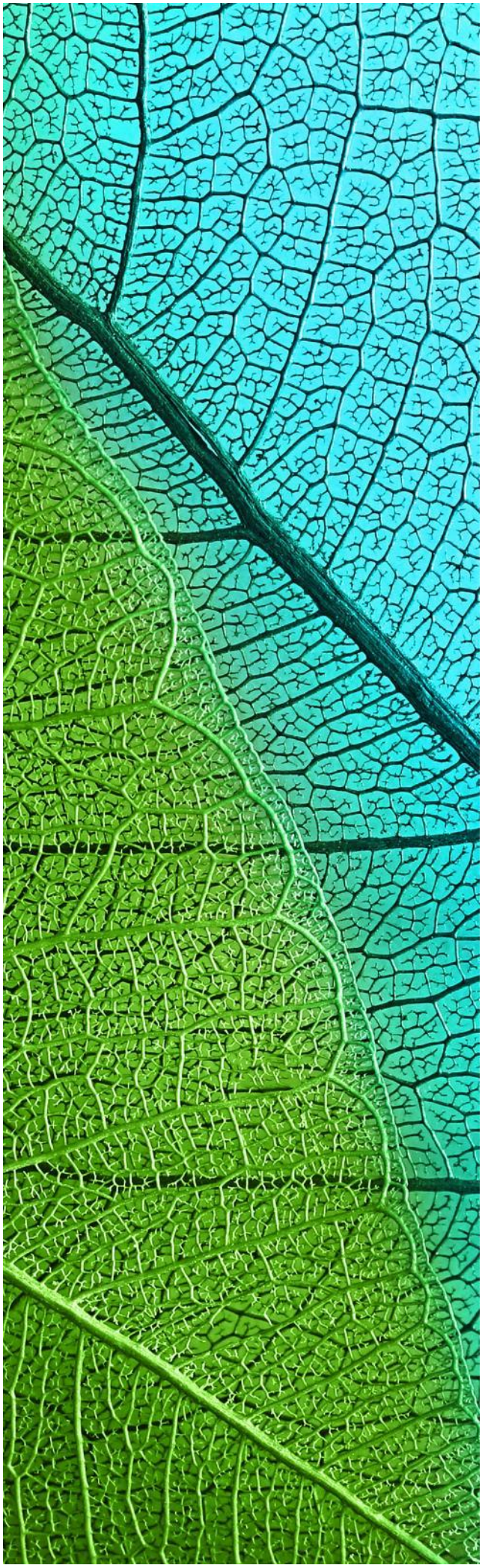

Navarre Green Power Hub

Flora, Fauna and Targeted Threatened Species Assessments

Prepared for
Aurecon Australasia Pty Ltd

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Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

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1. Executive summary

Neoen Australia Pty Ltd proposes to build and operate a wind farm and battery hub near the township of Navarre in north-western Victoria (the Project). The Project will generate around 600MW and will incorporate a total of 102 wind turbines, split across two areas:

- Wind Farm Project Area – Eastern Layout, which will consist of 50 wind turbines across approximately 5,266 ha of land.
- Wind Farm Project Area – Western Layout, which will consist of 52 wind turbines across approximately hectares 4,873 (ha) of land.

The Project will include a 220kV transmission line between the western and eastern development and a 220kV transmission line between the western development and Bulgana Terminal Station.

Aurecon Australasia Pty Ltd engaged Nature Advisory Pty Ltd to implement pre-construction flora and fauna surveys for the proposed Navarre Green Power Hub, situated between Stawell and St Arnaud in central-western Victoria, approximately 185 to 200 km north-west of Melbourne (Figure 1). The specific area investigated, herein referred to as the 'study area', comprised approximately 855-hectares of predominantly private land. This included a 50-metre-wide corridor along tracks and a 100-metre-radius around turbine areas of an initial footprint. The study area falls primarily in the Goldfields bioregion, Northern Grampians shire and North-Central Catchment Management Authority, but also includes a small area of the Wimmera bioregion, Pyrenees shire and Wimmera Catchment Management Authority in the south.

The assessment was based on a desktop evaluation of available information on the flora, fauna habitat and ecological communities of the study area and its surrounds, accompanied by detailed field assessments to ground truth the actual or potential occurrence of these matters.

This assessment is required as part of early investigations to inform the feasibility analysis and the layout of the proposed wind farm. The Victorian *Policy and planning guidelines – Development of wind energy facilities in Victoria* (DELWP 2019) require all wind farm proponents to assess the impacts of their projects on threatened species and communities listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report evaluates the proposed wind farm site for the likelihood of occurrence and potential impacts to listed flora and fauna species and ecological communities and discusses the prospective implications for project planning and assessment.

The following biodiversity investigations have been undertaken:

- Vegetation and flora surveys (Section 5)
- Fauna overview assessment (Section 6)
- Bird utilisation survey (Section 7)
- Bat assessment (Section 8)
- Swift Parrot assessment (Section 9)
- Barking Owl and Powerful Owl Assessment (Section 10)
- Pink-tailed Worm-lizard Assessment (Section 11)
- Transmission Line Assessment (Section 13)

Results of these investigations are summarised below.

Native Vegetation and fauna habitat

Despite a land use history of gold mining and agricultural use leading to the clearing of most trees, the majority of the study area was found to support native vegetation in the form of derived native understory. Native treed vegetation in the study area was mostly Grassy Dry Forest on the eastern range, Hillcrest Herb-rich Woodland on the lower-lying western range, Box Ironbark Forest on the undulating hills, Grassy Woodland on the plains, undulating hills and lower slopes (widespread but fragmented) and Plains Woodland (fragmented occurrence to the south-west of Navarre). Other less common vegetation types observed in the study area included Creekline Grassy Woodland, Riparian Woodland and Alluvial Terraces Herb-rich Woodland, which were associated with the watercourses.

Fauna habitat within the study area comprised remnant treed habitats, rocky outcrops, native grasslands and linear creek-line and roadside habitats. There were also areas of revegetation that provide habitat for fauna species and have helped prevent large scale erosion that has occurred across the region. The study area encompasses many conservation areas known as the Kara Kara Conservation Management Network (CMN). The study area is located centrally within this network, which includes Kara Kara National Park and Stuart Mill Nature Conservation Reserve to the east, Little Tottington State Forest to the north and Mount Bolangum Flora and Fauna Reserve, Big Tottington Nature Conservation Reserve and Morrl Morrl Nature Conservation Reserve to the north-west. The network is of high ecological importance, as it contains the largest remnants of temperate woodland left in the region and is managed for many listed species.

Detailed native vegetation assessments were undertaken between October 2021 and September 2022. 278 patches (habitat zones) totalling an area of 654 hectares and including 1,231 large trees were recorded. In addition, 436 scattered trees (282 large and 154 small) were mapped within the study area. A total of ten Ecological Vegetation Classes were found to occur: Heathy Dry Forest (EVC 20), Grassy Dry Forest (EVC 22), Box Ironbark Forest (EVC 61), Alluvial Terraces Herb-rich Woodland (EVC 67), Creek line Grassy Woodland (EVC 68), Hillcrest Herb-rich Woodland (EVC 70), Swampy Riparian Woodland (EVC 83), Plains Grassy Wetland (EVC 125), Low Rises Grassy Woodland (EVC 175_61) and Plains Woodland (EVC 803).

The current windfarm footprint will result in the loss of a total extent of 127.515 hectares of native vegetation including 121.677 hectares of native vegetation in patches, 325 large trees in patches and 104 scattered trees.

With the inclusion of estimated native vegetation removal along the transmission line, this will result in the loss of a total of 134.771 hectares of native vegetation including 128.309 hectares of native vegetation in patches, 329 large trees in patches and 113 scattered trees.

This comprised:

Western Section:

- 52.129 hectares of native vegetation in patches (including 111 large trees in patches)
- 52 scattered trees (namely 38 large scattered trees and 14 small scattered trees).

Eastern Section

- 69.548 hectares of native vegetation in patches (including 214 large trees in patches)
- 52 scattered trees (namely 36 large scattered trees and 16 small scattered trees).

3.484 hectares of the native vegetation to be removed is in an area mapped as an endangered Ecological Vegetation Class. This is in addition to 6.436 hectares of removal of mapped as an endangered Ecological Vegetation Class for the transmission line, totalling 9.92 hectares for the entire project.

Transmission Line

While vegetation quality assessments have not yet been conducted for the transmission line, a desk-top overview study has estimated removal of:

- 6.632 hectares of native vegetation in patches (including 4 large trees in patches). and

9 large scattered trees.The total offsets required to compensate for the proposed removal of native vegetation from the study area equals 70.221 general habitat units. This has been determined based on 3 separate Native Vegetation Removal Reports (NVRRs) for the 3 sections of the project (Western Section of the wind farm, Eastern Section of the wind farm and Transmission Line).

Threatened ecological communities and flora species

The following three threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Flora and Fauna Guarantee Act 1988* (FFG Act) were identified within the study area:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act: Endangered) (179.588 hectares);
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act: Critically Endangered) (31.110 hectares); and
- Grey Box – Buloke Grassy Woodland Community (FFG Act: Threatened) (58.318 hectares).

The proposed windfarm development footprint (excluding the transmission line) will result in the following losses:

- 23.371 hectares of Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act: Endangered) (13% of that recorded in the study area);
- 5.627 hectares of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act: Critically Endangered) (18% of that recorded in the study area); and
- 3.105 hectares of Grey Box – Buloke Grassy Woodland (FFG Act: Threatened) (5% of that recorded in the study area).

A total of 230 flora species (75% indigenous) were recorded. Twenty-two flora species listed under the FFG or EPBC Act were considered to have potential to occur within the study area. Targeted surveys were undertaken for these species in November 2021 as well as September and November 2022. These surveys found that the following species occur within the study area:

- *Diuris behrii* (Golden Cowslips, FFG Act: Endangered); and
- *Allocasuarina luehmannii* (Buloke, FFG Act: Vulnerable).

A large number of individuals in the Sun Orchid genus (*Thelymitra* spp.) were observed prior flower development or after setting of seed and could therefore be identified to genus level only due to a lack of identifiable features. The following two species are therefore considered to have potential to occur despite not being identified during the targeted surveys:

- Brilliant Sun-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered); and
- Fringed Sun-orchid (FFG Act: Vulnerable).

In addition, the following species' presence within the study area could not be assessed at the time that targeted surveys were carried out, as they were carried out after their flowering season:

- Yellow-lip Spider-orchid (EPBC Act: Endangered; FFG Act: Endangered); and
- Stuart Mill Spider-orchid (FFG Act: Endangered).

All of these threatened orchid species have potential to occur only within high quality woodland habitat, which has mostly been avoided. Pre-construction targeted surveys are recommended within works areas that occur in this habitat to ensure micro-siting of turbines and associated infrastructure to avoid and minimise impacts on these species, if present.

Threatened fauna species

The review of existing information and online databases in combination with field surveys identified 17 species listed under the EPBC Act and/or under the FFG Act either recorded, or their habitat was considered to occur at the wind farm site.

Species considered likely to occur and requiring targeted survey included:

- Swift Parrot (EPBC Act: critically endangered, FFG Act: critically endangered)
- Powerful Owl (FFG Act: vulnerable)
- Barking Owl (FFG Act: critically endangered)

Targeted surveys for the EPBC Act listed **Swift Parrot** found a pair within the Big Tottington Nature Conservation Reserve to the north of the wind farm site. This species is not expected to move across the site on a regular basis due to the lack of high-quality habitat on the wind farm site. Occasionally, individuals of Swift Parrot may visit the wind farm temporarily when food resources may attract them into the site. Such occasional visits by the species are considered unlikely to have a significant impact on their overall populations.

None of the two threatened owl species were found within the proposed wind farm footprint during targeted surveys. It is not expected there would be any regular movement of **Powerful Owl** from surrounding areas onto the wind farm site, owing to a lack of high-quality or extensive habitat that would support these species. Instead, it may be expected that the occasional individual may visit the wind farm temporarily when food resources may attract them into the site. Such occasional visits by the two species are considered unlikely to have a significant impact on their overall populations.

The **Barking Owl** appears unlikely to occur regularly in the Navarre area, based on paucity of recent records and negative survey result in April and August 2021.

Migratory birds

Two EPBC Act listed migratory bird species are considered to potentially occur within the study region, the White-throated Needletail and the Fork-tailed Swift. These species could fly over the proposed development site, but impacts are likely to be negligible. The **White-throated Needletail,** a known occasional casualty of turbines, is at the inland edge of its range at Navarre Wind Farm with only few records within the search region. The **Fork-tailed Swift** is a likely turbine casualty, but the number involved are such that there would be negligible population impacts on this

widespread, mobile species, that may occur in the study area only on a few days per year. Impacts to both species are considered negligible from the proposed wind farm.

Mammals

Two FFG Act listed mammal species were considered likely to occur in the study area, **Brush-tailed Phascogale** and **Squirrel Glider**. Both species have been known to inhabit dry forested areas, particularly Box-Ironbark. However, no recent sightings have been recorded for either species.

Targeted surveys (hair-tubes) were undertaken from 18th October to 14th December 2021 for both species within suitable habitat along roadside vegetation, but none were observed. These involved fortnightly checks, tape change and re-baiting of hair-tubes,

Reptiles

One listed reptile species, the **Pink-tailed Worm-lizard** was considered to have the potential to occur within rocky habitats of box-ironbark forests in the study area.

Targeted surveys were undertaken within suitable habitat, but none were observed.

Invertebrates

One EPBC Act listed species, the **Golden Sun Moth** (GSM) is considered to have the potential to occur in the study area. GSM have previously been recorded in the wider search area and it has been recorded in degraded grassland areas near Ararat by ecologists of Nature Advisory and could occur in similarly degraded grassy areas within the study area.

Suitable habitat is present within the study area in form of native grassland and the presence of this species is assumed within these habitats. The current proposed wind farm layout would impact 68.377 hectares of potential Golden Sun Moth habitat.

Bird utilisation survey

Two bird utilisation surveys were undertaken at the proposed Navarre Wind Farm, in spring 2020 and autumn 2021.

The study area is mostly cleared ridges and valleys with scattered remnant woodland patches. Treeless areas supported a low diversity and abundance of common, predominantly farmland birds, while woodland areas supported more diverse and abundant woodland species.

Species richness at the impact survey points was relatively consistent and characterised by reasonable diversity with a total of 47 species recorded during the spring and 50 species during autumn BUS surveys.

Relative abundance of birds was moderate and dominated by large flocking birds such as cockatoos and corellas. Relative abundance fluctuated between 56 and 253 and between 18 and 357 in spring and autumn, respectively.

Flight heights at rotor swept area (84 to 246 metres above ground) were restricted to 4.3 percent and 0.9 percent of number of all birds at impact survey points during spring and autumn, respectively.

Three listed threatened species (Brown Treecreeper, Hooded Robin and Diamond Firetail) were recorded during the formal bird utilisation surveys at the observation points in woodland habitat. These species are generally confined to areas in or adjacent to woodland and are not expected to fly at RSA height. Impacts to threatened woodland birds from the development and construction of Navarre Wind Farm are unlikely to be significant.

Four species of raptors were seen at the impact points in spring, comprising 1.8 percent, and two species in autumn comprising 0.8 percent of all birds at impact points.

The Wedge-tailed Eagle was the most common species and was recorded on 10 occasions during spring and 13 occasions during autumn BUS. Eagles were mostly flying below RSA heights (90% and 75% of eagles' sightings in spring and autumn, respectively).

In a previous survey by Nature Advisory during October and November, 2020, 11 Wedge-tailed Eagle nests were discovered, some of which were active. These nests may potentially belong to a minimum of three pairs utilising the wind farm site as a breeding territory.

The utilisation rate of the Wedge-tailed Eagle was estimated at 0.95 and 0.80 eagles per hectare per hour in spring and autumn seasons, respectively. This rate is higher than rates recorded at a range of wind farms (0.01 – 0.44 eagle/ha/hr) studied by Nature Advisory in south-east Australia.

Bat assessment

Across two bat survey periods in Spring 2020 and Autumn 2021 at least nine species were positively identified, together with three species complexes.

Eight of these were common, widespread and secure bat species that occur in farmland and other habitats throughout eastern and south-eastern Australia. These common species were positively identified to occur on the wind farm site.

One threatened species, Eastern Bentwing Bat was recorded during the autumn 2021 survey with two calls being positively attributed to this species and a further 21 calls assigned to the species complex.

2. Introduction

2.1. Background and Scope

Aurecon Australasia Pty Ltd engaged Nature Advisory Pty Ltd to implement pre-construction flora and fauna surveys for the proposed Navarre Wind Farm, situated between Stawell and St Arnaud in central-western Victoria, approximately 185 to 200 km north-west of Melbourne (Figure 1). The specific area investigated, herein referred to as the 'study area', comprised approximately 855-hectares of predominantly private land in central Victoria, located immediately north of Navarre, approximately 35 kilometres north-east of Stawell. This included a 50-metre-wide corridor along tracks and a 100-metre-radius around turbine areas of an initial footprint, as shown in Figure 1. The study area falls primarily in the Goldfields bioregion, Northern Grampians shire and North-Central Catchment Management Authority, but also includes a small area of the Wimmera bioregion, Pyrenees shire and Wimmera Catchment Management Authority in the south.

The assessment was based on a desktop evaluation of available information on the flora, fauna habitat and ecological communities of the study area and its surrounds, accompanied by a field assessment to ground truth the actual or potential occurrence of these matters. In addition, this investigation was also commissioned to provide baseline data on the pre-construction status of flora and fauna, particularly the threatened species that could potentially occur within or close to the wind farm site.

This assessment is required as part of early investigations to inform the feasibility analysis and layout of the proposed wind farm. The Victorian *Policy and planning guidelines – Development of wind energy facilities in Victoria* (DELWP 2019) require all wind farm proponents to assess the impacts of their projects on threatened species and communities listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report evaluates the proposed wind farm site for the likelihood of occurrence and potential impacts to listed flora and fauna species and ecological communities and discusses the prospective implications of this for project planning and assessment.

Specifically, the scope of the investigation included the following activities:

- Review of existing information within the proposed wind farm boundary and a ten-kilometre buffer search region from the following sources:
    - Victorian Biodiversity Atlas (VBA) administered by the Department of Energy, Environment and Climate Action (DEECA);
    - The Commonwealth EPBC Act Protected Matters Search Tool;
    - DEECA's Native Vegetation Information Management system (NVIM); and
    - DEECA's NatureKit.
- Flora and fauna field assessments including:
    - Characterisation and mapping of native vegetation on the site that might be impacted by the new layout, as defined in Victoria's Guidelines for the removal, destruction or lopping of native vegetation (the 'Guidelines');
    - Assessment of native vegetation in accordance with the Guidelines, including habitat hectare assessment and/or scattered tree assessment;

- Compilation of a flora species list for the study area;
- Assessment of the likelihood of occurrence of listed flora, fauna and ecological communities in the study area;
- Targeted surveys for threatened flora species in the study area;
- Detailed bird and bat utilisation surveys within the project site;
- Detailed assessments of the threatened fauna species that were considered to potentially occur on or near the wind farm study area including:
  - Swift Parrot
  - Barking and Powerful Owls
  - Pink-tailed Worm-lizard

- Consideration of possible implications of the wind farm development on these listed species and their habitat and recommendations on avoidance and minimising of such impacts;
- Provide the key legislative constraints for the project including details of all relevant Commonwealth, State and local legislation and policies.

This investigation was undertaken by a team from Nature Advisory including Chris Armstrong (Botanist), Elinor Ebsworth (Senior Ecologist), Verity Fyfe (Senior Botanist), Merinda Day-Smith (Botanist), Tessa Doherty (Botanist), Arend Kwak (Botanist), Dean Karopoulos (Botanist), Brett Macdonald (Senior Ecologist), Khalid Al-Dabbagh (Senior Zoologist), Peter Lansley (Senior Zoologist), Cara Cappelletti (Zoologist), Clint Schipper (Zoologist), Curtis Doughty (Senior Zoologist), Nhung Thi Hong Nguyen (GIS Analyst), Emma Wagner (GIS Analyst), Inga Kulik (Senior Ecologist and Project Manager) and Brett Lane (Principal Consultant).

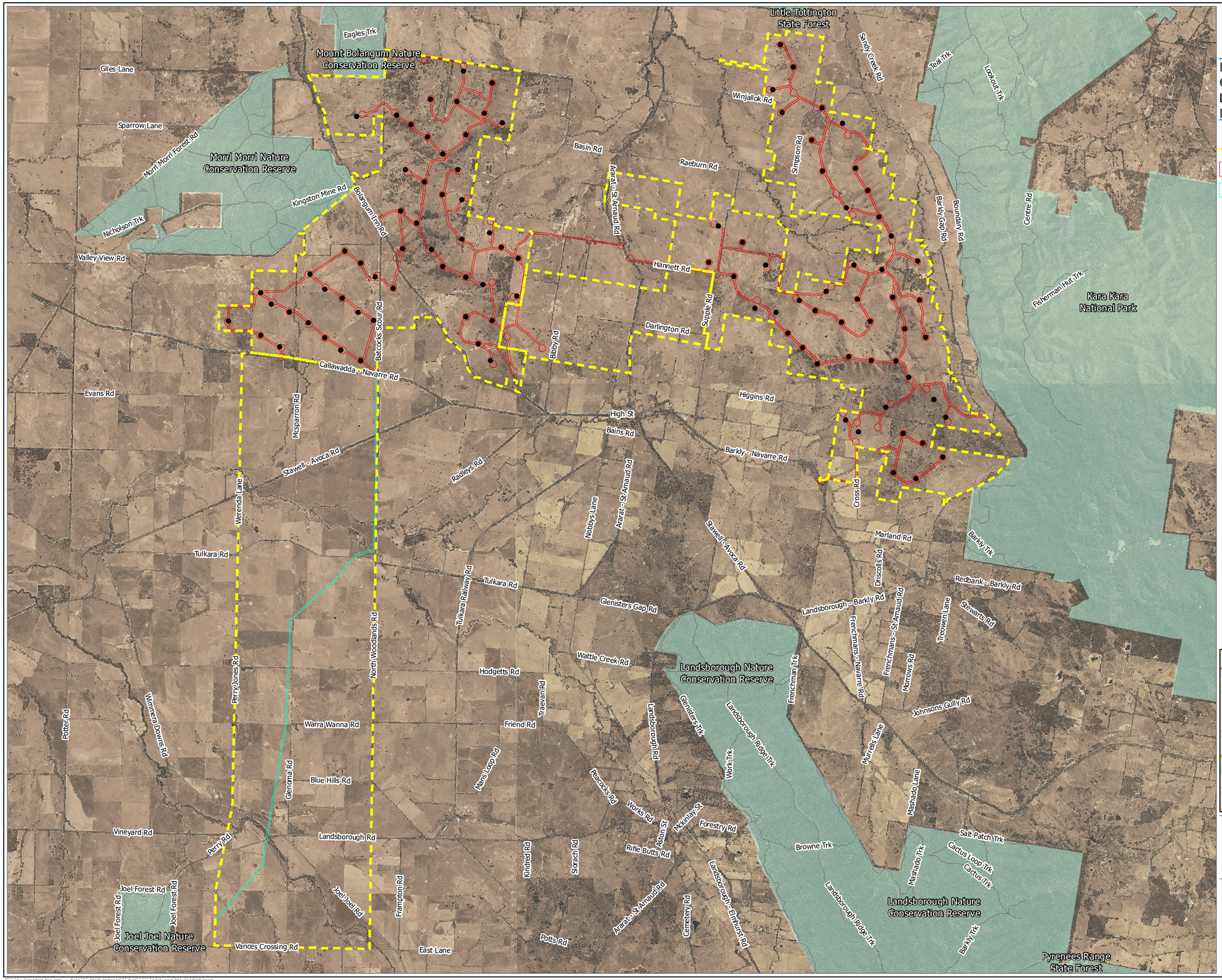

Figure 1: Study Area and Location

Project: Navarre Wind Farm
Client: Aurecon Australasia Pty Ltd
Date: 27/03/2023

- Wind farm boundary
- Study area
- Transmission line
- Turbines

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

2.2. Project Location

The Navarre Green Power Hub (the Project) comprises approximately 18,404 hectares of predominantly private land immediately north of Navarre in north-western Victoria (Project Area). The Project Area consists of four main sub-areas:

- Wind Farm Project Area – Eastern Layout: Approximately 5,266 ha located to the east of Ararat-St Arnaud Road and west of Kara Kara National Park.
- Wind Farm Project Area – Western Layout: Approximately 4,873 ha located to the west Ararat-St Arnaud Road and east of Morrl Morrl Nature Conservation Reserve.
- Transmission Line Project Area – Eastern and Western Layout Link: Approximately 1,272 ha investigation corridor located between the Eastern Layout and Western Layout.
- Transmission Line Project Area – Bulgana Terminal Station Connection: Approximately 6,993 ha investigation corridor located between the Eastern Layout and Bulgana Terminal Station.

Sections 5 to 9 of this report relate to the two Wind Farm project areas (East and West), while Section 13 of this report relates to the Transmission Line Project Area – Bulgana Terminal Station Connection.

The Transmission Line Project Area – Eastern and Western Layout Link has not been considered as part of this investigation as it was not finalised during these assessments.

A draft transport plan of external access route from the Port of Geelong to the site (Rex J Andrews 2023) has been reviewed and impacts to native vegetation are considered likely to be limited to trimming trees in a small number of locations. Detailed (field based) assessment of impacts to native vegetation from the transport route will be undertaken as part of the EES process.

2.3. Project description

Neoen Australia Pty Ltd proposes to build and operate a wind farm and battery hub near the township of Navarre in north-western Victoria (the Project). The Project will generate around 600MW and will incorporate a total of 102 wind turbines, split across two areas:

- The Wind Farm Project Area – Eastern Layout, which will consist of 50 wind turbines across approximately 5,266 ha of land.
- Wind Farm Project Area – Western Layout, which will consist of 52 wind turbines across approximately 4,873 hectares (ha) of land.

Turbine dimensions will be within the proposed turbine envelope:

- Maximum tip height: 246 metres
- Minimum tip height: 84 metres

The Project will include a 220kV transmission line between the western and eastern development and a 220kV transmission line between the western development and Bulgana Terminal Station.

In addition to the turbines and transmission lines, the project will also include the permanent and temporary infrastructure listed below.

Table 1: Project infrastructure specifications

The Wind Farm Project Area – Eastern Layout	
Permanent	**Temporary**
A substation (up to 10ha) Hardstand and laydown areas surrounding each turbine. Access tracks and site access points. It is expected the site access points will be at one location on Barkly-Navarre Road, one location on Ararat-St Arnaud Road and one location on Winjallock Road. Operations and maintenance building and laydown A Battery Energy Storage System with a capacity of 600MW / 1200MWh Road upgrades to the local roads Meteorological monitoring masts Internal power collection stations Internal underground cabling A quarry to source raw material required for construction and maintenance during operations.	A construction office and compounds. This will include site offices, car parking, storage and amenities. A concrete batching plant.

The Wind Farm Project Area – Western Layout	
Permanent	**Temporary**
A substation (up to 10ha) Hardstand and laydown areas surrounding each turbine. Access tracks and site access points. It is expected the site access points will be at one location on Callawadda-Navarre Road and three locations on Bolangum Inn Road. Operations and maintenance building and laydown. Road upgrades to the local roads. Meteorological monitoring masts. Internal power collection stations. Internal underground cabling. A quarry to source raw material required for construction and maintenance during operations.	A construction office and compounds. This will include site offices, car parking, storage and amenities. A concrete batching plant.

2.4. Scope of work and timeline of ecological surveys

Table 2 outlines surveys completed to inform this assessment of impacts of the proposed Navarre Green Power Hub.

Table 2: Surveys completed (to March 2023)

Survey – field assessment	Date
Flora and vegetation assessments	
Native vegetation assessments and targeted surveys for threatened ecological communities and listed flora species	▪ 5–8, 11–15 and 25–29 September 2021 ▪ 25–29 October 2021 ▪ 15–19 November 2021 ▪ 19–23 and 26–30 September 2022 ▪ 14–18 November 2022
Fauna overview assessments	
Fauna field surveys	▪ 12–16 October 2020 ▪ 9–13 November 2020
Bird studies	
Bird utilisaton surveys	▪ 14–17 October 2019 (spring) ▪ 20–23 April 2021 (autumn)
Swift Parrot surveys	▪ 12th to 15th April 2021 ▪ 10th to 13th May 2021 ▪ 14th to 18th June 2021 ▪ 12th to 16th July 2021 ▪ 9th to 13th August 2021
Barking and Powerful Owl surveys	▪ 26th to 29th April 2021 ▪ 23rd to 26th August 2021
Bat studies	
Bat surveys	▪ 13 October – 30 November 2020 (spring) ▪ 11 March – 29 April 2021 (autumn)
Pink-tailed Worm-lizard survey	
Field surveys	▪ 25–26 October 2021 ▪ 1–3 December 2021

3. Regulatory Context

This report considers the application of relevant legislation and planning policies that protect listed biodiversity values. Commonwealth, state and local controls that have been addressed as part of this investigation are summarised below.

3.1. Victorian Wind Farm Planning Guidelines

The Victorian Wind Farm Planning Guidelines (DELWP 2019) state that proponents of a wind energy facility must consider risk factors, impacts and mitigation measures to environmental values. During the design and planning process, the responsible authorities must be aware of the following controls related to flora and fauna:

- The *Commonwealth Environment Protection and Biodiversity Act 1999* (EPBC Act) provides for the protection of matters of national environmental significance, including nationally significant threatened species and wetlands protected under the *Convention of Wetlands of International Importance* (the Ramsar Convention).
- The *Flora and Fauna Guarantee Act 1988 (FFG Act)*, which provides protection for species and ecosystems that are of statewide importance.
- The Planning Policy Framework (PP)F which sets out the state planning objectives for protection and conservation of biodiversity - refer to Clause 12.01 (Biodiversity) of the Victoria Planning Provisions (VPP).
- Clause 52.17 (Native vegetation) of the VPP which provides the relevant decision-making framework for native vegetation protection and conservation.
- Other sections of the Planning Scheme may require additional consideration of flora and fauna matters. These may be found in the PPF and the zone and overlay provisions.

The above-mentioned legislation and policy relevant to this investigation is discussed in further detail in the subsections below.

3.2. Local planning provisions

The study area falls within the area of the Northern Grampians Shire Council and the Pyrenees Shire Council, as well as the Wimmera and North Central Catchment Management Authorities (CMAs). The study area is predominately zoned Farm Zone (FZ), with the exception of the road reserves – zoned Transport Zone (TRZ2) and small areas of woodland corridors – zoned Public Conservation and Resource Zone (PCR2).

Local planning provisions will apply under the Victorian *Planning and Environment Act 1987*.

3.3. Overlays

The study area is subject to the following three overlays in the Northern Grampians Planning Scheme:

- *Bushfire Management Overlay (BMO)* – This overlay is considered to be irrelevant to the current investigation.
- *Floodway Overlay – Schedule 1 (FO1)* - This overlay is considered to be irrelevant to the current investigation.
- *Land Subject to Inundation Overlay – Schedule 1 (LSIO1)* - This overlay is considered to be irrelevant to the current investigation.

3.4. State planning provisions

State planning provisions are established under the Victorian *Planning and Environment Act 1987*.

Clause 52.17 of all Victorian Planning Schemes states that:

A permit is required to remove, destroy or lop native vegetation, including dead native vegetation.

A permit is not required if:

- If an exemption in Table 52.17-7 specifically states that that a permit is not required.
- If a native vegetation precinct plan corresponding to the land is incorporated into the planning scheme and listed in the schedule to Clause 52.16.
- If the native vegetation is specified in a schedule to Clause 52.17.

3.4.1. Application requirements

Any planning permit application to remove, destroy or lop native vegetation must comply with the application requirements specified in the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a), herein referred to as the 'Guidelines'.

When assessing an application, Responsible Authorities are also obligated to refer to Clause 12.01-2 (Native vegetation management) in the Planning Scheme which in addition to the Guidelines, refers to the following:

- Assessor's handbook – applications to remove, destroy or lop native vegetation (DELWP 2018a); and
- Statewide biodiversity information maintained by DEECA.

The application of the Guidelines (DELWP 2017a) is explained further in Appendix 1.

3.4.2. Referral to DEECA

Clause 66.02-2 of both the Northern Grampians and Pyrenees Planning Scheme determines the role of DEECA as a recommending referral authority in the assessment of native vegetation removal permit applications. If an application is referred, DEECA may make certain recommendations to the responsible authority in relation to the permit application.

In accordance with S55(1) of the *Planning and Environment Act* 1987 and Clause 66.02-2 of the planning scheme, any application to remove, destroy or lop native vegetation must be referred to the DEECA Secretary (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987)* as the recommending referral authority if:

- The impacts to native vegetation are in the Detailed Assessment Pathway;
- A property vegetation plan applies to the site; or
- The native vegetation is on Crown land which is occupied or managed by the responsible authority.

3.5. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts on these species require the approval of the Australian Minister for the Environment.

If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species, a Referral under the EPBC Act should be considered. The Minister will decide after 20 business days whether the project will be a 'controlled action' under the EPBC Act, in which case it cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

Implications under the EPBC Act for the current proposal are discussed in Section 12.7.

3.6. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) lists threatened and protected species and ecological communities (DELWP 2022f). Any removal of protected flora, which includes threatened flora species and the plants that make up threatened communities, listed under the FFG Act from public land requires a Protected Flora Licence or Permit under the Act, obtained from DEECA.

The FFG Act only applies to private land where a license is required to remove grass trees, tree ferns and sphagnum moss for sale, or where an Interim Conservation Order has been made to protect critical habitat for a threatened species or community. As no such habitat has ever been declared, this mechanism under the FFG Act has never been implemented.

Implications under the FFG Act for the current proposal are discussed in Section 12.8.

3.7. EE Act

One or a combination of a number of criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an Environmental Effects Statement (EES) is required according to the *Ministerial Guidelines for Assessment of Environmental Effects under the* Environment Effects Act 1978 (DSE 2006).

The criteria related to flora, fauna and native vegetation which trigger a Referral are outlined below.

One or more of the following would trigger a Referral:

- Potential clearing of 10 hectares or more of native vegetation from an area that:
    - Is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
    - Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
    - Is not authorised under an approved Forest Management Plan or Fire Protection Plan
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria
- Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term

Two or more of the following would also trigger a Referral:

- Potential clearing of 10 hectares or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan
- Matters listed under the Flora and Fauna Guarantee Act 1988:
    - Potential loss of a significant area of a listed ecological community; or
    - Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
    - Potential loss of critical habitat; or
    - Potential significant effects on habitat values of a wetland supporting migratory bird species.

Implications under the *Environment Effects Act 1978* (EE Act) for the current proposal are discussed in Section 12.9.

3.8. CaLP Act

The *Catchment and Land Protection Act 1994* (CaLP Act) requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

Weed species listed on the CaLP Act that have been recorded in the study area are discussed in Section 12.10.

4. Site description

4.1. Location

The study area for this investigation comprised several iterations of the proposed layout for the Wind Farm Project Area – Eastern Layout and Western Layout, with a 50-metre-wide corridor along tracks and a 100-metre-radius around turbine areas of the initial footprint. This occurred predominantly on private land in central Victoria, located immediately north of Navarre, approximately 35 kilometres north-east of Stawell and 100 kilometres west of Bendigo (Figure 1).

4.2. Site description

The study area supports two dominant ridge lines, undulating hilly country and flat plains. One of the ridge lines runs north to south along the eastern boundary of the study area (to the west of Barkly Gap Road) and includes an arm that runs to the west and north-west towards Hannet Road and Supple Road. The other ridge line is lower in elevation and runs north-west to south-east (to the east of Bolangum Inn Road) towards the western boundary of the study area, with an arm extending north-east (west of Basin Road). The majority of the remainder of the study area supported low undulating hills and flat plains, with the flattest country occurring west of Batcocks Scour Road.

The geology of the study area contains Neogene fluvial gravel, sand and silt and Quaternary silt, sand, minor gravel and fluvial gravel (Agriculture Victoria 2019). The study area supports well-drained, red-textured contrast soils on the upper hill slopes and sodic soils on the lower slopes with poorer drainage areas (Agriculture Victoria 2019). The soil of the undulating rises is comprised of marine sand and silt, minor sandstone, siltstone and biotite schist with a fine sandy loam to sandy clay loam surface texture (Agriculture Victoria 2019). The undulating plains were comprised of fluvial gravel, sand and silt with a sandy loam (silty) surface texture (Agriculture Victoria 2019).

The study area supports a number of waterbodies. Three tributaries of the Avon River – Paradise Creek, Avon Creek and Reedy Creek – enter into the north and north-eastern parts of the study area. Bolangum Creek terminates in the north-western portion of the study area. Morrl Morrl Creek and Wattle Creek, tributaries of the Wimmera River, run through the south-west and south-east of the study area, respectively. No DEECA mapped wetlands occur within the study area.

4.3. Vegetation

The majority of remnant treed vegetation has been cleared from the study area, with much of the remaining treed vegetation occurring along the ridge lines (which are less suitable for agriculture than the lower lying areas). The initial wave of tree clearing would have occurred during the gold rush era for mining infrastructure, shelter and fire, as well as for the construction of the Stawell–Melbourne Railway. This clearing would have occurred on the ranges also and much of the treed vegetation here appears to be regrowth dating back to this time. At present the study area predominantly supports livestock grazing (mostly sheep) and dryland cropping. A large number of farms supported revegetation areas and there is an active land care group in the area.

Despite this land use history, the majority of the study area was found to support native vegetation in the form of derived native understory. Native treed vegetation in the study area was mostly Grassy Dry Forest on the eastern range, Hillcrest Herb-rich Woodland on the lower-lying western range, Box Ironbark Forest on the undulating hills, Grassy Woodland on the plains, undulating hills and lower slopes (widespread but fragmented) and Plains Woodland (fragmented occurrence to the south-west of Navarre). Other less common vegetation types observed in the study area

included Creekline Grassy Woodland, Riparian Woodland and Alluvial Terraces Herb-rich Woodland which were associated with the watercourses. More information regarding native vegetation in the study area is provided in Section 5.4 and representative photos of native vegetation in the study area are provided in Appendix 6.

4.4. Fauna habitat

Fauna habitat within the study area comprised remnant treed habitats, rocky outcrops, native grasslands and linear creek-line habitats. There were also areas of revegetation that provide habitat for fauna species and have helped prevent large scale erosion that has occurred across the region. Much of the area has been cleared of trees for agricultural purposes and these areas provide limited habitat for native fauna.

The study area encompasses many conservation areas known as the Kara Kara Conservation Management Network (CMN). The study area is located centrally within this network, which includes Kara Kara National Park and Stuart Mill Nature Conservation Reserve to the east, Little Tottington State Forest to the north and Mount Bolangum Flora and Fauna Reserve, Big Tottington Nature Conservation Reserve and Morrl Morrl Nature Conservation Reserve to the north-west. The network is of high ecological importance, as it contains the largest remnants of temperate woodland left in the region and is managed for many listed species.

Creek-line and roadside vegetation and remnant patches of treed vegetation serve as natural bio links for the movement of wildlife in the region.

The study area lies within the Goldfields bioregion and the Victorian Midlands IBRA Bioregion, and falls within the North Central CMA and Wimmera CMA areas, and the Northern Grampians and Pyrenees local government areas.

5. Vegetation and flora surveys

5.1. Introduction

The aim of the vegetation surveys was to identify native vegetation and ascertain whether EPBC Act and FFG Act listed threatened flora species and ecological communities have the potential to be present in the Navarre Wind Farm development footprint. The information from these surveys has been used to inform the proposed wind farm layout by applying the 'avoid' and 'minimise' principles in accordance with the Guidelines.

The vegetation surveys covered an 'investigation area' that was larger than and contained the actual development footprint. This provided an overview of the occurrence of habitats for threatened flora species on and near the development footprint.

Targeted flora surveys during the appropriate seasons in proposed impact areas that are suitable habitat for threatened flora species provide greater certainty on the presence of these species. Targeted surveys for spring-flowering threatened species were undertaken in areas of suitable habitat in spring 2021 and 2022.

This section of the report presents the results of the vegetation and flora surveys. The methods used and sources of information are considered first. The native vegetation that lies within the investigation area is then described, including vegetation mapping. The impacts on vegetation and potential impacts to threatened species are considered next, followed by mitigation measures for reducing the impacts of the project. Implications of the project under applicable legislation and planning policies are also summarised.

Table 3 below summarises the compliance of the information in this report with the application requirements of the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a).

Table 3: Application requirements under the Guidelines

Application requirement		Response
1.	Information about the native vegetation to be removed	See Section 12.2.1
2.	Topographic and land information relating to the native vegetation to be removed	See Section 4.2
3.	Recent, dated photographs of the native vegetation to be removed	See Appendix 6
4.	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five year period before the application for a permit is lodged	It is understood that no native vegetation has been removed in relation to the current project within the last five years
5.	An avoid and minimise statement	Please see Section 12.5.1

Application requirement		Response
6.	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed	It is understood that no Property Vegetation Plan applies to any of the native vegetation proposed for removal
7.	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	The removal of native vegetation is not to create defendable space
8.	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations (at decision guideline 8).	The application is not being made under Clause 52.16
9.	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured in accordance with the Guidelines.	See Appendix 14

Application requirement		Response
Additional requirements for applications in the Detailed Assessment Pathway		
10.	▪ A site assessment report of the native vegetation to be removed, including: ▪ A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	See Section 5.4.1, Appendix 2 and Appendix 3

5.2. Methods

This section describes the methods used for the vegetation survey within the windfarm study area (excluding transmission line area) and determination of the presence of habitat for listed flora species, including sources of information reviewed to ensure a comprehensive consideration of native vegetation and flora species was undertaken.

5.2.1. Existing information

The existing documentation below, relating to the study area was reviewed.

- Northern Grampians Planning Scheme;
- Pyrenees Planning Scheme;
- The Victorian *Policy and planning guidelines – Development of wind energy facilities in Victoria* (DELWP 2017);
- Kara Kara Conservation Management Network: Strategic Plan;
- Nature Advisory 2019, *Navarre Wind Farm Overview flora and fauna constraints assessment* - Report No. 19222 (1.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Neoen; and
- Nature Advisory 2021, *Navarre Wind Farm Overview biodiversity constraints assessment* - Report No. 19222 (3.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Aurecon.

Native vegetation

Pre-1750 (pre-European settlement) vegetation and current wetland mapping administered by DEECA was reviewed to determine the type of native vegetation likely to occur in the study area and surrounds. Information on Ecological Vegetation Classes (EVCs) was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the Goldfields and Wimmera bioregions[1] (DSE 2004a);
- *NatureKit* (DELWP 2022a).

Listed Matters

Existing flora species records and information about the potential occurrence of listed matters was obtained from an area termed the 'search region', defined here as the wind farm boundary with a 10-kilometre buffer applied (coordinates of approximate centre point: latitude 36˚ 50' 23" S and longitude 143˚ 8' 3" E).

A list of the flora species recorded in the search region was obtained from the *Victorian Biodiversity Atlas* (VBA), a database administered by DEECA (DELWP 2022d).

The online EPBC Act *Protected Matters Search Tool* (DAWE 2022a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

5.2.2. Field Methods

Field assessments were conducted across multiple weeks throughout spring 2021 and spring 2022. These included the following:

- 5th – 8th, 11th – 15th and 25th – 29th September 2021;
- 15th – 19th November 2021; and
- 19th – 23rd and 26th – 30th September 2022.

During these assessments, the study area was surveyed initially by vehicle and areas supporting native vegetation were inspected in more detail on foot.

Sites in the study area found to support native vegetation or with potential to support listed matters were mapped through a combination of aerial photograph interpretation and ground-truthing using a hand-held GPS (accurate to approximately five metres). Species and ecological communities listed as threatened under the EPBC Act or FFG Act (where they occurred on public land) were also mapped using the same method.

Native vegetation

Native vegetation is currently defined in Clause 73.01 of all Victorian planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses. The Guidelines (DELWP 2017a) further classify native vegetation as belonging to two categories:

[1] A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values". In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

- Patch; or
- Scattered tree.

The definitions of these categories are provided below, along with the prescribed DEECA methods to assess them. Further details on definitions of patches and scattered trees are provided in Appendix 1.

Patch

A patch of native vegetation is either:

- An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or
- Any area with three or more native canopy trees[2] where the drip line[3] of each tree touches the drip line of at least one other tree, forming a continuous canopy; or
- Any mapped wetland included in the *Current wetlands map*, available at *MapShareVic* (DELWP 2022b).

Patch condition is assessed using the habitat hectare method (Parkes *et al.* 2003; DSE 2004b) whereby components of the patch (e.g. tree canopy, understorey and ground cover) are assessed against an EVC benchmark. The score effectively measures the percentage resemblance of the vegetation to its original condition.

The *Native Vegetation Information Management* (NVIM) system (DELWP 2022c) provides modelled condition scores for native vegetation to be used in certain circumstances.

Scattered tree

A scattered tree is:

- A native canopy tree[2] that does not form part of a patch.

Scattered trees are counted and mapped, the species identified and their circumference at 1.3 m above the ground is recorded.

Flora Species and habitats

Records of flora species were made in conjunction with sampling methods used to undertake habitat hectare assessments of native vegetation described above. Specimens requiring identification using laboratory techniques were collected. Species protected under the FFG Act were determined by crosschecking against the FFG Act *Protected Flora List* (DELWP 2019a). The potential for habitats to support listed flora species was assessed based on the criteria outlined below:

- The presence of suitable habitat for flora species such as soil type, floristic associations and landscape context; and

[2] A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant vegetation type.
[3] The drip line is the outermost boundary of a tree canopy (leaves and/or branches) where the water drips on to the ground.

- The level of disturbance of suitable habitats by anthropogenic disturbances and invasions by pest plants and animals.

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or flora listed under the EPBC Act and/or FFG Act. That is, where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat.

Threatened ecological communities

The likelihood of listed threatened ecological communities occurring in the study area was determined by checking EVC mapping and aerial imagery against published descriptions of relevant listed ecological communities modelled to potentially occur in the study area.

Reviewed ecological community descriptions comprised identification criteria and condition thresholds from listing advice for EPBC Act communities as well as FFG Act listed community descriptions (DELWP 2022f).

Targeted flora surveys

Based on the results of the vegetation assessments, it was determined that 20 flora species listed under the EPBC Act and/or FFG Act had the potential to occur within areas of suitable habitat in the wind farm footprint. These species were:

- Brilliant Sun-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Buloke (FFG Act: Vulnerable);
- Clover Glycine (EPBC Act: Vulnerable; FFG Act: Vulnerable);
- Douglas' Spider-orchid (FFG Act: Critically Endangered);
- Grey Grass-tree (FFG Act: Critically Endangered);
- Inland Leek-orchid (FFG Act: Endangered);
- Hairy Tails (FFG Act: Critically Endangered);
- Lowly Greenhood (EPBC Act: Endangered; FFG Act: Endangered);
- McIvor Spider-orchid (EPBC Act: Endangered; FFG Act: Vulnerable);
- Pink-lip Leek-orchid (FFG Act: Critically Endangered);
- Pomonal Leek-orchid (EPBC Act: Endangered; FFG Act: Critically Endangered);
- Purple Eyebright (EPBC Act: Endangered; FFG Act: Endangered);
- Red-cross Spider-orchid (FFG Act: Endangered);
- Stuart-Mill Spider-orchid (FFG Act: Endangered);
- Sturdy Leek-orchid (EPBC Act: Vulnerable);
- Swamp Diuris (FFG Act: Endangered);
- Tawny Spider-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Trailing Hop-bush (EPBC Act: Vulnerable);
- Turnip Copperburr (EPBC Act: Endangered; FFG Act: Critically Endangered); and
- Yellow-lip Spider-orchid (EPBC Act: Endangered; FFG Act: Endangered).

Targeted Surveys for these species were undertaken in the western section of the wind farm between the 25th and 29th October 2021, and were repeated between the 15th and 19th November 2021. Targeted surveys for the eastern section of the wind farm, as well as additional vegetation identified in the 2022 surveys were undertaken from 19th to 23rd and from 26th to 30th September 2022, and repeated between the 14th and 18th November 2022.

During these surveys, areas identified to support suitable habitat for these species were inspected thoroughly along transects spaced 5-10 metres apart. This transect spacing was chosen based on the *Draft survey guidelines for Australia's threatened orchids* (DAWE 2013).

Threatened ecological communities

The study area was assessed against published descriptions of relevant listed ecological communities modelled to potentially occur in the study area.

Reviewed ecological community descriptions comprised identification criteria and condition thresholds from listing advice for EPBC Act communities as well as FFG Act-listed community descriptions (DELWP 2022f).

5.3. Limitations of native vegetation assessments

The site assessments were carried out in spring. The short duration and seasonal timing of field assessments can result in some species not being detected when they may occur at other times. Additionally, some flora species and life-forms may be undetectable at the time of the survey or unidentifiable due to a lack of flowers or fruit.

The following threatened species' presence within the study area could not be assessed at the time that targeted surveys were carried out, as they were carried out after their flowering season:

- Yellow-lip Spider-orchid (Flowering season: September); and
- Stuart Mill Spider-orchid (Flowering season: August to September).

Species in the Sun Orchid genus (*Thelymitra* spp.) were observed to be flowering and subsequently setting seed earlier than expected due to seasonal variation. As such, Sun-orchids could be identified to genus level only due to a loss of identifiable features during seed production. It is therefore not possible to determine the presence or otherwise of the following species in the targeted survey area:

- Brilliant Sun-orchid; and
- Fringed Sun-orchid.

Where Sun Orchids were found to occur, a precautionary approach was taken in determining impacts to listed matters, and the above species were assumed to be susceptible to impacts.

Difficulties in identifying flora in its observed state limited occasionally the accuracy of determining native vegetation patch extent. The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and condition of native vegetation and fauna habitats.

These limitations were not considered to compromise the validity of the current investigation, which was designed to address the relevant policies and decision guidelines.

Identification of EVCs considers vegetation types which would have naturally occupied the landscape prior to European impacts. Significant past alteration of the study area's landform, hydrology and soil composition as well as past vegetation clearance has resulted in the emergence of an artificial site ecology and the reestablishment of vegetation that is likely to be notably

different to what would have naturally occupied the study area. Identification of EVCs in altered areas was therefore based upon consideration of:

- Modelled EVC mapping (DELWP 2020a);
- Observations of adjacent landforms that had not been significantly altered;
- Observations of nearby natural vegetation;
- Any observed indigenous flora species that are useful for determining EVCs; and
- Relevant published EVC benchmark descriptions.

If the above information was not sufficient to allow for a reasonable conclusion to be made on which EVC would have naturally occurred and the observed vegetation resembled an EVC which is likely to have naturally occurred in the region, EVC identification was based upon the structure and floristic composition of current observed vegetation.

Aurecon have worked closely with Nature Advisory to reduce the area of native vegetation impacted. As a result, the layout of the proposed wind farm has, in some cases, been altered to extend outside of the assessment area. In addition, several laydown and operations areas have been added to the development layout since the initial field assessment due to the complex nature of the project.

These locations have been chosen to minimise impacts to native vegetation and prioritise cleared or low-quality areas based on general field observations but will still require a detailed field assessment. Together, these total an additional area of 48.56 ha requiring a field assessment, approximately 50% of which could potentially contain native vegetation. In addition, detailed field survey of the transmission line is also required.

5.4. Assessment results

5.4.1. Patches of native vegetation

Pre–European EVC mapping (DELWP 2022a) indicated that the windfarm study area and surrounds would have supported Box Ironbark Forest (EVC 61), Alluvial Terraces Herb-rich Woodland (EVC 67), Creek line Grassy Woodland (EVC 68), Hillcrest Herb-rich Woodland (EVC 70), Low Rises Grassy Woodland (EVC 175_61) and Plains Woodland (EVC 803) prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that Heathy Dry Forest (EVC 20), Grassy Dry Forest (EVC 22), Box Ironbark Forest (EVC 61), Alluvial Terraces Herb-rich Woodland (EVC 67), Creek line Grassy Woodland (EVC 68), Hillcrest Herb-rich Woodland (EVC 70), Swampy Riparian Woodland (EVC 83), Plains Grassy Wetland (EVC 125), Low Rises Grassy Woodland (EVC 175_61) and Plains Woodland (EVC 803) were present throughout the study area (Figure 2 and Table 4). A description of these EVCs is provided within the EVC benchmarks in Appendix 7.

278 patches (referred to herein as habitat zones) comprising the abovementioned EVCs, were identified in the study area (Table 5). This totalled an area of 654.376 hectares of native vegetation in patches and included 1240 large trees in patches. In addition, 436 scattered trees (282 large and 154 small) were mapped within the study area. More patches are likely to be identified in the additional assessment areas outlined in Section 5.3.

Table 4: Description of ecological vegetation classes recorded in the study area

EVC	Description
Heathy Dry Forest (EVC 20)	Occurs in the eastern section of the study area on exposed aspects on hilltops and steeper slopes. Remnants of this EVC were often treeless, but occasionally had a sparse canopy of Red Stringybark, Yellow Gum, Yellow Box and Grey Box, often in poor health. Although remnant trees were typically sparse, many of these trees were large (>60cm DBH), with limited recruitment of canopy species. Understory vegetation was dominated by graminoids such as Supple Spear-grass, Chocolate Lily, Common Wallaby Grass, Kangaroo Grass and Dwarf Mat-rush as well as ericoid-leaf shrubs such as Spreading Wattle, Hedge Wattle, Cranberry Heath, Gorse Bitter-pea and Spiky Guinea-flower. Herb cover was typically sparse and comprised of Sieber Crassula, Sheep's Burr, Wood Sorrel and Small St. John's Wort, but larger patches had high herb cover with a more diverse assemblage including Stinking Pennywort, Bronze Bluebell, New Holland Daisy and Tall Raspwort. Bryophytes, lichens and soil crusts often occupied a significant portion of the ground layer (10-25%), as well as a low amount of predominantly native litter and a low-moderate number of logs. Weed cover was low in treed patches and high in treeless patches and was largely composed of low-threat exotic pasture species such as Annual Veldt-grass, White Clover, Sheep Sorrel and Capeweed. Shrubs were often absent in smaller patches due to grazing pressure and lack of connectivity, leading these habitat zones to more closely resemble Grassy Dry Forest (EVC 22). These habitat zones were determined to be Heathy Dry Forest based on their proximity to larger remnant patches of this EVC with a well-developed heathy shrub layer, although some isolated patches without higher-quality nearby remnants may have been identified as Grassy Dry Forest due to this modification.
Grassy Dry Forest (EVC 22)	Occurs throughout the eastern section of the study area along the central ridgeline and on associated arms and exposed foothills. Remnants of this EVC often had a sparse or absent canopy on ridgelines but supported many trees on sheltered slopes as well as in the heavily wooded areas in the south-east of the study area. Canopy species were highly variable and diverse, often being dominated by Grey Box, Bundy and Red Stringybark with occasional Yellow Box, Red Box and Yellow Gum. These trees were often in moderate – good health, and many were large (>60cm), with adequate recruitment of canopy species only typically observed on sheltered slopes. Understory vegetation was dominated by grasses such as Spear Grasses, Wallaby Grasses, Common Wheat-grass and other graminoids such as Chocolate Lily, Black-anther Flax-lily, Wattle Mat-rush and Kangaroo Grass. Several patches also had a prominent layer of shrubs and small trees such as Golden Wattle, Blackwood, Sweet Bursaria and Sticky Hop-bush. Herbs were also typically abundant, and included Stinking Pennywort, Creamy Candles, Early Nancy, Austral Bear's-ear, Smooth Solenogyne, Austral Stork's-bill, Trailing Speedwell and several species of Sundew. Green Rock-fern and Narrow Rock-fern were also widespread. Bryophytes, lichens and soil crusts often occupied a significant portion of the ground layer (10-25%), as well as a low amount of predominantly native litter and a low-moderate number of logs. Weed cover was variable, with exposed slopes often heavily invaded by high-threat exotic such as Onion Grass, Cocksfoot, St-John's Wort, White Clover, Flatweed and Horehound, while drier ridgelines and sheltered slopes only had a low cover of predominantly low-threat exotic herbs and grasses such as Annual Veldt-grass, Silky Plantain, Rye-grass, Square Cicendia and Wild Oat.

EVC	Description
Box Ironbark Forest (EVC 61)	Occurs throughout both sections of the study area scattered throughout the plains and low rises, with large areas occurring along Bolangum Inn Road and Supple Road, east of Simpson Road, and north-west of Frenchmans – St Arnaud Road. Remnants of this EVC were often treeless or with a very sparse canopy on private land, but had a dense, healthy canopy of Red Ironbark, Grey Box, Yellow Gum, Yellow Box and occasionally Red Stringybark supporting large numbers of large trees (>70cm DBH) along roadsides and property boundaries. Understory vegetation was highly variable, being composed predominantly of Spear and Wallaby Grasses with sparse herbs in small degraded patches on private land, but supporting a diverse assemblage of graminoids and shrubs on roadsides and in large patches of remnant forest. Typical understory species include Gorse Bitter-pea, Golden Wattle, Spreading Wattle, Peach Heath, Chocolate Lily, Dwarf Mat-rush, Dwarf Beauty-heads and Rough Spear-grass. Bryophytes, lichens and soil crusts often had a high cover (15-25%), as well as a low amount of predominantly native litter. Logs were abundant throughout remnants of the EVC with retained canopy trees, but largely absent in areas of derived understory vegetation. Weed cover was variable, often comprising a very high cover (<50%) of high-threat weeds such as White Clover, Onion Grass, Ribwort and Flatweed on private land, while public land and larger areas of forest often had low covers of predominantly low-threat weeds such as Silky Plantain, Rye, Annual Veldt-grass and Hair Grass.
Alluvial Terraces Herb-rich Woodland (EVC 67)	Occurs in a single patch in the south-east of the study area, west of Barkly Gap Road. This patch lacked a canopy, with the tallest strata comprising sparse River Red-gum and Grey Box recruits from nearby vegetation. Blackwood, Hedge Wattle and Gorse Bitter-pea also contributed to this open shrub layer. Understory vegetation was dominated by a mosaic of herbs with a prominent cover of graminoids such as Kangaroo Grass, Chocolate Lily, Supple Spear-grass, Rough Spear-grass, Wattle Mat-rush and Bristly Wallaby-grass. Herb species were particularly diverse, including Dwarf Beauty-heads, Common Woodruff, Common Raspwort, Creamy Candles, New Holland Daisy and several species of Sundew. Bryophytes, lichens and soil crusts occupied the majority of the remaining groundcover, with a low cover of predominantly native litter. Weed cover was low and predominantly composed of the low-threat weeds Soft Brome, Silky Plantain and Squirrel-tail Fescue.
Creekline Grassy Woodland (EVC 68)	Occurs in two small patches along the northern boundary of the western section of the study area on a tributary to Faulkner Creek, in the centre-west of the study area along a tributary to Avon Creek, and in the south-east of the study area along a tributary to Wattle Creek. Remnants of this EVC had an open canopy of River Red-gum with the occasional inclusion of Grey Box. Large trees were common and generally in moderate health. Native understory vegetation was dominated by shrubs and graminoids such as Lightwood, Hedge Wattle, Wirilda, Spreading Wattle, Common Rice-flower, Rush, Wattle Mat-rush, Vanilla Lily and a diversity of Wallaby and Spear grasses. Herbs such as Sheep's Burr, Spreading Crassula and Sieber Crassula were present at low cover. Bryophytes, lichens and soil crusts as well as native leaf litter and logs were abundant in the ground layer. Weed cover was often low-moderate and primarily composed of low-threat weeds such as Wild Oat, Squirrel-tail Fescue, Rye-grass and Vetch.

EVC	Description
Hillcrest Herb-rich Woodland (EVC 70)	Occurs in the western section of the study area along the crest and branching arms of the main ridgeline which runs roughly parallel to Bolangum Inn Road. Remnants of this EVC often had a sparse (<1-15%) canopy composed predominantly of Grey Box and Yellow Box, but occasionally including Red Box, Red Stringybark and Bundy. Although remnant trees were typically sparse, many of these trees were large (>70cm DBH), with limited recruitment of canopy species. Native understory vegetation was largely composed of graminoid species such as Wattle Mat-rush, Common Wheat-grass, Blue Stars, Windmill Grass, Weeping Grass, Supple Spear-grass and a diversity of Wallaby Grasses. Herb cover was sparse in patches degraded by grazing, but constituted a dominant component of understory cover in many sheltered and non-grazed patches, including Small St John's Wort, Creamy Candles, Scaly Buttons, New Holland Daisy, Smooth Solenogyne, Slender Dock and a diversity of orchid species. Bryophytes, lichens and soil crusts were variable in the ground layer (5-25%), as well as a low amount of predominantly native litter. Logs were abundant throughout remnants of the EVC, likely due to the death of a large number of canopy trees. Weed cover was often high (>25%) and largely high-threat, comprising Cocksfoot, Onion Weed, White Clover, St John's Wort and Cape Weed as dominant components.
Swampy Riparian Woodland (EVC 83)	Occurs in the south-east of the study area at the junction of T Driscolls Road and Barkly-Navarre Road in a semi-inundated area associated with Wattle Creek. Remnants of this EVC had a well-developed canopy of River Red-gum containing several large trees in moderate health. Native understory vegetation was heavily degraded by grazing and weed invasion, and comprised scattered occurrences of Hedge Wattle, Lightwood, Blackwood and Narrow-leaf Wattle as well as Rush and Water Ribbons in inundated areas. Weeds dominated the understory, and were primarily composed of high threat species such as Cocksfoot, Broom, Yorkshire Fog and Toowoomba Canary-grass.
Plains Grassy Wetland (EVC 125)	Occurs in the west of the study area in treeless inundated areas associated with a small farm dam. Native vegetation was dominated by Common Spike-sedge and included a mosaic of Common Swamp Wallaby-grass, Rush, Knob Sedge, Variable Willow-herb and Sundew. Vegetation overall was sparse, with more than half of the groundcover occupied by standing water with little organic litter. Weed cover was very low (5%), and solely comprised Squirrel-tail Fescue and Flatweed.
Low Rises Grassy Woodland (EVC 175_61)	Occurs throughout the study area on undulating plains and on the low rises associated with the central ridgelines and surrounding hills which run through both the eastern and western sections of the study area. Remnants of this EVC often had a sparse or absent canopy comprising Yellow Gum, River Red-gum, Yellow Box and Grey Box, and often supported several large trees. Recruitment of canopy species was common. Native understory vegetation was dominated by graminoid species such as Kangaroo Grass, Common Wheat-grass, Weeping Grass, Wattle Mat-rush, Chocolate Lily, Rough Spear-grass and a diversity of Wallaby Grasses. Shrubs were also a common component, including Hedge Wattle, Gorse Bitter-pea, Tree Violet, Sticky Hop-bush and Sweet Bursaria. Herbs were often sparse but diverse, including Annual Buttercup, Rough Bedstraw, Early Nancy, Stinking Pennywort and Variable Raspwort.

EVC	Description
	Bryophytes, lichens and soil crusts often had a high cover (15-25%), as well as a low amount of predominantly native litter. Logs were abundant throughout remnants of the EVC with retained canopy trees, but largely absent in areas of derived grassland. Weed cover was often moderate-high, but largely comprised low-threat species such as annual pasture grasses and weeds such as Capeweed, Square Cicendia and Chickweed.
Plains Woodland (803)	Occurs in the south-west of the western section of the study area in the gently undulating plains south of Bolangum Inn Road and Callawadda – Navarre Road, primarily in roadside reserves. Remnants of this EVC typically had a well-developed canopy of Grey Box, River Red-gum and Yellow Box and supported a large number of large trees with adequate recruitment. Native understory vegetation was diverse, comprising a mixture of shrubs, graminoids and herbs, with Lilies, Acacias and ericoid-leaf shrubs particularly abundant. Dominant species included Golden Wattle, Gold-dust Wattle, Peach Heath, Chocolate Lily, Bulbine Lily, Rough Spear-grass, Austral Stork's-bill, Trailing Speedwell and Soft Crane's-bill. Bryophytes, lichens and soil crusts were typically low in cover, with a large amount of native litter dominating non-vegetated areas. Logs were present at low-moderate levels throughout these habitat zones. Weed cover was variable, but largely composed of low-threat pasture grasses such as Annual Veldt-grass, Squirrel-tail Fescue and Rye Grass.

The habitat hectare assessment results for these habitat zones are provided in Table 5. More detailed habitat scoring results are presented in Appendix 2. Details of large trees in patches are provided in Appendix 3. Note that this does not include the transmission line which has not yet had detailed field surveys.

Table 5: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
1A	Box Ironbark Forest (EVC 61)	0.410	28	6		
1B	Plains Woodland (EVC 803)	2.251	46	32		
1C	Hillcrest Herb-rich Woodland (EVC 70)	0.130	36	1		
1D	Box Ironbark Forest (EVC 61)	0.199	32	5		
1E	Box Ironbark Forest (EVC 61)	0.094	31	4		
1F	Box Ironbark Forest (EVC 61)	0.024	27	0		
1G	Box Ironbark Forest (EVC 61)	0.032	32	0		
1H	Box Ironbark Forest (EVC 61)	0.028	41	0		
1I	Swampy Riparian Woodland (EVC 83)	1.233	34	13		
1J	Swampy Riparian Woodland (EVC 83)	1.093	39	12		
1K	Swampy Riparian Woodland (EVC 83)	0.196	37	3		
1L	Creekline Grassy Woodland (EVC 68)	0.128	24	1		
1M	Creekline Grassy Woodland (EVC 68)	0.249	25	2		
1N	Creekline Grassy Woodland (EVC 68)	0.188	37	4		
1O	Creekline Grassy Woodland (EVC 68)	0.029	22	0		
1P	Creekline Grassy Woodland (EVC 68)	0.158	36	1		
1Q	Creekline Grassy Woodland (EVC 68)	0.242	32	3		
1R	Low Rises Grassy Woodland (EVC 175_61)	0.178	40	5		
1S	Creekline Grassy Woodland (EVC 68)	0.243	11	0		
1T	Creekline Grassy Woodland (EVC 68)	0.027	11	0		
1U	Creekline Grassy Woodland (EVC 68)	0.097	17	0		
1V	Low Rises Grassy Woodland (EVC 175_61)	0.279	44	15		
2A	Plains Woodland (EVC 803)	0.126	56	0		
2B	Plains Grassy Wetland (EVC 125)	0.002	33	NA		

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
2C	Box Ironbark Forest (EVC 61)	0.077	23	0		
2D	Plains Woodland (EVC 803)	1.644	62	20	GBW	
2E	Box Ironbark Forest (EVC 61)	4.250	54	68		
2F	Box Ironbark Forest (EVC 61)	3.560	54	0		
3A	Low Rises Grassy Woodland (EVC 175_61)	1.144	67	19	GBW	
3AA	Low Rises Grassy Woodland (EVC 175_61)	0.848	60	3	GBW	
3AB	Low Rises Grassy Woodland (EVC 175_61)	3.782	54	3		
3AC	Low Rises Grassy Woodland (EVC 175_61)	0.464	68	3		
3AD	Low Rises Grassy Woodland (EVC 175_61)	0.068	37	1		
3AE	Low Rises Grassy Woodland (EVC 175_61)	0.771	53	2		
3AF	Low Rises Grassy Woodland (EVC 175_61)	0.632	33	0		
3AG	Hillcrest Herb-rich Woodland (EVC 70)	1.100	60	1	GBW	
3B	Box Ironbark Forest (EVC 61)	8.651	47	5		
3C	Plains Woodland (EVC 803)	0.062	15	0		
3D	Hillcrest Herb-rich Woodland (EVC 70)	0.695	35	0		
3E	Low Rises Grassy Woodland (EVC 175_61)	0.146	69	0	GBW	GBGW
3G	Grassy Dry Forest (EVC 22)	0.683	48	1		
3H	Grassy Dry Forest (EVC 22)	11.199	58	4	GBW	GBGW
3I	Box Ironbark Forest (EVC 61)	1.133	15	0		
3J	Box Ironbark Forest (EVC 61)	1.271	42	0		
3K	Low Rises Grassy Woodland (EVC 175_61)	0.452	44	1		
3L	Grassy Dry Forest (EVC 22)	0.104	21	0		
3M	Grassy Dry Forest (EVC 22)	5.559	69	29		
3N	Grassy Dry Forest (EVC 22)	0.204	39	2		
3O	Grassy Dry Forest (EVC 22)	0.104	41	1		
3P	Grassy Dry Forest (EVC 22)	0.653	64	12		
3Q	Grassy Dry Forest (EVC 22)	0.504	44	6		
3R	Grassy Dry Forest (EVC 22)	0.077	20	0		
3S	Grassy Dry Forest (EVC 22)	0.030	20	0		
3T	Grassy Dry Forest (EVC 22)	6.419	59	3		
3U	Grassy Dry Forest (EVC 22)	1.364	66	2		
3V	Grassy Dry Forest (EVC 22)	1.844	51	3		
3W	Grassy Dry Forest (EVC 22)	2.117	59	4	GBW	
3X	Grassy Dry Forest (EVC 22)	4.614	53	7		
3Y	Grassy Dry Forest (EVC 22)	2.541	45	0		
3Z	Grassy Dry Forest (EVC 22)	0.286	19	0		
4A	Grassy Dry Forest (EVC 22)	6.665	25	0	GBW	
4B	Grassy Dry Forest (EVC 22)	10.975	45	10		
4C	Grassy Dry Forest (EVC 22)	0.095	31	5		
4D	Grassy Dry Forest (EVC 22)	3.321	40	2		
4F	Grassy Dry Forest (EVC 22)	0.062	40	1		
4G	Grassy Dry Forest (EVC 22)	0.610	31	2		
4H	Grassy Dry Forest (EVC 22)	1.381	32	0		
4I	Box Ironbark Forest (EVC 61)	0.210	11	0		
4J	Box Ironbark Forest (EVC 61)	0.205	50	0		
4K	Box Ironbark Forest (EVC 61)	5.205	32	0		
4L	Low Rises Grassy Woodland (EVC 175_61)	0.112	13	0		
AA	Hillcrest Herb-rich Woodland (EVC 70)	11.206	43	8		
AB	Hillcrest Herb-rich Woodland (EVC 70)	0.775	41	15		
AC	Hillcrest Herb-rich Woodland (EVC 70)	0.041	30	3		
AD	Hillcrest Herb-rich Woodland (EVC 70)	1.457	28	1		
AE	Hillcrest Herb-rich Woodland (EVC 70)	5.161	24	2		
AF	Hillcrest Herb-rich Woodland (EVC 70)	2.474	41	2		
AG	Hillcrest Herb-rich Woodland (EVC 70)	6.816	45	2		
AH	Hillcrest Herb-rich Woodland (EVC 70)	5.027	63	3	GBW	
AI	Hillcrest Herb-rich Woodland (EVC 70)	7.136	68	11		

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
AJ	Hillcrest Herb-rich Woodland (EVC 70)	1.358	31	2		
AK	Hillcrest Herb-rich Woodland (EVC 70)	2.449	50	0	GBW	
AL	Hillcrest Herb-rich Woodland (EVC 70)	0.054	33	2		
AM	Hillcrest Herb-rich Woodland (EVC 70)	0.378	42	1		
AN	Hillcrest Herb-rich Woodland (EVC 70)	0.117	26	1		
AO	Hillcrest Herb-rich Woodland (EVC 70)	0.132	32	2		
AP	Hillcrest Herb-rich Woodland (EVC 70)	1.256	23	0		
AQ	Hillcrest Herb-rich Woodland (EVC 70)	0.227	42	4		
AR	Hillcrest Herb-rich Woodland (EVC 70)	0.060	17	0		
AS	Hillcrest Herb-rich Woodland (EVC 70)	0.079	37	3		
AT	Grassy Dry Forest (EVC 22)	0.117	22	0		
AU	Hillcrest Herb-rich Woodland (EVC 70)	0.649	38	10	GBW	
AW	Hillcrest Herb-rich Woodland (EVC 70)	0.784	50	15		
AX	Hillcrest Herb-rich Woodland (EVC 70)	3.980	55	11	YBW	
AY	Hillcrest Herb-rich Woodland (EVC 70)	0.127	22	0		
AZ	Hillcrest Herb-rich Woodland (EVC 70)	3.515	59	14	YBW	
BA	Low Rises Grassy Woodland (EVC 175_61)	4.085	57	2	YBW	
BB	Low Rises Grassy Woodland (EVC 175_61)	2.903	52	1	GBW	
BC	Hillcrest Herb-rich Woodland (EVC 70)	1.288	63	0	GBW	
BD	Hillcrest Herb-rich Woodland (EVC 70)	9.981	60	1	GBW	
BE	Hillcrest Herb-rich Woodland (EVC 70)	0.652	64	1	GBW	
BF	Hillcrest Herb-rich Woodland (EVC 70)	2.157	49	0		
BG	Hillcrest Herb-rich Woodland (EVC 70)	1.507	30	0		
BH	Low Rises Grassy Woodland (EVC 175_61)	1.787	33	0		
BI	Hillcrest Herb-rich Woodland (EVC 70)	5.972	63	0	GBW	
BJ	Box Ironbark Forest (EVC 61)	0.442	18	0		
BK	Box Ironbark Forest (EVC 61)	0.424	18	0		
BL	Box Ironbark Forest (EVC 61)	0.296	23	0		
BM	Box Ironbark Forest (EVC 61)	7.535	32	10		
BN	Box Ironbark Forest (EVC 61)	1.804	27	0		
BO	Low Rises Grassy Woodland (EVC 175_61)	0.630	45	4		
BP	Low Rises Grassy Woodland (EVC 175_61)	0.313	34	4		
BQ	Low Rises Grassy Woodland (EVC 175_61)	0.030	18	0		
BR	Low Rises Grassy Woodland (EVC 175_61)	0.316	29	1		
BS	Low Rises Grassy Woodland (EVC 175_61)	3.574	37	0		
BT	Low Rises Grassy Woodland (EVC 175_61)	2.791	65	9		
BU	Low Rises Grassy Woodland (EVC 175_61)	0.932	40	3		
BV	Low Rises Grassy Woodland (EVC 175_61)	2.151	41	0		
BW	Low Rises Grassy Woodland (EVC 175_61)	1.849	72	10		
BX	Low Rises Grassy Woodland (EVC 175_61)	0.839	72	4		
BY	Box Ironbark Forest (EVC 61)	2.032	31	1		
BZ	Box Ironbark Forest (EVC 61)	0.265	32	1		
CA	Low Rises Grassy Woodland (EVC 175_61)	0.990	27	0		
CB	Low Rises Grassy Woodland (EVC 175_61)	0.380	43	1	GBW	
CC	Heathy Dry Forest (EVC 20)	0.426	32	0		
CD	Heathy Dry Forest (EVC 20)	0.364	30	2		
CE	Low Rises Grassy Woodland (EVC 175_61)	0.300	46	0		
CF	Box Ironbark Forest (EVC 61)	0.139	31	5		
CG	Low Rises Grassy Woodland (EVC 175_61)	0.361	50	0		
CH	Low Rises Grassy Woodland (EVC 175_61)	2.337	42	1	YBW	
CI	Box Ironbark Forest (EVC 61)	0.231	31	6		
CJ	Box Ironbark Forest (EVC 61)	0.410	20	0		
CK	Box Ironbark Forest (EVC 61)	0.073	20	0		
CL	Box Ironbark Forest (EVC 61)	0.335	27	1		
CM	Box Ironbark Forest (EVC 61)	0.417	59	0		
CN	Box Ironbark Forest (EVC 61)	2.206	47	1	GBW	

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
CO	Heathy Dry Forest (EVC 20)	6.716	67	4		
CP	Heathy Dry Forest (EVC 20)	0.946	37	0		
CQ	Heathy Dry Forest (EVC 20)	5.080	25	0		
CR	Heathy Dry Forest (EVC 20)	1.012	25	2		
CS	Heathy Dry Forest (EVC 20)	0.117	14	0		
CT	Heathy Dry Forest (EVC 20)	0.078	14	0		
CU	Heathy Dry Forest (EVC 20)	0.116	14	0		
CV	Heathy Dry Forest (EVC 20)	0.381	20	0		
CW	Heathy Dry Forest (EVC 20)	0.103	19	0		
CX	Low Rises Grassy Woodland (EVC 175_61)	0.203	0	0		
DA	Low Rises Grassy Woodland (EVC 175_61)	1.613	50	14		
DB	Box Ironbark Forest (EVC 61)	1.789	66	29	GBW	
DC	Low Rises Grassy Woodland (EVC 175_61)	0.669	66	17	GBW	
DD	Creekline Grassy Woodland (EVC 68)	0.588	65	12		
DE	Low Rises Grassy Woodland (EVC 175_61)	1.200	62	11	GBW	
DF	Box Ironbark Forest (EVC 61)	3.188	54	19		
DG	Box Ironbark Forest (EVC 61)	1.851	32	1		
DH	Low Rises Grassy Woodland (EVC 175_61)	0.742	29	0		
DI	Low Rises Grassy Woodland (EVC 175_61)	0.172	27	0		
DJ	Low Rises Grassy Woodland (EVC 175_61)	0.592	23	0		
DK	Low Rises Grassy Woodland (EVC 175_61)	4.478	55	11		
DL	Low Rises Grassy Woodland (EVC 175_61)	0.920	31	0		
DM	Low Rises Grassy Woodland (EVC 175_61)	0.463	45	0		
DN	Low Rises Grassy Woodland (EVC 175_61)	3.652	53	14		
DO	Low Rises Grassy Woodland (EVC 175_61)	0.233	33	3		
DP	Low Rises Grassy Woodland (EVC 175_61)	1.105	46	9		
DR	Hillcrest Herb-rich Woodland (EVC 70)	4.800	48	10		
DS	Hillcrest Herb-rich Woodland (EVC 70)	0.115	43	1		
DT	Hillcrest Herb-rich Woodland (EVC 70)	0.805	58	12		
DU	Low Rises Grassy Woodland (EVC 175_61)	0.078	32	3		
DV	Hillcrest Herb-rich Woodland (EVC 70)	6.941	46	1	GBW	
DW	Plains Woodland (EVC 803)	0.148	31	1		
DX	Plains Woodland (EVC 803)	0.170	48	2		
DY	Hillcrest Herb-rich Woodland (EVC 70)	1.417	51	7		
DZ	Plains Woodland (EVC 803)	0.243	48	1		GBGW
EA	Plains Woodland (EVC 803)	1.144	39	4		
EB	Creekline Grassy Woodland (EVC 68)	0.304	38	2		
EC	Hillcrest Herb-rich Woodland (EVC 70)	3.106	47	0	YBW	
ED	Hillcrest Herb-rich Woodland (EVC 70)	3.827	44	0	YBW	
EE	Low Rises Grassy Woodland (EVC 175_61)	3.558	63	3	GBW	
EF	Box Ironbark Forest (EVC 61)	29.912	42	2		
EG	Hillcrest Herb-rich Woodland (EVC 70)	2.783	51	4		
EH	Plains Woodland (EVC 803)	0.252	61	3		
EI	Low Rises Grassy Woodland (EVC 175_61)	2.147	61	10	YBW	
EJ	Low Rises Grassy Woodland (EVC 175_61)	1.925	35	0		
EK	Hillcrest Herb-rich Woodland (EVC 70)	0.114	36	5		
EL	Hillcrest Herb-rich Woodland (EVC 70)	0.028	24	0		
EM	Hillcrest Herb-rich Woodland (EVC 70)	0.998	42	5		
EN	Hillcrest Herb-rich Woodland (EVC 70)	5.169	22	0		
EO	Hillcrest Herb-rich Woodland (EVC 70)	0.206	33	0		
EP	Hillcrest Herb-rich Woodland (EVC 70)	0.888	36	2		
EQ	Hillcrest Herb-rich Woodland (EVC 70)	1.892	33	0		
ER	Grassy Dry Forest (EVC 22)	3.436	34	3		
ES	Grassy Dry Forest (EVC 22)	3.615	33	11		
ET	Grassy Dry Forest (EVC 22)	0.028	21	0		
EU	Grassy Dry Forest (EVC 22)	0.362	18	0		

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
EV	Grassy Dry Forest (EVC 22)	12.363	61	3		
EW	Grassy Dry Forest (EVC 22)	17.352	54	2	GBW	
EX	Box Ironbark Forest (EVC 61)	24.737	66	38	GBW	
EY	Grassy Dry Forest (EVC 22)	5.359	50	6		
EZ	Grassy Dry Forest (EVC 22)	20.079	55	30		
FA	Low Rises Grassy Woodland (EVC 175_61)	0.133	33	3		
FB	Low Rises Grassy Woodland (EVC 175_61)	1.253	24	0		
FC	Box Ironbark Forest (EVC 61)	3.613	48	8		
FD	Low Rises Grassy Woodland (EVC 175_61)	0.051	20	0		
FE	Grassy Dry Forest (EVC 22)	3.118	29	3		
FF	Creekline Grassy Woodland (EVC 68)	3.043	56	1		
FG	Creekline Grassy Woodland (EVC 68)	1.379	46	0		
FH	Grassy Dry Forest (EVC 22)	4.077	0	0		
FI	Low Rises Grassy Woodland (EVC 175_61)	7.098	52	11		
FJ	Box Ironbark Forest (EVC 61)	0.417	50	3		
FK	Heathy Dry Forest (EVC 20)	1.582	54	2		
FL	Creekline Grassy Woodland (EVC 68)	0.095	20	0		
FM	Creekline Grassy Woodland (EVC 68)	0.090	20	0		
FN	Low Rises Grassy Woodland (EVC 175_61)	7.848	54	2	GBW	
FO	Grassy Dry Forest (EVC 22)	3.509	54	6		
FP	Alluvial Terraces Herb-rich Woodland (EVC 67)	5.345	56	0	GBW	
FQ	Low Rises Grassy Woodland (EVC 175_61)	1.732	56	2		
GA	Hillcrest Herb-rich Woodland (EVC 70)	1.110	42	0		
GB	Hillcrest Herb-rich Woodland (EVC 70)	10.877	54	22		
GC	Box Ironbark Forest (EVC 61)	7.359	44	8		
GD	Hillcrest Herb-rich Woodland (EVC 70)	9.114	52	5	YBW	GBGW
GE	Box Ironbark Forest (EVC 61)	2.970	44	15		
GF	Box Ironbark Forest (EVC 61)	0.161	12	0		
GG	Box Ironbark Forest (EVC 61)	0.631	12	0		
GH	Box Ironbark Forest (EVC 61)	1.728	14	0		
GI	Box Ironbark Forest (EVC 61)	0.885	13	0		
GJ	Box Ironbark Forest (EVC 61)	0.471	12	0		
GK	Box Ironbark Forest (EVC 61)	0.327	12	0		
GL	Box Ironbark Forest (EVC 61)	0.013	12	0		
GM	Box Ironbark Forest (EVC 61)	2.039	26	0		
GN	Box Ironbark Forest (EVC 61)	0.428	13	0		
GO	Box Ironbark Forest (EVC 61)	0.096	12	0		
GP	Box Ironbark Forest (EVC 61)	0.063	12	0		
GQ	Box Ironbark Forest (EVC 61)	0.244	16	0		
GR	Low Rises Grassy Woodland (EVC 175_61)	0.089	35	0		
GS	Box Ironbark Forest (EVC 61)	1.683	39	11		
GT	Box Ironbark Forest (EVC 61)	0.163	43	7		
GU	Box Ironbark Forest (EVC 61)	0.666	48	4		
GV	Box Ironbark Forest (EVC 61)	1.501	19	0		
GW	Box Ironbark Forest (EVC 61)	0.339	23	0		
GX	Box Ironbark Forest (EVC 61)	0.695	29	0		
GY	Box Ironbark Forest (EVC 61)	0.124	12	0		
GZ	Box Ironbark Forest (EVC 61)	0.839	31	3		
HA	Box Ironbark Forest (EVC 61)	0.335	14	0		
HB	Box Ironbark Forest (EVC 61)	9.945	47	15		
HC	Box Ironbark Forest (EVC 61)	10.736	49	0		
HD	Hillcrest Herb-rich Woodland (EVC 70)	0.971	24	0		
HE	Hillcrest Herb-rich Woodland (EVC 70)	5.832	49	3		
HF	Box Ironbark Forest (EVC 61)	0.890	56	3		
HG	Box Ironbark Forest (EVC 61)	0.684	56	6		
HH	Low Rises Grassy Woodland (EVC 175_61)	8.790	47	4		

Habitat Zone	EVC	Area (ha)	Condition Score	# Large Trees	EPBC	FFG
HI	Low Rises Grassy Woodland (EVC 175_61)	0.435	66	10	GBW	
HJ	Low Rises Grassy Woodland (EVC 175_61)	0.123	66	2	GBW	
HK	Low Rises Grassy Woodland (EVC 175_61)	0.007	15	0		
HL	Low Rises Grassy Woodland (EVC 175_61)	0.258	12	0		
HM	Low Rises Grassy Woodland (EVC 175_61)	0.104	11	0		
HN	Low Rises Grassy Woodland (EVC 175_61)	0.695	12	0		
HO	Low Rises Grassy Woodland (EVC 175_61)	7.507	23	0		
HP	Low Rises Grassy Woodland (EVC 175_61)	0.574	27	6		
HQ	Box Ironbark Forest (EVC 61)	0.056	23	3		
HR	Low Rises Grassy Woodland (EVC 175_61)	1.321	61	18	GBW	
HS	Low Rises Grassy Woodland (EVC 175_61)	0.319	53	4	GBW	
HT	Low Rises Grassy Woodland (EVC 175_61)	0.220	11	0		
HU	Low Rises Grassy Woodland (EVC 175_61)	23.279	45	8		
HV	Low Rises Grassy Woodland (EVC 175_61)	0.224	14	0		
HW	Low Rises Grassy Woodland (EVC 175_61)	3.343	21	0		
JA	Low Rises Grassy Woodland (EVC 175_61)	3.013	60	19	GBW	
JB	Hillcrest Herb-rich Woodland (EVC 70)	4.206	52	0	GBW	GBGW
JC	Plains Woodland (EVC 803)	0.296	44	6	GBW	GBGW
JD	Plains Woodland (EVC 803)	0.150	44	5	GBW	GBGW
JE	Low Rises Grassy Woodland (EVC 175_61)	0.184	32	7		
JF	Plains Woodland (EVC 803)	1.460	22	0	GBW	
JG	Low Rises Grassy Woodland (EVC 175_61)	0.871	64	6	GBW	
JH	Low Rises Grassy Woodland (EVC 175_61)	7.902	47	0	GBW	
JI	Plains Grassy Wetland (EVC 125)	0.157	56	0		
JJ	Low Rises Grassy Woodland (EVC 175_61)	0.391	35	8		
UV	Hillcrest Herb-rich Woodland (EVC 70)	0.064	37	3		
ZA	Hillcrest Herb-rich Woodland (EVC 70)	4.473	59	18		
ZB	Hillcrest Herb-rich Woodland (EVC 70)	32.964	71	5	GBW	GBGW
ZC	Low Rises Grassy Woodland (EVC 175_61)	0.719	48	5	GBW	
ZD	Low Rises Grassy Woodland (EVC 175_61)	7.144	67	126		
Total		**654.376**		**1231**		

Note: Rows shaded in grey indicate the habitat zone is representative of the EPBC Act Endangered community *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (GBW); Rows shaded in yellow indicate the habitat zone is representative of the EPBC Act Critically Endangered community *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (YBW); Rows shaded in green indicate the habitat zone is representative of the FFG Act listed community Grey Box – Buloke Grassy Woodland (GBGW)

5.4.2. Scattered trees

Scattered trees recorded in the study area would have predominantly comprised the canopy components of Heathy Dry Forest (EVC 20), Grassy Dry Forest (EVC 22), Box Ironbark Forest (EVC 61), Creekline Grassy Woodland (EVC 68), Hillcrest Herb-rich Woodland (EVC 70), Low Rises Grassy Woodland (EVC 175_61) and Plains Woodland (EVC 803).

423 scattered trees occurred in the study area (Figure 2), including 269 large scattered trees and 154 small scattered trees. Details of all scattered trees recorded are listed in Appendix 3.

In addition, 1,242 large trees were mapped within patches of native vegetation (see Table 5).

Figure 2-1: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

Wind farm boundary
Construction footprint (May 2023)
Turbines

Threatened species

Allocasuarina - Buloke

Native vegetation

Large tree in patch
Large scattered tree
Small scattered tree
Tree to be removed
Grassy Dry Forest (EVC 22)
Box Ironbark Forest (EVC 61)
Creekline Grassy Woodland (EVC 68)
Hillcrest Herb-rich Woodland (EVC 70)
Low Rises Grassy Woodland (EVC 175_61)
Plains Woodland (EVC 803)
Native vegetation to be removed

FFG Act listed community

Grey Box-Buloke Grassy Woodland

Potential listed flora

Listed Grey Box community

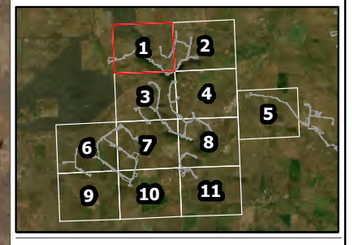

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Figure 2-2: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Thelymitra - Sun Orchid

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree to be removed
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Hillcrest Herb-rich Woodland (EVC 70)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Grey Box community

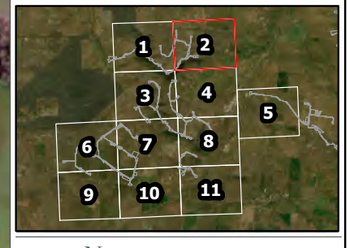

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Figure 2-3: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed

Threatened species

- Allocasuarina - Buloke

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree to be removed
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Hillcrest Herb-rich Woodland (EVC 70)
- Plains Grassy Wetland (EVC 125)
- Low Rises Grassy Woodland (EVC 175_61)
- Plains Woodland (EVC 803)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Yellow Box community
- Listed Grey Box community

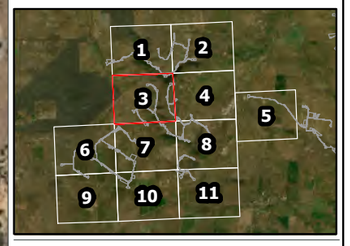

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Figure 2-4: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Thelymitra - Sun Orchid

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree to be removed
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Hillcrest Herb-rich Woodland (EVC 70)
- Low Rises Grassy Woodland (EVC 175_61)
- Plains Woodland (EVC 803)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Yellow Box community
- Listed Grey Box community

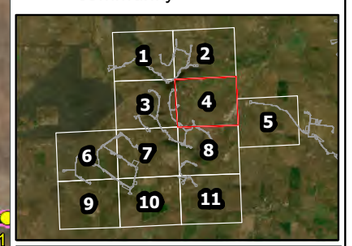

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Figure 2-5: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Area not surveyed
- DELWP wetland

Threatened species

- Allocasuarina - Buloke

Native vegetation

- Large tree in patch
- Large scattered tree
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

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Figure 2-6: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

Wind farm boundary
Construction footprint (May 2023)
Turbines
Area not surveyed

Threatened species

Allocasuarina - Buloke
Ptilotus erupubescens - Hairy Tails

Native vegetation

Large tree in patch
Large scattered tree
Small scattered tree
Tree to be removed
Box Ironbark Forest (EVC 61)
Plains Grassy Wetland (EVC 125)
Low Rises Grassy Woodland (EVC 175_61)
Native vegetation to be removed

FFG Act listed community

Grey Box-Buloke Grassy Woodland

Potential listed flora

Listed Grey Box community

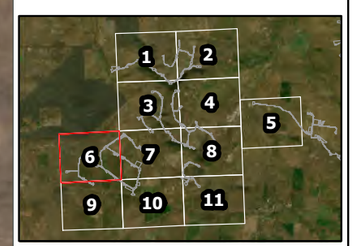

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Figure 2-7: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Thelymitra - Sun Orchid

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree to be removed
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Hillcrest Herb-rich Woodland (EVC 70)
- Plains Grassy Wetland (EVC 125)
- Low Rises Grassy Woodland (EVC 175_61)
- Plains Woodland (EVC 803)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Yellow Box community
- Listed Grey Box community

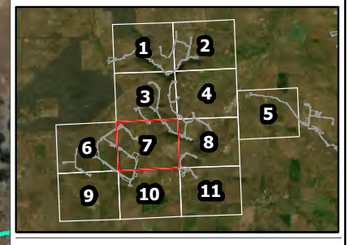

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Figure 2-8: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Thelymitra - Sun Orchid

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree to be removed
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Hillcrest Herb-rich Woodland (EVC 70)
- Low Rises Grassy Woodland (EVC 175_61)
- Plains Woodland (EVC 803)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Yellow Box community
- Listed Grey Box community

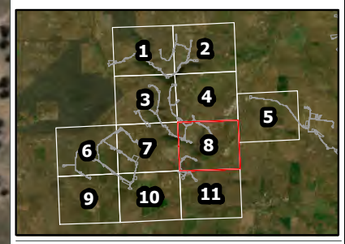

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Figure 2-9: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines

Threatened species

- Allocasuarina - Buloke

Native vegetation

- Large tree in patch
- Large scattered tree
- Tree to be removed
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Grey Box community

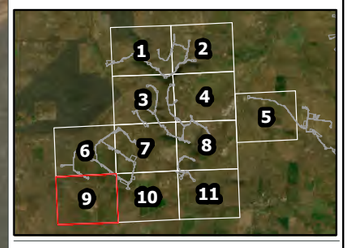

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Figure 2-10: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland

Native vegetation

- Large tree in patch
- Large scattered tree
- Tree to be removed
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Plains Woodland (EVC 803)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland

Potential listed flora

- Listed Yellow Box community
- Listed Grey Box community

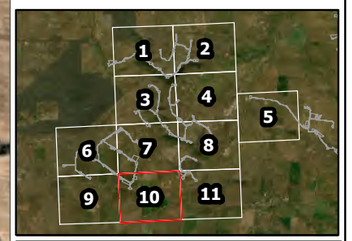

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Figure 2-11: Native vegetation to be impacted - Western

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

Wind farm boundary
Construction footprint (May 2023)
Turbines
DELWP wetland

Threatened species

Allocasuarina - Buloke
Thelymitra - Sun Orchid

Native vegetation

Large tree in patch
Large scattered tree
Small scattered tree
Tree to be removed
Hillcrest Herb-rich Woodland (EVC 70)
Low Rises Grassy Woodland (EVC 175_61)
Plains Woodland (EVC 803)
Native vegetation to be removed

FFG Act listed community

Grey Box-Buloke Grassy Woodland

Potential listed flora

Listed Yellow Box community
Listed Grey Box community

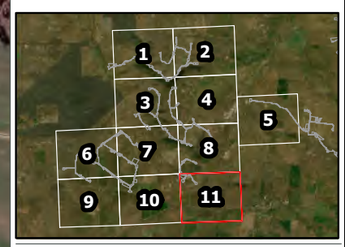

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Figure 2-1: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Box Ironbark Forest (EVC 61)
- Native vegetation to be removed

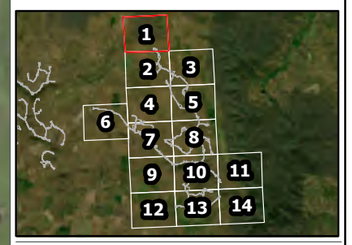

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Figure 2-2: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- DELWP wetland
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

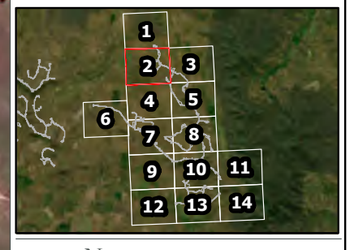

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Figure 2-3: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Heathy Dry Forest (EVC 20)
- Box Ironbark Forest (EVC 61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

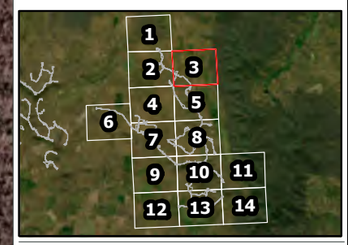

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Figure 2-4: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

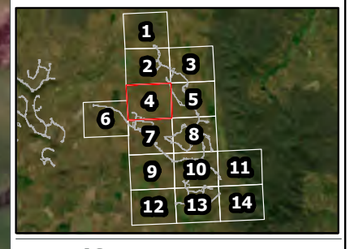

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Figure 2-5: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

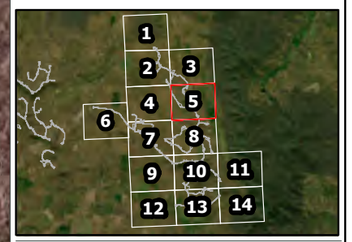

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Figure 2-6: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

Wind farm boundary
Construction footprint (May 2023)
Turbines
Area not surveyed
DELWP wetland

Threatened species

Allocasuarina - Buloke
Tree to be removed

Native vegetation

Large tree in patch
Large scattered tree
Box Ironbark Forest (EVC 61)
Low Rises Grassy Woodland (EVC 175_61)
Native vegetation to be removed

Potential listed flora

Listed Grey Box community

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Figure 2-7: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed
- DELWP wetland

Threatened species

- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

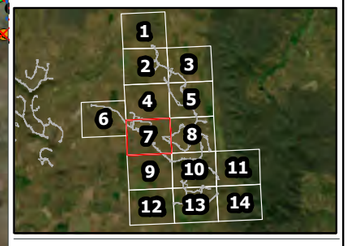
- Large tree in patch
- Large scattered tree
- Small scattered tree
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

FFG Act listed community

- Grey Box-Buloke Grassy Woodland Community

Potential listed flora

- Listed Grey Box community
- Listed Yellow Box community



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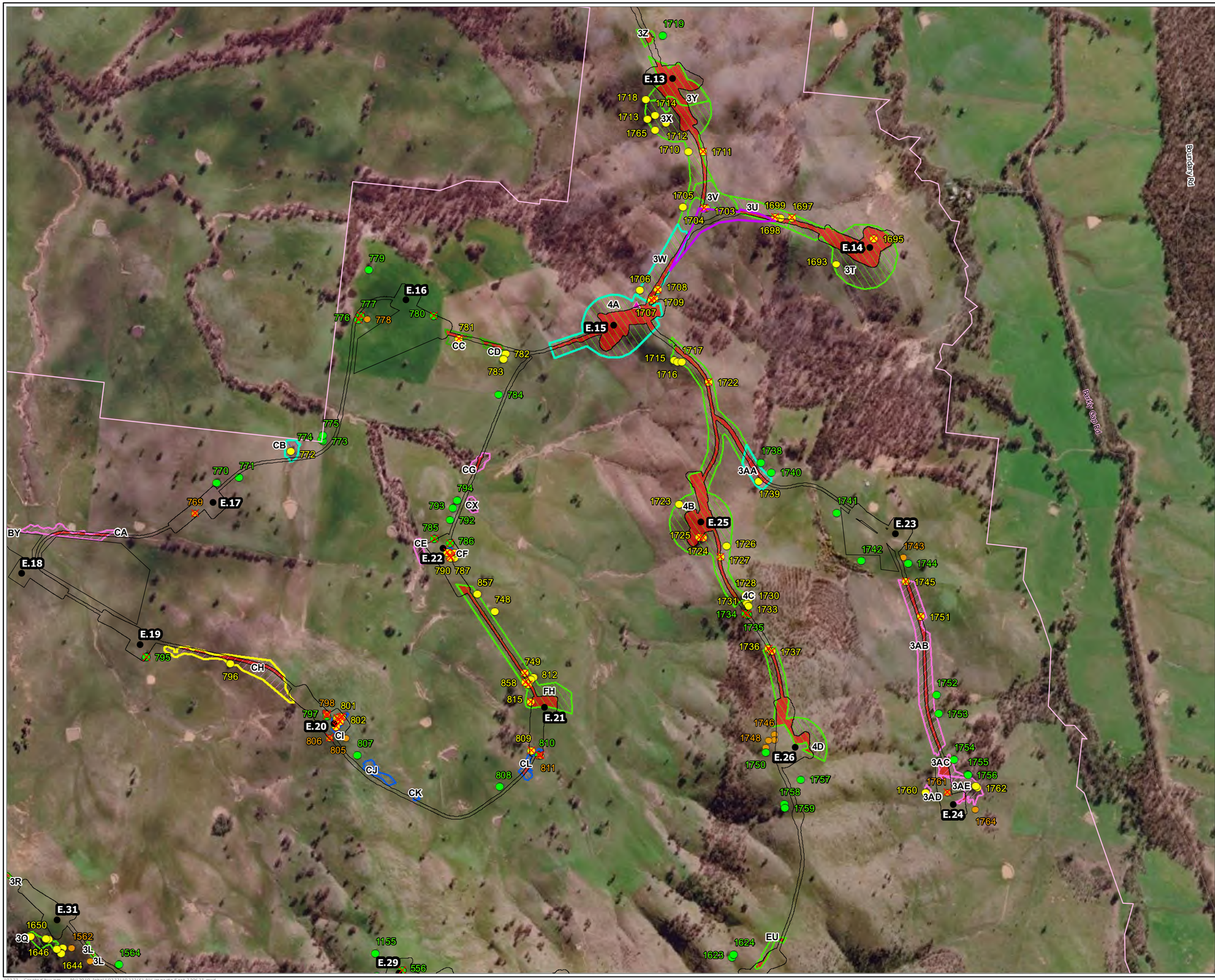


Figure 2-8: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed

Threatened species

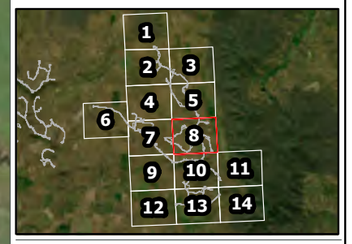
- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community
- Listed Yellow Box community



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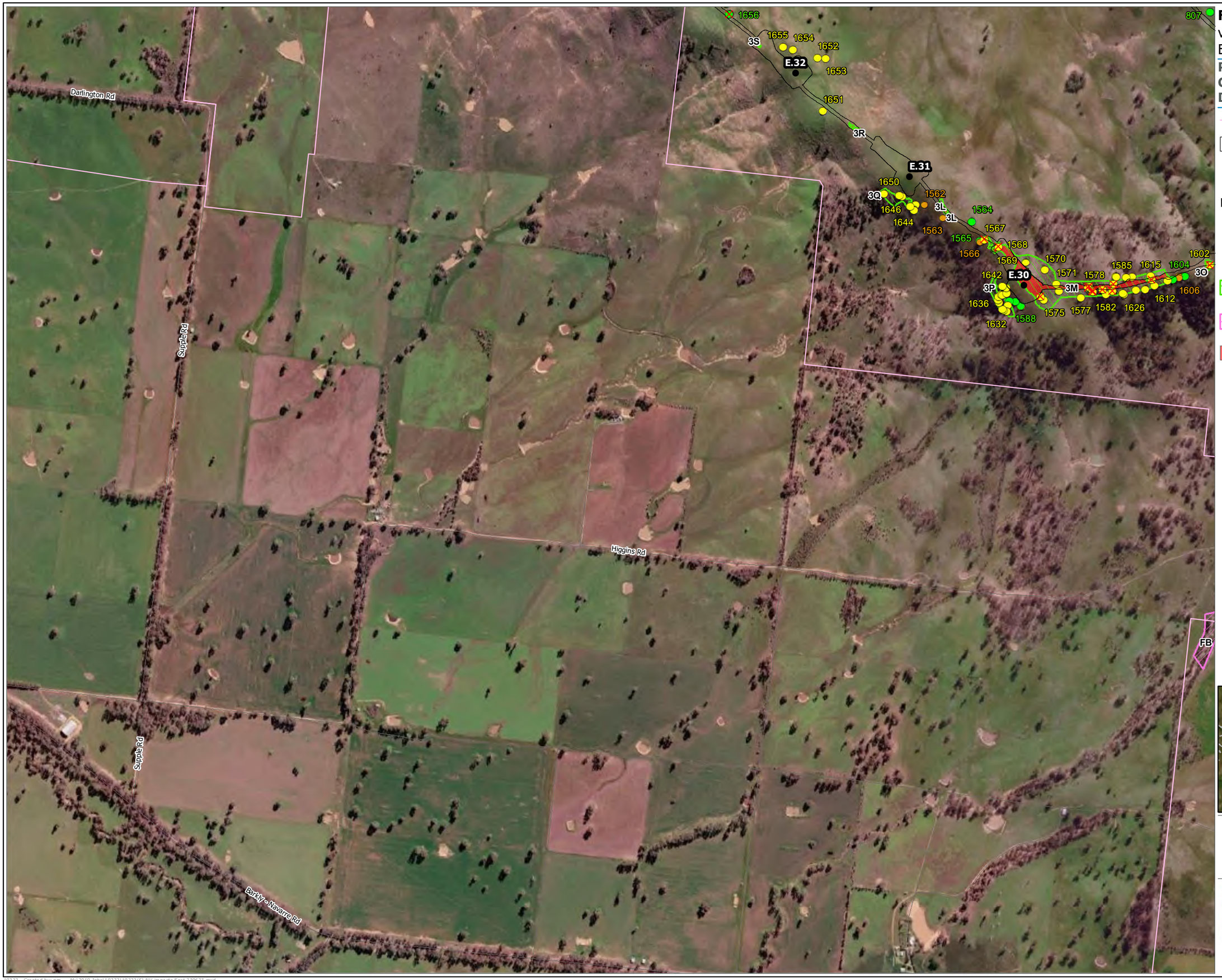

Figure 2-9: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Grassy Dry Forest (EVC 22)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

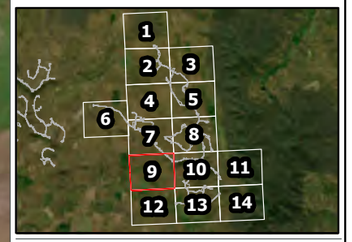

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Figure 2-10: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed

Threatened species

- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Alluvial Terraces Herb-rich Woodland (EVC 67)
- Creekline Grassy Woodland (EVC 68)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

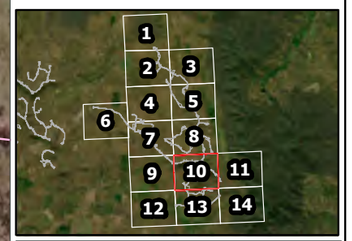

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Figure 2-11: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines

Threatened species

- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Alluvial Terraces Herb-rich Woodland (EVC 67)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community

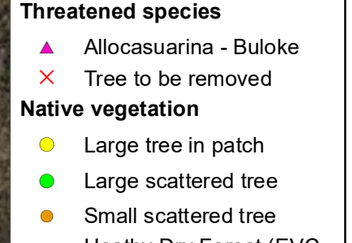

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Figure 2-12: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Creekline Grassy Woodland (EVC 68)
- Swampy Riparian Woodland (EVC 83)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

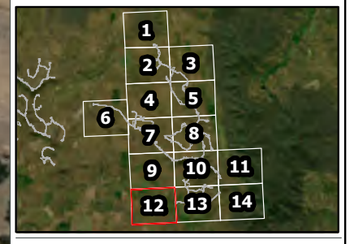

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Figure 2-13: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

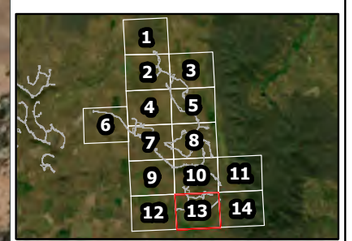
- Wind farm boundary
- Construction footprint (May 2023)
- Turbines
- Area not surveyed
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Creekline Grassy Woodland (EVC 68)
- Swampy Riparian Woodland (EVC 83)
- Low Rises Grassy Woodland (EVC 175_61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community



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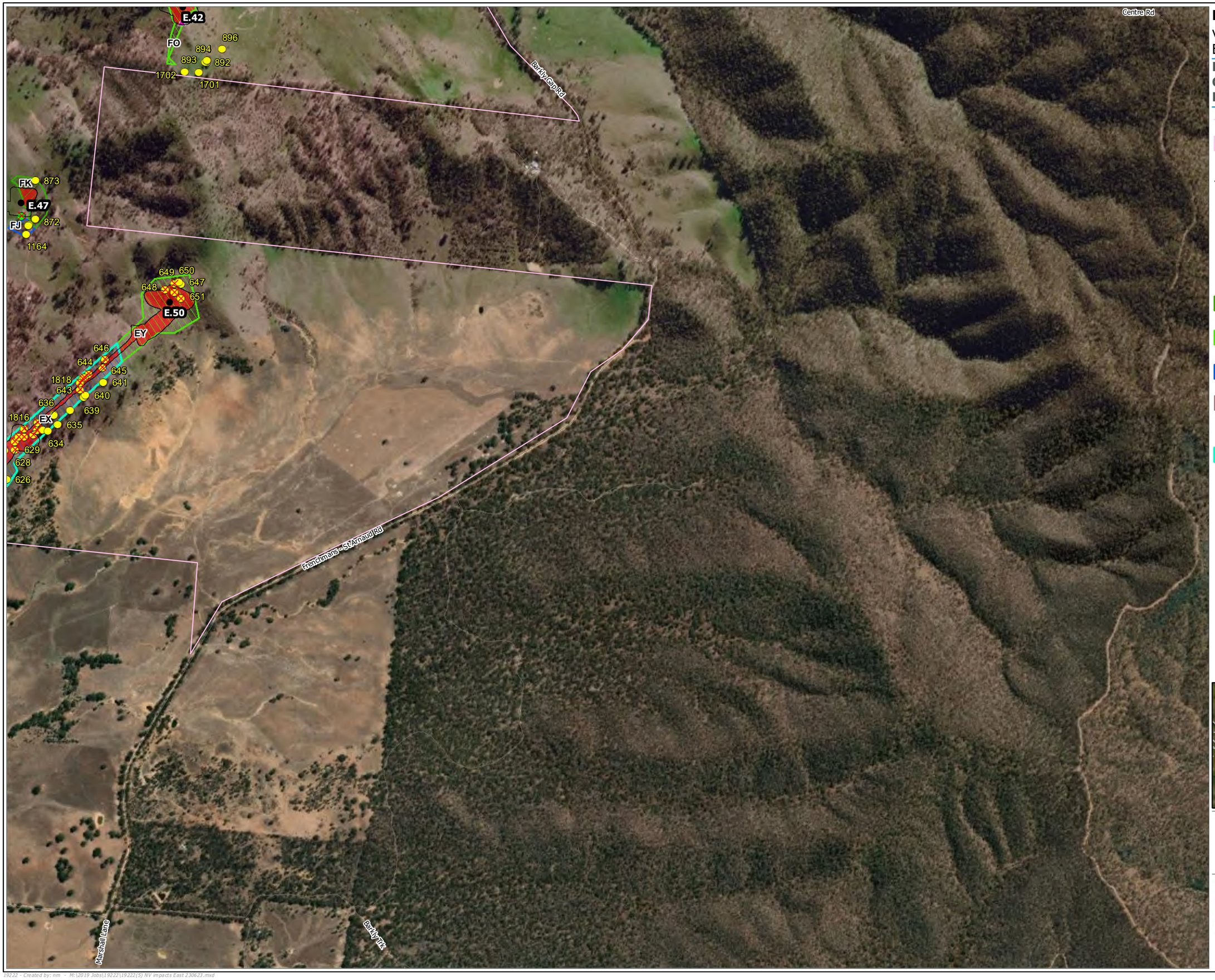


Figure 2-14: Native vegetation to be impacted - Eastern

Project: Navarre Wind Farm
Client: Neoen
Date: 9/06/2023

- Wind farm boundary
- Construction footprint (May 2023)
- Turbines

Threatened species

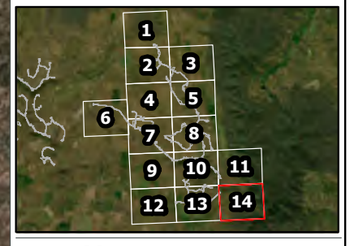
- Allocasuarina - Buloke
- Tree to be removed

Native vegetation

- Large tree in patch
- Large scattered tree
- Heathy Dry Forest (EVC 20)
- Grassy Dry Forest (EVC 22)
- Box Ironbark Forest (EVC 61)
- Native vegetation to be removed

Potential listed flora

- Listed Grey Box community



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5.4.3. Flora species

During the field assessments 230 plant species were recorded. Of these, 173 (75%) were indigenous and 57 (25%) were introduced or non-indigenous native in origin (Appendix 4).

VBA records (DELWP 2020d) and the EPBC Protected Matters Search Tool (DAWE 2020a) indicated that within the search region there were records of, or there occurred potential suitable habitat for, 24 species listed under the Commonwealth EPBC Act and 39 listed under the state FFG Act, including 21 listed under both Acts. No flora species listed under the EPBC Act were recorded during the field survey.

The likelihood of occurrence in the study area of species listed under the EPBC Act and FFG Act is addressed in Table 6. Species considered 'likely to occur' are those that have a very high chance of being in the study area based on numerous records in the search region and suitable habitat in the study area. Species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce. This analysis indicates that the following 20 listed flora species were likely to occur or had the potential to occur:

- Brilliant Sun-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Buloke (FFG Act: Vulnerable);
- Clover Glycine (EPBC Act: Vulnerable; FFG Act: Vulnerable);
- Douglas' Spider-orchid (FFG Act: Critically Endangered);
- Grey Grass-tree (FFG Act: Critically Endangered);
- Inland Leek-orchid (FFG Act: Endangered);
- Hairy Tails (FFG Act: Critically Endangered);
- Lowly Greenhood (EPBC Act: Endangered; FFG Act: Endangered);
- McIvor Spider-orchid (EPBC Act: Endangered; FFG Act: Vulnerable);
- Pink-lip Leek-orchid (FFG Act: Critically Endangered);
- Pomonal Leek-orchid (EPBC Act: Endangered; FFG Act: Critically Endangered);
- Purple Eyebright (EPBC Act: Endangered; FFG Act: Endangered);
- Red-cross Spider-orchid (FFG Act: Endangered);
- Stuart-Mill Spider-orchid (FFG Act: Endangered);
- Sturdy Leek-orchid (EPBC Act: Vulnerable);
- Swamp Diuris (FFG Act: Endangered);
- Tawny Spider-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Trailing Hop-bush (EPBC Act: Vulnerable);
- Turnip Copperburr (EPBC Act: Endangered; FFG Act: Critically Endangered); and
- Yellow-lip Spider-orchid (EPBC Act: Endangered; FFG Act: Endangered).

Targeted surveys for the above-listed species were conducted in October and November 2021 as well as in September and November 2022. Surveys were undertaken on foot along transects spaced 5 metres apart within areas of suitable habitat. The locations of any target species were

recorded using a hand-held device with the Field Maps application (ESRI), accurate to approximately 5 metres.

The following flora species were recorded during the targeted surveys:

- *Thelymitra* sp. (Sun-orchid, FFG Act protected, potentially FFG Act listed and potentially EPBC Act listed)– 340 individuals recorded
- *Diuris behrii* (Golden Cowslips, FFG Act: Endangered)– two individuals recorded
- *Allocasuarina luehmannii* (Buloke, FFG Act: Vulnerable)– five individuals recorded

It should be noted that all Sun-orchids are unidentified as they had not yet flowered during the September surveys and had finished flowering during the November surveys. As such, we have taken a precautionary approach in assuming that threatened Sun-orchids could be present.

None of the other threatened flora species were recorded within the survey areas of suitable habitat that are proposed to be impacted.

The locations of recorded threatened species are shown in Figure 2.

Table 6: Listed flora species and the likelihood of their occurrence in the study area

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Weeping Myall	*Acacia pendula*		CR	Rare in Victoria with isolated occurrences near Waracknabeal and Echuca. Mainly on floodplains in fertile alluvial clay and red earth soils (Entwisle et al. 1996).	1	28/06/2001	Only one record in search region and study area well beyond species known distribution – **unlikely to occur**
Buloke	*Allocasuarina luehmannii*		VU	Woodlands on non-calcareous soils. Commonly grows with Grey Box (Entwisle 1996).	159	17/12/2019	Numerous trees recorded in the study area during the current field assessment – **does occur**
Plump Swamp Wallaby-grass	*Amphibromus pithogastrus*		CR	Currently confined to treeless grassland or sedgeland, includes, gilgai depressions in seasonally wet Kangaroo Grass (*Themeda triandra*) dominated grassland, a seasonal soak dominated by Common Bog-rush *Schoenus apogon* and in a stand of Sedge (Carex sp. aff. bichenoviana). Only known from Bathurst and Armidale (DSE 2004).	1	1/12/2016	Only one record exists within 40km of Navarre – **unlikely to occur**
McIvor Spider-orchid	*Caladenia audasii*	EN	VU	Dry box ironbark forest in central Victoria, from Bendigo to Stawell (Jeanes & Backhouse 2006).	11	6/09/2016	Suitable Box Ironbark Forest habitat in the study area and records nearby. **Not recorded during targeted surveys – unlikely to occur.**
Stuart Mill Spider-orchid	*Caladenia cretacea*		EN	Endemic to Victoria where known only from heathy open forests between Stuart Mill and Dalyenong in the western goldfields on sandy loams (Entwisle 1994).	187	14/09/2011	The study area supports suitable habitat and records exist to the east and west of the study area – **potential to occur**
Red-cross Spider-orchid	*Caladenia cruciformis*		EN	Endemic to Victoria where known only from heathy open forests between Stuart Mill and Dalyenong in the western goldfields on sandy loams (Entwisle 1994).	339	12/11/2010	The study area supports suitable habitat and records exist to the east and west of the study area. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Douglas' Spider-orchid	*Caladenia douglasiorum*		CR	Endemic to Victoria where known only from heathy open forest on sandy loam in the Dalyenong-Emu area of the western goldfields (Entwisle 1994).	3	30/09/2010	The study area supports suitable habitat. **Not recorded during targeted surveys – unlikely to occur.**
Tawny Spider-orchid	*Caladenia fulva*	EN	EN	Drier forest with a sparse understorey. Grows on slopes and ridges in well-drained soil (Jones 2006).	49	9/09/2013	The study area supports suitable habitat and records exist to the east and west of the study area. **Not recorded during targeted surveys – unlikely to occur.**
Magnificent Spider-orchid	*Caladenia magnifica*		EX	Recorded from a few sites north of Ballarat, growing in dry foothill forest, particularly those dominated by Yellow Gum (Jeanes and Backhouse 2006).	1	4/09/1992	Only one record in the search region and study area lies beyond species known range – **unlikely to occur**
Eastern Spider-orchid	*Caladenia orientalis*	EN	EN	Heathland and Heathy Woodland in coastal areas between the Mornington Peninsula and Wilsons Promontory (Jeanes & Backhouse 2006).	5	2/09/2010	Study area does not support suitable habitat – **unlikely to occur**
Ornate Pink-fingers	*Caladenia ornata*	VU	EN	Heathy forest and among shrubs on seasonally moist sandy loams (Jones 2006).	1	6/10/1995	Only one record exists within the search region and study area does not support suitable soil type – **unlikely to occur**
Rigid Spider-orchid	*Caladenia tensa*	EN		Eucalyptus and Callitris woodland in well-drained sandy loams. Grows among shrubs (Jones 2006).	None	N/A	No records within 40km of Navarre – **unlikely to occur**
Bow-lip Spider-orchid	*Caladenia toxochila*		CR	Mallee-scrub or Callitris woodland on sandy soils or box-woodland on clay-loam (Entwisle 1994).	2	17/10/2000	Only one record in the search region and study area does not support suitable habitat (Mallee-scrub or Callitris woodland) – **unlikely to occur**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Candy Spider-orchid	*Caladenia versicolor*	VU	EN	Plains Sedgy Woodland; Shallow Sands Woodland. Soils are generally sandy/silty clay loams derived from Quaternary alluvial and swamp deposits (Todd 2000).	6	7/10/1998	No recent records in search region and no suitable habitat observed during the current field assessment – **unlikely to occur**
Yellow-lip Spider-orchid	*Caladenia xanthochila*	EN	EN	Very rare and known from only two locations, growing on sandy soils in Yellow Gum woodland. Very similar to C. stellata from southern NSW and eastern SA (Entwistle 1994).	4	17/09/2013	The study area supports suitable habitat – **potential to occur**
Cut-leaf Burr-daisy	*Calotis anthemoides*		CR	Scattered north and west of Melbourne (e.g. Sunshine, Camperdown, Moyston, Dunkeld, Numurkah regions) on heavy soils prone to waterlogging, but now rather rare due to habitat depletion (Walsh 1999). Wet depressions in Plains Grassland, Plains Grassy Wetland and Plains Grassy Woodland (Bull 2014).	1	20/09/1990	Only two records in the search region and study area does not support suitable habitat (Plains Grassy Woodland) – **unlikely to occur**
Swamp Sheoak	*Casuarina obesa*		CR	Brackish or saline swampy land near lakes or rivers (Entwisle 1996).	2	1/02/2009	Only one record exists within 10 km of the study area and no suitable habitat observed during the current field assessment – **unlikely to occur**
Small Milkwort	*Comesperma polygaloides*		CR	Found in remnant native grasslands and grassy woodlands on heavy soils (Walsh 1999) on the Western Basalt Plains, dominated by Kangaroo Grass, Silver Tussock and, less commonly, wallaby grasses and spear grasses (DSE 1999)	31	4/02/2015	The study area does not support any suitable habitat –**unlikely to occur**
Swamp Diuris	*Diuris palustris*		EN	Scattered distribution throughout western Victoria. Usually in swampy depressions in grassland or open woodland (Entwisle 1994).	11	15/09/1998	Recorded to the north of the study area on the Avon River and some suitable habitat present. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Trailing Hop-bush	*Dodonaea procumbens*	VU		Grows in low lying, often winter wet areas in woodland, low open-forest heathland and grasslands on sands and clays. Largely confined to SW of Victoria (DAWE 2020).	21	18/10/2010	Some records exist in Box Ironbark Forest around Stawell. **Not recorded during targeted surveys – unlikely to occur.**
Buxton Gum	*Eucalyptus crenulata*	EN	EN	Known from only two natural populations that are about 64 km apart, and separated by the Great Dividing Range. Yering: Low-lying, wet/swampy habitats that are seasonally cold with deep alluvial loams and a generally flat topography with scattered, periodically inundated depressions. Buxton: poorly drained hollow on the alluvial terraces adjacent to the Acheron River.	1	11/09/2014	Only one record in the search region and only known from two locations in Victoria – **unlikely to occur**
Kamarooka Mallee	*Eucalyptus froggattii*		CR	Mallee scrub and woodland (Brooker & Slee 1996).	1	18/11/1998	The study area does not support any suitable habitat –**unlikely to occur**
Large-fruit Yellow-gum	*Eucalyptus leucoxylon* subsp. *megalocarpa*		CR	Undulating low hills of thin loam over limestone in coastal shrubland. Naturally restricted to far south-western Victoria, near the Glenelg River estuary south of Nelson, and south-eastern South Australia. Other occurrences comprise planted individuals (Nicolle 2006).	1	11/09/2014	Only one record in the search region and study area lies beyond species known range – **unlikely to occur**
Purple Eyebright	*Euphrasia collina* subsp. *muelleri*	EN	EN	Grows in heathland and heathy woodland on sand and in open forest. Prefers environments where light levels are very high. Habitats suitable for the Purple Eyebright are prone to fire or periodic inundation by water, including open grassland, grassy woodland, heath in perched swamps and heathy woodland (DAWE 2020).	5	28/09/1998	The study area supports at least some sub-optimal habitat. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Clover Glycine	*Glycine latrobeana*	VU	VU	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. In Victoria, populations occur in lowland grasslands, grassy woodlands and sometimes in grassy heath (DAWE 2020).	7	30/10/2017	Widespread species and at least some suitable habitat in study area. **Not recorded during targeted surveys – unlikely to occur.**
Square Raspwort	*Haloragis exalata* var. *exalata*	VU		Damp riparian habitats (Jeanes 1996).	1	18/09/2008	Only on record exists within 10 km of the study area and suitable habitat is scarce – **unlikely to occur**
Slender Club-sedge	*Isolepis congrua*		EN	Cracking grey clay soils or in seasonally wet areas (Wilson 1994).	6	16/10/1988	No recent records in the search region and the study area does not support optimal habitat – **unlikely to occur**
White Sunray	*Leucochrysum albicans* subsp. *tricolor*	EN	EN	Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination. The unpalatability of this species is likely to protect it in heavily grazed areas where patches of bare ground are likely to develop, favouring recruitment (DAWE 2020).	None	N/A	No records within 40km of Navarre – **unlikely to occur**
Marbled Marshwort	*Nymphoides spinulosperma*		EN	Known in Victoria only from seasonal to permanent freshwater swamps to 75 cm deep, dominated by *Eragrostis infecunda*, near St Arnaud and Apsley, at altitudes from 150–170 m (Aston 1999).	22	21/01/1996	No recent records and no suitable habitat observed during the current field assessment – **unlikely to occur**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Wimmera Rice-flower	*Pimelea spinescens* subsp. *pubiflora*	CR	CR	Only known from two extant populations at Natimuk and Minyip, in western Victoria. Both populations occur on level ground with a loamy soil type. The Natimuk population occurs on a roadside reserve in a grassland dominated by spear grasses and wallaby grasses (Austrostipa and Austrodanthonia species respectively), with scattered shrubs of *Bursaria spinosa* (Sweet Bursaria) and *Senna artemisioides* (Cassia), whereas the population at Minyip occurs on Crown Land within a Buloke grassland area (DAWE 2020).	None	N/A	No records within 40km of Navarre – **unlikely to occur**
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	CR	CR	Occurs in grassland or open shrubland on basalt derived soils, usually comprising black or grey clays. Plants from more northerly populations occur on red clay complexes, while plants from southern populations occur on heavy grey-black clay loams. Topography is generally flat but populations may occur on slight rises or in slightly wettish depressions.	1276	27/08/2019	The study area does not support any suitable habitat. Records are much further south on the Victorian Volcanic Plain – **unlikely to occur**
Inland Leek-orchid	*Prasophyllum maccannii*		EN	Occurs in open forests, particularly those dominated by *Eucalyptus baxteri* and *Callitris rhomboidea*, on well-drained gravelly or sandy loams. Apparently confined to the Stawell, Deep Lead and northern Grampians area of western Victoria.	13	21/11/2009	Distribution of this species unknown and study area supports suitable 'open forest' habitat. **Not recorded during targeted surveys – unlikely to occur.**
Pink-lip Leek-orchid	*Prasophyllum roseum*		CR	Heathy woodland and box ironbark forest (Jeanes & Backhouse 2006).	6	30/10/2005	Study area supports suitable habitat. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Pomonal Leek-orchid	*Prasophyllum subbisectum*	EN	CR	Well-drained gravelly loam in heathy woodland (Jones 2006).	12	13/10/2016	Twelve records in the search region and the study area supports some suitable habitat. **Not recorded during targeted surveys – unlikely to occur.**
Sturdy Leek-orchid	*Prasophyllum validum*	VU		The Sturdy Leek-orchid tends to grow in drier woodland habitats, generally with a low sparse understorey. In Victoria, it occurs in box and box-ironbark woodland with an open grassy to sparsely shrubby understorey. Soils vary from heavy clays to sandy loams (Duncan 2010).	None	N/A	No records exist within 10 km of the study area, however suitable habitat is present. **Not recorded during targeted surveys – unlikely to occur.**
Floodplain Rustyhood	*Pterostylis cheraphila*	VU	EN	Grows in open *Eucalyptus largiflorens/Eucalyptus leucoxylon* woodland with a sparse grassy understorey, on seasonally inundated, heavy, grey-black clay soils. A couple of sites occur on the floodplain of the Wimmera River (Duncun et al. 2009).	None	N/A	No records exist within the search region and study area does not occur on the floodplain of the Wimmera River – **unlikely to occur**
Green-striped Greenhood	*Pterostylis chlorogramma*	VU	EN	Occurs in mixed Box-Stringybark forest with a shrubby understorey, often with Pteridium esculentum as a major component on sandy or clay loam soils (Duncan et al. 2009).	None	N/A	No records exist within the search region and study area does not support optimal habitat – **unlikely to occur**
Lowly Greenhood	*Pterostylis despectans*	EN	EN	Localised in Victoria where known from a few sites near Maryborough, growing in sparse open forest. Flowers October to November (Jones 1994).	590	17/12/2018	Many records to the east of the study area and suitable habitat present. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Small Sickle Greenhood	*Pterostylis lustra*		EN	Apparently restricted to waterlogged black, peaty alkaline soils in closed, Woolly Tea-tree scrub within swamps and along watercourses. Vegetation considered to be suitable habitat provides a continuous canopy over a relatively open understorey with a herbaceous ground layer. Gahnia species, *Viola hederacea*, Lobelia species, *Selliera radicans* and *Geranium molle* are notable associated species (Duncan et al. 2009).	1	7/02/2020	One record within the search region and no suitable habitat observed in the study area – **unlikely to occur**
Hairy Tails	*Ptilotus erubescens*		CR	Fertile soils with grassland and woodland communities (Walsh 1996).	3	10/01/2012	No recent records however some suitable habitat is present in the study area. **Not recorded during targeted surveys – unlikely to occur.**
Button Wrinklewort	*Rutidosis leptorhynchoides*	EN	EN	In Victoria restricted to open stands of plains grassland and grassy woodlands, on fertile clays to clay loams, usually in areas where the grass cover is more open, either as a result of recurrent fires or grazing by native macropods or stock. It also occurs on low rises with shallow, stony soils at less than 100 m above sea level.	1	12/12/1994	Only one record exists within the search region and the study area does not support any optimal habitat – **unlikely to occur**
Turnip Copperburr	*Sclerolaena napiformis*	EN	CR	Grows in native grasslands and grassy woodlands on relatively fertile clay-loam soils. In Victoria the species grows on red clay to red loam soils, and associated species include Common Wallaby-grass, Rough Spear-Grass, Spurred Spear-Grass, Common Everlasting and Buloke. Anecdotal evidence suggests that Turnip Copperburr can tolerate waterlogging in the spring, and all remaining populations are located in close vicinity to a water course or swamp.	178	27/08/2019	Many recent records exist within 10 km of the study area and at least some suitable habitat present. **Not recorded during targeted surveys – unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Large-headed Fireweed	*Senecio macrocarpus*	VU	CR	In Victoria, Large-fruit Fireweed occurs most commonly in grasslands on red-brown earth soils. It may also occur in grassy woodlands and open woodlands predominantly in the Western (Basalt) Plains grassland on red brown earth soils found on recent Quaternary (basalt) deposits (DAWE 2020).	16	11/10/2012	The study area does not support suitable soils for this species – **unlikely to occur**
Swamp Fireweed	*Senecio psilocarpus*	VU		Herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999). Known from approximately 10 sites between Wallan, about 45 km north of Melbourne, and Honans Scrub in south-eastern South Australia (TSSC 2008).	None	N/A	No records exist within the search region and study area does not support optimal habitat – **unlikely to occur**
Metallic Sun-orchid	*Thelymitra epipactoides*	EN	EN	Grows primarily in mesic coastal heathlands, grasslands and woodlands, but is also found in drier inland heathlands, open forests and woodlands. Substrates may be moist or dry sandy loams or loamy sands. Critical habitat has not been determined but the species is likely to require open conditions, which may be created by soil disturbance or fire, for recruitment (DAWE 2020).	2	26/05/2009	Only two records within the search region, with closest record in Ararat – **unlikely to occur**
Brilliant Sun-orchid	*Thelymitra mackibbinii*	VU	CR	*Eucalyptus leucoxylon* woodland within box ironbark forest in central and western Victoria (Jeanes & Backhouse 2006).	38	15/08/2017	Recent records exist within the search region and suitable habitat present – **potential to occur**
Spiral Sun-orchid	*Thelymitra matthewsii*	VU	EN	Slightly elevated sites to 300m in well-drained soils (sandy loams to gravelly limestone soils) in light to dense forest; sometimes in coastal sandy flats (Weber & Entwisle 1994).	None	N/A	No records exist within the search region and study area does not support optimal habitat – **unlikely to occur**

Common Name	Scientific name	EPBC	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Grey Grass-tree	*Xanthorrhoea glauca* subsp. *angustifolia*		CR	Occurs on rocky northern slopes of the Great Dividing Range from Chilton to forest south of Rushworth, with unverified records further west extending to the Grampians.	3	2/02/2015	Only three records within the study area however suitable habitat present. **Not recorded during targeted surveys – unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	VU	VU	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. Commonly associated genera include *Amphibromus, Baumea, Carex, Chorizandra, Craspedia, Eleocharis, Isolepis, Lachnagrostis, Lepidosperma, Myriophyllum, Phragmites australis, Themea triandra* and *Villarsia* (DAWE 2020).	None	N/A	No records exist within the search region and study area does not support optimal habitat – **unlikely to occur**

5.5. Listed ecological communities

The EPBC Protected Matters Search Tool (DAWE 2020a) indicated that seven ecological communities listed under the EPBC Act had the potential to occur in the search region (Table 7). Their occurrence in the study area was determined based on an assessment of the native vegetation present against published descriptions and condition thresholds for these communities.

Table 7: EPBC Act listed ecological communities and likelihood of occurrence in the study area

Ecological Community	EPBC Status	Occurrence in the study area
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	EN	This community occurs within the Murray Darling Depression and IBRA Riverina Bioregions (Cheal *et al* 2011), while the study area falls within the Victorian Midlands IBRA Bioregion (DELWP 2022a). Bulokes recorded in the study area largely occur as part of revegetation works, and do not occur with associated species characteristic of the threatened community such as Slender Cypress-pine. **Does not occur.**
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	CR	The study area is outside the distribution of this community, which is restricted to the Victorian Volcanic Plain, and the cracking clay soils associated with the community are not present within the study area. **Does not occur.**
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	EN	Several habitat zones across the study area meet the criteria for listing as this community. These comprise patches of woodland dominated by Grey Box, and derived high-quality grasslands where Grey Box is likely to have once been the dominant canopy species prior to clearing. **Known to occur.**
Natural Grasslands of the Murray Valley Plains	CR	This community occurs predominately across the southern parts of the Riverina IBRA Bioregion and extends into parts of the Murray Darling Depression and NSW South-Western Slopes IBRA Bioregions (TSSC 2012), while the study area falls within the Victorian Midlands IBRA Bioregion (DELWP 2022a). In addition, this community only includes grasslands which are not derived from previously treed vegetation. No treeless grassland is modelled to occur within the study area, and the abundance of large remnant scattered trees observed throughout the study area further indicates that natural grassland is not present. **Unlikely to occur.**

Ecological Community	EPBC Status	Occurrence in the study area
Natural Temperate Grassland of the Victorian Volcanic Plain	CR	This community includes two component EVCs from the Victorian Volcanic Plain and adjacent bioregions (TSSC 2008b): ▪ EVC 132 Plains Grassland; and ▪ EVC 654 Creekline Tussock Grassland. The study area is outside the distribution of this community, which is restricted to the Victorian Volcanic Plain, and the cracking clay soils associated with the community are not present within the study area. **Does not occur.**
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	CR	This community occurs on seasonally inundated depressions and drainage lines that are disconnected from flowing water sources such as creeks and rivers. The study area was largely restricted to stony rises and hills with skeletal, well-draining soils where standing water is unlikely to occur. No wetland vegetation was recorded in the study area. **Unlikely to occur.**
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CR	Several habitat zones across the study area meet the criteria for listing as this community. These comprise patches of woodland dominated by Yellow Box, and derived high-quality grasslands where Yellow Box is likely to have once been the dominant canopy species prior to clearing. No white Box or Blakely's Red Gum was recorded in the study area. **Known to occur.**

Notes: EPBC = status under the EPBC Act (CR = Critically Endangered; EN = Endangered; VU = Vulnerable).

The following two EPBC Act listed ecological communities were recorded in the study area:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia – listed as Endangered (occurs in 37 habitat zones throughout the study area); and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – listed as Critically Endangered (occurs in 7 habitat zones throughout the study area)

In addition, the following ecological community listed as threatened under the FFG Act was recorded in the study area:

- Grey Box – Buloke Grassy Woodland Community (occurs in five habitat zones throughout the study area).

6. Fauna overview assessment

6.1. Introduction

A combination of reviewing existing information and field assessments was undertaken to assess the potential impacts the proposed development may have on fauna species listed under the Commonwealth EPBC Act and Victorian FFG Act.

6.2. Existing Information

The existing documentation below, relating to the study area was reviewed.

- Best Practice Guidelines for Wind Energy Developments in Australia (CEC 2018)
- DSE's Biodiversity Precinct Planning Kit (DSE 2010)
- EPBC Act survey guidelines for listed threatened fauna and various significant impact guidelines for listed species under the EPBC Act (DSEWPaC 2011).

6.3. Listed fauna species

Based on the desktop review and field assessment outcomes, the following criteria were used to define the likelihood of occurrence for threatened fauna species:

- Known - species recorded within the study area during surveys or from desktop sources;
- Likely - species not recorded within the study area during surveys or from desktop sources, although species has been recorded within 10 kilometres of the study area and suitable habitat is present within the study area;
- Potential - species not recorded within the study area during surveys or from desktop sources, although species has been recorded within 10 kilometres of the study area and marginal habitat is present within the study area; and
- Unlikely – suitable and/or marginal habitat is present within the study area, although species not recorded within the study area or within 10 kilometres of the study area during surveys or from desktop sources.

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence of fauna species listed under the EPBC Act and/or FFG Act. Where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat.

6.4. Methods of field surveys

The fauna field assessment was conducted over 10 days from the 12th to 16th October and 9th to 13th November 2020. Surveys were conducted by a team of five experienced field staff from Nature Advisory. Prior to the field assessment, aerial photography (Nearmap 2020) and NVIM modelled native vegetation extent mapping (DELWP 2020a) was reviewed in order to attempt to gain a general understanding of the extent and types of native vegetation that could be expected to occur within the study area.

During the field assessment, the study area was surveyed by combination of 4WD vehicle and on foot and sites found to support native vegetation and/or the potential to support listed matters were broadly mapped via aerial photograph interpretation and ground-truthing.

Areas which were difficult to access (due to factors such as patch size, steep terrain and absence of vehicle tracks) were surveyed with binoculars from the closest suitable vantage point.

6.4.1. Fauna species and habitats

The techniques below were used to detect fauna species utilising the study area.

- Incidental searches for mammal scats, tracks and signs (e.g., diggings, signs of feeding and nests/burrows);
- Turning over logs/rocks and other ground debris for reptiles, frogs and mammals;
- Daytime bird observations;
- General searches for reptiles and frogs; including identification of frog calls in seasonally wet areas.

Fauna habitats are described using habitat components that include old-growth trees, fallen timber, leaf litter and surface rocks.

The study area's habitat connectivity (i.e., degree of isolation/fragmentation), including linkages to other habitats in the region, was determined using field observations, recent aerial photography and *Nature Kit* (DELWP 2020b).

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or fauna listed under the EPBC Act and FFG Act. That is, where insufficient evidence was available on the potential occurrence of a listed species, it is assumed that it could be in an area of suitable habitat.

6.4.2. Limitations of fauna field assessment

The field assessment was undertaken in mid-late spring when most of the fauna are breeding, and habitat characteristics are easily identified. The timing of the survey was considered appropriate at determining the presence of threatened fauna habitat.

The sheer size of the study area combined with the challenging terrain of the mountain ranges and limited extent of vehicular tracks meant that certain areas were either difficult or impractical to ground-truth. In these situations, areas were surveyed from the closest possible vantage point with binoculars to identify their potential to support listed matters – i.e., dominant canopy tree species, the presence of understorey vegetation.

The review of existing information combined with the field survey was considered ample to achieve the main objective of this investigation, which was to broadly identify key biodiversity constraints for the proposed wind farm.

Wherever appropriate, a precautionary approach was adopted in the discussion of implications. That is, where insufficient evidence was available on the occurrence or potential occurrence of a species, it was assumed that it could be in an area of suitable habitat. The implications under legislation and policy were considered accordingly.

Details of fauna survey within the transmission line are outlined in Section 13.2.1.

6.5. Results of fauna overview assessment

6.5.1. Fauna habitats

Fauna habitat types within the study area comprised of areas of woodland and paddocks. The vast network of conservation areas within the Kara Kara CMN provides key habitat for numerous listed fauna species. Creek line vegetation and remnant patches of woodland act as natural bio links in creating high connectivity for wildlife movement.

Patches of native treed vegetation are scattered throughout the study area connecting conservation areas. Wooded areas including Box-Ironbark Forest and Heathy Dry Forest provide ideal habitat for woodland birds, which are declining in population. Large trees with hollows provide habitat suitable for birds and small mammals and fallen timber and rocks for reptiles.

Minor wetlands and freshwater gullies, which drain into the Avoca and Avon Rivers, also occur throughout the study area. However, due to the low rainfall of the region and ephemeral nature of water sources, it is assumed fauna species that are dependent on suitable aquatic habitat are unlikely to occur within the study region.

6.5.2. Listed fauna species

VBA records (DELWP 2020d) and the EPBC Protected Matters Search Tool (DAWE 2020a) indicated that within the search region there were records of, or there occurred potential suitable habitat for a total of 64 fauna species including 40 species listed under the Commonwealth EPBC Act and 50 listed under the state FFG Act. No fauna species listed under the EPBC Act were recorded during the field survey and two species listed under the FFG Act (Diamond Firetail and Hooded Robin) were recorded in the study area. A full list of fauna species recorded and considered likely to occur is presented in Appendix 5.

The likelihood of occurrence in the study area of species listed under the EPBC Act and FFG Act is addressed in Table 8. Species considered 'likely to occur' are those that have a very high chance of being in the study area based on numerous records in the search region and suitable habitat in the study area. Species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce. This analysis indicates that the following 17 listed fauna species are likely to occur, have the potential to occur, or have been recorded in the study area.

- Barking Owl (FFG Act: critically endangered)
- Black Falcon (FFG Act: critically endangered)
- Brown Treecreeper (EPBC Act: vulnerable)
- Bush Stone-curlew (FFG Act: critically endangered)
- Diamond Firetail (EPBC Act: vulnerable, FFG Act: vulnerable)
- Fork-tailed Swift (EPBC Act: migratory)
- Hooded Robin (EPBC Act: endangered, FFG Act: vulnerable)
- Painted Honeyeater (EPBC Act: vulnerable, FFG Act: vulnerable)
- Powerful Owl (FFG Act: vulnerable)
- Speckled Warbler (FFG Act: endangered)
- Square-tailed Kite (FFG Act: vulnerable)
- Swift Parrot (EPBC Act: critically endangered, FFG Act: critically endangered)
- White-throated Needletail (EPBC Act: vulnerable, migratory, FFG Act: vulnerable)
- Brush-tailed Phascogale (FFG Act: vulnerable)
- Squirrel Glider (FFG Act: vulnerable)
- Pink-tailed Worm-Lizard (EPBC Act: vulnerable, FFG Act: endangered)

- Golden Sun Moth (EPBC Act: vulnerable, FFG Act: vulnerable).

Table 8: Listed fauna species and their likelihood of occurrence in the study area

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Birds								
Australasian Bittern	*Botaurus poiciloptilus*	EN		CR	Terrestrial wetlands, including a range of wetland types but prefers permanent water bodies with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass (Marchant & Higgins 1990).	2	19/08/1993	No suitable habitat - unlikely to occur.
Australian Painted-snipe	*Rostratula australis*	EN		CR	Generally, inhabits shallow terrestrial freshwater 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. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum or cane grass or sometimes tea-tree (Melaleuca). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DAWE 2020).	None	N/A	No suitable habitat - unlikely to occur.
Barking Owl	*Ninox connivens*			CR	Eucalyptus dominated forests and woodlands, commonly near water-bodies, such as streams and rivers, and requires hollow trees for nesting and trees with dense foliage for roosting (Higgins 1999).	9	4/07/2011	Suitable habitat occur in woodland and in treed areas along creek lines in the study area - **potential to occur**.
Black Falcon	*Falco subniger*			CR	Woodlands, open country and terrestrial wetlands; in arid and semi-arid zones; mainly over open plains and undulating land with large tracts of low vegetation. It is more commonly found in north-western Victoria and is only occasionally found in southern Victoria. It is a highly mobile species, moving in response to food availability and seasonal conditions (Marchant & Higgins 1993).	7	10/03/2007	Suitable habitat occur across the site - **potential to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Blue-billed Duck	*Oxyura australis*			VU	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies. V (Marchant & Higgins 1990).	32	28/06/2018	No suitable habitat - **unlikely to occur**.
Brolga	*Grus rubicunda*			EN	Wetlands that include permanent open water and deep freshwater marsh. Between 500 and 700 Brolgas are known to occur in southwestern Victoria (Marchant & Higgins 1993).	86	1/06/2010	Suitable habitat occur along the north-west transmission line - potential to occur. No suitable habitat within the wind farm boundary – **unlikely to occur here**.
Brown Treecreeper	*Climacteris picumnus*	VU			Woodlands dominated by eucalypts, especially Stringybarks or other rough-barked eucalypts usually with open grassy understorey (Higgins et al. 2001).	149	2/08/2021	Suitable habitat in open woodland in the study area - **recorded in the study area.**
Bush Stone-curlew	*Burhinus grallarius*			CR	Open woodlands with Grey Box, Yellow Box and/or River Red Gum, with a grassy understorey. The species is mainly found in northern and western Victoria; the bird has declined since European settlement, especially in the south of the state (Robinson & Johnson 1997).	21	13/05/2019	There is suitable woodland habitat in the study area. This species has become scarce in Victoria. There are some recent records at the northern end of Big Tottingham State Forest over 1km from the study area boundary. **Potential to occur**.

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*			VU	Dense heathland and dense understorey or ground-layer in sclerophyll forests and woodlands; also, in Box-ironbark forests. Widespread but sparsely distributed (Higgins & Peter 2002; Tzaros 2005).	1	7/12/1995	Understorey has been modified greatly across the study area. Patchy understorey along some of the roadside vegetation - **unlikely to occur.**
Common Greenshank	*Tringa nebularia*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur**.
Common Sandpiper	*Actitis hypoleucos*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabits a wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands. In Victoria, mostly found Westernport and Port Phillip Bay (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Crested Bellbird	*Oreoica gutturalis*			EN	Dry acacia shrublands or woodlands, eucalypt woodlands including mallee and spinifex; usually occur in dense vegetation near ground. In Victoria, widespread in north central and southern northern districts; often in box-ironbark woodlands with open shrubby understorey (Higgins & Peter 2002; Tzaros 2005).	164	14/05/2019	Habitat is not ideal in the study area although there are some areas of box-ironbark they have been modified too much to provide habitat for Crested Bellbird and is considered **unlikely to occur**. Likely it occurs in state forests and national parks to the north and east of the study area.
Curlew Sandpiper	*Calidris ferruginea*	CR	M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur**.
Diamond Dove	*Geopelia cuneata*			VU	Mostly arid and semi-arid grassland savannah, often of spinifex and in low open woodlands with grassy understorey. Also often found in open riparian woodlands (Higgins & Davies 1996).	1	20/11/1998	Due to lack of recent and regular records this species is considered unlikely to occur.
Diamond Firetail	*Stagonopleura guttata*	VU		VU	Commonly found in box-ironbark forests and woodlands and also occurs along watercourses and in farmland areas. Widespread but scattered. Forages on a wide range of seeds, which in some cases a large portion can be derived from weed species (Read 1994). Populations had declined in Victoria since the 1950s (Emison et al. 1987; Tzaros 2005).	138	7/04/2020	Suitable habitat in open woodland in the study area - **recorded in the study area.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Double-banded Plover	*Charadrius bicinctus*		M (Bonn A2H)		Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Marchant & Higgins 1993).	1	31/01/1978	No suitable habitat - unlikely to occur.
Eastern Curlew	*Numenius madagascariensis*	CR	M (Bonn A1, ROKAMBA, JAMBA, CAMBA)		Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur**.
Fork-tailed Swift	*Apus pacificus*		M (CAMBA, ROKAMBA, JAMBA)		The species can occur in wet sclerophyll forest but mainly prefers open forest or plains. It is almost exclusively aerial and feeds up to hundreds on metres above the ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees (Higgins 1999).	6	31/03/2011	This species is a summer visitor to the region. It may fly over the study irregularly from time to time - **potential to occur**.
Freckled Duck	*Stictonetta naevosa*			EN	Terrestrial wetlands; prefer fresh, densely vegetated waters, particularly floodwater swamps and creeks vegetated with lignum or cane grass. During dry seasons or droughts, move off ephemeral breeding swamps and occupy large permanent waters (Marchant & Higgins 1990).	4	15/03/2018	No suitable habitat - **unlikely to occur**.
Glossy Ibis	*Plegadis falcinellus*		M (Bonn A2S)		Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant & Higgins 1990).	1	1/01/2015	No suitable habitat - unlikely to occur.
Grey Falcon	*Falco hypoleucos*	VU		VU	Inhabits arid and semi-arid zones; mainly on sandy and stony plains of inland drainage systems, lightly timbered with acacia. Hunt far into open areas, over spinifex, tussock grasslands and low shrublands. In Victoria, few records mostly in north and north-western regions (Marchant & Higgins 1993).	4	1/01/2015	Very few records in the search region - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Grey Goshawk	*Accipiter novaehollan-diae*			EN	Inhabit rainforests, open forests, swamp forests, woodlands and plantations; most abundant where forest or woodland provide cover for hunting from perches. in Vic., most common in Otway ranges (Marchant & Higgins 1993).	1	4/07/2011	No suitable habitat - **unlikely to occur**.
Grey-crowned Babbler	*Pomatostomus temporalis*			VU	Inhabits dry woodlands and forests with a shrub layer and a groundcover of leaf litter and fallen timber. In Victoria it is found in woodlands and forests with box-ironbark eucalypt associations and River Red Gums, including narrow remnants along roadsides and streams. Formerly widespread over much of Victoria, but populations has declined and range has contracted markedly, mostly from the south and west since the 1970s. Gregarious, usually found in family group of 3–6 birds (Higgins & Peter 2002; Tzaros 2005).	3	18/01/2007	Due to lack of recent and regular records in the search region this species is considered **unlikely to occur**.
Hooded Robin	*Melanodryas cucullata*	EN		VU	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. The population has declined throughout range, especially since the early 1980s. This species typically occurs north of the great divide in shrubland or woodland dominated by acacias (Higgins & Peter 2002; Tzaros 2005).	110	14/05/2019	Suitable habitat occur in woodland habitats - **recorded in the study area.**
Latham's Snipe	*Gallinago hardwickii*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes. The species is wide spread in southeast Australia and most of its population occurs in Victoria, except in the northwest of the state (Naarding 1983; Higgins & Davies 1996).	2	1/01/2003	No suitable habitat - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Little Egret	*Egretta garzetta*			EN	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as bulrush and requires trees for roosting and nesting (Marchant & Higgins 1990).	1	24/11/1993	No suitable habitat - **unlikely to occur.**
Malleefowl	*Leipoa ocellata*	VU		VU	Mainly in semi-arid zones (200–450 mm rainfall), but in higher rainfall area of heath and mallee-heath. Rarely occurs in arid zones. Associated with mallee, particularly floristically rich tall dense mallee of higher rainfall areas (Marchant & Higgins 1993). Notably in Victoria, a small, isolated population does occur in Wychitella Flora and Fauna Reserve near Wedderburn (DSE 2003).	None	N/A	No suitable habitat - **unlikely to occur.**
Yellow Wagtail	*Motacilla flava*		M (CAMBA, JAMBA, ROKAMBA)		Regular non-breeding visitor in northern Australia mainly spring-summer, vagrant to the south. Occupies a wide range of habitats, usually open areas with low vegetation such as crop, grassland and even parkland. Often recorded near water (Higgins, Peter & Cowling 1999)	None	N/A	Rare vagrant to Victoria - **unlikely to occur.**
Painted Honeyeater	*Grantiella picta*	VU		VU	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. Can also be found in farmland containing remnant treed vegetation. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving in February (Higgins et al. 2001; Tzaros 2005).	21	22/09/2019	Suitable woodland habitat in the study area - **potential to occur.**
Pectoral Sandpiper	*Calidris melanotos*		M (Bonn A2H, ROKAMBA, JAMBA)		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Plains-wanderer	*Pedionomus torquatus*	CR		CR	This species is highly sensitive to changes in grassland cover and density. Typically inhabits treeless native grasslands with sparse cover, with a preference for grasslands composed of wallaby grass and spear grass (Marchant & Higgins 1993). Habitat becomes unsuitable when grassland becomes dense (CA 2016). Evidence suggests it avoids areas of tree cover, with no records of the species within 300m of trees (>10m high) in their strongholds in New South Wales or Victoria (CA 2016).	4	17/03/1975	Due to lack of recent and regular records this species is considered **unlikely to occur**.
Powerful Owl	*Ninox strenua*			VU	Found in open and tall wet sclerophyll forests with sheltered gullies and old growth forest with dense understorey. They are also found in dry forests with box and ironbark eucalypts and River Red Gum. Large old trees with hollows are required by this species for nesting. In Victoria, the Powerful Owl is widespread, having been recorded from most of the state. However, throughout its range it is uncommon and occurs in low densities (Higgins 1999). Also occurs in highly urbanised areas, such as metropolitan Melbourne, where they are heavily reliant upon various forms of movement corridors (riparian strips, roadside vegetation and recreational reserves) to both hunt within and navigate throughout the landscape (Carter et al. 2019).	76	14/05/2019	Limited habitat in the study area. This species occurs in the state parks and national parks surrounding the study area. **Potential to occur**
Red-chested Button-quail	*Turnix pyrrhothorax*			EN	Inhabits dense, sometimes damp grasslands with little or no tree cover; also in acacia, eucalypts and melaleuca woodlands with ground cover of long grass. Sparsely distributed in Victoria, with few records present (Marchant & Higgins 1993).	1	31/01/1978	Due to lack of recent and regular records this species is considered **unlikely to occur**.

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Red-necked Stint	*Calidris ruficollis*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	2	1/05/2009	No suitable habitat - **unlikely to occur**.
Regent Honeyeater	*Anthochaera phrygia*	CR		CR	Inhabits dry box-ironbark eucalypt forests near rivers and creeks on inland slopes of the Great Dividing Range. Can also occur in small remnant patches or in mature trees in farmland or partly cleared agricultural land (Higgins et al. 2001).	5	4/01/2006	This species is no longer recorded in the search region. Due to lack of recent and regular records this species is considered **unlikely to occur**.
Rufous Fantail	*Rhipidura rufifrons*		M (Bonn A2H)		In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	None	N/A	No suitable habitat - **unlikely to occur.**
Satin Flycatcher	*Myiagra cyanoleuca*		M (Bonn A2H)		Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	5	26/04/1997	No suitable habitat - **unlikely to occur**.
Sharp-tailed Sandpiper	*Calidris acuminata*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Speckled Warbler	*Pyrrholaemus sagittatus*			EN	Inhabits dry eucalypt forests and woodlands, especially those with box-ironbark eucalypt associations. It is also found in River Red Gum woodlands. The species is uncommon; populations have declined since the 1980s (Higgins & Peter 2002; Tzaros 2005).	31	1/01/2017	Suitable habitat in woodland - **potential to occur.**
Square-tailed Kite	*Lophoictinia isura*			VU	It occurs mainly in open forests and woodlands and in Victoria utilises habitats with box-ironbark, peppermint, Stringybark and River Red Gum eucalypt associations. The rarest and least seen bird in Victoria, mainly occur in the far east of the state, though occasionally recorded in central and western parts of the state (Marchant & Higgins 1993).	11	3/01/2019	Suitable habitat across the site - **potential to occasionally occur.**
Swift Parrot	*Lathamus discolor*	CR		CR	Prefers a select range of eucalypts in Victoria, including Yellow Gum, Grey Box, White Box, Red Ironbark and Yellow Box, as well as River Red-gum when this species supports abundant 'lerp' (Saunders & Tzaros 2011). The species is also known to forage within planted stands of Spotted Gum and Sugar Gum (Nature Advisory; unpublished data). Breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison et al. 1987; Higgins 1999; Kennedy & Tzaros 2005). Though it is also not uncommonly sighted in urban areas (Nature Advisory; unpublished data). Occurrence of this species on the mainland can substantially change from year to year depending on food availability, giving potential for this species to occur almost anywhere throughout its range (Emison et al. 1987).	291	28/07/2019	Suitable habitat in Grey Box, Yellow Box, Yellow Gum and Red Ironbark treed areas - **likely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			EN	Maritime habitats, terrestrial large wetlands and coastal lands of tropical and temperate Australia and offshore islands, ranging far inland only over large rivers and wetlands. The eagles usually breed on coast and offshore islands and inland beside large lakes or rivers, usually in tall trees in or near water, also in cliffs, rock pinnacles and escarpments (Marchant & Higgins 1993).	1	23/05/1982	No suitable habitat - **unlikely to occur**.
White-throated Needletail	*Hirundapus caudacutus*	VU	M (CAMBA, ROKAMBA, JAMBA)	VU	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	26	30/01/2019	This species is a summer visitor to the region. It may fly over the study irregularly from time to time - **potential to occur**.
Mammals								
Brush-tailed Phascogale	*Phascogale tapoatafa*			VU	Dry forest and woodland in association with box, ironbark and stringybark eucalypts (Menkhorst 1995). Closely associated with remnant vegetation, this species occupies large home ranges of woodland habitat (M=100Ha; F=20-70Ha) (Menkhorst 1995).	20	15/01/2020	Suitable woodland habitat occurs in the study area particularly along the treed roadsides. More likely to be in state forests and national parks. **Not recorded during targeted surveys along the roadsides – unlikely to occur**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU		VU	Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Elsewhere, during spring, they are uncommon south of Nowra and widespread in other areas of their range. Roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (DAWE 2020).	2	8/05/1975	No known roost sites within the search region - **unlikely to occur**.
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	VU		VU	In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occurring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995). Dense understorey vegetation is an essential component for the species persistence, which can consist of grass trees, sedges, ferns, heath, tea-tree or melaleucas (Menkhorst 1995).	None	N/A	No suitable habitat - **unlikely to occur.**
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN		EN	Suitable habitat for Southern Brown Bandicoots (eastern) is defined to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (Rubus spp.), can and often does, provide important habitat (DAWE 2020).	9	20/11/2001	No suitable habitat - **unlikely to occur.**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN		EN	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	1	2/01/1900	Only one extremely old record in search region - **unlikely to occur**.

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Squirrel Glider	*Petaurus norfolcensis*			VU	Dry forest and woodland and nearby riverine corridors (Menkhorst 1995).	28	21/03/2006	Suitable woodland habitat occur in the study area particularly along the treed roadsides. More likely to be in state forests and national parks. **Not recorded during targeted surveys along the roadsides – unlikely to occur.**
Reptiles								
Bandy Bandy	*Vermicella annulata*			EN	Wide range of habitats including wet coastal forest, savannah woodland, mallee, mulga and other acacia scrub to spinifex-covered desert sandhills (Cogger 2000).	1	31/12/1897	Only one extremely old record in search region - **unlikely to occur**.
Pink-tailed Worm-Lizard	*Aprasia parapulchella*	VU		EN	Sites where the species is found generally include rocky outcrops or scattered partly buried rocks. This species is diurnal and largely fossorial, sheltering under rocks and vegetation, and in the burrow passages of small ants and termites within grassland and woodland habitats of south-eastern Australia (Robertson & Coventry 2019). It feeds primarily on the larvae and eggs of ants. In Victoria, the species is largely restricted to box-ironbark woodland in the greater Bendigo region, though it may also persist elsewhere in the state (Robertson & Coventry 2019).	None	N/A	Suitable habitat occur in rocky habitats. **Not recorded during targeted surveys – unlikely to occur**.
Samphire Skink	*Morethia adelaidensis*			EN	Chenopod dominated shrubland, often associated with woodlands, in dry to arid areas, distributed across northern Victoria (Wilson & Swan 2003).	1	20/05/1963	Only one extremely old record in search region - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Striped Legless Lizard	*Delma impar*	VU		EN	Grassland specialist. Known to occur in some areas dominated by introduced species such as Harding Grass Phalaris aquatica, Serrated Tussock *Nasella trichotoma* and Flatweed *Hypocharis radicata* and at sites with a history of grazing and pasture improvement. shelter in grass tussocks, thick ground cover, soil cracks, under rocks, spider burrows, and underground debris such as timber. The majority of sites in Victoria and NSW occur on cracking clay soils with some surface rock which provide shelter for the species (DAWE 2020).	1	29/06/2009	No plains grassland habitats in the study area - **unlikely to occur.**
Frogs								
Brown Toadlet	*Pseudophryne bibronii*			EN	Wet and dry forest, grassy areas besides small creeks, alpine grasslands and mossy bogs (Cogger 2000). In Victoria, the Brown Toadlet is distributed from the north-east through to central and western Victoria with scattered records in Gippsland (SWIFFT 2020).	81	9/06/2019	Recent records from Deep Lead Flora and Fauna Reserve near Stawell. Habitat on site not ideal - **unlikely to occur.**
Growling Grass Frog	*Litoria raniformis*	VU		VU	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann & Gillespie 2004).	23	14/09/1963	No suitable habitat - **unlikely to occur**.
Fish								
Australian Grayling	*Prototroctes maraena*	VU		EN	Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	None	N/A	No suitable habitat - **unlikely to occur**.

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Dwarf Galaxias	*Galaxiella pusilla*	VU		EN	Ranges from the far west of the state through to the Mitchell River basin in central Gippsland. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002). Some wetlands where it occurs may partially or completely dry up during summer, with such wetlands reliant on seasonal flooding plus linkages to other sites where the species occurs, for habitat and population replenishment (Saddlier, Jackson & Hammer 2010). Dwarf Galaxias is also often found in association with burrowing freshwater crayfish (*Engaeus* spp.), with the crayfish burrows reportedly providing refuge from predators and dry conditions for the species (Saddlier, Jackson & Hammer 2010).	None	N/A	No suitable habitat - **unlikely to occur.**
Freshwater Catfish	*Tandanus tandanus*			EN	Swims close to sand or ravel bottoms in slow-moving streams, lakes and ponds with fringing vegetation (Allen et al. 2002).	1	23/03/2018	No suitable habitat - **unlikely to occur.**
Macquarie Perch	*Macquaria australasica*	EN		EN	Cool, clear water of rivers and lakes. Favours slower moving water (Allen et al. 2002).	2	1/04/1950	No suitable habitat - **unlikely to occur.**
Murray Cod	*Maccullochella peelii*	VU		EN	Slow flowing turbid water of rivers and streams of low elevation; also fast flowing clear upland streams (Allen et al. 2002).	7	1/01/1982	No suitable habitat - **unlikely to occur.**

Common Name	Scientific Name	EPBC	EPBC migratory	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Invertebrates								
Glenelg Spiny Crayfish	*Euastacus bispinosus*	EN		EN	Glenelg Spiny Freshwater Crayfish is considered a specialist species with typically low tolerance to environmental conditions (namely dissolved oxygen concentrations), ensuring that species requires specific habitat requirements. As with other *Euastacus* species, Glenelg Spiny Freshwater Crayfish have a preference for permanently-flowing, cool (and shaded) and well-oxygenated water (Morgan 1986; Morgan 1997). Other habitat requirements vary across Victorian and South Australian populations.	None	N/A	No suitable habitat - **unlikely to occur.**
Western Bright-eyed Brown Butterfly	*Heteronympha cordace wilsoni*			CR	Occurs with *Carex* species and various wetland grasses	1	01/01/1760	Only one extremely old record in search region - **unlikely to occur.**
Golden Sun Moth	*Synemon plana*	VU		VU	Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (DEWHA 2009). Also known to be closely associated with exotic grass species, with populations found in grassland almost entirely composed of Chilean needlegrass (Richter et al. 2013).	64	14/11/2018	Suitable habitat occurs in native grassy habitats - **potential to occur**.

6.5.3. Susceptibility to potential impacts

The following analysis identifies the susceptibility to development of listed fauna species which may utilise the study area. This analysis includes consideration of the factors below.

- The mobility of the species
- The availability and extent of other suitable habitat in the region and the degree to which each species may rely on habitat in the study area
- Historical and recent records

Birds (non-migratory)

Eleven listed non-migratory bird species were considered to have the potential to occur, were likely to occur or have been recorded in the study area. It was recommended that three of the 11 species be further investigated through targeted surveys to determine possible impacts of the proposed development. These included the following:

- Powerful Owl (FFG Act: vulnerable)
- Barking Owl (FFG Act: critically endangered)
- Swift Parrot (EPBC Act: critically endangered, FFG Act: critically endangered)

The **Powerful Owl** has been sighted numerous times within the study region. Eucalypt communities with large hollow bearing trees provide ideal habitat for the Powerful Owl. The **Barking Owl** prefers similar habitat to the Powerful Owl. Although the species has not been recently recorded, it is still likely to occur due to the suitability of available habitat and accessibility to freshwater sources within the study region.

The EPBC Act listed **Swift Parrot** has been recorded many times within the search region. Past surveys have indicated the individuals of the species fly lower than turbine height, however targeted surveys were recommended to check for the presence of this species.

Targeted surveys for these species have been undertaken and are detailed in sections 9 and 10.

Six species are woodland birds, three of which were recorded during the BUS (see Section 7). These species are unlikely to be impacted by turbines as they spend most of their time foraging on or near the ground or perching in trees of heights of no more than 20 metres, and rarely fly above tree top height.

Migratory birds

Two migratory bird species are considered to potentially occur within the study region, the White-throated Needletail and the Fork-tailed Swift. These species could fly over the proposed development site, but impacts are likely to be negligible. The **White-throated Needletail,** a known occasional casualty of turbines, is at the inland edge of its range at Navarre Wind Farm with only few records within the search region. The **Fork-tailed Swift** is a likely turbine casualty, but the number involved are such that there would be negligible population impacts on this widespread, mobile species, that may occur in the study area only on a few days per year. Impacts to both species are considered negligible from the proposed wind farm.

Invertebrates

One EPBC Act listed species, the **Golden Sun Moth** (GSM) is considered to have the potential to occur in the study area. GSM have previously been recorded in the wider search area and it has

been recorded in degraded grassland areas near Ararat by ecologists of Nature Advisory and could occur in similarly degraded grassy areas within the study area.

Suitable habitat is present within the study area in form of native grassland and treed areas with a grassy understorey supporting suitable species. The presence of this species is assumed within these habitats. The extent of suitable habitat for GSM has been determined based on field observations recorded during the fauna overview assessment, and vegetation descriptions recorded during the native vegetation assessments.