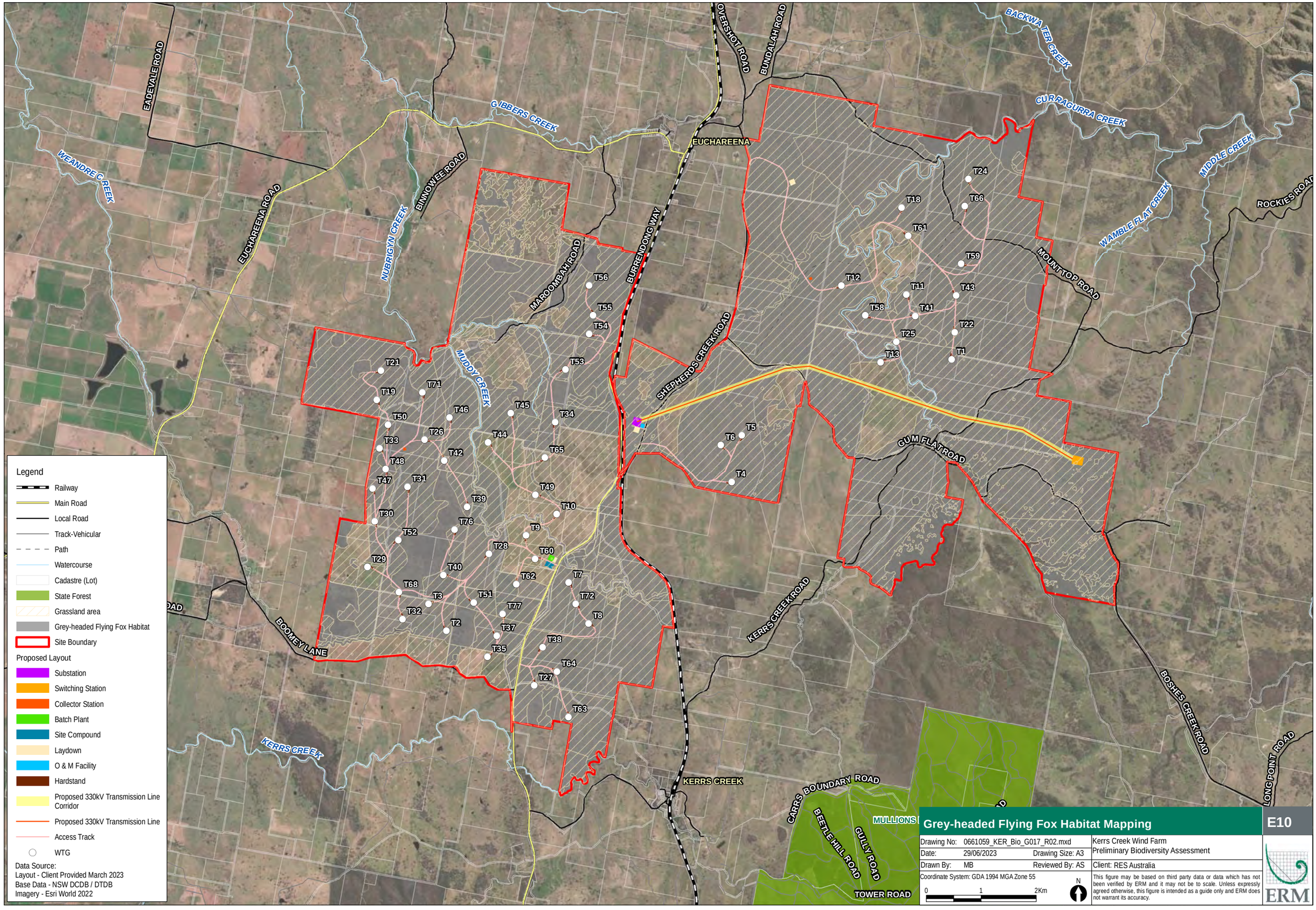
Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The Grey-headed Flying-fox is considered to exist as one national population split into separate colonies due to the constant genetic exchange and movement between camps throughout the species' entire geographic range (DAWE, 2021b).	Unlikely

Criteria	Description	Criteria Triggered?
	No roost sites will be directly or indirectly affected by the Project. This species has the potential to forage within parts of the Project on an opportunistic and occasional basis. On a local and regional scale, the habitat with potential to be removed forms a small proportion of foraging resources. Intensification of light and noise are not expected to adversely affect local populations of the Grey-headed Flying-fox. The Project is unlikely to lead to a long-term decrease in the size of the population.	
Reduce the area of occupancy of an important population,	The Grey-headed Flying-fox is considered to exist as one national population split into separate colonies due to the constant genetic exchange and movement between camps throughout the species' entire geographic range (DAWE, 2021b). The proposed development will result in the potential disturbance of Grey-headed Flying-Fox foraging habitat. Given the species relatively high area of occupancy, with a distribution ranging across the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria and abundant accessibility of eucalypts in the locality and the wider landscape, the removal of vegetation is unlikely to have a significant impact on the area of occupancy of the species. The clearing of patches of vegetation across the Project and the retention of patches of myrtaceous vegetation will ensure that the area of occupancy for the species is not significantly reduced.	Unlikely
Fragment an existing important population into two or more populations,	Grey-headed Flying-foxes are highly mobile and forage over extensive areas. The potential disturbance of potential Grey-headed Flying-fox foraging habitat within an already fragmented landscape will not further fragment the existing population.	Unlikely
Adversely affect habitat critical to the survival of a species,	The Project contains myrtaceous species that are seasonal foraging resources considered habitat critical to the survival of the Grey-headed Flying-fox. Critical breeding habitat is not present. The potential critical Grey-headed Flying-fox foraging habitat has been mapped in line with the associated PCTs for this species, being PCTs 266, 277, 3368, 3369, 3370, 3373, 3399, 3406, 3451, 3534, 3541, 3734 and 4063.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
	The Project has potential to adversely affect 1,053.59 ha of habitat critical to the survival of a species.	
Disrupt the breeding cycle of an important population,	The Grey-headed Flying-fox is considered to exist as one national population split into separate colonies due to the constant genetic exchange and movement between camps throughout the species' entire geographic range (DAWE, 2021b). Colonies of Grey-headed Flying-fox rest, socialise, breed and give birth at roosting sites also known as camps. No known camps will be removed as part of the proposed development works. Intensification of light and noise during construction are not expected to adversely affect the breeding cycle of any colonies of Grey-headed Flying-fox. The Project is approximately 27 km north from the closest active colony with recent Grey-headed Flying-fox activity (per the interactive flying-fox viewer of the DCCEEW). Thus, the proposed development is not anticipated to disrupt the breeding cycle of an important population.	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The Project contains myrtaceous species that are foraging resources considered habitat critical to the survival of the Grey-headed Flying-fox. The proposed disturbance of potential habitat within an already fragmented landscape is unlikely to adversely affect the quality of habitat to the extent that the species is likely to decline. The seasonal foraging resources to be removed are commensurate to an abundance of other vegetation communities within the locality.	Unlikely
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat,	The proposed development is not anticipated to introduce invasive species that are harmful to the Grey-headed Flying-fox. The proposed development activities during construction and operation will adopt and follow biosecurity measures to mitigate the introduction or further spread of invasive species within the Project Boundary.	Unlikely
Introduce disease that may cause the species to decline, or	There is currently limited information necessary to assess and quantify the risks posed to Grey-headed Flying-fox populations by the introduction of diseases (DAWE, 2021).	Unlikely

Criteria	Description	Criteria Triggered?
	The proposed development is not anticipated to introduce diseases to any Grey-headed Flying-fox colonies. There is no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn if a Grey-headed Flying-fox is encountered. Only appropriately trained and licensed workers will handle wildlife.	
Interfere with the recovery of the species.	The National Recovery Plan for the Grey-headed Flying-fox (DAWE, 2021b), outlines nine specific recovery objectives intended to be achieved over ten years. These include: ■ Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox. ■ Identify, protect and increase roosting habitat of Grey-headed Flying-fox camps. ■ Determine trends in the Grey-headed Flying-fox population to monitor the species' national distribution, habitat use and conservation status. ■ Build community capacity to coexist with Grey-headed Flying-foxes and minimise the impacts on urban settlements from new and existing camps while avoiding interventions to move on or relocate entire camps. ■ Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program and involve the community in the recovery program where appropriate. ■ Improve the management of Grey-headed Flying-fox camps in areas where interaction with humans is likely. ■ Significantly reduce levels of licenced harm to Grey-headed Flying-foxes associated with commercial horticulture. ■ Support research activities that will improve the conservation status and management of Grey-headed Flying-foxes. ■ Reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire.	Potential. Assessment and mapping to be refined in the EIS.

Criteria	Description	Criteria Triggered?
	The first recovery objective is applicable to this assessment, native foraging habitat that is critical to the survival of the Grey-headed Flying-Fox has been identified in the Project. As previously outlined, the seasonal foraging resources are minimal compared to the abundance of other suitable vegetation within the locality. The Project will result in the disturbance of potential habitat. Therefore, has the potential to interfere with the recovery plan for the species.	
Significant Impact: Potentially Significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Grey-headed Flying Fox Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Grey-headed Flying Fox Habitat Mapping

E10

Drawing No:	0661059_KER_Bio_G017_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

N

ERM

Large-eared Pied Bat (*Chalinolobus dwyeri)* – Vulnerable

The Project is unlikely to have a significant impact on the Large-eared Pied Bat.

The Large-eared Pied Bat is listed as Vulnerable under the EPBC Act and BC Act and is considered likely to occur within the Project Area. The species was possibly (unresolved) recorded within the Project Area, with three calls in total being identified as possibly belonging to this species during the Nature Advisory Summer/ Autumn 2021 survey. There is also a recent record of the species from 2020 located 4.7 km west of the Project Area, along Bell River.

The Large-eared Pied Bat is mainly found in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. The Project Area is situated within the known distribution for the species (OEH 2022d).

The species occurs primarily in areas with suitable roosting habitat of caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*). Foraging occurs within low to mid-elevation dry open forest and woodland close to roosting habitat and in well-timbered areas containing gullies (OEH 2022d). This potential Large-eared Pied Bat foraging/ breeding habitat has been mapped in line with the associated PCTs for this species, being PCTs 277, 3368, 3369, 3370, 3373, 3387, 3399, 3406, 3734 and 4063.

No Critical Habitat has been identified, described or included in the Register of Critical Habitat (DAWE 2021c). In the absence of this, all habitat for the species either now or at some point in the near future is considered likely to be critical to the survival of the species (DAWE 2021c).

Similarly, there is insufficient information available to describe, with spatial information, important populations of this species. Until such information is available, all populations, inclusive of the likely population present within the Project Area, are considered important due to their likely role in maintaining population connectivity and genetic diversity necessary for the evolutionary potential of the species (DAWE 2021c).

Associated PCT habitat for the Large-eared Pied Bat is displayed in **Figure E 11**.

There is also a potential for this species to collide with the wind turbine blades proposed by the Project when travelling between foraging and breeding sites. Additional bat surveys and habitat mapping are proposed for future field investigations and additional data will be obtained to inform ongoing management and potential impact for the species.

A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

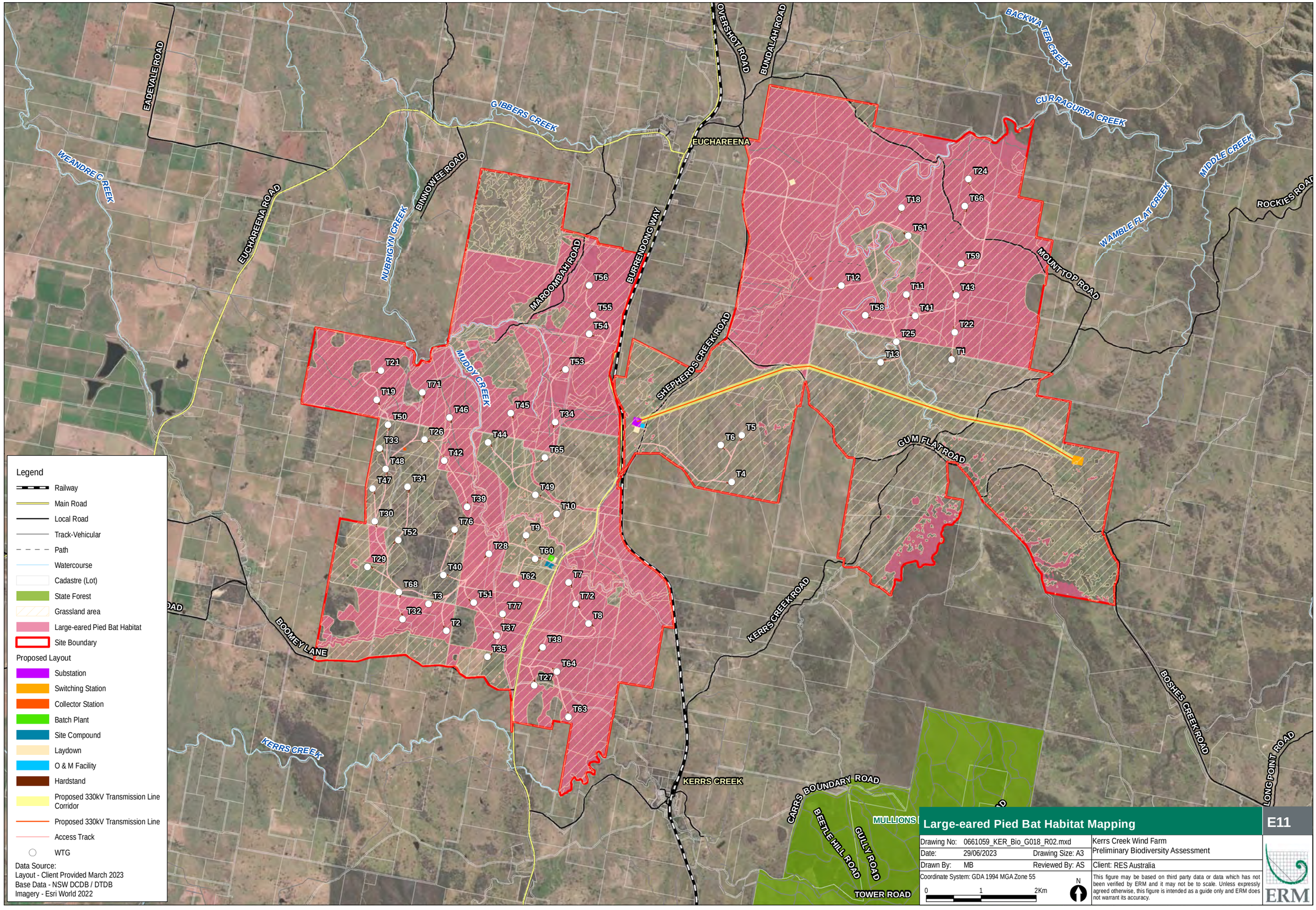
Table E 11 Significant Impact Assessment for the Large-eared Pied Bat– Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The likely population of Large-eared Pied Bats present within the Project Area is considered an important population. The proposed Project would result in the disturbance of potential habitat for the Large-eared Pied Bat, including potential foraging resources.	Unlikely

Criteria	Description	Criteria Triggered?
	However, this species is highly mobile (known to forage more than three kilometres from roost sites) (Churchill 2008), and similar foraging and roosting resources would remain in the locality. It is unlikely that the Project would lead to a long-term decrease in the size of an important population of the species.	
Reduce the area of occupancy of an important population,	The AOO for the species is based on areas supporting maternity roost sites and is estimated at 280,000 km2 (DAWE 2021c). It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	Unlikely
Fragment an existing important population into two or more populations,	Habitat connectivity would be unlikely to be significantly affected by the proposed Project. The proposed Project is unlikely to result in any barriers to movement, as the species likely foraged below canopy level and are unlikely to be at high risk of turbine collision. The Project and is unlikely to fragment an existing population of this species into two or more populations. A bird and bat collision risk assessment considering the Large-eared Pied Bat will be completed to inform an EIS.	Unlikely
Adversely affect habitat critical to the survival of a species	No Critical Habitat as has been identified, described or included in the Register of Critical Habitat (DAWE 2021). In the absence of this, all habitat for the species either now or at some point in the near future is considered likely to be critical to the survival of the species (DAWE 2021). The proposed Project would result in the potential disturbance of potential habitat, subsequently habitat critical to the survival of the species, however based on the AOO for the species, this level of impact is unlikely to be significant.	Unlikely
Disrupt the breeding cycle of an important population,	The likely population of Large-eared Pied Bats present within the Project Area is considered an important population. Due to the species dependence on roost sites for shelter and breeding, the Large-eared Pied bat is particularly vulnerable to threats that impact maternity roost sites. Further investigation of the presence of habitat suitable for roost sites will be undertaken to inform the EIS.	Unlikely

Criteria	Description	Criteria Triggered?
	Mitigation measures will be undertaken to ensure there is limited impact to breeding habitat if identified. The proposed action is unlikely to disrupt the breeding cycle of the local population	
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed action has the potential to impact suitable habitat for the Large-eared Pied Bat. However, due to the mobile nature of this species, it is unlikely that the proposed action will further modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	Habitat destruction by livestock and feral animals and predation by introduced species are recognised threats for the Large-eared Pied Bat. Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that invasive species are not introduced into the Project Area.	Unlikely
Introduce disease that may cause the species to decline, or,	The impact of diseases, including but not limited to, White-nose syndrome (WNS) is a potential threat to the species. WNS is caused by the fungus *Pseudogymnoascus destructans*. It has not yet been detected in Australia but is a threat to cave-dwelling bats in other parts of the world and could have a significant impact of this species if it is introduced to Australia. Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers	Unlikely
Interfere substantially with the recovery of the species.	The Recovery Plan established for the species (DERM 2011) identifies key threats for the species, including the following: ■ Destruction of and interference with maternity and other roosts ■ Mining of roosts ■ Mine induced subsidence of cliff lines ■ Disturbance from human recreational activities	Unlikely

Criteria	Description	Criteria Triggered?
	■ Habitat disturbance by other animals, including livestock and feral animals ■ Predation by introduced predators ■ Vegetation clearance in the proximity of roosts ■ Fire in the proximity of roosts ■ Loss of genetic diversity The number and known location of roosting sites is limited. Given the likely records of the species on the site, the Project has the potential to disturb vegetation in proximity to a roost. Further investigations will be undertaken to inform an EIS. Given the small scale of the potential habitat disturbance within the Project Area in relation to the species AOO, it is unlikely this disturbance would interfere substantially with the recovery of the species.	
Significant Impact: Unlikely Significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Large-eared Pied Bat Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Large-eared Pied Bat Habitat Mapping

E11

Drawing No:	0661059_KER_Bio_G018_R02.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

N

ERM

Diamond Firetail (*Stagonopleura guttata)* – Vulnerable

The Project is unlikely to have a significant impact on the Diamond Firetail.

The Diamond Firetail is listed as Vulnerable under the EPBC Act and BC Act and is considered known to occur within the Project Area. The species was recorded within the Project Area during the Nature Advisory Summer/ Autumn 2021 field survey.

The Diamond Firetail is known to occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea. The Project Area is situated within the known distribution for the species (DCCEEW, 2023).

Habitat critical to the survival of the Diamond Firetail includes areas of:

- Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats;
- Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding; and
- Drooping she-oak (*Allocasuarina verticillata*) within the Mt Lofty Ranges

The species occur in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees, Foraging occurs at ground level, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects. (DCCEEW, 2023).

Habitat for the Diamond Firetail has been mapped in line with the associated PCTs for this species, being PCTs 266, 277, 347, 3369, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063 and 3406.

Associated PCT habitat for the Diamond Firetail is displayed in **Figure E 12**.

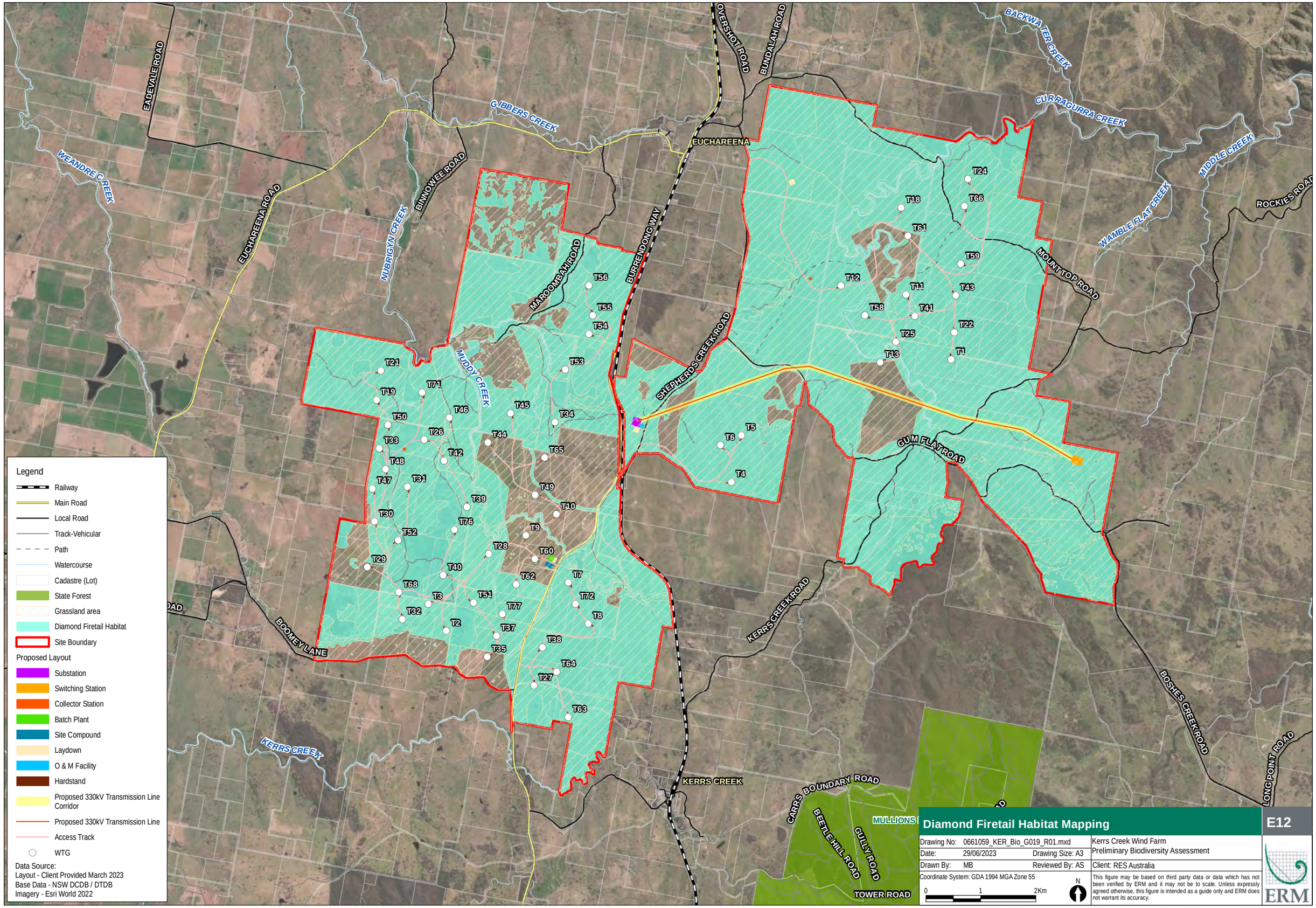
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 12 Significant Impact Assessment for the Diamond Firetail – Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The population of Diamond Firetail present within the Project Area is not considered an important population. The proposed Project would result in the potential disturbance of habitat for the Diamond Firetail. It is unlikely that the Project would lead to a long-term decrease in the size of an important population of the species.	Unlikely
Reduce the area of occupancy of an important population,	The AOO for the species is estimated at 25,000 km2 (DCCEEW, 2023a). The proposed Project would result in the potential disturbance of habitat within its AOO. It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	Unlikely

Criteria	Description	Criteria Triggered?
Fragment an existing important population into two or more populations,	Habitat connectivity would be unlikely to be significantly affected by the proposed Project. The proposed Project is unlikely to result in any barriers to movement, as the species forage below canopy level and are unlikely to be at high risk of turbine collision. The Project is unlikely to fragment an existing population of this species into two or more populations	Unlikely
Adversely affect habitat critical to the survival of a species	The proposed Project would result in the potential disturbance of habitat, subsequently habitat critical to the survival of the species, however based on the AOO for the species, this level of impact is unlikely to be significant.	Unlikely
Disrupt the breeding cycle of an important population,	The population of Diamond Firetail present within the Project Area is not considered an important population. Mitigation measures will be undertaken to ensure there is limited impact to breeding habitat if identified. The proposed action is unlikely to disrupt the breeding cycle of the local population	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed action has the potential to impact 1,056.78 ha of suitable habitat for the Diamond Firetail. However, due to the mobile nature of this species, it is unlikely that the proposed action will further modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	Habitat degradation by livestock and feral animals and predation by introduced species are recognised threats for the Diamond Firetail Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that invasive species are not introduced into the Project Area.	Unlikely
Introduce disease that may cause the species to decline, or,	Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers	Unlikely
Interfere substantially with the recovery of the species.	There is evidence that the Project may have the potential to support that habitat critical to the survival of the species is likely to be present within the associated mapped PCTs. The proposed removal of potential habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the species and reduce the area of occupancy, as outlined within the species conservation advice (DCCEEW, 2023a).	Unlikely

Criteria	Description	Criteria Triggered?
	However, given the small scale of the potential habitat disturbance within the Project Area in relation to the species AOO, it is unlikely this disturbance would interfere substantially with the recovery of the species	
Significant Impact: Unlikely Significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Diamond Firetail Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Diamond Firetail Habitat Mapping

E12

Drawing No:	0661059_KER_Bio_G019_R01.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

0 1 2Km

N

ERM

South-eastern Hooded Robin (*Melanodryas cucullata cucullata*) – Endangered

The Project is unlikely to have a significant impact on the South-eastern Hooded Robin

The South-eastern Hooded Robin is listed as Endangered under the EPBC act and vulnerable under the BC Act. The species was recorded within the Project Area by NGH in 2020, and Nature Advisory in 2021.

The species occurs in south-eastern Australia from far south-east Queensland to Yorke Peninsula, South Australia. The Project Area is situated within the known distribution for the species (DCCEEW, 2023a).

This species prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. (DCCEEW, 2023b).

Habitat critical to the survival of the South-eastern Hooded Robin include areas of:

- Dry eucalypt and acacia woodlands and shrublands remnants with an open understorey, some grassy areas and a complex ground layer, often in or near clearings or open areas;
- Structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses;
- Standing dead or live trees and tree stumps are also essential for nesting, roosting and foraging; and
- Moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat

Habitat for the South-eastern Hooded-robin has been mapped in line with the associated PCTs for this species, being PCTs 266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063 and 3406.

Associated PCT habitat for the South-eastern Hooded Robin is displayed in Figure E-13.

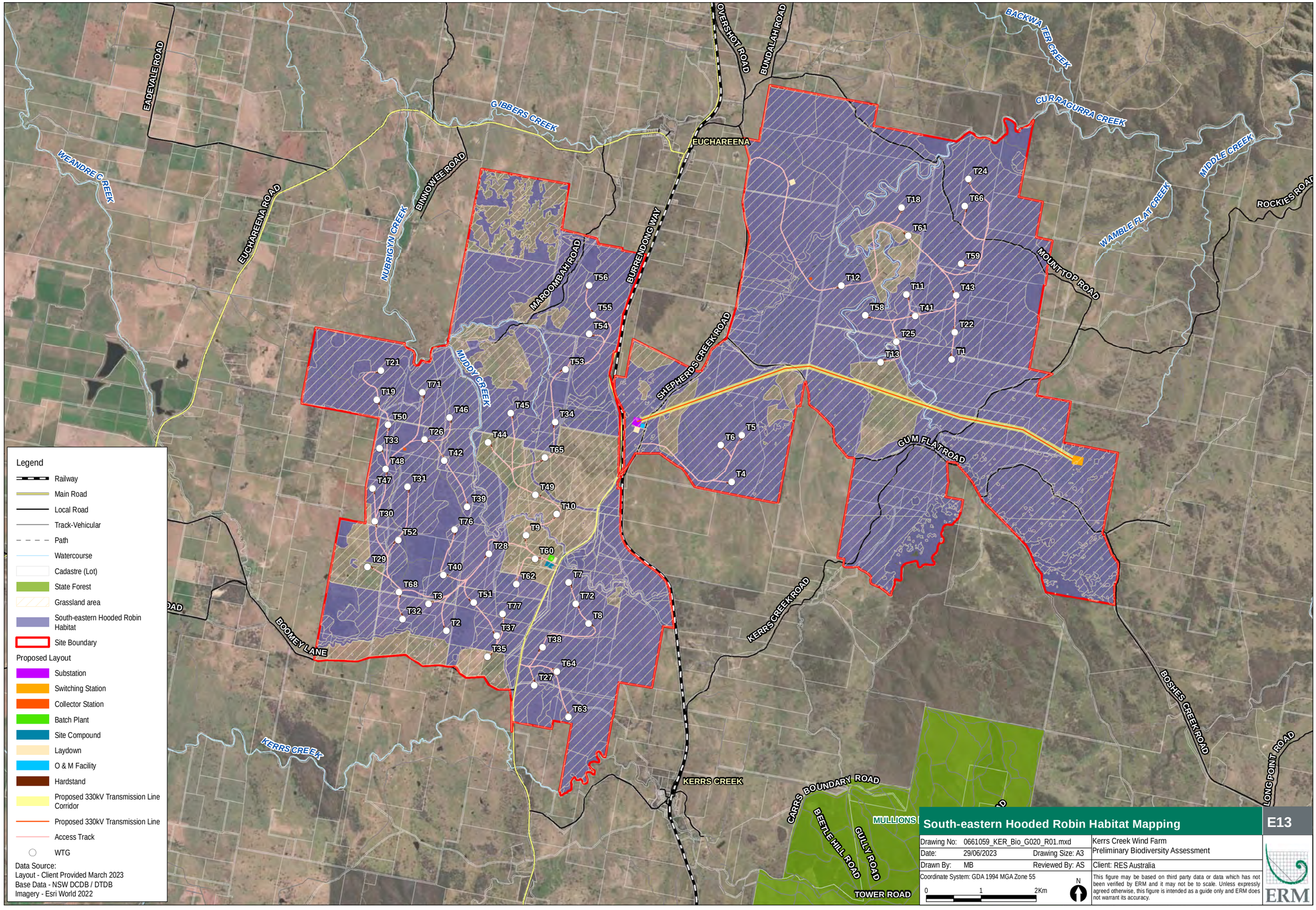
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 13 Significant Impact Assessment for the South-eastern Hooded Robin – Endangered

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population	The Project has the potential to disturb suitable habitat for the South-eastern Hooded Robin, with the majority of suitable habitat present within the Project Area remaining undisturbed. It is unlikely that the Project would lead to a long-term decrease in the size of an important population of the species.	Unlikely
Reduce the area of occupancy of the species	The AOO for the species is estimated at 1,200,000 km2 (DCCEEW, 2023b). The proposed Project would result in the potential disturbance of habitat within this AOO.	Unlikely

Criteria	Description	Criteria Triggered?
	It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	
Fragment an existing population into two or more populations	The Project Area is currently characterised by a fragmented landscape., it is unlikely that the Proposed development would result in further fragmentation of a potential population of the South-eastern Hooded Robin. The proposed Project is unlikely to result in any barriers to movement, as the species forage below canopy level and are unlikely to be at high risk of turbine collision.	Unlikely
Adversely affect habitat critical to the survival of a species	The proposed Project would result in the potential disturbance of habitat, subsequently habitat critical to the survival of the species, however based on the AOO for the species, this level of impact is unlikely to be significant.	Unlikely.
Disrupt the breeding cycle of a population	The population of South-eastern Hooded-robin present within the Project Area is not considered an important population. Mitigation measures will be undertaken to ensure there is limited impact to breeding habitat if identified. The proposed action is unlikely to disrupt the breeding cycle of the local population	Unlikely
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project has the potential to disturb suitable habitat for the South-eastern Hooded-robin. However, targeted surveys will be undertaken to confirm presence of important habitat features and the species itself in future survey efforts. It is unlikely that the level of disturbance would decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Habitat degradation by livestock and feral animals and predation by introduced species are recognised threats for the South-eastern Hooded Robin. Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that invasive species are not introduced into the Project Area.	Unlikely

Criteria	Description	Criteria Triggered?
Introduce disease that may cause the species to decline	Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers	Unlikely
Interfere with the recovery of the species	There is evidence that the Project may have the potential to support that habitat critical to the survival of the species is likely to be present within the associated mapped PCTs. The proposed removal of potential habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the species and reduce the area of occupancy, as outlined within the species conservation advice (DCCEEW, 2023b). However, given the small scale of the potential habitat disturbance within the Project Area in relation to the species AOO, it is unlikely this disturbance would interfere substantially with the recovery of the species.	Unlikely
Significant Impact: Unlikely significant impact		


EADEVALE ROAD
WEANDRE CREEK
EUCHAREENA ROAD
GIBBERS CREEK
BINNOWEE ROAD
NUBRIGYN CREEK
OVERSHOT ROAD
BUNDALAH ROAD
EUCHAREENA
BURRENDONG WAY
MAROOMBAH ROAD
MUDDY CREEK
SHEPHERDS CREEK ROAD
BACKWATER CREEK
CURRAGURRA CREEK
MIDDLE CREEK
WAMBLE FLAT CREEK
ROCKIES ROAD
MOUNTTOP ROAD
GUM FLAT ROAD
KERRS CREEK ROAD
BOOMEY LANE
KERRS CREEK
BOSHES CREEK ROAD
LONG POINT ROAD
CARRS BOUNDARY ROAD
BEETLE HILL ROAD
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T76
T77
Legend
Railway
Main Road
Local Road
Track-Vehicular
Path
Watercourse
Cadastre (Lot)
State Forest
Grassland area
South-eastern Hooded Robin Habitat
Site Boundary
Proposed Layout
Substation
Switching Station
Collector Station
Batch Plant
Site Compound
Laydown
O & M Facility
Hardstand
Proposed 330kV Transmission Line Corridor
Proposed 330kV Transmission Line
Access Track
WTG
Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022
South-eastern Hooded Robin Habitat Mapping
E13
Drawing No: 0661059_KER_Bio_G020_R01.mxd
Date: 29/06/2023
Drawing Size: A3
Drawn By: MB
Reviewed By: AS
Coordinate System: GDA 1994 MGA Zone 55
0
1
2Km
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Kerrs Creek Wind Farm
Preliminary Biodiversity Assessment
Client: RES Australia
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

Brown Treecreeper (*Climacteris picumnus victoriae)* – Vulnerable

The Project is unlikely to have a significant impact on the Brown Treecreeper

The Brown Treecreeper is listed as Vulnerable under the EPBC Act and BC Act and is considered likely to occur within the Project Area. The species was recorded within the Project Area during the Nature Advisory Summer/ Autumn 2021 survey.

The Brown Treecreeper occurs from south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland (DCCEEW, 2023c).

Habitat critical to the survival of the brown treecreeper includes areas that have:

- Relatively undisturbed grassy woodland with native understorey. − Habitat structure should be quite open at ground level;
- Large living and dead trees which are essential for roosting and nesting sites and for foraging;
- Fallen timber which provides essential foraging habitat and;
- Hollows in standing dead or live trees and tree stumps are also essential for nesting.

The species occupy mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. The subspecies is not usually found in woodlands with a dense shrub layer, and it is absent from heavily degraded woodlands and steep rocky hills. (DCCEEW, 2023).

Habitat for the Brown Treecreeper has been mapped in line with the associated PCTs for this species, being PCTs 266, 277, 347, 3370, 3373, 3387, 3399, 3451, 3534, 3541, 3734, 4063 and 3406.

Associated PCT habitat for the Diamond Firetail is displayed in **Figure E-13**.

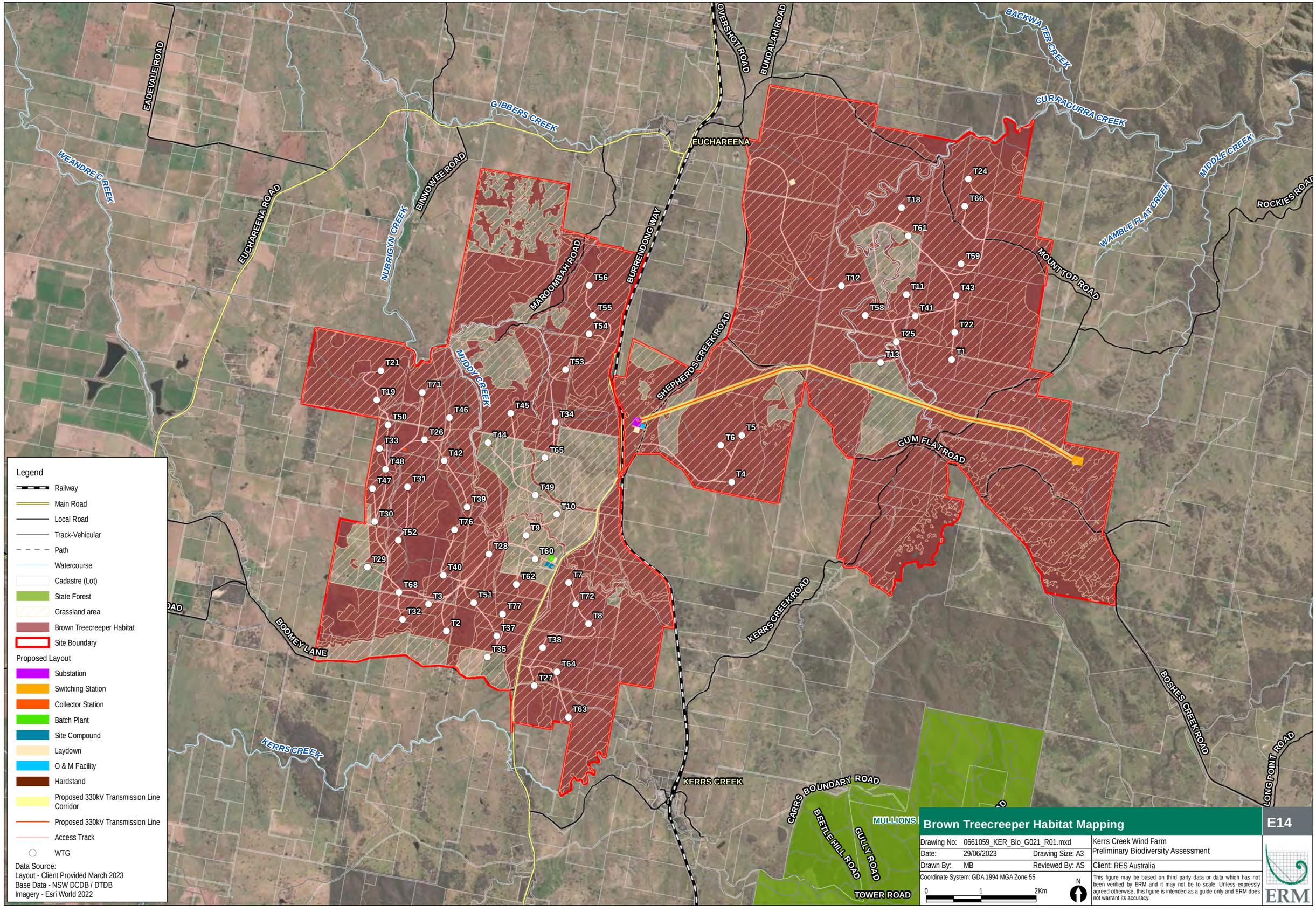
A significant impact assessment based on guidance provided in the SIG 1.1, is presented the following table.

Table E 13 Significant Impact Assessment for the Brown Treecreeper– Vulnerable

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species,	The population of Brown Treecreeper present within the Project Area is not considered an important population. The proposed Project would result in the potential disturbance of habitat for the Brown Treecreeper. It is unlikely that the Project would lead to a long-term decrease in the size of an important population of the species.	Unlikely
Reduce the area of occupancy of an important population,	The AOO for the species is estimated at 30,000 km2 (DCCEEW, 2023c). The proposed Project would result in the potential disturbance of habitat within the species AOO. It is unlikely that the Project would result in a reduction in the AOO for the species to a level that would result in a significant impact.	Unlikely

Criteria	Description	Criteria Triggered?
Fragment an existing important population into two or more populations,	Habitat connectivity would be unlikely to be significantly affected by the proposed Project. The proposed Project is unlikely to result in any barriers to movement, as the species forage below canopy level and are unlikely to be at high risk of turbine collision. The Project is unlikely to fragment an existing population of this species into two or more populations	Unlikely
Adversely affect habitat critical to the survival of a species	The proposed Project would result in the potential disturbance of habitat, subsequently habitat critical to the survival of the species, however based on the AOO for the species, this level of impact is unlikely to be significant.	Unlikely
Disrupt the breeding cycle of an important population,	The population of Brown Treecreeper present within the Project Area is not considered an important population. Mitigation measures will be undertaken to ensure there is limited impact to breeding habitat if identified. The proposed action is unlikely to disrupt the breeding cycle of the local population	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline,	The proposed action has the potential to impact 1 suitable habitat for the Brown Treecreeper. However, due to the mobile nature of this species, it is unlikely that the proposed action will further modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat,	Habitat degradation by livestock and feral animals and predation by introduced species are recognised threats for the Brown Treecreeper. Project activities during construction and operation will adopt and follow Biosecurity measures that ensure that invasive species are not introduced into the Project Area.	Unlikely
Introduce disease that may cause the species to decline, or,	Precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by construction workers	Unlikely
Interfere substantially with the recovery of the species.	There is evidence that the Project may have the potential to support that habitat critical to the survival of the species is likely to be present within the associated mapped PCTs. The proposed removal of potential habitat critical to the survival of the species within the Project Area is an action that would potentially interfere with the recovery of the species and reduce the area of occupancy, as outlined within the species conservation advice (DCCEEW, 2023c).	Unlikely

Criteria	Description	Criteria Triggered?
	However, given the small scale of the potential habitat disturbance within the Project Area in relation to the species AOO, it is unlikely this disturbance would interfere substantially with the recovery of the species.	
Significant Impact: Unlikely Significant		



Legend

- Railway
- Main Road
- Local Road
- Track-Vehicular
- Path
- Watercourse
- Cadastre (Lot)
- State Forest
- Grassland area
- Brown Treecreeper Habitat
- Site Boundary

Proposed Layout

- Substation
- Switching Station
- Collector Station
- Batch Plant
- Site Compound
- Laydown
- O & M Facility
- Hardstand
- Proposed 330kV Transmission Line Corridor
- Proposed 330kV Transmission Line
- Access Track
- WTG

Data Source:
Layout - Client Provided March 2023
Base Data - NSW DCDB / DTDB
Imagery - Esri World 2022

Brown Treecreeper Habitat Mapping

E14

Drawing No:	0661059_KER_Bio_G021_R01.mxd		Kerrs Creek Wind Farm Preliminary Biodiversity Assessment
Date:	29/06/2023	Drawing Size: A3	
Drawn By:	MB	Reviewed By: AS	Client: RES Australia

Coordinate System: GDA 1994 MGA Zone 55

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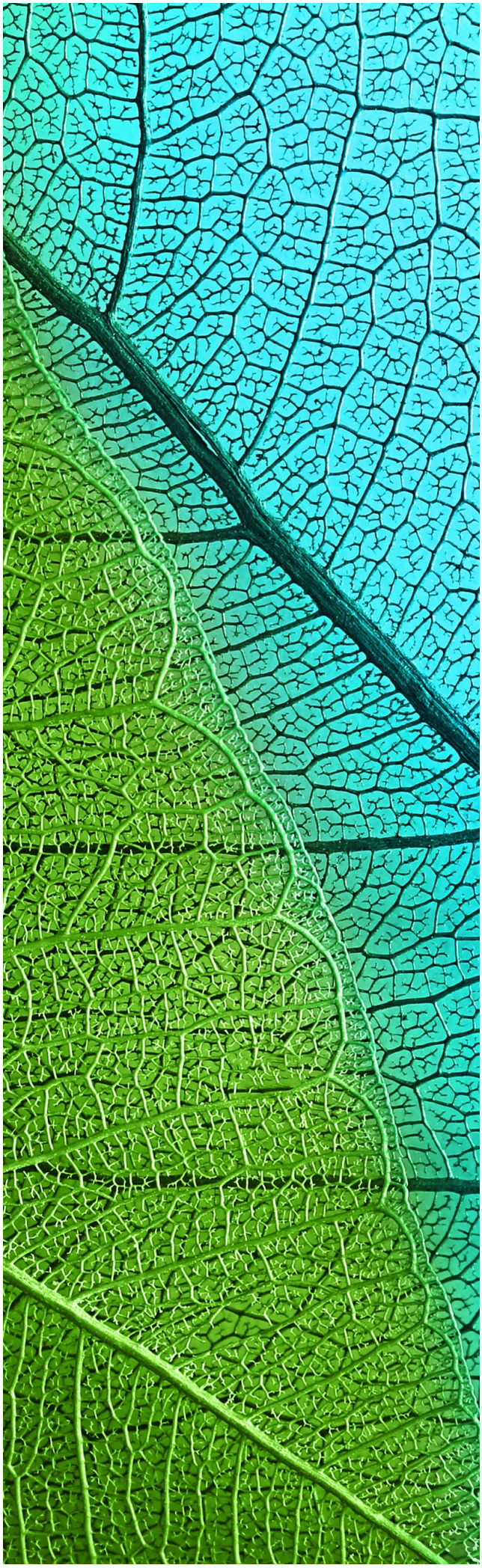
ERM

APPENDIX F BIRD AND BAT RISK ASSESSMENT (NATURE ADVISORY, 2021)



Kerrs Creek Wind Farm

Bird and Bat Risk Assessment

Prepared for Icubed Consulting Pty Ltd

August 2021
Report No. 19143 (3.1)

Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
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Contents

Figures

Tables

1. Introduction

Icubed Consulting Pty Ltd engaged Nature Advisory Pty Ltd to conduct a bird and bat risk assessment of the proposed Kerrs Creek Wind Farm (WF), NSW.

The wind farm is proposed to comprise between 45 and 70 turbines upon completion, and integral components for the operation of the equipment and generation of electricity from wind including turbine foundations, electrical transformers and inverters, electrical wiring, telecommunication equipment and electrical control enclosures.

The wind turbines will be connected to cable marshalling points and the onsite transformer through underground and some overhead cabling. The height-to-blade tip of the turbines will be approximately 250 metres (m) above the base of the wind turbine tower. The blade length will be approximately 80 m.

The development covers an area of approximately 13,507 ha within the Orange City Council jurisdiction, and is situated approximately 20 km north-east of the township of Molong and 30 km north of Orange City.

This investigation was commissioned to provide information on the risk of impacts on birds and bats listed under the NSW state *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This risk assessment is the first step in developing a Bird and Bat Management Plan (BBMP), as is typically required under wind farm development permit conditions in New South Wales and it has been prepared for review by the Biodiversity Conservation Division (BCD). The risk assessment will identify significant risks to avifauna utilising the proposed wind farm site and form the basis of prescribed monitoring programs and mitigation measures to be set out in the BBMP.

Wind farm impacts on birds and bats can arise from three potential pathways:

- Direct collision of birds and bats with operating wind turbine blades or towers at rotor swept area (RSA) heights;
- Disturbance effects that exclude birds and bats from habitat; and
- Barrier effects that limit bird and bat movements between essential resources, such as foraging and roosting areas.

The risk assessment has followed the procedure for risk assessment of AS/NZS ISO 31000 2018. The assessment has been undertaken as follows:

- Species or groups of concern have been short-listed based on likelihood of occurrence at the site;
- Two impact pathways have been assessed: a) collision with turbines; and b) indirect effects (including both disturbance and barrier effects);
- Impact likelihood criteria have been developed and applied to each impact pathway for each species or group of concern;
- Impact consequence criteria have been developed and applied to each impact pathway for each species or group of concern; and
- The risk level for each species or group of concern from the two impact pathways has been determined consistent with a risk matrix.

This report presents the results of this risk assessment under the headings below and is divided into the following sections:

Section 2 summarises the sources of information used to understand the likelihood of occurrence of each species or group on the Kerrs Creek WF site and the likely behaviour on the site;

Section 3 provides an overview of the risk assessment method adopted, including the likelihood and consequence criteria, and the risk matrix;

Section 4 presents the results of the risk assessment; and,

Section 5 present the conclusions and identifies the focus for the BBAMP for Kerrs Creek WF.

This investigation was undertaken by a team from Nature Advisory comprising Eamon O'Meara (Zoologist) Guille Mayor (Ecologist), Bernard O'Callaghan (Director), and Jim Grant (Senior Ecologist & Project Manager).

2. Sources of information and species of concern

To ascertain the species of concern that may occur on the Kerrs Creek WF site, the following sources were consulted:

- The NSW Bionet Atlas Search tool (OEH 2021): search area within the following co-ordinates, [North: -32.94 West: 148.98 East: 149.17 South: -33.11].
- The EPBC Act Protected Matters Search Tool (PMST) using a search region that included the proposed site and a 10 km buffer zone (DoEE 2021).
- Kerrs Creek Wind Farm Bat Report (Nature Advisory 2021)
- Kerrs Creek Wind Farm Bird Utilisation Survey –(Nature Advisory 2020).
- Incidental observations of species of concern during formal surveys.

2.1. Species and groups of concern

A list of species with the potential to occur on or around the Kerrs Creek WF site was generated from these sources. Species of concern were subsequently shortlisted from these species, based on the likelihood of occurrence on the wind farm site given the habitat present.

A total of 27 listed bird species and eight listed bat species were considered. Some threatened and listed migratory species considered likely to occur on the site were detected during on-site fauna survey work. The rationale for the inclusion of the shortlisted species and groups is provided in Section 4. The list does not include marine listed species as the wind farm is not coastal.

Shortlisted species are presented in Table 1 and Table 2 below.

Table 1: Source of information and status of bird species of concern for Kerrs Creek WF.

Common Name	Scientific Name	Source	EPBC*	BC*
Swift Parrot	*Lathamus discolor*	PMST	CE, M	E
Regent Honeyeater	*Anthochaera phrygia*	PMST, Bionet	CE, E	E4A
Scarlet Robin	*Petroica boodang*	Bionet		V
Varied Sittella	*Daphoenositta chrysoptera*	Bionet		V
Speckled Warbler	*Chthonicola sagittata*	Incidental		V
Glossy Black Cockatoo	*Calyptorhynchus lathami*	BUS	E	V
Painted Honeyeater	*Grantiella picta*	PMST	V	V
White-throated Needletail	*Hirundapus caudacutus*	PMST	V, M	
Superb Parrot	*Polytelis swainsonii*	PMST	V	V
Fork-tailed Swift	*Apus pacificus*	PMST	M	
Rufous Fantail	*Rhipidura rufifrons*	PMST	M	
Satin Flycatcher	*Myiagra cyanoleuca*	PMST	M	
Dusky Woodswallow	*Artamus cinereus*	BUS		V
White-fronted Chat	*Epthianura albifrons*	BUS		V
Brown Treecreeper	*Climacteris picumnus*	Nature Advisory		V
Speckled Warbler	*Pyrrholaemus saggitatus*	Nature Advisory		V
Little Eagle	*Hieraaetus morphnoides*	Nature Advisory		V
Black Falcon	*Falco subniger*	Nature Advisory		V

Common Name	Scientific Name	Source	EPBC*	BC*
Hooded Robin	*Melanodryas cucullata*	Nature Advisory		V
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Nature Advisory	M, C	V
Diamond Firetail	*Stagonopleura guttata*	Nature Advisory		V
Little Lorikeet	*Glossopsitta pusilla*	Nature Advisory		V
Spotted Harrier	*Circus assimilis*	Nature Advisory		V
Turquoise Parrot	*Neophema pulchella*	Nature Advisory		V
Square-tailed Kite	*Lophoictinia isura*	Nature Advisory		V
Dusky Woodswallow	*Artamus cyanopterus cyanopes*	Nature Advisory		V
Barking Owl	*Ninox connivens*	Nature Advisory		V

*CE: Critically Endangered, E, E1: Endangered, V: Vulnerable, M: Migratory, E4A: Critically Endangered.

Table 2: Source of information and status of bat species of concern for Kerrs Creek WF.

Common Name	Scientific Name	Source	EPBC*	BC*
Greater Long-eared Bat (SE form)	*Nctophilus corbeni*	PMST, BAT	V	V
Grey-headed Flying Fox	*Pteropus poliocephalus*	PMST, Bionet	V	V
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Nature Advisory		V
Eastern Bent-wing Bat	*Miniopterus orianae oceanensis*	Nature Advisory		V
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Nature Advisory		V
Southern Myotis	*Myotis macropus*	Bionet		V
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	Nature Advisory		V
Large-eared Pied Bat	*Chalinolobus dwyeri*	Nature Advisory		V

*V: Vulnerable.

3. Risk assessment process

The objective of this risk assessment is to guide the development of the BBMP for the Kerrs Creek WF by identifying those species or groups considered potentially at risk from either collision with turbines or disturbance by the operation of the wind farm. The outcomes of this risk assessment enable more targeted monitoring and management measures to be included in the BBMP, focusing on species and groups at greater risk.

The risk assessment process was based on the Risk Evaluation Matrix Model used to measure the overall risk of a potential impact event. In this case, birds or bats striking wind turbine blades or being deterred from using part of the wind farm due to disturbance, based on the *likelihood* of that event, and should this occur, the *consequences*. This model is currently used across a wide range of industry sectors, for assessing environmental risk. The Risk Evaluation Matrix Model also complies with the ISO31000 Risk Assessment Standard.

The assessment requires criteria to be developed for likelihood and consequence. These criteria are provided in Table 3 and Table 4, and Table 5 shows the risk levels used and how these are determined from the assessed likelihood and consequence levels.

Table 3: Likelihood criteria for a risk event to occur.

Likelihood	Description
Certain	Very probable that the risk event could occur in any year (> 95%).
Almost Certain	More probable than not that the risk event could occur in any year (> 50%).
Likely	Equally probable that the risk event could or could not occur in any year (50%).
Unlikely	Less probable than not that the risk event could occur in any year (< 50%).
Rare	Improbable that the risk event could occur in any year (< 5%). The risk event is only theoretically possible or would require exceptional circumstances to occur.

Table 4: Consequence criteria.

Negligible	*Low*	*Moderate*	*High*	*Severe*
Occasional individuals lost but no reduction in local or regional population viability.	Repeated loss of small numbers of individuals but no reduction in local or regional population viability.	Moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years.	Major loss in numbers of individuals, leading to reduction in regional or state population viability for between five and ten years.	Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least ten years.

Table 5: Risk matrix defining risk level based on likelihood and consequence.

		Consequence				
		Negligible	*Low*	*Moderate*	*High*	*Severe*
Likelihood	*Certain*	*Negligible*	*Low*	*High*	*Severe*	*Severe*
	Almost Certain	*Negligible*	*Low*	*Moderate*	*High*	*Severe*
	Likely	*Negligible*	*Low*	*Moderate*	*High*	*High*
	Unlikely	*Negligible*	*Negligible*	*Low*	*Moderate*	*High*
	Rare	*Negligible*	*Negligible*	*Negligible*	*Low*	*Low*

4. Risk assessment results

Table 6 provides the results of the likelihood and consequence assessment based on the inputs from the aforementioned sources and includes the following information as part of the risk assessment process:

- Environmental value to be protected.
- Reasons for inclusion.
- Threatened species status.
- Hazard or source event.
- Consequence score and likelihood scores.
- Risk rating.
- Comments relating to risk rating scores.

The risk associated with wind turbine collision and indirect effects at the Kerrs Creek WF for most birds and bats was rated as **negligible**. The exceptions are described below.

The location of known sightings of listed threatened species on the proposed Kerrs Creek wind farm sit are shown in Figure 1. These records come from 12 months (four seasons) of formal bird utilisation surveys and incidental observations by the Nature Advisory team during and incidental to these formal surveys.

The **White-throated Needletail** is listed as Vulnerable and Migratory under the EPBC Act and regularly flies at turbine height. Flocks may pass over the Kerrs Creek WF site during the summer months. Collisions have been recorded at wind farms elsewhere in NSW and Victoria (16 mortalities detected over 8,500 turbine searches across 17 wind farms – Nature Advisory data) and may therefore occur at Kerrs Creek WF. The species was not recorded during BUS surveys and utilises a wide range of habitats (TSSC 2019) therefore there are unlikely to be specific ecological reasons that would draw the White-throated Needletail to the wind farm site. The species' population is in demonstrable decline; however, this is a result of destruction of breeding habitat in Siberia (Tarburton 2014) and occasional individuals colliding with turbines is unlikely to be a significant contributing factor. The risk to this species from the Kerrs Creek WF is considered to be **low** as the species' range is widespread across eastern Australia, and collisions are not expected to be frequent or a regular occurrence.

Other aerial feeders such as **Dusky Woodswallow** (Vulnerable BC Act) fly at lower heights, including at turbine Rotor Swept Area (RSA) height. Due to the confirmed occurrence of Dusky Woodswallow at the site, there is potential risk of collisions during the life of the wind farm. The population of the species has recently declined due to habitat loss and degradation, and is estimated to consist of approximately 200,000 individuals in NSW (NSC 2015). Collision is not predicted to occur regularly or in high numbers given the species' habitat preference for foraging above and in woodland areas (OEH 2021b) and likely seasonal occurrence. Due to the size of the population, occasional collisions are not considered to result in significant population impacts. Risk to this species is considered to be **low.**

Many records of the **Superb Parrot** near the project area were made at the northern fringes of Orange, approximately 15 km south of the area. Additionally, during surveys, Superb Parrot was recorded on site nine times during surveys. The Superb Parrot primarily spends time feeding on the ground but can also feed off branches on shrubs and trees, and can fly above 20 m in height. However, observations elsewhere during targeted surveys at a proposed wind farm within the species range in NSW indicated that approximately 80 percent of Superb Parrot flights over cleared, agricultural land were below 20 m above the ground (Nature Advisory data). Since the Superb Parrot is unlikely to fly at RSA much of the time, the collision risk is rated as **low**. The Superb Parrot has not been observed breeding in the wind

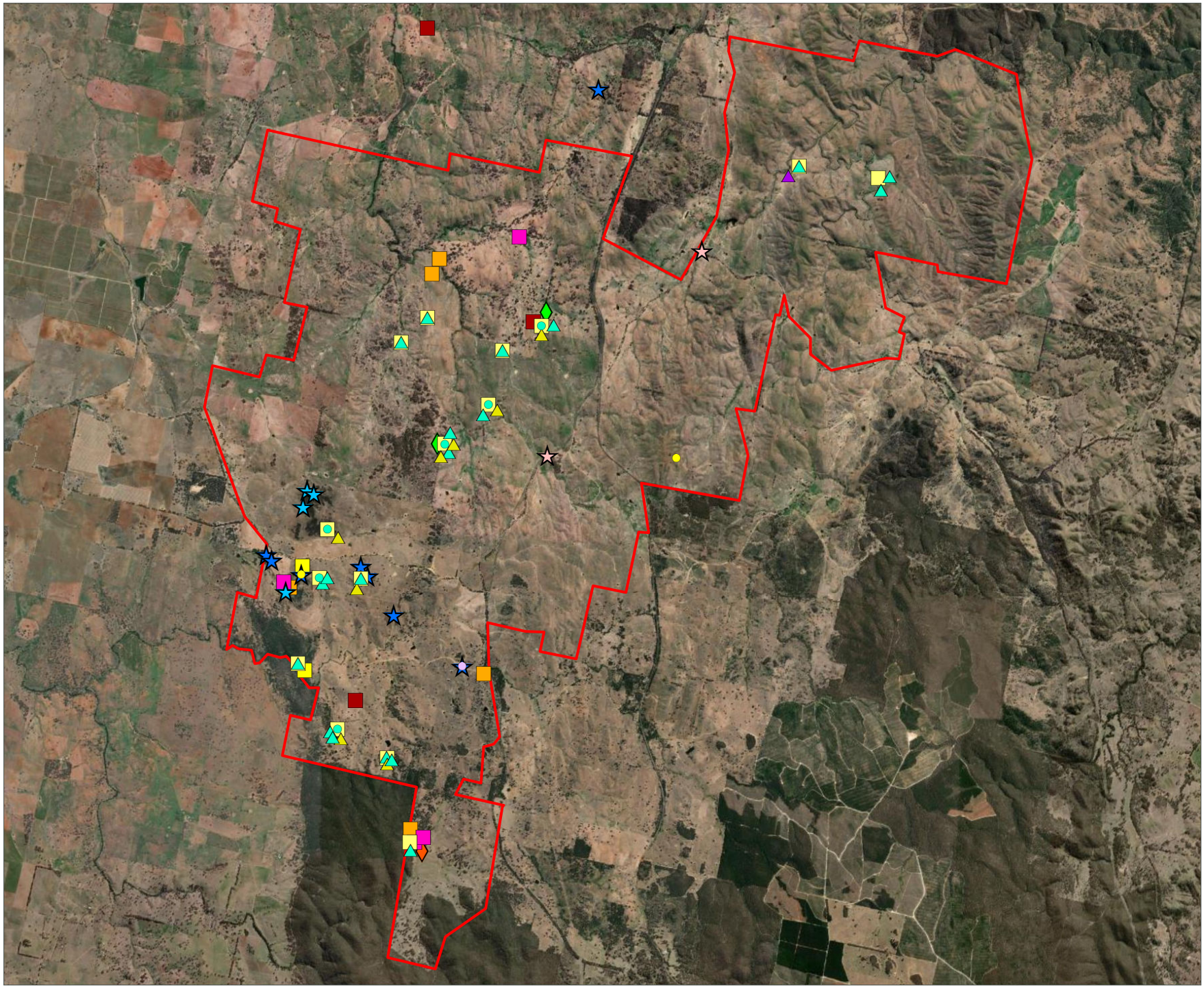

Figure 1: Threatened species observations at Kerrs Creek Wind Farm

Project: Kerrs Creek Wind Farm
Client: Icubed Consulting
Date: 5/08/2021

Wind Farm boundary

Species

- Black Falcon
- Brown Treecreeper
- Diamond Firetail
- Dusky Woodswallow
- Eastern False Pipistrelle
- Glossy Black Cockatoo
- Greater Broad-nosed Bat
- Hooded Robin
- Large Bent-winged Bat
- Large-eared pied bat
- Speckled Warbler
- Spotted Harrier
- Superb Parrot
- Turquoise Parrot
- White-fronted Chat
- Yellow-bellied Sheathtail Bat

N

Metres
0 1,600

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03 9815 2111 - info@natureadvisory.com.au

farm site, therefore the proposed development will most likely not have a significant impact on the Superb Parrot's breeding habitat or breeding cycle.

Given the occurrence of collisions involving the **Wedge-tailed Eagle** at wind farms across Australia, but a low incidence of disturbance including successful breeding within 200 m of operating turbines (repeated breeding and nesting events over consecutive years at operating wind farms – Nature Advisory data), risks to this species arise from likely collisions but not indirect disturbance. The risk to the Wedge-tailed Eagle from collision are therefore considered to be **moderate**.

Other common raptor species such as **Brown Falcon** and **Nankeen Kestrel**, though not listed on legislation, are considered a group of concern as these species are commonly observed as mortalities during post construction monitoring at wind farms throughout south-eastern Australia (Nature Advisory data). This group is rated as at **low** risk as the members are less likely to consistently fly at and above RSA height than Wedge-tailed Eagle and are also widespread and numerous in eastern and south-eastern Australia.

Black Falcon (Vulnerable BC Act) was recorded on site but is wide-ranging and occurs in low densities. Given that recent mortalities have been recorded at a wind farm in NSW in similar habitat and without records of the species in the vicinity (Nature Advisory data), a precautionary approach has been adopted and the species rated as at **low** risk. Any collisions would not be expected to occur frequently or have a significant impact on local or regional populations.

Spotted Harrier (Vulnerable BC Act) was also recorded during surveys and is considered likely to occur on the wind farm site given the suitable habitat present. The foraging habits of searching for prey by flying low over open country may occasionally bring this species up to RSA. Height and one has collided with a wind turbine in NSW previously (Nature Advisory data). Therefore, as a precautionary approach, this species is at **low** risk.

Grey-headed Flying Fox (Vulnerable EPBC Act) has been observed as mortalities at wind farms in both NSW and Victoria within the species range (Nature Advisory data) in recent years. Colonies, or temporary camps, were within nightly flying distance of the species [approximately 30 km (Menkhorst 1995)] of where the mortalities occurred. A camp is present in Orange, located 25 km south of Kerrs Creek, and consists of 500 – 2,499 individuals [last surveyed in April 2018 (DAWE 2021b)]. This and the species' ability to set up temporary camps in a given area as resources become available indicate that collision may occasionally occur, however, given the small numbers involved and large population (>700,000), population impacts would be **low.**

Large Bent-wing Bat (Vulnerable BC Act) was recorded at all four survey sites during bat utilisation surveys at the wind farm site. The relatively high numbers of calls recorded compared with other wind farms surveyed by Nature Advisory within the species range (Nature Advisory data) may indicate high activity levels at the site or a possible migration path. Further surveys are scheduled during the next migration period to understand the species' usage of the site better. The species is known to fly at height when leaving maternity caves but typically closer to the ground when away from caves (Mills and Pennay 2017) and may therefore occasionally enter the RSA. A recent report by Moloney *et al*. (2019) indicated a relatively low number of at least eight mortalities of the closely related subspecies. Southern Bent-wing Bat (*Miniopterus orianae bassanii*) has occurred across wind farms within that species range in Victoria, therefore occasional mortalities may likely occur for Large Bent-wing Bat. Given the suggested preference of the species for flying closer to ground level in open country and the relatively low numbers of mortalities occurring for the closely related subspecies in Victoria, population impacts are predicted to be not significant and Large Bent-wing Bat is considered at **low** risk.

Eastern False Pipistrelle (Vulnerable BC Act) was recorded only as a species complex (where a call cannot be distinguished between several species) in very low numbers, so the inclusion as **low** risk is highly conservative. However, the species is known to forage above the canopy (OEH 2021b) and there is therefore some risk that the species could enter RSA height and collide with turbines.

Yellow-bellied Sheathtail Bat (Vulnerable BC Act) was positively recorded at three sites during Spring 2020 surveys, and at five sites during the Summer/Autumn 2021 surveys with an average of 0.14 calls per night per site. This species was not recorded during the autumn 2020 survey period. The species is widespread across northern and eastern Australia and is commonly found in urban, agricultural, semi-arid and tall wet forest habitats (Menkhorst 1995). The species is known to roost in old growth trees and is occasionally found in abandoned nests of sugar gliders. Yellow-bellied Sheathtail bats form and live in small colonies of up to 30 individuals. The risk to this species from the Kerrs Creek Wind Farm is considered **low.**

Large-eared Pied Bat (Vulnerable BC Act) was possibly (unresolved) recorded at two sites, with three calls in total being identified as possibley belonging to this species during the Summer/Autumn 2021 survey. The species was not recorded during any other previous surveys. It has been found from Rockhampton in Queensland to the NSW Southern Highlands. The species is known to roost in caves, cliffs or old mines (Churchill 2008). Tt least ten records of this species have been found within 30 km of the wind farm. It is listed as Vulnerable under both the NSW BC Act and the Commonwealth EPBC Act. If the species is present at the Kerrs Creek Wind Farm site, activity levels were extremely low. Risk to this species from Kerrs Creek Wind Farm is considered **low.**

Table 6: Kerrs Creek WF risk assessment.

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
Birds							
Fork-tailed Swift *Apus pacificus*	Species or species habitat likely to occur within area	Listed Marine/Marine Migratory species EPBC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Fork-tailed Swift occurs throughout most of Australia in the non-breeding season, generally reaching south-eastern Australia by summer and early autumn, often following weather fronts. Flies at turbine height. Collision likely to be infrequent due to irregularity of occurrence. Small numbers possibly affected do not represent a significant proportion of the total population, estimated as at least in the tens of thousands (DAWE 2021c).
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Satin Flycatcher *Myiagra cyanloleuca*	Species or species habitat likely to occur within area	Listed Migratory species EPBC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Occurs over a wide area of forests in Eastern Australia. Migrates across cleared ground between remnant treed vegetation. Numerous records in the wider region (BirdLife Australia 2021). Tends to move within treed habitats. Flight height on migration not known. Small numbers of individuals may migrate through the site and only a small proportion of these would collide with turbines. Small numbers that may be affected do not represent a significant proportion of the total population that occupies a large proportion of the forested country in south-eastern Australia (BirdLife Australia 2021) and likely numbers in the thousands.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
White-Throated Needletail *Hirundapus caudacutus*	Suitable habitat occurs within area	Vulnerable Listed Migratory/Marine species EPBC Act	Collision with operating wind turbines	Likely	Low	Low	Known to follow storm systems and fronts. Occasional mortality on other wind farms within range and elsewhere. Typically flies at and above RSA height. Loss of a small number of individuals is concerning but not considered to be of population significance as the species is numerous in Australia (DAWE 2021c). Current population estimates of population are not available and the number of Needletails recorded in eastern and south-eastern Australia may vary between years, but uncertain whether this reflects fluctuations in the actual overall population numbers.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Brown Treecreeper *Climacteris picumnus*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Occurs in woodlands dominated by eucalyptus, especially Stringybarks or other rough-barked eucalypts, usually with open grassy understorey (Higgins *et al.* 2001). This species usually occurs in the lower canopy and would not fly at RSA height. Further surveys will confirm presence/absence in the area.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
Speckled Warbler *Chthonicola sagittata*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	Inhabits dry eucalypt forests and woodlands, especially those with box-ironbark eucalypt associations. Also found in River Red-gum woodlands (Higgins and Peter 2002; Tzaros 2005). This woodland species does not fly at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Little Eagle *Hieraaetus morphnoides*	Species or species habitat likely to occur within area	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	The Little Eagle is distributed throughout the Australian mainland except for the most densely forested parts of the Dividing Range (Marchant and Higgins 1993). Turbine strikes of this raptor species could occur; however, the species has not been recorded at the Kerrs Creek site or other nearby areas recently surveyed for fauna. The species has been recorded colliding with wind turbines at a wind farm near Goulburn in 2020 (Nature Advisory unpublished data) however the species occurs in NSW at very low population densities, therefore regular collision is unlikely. In the 1990s, the Little Eagle was estimated as numbering tens of thousands globally to as many as 100,000 birds (Ferguson-Lees & Christie 2001) but in recent decades, the Little Eagle is believed to have undergone a moderate reduction in population size in NSW (OEH species listing advice). Further surveys will offer more detailed data on the species in the area.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Varied Sittella *Daphoenositta chrysoptera*	Suitable habitat occurs within area	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	The Varied Sittella is sedentary and inhabits most of mainland Australia except for the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades (OEH 2021b). Inhabits eucalypt forests and woodlands flying at canopy level. Varied Sittellas forage in groups, flying into the tree canopy and working down the branches and the trunk, probing through the bark in search of insects (Pizzey & Knight 2003). This species would not fly at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Barking Owl *Ninox connivens*	Species or species habitat may occur within area, but species was not recorded	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Flexible in habitat use, and hunting can extend into closed forest and more open areas. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occupies a wide but sparse distribution in NSW (OEH 2021b). Should turbine strike occur to individuals flying within the turbine blade

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	height, only a very small number of birds would likely be affected. Further targeted surveys will confirm presence/absence in the WF.
Grey-crowned Babbler *Pomatostomus temporalis Protostomes*	Species or species habitat may occur within area, but species was not recorded	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Inhabits open forests and woodlands, and requires an open shrub layer with sparse ground cover and fallen timber and leaf-litter (Higgins and Peter 2002). Ground-dwelling bird that lives in communal family groups and nests in small terminal branches at top or crowns of a wide variety of plants, usually small trees or saplings and also in tall shrubs. Generally confined to areas of wooded country and unlikely to fly at RSA height. OEH requested this species be included in pre- and post-construction monitoring in nearby wind farms in the past. Further surveys will confirm presence/absence.
			Indirect disturbance, including barrier effects	Unlikely	Low	Negligible	
Superb Parrot *Polytelis swainsonii*	Species recorded on site (Nature Advisory 2021)	Vulnerable EPBC Act, BC Act	Collision with operating wind turbines	Likely	Low	Low	The Superb Parrot generally occurs in woodlands. As a seasonal visitor, flights across the proposed wind farm would not be common throughout the full year. The likelihood of a collision is considered very low as behaviour of the species indicates the species will typically fly below RSA height, although some flights may be at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Regent Honeyeater *Anthochaera phrygia*	Species recorded in area in 2005 (Bionet), habitat may occur within area	Critically Endangered EPBC Act, BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. Could also occur in small remnant patches or mature trees in farmland or partly cleared agricultural land (Higgins *et al*. 2001). Wide-ranging, highly nomadic and unlikely to fly at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Painted Honeyeater *Grantiella picta*	Species or species habitat may occur within area, but was not recorded	Vulnerable EPBC Act, BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Inhabits Box-ironbark forests and woodlands, and mainly feeds on the fruits of mistletoe. Strongly associated with mistletoe around the margins of open forests and woodlands (Higgins *et al.* 2001; Tzaros 2005). Not recorded in the study area and unlikely to occur regularly and fly at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Swift Parrot *Lathamus discolor*	Species or species habitat may occur	Critically Endangered	Collision with operating wind turbines	Unlikely	Negligible	Negligible	The Swift Parrot may pass through the study area occasionally when migrating. Most tree species on the site are not the preferred sources of nectar for the Swift Parrot. A small number of Box-ironbark trees were

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
	within area, but was not recorded	EPBC Act, BC Act	Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	found in the central area of the site and these are a preferred food source. However, the small number of individuals in the study area means the species would unlikely spend much time in the area.
Diamond Firetail *Stagonopleura guttata*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	Found in Box-ironbark forests and woodlands, and occurs along watercourses and in farmland areas (Emison *et al.* 1987; Tzaros 2005). Low chance of occurrence on the wind farm site. Recorded regularly inhabiting farmland around wind turbines in southern NSW where the species has never been observed flying at RSA height. Further surveys will confirm presence/absence.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Flame Robin *Petroica phoenicea*	Species or species habitat may occur within area, but was not recorded	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	Widespread on the tablelands and nearby, moving to lower altitudes in winter. Birds inhabit woodland and more open country in winter. Regularly recorded inhabiting farmland around wind turbines in southern NSW but unlikely to fly at RSA height. Further surveys will confirm presence/absence.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
White-fronted Chat *Epthianura albifrons*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	The White-fronted Chat inhabits damp open habitats, particularly wetlands with saltmarsh areas bordered by open grasslands or lightly timbered land. The species is also observed in open grasslands and sometimes in low shrubs bordering wetlands (OEH 2021b). Inland, the White-fronted Chat is often observed in open grassy plains, salt lakes and saltpans along the margins of rivers and waterways. This species usually occurs in the lower canopy and would not fly at RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Glossy Black Cockatoo *Calyptorhynchus lathami*	Species recorded on site (Nature Advisory 2021)	Vulnerable, EPBC Act BC Act	Collision with operating wind turbines	Unlikely	Low	Negligible	Unusual record out of the expected range for the species along the dividing range over the NSW coast. Birds likely dispersing for food after habitat was lost to 2019 – 2020 summer bushfires. No records of blade strikes but can fly at RSA.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Dusky Woodswallow *Artamus cyanopterus*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	Dusky Woodswallows were observed at Kerrs Creek WF during BUS surveys in 2020. The species is likely to breed in the area and present for at least spring and summer. Almost exclusively aerial feeders, flying at different heights including within RSA. Turbine strikes are known to affect

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
			Indirect disturbance, including barrier effects	Likely	Low	Low	this species but the impact will be unlikely to affect the local populations significantly.
Little Lorikeet *Glossopsitta pusilla*	Species or species habitat may occur within wider region but was not recorded	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Low	Negligible	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 (OEH 2021b). The species is at risk of colliding with turbines given the fast flight patterns and that flight at RSA height may occur particularly when moving between feeding areas. There are no records of Little Lorikeets colliding with wind turbines. The wide distribution and episodic occurrence in the area coinciding with sporadic eucalypt flowering events ensure the species would only occasionally be likely to collide with turbines. Further surveys will confirm presence/absence.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Scarlet Robin *Petroica multicolor*	Species has been recorded on site (Bionet)	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	The Scarlet Robin lives in open forests and woodlands in Australia. During winter, the species will visit more open habitats such as grasslands and will be seen in farmland, and urban parks and gardens at this time. Flight height studies at the nearby wind farms indicate that Scarlet Robin flies at heights of 20 m or less. This is below the RSA height.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Turquoise Parrot *Neophema pulchella*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Low	Negligible	Occur in eucalypt woodlands and open forests, with ground cover of grasses and sometimes low understorey of shrubs; usually in native grassy forests and woodlands composed of mixed assemblages of native pine and a variety of eucalypts. Also occur in savannah woodlands and riparian woodlands (Higgins 1999). This species flies fast and at a range of heights from high to low, depending on activity and may be susceptible to colliding with turbines. Not recorded at the Kerrs Creek site but has been recorded once to the north of Wellington.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Hooded Robin (south-eastern form) *Melanodryas cucullata*	Species or suitable habitat may occur within area.	Vulnerable BC Act	Collision with operating wind turbines	Rare	Negligible	Negligible	Occur mostly in open Grey Box, White Box, Yellow Box, Yellow Gum and Ironbark woodlands with pockets of saplings or taller shrubs, an open shrubby understorey, sparse grasses and patches of bare ground and leaf-litter, with scattered fallen timber (Higgins and Peter 2002; Tzaros 2005). This species is generally confined to areas of wooded country and does not fly at RSA height. Further surveys would confirm presence/absence.
			Indirect disturbance, including barrier effects	Rare	Negligible	Negligible	
Wedge-tailed Eagle *Aquila audax*	Species recorded on site	N/A	Collision with operating wind turbines	Almost Certain	Moderate	Moderate	The Wedge-tailed Eagle is the species most exposed to collision risk due to the common habit of soaring and circling at height while foraging. Several birds of this species have been struck at other wind farms in New

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
	(Nature Advisory 2021)		Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	South Wales (Nature Advisory unpublished data). Disturbance is not an issue, with the eagle breeding successfully as close as 200 m from operating wind turbines. The regular incidence of collisions has the potential to affect the regional population (to be confirmed through further monitoring).
Other raptor species	Species recorded on site (Nature Advisory 2021)	N/A	Collision with operating wind turbines	Likely	Low	Low	Turbine strikes by commonly occurring raptors, such as Brown Falcon and Nankeen Kestrel are likely based on experience at other wind farms in south-eastern Australia (Nature Advisory unpublished data). The widespread and common status of these species makes population impacts unlikely. These species appear not to be deterred by the presence of operating wind turbines and occur regularly at other wind farms in NSW.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Black Falcon *Falco subniger*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	Black Falcon is found in inland open country with a variety of woodland types that support middle-sized birds that comprise the main prey items. Black Falcon was recorded on three occasions at Kerrs Creek. Recent turbine strikes of Black Falcons in Eastern NSW in areas where the species was not previously reported (Nature Advisory unpublished data) suggest that a precautionary approach is taken. Due to low density and high mobility, a significant impact is unlikely, although further surveys will shed more light on the presence/absence of the species at the site.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
White-bellied Sea Eagle *Haliaeetus leucogaster*	Species may occur within area, but was not recorded	Migratory EPBC Act	Collision with operating wind turbines	Unlikely	Low	Negligible	The species can be found mostly on the coastline but also in the vicinity of large water bodies that hold large numbers of fish, birds and medium mammals to prey on. Capable of traveling long distances inland in search of water, the species can potentially occur near farm dams across windfarms. Due to the low density of the species and the lack of large water bodies in the area, the likelihood of impact is very low. Further surveys would confirm the occurrence of the species in the area.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Spotted Harrier *Circus assimilis*	Species recorded on site (Nature Advisory 2020)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	Spotted harriers are found in open country such as grasslands, crops, grazing paddocks and wetlands provided these offer vegetation cover for prey. Due to the widespread distribution and mobility, the species is considered as having potential to occur in the area although the impact would be minimal.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Waterbirds	Species recorded on site	N/A	Collision with operating wind turbines	Unlikely	Low	Negligible	Habitats on the Kerrs Creek site for waterbirds are limited to small farm dams. No large concentrations of waterbirds occur nearby. Experience at other wind farms in NSW indicates few waterbirds collide with turbines,

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
	(Nature Advisory 2021)		Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	even near large waterbird concentrations (e.g. Lake George), where birds confine most activities to the wetlands and do not frequently move across farmland.
Bats							
Grey-headed Flying Fox *Pteropus poliocephalus*	Species or species habitat may occur within area, but species was not recorded	Vulnerable EPBC Act	Collision with operating wind turbines	Likely	Low	Low	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 2008). This species has been observed to collide with turbines at other wind farms in south-eastern Australia. Not observed during surveys within the study area but the location of a colony in Orange (DAWE 2021b), 25 km south of Kerrs Creek and numerous records in the search radius (OEH 2021a) indicate that collisions with turbines may be likely. The wide distribution and episodic occurrence in the area coinciding with sporadic eucalypt flowering events suggests this species would be likely to collide with turbines only occasionally.
			Indirect disturbance, including barrier effects	Rare	Negligible	Negligible	
South-eastern Long-eared Bat *Nyctophilus corbeni*	Species or species habitat may occur within area, but species was not recorded	Vulnerable EPBC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	Occurs in dry woodland and shrubland communities in semi-arid regions (Menkhorst 1995). Unlikely to occur in the region.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
(Eastern) Large Bent-wing Bat *Miniopterus orianae oceanensis*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	The Large Bent-wing Bat was recorded in all survey sites at Kerrs Creek Windfarm in 2020. Further surveys will increase understanding of behaviour in the area.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Greater Broad-nosed Bat *Scoteanax rueppellii*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Low	Negligible	Recorded at three sites, although only four calls in total for the whole survey. The species' presence in the project area would be considered very rare and this may be related to an apparent requirement for viable populations to only be found in very large forest remnants (in this region). The species is thought to fly close to water bodies at an altitude of 3 – 6 m from ground level (OEH 2021b) or within 5 m of trees (Churchill 2008) and is not considered likely to collide with turbines.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	

Value to be Protected	Reasons for Inclusion	Threatened species status	Hazard or Source Event	Likelihood of risk event	Consequence	Risk Rating	Comments
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	Recorded at three sites, although records of this species were of the species complex (unresolvable) and in very low numbers. The presence of this species would be considered to be very rare in the project area and this may be related to an apparent requirement for viable populations to be found in moist habitats, including wet sclerophyll and coastal Mallee where trees are more than 20 m tall and the understorey is dense. The species is thought to forage above or slightly below the tree canopy (OEH 2021b) therefore occasional mortalities may occur in the life of the Kerrs Creek WF project.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	The species was recorded at five sites with an average of 0.14 calls per night per site. There is potential that the Yellow-bellied Sheathtail is only present at Kerrs Creek Wind Farm during spring with low levels of activity recorded. The species is widespread across northern and eastern Australia, particularly southwestern NSW. This species is commonly found in urban, agricultural, semi-arid and tall wet forest habitats (Menkhorst 1995). The species is known to roost in old growth trees and is occasionally found in abandoned nests of sugar gliders. Yellow-bellied Sheathtail bats form and live in small colonies *of* up to 30 individuals.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Large-eared Pied Bat *Chalinolobus dwyeri*	Species recorded on site (Nature Advisory 2021)	Vulnerable BC Act	Collision with operating wind turbines	Likely	Low	Low	Large-eared Pied Bat was possibly (unresolved) recorded at two sites, with three calls in total being identified as possible LEPB calls. The species has been found from Rockhampton in Queensland to the NSW Southern Highlands. The species has been known to roost in caves, cliffs or old mines (Churchill 2008). The species is lacking in historical records but at least ten records have been found within 30 km of the wind farm.
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	
Southern Myotis *Myotis macropus*	Species or species habitat may occur within area, but species was not recorded	Vulnerable BC Act	Collision with operating wind turbines	Unlikely	Negligible	Negligible	The Southern Myotis occurs in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. The species is rarely found more than 100 km inland, except along major rivers (Churchill 2008).
			Indirect disturbance, including barrier effects	Unlikely	Negligible	Negligible	

5. Conclusions

This current risk assessment concludes that of 33 listed species, 10 (five birds and five bats) were considered to be above a negligible risk. This includes three species listed under the EPBC Act and seven under the BC Act. In addition, as a group, Wedge-tailed Eagle, common raptor species were included as species/group of concern. Given Nature Advisory experience of such species' propensity to be amongst the most common mortalities at wind farms in south-eastern Australia the eagle and other raptors were found to be at greater than negligible risk.

All species of concern will be the subject of additional monitoring procedures to further inform risk to each and this will be outlined in the BBMP.

No significant population impacts are expected on a local, regional or national scale for any species considered. However, a post-construction monitoring regime will be implemented to inform an adaptive management plan for all species of concern occurring on site.

6. References

BirdLife Australia 2021, *Birdata*, BirdLife Australia, viewed 10 August 2021, https://birdata.birdlife.org.au/

Churchill, S 2008, Australian Bats (2nd Ed.), Allen & Enwin, Crows Nest, NSW.

Department of Agriculture, Water and Environment (DAWE) 2021a, EPBC Act Protected Matters Search Tool, Australian Government, viewed 10 August 2021, http://www.environment.gov.au.

Department of Agriculture, Water and Environment (DAWE) 2021b, National Flying Fox Monitoring Viewer, Australian Government, viewed 10 August 2021, http://www.environment.gov.au.

Department of Agriculture, Water and Environment (DAWE) 2021c, Species Profile and Threats Database, Australian Government, viewed 10 August 2021, http://www.environment.gov.au

Emison, WB, Beardsell, CM, Norman, FI Loyn, RH, & Bennett, SC 1987, *Atlas of Victorian Birds,* Department of Conservation, Forests and Lands & Royal Australasian Ornithologists Union, Melbourne.

Ferguson-Lees, J & Christie, DA 2001, *Raptors of the World*, Christopher Helm Publishers.

Higgins, PJ & Peter, JM (eds) 2002, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 6: Pardalotes to Shrike-thrushes*, Oxford University Press, Melbourne.

Higgins, PJ Peter, JM & Steele, WK (eds) 2001, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 5: Tyrant-flycatchers to Chats*, Oxford University Press, Melbourne.

Marchant, S & Higgins, PJ (eds) 1993, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 2, Raptors to Lapwings*, Oxford University Press, Melbourne.

Menkhorst P 1995, *Mammals of Victoria*, Oxford University Press, Melbourne.

Mills, D & Pennay, M 2017, *Landscape utilisation by the threatened eastern bent-wing bat (Miniopterus schreibersii oceanensis). A pilot study at Parson's Creek, Adjungbilly, NSW (2015/16 and 2016/17)*. Ecosystems and Threatened Species, South East. NSW Office of Environment and Heritage.

Moloney, PD, Lumsden, LF & Smales, I 2019, Investigation of existing post-construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates. *Arthur Rylah Institute for Environmental Research Technical Report Series* No. 302. Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Nature Advisory 2020, Kerrs Creek Wind Farm Bird Utilisation Survey – Autumn and Winter 2020, report number 19143 (2.0). Prepared for Icubed Consulting Pty Ltd.

Nature Advisory 2021, Kerrs Creek Wind Farm Bat Report – report number 19143 (5.0). Prepared for Icubed Consulting Pty Ltd.

NSW Scientific Committee (NSC) 2015, Preliminary Determination (proposal to list the Dusky Woodswallow *Artamus cyanopterus* I cubed (Latham, 1802) as a VULNERABLE SPECIES), NEW Government, viewed 17 September 2020, https://www.environment.nsw.gov.au/resources/threatenedspecies/determinations/PDDuskyWoodswallowVS.pdf

Office of Environment and Heritage (OEH) 2021a, NSW BioNet, NSW Office of Environment and Heritage, viewed 10 August 2021, http://www.bionet.nsw.gov.au

Office of Environment and Heritage (OEH) 2021b, Threatened Species Profile, NSW Government, visited 10 August 2021, https://www.environment.nsw.gov.au/threatenedspeciesapp

Pizzey, G & Knight, F 2003, *Graham Pizzey & Frank Knight: The Field Guide to the Birds of Australia*, HarperCollins Publishers, Australia

Rollason, V, Fisk, G, Haines, P 2010, *Applying the ISO31000 Risk Assessment Framework to Coastal Zone Management,* Proceedings of the 20th NSW Coastal Management Conference.

Tarburton, M 2014, Status of the White-throated Needletail *Hirundapus caudacutus* in Australia: Evidence for a marked decline. *Australian Field Ornithology* 31, 122 – 140.

TSSC, 2019, Threatened Species Scientific Committee, Conservation Advice, *Hirundapus caudacutus,* White-throated Needletail.

Tzaros, C 2005, *Wildlife of the Box-Ironbark Country*, CSIRO Publishing, Melbourne.

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