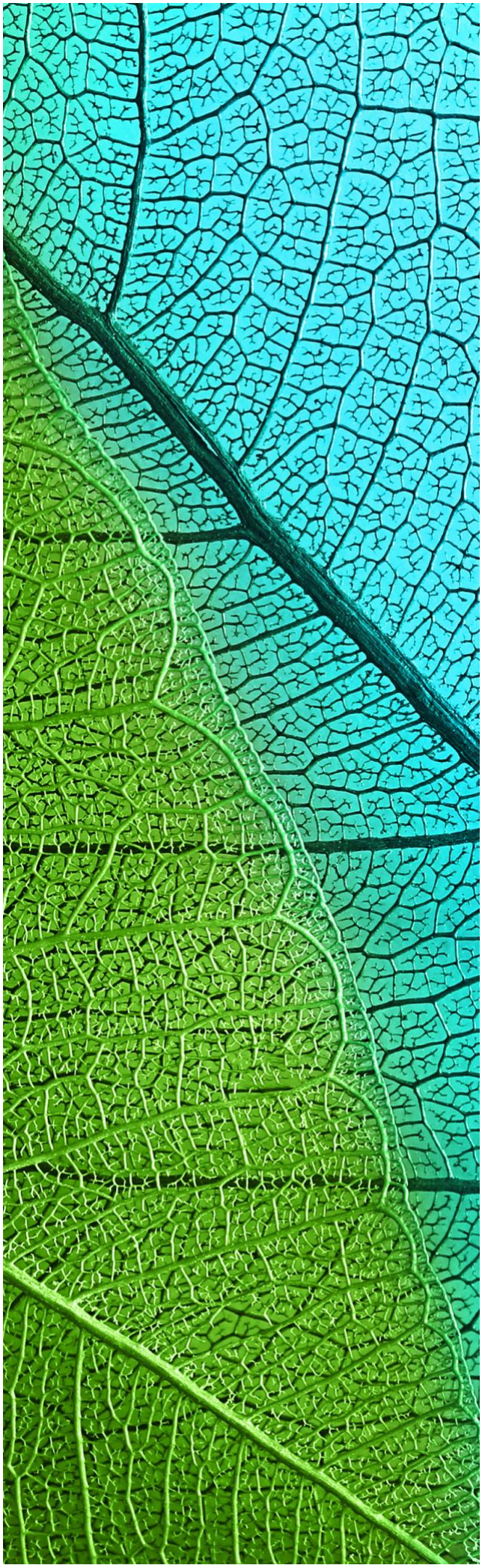

Gelliondale Wind Farm

Flora and Fauna Assessment

Prepared for Synergy Wind Pty Ltd

December 2022
Report No. 14107 (3.7)

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1. Executive summary

The initial Alberton Wind Farm was approved with 34 turbines through a bilateral assessment process as no Environmental Effects Statement (EES) was required. The project has been reduced to 13 turbines with associated infrastructure and was renamed Gelliondale Wind Farm. The distance between proposed turbines and forest edges has been increased for most turbines, unless other restrictions were in place (distance to dwellings) and a proposed turbine between two large forest blocks has been removed to reduce risk to forest species.

For the initial Alberton Wind Farm project, Nature Advisory Pty Ltd undertook flora and fauna assessments, bird utilisation surveys (BUS), and bat surveys between 2014 and 2016 at a number of private properties as well as public road and rail reserves around the township of Alberton West in South Gippsland, Victoria. An additional native vegetation field survey of the revised layout of the wind farm and associated infrastructure was conducted in September 2021.

The study area supported mostly extensive areas of cleared pasture with small, fenced patches of native scrub. Large, extensive remnant forests, woodlands, heathlands, sedgelands and scrubs abutted some edges of the study area. Several road and rail reserves supported native vegetation in from of swamp scrub. The Albert River flows along the northeast boundary of wind farm site.

Much of the study area was being used for dairy farming. As such, most of its remnant native vegetation and original fauna habitats had been removed through historical clearing for agricultural development. In this respect, the biodiversity value of the site is no different from most cleared agricultural landscapes in south-eastern Australia.

Six fauna habitat types were identified:

- Eucalypt Forest;
- Agricultural pastures/Grazing paddocks;
- Rows of native and introduced trees;
- Heathy woodland;
- Saltmarsh and mangroves; and
- Aquatic habitats (drainage lines, creeks, rivers).

A detailed native vegetation assessment was undertaken in September 2021. 92 patches (habitat zones) including 39 large trees in patches and 38 scattered trees were mapped within the study area. A total of five Ecological Vegetation Classes were found to occur: Swamp Scrub (EVC 53), Tall Marsh (EVC 821), Aquatic Herbland (EVC 653) Heathy Woodland (EVC 48) and Wet Heathland (EVC 8).

Two listed threatened ecological communities were considered to potentially occur in the study area: Natural Damp Grassland of the Victorian Coastal Plains (within the proposed development footprint) and Subtropical and Temperate Coastal Saltmarsh (outside the proposed development footprint). Targeted surveys have been undertaken in November 2016 to determine whether Natural Dam Grassland occurs within the proposed development footprint and it has not been found.

A total of 116 flora species (64% indigenous) were recorded during the 2021 vegetation assessment and 120 fauna species (mostly indigenous) were recorded during the fauna assessment in 2016 (BL&A 2016a). Eight EPBC Act and six FFG Act listed flora species and 29

fauna species (17 EPBC Act listed and 12 FFG Act listed) were considered to potentially occur or likely to occur.

Flora

The analysis of the likelihood of occurrence of listed flora species presented in Section 5.3.2 identified that the following species had potential to occur within the study area:

- Creeping Rush (FFG Act: Endangered);
- Currant-wood (FFG Act: Endangered);
- River Swamp Wallaby-grass (EPBC Act: Vulnerable);
- Southern Blue-gum (FFG Act: Endangered); and
- Strzelecki Gum (EPBC Act: Vulnerable; FFG Act: Critically Endangered).

No trees and wetlands will be removed by the proposed wind farm and targeted flora surveys undertaken within the wider initial layout did not record any threatened flora species (BL&A 2016a).

The following species only have potential to occur in the adjacent Gelliondale State Forest, which was part of the study area but has been avoided as part of the design response to mitigate impacts:

- Clover Glycine (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Dense Leek-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Eastern Spider-orchid (EPBC Act: Endangered);
- Fringed Helmet-orchid (FFG Act: Endangered);
- Metallic Sun-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Maroon Leek-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Orange-tip Finger-orchid (FFG Act: Endangered);
- Spurred Helmet-orchid (FFG Act: Endangered);
- Thick-lip Spider-orchid (EPBC Act: Vulnerable).

Fauna

The following listed fauna species were considered to be potentially impacted, as they have the potential to occur, been recorded within the wind farm, or fly at RSA height:

- Swift Parrot
- White-throated Needletail
- Gang–gang Cockatoo
- Powerful Owl
- White-bellied Sea-Eagle

Targeted surveys for Swift Parrot have been carried out in April 2020 and April/May 2021 and for White-throated Needletail in December 2020 as well as March and April 2021. No Swift Parrots have been observed, but White-throated Needletail have been observed along forest edges and paddocks between forest blocks. No significant impacts to the Swift Parrot or White-throated Needletail populations are expected from the proposed reduced wind farm layout.

The Gang–gang Cockatoo is a strict woodland species and would only occasionally venture outside the woodland and is not expected to be significantly impacted.

Powerful Owl generally confines itself to forested habitats, none of which will have turbines built in them and dispersal of juvenile owls after breeding is finished would be a rare event most likely confined to the areas where treed habitats are closest. Where this occurs, either side of the South Gippsland Highway, no turbines are proposed to be constructed. The likelihood of an ongoing impact on this species is therefore considered to be low.

The White-bellied Sea-Eagle is not likely to be impacted by the operation of the wind farm as it is mostly found along the coast and may only on occasions venture inland passing over the wind farm site.

Native vegetation

A total of ***0.691 hectares*** of remnant patch native vegetation are ***proposed to be removed*** from the study area. No trees are proposed to be removed.

Proposed vegetation removal would result in an estimated ***offset requirement of 0.261 General Habitat Units (GHUs)*** with a minimum Strategic Biodiversity Score of 0.316. Offsets would need to be achieved within the West Gippsland CMA or Wellington Shire Council and will need to be secured prior to the removal of native vegetation.

Small areas of additional native vegetation removal in form of swamp scrub or treed vegetation within road reserves is expected within turning circles of trucks carrying blades at up to 10 intersections along the transport route during construction. The exact amount of this native vegetation removal will be determined in response to the full Traffic Impact Assessment, which is currently being prepared.

A permit is required under Environmental Significance Overlay and Schedules 1 and 2 to that overlay within the Wellington Planning Scheme to remove, destroy or lop any vegetation, including dead vegetation. A planning permit under Clause 52.17 of the Wellington Planning Scheme is also required for the removal of native vegetation. The current proposal will be assessed under the detailed assessment pathway and will be referred to the state Department of Environment, Land Water and Planning (DELWP).

A Referral under the EPBC Act has been submitted in December 2016 for the initial layout (34 turbines) and the project was decided to be a controlled action. The initial project (Alberton Wind Farm) has been assessed and approved under the bilateral agreement between the Commonwealth and the state of Victoria.

2. Introduction

Synergy Wind Pty Ltd engaged Nature Advisory Pty. Ltd. to conduct an updated native vegetation assessment for the reduced and updated layout of Gelliondale Wind Farm. This was in addition to flora and fauna assessments, a bird utilisation survey (BUS) and bat surveys undertaken between 2014 and 2016 for the initially proposed Alberton Wind Farm. The specific area investigated included the private properties listed in Appendix 2. Gelliondale Wind Farm will comprise 13 turbines and associated infrastructure on this land (see Figure 1).

This investigation was commissioned to provide information on the extent and condition of native vegetation in the study areas according to Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017), herein referred to as 'the guidelines', as well as any potential impacts on flora and fauna matters listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report outlines any implications under relevant national, state and local legislation and planning policies that control development impacts on biodiversity.

This report updates the initial Flora and Fauna report prepared by Brett Lane & Associates BL&A 2016a) to bring the contained information in line with recently gazetted changes to Victoria's native vegetation removal regulations (DELWP 2017) and addresses layout changes from initially 34 to 13 turbines and associated infrastructure, such as the substation, battery, access tracks and underground cables.

Bird and bat surveys were undertaken for the initial Alberton Wind Farm to provide baseline data on the pre-construction utilisation of the wind farm site by birds and bats as a basis for the development of any mitigation measures that may be necessary. In addition, a migratory shorebird survey was undertaken along the coast of the Corner Inlet and Nouramunga Marine and Wildlife Reserves, whose main coastlines lie approximately three kilometres south of the proposed wind farm site (BL&A 2016b). These surveys are still valid for Gelliondale Wind Farm as this is just a smaller footprint of the Alberton Wind Farm footprint.

The bird utilisation survey (BUS) scope was consistent with the requirements for a "Level One" bird risk assessment in accordance with 'Wind Farms and Birds - Interim Standards for Risk Assessment' issued by the then Australian Wind Energy Association (AusWEA 2005). This approach has been endorsed in the Clean Energy Council's Best Practice Guidelines (CEC 2018).

Bat surveys were undertaken in accordance with Clean Energy Councils' Best Practice Guidelines (2018) using bat detection systems to record the echolocation calls of bats. Records were made from five sites during February and March 2015. The sites included monitoring with two recorders at a wind mast with one microphone at 50 metres, and another at ground level (1-2 metres) at the same location. The survey sites represented the various habitat types within the wind farm with a focus on the possible presence of threatened species of bats.

The vegetation assessment was divided into two stages: an initial overview assessment of the broader wind farm site (referred to herein as the 'broader study area') followed by several detailed assessments of various proposed development footprints (referred to herein as the 'study area').

All ecological assessments were undertaken by a team from Nature Advisory, comprising Davide Coppolino (Senior Ecologist), Jeremy Ward (Senior Zoologist), Guille Mayor (Ecologist), Luke Halpin (Zoologist); Dean Karopoulos (Botanist), Khalid Al-Dabbagh (Senior Zoologist), Nhung Thi Hong Ngyuen (Senior GIS Analyst), Inga Kulik (Director) and Brett Lane (Managing Director).

3. Planning and legislative considerations

This section of the report reviews the legislation and planning provisions that relate to biodiversity considered relevant to the control of the proposed development's impacts on biodiversity. The implications of these controls for the project are addressed in Section 6 of this report.

3.1. Local laws and regulations

Section 111, Part 5 of the *Local Government Act 1989* gives authority to local governments to make local laws for or with respect to any act, matter or thing that it has jurisdiction over under any Act.

There are no local laws relevant to biodiversity that relate to the current proposal.

3.2. Planning and Environment Act 1987

The Victorian *Planning and Environment Act 1987* (P&E Act) establishes a framework for planning the use, development and protection (or conservation) of land in Victoria.

Section 4A (1-2) of the Act allows the Minister for Planning to prepare and approve standard planning provisions (i.e., Victorian Planning Provisions, or VPPs). VPPs are implemented through Victoria's planning schemes which are constituted and approved under the Act.

VPPs within each planning scheme are divided into State Planning Provisions, which apply across Victoria; and Local Planning Provisions, which apply specifically to the applicable local planning scheme in the relevant municipality.

This section discusses planning provisions in the Welshpool planning scheme applicable to flora, fauna and native vegetation.

3.2.1. Land designation

Zoning of land within the broader study area is detailed in Appendix 2. Zones in the broader study area comprise the following:

- Farming Zone
- Transport Zone – Category 2
- Public Conservation and Resource Zone
- Industrial 1 Zone

The entire study area is located within a Bushfire-prone Area.

3.2.2. Local provisions

Local Planning Policy Framework

There are no local planning policies relevant to the current investigation.

Overlays

The study area is subject to the following overlay relevant to this assessment. The purpose of this overlay in the Wellington Planning Scheme are also discussed below.

- *Environmental Significance Overlay – Schedule 2* (*ESO2*) – The purpose of this overlay is to ensure the long-term protection and enhancement of the environmental quality, natural beauty, cultural and scientific value and visual amenity of wetland environs. A permit is required to remove any vegetation under this overlay.

3.3. 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 the following:

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

A permit is not required if any of the following apply:

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

3.3.1. Exemptions

Exemptions listed in Table 52.17-7 relevant to the study area include the following:

- *Dead native vegetation:* Native vegetation that is dead is exempt and does not require a planning permit. This does not apply to a standing dead tree with a trunk diameter of 40 centimetres or more at a height of 1.3 metres above ground level. As such, any dead trees with a diameter at breast height (DBH) of 40 centimetres or more have been included in the tree data collected for this investigation.
- *Planted vegetation:* Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding. This exemption does not apply to native vegetation planted or managed with public funding for the purpose of land protection or enhancing biodiversity.
- *Regrowth:* Native vegetation that is to be removed, destroyed or lopped that has been naturally established or regenerated on land lawfully cleared of naturally established native vegetation and meets the following criteria:
    - Is less than 10 years old; or
    - Is Austral Bracken (*Pteridium esculentum*); or
    - Falls within the boundary of a timber production plantation, as indicated on a Plantation Development Notice or other documented record and has become established after the plantation; or
    - Is less than 10 years old at the time of a property vegetation plan being signed by the Secretary to the Department of Environment, Land, Water and Planning (DELWP) (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987*) and is shown on that plan as being 'certified regrowth'; and occurs on land that is to be used or maintained for cultivation or pasture during the term of that plan.

  This exemption does not apply to land where native vegetation has been destroyed or otherwise damaged as a result of flood, fire or other natural disaster.

3.3.2. Application requirements

Any application to remove, destroy or lop native vegetation must comply with the application requirements specified in the Guidelines (DELWP 2017).

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

- *Assessor's handbook – applications to remove, destroy or lop native vegetation* (Version 1.1) (DELWP 2018).
- Statewide biodiversity information maintained by DELWP.

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

3.3.3. Referral to DELWP

Clause 66.02-2 of the planning scheme determines the role of DELWP in the assessment of native vegetation removal permit applications. If an application is referred, DELWP may make certain recommendations to the responsible authority in relation to the permit application.

Any application to remove, destroy or lop native vegetation must be referred to DELWP if any of the following apply:

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

3.4. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* 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.

The initial project has been referred under the EPBC Act as Alberton Wind Farm for 34 turbines and it was approved as a controlled action (EPBC 2017/7854) and was assessed as a bilateral project under state and federal regulations.

Implications under the EPBC Act for the current proposal are discussed in Section 7.3.

3.5. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* lists threatened and protected species and ecological communities (DELWP 2022d). Any removal of threatened flora species or communities (or protected flora) listed under the FFG Act from public land requires a Protected Flora Permit under the Act, obtained from DELWP.

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 7.3.

3.6. 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.

The project has been referred under the EE Act as Alberton Wind Farm for 34 turbines and was assessed and approved under the bilateral agreement between the Commonwealth and Victoria for environmental assessments (EPBC 2017-7854).

4. Existing information and methods

4.1. Existing information

Existing information used for this investigation is described below.

4.1.1. Existing reporting and documentation

The reports, planning schemes and/or development plans below, relating to the study area were reviewed.

- Wellington Planning Scheme (DTPLI 2015)
- Brett Lane & Associates (BL&A 2016a), *Alberton Wind Farm - Flora and Fauna Assessment* - Report No. 14107 (3.3), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Synergy Wind Pty Ltd, December 2016.
- Brett Lane & Associates (BL&A 2016b), *Alberton Wind Farm - Bird and Bat Assessment* - Report No. 14107 (1.3), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Synergy Wind Pty Ltd, August 2016.
- Updated windfarm layout received in August 2022 in addition to the previous wind farm layouts received between December 2015 and July 2022.

4.1.2. Native vegetation

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

- Relevant EVC benchmarks for the Gippsland Plain bioregion[1] (DSE 2004a); and
- *Naturekit* (DELWP 2022a)

4.1.3. Listed matters

Existing flora and fauna species records information about the potential occurrence of listed matters was obtained from an area termed the 'search region', defined here as an area with a radius of ten kilometres from the approximate centre point of the study area (coordinates: latitude 38° 37' 22" S and longitude 146° 35' 42" E).

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

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

[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).

4.2. Field methods

4.2.1. Native Vegetation Assessments

Overview Assessment

An initial overview assessment was carried out from 23rd to 27th March 2015. The subsequent flora and fauna assessments were conducted from 7th to 11th December 2015, from 7th to 10th June 2016 as well as 2nd to 4th November 2016 (flora survey only, during the latter two). The second, third and fourth assessment focused on parts of additional properties within which overhead transmission lines were proposed. During these assessments, the broader study area (comprising most of the properties participating in the wind farm project) was inspected from a vehicle. During the fauna assessments, the wind farm site was surveyed by sampling the various distinct landscapes and habitat types recorded during the overview assessment. These areas were initially surveyed from a vehicle and areas supporting notable fauna habitat were inspected in more detail on foot.

During the overview assessments, each distinct site found to support native vegetation was mapped at a course-scale using aerial photograph interpretation. The following information was recorded for each site:

- Ecological Vegetation Classes identified or likely to occur;
- General weediness;
- Indication of indigenous flora diversity;
- Basic notes of vegetation such as dominant species; and
- General quality of vegetation.

Detailed Native vegetation Assessments

A detailed habitat hectare assessment was undertaken between the 21st and 23rd September 2016. After receiving amendments to the windfarm layout and reducing the number of turbines to fourteen, an additional native vegetation field survey of 603 hectares was conducted on the 20th – 23rd September 2021.

During this assessment, the study area was surveyed on foot. Native vegetation sites intersecting with, or in close proximity to development footprint options were mapped and assessed in detail. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand-held GPS (accurate to approximately five metres).

Whilst this assessment was not designed to provide an exhaustive inventory of flora species in the study area, all efforts were made to schedule the site assessment at a time of year when the majority of native vegetation life forms are likely to be present. The spring timing of the 2021 survey and condition of vegetation was considered suitable to ascertain the extent and condition of native vegetation.

Definitions

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 2017) further classify native vegetation as belonging to two categories:

- Patch; or
- Scattered trees.

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

A **remnant patch of native vegetation** is either:

- An area of native vegetation where at least 25 per cent of the total perennial understorey plant cover is native; and/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).

Remnant patch condition is assessed using the habitat hectare method (Parkes *et al*. 2003; DSE 2004) whereby components of native vegetation (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.

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.

4.2.2. Flora species and ecological communities

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 2022).

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
- 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.

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[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.

A targeted flora survey for EPBC Act listed species and ecological communities was undertaken between the 2nd and 4th November 2016 (BL&A 2016a). Targeted surveys were undertaken for the following listed flora species and communities:

- Natural Damp Grassland of the Victorian Coastal Plains
- Clover Glycine
- Eastern Spider-orchid
- Maroon Leek-orchid
- Metallic Sun-orchid
- River Swamp Wallaby-grass
- Strzelecki Gum and
- Thick-lip Spider-orchid

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 (SAC 2015).

The orchid species and Clover Glycine would only have potential to occur within the adjacent Gelliondale State Forest, which is not going to be impacted. Coastal areas and wetlands will not be impacted and no trees are proposed to be removed. For this reason, targeted surveys for threatened flora species and listed ecological communities were not repeated in 2021.

4.2.3. Fauna species and habitats

The techniques below were used to detect fauna species utilising the study area during the initial fauna survey in 2016:

- 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;
- Bird observation during the day in addition to transect surveys in relevant habitats in association with the proposed wind farm;
- General searches for reptiles and frogs; including identification of frog calls in seasonally wet areas; and
- General searches for bat habitat including waterbodies, potential commuting corridors, foraging sites and potential roosting sites such as caves, trees with hollows and lifted bark for crevice dwelling species.

The broader 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 *NatureKit* (DELWP 2020a).

In addition to the fauna assessment in this report, detailed avifauna and bat investigations have been undertaken in the broader study area and its environs, in particular:

- Bird Utilisation Studies (BL&A 2016b);
- Bat Utilisation Studies (BL&A 2016b);
- Targeted Swift Parrot and White-throated Needletail surveys (see Section 6); and

- Migratory and resident shorebird surveys of the intertidal and shallow marine habitats in the nearby parts of the Nooramunga Marine and Coastal Parks (BL&A 2016b).

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or fauna listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Victorian *Flora and Fauna Guarantee Act 1988*. 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.

4.3. Limitations of field assessment

The short duration of field assessments can result in a failure to record all species and life-forms because of the seasonal absence of some species. However, this limitation was not considered to undermine the current investigation, which was designed to provide an indicative, rather than exhaustive inventory of flora and fauna species in the study area.

The site assessments were carried out in early autumn (overview assessment), early summer (detailed flora and fauna assessment), early spring (habitat hectare assessment of powerline layout) and spring (2016 targeted EPBC Act species surveys and 2021 native vegetation assessment).

Some paddocks had been heavily grazed during the assessments, leaving little vegetation available to determine the presence, extent and/or composition of native vegetation. 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.

Identification of EVCs considers vegetation types which would have naturally occupied the landscape prior to European impacts. Significant past alteration of parts 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 2021);
- Observations of adjacent landforms that had not been significantly altered;
- Observations of nearby natural vegetation remnants;
- Any observed indigenous flora species that are useful for determining EVCs; and
- Relevant published EVC benchmark descriptions.

EVC identification was based upon the structure and floristic composition of current observed vegetation 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.

No information was available on whether planted vegetation had been planted and maintained with public or private funding. Therefore, for the purposes of the current investigation, vegetation planted on private land was assumed to have been planted and maintained with private funding while that on public land was assumed to have been planted and maintained with public funding.

5. Assessment results

5.1. Site description

The study area for this investigation was approximately 621 hectares of private and public land located at Alberton West, approximately 13 kilometres south-west of Yarram and 167 kilometres south-east of Melbourne CBD.

The study area supported heavy alluvial soils on a very gently undulating plain. These soils gradually graded into light-loamy to sandy soils on the southern extent. The study area supported many small to large farm dams, divided by numerous minor to prominent man-made drainage channels. Many of these water bodies were inundated during investigations and supported a mixture of indigenous and introduced aquatic and wetland vegetation (e.g., reeds, rushes, herbs and shrubs).

Land in the study area would have once supported a complex of heathy vegetation types with Sedgy Wetland and Swamp Scrub in larger wet depressions and along drainage lines. Almost all this area and surrounding land had been cleared of native vegetation and was being used for stock grazing. Ground water had also been significantly drained. Other land uses within the study area include a rail reserve and several road reserves, as well as Alberton West State Forest to the north Gelliondale State Forest to the south.

Vegetation in the study area consisted of Swamp Scrub and Heathland remnant vegetation on roadsides, windbreaks, and in the rail trail corridor, and ephemeral wetland vegetation in grazing paddocks and drainage lines. Roadside vegetation was mostly dominated by Swamp Paperbark thickets with some emergent Swamp Gums and mixed native and non-native understorey of grasses and herbs. The rail trail roadside vegetation comprised larger trees, mostly Swamp Gums, with a remnant understorey of Swamp Paperbark and native grasses. Grazing paddocks held wetland vegetation in low laying areas, dominated by native grasses such as Spike Sedge, Rushes, Common Reed, Cumbungi, and some aquatic herbs such as Pondweed.

The following DELWP BioSites occurred within the broader study area:

- Albert River (Site No. 1903) – national significance;
- Gelliondale Railway (Site No. 1955) – regional significance; and
- Hedley (Site No. 1914) – regional significance.

The disused Gelliondale Railway which crosses the broader study area provided the only narrow, densely vegetated east to west wildlife corridor through the otherwise cleared landscape.

The key habitat areas listed below occurred within the region.

- Alberton West State Forest

  This area comprised an extensive forest remnant on the foothills of the Strzelecki Ranges, immediately north-west and contiguous with remnant forest blocks in the central north-western part of the broader study area.

- Strzelecki Ranges

  The main expanse of remaining remnant native forest covering the Strzelecki Ranges occurred less than 10 kilometres to the north-west. This habitat was somewhat linked to the broader study area via a patchwork of cleared farmland and small to large patches of remnant native forest.

- Gelliondale State Forest

  This area supported extensive heathy woodlands and other near-coastal vegetation types. It extended southwards from the southern edge of the broader study area.

- Nooramunga Marine and Coastal Parks

  This area supported extensive coastal banksia woodlands, saltmarshes and other coastal vegetation types, as well as areas of intertidal sand and mud flats and shallow marine waters. It extended southwards from the southern edge of the abovementioned unnamed state forest, to Corner Inlet. Nooramunga Marine Coastal Park occurs approximately 3.5 kilometres south of the broader study area.

- Corner Inlet (Ramsar and listed Important Wetland)

  This area extended westward from the southern end of Nooramunga Marine Coastal Park. Corner Inlet lies approximately seven kilometres southwest of the broader study area.

- Wilsons Promontory National Park

  This area extended southward from Corner Inlet, approximately 15 kilometres south-west of the study area.

The study area lies within the Gippsland Plain bioregion and falls within the West Gippsland catchment.

Figure 1- Study area and native vegetation

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Study area
- Turbine
- Access track
- Electrical cable
- Staging area

Native vegetation

- Wet Heathland (EVC 8)
- Heathy Woodland (EVC 48)
- Swamp Scrub (EVC 53)
- Aquatic Herbland (EVC 653)
- Tall Marsh (EVC 821)
- Large tree in patch
- Large scattered tree
- Small scattered tree

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5.2. Native vegetation

5.2.1. Patches of native vegetation

Pre–European EVC mapping (DELWP 2021) indicated that the study area and surrounds would have supported Swamp Scrub (EVC 53), Plains Grassland (EVC 132), Heathy Woodland (EVC 48) and Wet Heathland (EVC 8) 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 Swamp Scrub (EVC 53), Tall Marsh (EVC 821), Aquatic Herbland (EVC 653) Heathy Woodland (EVC 48) and Wet Heathland (EVC 8) were present in remnant patches throughout the study area (Figure 1). A description of these EVCs are provided within the EVC benchmarks in Appendix 9.

A total of 92 patches (referred to herein as habitat zones) comprising the abovementioned EVCs, were identified in the study area (Table 1). This totalled an area of 20.58 hectares of native vegetation in patches and included 39 large trees.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
A, B	Aquatic Herbland (EVC 653)	These habitat zones comprised semi-permanent wetlands occurring in drainage lines. Vegetation in these habitat zones primarily consisted of graminoids such as Spike-rush, Rush (*Juncus spp.*) and Tall Sedge (*Carex appressa*), as well as Creeping Monkey-flower (*Thyridia* repens) and Fennel Pondweed (*Stuckenia pectinata*). Bryophyte and soil crusts were virtually absent. Weed cover was moderate (~20%) and was primarily composed of grasses such as Toowoomba Canary-grass, Rye and Cocksfoot. Organic litter was low (~5%), and mostly native. There was relatively little bare ground available for recruitment (~15%).
C, AB	Aquatic Herbland (EVC 653)	These habitat zones comprised semi-permanent wetlands occurring in low-lying areas of paddocks Native vegetation in these habitat zones primarily consisted of Spike-rush and Rush (*Juncus spp.*), with herbs such as Willow-herb (*Eplilobium spp.*) and Common Duckweed (*Lemna disperma*) also occurring. Bryophyte and soil crusts were virtually absent. Weed cover was moderate (~30%) and was primarily composed of grasses such as Toowoomba Canary-grass, Fescue and Cocksfoot. Organic litter was low (~10%), and mostly native. There was relatively little bare ground available for recruitment (~10%).

Habitat Zone	EVC	Description
D, E, K, M, N, P, Q, R, S, T, W, AC, AD, AE, AI, AF, AG, AH, AJ, CJ	Swamp Scrub (EVC 53)	These habitat zones primarily comprised vegetation occurring in road reserves, often in slight depressions. Canopy cover was low (5-25%), but very healthy, and was largely comprised of Swamp Paperbark with occasional Blackwood present. Native vegetation in the understory was often scarce, being composed of Seaberry Saltbush, Rushes, Spike-rushes, Sheep's burr, Heron's Bill and Wallaby Grasses. Most woody species observed were recruiting. Bryophytes soil crusts were present at very low cover. Weed cover was moderate (20-60%) and primarily composed of Toowoomba Canary-grass and Rat's-tail Grass. Organic litter was moderate (~20%) and largely exotic.
F, G, H, CF, CK, CL	Swamp Scrub (EVC 53)	These habitat zones occurred in wind breaks on grazing and cropping land. While they occurred in stands of planted eucalypts, the understory vegetation had occurred naturally. Canopy cover was low (5-25%), but very healthy, and was largely comprised of Swamp Paperbark with occasional Blackwood present. Native vegetation in the understory was composed of Seaberry Saltbush, Tree violet, Rushes, Common Reed, Nodding Saltbush, Spike-rushes and Sheep's burr. Bryophytes and soil crusts were present at very low cover. Weed cover was moderate (10-40%) and primarily composed of Toowoomba Canary-grass and Rat's-tail Grass. Organic litter was moderate (15-40%) and largely native.
I, J, L, O, U, CB, CC, CG, CH, CI	Swamp Scrub (EVC 53)	These habitat zones primarily comprised vegetation occurring in road reserves, often in slight depressions. Canopy cover was low (10-25%), but very healthy, and was largely comprised of Swamp Paperbark with occasional Blackwood present. Native vegetation in the understory was composed of Seaberry Saltbush, Common Woodruff, Tussock Grasses, Rushes, Spike-rushes, Sheep's burr, Heron's Bill and Kangaroo Grass. Most woody species observed were recruiting. Bryophytes and soil crusts were present at low cover. Weed cover was moderate (10-40%) and primarily composed of Toowoomba Canary-grass and Rat's-tail Grass. Organic litter was moderate (~20%) and largely native.

Habitat Zone	EVC	Description
V, X, Y, Z, AA	Tall Marsh (EVC 821)	These habitat zones mostly comprised artificial water bodies and surrounding low-lying inundated areas. Native vegetation in these habitat zones primarily consisted of Common Reed (*Phragmites australis*), Cumbungi (*Typha orientalis*), Spike-rush, Rush and a variety of herbs including Tiny Duckweed (*Wolffia australiana*), Common Duckweed, Slender Knotweed (*Persicaria descipiens*) and thick mats of Azolla (*Azolla spp.).* Bryophyte and soil crusts had low cover (~5%). Weed cover was low (~10%) and was primarily composed of grasses such as Toowoomba Canary-grass and Cocksfoot as well as Common Starwort and Ribwort. Organic litter was low (~5%), and mostly native. There was relatively little bare ground available for recruitment (~15%).
AK, AL	Swamp Scrub (EVC 53)	These habitat zones occurred along the rail trail reserve. Several planted spotted gums occurred in these habitat zones, but the understory was naturally established. Canopy cover was low (10-25%), but very healthy, and was largely comprised of Swamp Paperbark with Sallow Wattle present. Native vegetation in the understory was composed of Seaberry Saltbush, Smooth Rice-flower, Rushes, Spike-rushes, Sheep's burr, Small Grass-tree, Prickly tea-tree and Kangaroo Grass. Most woody species observed were recruiting. Bryophytes and soil crusts were present at low cover. Weed cover was moderate (~30%) and primarily composed of Toowoomba Canary-grass and Drain Flat-sedge Organic litter was moderate (~20%) and largely native.
AN, AM, AO, AP, AQ, AR, AS, AT, AU, BR, BS, BV, BX	Swamp Scrub (EVC 53)	These habitat zones occurred along the rail trail reserve and were heavily degraded by grazing and soil disturbance. Canopy cover was low (5-25%), but healthy, and was largely comprised of Swamp Paperbark with occasional Blackwood present. Native vegetation in the understory was composed of Seaberry Saltbush, Willow Herb, Rushes, Saw-sedge, Spike-rushes, and Mat-rush. Most woody species observed were recruiting. Bryophytes and soil crusts were scarcely present. Weed cover was high (30-75%) and primarily composed of Toowoomba Canary-grass. Organic litter was low (~15%) and largely exotic.

Habitat Zone	EVC	Description
AV, AW, AX, AZ, BA, BB, BC, BD, BF, BG, BI, BJ, BK, BL, BM, BN, BO, BW,	Heathy Woodland (EVC 48)	These habitat zones occurred along the rail trail reserve and were heavily degraded by grazing and soil disturbance. Roughly half of these patches contained large trees, which were generally in good health. Canopy cover was high (20-50%), and consisted of Swamp Gum and Coast Manna-gum which were generally in good health. Understory vegetation was sparse, primarily consisting of scatted Swamp Paperbark, Rush, Spike-rush and Austral Bracken. Blackwood, Thatch Saw-sedge, Wattle Mat-rush Recruitment of woody species was only rarely observed. Bryophytes and Soil Crusts were virtually absent. Weed cover was high (50-75%), and primarily comprised introduced pasture grasses such as Toowoomba Canary-Grass, Sweet Vernal Grass and Cocksfoot. Blackberry and Sweet Briar were also common. Organic litter was low (~15%), and mostly exotic. Large and small logs were abundant, and often exceeded the benchmark.
BE, BH, BP, BQ, BT, BU	Heathy Woodland (EVC 48)	These habitat zones occurred along the rail trail reserve. Roughly half of these patches contained large trees, which were generally in good health. Canopy cover was moderate (10-30%), and consisted of Swamp Gum and Coast Manna-gum which were generally in good health. Understory vegetation was diverse, consisting of Swamp Paperbark, Scrub She-oak, Blackwood, Rush, Austral Bracken, Small Grass-tree and Spear Grasses. Most woody species observed were recruiting. Bryophytes and Soil Crusts were present at low covers. Weed cover was moderate (25-50%), and primarily comprised introduced pasture grasses such as Toowoomba Canary-Grass, Sweet Vernal Grass and Cocksfoot. Blackberry and Sweet Briar were also common. Organic litter was moderate (20-40%), and mostly native. Large and small logs were abundant, and often exceeded the benchmark.
BY	Swamp Scrub (EVC 53)	This habitat zone occurred as part of the western boundary of Gelliondale State Forest. Canopy cover was low (9%), but very healthy. Native vegetation in the understory was extremely diverse. Swamp Paperbark, Scrub She-oak Common Reed, Pithy Sword-sedge, Spear Grasses and Common Raspwort were particularly abundant. Most woody species observed were recruiting. Bryophytes and lichen were abundant (20%) and soil crusts had low cover. Weed cover was low (5%) and primarily low threat, although Blackberry was present. Organic litter was moderate (20%) and largely native. This habitat zone was found to support orchids, but as they were not in flower they could not be identified.

Habitat Zone	EVC	Description
BZ	Heathy Woodland (EVC 48)	This habitat zone occurred as part of the western boundary of Gelliondale State Forest. 12 large trees were recorded, which were in good health. The canopy was open (5%), and consisted of Messmate and Coast Manna-gum which were in good health. Understory vegetation was very diverse, consisting of Beard Heath, Seaberry Saltbush, Mat-rush, Austral Bracken, Small Grass-tree, Spear Grasses and abundant small herbs such as Kidneyweed, Ivy-leaved Violet and Sieber Crassula. Most woody species observed were recruiting. Bryophyte cover was high (25%) and Soil Crusts were also prevalent (10%). Weed cover was moderate (25%), but primarily comprised introduced pasture grasses such as Toowoomba Canary-Grass and restricted to the edge of the patch. Organic litter was high (40%), and mostly native. 36 meters of logs were recorded.
CD	Wet Heathland (EVC 8)	This habitat zone occurred as part of the eastern boundary of Gelliondale State Forest. Native vegetation in the understory was extremely diverse. Swamp Paperbark, Scrub She-oak, Seaberry Saltbush, Common Reed, Pithy Sword-sedge, Spear Grasses and Common Raspwort were particularly abundant. Most woody species observed were recruiting. Bryophytes and lichen were abundant (20%) and soil crusts had low cover. Weed cover was low (5%) and primarily low threat, although Blackberry was present. Organic litter was moderate (20%) and largely native. This habitat zone was found to support orchids, but as they were not in flower they could not be identified.
CE	Wet Heathland (EVC 8)	This habitat zone occurred in the road reserve adjacent to of the eastern boundary of Gelliondale State Forest. Native vegetation in this habitat zone comprised Swamp Paperbark, Seaberry Saltbush, Common Reed, Spike-rushes, Rough Fireweed, Variable Plantain, Sheep's Burr and Spear Grass. Most woody species observed were recruiting. Bryophytes were present (10%), and soil crusts were present at low cover (2%). Weed cover was moderate (40%) and was largely high-threat, including Spear Thistle, Blackberry and Drain Flat-sedge. Organic litter was low (15%) and largely exotic.

The habitat hectare assessment results for these habitat zones are provided in Table 2. More detailed habitat scoring results are presented in Appendix 3. Details of large trees in patches are provided in Appendix 4.

Table 2: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of Large Trees in HZ
A	Aquatic Herbland (EVC 653)	0.02	46	0
B	Aquatic Herbland (EVC 653)	0.02	46	0
C	Aquatic Herbland (EVC 653)	0.85	43	0
D	Swamp Scrub (EVC 53)	0.03	38	0
E	Swamp Scrub (EVC 53)	0.26	38	0
F	Swamp Scrub (EVC 53)	1.32	52	0
G	Swamp Scrub (EVC 53)	0.37	38	0
H	Swamp Scrub (EVC 53)	0.42	38	0
I	Swamp Scrub (EVC 53)	0.04	47	0
J	Swamp Scrub (EVC 53)	0.06	40	0
K	Swamp Scrub (EVC 53)	0.09	35	0
L	Swamp Scrub (EVC 53)	0.33	35	0
M	Swamp Scrub (EVC 53)	0.06	35	0
N	Swamp Scrub (EVC 53)	0.04	23	0
O	Swamp Scrub (EVC 53)	0.01	38	0
P	Swamp Scrub (EVC 53)	0.19	30	0
Q	Swamp Scrub (EVC 53)	0.02	23	0
R	Swamp Scrub (EVC 53)	0.07	23	0
S	Swamp Scrub (EVC 53)	0.02	32	0
T	Swamp Scrub (EVC 53)	0.08	30	0
U	Swamp Scrub (EVC 53)	0.69	30	0
V	Tall Marsh (EVC 821)	0.06	43	0
W	Swamp Scrub (EVC 53)	0.03	23	0
X	Tall Marsh (EVC 821)	0.39	56	0
Y	Tall Marsh (EVC 821)	0.05	43	0
Z	Tall Marsh (EVC 821)	0.12	47	0
AA	Tall Marsh (EVC 821)	0.19	46	0
AB	Aquatic Herbland (EVC 653)	0.01	21	0
AC	Swamp Scrub (EVC 53)	0.1	25	0
AD	Swamp Scrub (EVC 53)	0.11	30	0
AE	Swamp Scrub (EVC 53)	0.01	30	0
AF	Swamp Scrub (EVC 53)	0.06	40	0
AG	Swamp Scrub (EVC 53)	0.02	40	0
AH	Swamp Scrub (EVC 53)	0.01	40	0
AI	Swamp Scrub (EVC 53)	0.08	36	0
AJ	Swamp Scrub (EVC 53)	0.04	36	0
AK	Swamp Scrub (EVC 53)	0.24	45	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of Large Trees in HZ
AL	Swamp Scrub (EVC 53)	0.19	45	0
AM	Swamp Scrub (EVC 53)	0.01	40	0
AN	Swamp Scrub (EVC 53)	0.01	40	0
AO	Swamp Scrub (EVC 53)	0.07	29	0
AP	Swamp Scrub (EVC 53)	0.08	29	0
AQ	Swamp Scrub (EVC 53)	0.1	29	0
AR	Swamp Scrub (EVC 53)	0.15	29	0
AS	Swamp Scrub (EVC 53)	0.13	29	0
AT	Swamp Scrub (EVC 53)	0.17	29	0
AU	Swamp Scrub (EVC 53)	0.06	29	0
AV	Heathy Woodland (EVC 48)	0.09	33	4
AW	Heathy Woodland (EVC 48)	0.04	22	0
AX	Heathy Woodland (EVC 48)	0.05	37	3
AZ	Heathy Woodland (EVC 48)	0.05	27	0
BA	Heathy Woodland (EVC 48)	0.1	34	1
BB	Heathy Woodland (EVC 48)	0.02	29	3
BC	Swamp Scrub (EVC 53)	0.07	33	0
BD	Swamp Scrub (EVC 53)	0.02	34	0
BE	Heathy Woodland (EVC 48)	0.14	47	3
BF	Heathy Woodland (EVC 48)	0.06	25	0
BG	Heathy Woodland (EVC 48)	0.02	25	0
BH	Heathy Woodland (EVC 48)	0.04	44	0
BI	Heathy Woodland (EVC 48)	0.02	25	0
BJ	Heathy Woodland (EVC 48)	0.01	25	0
BK	Heathy Woodland (EVC 48)	0.01	25	0
BL	Heathy Woodland (EVC 48)	0.02	38	1
BM	Heathy Woodland (EVC 48)	0.01	25	0
BM1	Heathy Woodland (EVC 48)	0.019	22	0
BN	Heathy Woodland (EVC 48)	0.02	28	0
BN1	Heathy Woodland (EVC 48)	0.03	38	1
BO	Heathy Woodland (EVC 48)	0.13	36	4
BP	Heathy Woodland (EVC 48)	0.51	58	4
BQ	Heathy Woodland (EVC 48)	0.15	45	1
BR	Swamp Scrub (EVC 53)	0.01	23	0
BS	Swamp Scrub (EVC 53)	0.01	23	0
BT	Heathy Woodland (EVC 48)	0.32	34	1
BU	Heathy Woodland (EVC 48)	0.13	31	0
BV	Swamp Scrub (EVC 53)	0.02	23	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of Large Trees in HZ
BW	Heathy Woodland (EVC 48)	0.18	34	1
BX	Swamp Scrub (EVC 53)	0.1	23	0
BY	Swamp Scrub (EVC 53)	4.49	73	0
BZ	Heathy Woodland (EVC 48)	0.81	75	12
CB	Swamp Scrub (EVC 53)	0.13	48	0
CC	Swamp Scrub (EVC 53)	0.07	48	0
CD	Wet Heathland (EVC 8)	0.26	76	0
CE	Wet Heathland (EVC 8)	0.04	67	0
CF	Swamp Scrub (EVC 53)	0.7	51	0
CG	Swamp Scrub (EVC 53)	0.03	51	0
CH	Swamp Scrub (EVC 53)	0.07	51	0
CI	Swamp Scrub (EVC 53)	0.11	36	0
CJ	Swamp Scrub (EVC 53)	0.74	36	0
CK	Swamp Scrub (EVC 53)	0.74	38	0
CL	Swamp Scrub (EVC 53)	0.01	38	0
CM	Heathy Woodland (EVC 48)	0.05	58	0
CN	Swamp Scrub (EVC 53)	0.03	35	0
Total		**20.58**		**39**

5.2.2. Scattered trees

Scattered trees recorded in the study area would have once comprised the canopy component of Swamp Scrub (EVC 53), Heathy Woodland (EVC 48), and Wet Heathland (EVC 8).

38 scattered trees occurred in the study area including:

- 16 large, scattered trees (≥ 70 DBH); and
- 22 small, scattered trees (< 70 DBH).

Details of all scattered trees recorded are listed in Appendix 4.

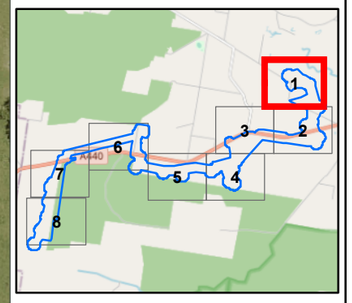
Figure 2-1 Study area and native vegetation to be removed

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Study area
- Turbine
- Access Points
- Access track
- Electrical cable
- Application footprint
- Impact area

Native vegetation

- Swamp Scrub (EVC 53)
- Aquatic Herbland (EVC 653)
- Native vegetation to be removed



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5.3. Flora species

5.3.1. Flora species recorded

During the current field assessment 116 plant species were recorded. Of these, 74 (64%) were indigenous and 42 (36%) were introduced or non-indigenous native in origin (Appendix 5).

5.3.2. Listed species

VBA records (DELWP 2022f) and the EPBC Protected Matters Search Tool (DAWE 2022) indicated that within the search region there were records of, or there occurred potential suitable habitat for, nine species listed under the Commonwealth EPBC Act and seven listed under the state FFG Act, including seven listed under both Acts. No flora species listed under the EPBC Act or FFG 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 3. 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 where suitable habitat exists, but recent records are scarce.

This analysis indicates that the following 14 listed flora species are likely to occur or have the potential to occur:

EPBC Act

- Clover Glycine (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Dense Leek-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Eastern Spider-orchid (EPBC Act: Endangered);
- Metallic Sun-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Maroon Leek-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- River Swamp Wallaby-grass (EPBC Act: Vulnerable);
- Strzelecki Gum (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Thick-lip Spider-orchid (EPBC Act: Vulnerable)

FFG Act

- Creeping Rush (FFG Act: Endangered);
- Currant-wood (FFG Act: Endangered);
- Fringed Helmet-orchid (FFG Act: Endangered);
- Orange-tip Finger-orchid (FFG Act: Endangered);
- Southern Blue-gum (FFG Act: Endangered);
- Spurred Helmet-orchid (FFG Act: Endangered)

None of these species were recorded within the initial layout area in 2016. The orchid species and Clover Glycine would only have potential to occur within the heathland and heathy woodland areas of the adjacent Gelliondale State Forest, which is not going to be impacted. River Swamp Wallaby-grass only occurs in wetlands and permanent swamps that are not impacted and no trees are proposed to be removed.

5.4. Listed ecological communities

Three ecological communities were modelled to potentially occur in the study area. Of these, the ecological communities below are considered to potentially occur in the study area due to the presence of loosely corresponding site characteristics and general species composition.

- Natural Damp Grassland of the Victorian Coastal Plains – listed as critically endangered under the EPBC Act (potential to occur in damp areas in the south-eastern corner of the broader study area). Areas of suitable habitat for this community occur within the proposed development footprint.

  The targeted surveys confirmed that this community is not present in the study area.
- Subtropical and Temperate Coastal Saltmarsh – listed as vulnerable under the EPBC Act (in areas of coastal saltmarsh, where tidal inundation is infrequent). Areas of suitable habitat for this community occur outside the proposed development footprint.

Based on an assessment of native vegetation in the study area against published descriptions and condition thresholds, the communities below were found not to occur in the study area based on the factors described below.

- Central Gippsland Plains Grassland Community - Native grasslands in the broader study area did not support the structure or floristic assemblage described in the FFG Act Action Statement (Craigie & Moorree 2003) and Characteristics of Threatened Communities description of this community (e.g., Dominance or presence of Kangaroo Grass and open to closed tussock grassland structure).

Table 3: FFG Act and EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Sticky Wattle	*Acacia howittii*		VU	p	Moist forest in eastern Victoria. Confined to eastern Victoria from the upper Macalister River area near Mt Howitt south to near Yarram and east to near Tabberabbera, but widely planted	64	9/12/2017	Within endemic range. No moist forest habitat in study area, and wooded habitats degraded. Conspicuous species not recorded in field survey. **Unlikely to occur.**
Broad-leaf Prickly Moses	*Acacia verticillata subsp. ruscifolia*		EN	p	Apparently restricted in Victoria to Wilsons Promontory and Sunday Island	2	14/11/2011	Study area outside of known distribution of highly localised subspecies. **Unlikely to occur.**
River Swamp Wallaby-grass	*Amphibromus fluitans*	VU			River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (DAWE 2020).	2	18/04/2007	Habitat present within drainage channels, vegetated dams and waterways. **Potential to occur.**
Grey Mangrove	*Avicennia marina subsp. australasica*		EN		Tidal mudflats in bays, estuaries and creek-mouths (Conn 1999).	24	17/05/2017	Study area does not include any tidal areas which could support Mangrove growth. **Does not occur.**
Velvet Apple-berry	*Billardiera scandens s.s.*		EN		Dry open forests and woodlands.	2	18/04/2019	Study area does not support open forest or woodland habitat. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Variable Bossiaea	*Bossiaea heterophylla*		EN		Favours sandy soils in a variety of habitats including heath and open woodlands. Confined to Gippsland east of Rosedale (Walsh 1996).	1	28/02/2006	Study area outside of known distribution, which extends southwards from Rosedale to Won Wron and includes a population in Wilsons Promonotory. Forest and woodland habitat within the study area highly degraded. **Unlikely to occur.**
River Leafless Bossiaea	*Bossiaea riparia*		EN		Occurs south-west and eastern Victoria. Grows on streambanks and in moist and dry situations in dry sclerophyll forest, often at fairly high altitudes.	1	3/06/2019	No streams occur in the study area, which largely comprises low-altitude plains. Forest and woodland habitat within the study area highly degraded. **Unlikely to occur.**
Orange-tip Finger-orchid	*Caladenia aurantiaca*		EN	p	Coastal open woodlands, Lowland forest, heathy woodland (Entwisle 1994).	8	30/10/2004	Habitat present within Heathland and heathy woodland patches with an intact ground layer within Gelliondale State Forest, and multiple nearby records. **Potential to occur.**
Eastern Spider-orchid	*Caladenia orientalis*	EN	EN	p	Heathland and Heathy Woodland in coastal areas between the Mornington Peninsula and Wilsons Promontory (Jeanes & Backhouse 2006).	None	N/A	Habitat present within Heathland and heathy woodland patches with an intact ground layer within Gelliondale State Forest. **Potential to occur.**
Thick-lip Spider-orchid	*Caladenia tessellata*	VU		p	Coastal open woodlands, Lowland Forest, heathy woodland (Entwisle 1994).	2	15/04/1992	Habitat present within heathy woodland with intact ground layer within Gelliondale State Forest. **Potential to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
River Hook-sedge	*Carex nemoralis*		EN		Temperate rainforests and shaded tall open-forests of the Strzelecki and Bowen Ranges, and catchments of the major East Gippsland river systems	1	11/07/1997	Study area lays to the south of known distribution, and does not support rainforest or tall open forest vegetation. **Unlikely to occur.**
Pale Swamp Everlasting	*Coronidium gunnianum*		CR	p	Grows mostly in grasslands and woodlands dominated by River Red-gum on soils prone to inundation.	3	6/06/2016	Most areas in study area are prone to inundation, but no grassland was recorded and woodlands typically dominated by heathy vegetation and not including River Red-gum. **Unlikely to occur.**
Spurred Helmet-orchid	*Corybas aconitiflorus*		EN	p	Dry-wet sclerophyll forest, Coastal open woodlands, Lowland forest, heathy woodland (Entwisle 1994).	6	18/06/1991	Habitat present within heathy woodland with intact ground layer within Gelliondale State Forest. **Potential to occur.**
Fringed Helmet-orchid	*Corybas fimbriatus*		EN	p	Moist sclerophyll forest on sands (Entwisle 1994).	5	14/06/2020	Habitat present within heathy woodland with intact ground layer within Gelliondale State Forest. **Potential to occur.**
Spotted Gum	*Corymbia maculata*		VU		Coastal Plains and hills. Endemic to the Tara range in East Gippsland (Walsh & Entwistle).	1	1/03/2006	Study area outside of endemic range. Nearby record likely represents cultivated individual. **Does not occur as remnant vegetation.**
Grey Billy-buttons	*Craspedia canens*		CR	p	Lowland grasslands, often on swamp fringes. Current records occur between Cranbourne and Traralgon (Everett 1999).	1	29/10/1983	No grassland vegetation occurs in study area. No nearby recent records. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Slender Tree-fern	*Cyathea cunninghamii*		CR	p	Deep loamy humus soils on the banks of sheltered gullies in wet, hilly regions. Found in Otway Ranges, Dandenong Ranges, Tarra-Bulga National Park, Wilsons Promontory and Mt Drummer (Entwisle 1994).	79	26/07/2012	No sheltered gullies and associated wet forest and rainforest vegetation occur in study area. **Unlikely to occur.**
Matted Flax-lily	*Dianella amoena*	EN	CR	P	Lowland grassland and grassy woodlands on well-drained to seasonally waterlogged fertile sandy loams to heavy cracking soils derived from sedimentary or volcanic Geology. It is widely distributed from eastern to south-western Victoria (DAWE 2020).	None	N/A	Soils largely non-clay within study area. No grassland habitat occurs, and woodlands typically dominated by heath. **Unlikely to occur**
Gippsland Lakes Peppermint	*Eucalyptus arenicola*		EN		Occurs in coastal and near-coastal areas in sandy soils.	3	11/12/1996	Some habitat occurs, but study area outside of known distribution which has a southern extent north of Yarram. **Unlikely to occur.**
Southern Blue-gum	*Eucalyptus globulus subsp. globulus*		EN		Occurs in and south of the Strzelecki Ranges.	11	17/01/2019	Within endemic distribution, and habitat occurs. Several planted individuals were observed in wind-breaks throughout the study area, and an individual was observed in rail-trail corridor east of the study area during field assessment. **Known to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Bog Gum	*Eucalyptus kitsoniana*		CR		Occurring on coastal lowlands from Yarram west to Cape Otway, and Mt Richmond near Portland. It also occurs on top of Mt Oberon (Wilsons Promontory) and on nearby Snake Is. An inland collection from near Woohlpooer (west of the Grampians) requires verification.	16	6/06/2016	Habitat present throughout study area, but conspicuous species not recorded in field survey. Study area largely cleared of trees. **Unlikely to occur.**
Strzelecki Gum	*Eucalyptus strzeleckii*	VU	CR	P	Apparently endemic, confined to across the western section of the Strzelecki Range, from Neerim South in the north, south to Foster. Favours ridges, slopes and streambanks and deep fertile soils (Brooker & Slee 1996).	8	24/02/2012	Study area dominated by lowland plains with heavy soils grading into coastal sands. Some habitat occurs, but treed vegetation largely cleared from study area. **Potential to occur.**
Promontory Peppermint	*Eucalyptus willisii s.s.*		VU		Confined to granite hills and sandy areas within Wilsons Promontory.	1	17/12/1996	Sandy habitat occurs within study area, but study area outside of endemic range. **Unlikely to occur.**
Coast Ballart	*Exocarpos syrticola*		EN		Confined to coastal dunes and cliffs on and west of Wilsons Promontory, but locally common (Jeanes 1999).	5	28/09/2004	Study area is near-coastal, but does not support coastal dunes and cliffs. **Unlikely to occur.**
Clover Glycine	*Glycine latrobeana*	VU	CR	P	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).	1	18/04/2019	Habitat present within more open areas of heathy woodland and swamp scrub with intact grassy ground layer within Gelliondale State Forest. **Potential to occur.**
Creeping Rush	*Juncus revolutus*		EN		Damp saline or subsaline sites in southern Victoria (Albrecht & Walsh 1994).	9	11/12/1983	Some degraded subsaline wetland habitat occurs in study area. **Potential to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Salt Lawrencia	*Lawrencia spicata*		EN		An occasional component of saltmarsh communities along the coast, rare in saline depressions and around salt lakes of south-western Vic (Walsh 1996)	7	28/09/2004	No saltmarsh or saline depression habitat occurs in study area. **Unlikely to occur.**
Yellow Sea-lavender	*Limonium australe var. australe*		EN		Confined to mangrove and saltmarsh communities	14	29/09/2004	No saltmarsh or mangrove communities occurs in study area. **Unlikely to occur.**
Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*		EN		Near coastal sandy heaths from Marlo eastwards. Widely planted	1	1/03/2006	Study area outside of endemic range. Nearby records likely comprise planted or naturalised individuals. **Does not occur.**
Currant-wood	*Monotoca glauca*		EN	p	Occurs on infertile sandy soils at sea-level or on near-coastal high-rainfall ranges. Grows in open-forest, heathy woodland, wet closed scrub and margins of cool-temperate rainforest (Albrecht 1996).	2	1/09/2003	Habitat occurs in heath and heathy woodland throughout study area. **Potential to occur.**
Coast Fescue	*Poa billardierei*		EN		Of scattered occurrence on coastal sand dunes from near the NSW border to Nelson in the far south-west, but infrequently collected in recent times and possibly receding as the similar, introduced Marram-grass (*Ammophila arenaria*) advances (Walsh 1994).	3	15/04/1992	Study area does not support coastal sand dunes. **Unlikely to occur.**
Tasman Pomaderris	*Pomaderris apetala subsp. maritima*		EN		Restricted to coastal dunes and cliffs in Wilsons Promontory and islands of Corner Inlet.	2	15/11/2011	Study area outside of endemic range. No habitat occurs. **Does not occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Maroon Leek-orchid	*Prasophyllum frenchii*	EN	EN	p	Grows mainly in open sedge swampland or in wet grassland and wet heathland generally bordering swampy regions. Sites are generally low altitude, flat and moist. Soils are generally moderately rich damp sandy or black clay loams. Climate is mild, with an annual rainfall of 600–1100 mm, occurring predominantly in winter and spring (DAWE 2020).	7	1/09/2003	Habitat present in wet heathland and swamp scrub with intact ground layer within Gelliondale State Forest. **Potential to occur.**
Dense Leek-orchid	*Prasophyllum spicatum*	VU	CR	p	Occurs in coastal and near-coastal heathland and heathy woodland. Soils are generally sandy, with some sites seasonally waterlogged (Duncan 2010).	None	N/A	Study area supports near-coastal heathland and heathy woodland within Gelliondale State Forest with sandy soils prone to waterlogging. **Potential to occur.**
Green-striped Greenhood	*Pterostylis chlorogramma*	VU	EN	p	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 Box-stringybark forest occurs in study area. **Unlikely to occur.**
Fisch's Greenhood	*Pterostylis fischii*		EN	p	Among grass and low shrubs in moist areas of open forest, uncommon in Victoria (Jones 1994).	3	1/09/2003	No grassy open forest occurs in study area. **Unlikely to occur.**
Cobra Greenhood	*Pterostylis grandiflora*		EN	p	Moist shady gullies in tall wet forest (Jones 1994).	41	3/06/2019	No tall wet forest or gully habitat occurs in study area. **Unlikely to occur.**
Lacey River Buttercup	*Ranunculus amplus*		CR		Grows on swamp margins.	1	1/12/2003	Freshwater wetlands and swamp habitat limited within study area, and comprises low-diversity artificial farm dams and drainage lines. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Swamp Fireweed	*Senecio psilocarpus*	VU		p	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	Wetland and swamp habitat degraded in study area, and not derived from volcanic clay. No nearby records. **Unlikely to occur.**
Tasman Fan-fern	*Sticherus tener s.s.*		EN	p	Grows in wet forests in gullies and sheltered slopes, as well as on rocky streams.	1	13/02/2003	No wet forest, gullies or sheltered slopes occur in study area. **Unlikely to occur.**
Metallic Sun-orchid	*Thelymitra epipactoides*	EN	EN	p	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).	None	N/A	Habitat present within areas with a relatively intact and diverse grassy or heathy understory within Gelliondale State Forest - **Potential to occur.**
Spiral Sun-orchid	*Thelymitra matthewsii*	VU	EN	p	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	Study area comprises lowland areas and largely poorly-draining soils. No nearby records. **Unlikely to occur.**
Slender Fork-fern	*Tmesipteris elongata*		CR	p	Epiphyte of Soft Tree-fern (*Dicksonia antarctica*)	2	11/07/1997	No Soft Tree-fern recorded in study area, nor is there suitable habitat for Soft Tree-fern. **Does not occur.**
Tiny Arrowgrass	*Triglochin minutissima*		EN		Damp saline lakes or saltmarsh (Conn & Aston 1994).	5	28/09/2004	No saline lakes or saltmarshes occur in study area. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	FFG - prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Dusky Violet	*Viola fuscoviolacea*		EN		Restricted to damp alpine herbfields and near-coastal Pithy Sword-sedge (*Lepidosperma longitudinale*) sedgeland north-east of Wilsons Promontory	2	31/10/1995	No sedgeland recorded in study area. **Unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	VU	CR	p	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, Themeda triandra* and *Villarsia* (DAWE 2020).	8	11/12/2007	Lack of wetland habitat dominated by associated genera on heavy clay soils. **Unlikely to occur**

Notes: **EPBC** = threatened species status under EPBC Act: EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable; **FFG** = threatened species status under the FFG Act: EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable. 'FFG-prot' are species protected under the FFG Act.

5.5. Fauna habitats

The broader study area supported the five fauna habitat types listed below.

- Eucalypt Forest;
- Agricultural pastures;
- Native and introduced treed vegetation-rows;
- Heathy woodland; and
- Aquatic habitats (drainage lines, wetlands, dams).

Eucalypt forest

This habitat type was predominately present in the outlying area in the north-west section of the broader study area (Alberton West State Forest). Species primarily comprised Yellow Stringy-bark, Mountain Grey Gum, Messmate, and Tasmanian Blue Gum, with an open understory of grasses and shrubs. Hollows that provide habitat for tree-dwelling fauna were present in some large trees. The ground layer comprised a mixture of weeds and native species. Leaf-litter and fallen timber were present throughout the forest, which provided suitable habitat for reptiles. As the forest sits just outside the broader study area, it has been included due to its direct proximity and its influence on the fauna of the broader study area.

Agricultural land

Grazing pastures were the dominant habitat type across most of the broader study area and primarily comprised introduced grass species. This habitat is largely devoid of native vegetation due to historic clearing for agriculture and the introduction of pasture grasses for dairy farms. Habitat components for ground dwelling fauna, such as leaf litter, rocks and woody debris, were scarce across the broader study area, however some artificial refuges was being utilised by some common reptile and frog species.

Native and introduced treed vegetation-rows

Linear patches of treed vegetation (tree-rows, wind breaks etc) along roadsides and rail-reserves in the broader study area, supported native and introduced plant species. Various eucalyptus species and swamp paperbark with the occasional she-oak species dominated this habitat. It provided foraging opportunities for a number of common and generalist fauna species.

Importantly, connectivity to similar habitats within the landscape, provided by linear strips of vegetated habitat, increased the value of habitats to fauna. The broader study area was connected to Alberton West State Forest to the north and the Gelliondale State Forest in the south. These large remnant forest blocks flanked the north-west and southern wind farm boundaries and formed a network of wider, regional value that provides dispersal, commuting routes, as well as foraging habitat for species that may move between forest blocks.

Heathy woodland

This habitat was located along the southern boundaries of the broader study area, in association with the Gelliondale State Forest and in degraded form along the rail reserve. This habitat was dominated by Coast Manna Gum, Messmate and Swamp Gum. Gelliondale State Forest is an intact remnant forest with a ground layer consisting of native grasses and a shrub layer dominated by grasstree species. As the woodland sits just outside the broader study area, it has been included due to its influence on the fauna of the broader study area. Additionally, due to the quality of habitat, it is likely to act as an attraction for fauna species as a place to feed and roost.

Aquatic habitats (drainage lines, creeks, rivers)

Aquatic habitats scattered across the broader study area consisted of drainage lines, ephemeral wetlands and farm dams.

The majority of farm dams were accessible to stock and supported little or no vegetation. Ephemeral drainage lines were common throughout the broader study area as a method of draining water from low-lying agricultural land. These were often in poor condition and dominated by native and weed species such as sedges and rushes. Although in poor condition, they provide potential habitat for several frog species and also migratory species such as Latham's Snipe and Eastern Great Egret.

Where more permanent water-bodies were allowed to flow naturally and excluded from grazing pressure, low and high marshes occurred, particularly in the north-east of the site in association with the Albert River. These marshes were dominated by reeds, rushes and sedges, providing good intact and connected vegetation cover. Consequently, they provided dispersal and foraging opportunities as well as critical refuges for a number of fauna species.

5.6. Fauna species

5.6.1. Species recorded

During the fauna field assessment 120 fauna species were recorded (BL&A 2016a). This included 101 bird (10 introduced), 10 mammal (5 introduced), six reptile, three frogs and an array of invertebrate species (Appendix 6).

5.6.2. Listed fauna species

The review of existing information indicated that 54 fauna species listed under the Commonwealth EPBC Act and the state FFG Act have previously been recorded within the search region in the last 40 years or for which potential habitat occurs according to the EPBC Act Protected Matters Search Tool. The listed fauna included, 33 birds, 11 mammals, three reptiles, three amphibians, two fish and two invertebrates. The likelihood of occurrence of these species in the study area was assessed and the results are presented in Table 4.

Species considered '**Likely to occur**' are those that have a very high chance of being in the study area given the existence of numerous records in the search region and suitable habitat in the study area. Using the precautionary approach, species considered to have the '**Potential to occur**' (at least occasionally) are that where suitable habitat exists or is situated close to the wind farm boundaries, but recent records are scarce.

Twenty-nine fauna species (17 EPBC Act listed and 12 FFG Act listed) were considered to potentially occur or likely to occur, including 23 bird, four mammal and two fish species.

Two species, namely, the **Swift Parrot** and the **White-throated Needletail** were considered as being at higher risk by DELWP, the Swift Parrot due to its conservation status, being currently experiencing low population numbers (Section 6.1), and the White-throated Needletail due to its aerial foraging habits and exposure to collision with operating turbines (Section 6.2). Both species were subject to detailed targeted surveys as discussed in Section 6.

This assessment of potential occurrence of listed fauna species excludes:

- Marine mammals (3 species, such as whales, dolphins and sea-lions) given that the study area is inland with no significant marine linkages;

- Strictly oceanic bird species (22 species, such as albatrosses and petrels) given that the study area is inland and such birds are not known to venture inland; and
- Migratory shorebirds (33 species) given that the study area is inland and not likely to provide shoreline habitats for these birds.

Table 4: Listed fauna species from the search region and likelihood of occurrence in the study area.

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
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).	None	N/A	Although there was some potential habitat in the broader study area this species is an uncommon visitor to the region and is considered **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 *muehlenbeckia* 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	Although suitable wetland habitat is present in the broader study area, sAs the nearest recent records are in wetland around Melbourne and at Sale and there are no records either in the VBA or in the Atlas of Australian Birds (http://birdata.com.au/homecontent., viewed 01/07/2016), this species is **unlikely to occur.**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN			In summer generally in tall mountain forests and woodlands, particularly in heavily timbered, mature wet sclerophyll forests and woodlands. Prefer Eucalyptus dominated assemblages. Also occurs in subalpine snow gum woodlands and occasionally in temperate rainforests and regenerating forests. In winter occur at lower altitudes in drier, more open Eucalyptus woodland (Higgins 1999).	64	11/07/2021	Common cockatoo in eucalypt forests surrounding study area; been recorded previously in such forests; recorded in nearby woodlands; **Likely 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).	None	N/A	No suitable habitat; **Unlikely to occur**
Orange-bellied Parrot	*Neophema chrysogaster*	CR		CR	The Orange-bellied Parrot is endemic to south-eastern Australia. Its current non-breeding mainland distribution is from the mouth of the Murray River in South Australia, along the coast, to the east of Jack Smith Lake in South Gippsland, Victoria, covering approximately 1000 km of coastline. The most used sites in Victoria are around Port Phillip Bay and Bellarine Peninsula. In South Australia, Carpenter Rocks is the main site. During winter on the mainland, found mostly within 3 km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. They are also found in low samphire herbland dominated by Beaded Glasswort *Sarcocornia quinqueflora*, Sea Heath *Frankenia pauciflora* or Sea-blite *Suaeda australis*, and in taller shrubland dominated by Shrubby Glasswort *Sclerostegia arbuscula*. They are sometimes found in low samphire dominated by Grey Glasswort *Halosarcia halocnemoides* or in Chenopodium herbfield. Breeds at Melaleuca in Tasmania during spring/summer months (DAWE 2020).	1	1/03/2004	There is limited suitable saltmarsh habitat within the broader study area and this species may on rare occasion pass through the region, **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).	None	N/A	No suitable habitat. **Unlikely to occur.**
Pilotbird	*Pycnoptilus floccosus*	VU			Common in wet sclerophyll forests and coastal heath, often in gullies; usually hoping across forest floor; can be confiding but keep to cover	39	9/07/2021	Habitat may exist in study area; no records in current survey; whoever many recent records from nearby habitats; **Likely to occur**

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
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).	None	N/A	No suitable habitat. **Unlikely to 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).	2	11/04/1991	Suitable woodland and forest habitat exists though recent and regular records are lacking in the study area - **potential 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).	53	20/02/2019	**Recorded** flying over the broader study area
Australasian Shoveler	*Spatula rhynchotis*			VU	Large and deep permanent bodies of water and aquatic flora abundant. Also occurs on billabongs, watercourses and flood waters on alluvial plains, freshwater meadows, shallow swamps, reed swamps, wooded lakes, sewage farms and farm dams (Marchant & Higgins 1990).	7	8/07/2019	Potential wetlands in the wider study area; not recorded in the current study; **Likely 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).	4	24/09/2007	Potential habitat may occur in Suitable Forest and woodland habitat and few records from surrounding woodlands, **Potential to occur**
Black-faced Monarch	*Monarcha melanopsis*		M (Bonn A2H)		Rainforests, eucalypt woodlands, coastal scrub and damp gullies (Higgins et al. 2006)	None	N/A	Suitable forest and woodland habitat though lack of records, **potential to occur**
Blue-billed Duck	*Oxyura australis*			VU	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies (Marchant & Higgins 1990).	4	8/04/2021	Potential wetlands in the wider study area; not recorded in the current study; **Potential to occur**
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).	5	3/07/2013	Potential habitat may occur within wind farm boundaries; **Potential to occur**
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).	38	11/06/2021	Migratory; usually coastal and near coastal habitats; not recorded in current study, but **likely 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	21/02/2015	**Recorded** in study area
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).	1	8/12/1992	May occur in any large freshwater wetland; suitable habitat may occur in study area; **Potential to occur**

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
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	7/03/2001	May occasionally pass through the study area - **potential to occur**
Grey Goshawk	*Accipiter novaehollandiae*			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).	7	8/06/2003	Suitable habitat exists, but there are no recent records of the species in this part of South Gippsland in the Atlas of Australian Birds (http://birdata.com.au/homecontent., views 01/07/16) or in the VBA since 2003, therefore **unlikely to occur.**
Hardhead	*Aythya australis*			VU	Inhabits large, deep waters where vegetation is abundant; particularly deep swamps and lakes, pools and creeks. Also occur on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant & Higgins 1990).	23	22/10/2020	Suitable habitat found within the study area; not recorded in the current survey; **Likely to occur**
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).	20	12/01/2021	**Recorded** in study area
Lewin's Rail	*Lewinia pectoralis*			VU	Occurs in a variety of densely vegetated wetland habitats, fresh or saline, and usually with areas of standing water. Requires shallow water areas for foraging (Marchant & Higgins 1993).	2	18/07/1981	In coastal and near coastal wetlands; rather uncommon and no recent records; **unlikely to occur**
Eastern Great Egret	*Ardea alba modesta*		M (JAMBA, CAMBA)	VU	Widespread in Australia; both freshwater and tidal, also in flooded grasslands. Usually solitary when fishing. Nest colonially in wetlands with fringing trees.	None		**Recorded** in study area
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).	33	28/02/2020	**Recorded** in study area
Magpie Goose	*Anseranas semipalmata*			VU	Terrestrial and aquatic habitats, but activities centred on wetlands, mainly those on floodplains of rivers (Marchant & Higgins 1990).	1	2/11/1994	No suitable habitats; uncommon in Gippsland shores; **unlikely to occur**
Australian Masked Owl	*Tyto novaehollandiae*			CR	Open woodlands and forests that provide dense and tall tree cover, and adjoining open habitats such as cleared farmlands. In Victoria, most widespread in E. Gippsland (Higgins 1999).	2	2/05/2013	Widespread but elusive; may occur in close by eucalypt forests; rarely in open areas; **unlikely to occur**
Musk Duck	*Biziura lobata*			VU	It inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic; preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant & Higgins 1990).	16	3/05/2019	Suitable habitat found within the study area; not recorded in the current survey; **Likely to occur**
Plumed Egret (Intermediate Egret)	*Ardea plumifera*			CR	It mainly inhabits terrestrial wetlands; only occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. It often occurs in wetlands that contain vegetation, including bulrush (Marchant & Higgins 1990).	12	5/08/2021	Suitable wetland may exist, but egret uncommon in area; **may occasionally 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).	30	10/12/2020	Suitable forest and woodland habitat exist and recent records near the broader study area. **Likely to occur.**

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
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).	35	3/02/2021	Suitable forest and woodland habitat exist and some records in the nearby search region. **Likely 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).	14	3/02/2021	May pass through the area during migration - **potential to occur**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			CR	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).	90	4/02/2021	Suitable habitat exists and recent records in the study area. **Likely to occur.**
Mammals								
Broad-toothed Rat	*Mastacomys fuscus mordicus*	VU		VU	Specialist herbivore which occurs in high rainfall areas in eastern highlands, south Gippsland highland and Otway ranges. Habitats include alpine herbfield, heath, woodland, sedgeland and coastal tussock grassland (Menkhorst 1995). This species has also been known to inhabit dense, heathy vegetation within disturbed areas such as powerline easements and alpine ski slopes (Clarke & White 2008; Whisson et al. 2015).	None	N/A	No records in or around the wind farm area; **unlikely to occur**
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).	15	17/02/2002	No recent records in the search area and the Bairnsdale seasonal camp is approximately 125 kilometres from the proposed wind farm site - **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	Suitable nearby habitat - **potential 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).	None	N/A	Suitable nearby habitat - **potential to occur**
Southern Greater Glider	*Petauroides volans*	VU		VU	In Victoria, this species inhabits forest habitats dominated by peppermint, stringybark, ash and gum eucalypts (Menkhorst 1995). Restricted to the central highlands and eastern Victoria, and common in areas of high rainfall. Rare in dry stringybark-box and Snow Gum Forest, and does not occur in the box-ironbark or River Red-gum dominated riverina regions (Menkhorst 1995).	51	11/12/2020	Might be found at the forested northern fringes of the wind farm; not recorded in the current survey; **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	3/11/1999	Rare, may be confined to coastal heath south of the wind farm site; **unlikely to occur**

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
Yellow-bellied Glider	*Petaurus australis*	VU			Patchily distributed in wet sclerophyll forests from Mackay, Qld to Melbourne, Vic.	1	15/05/2012	No suitable habitat; rarely recorded; **unlikely to occur**
Swamp Antechinus	*Antechinus minimus maritimus*	VU		VU	Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995). Requires mature, dense vegetation with thick ground cover (DAWE 2020). Shelters in short burrows or underneath dense leaf litter. Rarely occurs more than 200m above sea level. Though this species has also previously been detected at sites which had experienced some structural disturbance in the South Gippsland region (Nature Advisory; unpublished data).	18	13/04/1999	Suitable nearby habitat - **Likely to occur**
Platypus	*Ornithorhynchus anatinus*			VU	Inhabits freshwater streams, ranging from alpine creeks to tropical lowland rivers; also, lakes, shallow reservoirs and farm dams (Menkhorst and knight 2001).	9	29/12/2013	Habitat may exist in river system traversing the wind farm area, not recorded during current survey, but **Likely to occasionally occur**
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*			VU	Common in north Australia, but rare late summer-autumn in the south. Known to occur from urban, agricultural semi-arid and tall wet forest habitats (Menkhorst 1995).	1	25/04/2000	No suitable habitat; rarely recorded; **unlikely to occur**
Eastern Bent-wing Bat	*Miniopterus orianae oceanensis*			CR	Roosts in caves during the day, dispersing over a range of habitats at night. Its feeding areas tend to be associated with major drainage systems (Menkhorst 1995).	1	8/03/2005	Might fly across during none-breeding season; main known cave in Gippsland is at Bairnsdale; **unlikely to occur**
Reptiles								
Glossy Grass Skink	*Pseudemoia rawlinsoni*			EN	Swamps, lake edges, salt marsh, and boggy creeks with dense vegetation (Wilson & Swan 2003).	1	6/10/2004	No suitable habitat; **unlikely to occur**
Lace Monitor	*Varanus varius*			EN	Well-timbered areas from dry woodland to wet southern forests and rainforest (Wilson & Swan 2003).	23	3/03/2018	Habitat exist at timbered areas north of wind farm site; **unlikely to occur**
Swamp Skink	*Lissolepis coventryi*			EN	Wetlands including swamp margins, lakes, rivers, creeks and even tidal salt marshes, often associated with tea-tree thickets (Wilson & Swan 2003).	1	6/10/2004	Habitat may exist at southern fringes of wind farm site; **unlikely to occur**
Frogs								
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).	None	N/A	Suitable habitat exists in the broader study area though lack of nearby records. **Unlikely to occur.**
Martin's Toadlet	*Uperoleia martini*			CR	Dry forest and coastal heath, breeds in flooded grassy depressions (Cogger 2000).	4	1/12/1980	Habitat may exist within coastal heath; lack of recent records; **unlikely to occur**
Southern Toadlet	*Pseudophryne semimarmorata*			EN	Damp areas in forests and woodlands (Cogger 2000). In Victoria, the Southern Toadlet is mainly found on and south of the Great Dividing Range although there are records as far north as the Little Desert (SWIFFT 2020).	21	20/03/2019	Habitat may exist as frog may be found in damp woodlands, heath or grassland but not at the wind farm site; **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).	20	18/02/1990	Suitable habitat exists in the broader study area with historical records in the Albert River in the north-east of the study area. **Likely to occur.**

Common Name	Scientific name	Conservation Status			Habitat	Number of records	Date of last record	Likelihood of occurrence
		EPBC - T	EPBC - M	FFG				
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	Suitable habitat exists in the broader study area within tributaries associated with the Albert and Jack Rivers in the north-east of the site, but no historical records. **Potential to occur.**
Decopod crustacea								
South Gippsland Spiny Crayfish	*Euastacus neodiversus*			EN	occurs at Wilsons Promontory and the Strzelecki Ranges in southern Victoria; appears to be restricted to the southern side of the Strzelecki Ranges. The species occurs in streams in sclerophyll forest where the streamside vegetation is dominated by Mountain Ash, tree ferns and Lilly Pilly.	12	20/03/2018	No suitable habitat; **unlikely to occur**
Strzelecki Burrowing Crayfish	*Engaeus rostrogaleatus*			EN	Has a very restricted distribution and occurs along a 30 km section of the Eastern Strzelecki Ranges in South Gippsland. Inhabits small creek wet sclerophyll forest dominated by Mountain Ash and abundant tree ferns.	12	9/06/1999	No suitable habitat; **unlikely to occur**

Notes: EPBC-T = threatened species status under EPBC Act:

EX = presumed extinct in the wild
CE = critically endangered
EN = endangered
VU = vulnerable
EPBC-M = migratory status under the EPBC Act:
Bonn Convention (A2H) - Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family
Bonn Convention (A2S) - Convention on the Conservation of Migratory Species of Wild Animals - species listed explicitly
CAMBA - China- Australia Migratory Birds Agreement
JAMBA - Japan-Australia Migratory Birds Agreement
ROKAMBA - Republic of Korea Australia Migratory Birds Agreement

FFG = threatened species status under the FFG Act:
EX = presumed extinct in the wild
CE = critically endangered
EN = endangered
VU = vulnerable

5.6.3. Susceptibility of listed fauna to impacts

The following analysis identifies the susceptibility of listed fauna species which may utilise the study area to the potential impacts of the proposed wind farm. This analysis includes consideration of several factors such as, abundance of the species, habitat availability within and in the wider area of the wind farm site, mobility and flight heights.

Mammals

Based on the assessment in Table 6, the following three EPBC Act listed ground-dwelling mammals have the potential to occur in suitable habitats within the study area and in adjacent remnant blocks of vegetation.

- **Southern Brown Bandicoot** (endangered)
- **Long-nosed Potoroo** (Vulnerable)
- **Swamp Antechinus** (Vulnerable)

These species prefer habitat with dense vegetation cover (Menkhorst 1995). There are old records of Swamp Antechinus, dated back to 1999, in close proximity to the wind farm boundary. These habitats provide a high level of constraint, and where possible, removal of vegetation in these areas should be avoided. Provided direct impacts on these habitats can be avoided, no significant impacts are anticipated from the proposed wind farm.

In addition, one FFG threatened species, namely the **Platypus** is likely to inhabit the two freshwater rivers running through the wind farm site. Provided that direct impact on these rivers would be avoided during the construction phase of the wind farm, no effects is anticipated on the Platypus population.

Susceptibility of non-listed mammal species to impacts

A well-known Koala population (probably around 500 animals) inhabits the South Gippsland Strzelecki Ranges. This non-threatened species in Victoria may occasionally visit the broader wind farm area. Koalas are an iconic species in Australia and any incursion of individuals of this species into the wind farm site should be managed, and proper mitigation techniques applied to relocate the koala to a nearby suitable habitat.

Birds – EPBC Act listed, non-migratory

VBA records (DELWP 2022f) 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 nine EPBC Act listed non-migratory bird species. Four of these species are considered to have potential to occur or are likely to occur in the study area due to suitable habitat, including:

Swift Parrot (Critically Endangered): This species has the potential to forage in indigenous and planted eucalypts in the study area. The Swift Parrot could occur occasionally during dispersive movements, particularly when in transit between large, forested areas. This species has only been recorded on two occasion (1991) from the larger search area and is therefore expected not to occur regularly within the study area. The population of Swift Parrot likely to use the study area is very small relative to that using the larger forested blocks north of the Great Dividing Range or interstate. Therefore, this species is likely to experience minimal impact from the proposed wind farm. Targeted surveys have been undertaken for this species and are detailed in Section 6.1.

White-throated Needletail (Vulnerable): This species was recorded in the study area during Bird Utilisation Surveys (BUS) in 2015 and again during targeted surveys in 2021. They are likely to

occur over large forested areas of the study area during the migratory dispersal period (mostly late spring and summer). The White-throated Needletail has been recorded colliding with wind turbines at a number of south-eastern Australian wind farms in recent years and it is likely the occasional individual will be affected by the proposed project. Details of targeted surveys are provided in Section 6.2.

Gang-gang Cockatoo (Endangered): This species inhabits tall mountain forests and woodlands, particularly in heavily timbered, mature wet sclerophyll forests and woodlands. It prefers Eucalyptus dominated assemblages and occurs occasionally in temperate rainforests and regenerating forests. In winter, it moves at lower altitudes in drier, more open Eucalyptus woodland (Higgins 1999). The VBA listed 64 records from the search area surrounding the wind farm site, some of these records in eucalypt forests surrounding study area. Removal of patches of woodlands should be avoided or minimised to reduce impacts on the cockatoo population.

Pilotbird (Vulnerable): This species is common in wet sclerophyll forests and coastal heath, often in gullies and usually hopping across the forest floor keeping cover. The VBA listed 39 records from the 10 km search area, some of which as recent as 2021. The Pilotbird is sedentary and rarely flies. Little habitat is available to this species in the wind farm study area and therefore, no significant impact is expected on its populations.

Birds – EPBC Act listed - migratory species

Seven bird species listed as migratory under the EPBC Act are considered likely to occur within the study area. These have been divided into three sub-groups:

Bush birds

- **Black-faced Monarch**
- **Rufous Fantail**
- **Satin Flycatcher**

These species usually occur in areas of remnant woodlands, cool temperate forests, or rainforest. The VBA have no records from the search area for the Black-faced Monarch, but listed 35 and 14 records for Rufous and Satin Flycatchers, respectively. They are expected to fly below RSA and generally confine their activities to wooded areas where no turbines are proposed to be built. Therefore, these three species are likely to experience minimal impact from the proposed wind farm.

Wetland birds

- **Latham's Snipe**
- **Glossy Ibis**
- **Double-banded Plover**

The snipe and the ibis are migratory species that visit south-eastern Australia from August to February. They inhabit ephemeral and permanent freshwater wetlands on the site in spring when these hold water or after heavy rainfall events. The snipe is rather common and has been listed on 20 occasions from the search area surrounding the wind farm site, and been also recorded to occur on the study site. The ibis, on the other hand, is a rare species and been recorded only once in 2001.

The Double-banded Plover is a migratory species from New Zealand, visiting south-eastern Australia from mid-February to late-August. It is known from mainly coastal and near coastal areas and freshwater wetlands, but also ventures to inland open grasslands. The VBA listed 38 records

within the 10 km search area, some as recent as 2021. Latham's Snipe has been recorded, and the Double-banded Plover is likely to regularly occur in the study area.

The flight heights of the above three species are not known, but they are considered unlikely to fly at RSA height regularly. It is unlikely therefore that the project will represent a significant risk to the species' population.

Fork-tailed Swift: The swift is likely to occur over large areas of the proposed study area during the migratory dispersal period (mostly late spring and summer). It is an aerial forager, spending most of its time flying in search of aerial insect prey; usually flying 100s of metres high, but can descend close to the ground following food availability (Higgins 1999; Menkhorst *et al*. 2017). The species could therefore be susceptible to collisions with turbines and other structures as it flies mostly at and above RSA height. The swift has previously been listed by the VBA to occur in the search area, and has been actually recorded at the wind farm site during BUS surveys. It is likely the occasional individual will be affected by the proposed project.

Birds - FFG listed species

Sixteen FFG listed birds were expected to occur in the wider search area based on VBA records (Table 4). Of these FFG listed species, twelve are considered likely to utilise the wind farm site and were either recorded to occur or have the potential to occur in the study area. These are split into natural groups and discussed below:

Egrets

- **Eastern Great Egret (FFG Act: Vulnerable)**
- **Little Egret (FFG Act: Endangered)**
- **Intermediate Egret (FFG Act: Critically Endangered)**

The first two species were recorded during the fauna survey and are therefore known to utilise suitable habitats within the study area. The Intermediate Egret could potentially occur in the study area and has previously been recorded (12 records, latest in 2021). These waterbird species are found in association with wetlands, creeks, rivers and farm dams.

There is potential for direct impacts from strikes, although the number and frequency of occurrence of these species on the site is low and the likelihood of turbine collision is considered very low. To avoid the direct loss of habitat for these species, it is recommended that turbines and associated infrastructure avoid drainage lines, ponds, dams, marshes and the Albert River and its tributaries by a wide a margin possible and by at least 100 metres (assuming turbine blade length up to 75 metres).

Ducks

- **Australian Shoveler (FFG Act: Vulnerable)**
- **Blue-billed Duck (FFG Act: Vulnerable)**
- **Freckled Duck (FFG Act: Endangered)**
- **Hardhead (FFG Act: Vulnerable)**
- **Musk Duck (FFG Act: Vulnerable)**

The five species of ducks are found in association with freshwater wetlands, creeks, rivers and farm dams; most prefer deep permanent freshwater wetlands with abundance of aquatic vegetations. All five species were previously listed to likely occur in the wider search area, the Freckled Duck, however, is a rare species and been recorded only once.

Ducks are limited to wetlands and usually fly below RSA heights when moving between their habitats. Records of collision with operating wind farms are very low and these species are unlikely to be impacted by operating turbines. The establishment of 100 metres buffer zone around wetlands, and the use of new model wind farm turbines, including those that have a minimum of 80 metres height of their blades above ground, is highly recommended.

Owls

- **Powerful Owl (FFG Act: Vulnerable)**
- **Barking Owl (FFG Act: Critically Endangered)**

Usually found in Eucalyptus dominated forests and woodlands, with large old trees with hollows for nesting and roosting. 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. The Barking Owl is commonly found near water-bodies, such as streams and rivers (Higgins 1999).

Based on the VBA records, the Powerful Owl is more likely to occur in the wooded areas in or surrounding the wind farm site. While there were 30 records of the Powerful Owl within the 10 km radius (most recent in 2020), the Barking Owl was recorded on four occasions (most recent in 2007).

The owls are usually restricted in their activities to the wooded areas, and seldom forage outside these habitats, unless during dispersal. Flight heights of owls are not known, but no incidence of collision with operating turbines has been previously reported from other wind farms in south-eastern Australia.

The Powerful Owl has been historically recorded within habitats associated with the Alberton West State Forest to the north of the proposed wind farm site. Additionally, it has been seen within the northern section of the wind farm (local landholder *pers. comm.*). It is possible Powerful Owl may utilise some wooded areas of the study area and move occasionally into the southern forest at Hedley, where there are large hollow-bearing trees. The primary risk to this species is during nocturnal dispersive and foraging movements when they may potentially fly at RSA heights. Movements by the Powerful Owl are generally confined within forests habitats, which would therefore not involve any part of the proposed wind farm. Juvenile Owl dispersal from a breeding territory may result in a one-off flight across a gap between forest patches, such as north and south of the South Gippsland Highway between large nearby forest blocks. No turbines are proposed at the narrowed gap between Gelliondale Forest and the Alberton West State Forest, and thus the likelihood of Powerful Owl being affected by nearby wind turbines is considered low. It is therefore, anticipated that the construction of wind farm would have little impact on the population of owls.

The **Chestnut-rumped Heathwren (FFG Act: Vulnerable)**, could potentially occur based on the VBA records. There were five records from the search area (most recent 2013). The Heathwren inhabits dense heathland and dense understorey or ground-layer in sclerophyll forests and woodlands; widespread but sparsely distributed (Higgins & Peter 2002; Tzaros 2005). The species do not fly high and restricts its movement to the forest understorey. It will therefore not be impacted by operating turbines.

The **White-bellied Sea-Eagle (FFG Act: Critically Endangered)**, could potentially fly over the wind farm site. The VBA listed 90 records taken over the last 50 years from the wider search region, the last of these records in 2021. While the species was not recorded during bird utilization surveys in 2005 and 2009; one eagle was recorded twice flying over observation points 1 and 4 during the targeted surveys for White-throated Needletail in March 2021. Another individual was recorded

flying north between Gelliondale State Forest and Alberton West State Forest during a native vegetation assessment in September 2021.

This species is restricted to coastal habitats, but may occasionally travel inland along the river systems, including possibly the Albert River, whilst foraging or moving about its territory. This species has been recorded south of the broader study area boundaries, in association with its preferred habitat of coastal and estuarine ecosystems.

Sea-Eagles are vulnerable to collision with operating turbines. No evidence was found for nesting near proposed turbine locations during site studies, however the species may occasionally fly across the wind farm site given its proximity to coastal habitats. This could put individuals at risk of occasionally colliding with operating wind turbines. The frequency of such collisions is likely to be very low so population consequences are not considered significant given the state population is estimated at 100 adult pairs plus sub-adults, within the Corner Inlet area in South Gippsland supporting approximately 25 of these pairs (DSE 2003). It will be important to monitor for the presence of this species as part of any bird and bat management plan for the wind farm.

Susceptibility of non-listed bird species to impacts

The **Wedge-tailed Eagle** is considered to be a high-profile species and one of the most vulnerable species to collision with operating turbines. The VBA provided a large number of records (121 records) taken over the last 50 years from the search region (10 km radius from the centre of the wind farm site), indicating that a number of the eagles could regularly fly over the wind farm site.

This species was also observed twice flying over the wind farm site but outside the formal BUS surveys in 2005 and 2009; and again, seen on nine occasions during the WTNT targeted surveys between 22 and 26 March, 2021. During the latter surveys, WTE numbers observed ranged between one to three birds at each of the nine sightings and were recorded flying at 50 to 300 metres above ground.

No evidence was found of eagles nesting within the wind farm boundary. Based on the above, the wind farm site is likely to be part of the territory of one or probably two pairs of eagles that reside and probably breed in woodland located north of the wind farm site. They are likely to regularly forage over the wind farm site; and it may well be part of the eagle's home range (see also BL&A 2016b). This could put individuals at risk of occasionally colliding with operating wind turbines.

Reptiles

No listed reptile species have the potential to occur in the study area.

Frogs

No listed frog species have the potential to occur on the proposed wind farm site. Frog species are not considered at risk from proposed wind farm developments because they generally occur on lowlands or near water bodies. Provided a suitable buffer of at least 50 metres is provided from waterways and wetland habitats impacts on frog habitat are not expected.

Fish

Two listed fish species are considered to have the potential to occur in the study area. The likelihood of occurrence in the study area and vulnerability of these species to possible impacts from the proposed development are discussed below.

- **Australian Grayling (EPBC Act: vulnerable; FFG Act: Listed)**
- **Dwarf Galaxias (EPBC Act: vulnerable; FFG Act: Listed)**

Australian Grayling exists in large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader and Backhouse 1983). Suitable habitat exists within the study area and there are historical records in the Albert River in the north-east of the study area. Provided there are no impacts on flows or water quality in the Albert River from construction and operation of the proposed wind farm then impacts are not expected on this species. This can be assured by ensuring a minimum 30 metres separation between the development footprint (i.e., turbines, access tracks and power cabling) and the Albert River and any significant tributaries on the site.

Dwarf Galaxias occur amongst marginal vegetation in still or gently flowing water of roadside ditches, swamps, and backwaters of creeks (Allen *et al*. 2002). Suitable habitat exists within the study area, particular with tributaries associated with the Albert and Jack Rivers in the north-east of the site. Provided there are no impacts on flows or water quality in the Albert River from construction and operation of the proposed wind farm then impacts are not expected on this species. This can be assured by ensuring a minimum 30 metres separation between the development footprint (i.e., turbines, access tracks and power cabling) and the Albert River and any significant tributaries on the site.

Invertebrates

No listed invertebrate species (whether EPBC or FFG Acts) have been recorded historically within the broader study area. No suitable habitats for the two species listed in VBA records, was found during the fauna overview assessment. And therefore, these species are not expected to occur in the wind farm study area.

6. Targeted fauna surveys

During the bilateral assessment process of the initial project, targeted surveys were requested by DELWP for two species of concern, Swift Parrot and White-throated Needletail. Details of these surveys are provided below.

6.1. Swift Parrot

The Swift Parrot (*Lathamus discolor*) is endemic to south-eastern Australia. It is restricted as a breeding species to Tasmania during spring and summer, and migrates to spend autumn and winter in mainland south-eastern Australia. It breeds mainly in areas of dry grassy Blue Gum Forest in south-eastern Tasmania, with a smaller population breeding in shrubby stringybark forest in coastal northern Tasmania (Swift Parrot Recovery Team 2011).

The Swift Parrot (*Lathamus discolor*) is a medium sized migratory bird about 25 centimetres in length and is mostly green in colour. It weighs approximately 65 grams. Crown and ear coverts are dark blue and the face is red with yellow margins. Shoulder and underwing coverts are red, eye yellow and bill a horn colour (DSE 2003).

Typical Swift Parrot wintering habitat is dry open eucalyptus forests and woodlands, usually box-ironbark communities, especially those with Red Ironbark, Mugga Ironbark, Grey Box, Coast Grey Box, White Box and Yellow Gum. This species has also been recorded in River Red-gum, Blakely's Red-gum, Yellow Box, Spotted Gum and Swamp Mahogany (Higgins 1999). On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp infestations (from the sugary exudations of scale insects [Psylllids] (DECC 2005). Swift Parrots prefer to forage in large trees, defined as those greater than 60 centimetres diameter at breast height by Kennedy and Tzaros (2005).

Once on the mainland, this species undertakes semi-nomadic movements to take advantage of the richest areas of eucalypt nectar production and lerp infestation (Higgins 1999). Until recently it was believed that in NSW, Swift Parrots forage mostly in the inland slopes of the Great Dividing Range but are patchily distributed along the northern and southern coasts, including the Sydney region. However, evidence is gathering that the forests on the coastal plains from southern to northern NSW are also extremely important (Swift Parrot Recovery Team 2001). In Victoria, the Swift Parrots are mainly found in Box-Ironbark woodlands throughout central region of the state.

The total population of the Swift Parrot was thought to be 2000 mature birds in 2010, but have since declined to 750 with a maximum of 1000 individuals (Roderick 2021; Garnett *et al*. 2011; Garnett and Baker 2021). Genetic evidence was cited to estimate the population as low as 300 individuals in the wild (Heathcote, 2020). Recently, the population is believed to be in sharp decline however, due to the presence of the introduced (to Tasmania) Sugar Glider (*Petaurus breviceps*) which causes a high failure rate of nests on the main island of Tasmania leaving only the populations breeding on the smaller Bruny and Maria Islands offshore currently having sufficient breeding success to bolster the Swift Parrot population (Stojanavic *et al.* 2014 cited in Commonwealth of Australia 2019).

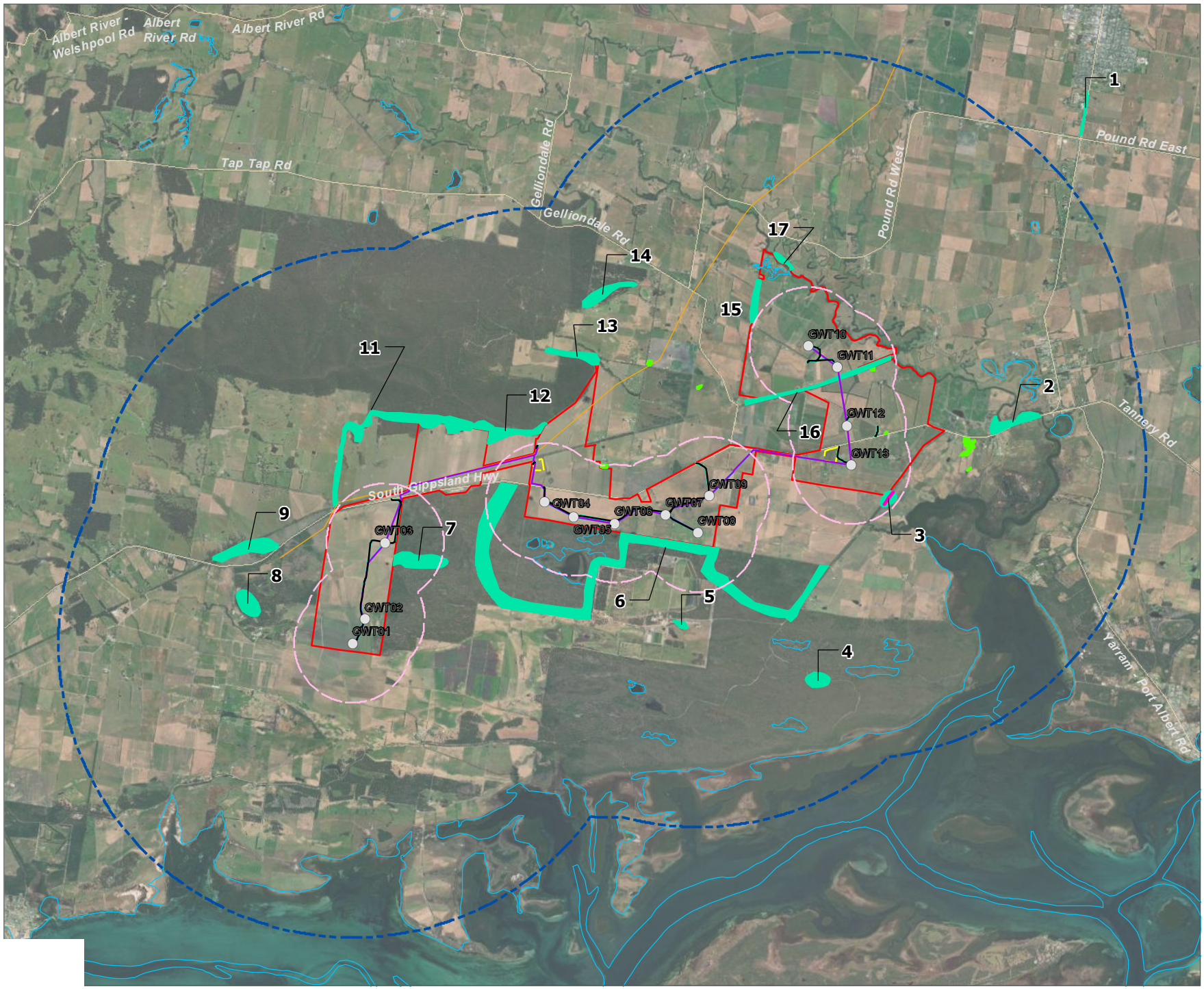

Figure 3: Swift Parrot sampling sites of suitable habitats

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 25/08/2022

- Wind farm boundary
- Turbine
- Turbine buffer 1km
- Turbine buffer 5km
- Electrical cable
- Access track
- Staging area
- Impact area
- Existing powerline
- DELWP wetlands
- Swift Parrot suitable habitat
- Grassland with Golden Wattle
- Swamp Gum area

N

Metres
0 1,200

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Field methodology

The Swift Parrot survey was undertaken using methods consistent with the DELWP Biodiversity Precinct Planning Kit (DSE 2010). This consisted of roaming surveys for up to half hour in each suitable patch of habitat, mapped earlier by Nature Advisory. A total of 17 habitat patches were mapped for Swift Parrot surveys (Figure 3). Some of these patches contained many planted *Eucalyptus* trees, a known winter-flowering foraging resource of Swift Parrot but not indigenous to the local area.

The Swift Parrot targeted survey was conducted in eucalypt remnants within the wind farm footprint. Several sites in larger blocks in surrounding State Forests were also included in the sample, since these areas were likely to provide feeding habitat for the species (Table 5).

Four surveys were undertaken, these included:

- First survey: 1/04/2020;
- Second survey: 12/04/2021;
- Third survey: 24/05/2021; and
- Fourth survey: 22/06/2021.

All surveys were undertaken in autumn when the parrots were flying from Tasmania towards their wintering ground in mainland Australia. Each of the surveys lasted two days, with the search sites visited twice (once a day) during the survey.

Table 5: Swift Parrot assessment of potential habitats on in and around Gelliondale wind farm

site	site name	potential foraging resource	flowering/lerp present			
			1/4/20	12/4/21	24/5/21	22/6/21
1	Yarram - Windmill caravan park	Blue Gum (planted)	yes	no	no	no
		Southern Mahogany (planted)	no	no	no	no
		Spotted Gum (planted)	no	yes	Yes	yes
		Un-ID Eucalypts (planted)	yes	no	no	no
2	Albert River Reserve	Red Ironbark (planted)	yes	no	no	no
		Yellow Gum (planted)	yes	no	no	no
		Spotted Gum (planted)	no	yes / lerp	yes	yes
		Southern Mahogany (planted)	no	yes / lerp	no	lerp
3	Telegraph Road	Golden Wattle - small grove	no	no	no	no
4	Nooramunga Marine & Coastal Park	Coast Banksia	yes	no	no	no
		Manna Gum	yes	yes	no	no
5	Gelliondale Nursery	Blue Gum (planted)	no		no	no
6	Gellions Run SF - central, east	Manna Gum	no	Lerp	no	no
		Saw Banksia	no	yes	no	no
7	Gellions Run SF - west	Swamp Gum	no	buds	no	no
		(Silver Banksia)	yes	no	no	no
8	Todds Road bush, Hedley	Manna Gum	no	yes	no	no
		Saw Banksia	no	Buds	no	no
		Swamp Gum	no	Buds	no	no

site	site name	potential foraging resource	flowering/lerp present			
			1/4/20	12/4/21	24/5/21	22/6/21
9	South Gippsland Highway, Hedley	Swamp Gum	no	no	no	no
		Stringybark	no	no	no	no
10	7085 South Gippsland Highway, Hedley	Yellow Gum (planted)	yes	no	no	no
11	James Road North - Alberton West SF southern edge (McPhails Track - South Boundary Track)	Swamp Gum	no	Buds/no lerp	no	yes
		Southern Blue Gum	no	no	yes	
12	Alberton West SF southern edge (Coalmine Road)	Swamp Gum	no	Many buds	no	no
13	Wests Road	Southern Blue Gum	no	Buds	yes	yes
		Yellow Gum (planted)	no	yes	yes	yes
14	Askews Road	Spotted Gum (plantation)	no	Buds	yes	yes
		Southern Mahogany (plantation)	no	no	no	lerp
15	Alberton West (Crangs Road)	Eucalyptus spp. Un-ID (planted)	yes	no	no	no
16	Great Southern Rail Trail from Gelliondale east to Albert River	Blue Gum (planted)	no	yes	no	no
		Swamp Gum/Strzelecki Gum (planted)	no	Buds	no	no
17	Pound Road West/Blackshaws Road	Blue Gum (planted)	no	no	no	No
		Southern Mahogany (plantation)	no	no	no	no

Results

The VBA holds one records of Swift Parrot within 20 km radius search region based on the wind farm locality. The record is 30 years old (dated back to 1991) and taken 3 kilometres south of the wind farm site. It seems that the wind farm location is not on the migration route usually followed by the parrots during their migration flights.

No Swift parrot was recorded at or near the wind farm site during the four targeted surveys described above. Flowering was reasonable at the sampling sites and have attracted many nectar eating lorikeets and honeyeaters, but not the targeted species.

Regulatory implications

The Swift Parrot is listed as *Critically Endangered* under both of the EPBC and FFG Acts. Since the species was not recorded in or close to the wind farm site, no referral was warranted for this species under both of the above two acts for the initial project. Impacts were evaluated against the Environmental Effects Statement (EES) trigger criteria, under the Environment Effects Act 1978 (EE Act) during the bilateral assessment process.

Conclusions and recommendations

The Swift Parrot was not confirmed as occurring within the Gelliondale Wind Farm study area during the targeted surveys conducted in April 2020, and April, May and June 2021. Owing to the lack of high-quality or extensive habitat that would support these species on the wind farm, Swift Parrot regular movements across the wind farm site is not anticipated. Instead, it may be expected that the occasional individuals of Swift Parrots may visit the wind farm temporarily when food resources may attract them into the site. Based on this and the updated improved layout of the proposed wind farm, which has a reduced number of turbines, no significant impact on the overall population of this species is expected.

6.2. White-throated Needletail

Ecology

This White-throated Needletail *(Hirundapus caudacutus caudacutus)* is widespread in eastern and south-eastern Australia and large numbers usually appear in Victoria and south-east NSW in December and later peak in Tasmania during February to March. This subspecies is a trans-equatorial migrant that breeds in the Northern Hemisphere summer and migrates south for the Southern Hemisphere summer. They arrive in Australia in about October each year and leave somewhere between May and August.

White-throated Needletail numbers have previously been estimated at 50,000–100,000 in Victoria, but have declined by 49 percent between 1979–1981 and 1998–2000. Numbers of needletails seen per day in eastern Australia more than halved between 1951-60 and 1991-20, same trend of decline in numbers seen per day in Victoria (Garnett and Baker 2021).

The species is almost exclusively aerial in Australia, flying at heights of less than one metre up to more than 1000 metres above the ground (Higgins 1999; Threatened Species Scientific Committee 2019). It moves around in flocks and occurs over most habitat types and is recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. When flying above farmland, it is more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. Many observations of needletails preceding or arriving with or soon after a frontal weather change or other atmospheric disturbance (Higgins 1999; Threatened Species Scientific Committee 2019).

The White-throated Needletail feeds on flying insects, such as termites, ants, beetles and flies. They catch the insects in flight in their wide gaping beaks. Birds usually feed in rising thermal currents associated with storm fronts and bushfires and they are commonly seen moving with wind fronts Higgins 1999; Threatened Species Scientific Committee 2019).

White-throated Needletails have been reported to roost in foliage at night in Australia; there are descriptions of these roosting but from few recorded instances (Corben *et al*. 1982; Day 1993; Tarburton, MK 1993; Garnett and Baker 2021). White-throated Needletail roosting habitat is considered to be absent from the immediate study area.

Threats

In Australia there are records of collision with wind turbines (Hull 2013), powerlines (Cameron & Hinchey 1981), windows (Slater 1964) and lighthouses (Draffen et al. 1983; Stokes 1983) but the impacts to the long-term population survival require further investigation. Organochlorine pesticides are another possible cause of decline of White-throated Needletails, either through a decrease in the abundance of invertebrates or from secondary poisoning (Tarburton 2014). The

loss of roosting sites in Australia may also be a cause of decline. Loss of forest and woodland habitats may have also resulted in the reduction of invertebrate prey (Tarburton 2014).

The largest single threat to White-throated Needletail appears to be the accelerated destruction of the Siberian forests, where a large proportion of the Australian population of Needletails needs old trees with hollows in which to breed (Tarburton 2014).

Legislative protection

The White-throated Needletail is listed in the EPBC Act under three categories:

- Listed as Vulnerable (Date effective 04-Jul-2019);
- Listed marine; and
- Listed migratory under CAMBA, JAMBA, and ROKAMBA.

Field methodology

The fixed-point bird count method, used to collect data on the numbers of White-throated Needletail (WTNT) visiting or utilizing the wind farm site, involved an observer stationed at a fixed survey point for a fixed period of time and counting all observed birds passing over the observation point. During this period, numbers of individual birds of WTNT observed or heard (up to 2000 metres from observer) were recorded. The number of birds, the approximate height when first sighted and direction of flights were documented.

Three surveys were undertaken during the period when the WTNT were in Australia. At each survey, the number of WTNT observed flying over the survey point was counted four times, at different times of the day (early morning, mid-morning, early afternoon, late afternoon). The timing of the three surveys and number of observation points were as follows:

7–11 December 2020: Six points were surveyed over four days (total of 24 replicates), with a period of one hour at each survey point (total of 24 hours of survey efforts) (Observer: G Mayor).

22–26 March 2021: 10 points were surveyed over four days (total of 40 replicates), with a period of 30 minutes at each survey point (Total of 20 hours of survey effort) (Observer: Luke Halpin).

25–29 April 2021: 10 points were surveyed over four days (total of 40 replicates), with a period of 30 minutes at each survey point (Total of 20 hours of survey effort) (Observer: G Mayor).

The increase in number of survey points, and reduction in observation time was believed to increase the likelihood of observation of WTNTs if present in the area. If a flock was observed, it would be monitored for the whole duration of the observation.

The points selected for the counting of the WTNT were located within the wind farm site, scattered along public roads and reserves throughout the study area, provided they offered good visual coverage. Habitats on the selected points varied between pasture paddocks, planted Cypress and Eucalypts, and small sections of state forests and plantations (Figure 4 and Figure 5).

Results

The VBA holds 15 historical records of the WTNT from a search region of 10 km radius centred on the wind farm site. Thirteen of these records were old (1977–1981), one record taken in 2004 at an area 5 km south of the wind farm site, and the latest record was of 10 WTNT taken in February 2015 over the wind farm site.

The WTNT have previously been recorded through bird surveys at the wind farm site. As mentioned above, a small flock of 10 individuals were sighted over the wind farm during bird utilisation survey

conducted in February 2015; and two weeks later, three birds were recorded while undertaking migratory bird surveys at the coastal area south of the wind farm site (BL&A 2016b).

During the 2020/2021 targeted survey, several WTNT were recorded flying over the wind farm site. None were seen during the December 2020 targeted survey. A lack of observations of the species during this period suggests that the species had still not arrived in the area in large numbers.

During the February 2021 targeted survey, a cumulative total of 469 WTNT were recorded flying over the wind farm site, however double counts were likely as flocks were seen over five days and actual numbers would range from 160-250 individuals. WTNT were recorded on four out of five days of surveys. Birds were mostly recorded from observation points 7 and 8, but also points 5, 9, and 10. The flock circled over the site at various heights ranging from 100–800 metres over ground. Flight patterns observed are summarised below and shown in Figure 6:

- Foraging above forest canopy (Alberton West State Forest, Gelliondale State Forest) in a linear trajectory, back and forth (20-100m above ground) and parallel to ridge or to forest edge with paddock.
- Traveling over paddocks between large patches of forest (30-200m above ground).
- Circling on thermal updrafts over paddocks to gain height, then travel (50-800m above ground).

During March 2021, a cumulative total of 41 WTNT were recorded on two out of the four days of the survey. The records were of small flocks ranging in size from 1 to 18 birds recorded at three different observation points (Table 8). Flight patterns were as observed in February 2021 however flight height ranged between 50 to 100 metres over ground, much lower than heights recorded in February 2021. Flight paths of the WTNT are depicted in Figure 6.

Weather conditions were mostly fine during February, and similarly during March, but there were more rainy days in March and temperature ranged between 11–24^{o}C. WTNT were recorded during the cooler days (11–16 ^{o}C), perhaps an indication of the conditions when the WTNT are more active.

Table 6: Summarized observations of WTNT during the December 2020 to March 2021 surveys

Date	Survey Point	Number of WTNT	Flight Direction	Height above ground	Distance to observer	Flight type	Behaviour
February 2021							
22/02/2021	7	**3**	W	20	500	Foraging	Foraging over Gelliondale State Forest canopy
23/02/2021	8	**80**	N	500	100	Circling	Coming from the south, catching a thermal and disappearing in height
23/02/2021	8	**30**	SW-NE-SW	100	400	Foraging	Foraging over Alberton West State Forest ridge and slopes, over canopy
23/02/2021	8	**68**	SW-NE-SW	60	400	Foraging	Foraging over AWSF canopy and chasing each other until dusk.
25/02/2021	8	**80**	NE	200	400	Circling	Catching a thermal over the paddocks, then descending in North direction into AWSF hills
25/02/2021	7	**160**	E, then N	200	100	Circling	Circling in a thermal, then heading north into AWSF
25/02/2021	8	**5**	N	50	100	Direct	Traveling at low distance from GSF over paddocks into AWSF
25/02/2021	8	**10**	E-W-E	300	300	Direct, Circling	Flock leaves ridge and stay at ridge level to catch a thermal on the paddocks, gain height, and

Date	Survey Point	Number of WTNT	Flight Direction	Height above ground	Distance to observer	Flight type	Behaviour
							come back to AWSF ridge at higher altitude
25/02/2021	9	**20**	E-W-E	100	500	Foraging	Foraging over canopy and chasing each other.
26/02/2021	10	**3**	N-S-N	30	400	Foraging	Foraging low over canopy of GSF
March 2021							
23/03/2021	9	**6**	E	50	250	Direct	Foraging in circular but sinuous flight easterly direction over farm paddocks and woodland breaks.
26/03/2021	7	**1**	NW	75	1000	Direct	Generally flying NW and circling occasionally above both forest and paddock
26/03/2021	10	**16**	NW-SE	75	900	Circling	Group was circling in a NW'erly direction over the forest and switched to fly SE'erly back over the paddock, foraging.
26/03/2021	9	**18**	E-W	100	2000	Circling	Group foraging above forest on AWSF back and forth E'erly and W'erly about 100m above the trees.

Foraging: Flight includes a variety of fast direct bursts, changes of direction, glides, sudden stops, and hawking.

Circling: Mainly used to gain height passively using an ascending warm air current, soaring in circles until desired height is reached, then birds glide to next current or foraging area.

Direct: Either gliding or flapping wings, flight aimed in a particular direction.

Conclusion and recommendation

WTNT was recorded at the wind farm site in the current targeted surveys. It was recorded in both February and March 2021, a period during which needletails most commonly occur over southern Victoria including east Gippsland. As noted above in the results section, the needletails were previously recorded at a similar period during 2015.

WTNT mortality from collision with wind turbines within Australia is known to occur, although is a low severity threat, affecting a small number of birds (Hull *et al*. 2013). Over a number of years, an estimate of 22 birds were killed by turbines at Bluff Point and Studland Bay Wind Farms, Tasmania (Hull *et al*. 2013), and other casualties have been reported at other wind farms in SE mainland Australia (Nature Advisory, unpubl. data). However, the annual cumulative impact of current operating windfarms in SE Australia is unknown.

The number of WTNT flying within the proposed windfarm footprint was considered overall low to moderate, but occasionally high and restricted to the forested sections and paddocks in between, however these numbers may only prevail over up to four months per year, namely December-April. Occasional impacts may occur in days of peak occurrence in the study area, given the presence of proposed turbines close to areas where flocks were seen flying at Rotor Swept Height. Continuous collisions over time may have a low impact to the species.

Better knowledge of the predicting variables of their occurrence in the area (time of the day, wind direction, weather) will inform the avoidance and mitigation measures. This can be achieved by further surveys in the next summer season.

Avoidance and mitigation measures may include but not be limited to:

- Further surveys to ascertain peak activity weather and time patterns;

- Targeted turbine curtailment during predicted peak occurrence times (month, time of the day, prevailing winds, storm fronts); and
- Mortality monitoring and impact triggers.

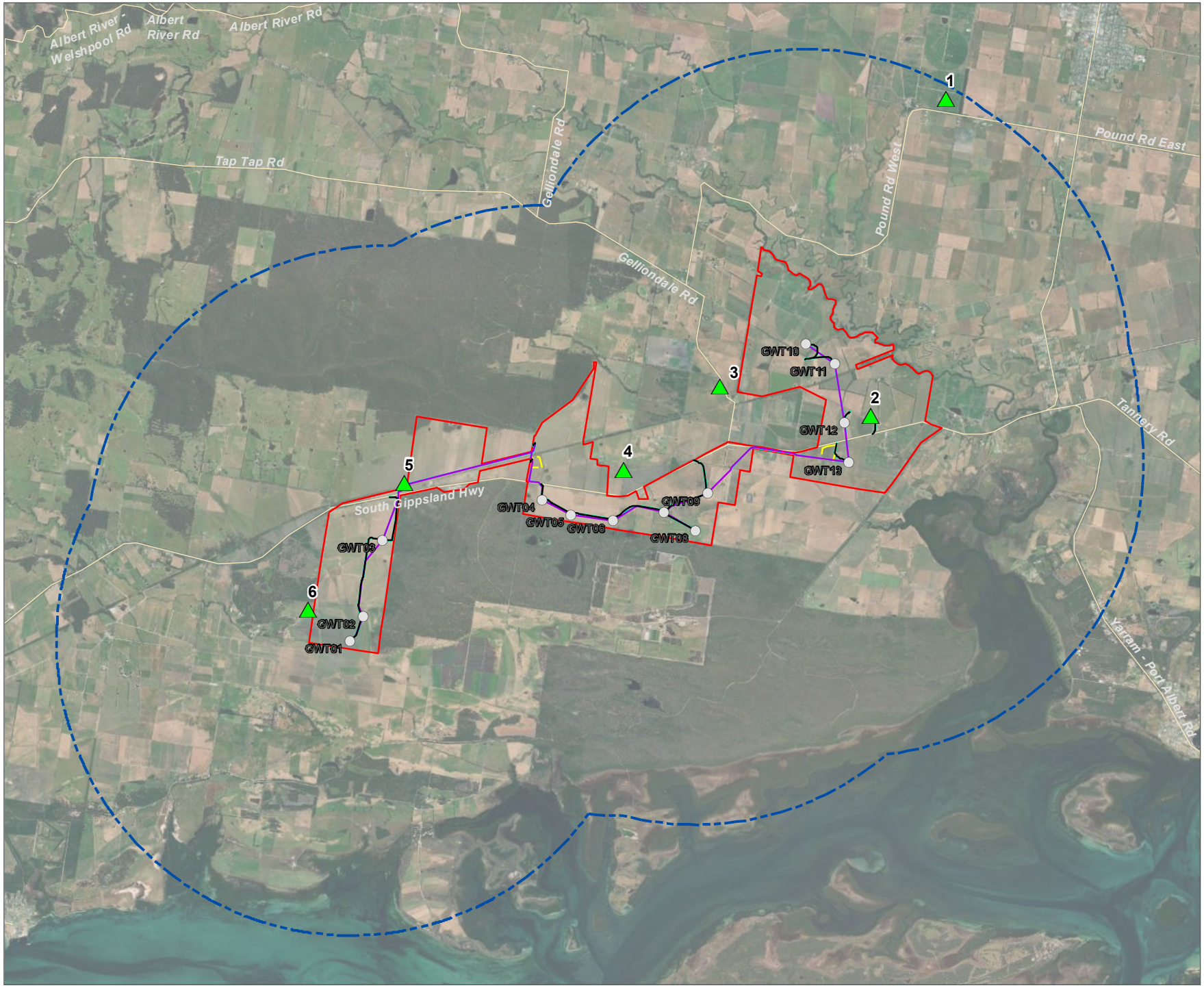

Figure 4: White-throated Needletail observation points during December 2020 Targeted survey

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Turbine
- Access track
- Electrical cable
- Turbine buffer 5km
- White-throated Needletail survey point

N

Metres
0 1,400

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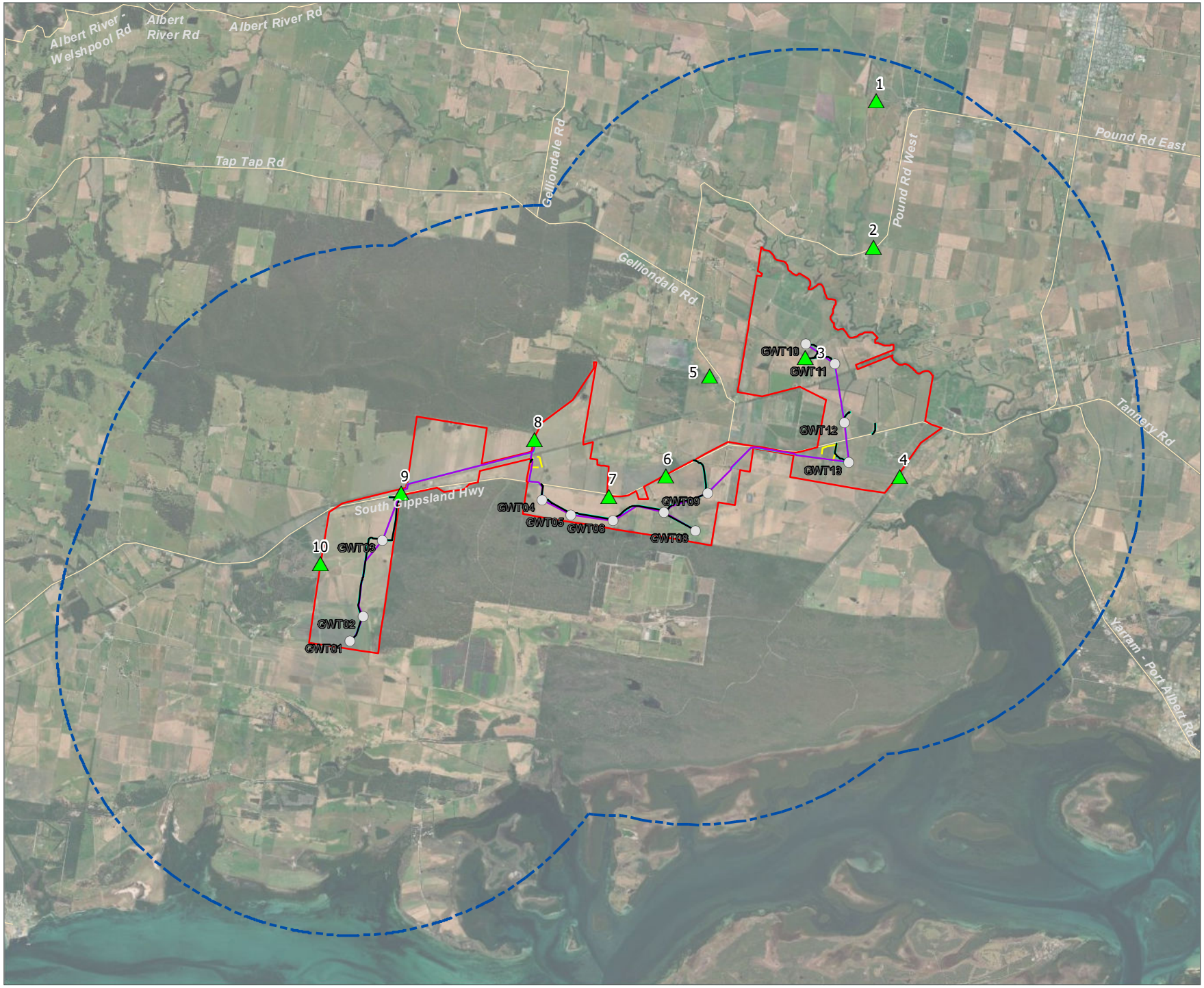

Figure 5: White-throated Needletail observation points during February and March 2021 Targeted survey

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Turbine
- Access track
- Electrical cable
- Turbine buffer 5km
- White-throated Needletail survey point

N

Metres
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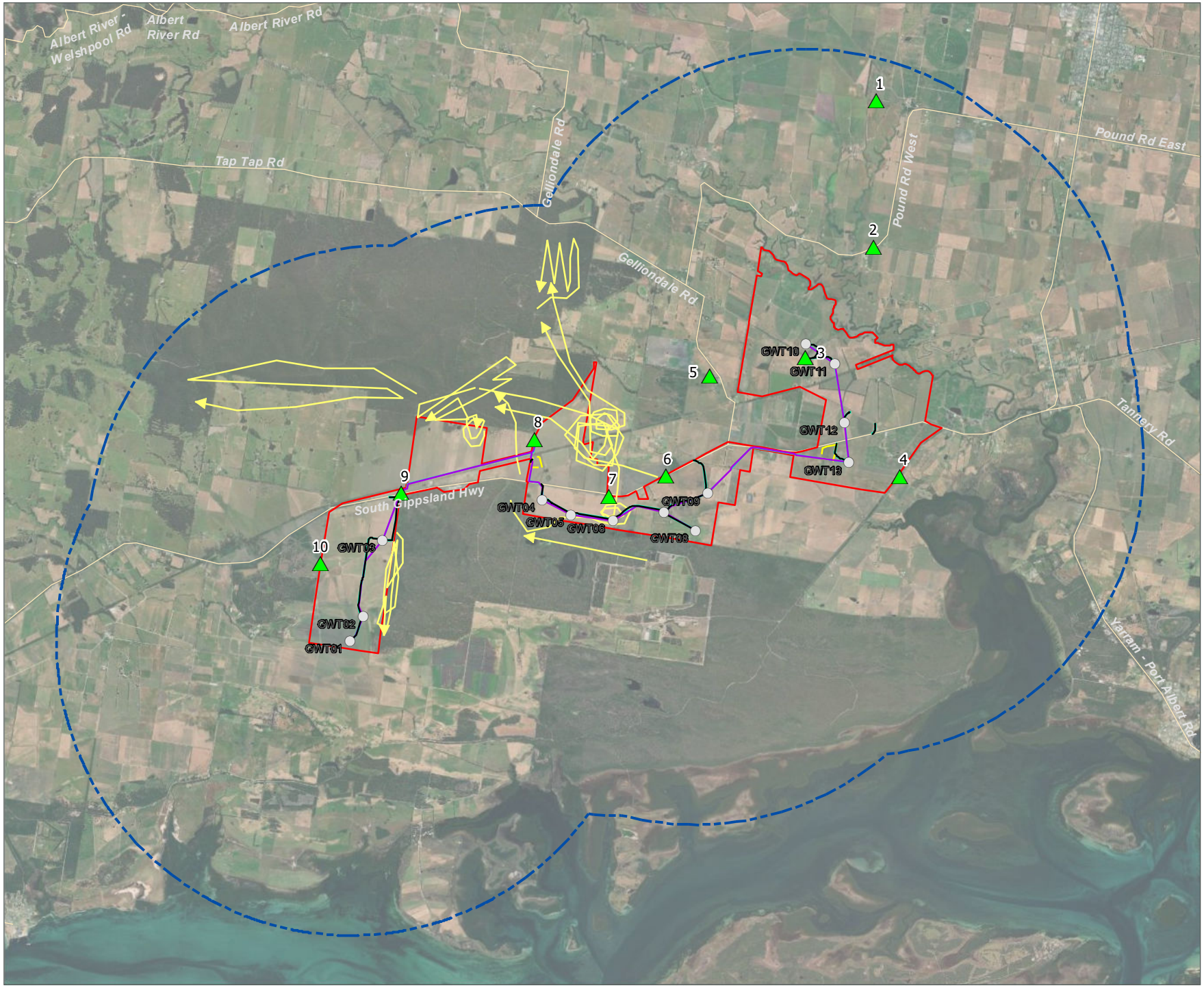

Figure 6: White-throated Needletail flight paths over the wind farm site during February 2021 Targeted survey

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Turbine
- Access track
- Electrical cable
- Turbine buffer 5km
- Flight path
- White-throated Needletail survey point

N

Metres
0 1,400

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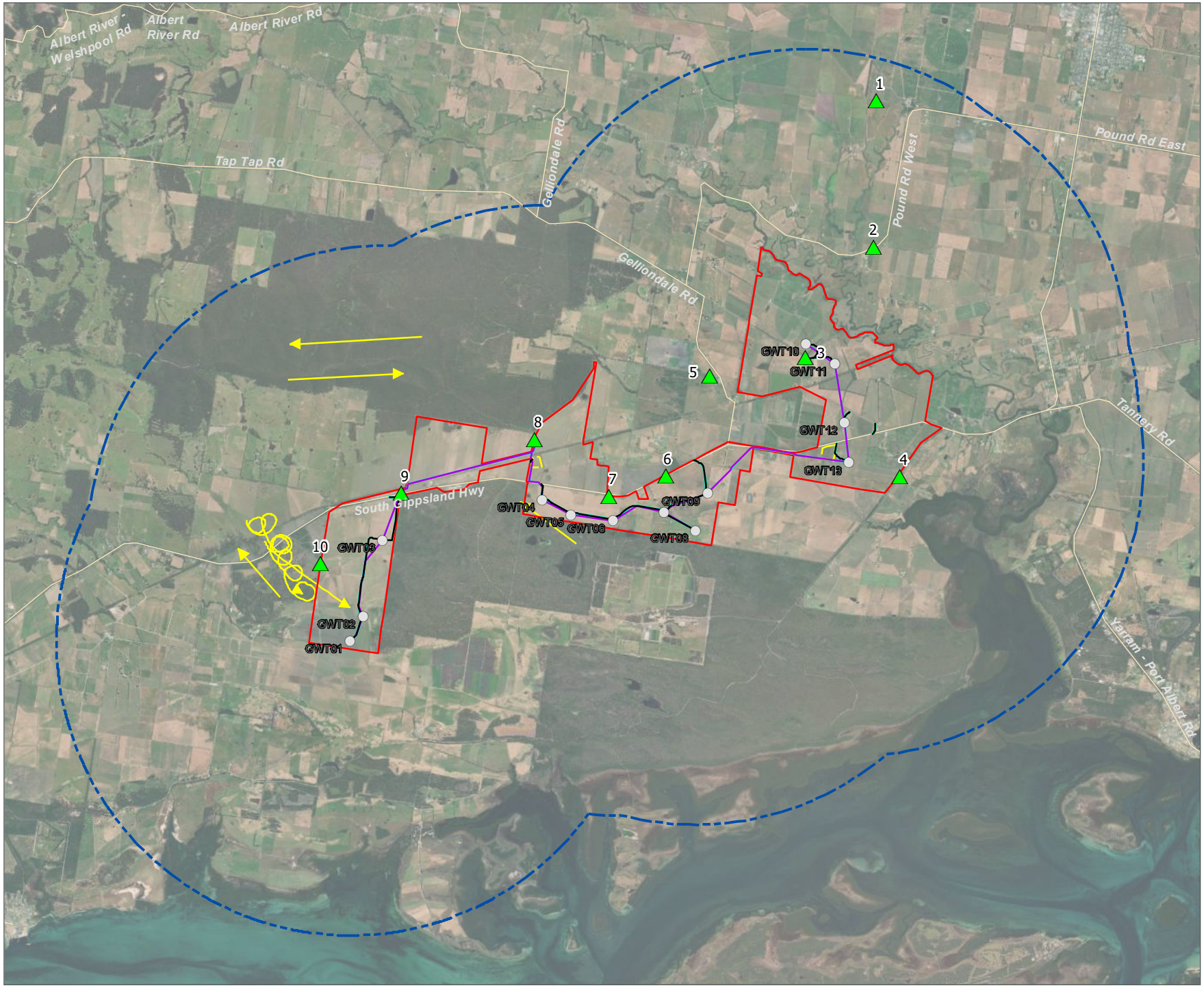

Figure 7: White-throated Needletail flight paths over the wind farm site during March 2021 Targeted survey

Project: Gelliondale Wind Farm
Client: Synergy Wind
Date: 7/09/2022

- Wind farm boundary
- Turbine
- Access track
- Electrical cable
- Turbine buffer 5km
- White-throated Needletail survey point
- Flight path

N

Metres
0 1,400

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7. Assessment of impacts

7.1. Proposed development

The proposed development will involve the construction of 13 wind turbines (each with an adjacent hardstand required for construction), access tracks, underground cabling, overhead powerlines and four work compounds.

The extent of the area of impact for the current proposal was considered to include the outer-most boundaries of the following:

- Access tracks – six metres wide;
- Underground cabling and associated trenching – three metres wide;
- Battery
- 13 wind turbines –15 metre radii;
- One hardstand beside each wind turbine – 25 x 45 metres;
- One large electrical substation; and
- Two staging and operations/maintenance areas.

Predominant land use within the site is for agricultural operations. This land use will continue during and after wind farm construction.

To determine impacts to native vegetation, the proposed construction layout was overlaid with the native vegetation mapped as part of this investigation. Native vegetation occurring in the following locations was considered to be removed based on the proposed development plan:

- Direct removal:
    - Native vegetation within all proposed wind turbine construction hardstands
    - Native vegetation within all proposed access tracks
    - Native vegetation within all proposed laydown and storage areas
    - Native vegetation within all proposed operations and management areas
    - Native vegetation within the proposed substation footprint
- Consequential removal:
    - Native vegetation within 10m of all wind turbine hardstands (to address potential 'cut and fill' requirements)
    - Trees with the more than 10% of their TPZ encroached.

Impacts to trees

In accordance with the *Assessor's Handbook* (DELWP 2018), a tree is deemed lost when earthworks encroach on more than 10% of its Tree Protection Zone (TPZ). A TPZ is defined as an area around the trunk of the tree which has a radius of 12 × the DBH (to a maximum of 15 metres but no less than 2 metres). Dead trees are treated in the same manner.

No trees will be impacted by the proposed layout.

7.2. Recommendations for further mitigation

Where feasible, rather than constructing new, parallel and adjacent transmission lines existing overhead power lines should be utilised. During the detailed design stage for overhead transmission lines, power poles, anchor-points and works access points should be sited outside native vegetation wherever feasible.

Implementation of a Bat and Avifauna Management Plan for the proposed wind farm will ensure that procedures and strategies exist to respond to any unanticipated impacts on any threatened species.

Implementing these mitigation measures will ensure that obligations under relevant legislation and policies are adhered to, and that requirements to offset native vegetation removal are avoided or minimised. It will also ensure that the environmental footprint of the project is appropriately limited.

Best-practice development and construction recommendations are provided in Appendix 7. These should be considered to ensure impacts are minimised to flora, fauna and/or native vegetation.

7.3. Impacts of proposed development

7.3.1. Native vegetation

The current wind farm footprint will result in the loss of a total extent of 0.691 hectares of native vegetation as represented in and documented in the *Native Vegetation Removal* (NVR) report provided by DELWP (Appendix 10).

Small areas of additional native vegetation removal in form of swamp scrub or treed vegetation within road reserves is expected within turning circles of trucks carrying blades at up to 10 intersections along the transport route during construction. The exact amount of this native vegetation removal will be determined in response to the full Traffic Impact Assessment, which is currently being prepared.

7.3.2. Modelled species important habitat

The current proposal footprint will not have a significant impact on any habitat for any rare or threatened flora species as determined in Appendix 10.

7.3.3. Listed flora species

The analysis of the likelihood of occurrence of listed flora species presented in Section 5.3.2 identified that the following species had potential to occur within the study area:

- Creeping Rush (FFG Act: Endangered);
- Currant-wood (FFG Act: Endangered);
- River Swamp Wallaby-grass (EPBC Act: Vulnerable);
- Southern Blue-gum (FFG Act: Endangered); and
- Strzelecki Gum (EPBC Act: Vulnerable; FFG Act: Critically Endangered).

No trees and wetlands will be removed by the proposed wind farm and targeted flora surveys undertaken within the wider initial layout did not record any threatened flora species (BL&A 2016a).

The following species only have potential to occur in the adjacent Gelliondale State Forest, which was part of the initial study area but has been avoided as part of the design response to mitigate impacts:

- Clover Glycine (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Dense Leek-orchid (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Eastern Spider-orchid (EPBC Act: Endangered);

- Fringed Helmet-orchid (FFG Act: Endangered);
- Metallic Sun-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Maroon Leek-orchid (EPBC Act: Endangered; FFG Act: Endangered);
- Orange-tip Finger-orchid (FFG Act: Endangered);
- Spurred Helmet-orchid (FFG Act: Endangered);
- Thick-lip Spider-orchid (EPBC Act: Vulnerable).

No significant impacts to any of these flora species are expected from the proposed revised wind farm layout.

7.3.4. Listed fauna species

The analysis of susceptibility of listed fauna species presented in Section 5.6.3 identified a number of nationally (EPBC Act) and state (FFG Act) threatened species, are susceptible to impacts from wind farm development in the study area. Of these species, the following were considered more likely to be impacted, as they have the potential to occur, been recorded within the wind farm, or fly at RSA height:

- Swift Parrot
- White-throated Needletail
- Gang–gang Cockatoo
- Powerful Owl
- White-bellied Sea-Eagle

Targeted surveys of the first EPBC two species have been carried out; the details of the survey and possible impacts on these two species are discussed in detail in Section 6. No significant impacts to the Swift Parrot or White-throated Needletail populations are expected from the proposed revised wind farm layout.

The Gang–gang Cockatoo is a strict woodland species and would only occasionally venture outside the woodland and is not expected to be significantly impacted.

Targeted surveys for Powerful Owl in areas of forest may well confirm their presence (already confirmed for the Alberton West state forest) but would not change conclusions in relation to the likelihood of impact, as discussed earlier in this report (see Section 5.6.3). The owl generally confines itself to forested habitats, none of which will have turbines built in them and dispersal of juvenile owls after breeding is finished would be a rare event most likely confined to the areas where treed habitats are closest. Where this occurs, either side of the South Gippsland Highway, no turbines are proposed to be constructed. The likelihood of an ongoing impact on this species is therefore considered to be low.

The White-bellied Sea-Eagle is not likely species to be impacted by the operation of a wind farm; the species mostly found along the coast and may on occasions venture inland passing over the wind farm site.

7.3.1. Threatened ecological communities

The proposed development footprint will not result in the loss of any threatened ecological communities.

8. Implications for the proposed development

8.1. Planning and Environment Act 1987

8.1.1. Local Provisions–Overlays

Environmental Significance Overlay – Schedule 2

A **permit is not required** as no works which will remove, destroy or lop any vegetation are proposed on land under this overlay.

8.1.2. Clause 52.17of the Planning Scheme

A permit for the proposed removal of native vegetation is required under Cl. 52.17 of the State Planning Provisions.

The current proposal would trigger a referral to DELWP as it meets the criteria specified in Section 3.3.3.

8.2. Implications under the Guidelines

8.2.1. Avoid and minimise statement

In accordance with the Guidelines, all applications to remove native vegetation must provide an avoid and minimise statement that describes any efforts undertaken to avoid the removal of, and minimise the impacts to biodiversity and other values of native vegetation, and how these efforts were focused on areas of native vegetation with the highest value.

The proponent committed early in the process to reduce the removal of native vegetation to a minimum based on the results of Nature Advisory's field surveys and subsequent advice. Efforts to avoid and minimise impacts to native vegetation in the current application are presented as follows:

- The number of turbines has been reduced to 13 from the initial 34 turbine layout.
- A proposed turbine between the large forest blocks has been removed.
- The distance between proposed turbines and forest edges has been increased for most turbines, unless other restrictions were in place (distance to dwellings).
- Where feasible, proposed access tracks follow existing cleared farm tracks.
- The vast majority of the remaining development footprint has been sited within cleared agricultural land.
- The transmission line route has been moved north of the rail reserve corridor to avoid remnant native vegetation and scattered trees within and south of the reserve.
- An access track was moved out of Birds Road (a narrow road lined on either side with diverse sedgy, shrubby and grassy vegetation as well as overhanging trees) and into the cleared private land to the east.
- Works compounds and electrical substations have been sited within cleared farm paddocks.
- Access point 1 and associated track were moved west, avoiding impacts on Gelliondale State Forest.

All of the above changes resulted in considerable reductions in overall proposed native vegetation removal.

The proponent has indicated that, where feasible, further micro siting of infrastructure will occur during the construction stage, to further reduce impacts to native vegetation. The impacts presented in this report therefore present a conservative account of proposed impacts.

Further recommendations to mitigate impacts on flora and fauna are presented in Section 7.2

8.2.2. Assessment pathway

The assessment pathway is determined by the location category and extent of native vegetation as detailed for the study area as follows:

- **Location Category:** Location 2
- **Extent of native vegetation:** A total of 0.691 hectares of native vegetation (no large trees).

Based on the extent of native vegetation removal being ≥ 0.5 hectares, the Guidelines stipulate that the proposal is to be assessed under the **Detailed** assessment pathway, as determined by the following matrix:

Table 7: Assessment pathway matrix

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
< 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
< 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
≥ 0.5 hectares	Detailed	**Detailed**	Detailed

This proposal **would** trigger a referral to DELWP based on the above criteria.

8.2.3. Offset requirements

Offsets required to compensate for the proposed removal of native vegetation from the study area are as follows:

- 0.261 general habitat units and must include the following offset attribute requirements:
  - Minimum strategic biodiversity value (SBV) of 0.316.
  - Occur within the West Gippsland CMA boundary or the Wellington Shire Council.

Under the Guidelines all offsets must be secured prior to the removal of native vegetation.

Any additional requirements for vegetation removal or lopping at locations outside of the project area due to turning circles of blade trucks will be included in the planning application for the project, and any additional offset requirements adopted.

8.2.4. Offset statement

The offset target for the current proposal will be achieved via a third-party offset.

An online search of the Native Vegetation Credit Register (NVCR) has shown that the required offset is currently available for purchase from a native vegetation credit owner (DELWP 2022e).

Evidence that the required offset is available is provided in Appendix 11. The required offset would be secured following approval of the application to remove native vegetation.

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Appendix 1: Details of the assessment process in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)

Purpose and objective

Policies and strategies relating to the protection and management of native vegetation in Victoria are defined in the State Planning Policy Framework (SPPF). The objective of all Victorian Planning Schemes, as identified in Clause 12.01, is 'To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This is to be achieved through the following three-step approach, as described in the Guidelines:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Note: While a planning permit may still be required, if native vegetation does not meet the definition of either a patch or a scattered tree, an offset under the Guidelines is not required.

Assessment pathways

The first step in determining the type of assessment required for any site in Victoria is to determine the assessment pathway for the proposed native vegetation removal. The three possible assessment pathways for applications to remove native vegetation in Victoria are the following:

- Basic;
- Intermediate; or
- Detailed.

This assessment pathway is determined by the following two factors:

- **Location Category**, as determined using the Location Map of Victoria. The location category indicates the potential risk to biodiversity from removing a small amount of native vegetation. The three location categories are defined as follows:
    - Location 1 – shown in light blue-green on the Location Map; occurring over most of Victoria.
    - Location 2 – shown in dark blue-green on the Location Map; includes areas mapped as endangered EVCs and/or sensitive wetlands and coastal areas.
    - Location 3 – shown in brown on the Location Map; includes areas where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for rare and threatened species.
- **Extent of native vegetation** – The extent of any patches and scattered trees proposed to be removed (and the extent of any past native vegetation removal), with consideration as to whether the proposed removal includes any large trees. Extent of native vegetation is determined as follows:
    - **Patch** – the area of the patch in hectares.
    - **Scattered Tree** – the extent of a scattered tree is dependent on whether the scattered tree is small or large. A tree is considered to be a large tree if the DBH is greater than or equal to the large tree benchmark DBH for the relevant bioregional EVC. Any scattered tree that is not a

large tree is a small scattered tree. The extent of large and small scattered trees is determined as follows:

- **Large scattered tree** – the area of a circle with a 15 metre radius, with the trunk of the tree at the centre.
- **Small scattered tree** – the area of a circle with a ten-metre radius, with the trunk of the tree at the centre.

The assessment pathway for assessing an application to remove native vegetation is subsequently determined as shown in the following matrix table:

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
< 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
< 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
≥ 0.5 hectares	Detailed	Detailed	Detailed

Note: If the native vegetation to be removed includes more than one location category, the higher location category is used to determine the assessment pathway.

Landscape scale information – strategic biodiversity value

The strategic biodiversity value (SBV) is a measure of a location's importance to Victoria's biodiversity, relative to other locations across the state. This is represented as a score between 0 and 1, and determined from the SBV map, available from *NVIM* (DELWP 2022c).

Landscape scale information – habitat for rare or threatened species

Habitat importance for rare or threatened species is a measure of the importance of a location in the landscape as habitat for a particular rare or threatened species, in relation to other habitat available for that species. This is represented as a score between 0 and 1 and determined from the Habitat importance maps, administered by DELWP.

This includes two groups of habitat:

- **Highly localised habitats** – Limited in area and considered to be equally important, therefore having the same habitat importance score.
- **Dispersed habitats** – Less limited in area and based on habitat distribution models.

Habitat for rare or threatened species is used to determine the type of offset required in the detailed assessment pathway.

Biodiversity value

A combination of site-based and landscape scale information is used to calculate the biodiversity value of native vegetation to be removed. Biodiversity value is represented by a general or species habitat score, as determined below.

Firstly, the extent and condition of native vegetation to be removed are combined to determine the habitat hectares as follows:

Habitat hectares = extent of native vegetation × condition score

Secondly, the habitat hectare score is combined with a landscape factor to obtain an overall measure of biodiversity value. Two landscape factors exist as follows:

- **General landscape factor** – determined using an adjusted strategic biodiversity score and relevant when no habitat importance scores are applicable;
- **Species landscape factor** – determined using an adjusted habitat importance score for each rare or threatened species habitat mapped at a site in the Habitat importance map.

These factors are subsequently used as follows to determine the biodiversity value of a site:

General habitat score = habitat hectares × general landscape factor

Species habitat score = habitat hectares × species landscape factor

Offset requirements

A native vegetation offset is required for the approved removal of native vegetation. Offsets conform to one of two types and each type incorporates a multiplier to address the risk of offset:

- A **general offset** is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species (i.e. the proportional impact is below the species offset threshold). In this case a multiplier of 1.5 applies to determine the general offset amount.

General offset (amount of general habitat units) = general habitat score × 1.5

- A **species offset** is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species (i.e. the proportional impact is above the species offset threshold). In this case a multiplier of 2 applies to determine the species offset amount.

Species offset (amount of species habitat units) = Species habitat score × 2

Note: If native vegetation does not meet the definition of either a patch or scattered tree, an offset is not required.

Offset attributes

Offsets must meet the following attribute requirements, as relevant:

- General offsets
    - **Offset amount** – general offset = general habitat score **×** 1.5

- **Strategic biodiversity value (SBV)** – the offset has at least 80% of the SBV of the native vegetation removed
- **Vicinity** – the offset is in the same CMA boundary or municipal district as the native vegetation removed
- Habitat for rare and threatened species – N/A
- **Large trees** – the offset includes the protection of at least one large tree for every large tree to be removed

- Species offsets
  - **Offset amount** – species offset = species habitat score × 2
  - Strategic biodiversity value (SBV): N/A
  - Vicinity: N/A
  - **Habitat for rare and threatened species** – the offset comprises mapped habitat according to the Habitat importance map for the relevant species

Large trees – the offset includes the protection of at least one large tree for every large tree to be removed

Appendix 2: Details of investigated properties

Property No.*	Street address	Town/Suburb	Lot description	Land Designation (DTPLI 2015)	
				Zones	Overlays^
Private Land					
1	150 Todds Road	Hedley	Lot 1 PS51087	FZ	WMO, SLO3
2	169 Birds Road South	Hedley	Allot. 1 Sec. A Parish of Alberton West	FZ	WMO
3	6970 South Gippsland Highway	Hedley	Lot 1 TP110485	FZ	WMO
4	South Gippsland Highway	Hedley	Lot 1 TP578219	FZ	
5	South Gippsland Highway	Hedley	Lot 1 TP578908	FZ	
6	7085 South Gippsland Highway	Hedley	Lot 1 TP754717	FZ, PCRZ	WMO, ESO2
7	Coal Mine Road	Gelliondale	Lot 2 Lp92727	FZ	WMO, ESO2
8	67 Lanes Road	Gelliondale	Lot 2 PS50651	FZ	
9	South Gippsland Highway	Hedley	Allot. 53 Parish of Alberton West	FZ, IN1Z	
10	South Gippsland Highway	Hedley	Lot 2 PS404524	FZ	
11	7438 South Gippsland Highway	Hedley	Lot 1 PS40452	FZ	
12	7618 South Gippsland Highway	Gelliondale	Plan PC36214	FZ	
13	Lanes Road	Alberton West	Lot 1 TP88769	FZ	ESO2
14	115 Gelliondale Road	Gelliondale	Lot 63 LP315	FZ	ESO2
15	Gelliondale Road	Gelliondale	Lot 1 TP814120	FZ, PCRZ	ESO2
16	738 Pound Road West	Alberton West	Lot 1 PS61948	FZ, PCRZ	ESO2
17	47 Nicols Road	Devon North	Allot. 14A Parish of Yarram Yarram	FZ	
18	Nicols Road	Devon North	Allot. 14L Parish of Yarram Yarram	FZ	
19	668 Pound Road West	Yarram	Lot 8 PS31552	FZ	

Property No.*	Street address	Town/Suburb	Lot description	Land Designation (DTPLI 2015)	
				Zones	Overlays^
20	80 Crangs Road	Alberton West	Lot 1 PS61738	FZ	
21	212 Old Alberton West Road	Alberton	Lot 7 LP4703	FZ	
22	174 Old Alberton West Road	Alberton	Lot 1 PS71429	FZ	ESO2
23	Old Alberton West Road	Gelliondale	Lot 5 LP4703	FZ	
24	7913 South Gippsland Highway	Alberton	Lot 3 LP4703	FZ	
25	South Gippsland Highway	Gelliondale	Lot 1 TP864748	FZ	
26	7776 South Gippsland Highway	Gelliondale	Lot 1 TP109933	FZ	
27	7802 South Gippsland Highway	Gelliondale	Plan TP4297	FZ	
28	7890 South Gippsland Highway	Alberton	Lot 1 TP128952	FZ	
29	7996 South Gippsland Highway	Alberton	Lot 1 PS603015	FZ	ESO1
30	8028 South Gippsland Highway	Alberton	Lot 1 PS51087	FZ	
31	Ti Tree Road	Gelliondale	Allot. A Sec. 9 Alberton West	FZ	
32	7666 South Gippsland Highway	Gelliondale	Allot. 8a Parish of Alberton West	FZ	
33	555 Ti Tree Road	Hedley	Allot. 24c Sec. A Parish of Alberton West	PCRZ	ESO2
34	Wests Road	Alberton West	Lot 1 LP9272	FZ	
35	205 Lanes Road	Alberton West	Lot 1 TP83713	FZ	
36	Lanes Road	Alberton West	Lot 1 TP53216	FZ	
37	Lanes Road	Gelliondale	Allot. 44 Parish of Alberton West	FZ	ESO2 (does not cover study area)
38	68 James Road	North Hedley	Allot. 78 Parish of Alberton West	FZ	
39	South Gippsland Highway	Hedley	Allot. 62 Parish of Alberton West	FZ	

Property No.*	Street address	Town/Suburb	Lot description	Land Designation (DTPLI 2015)	
				Zones	Overlays^
40	806 Pound Road West	Alberton West	Lot 4 PS31552	FZ	ESO2 (does not cover study area)
41	Pound Road West	Alberton West	Allot. A11A Parish of Yarram Yarram	PCRZ	ESO2
42	Pound Road West	Alberton West	Allot. 2009 Parish of Yarram Yarram	FZ	
43	Pound Road West	Alberton West	Allot. 2010 Parish of Yarram Yarram	FZ	
44	179 Lower Jack Road	Jack River	Lot 1 LP14081	FZ	
45	Ross Road	Alberton West	Allot. A13A Parish of Yarram Yarram	PCRZ, FZ	
46	Pound Road West	Alberton West	Plan CP16737	PCRZ, FZ	
47	937 Pound Road West	Alberton West	Lot 1 LP143423	FZ	
48	1007 Pound Road West	Alberton West	Lot 1 TP56137	FZ	
49	246 Gelliondale Road	Alberton West	Lot 1 PS438124	FZ	
50	392a Old Alberton West Road	Alberton West	Lot 2 PS438124	FZ	
51	246 Gelliondale Road	Alberton West	Lot 1 PS620983	FZ	
52	1007 Pound Road West	Alberton West	Lot 1 TP561378	FZ	
53	1045 Pound Road West	Alberton West	Lot 1 TP375270	FZ	
54	370 Lanes Road	Alberton West	Lot 2 PS41020	FZ	
55	289 Gelliondale Road	Alberton West	Lot 1 PS41020	FZ	
Public Land					
NA	South Gippsland Highway		Road Reserve	RDZ1	
NA	Great Southern Rail Trail		Rail Reserve (disused)	PCRZ	
NA	Birds Road South		Road Reserve	FZ	
NA	Todds Road		Road Reserve	FZ	

Property No.*	Street address	Town/Suburb	Lot description	Land Designation (DTPLI 2015)	
				Zones	Overlays^
NA	Old Alberton West Road		Road Reserve	FZ	
NA	McPhersons Road		Road Reserve	FZ	
NA	Ti Tree Road		Road Reserve	FZ	
NA	Lanes Road		Road Reserve	FZ	
NA	Wests Road		Road Reserve	FZ	
NA	Great Southern Rail Trail (SOUTH GIPPSLAND HIGHWAY)		Rail Reserve (disused)	PCRZ	
NA	Coal Mine Road		Road Reserve	FZ	
NA	Old Alberton Road		Road Reserve	FZ	
NA	Simmons Street / Crangs Road		Road Reserve (paper road)	FZ	
NA	Pound Road West		Road Reserve	FZ	
NA	Gelliondale Road		Road Reserve	RDZ2	

* = BL&A property reference

^ = Only relevant overlays have been listed

FZ = Farming Zone

RDZ1 = Road Zone – Category 1

RDZ2 = Road Zone – Category 2

PCRZ = Public Conservation and Resource Zone

IN1Z = Industrial 1 Zone

ESO1 = Environmental Significance Overlay – Schedule 1

ESO2 = Environmental Significance Overlay – Schedule 2

SLO3 = Significant Landscapes Overlay – Schedule 3

Appendix 3: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D	E	F	G	H	I	J	K	L
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			653	653	653	53	53	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.017	0.023	0.850	0.030	0.260	1.300	0.370	0.420	0.040	0.065	0.087	0.330
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No. large trees in habitat zone		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	3	3	3	3	3	3	3	3	3
	Lack of Weeds	/15	6	6	9	6	6	6	6	6	4	7	4	4
	Understorey	/25	15	15	10	5	5	15	5	5	15	5	5	5
	Recruitment	/10	6	6	6	10	10	10	10	10	10	10	10	10
	Organic Matter	/5	5	5	5	5	5	5	5	5	4	5	4	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Site Condition subtotal		*44*	*44*	*41*	*36*	*36*	*49*	*36*	*36*	*45*	*38*	*33*	*33*
Landscape Context	Patch Size	/10	1	1	1	1	1	2	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	1	1	1	1	1	1
Total Condition Score		**/100**	**46**	**46**	**43**	**38**	**38**	**52**	**38**	**38**	**47**	**40**	**35**	**35**

Habitat Zone			M	N	O	P	Q	R	S	T	U	V	W
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	53	53	53	53	53	53	53	821	53
Total area of Habitat Zone (ha)			0.065	0.035	0.008	0.190	0.019	0.073	0.023	0.080	0.690	0.059	0.029
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No. large trees in habitat zone		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	3	3	0	3	3	3	3	3	3	NA	3
	Lack of Weeds	/15	4	0	7	0	0	0	4	0	0	7	0
	Understorey	/25	5	5	15	5	5	5	5	5	5	15	5
	Recruitment	/10	10	5	5	10	5	5	10	10	10	3	5
	Organic Matter	/5	4	4	2	4	4	4	2	4	4	5	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.36	1.25
	Site Condition subtotal		*33*	*21*	*36*	*28*	*21*	*21*	*30*	*28*	*28*	*41*	*21*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	1	1	1	1	1
Total Condition Score		**/100**	**35**	**23**	**38**	**30**	**23**	**23**	**32**	**30**	**30**	**43**	**23**

Habitat Zone			X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			653	653	821	653	653	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.390	0.048	0.120	0.187	0.011	0.100	0.110	0.011	0.063	0.023	0.013
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No. large trees in habitat zone		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	NA	NA	NA	NA	3	3	3	3	3	3
	Lack of Weeds	/15	9	9	7	9	4	0	0	0	6	6	6
	Understorey	/25	20	15	15	15	5	5	5	5	5	5	5
	Recruitment	/10	6	3	6	3	0	6	10	10	10	10	10
	Organic Matter	/5	5	3	5	5	5	4	4	4	4	4	4
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.36	1.25	1.25	1.25	1.25	1.25	1.25
	Site Condition subtotal		*54*	*41*	*45*	*44*	*19*	*23*	*28*	*28*	*35*	*35*	*35*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	1	1	1
	Distance to Core	/5	1	1	1	1	1	1	1	1	3	3	3
Total Condition Score		**/100**	**56**	**43**	**47**	**46**	**21**	**25**	**30**	**30**	**40**	**40**	**40**

Habitat Zone			AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	53	53	53	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.084	0.038	0.240	0.190	0.010	0.005	0.066	0.079	0.098	0.150	0.130	0.170
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No. large trees in habitat zone		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	5	5	5	5	3	3	3	3	3	3	3	3
	Lack of Weeds	/15	6	6	6	6	6	6	4	4	4	4	4	4
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	5	5	10	10	10	10	5	5	5	5	5	5
	Organic Matter	/5	4	4	4	4	4	4	2	2	2	2	2	2
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Site Condition subtotal		*31*	*31*	*38*	*38*	*35*	*35*	*24*	*24*	*24*	*24*	*24*	*24*
Landscape Context	Patch Size	/10	1	1	2	2	1	1	1	1	1	1	1	1
	Neighbourhood	/10	1	1	2	2	1	1	1	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**36**	**36**	**45**	**45**	**40**	**40**	**29**	**29**	**29**	**29**	**29**	**29**

Habitat Zone			AU	AV	AW	AX	AZ	BA	BB	BC	BD	BE	BF	BG
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	48	48	48	48	48	48	53	53	48	48	48
Total area of Habitat Zone (ha)			0.063	0.085	0.044	0.048	0.046	0.019	0.099	0.069	0.019	0.140	0.059	0.018
Site Condition	Large Old Trees	/10	NA	10	0	10	0	8	8	NA	NA	9	0	0
	No. large trees in habitat zone		NA	4	0	3	0	1	3	NA	NA	3	0	0
	Tree Canopy Cover	/5	3	5	5	5	5	2	5	3	3	3	3	3
	Lack of Weeds	/15	4	0	0	0	0	0	0	4	7	4	0	0
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5	5	5	6	5	3	5	5
	Organic Matter	/5	2	3	2	2	2	4	4	4	3	3	2	2
	Logs	/5	NA	0	0	5	5	0	5	NA	NA	5	5	5
	Site condition standardising multiplier*		1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.25	1.00	1.00	1.00
	Site Condition subtotal		*24*	*28*	*17*	*32*	*22*	*24*	*32*	*28*	*29*	*32*	*20*	*20*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	1	1	1	1	1	1	1	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**29**	**33**	**22**	**37**	**27**	**29**	**37**	**33**	**34**	**37**	**25**	**25**

Habitat Zone			BH	BI	BJ	BK	BL	BM	BM1	BN	BN1	BO	BP	BQ
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			48	48	48	48	48	48	48	48	48	48	48	48
Total area of Habitat Zone (ha)			0.043	0.054	0.012	0.006	0.024	0.012	0.019	0.019	0.029	0.130	0.510	0.150
Site Condition	Large Old Trees	/10	0	0	0	0	10	0	0	0	10	10	6	6
	No. large trees in habitat zone		0	0	0	0	1	0	0	0	1	4	4	1
	Tree Canopy Cover	/5	3	3	3	3	3	3	0	3	3	3	3	3
	Lack of Weeds	/15	6	0	0	0	0	0	0	0	0	0	4	4
	Understorey	/25	15	5	5	5	5	5	5	5	5	5	20	15
	Recruitment	/10	5	5	5	5	5	5	5	5	5	5	10	5
	Organic Matter	/5	5	2	2	2	5	2	2	5	5	3	5	2
	Logs	/5	5	5	5	5	5	5	5	5	5	5	5	5
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Site Condition subtotal		*39*	*20*	*20*	*20*	*33*	*20*	*17*	*23*	*33*	*31*	*53*	*40*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	1	1	1	1	1	1	1	1	1	1	1	1
	Distance to Core	/5	3	3	3	3	3	3	3	3	3	3	3	3
Total Condition Score		**/100**	**44**	**25**	**25**	**25**	**38**	**25**	**22**	**28**	**38**	**36**	**58**	**45**

Habitat Zone			BR	BS	BT	BU	BV	BW	BX	BY	BZ	CB	CC	CD
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	48	48	53	48	53	53	48	53	53	8
Total area of Habitat Zone (ha)			0.005	0.011	0.320	0.130	0.023	0.180	0.096	7.400	0.810	0.130	0.073	0.260
Site Condition	Large Old Trees	/10	NA	NA	4	0	NA	4	NA	NA	8	NA	NA	NA
	No. large trees in habitat zone		NA	NA	1	0	NA	1	NA	NA	12	NA	NA	NA
	Tree Canopy Cover	/5	3	3	3	3	3	5	3	3	5	3	3	NA
	Lack of Weeds	/15	2	2	4	4	2	4	2	9	9	4	4	9
	Understorey	/25	5	5	5	5	5	5	5	20	20	15	15	20
	Recruitment	/10	0	0	5	5	0	5	0	10	10	10	10	10
	Organic Matter	/5	4	4	4	4	4	4	4	4	5	2	2	5
	Logs	/5	NA	NA	4	5	NA	2	NA	NA	2	NA	NA	NA
	Site condition standardising multiplier*		1.25	1.25	1.00	1.00	1.25	1.00	1.25	1.25	1.00	1.25	1.25	1.36
	Site Condition subtotal		*18*	*18*	*29*	*26*	*18*	*29*	*18*	*58*	*59*	*43*	*43*	*60*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	8	8	1	1	8
	Neighbourhood	/10	1	1	1	1	1	1	1	4	4	1	1	4
	Distance to Core	/5	3	3	3	3	3	3	3	3	4	3	3	4
Total Condition Score		**/100**	**23**	**23**	**34**	**31**	**23**	**34**	**23**	**73**	**75**	**48**	**48**	**76**

Habitat Zone			CE	CF	CG	CH	CI	CJ	CK	CL
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			8	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.045	0.700	0.034	0.068	0.110	0.740	0.420	0.870
Site Condition	Large Old Trees	/10	NA	NA	NA	NA	NA	NA	NA	NA
	No. large trees in habitat zone		NA	NA	NA	NA	NA	NA	NA	NA
	Tree Canopy Cover	/5	NA	3	3	3	3	3	3	3
	Lack of Weeds	/15	9	7	7	7	4	4	6	6
	Understorey	/25	20	15	15	15	5	5	5	5
	Recruitment	/10	10	10	10	10	10	10	10	10
	Organic Matter	/5	5	4	4	4	5	5	5	5
	Logs	/5	NA	NA	NA	NA	NA	NA	NA	NA
	Site condition standardising multiplier*		1.36	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Site Condition subtotal		*60*	*49*	*49*	*49*	*34*	*34*	*36*	*36*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1
	Neighbourhood	/10	3	0	0	0	0	0	0	0
	Distance to Core	/5	3	1	1	1	1	1	1	1
Total Condition Score		**/100**	**67**	**51**	**51**	**51**	**36**	**36**	**38**	**38**

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004).

Appendix 4: Large trees in patches and scattered trees recorded in the study area

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Notes
1	Swamp Gum	*Eucalyptus ovata*	71	Large Tree in Patch	8.5	
2	Swamp Gum	*Eucalyptus ovata*	83	Large Scattered Tree	9.7	
3	Swamp Gum	*Eucalyptus ovata*	98	Large Scattered Tree	11.8	
4	Eucalyptus	*Eucalyptus spp.*	Not recorded	Large Tree in Patch	N/A	
5	Eucalyptus	*Eucalyptus spp.*	Not recorded	Large Tree in Patch	N/A	
6	Eucalyptus	*Eucalyptus spp.*	Not recorded	Large Tree in Patch	N/A	
7	Eucalyptus	*Eucalyptus spp.*	Not recorded	Large Tree in Patch	N/A	
8	Eucalyptus	*Eucalyptus spp.*	Not recorded	Large Tree in Patch	N/A	
9	Swamp Gum	*Eucalyptus ovata*	47	Small Scattered Tree	5.6	
10	Manna Gum	*Eucalyptus viminalis*	45	Small Scattered Tree	5.4	
11	Swamp Gum	*Eucalyptus ovata*	65	Small Scattered Tree	7.8	
12	Eucalyptus	*Eucalyptus spp.*	82	Large Tree in Patch	9.8	Hollows present
13	Manna Gum	*Eucalyptus viminalis*	72	Large Tree in Patch	8.6	
14	Manna Gum	*Eucalyptus viminalis*	70	Large Tree in Patch	8.4	
15	Swamp Gum	*Eucalyptus ovata*	46	Small Scattered Tree	5.5	
16	Swamp Gum	*Eucalyptus ovata*	44	Small Scattered Tree	5.3	
17	Eucalyptus	*Eucalyptus spp.*	79	Large Tree in Patch	9.5	Hollows present
18	Manna Gum	*Eucalyptus viminalis*	99	Large Tree in Patch	11.9	Hollows present
19	Manna Gum	*Eucalyptus viminalis*	109	Large Tree in Patch	13.1	Hollows present
20	Swamp Gum	*Eucalyptus ovata*	71	Large Tree in Patch	8.5	Hollows present

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Notes
21	Swamp Gum	*Eucalyptus ovata*	44	Small Scattered Tree	5.3	
22	Swamp Gum	*Eucalyptus ovata*	31	Small Scattered Tree	3.7	
23	Manna Gum	*Eucalyptus viminalis*	48	Small Scattered Tree	5.8	
24	Manna Gum	*Eucalyptus viminalis*	38	Small Scattered Tree	4.6	
25	Swamp Gum	*Eucalyptus ovata*	82	Large Tree in Patch	9.8	
26	Swamp Gum	*Eucalyptus ovata*	84	Large Tree in Patch	10.1	
27	Swamp Gum	*Eucalyptus ovata*	116	Large Tree in Patch	13.9	Dead
28	Swamp Gum	*Eucalyptus ovata*	53	Small Scattered Tree	6.4	
29	Eucalyptus	*Eucalyptus spp.*	110	Large Scattered Tree	13.2	Dead
30	Eucalyptus	*Eucalyptus spp.*	82	Large Scattered Tree	9.8	Dead
31	Swamp Gum	*Eucalyptus ovata*	98	Large Tree in Patch	11.8	Dead
32	Swamp Gum	*Eucalyptus ovata*	82	Large Tree in Patch	9.8	
33	Swamp Gum	*Eucalyptus ovata*	82	Large Tree in Patch	9.8	
34	Swamp Gum	*Eucalyptus ovata*	98	Large Tree in Patch	11.8	
35	Swamp Gum	*Eucalyptus ovata*	84	Large Tree in Patch	10.1	
36	Swamp Gum	*Eucalyptus ovata*	81	Large Scattered Tree	9.7	Dead
37	Swamp Gum	*Eucalyptus ovata*	103	Large Scattered Tree	12.4	
38	Swamp Gum	*Eucalyptus ovata*	40	Small Scattered Tree	4.8	
39	Swamp Gum	*Eucalyptus ovata*	41	Small Scattered Tree	4.9	
40	Swamp Gum	*Eucalyptus ovata*	51	Small Scattered Tree	6.1	
41	Swamp Gum	*Eucalyptus ovata*	71	Large Scattered Tree	8.5	
42	Swamp Gum	*Eucalyptus ovata*	43	Small Scattered Tree	5.2	
43	Swamp Gum	*Eucalyptus ovata*	93	Large Tree in Patch	11.2	

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Notes
44	Swamp Gum	*Eucalyptus ovata*	54	Small Scattered Tree	6.5	
45	Swamp Gum	*Eucalyptus ovata*	60	Small Scattered Tree	7.2	
46	Swamp Gum	*Eucalyptus ovata*	38	Small Scattered Tree	4.6	
47	Swamp Gum	*Eucalyptus ovata*	76	Large Tree in Patch	9.1	
48	Swamp Gum	*Eucalyptus ovata*	107	Large Tree in Patch	12.8	
49	Swamp Gum	*Eucalyptus ovata*	116	Large Tree in Patch	13.9	
50	Swamp Gum	*Eucalyptus ovata*	108	Large Tree in Patch	13	
51	Swamp Gum	*Eucalyptus ovata*	24	Small Scattered Tree	2.9	
52	Swamp Gum	*Eucalyptus ovata*	44	Small Scattered Tree	5.3	
53	Swamp Gum	*Eucalyptus ovata*	78	Large Tree in Patch	9.4	Hollows present
54	Swamp Gum	*Eucalyptus ovata*	34	Small Scattered Tree	4.1	
55	Swamp Gum	*Eucalyptus spp.*	53	Small Scattered Tree	6.4	Dead
56	Swamp Gum	*Eucalyptus ovata*	41	Small Scattered Tree	4.9	
57	Swamp Gum	*Eucalyptus ovata*	75	Large Tree in Patch	9	
58	Swamp Gum	*Eucalyptus ovata*	71	Large Tree in Patch	8.5	
59	Eucalyptus	*Eucalyptus spp.*	97	Large Scattered Tree	11.6	Dead
60	Eucalyptus	*Eucalyptus spp.*	81	Large Scattered Tree	9.7	Dead
61	Manna Gum	*Eucalyptus viminalis*	98	Large Tree in Patch	11.8	
62	Manna Gum	*Eucalyptus viminalis*	127	Large Scattered Tree	15	
63	Manna Gum	*Eucalyptus viminalis*	143	Large Scattered Tree	15	
64	Manna Gum	*Eucalyptus viminalis*	168	Large Tree in Patch	15	
65	Manna Gum	*Eucalyptus viminalis*	102	Large Tree in Patch	12.2	
66	Messmate	*Eucalyptus obliqua*	101	Large Tree in Patch	12.1	
67	Manna Gum	*Eucalyptus viminalis*	86	Large Tree in Patch	10.3	

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Notes
68	Manna Gum	*Eucalyptus viminalis*	101	Large Tree in Patch	12.1	
69	Messmate	*Eucalyptus obliqua*	100	Large Tree in Patch	12	
70	Manna Gum	*Eucalyptus viminalis*	122	Large Tree in Patch	14.6	
71	Messmate	*Eucalyptus obliqua*	111	Large Tree in Patch	13.3	
72	Messmate	*Eucalyptus obliqua*	109	Large Tree in Patch	13.1	
73	Manna Gum	*Eucalyptus viminalis*	88	Large Tree in Patch	10.6	
74	Messmate	*Eucalyptus obliqua*	77	Large Tree in Patch	9.2	
75	Swamp Gum	*Eucalyptus ovata*	87	Large Scattered Tree	10.4	
76	Coast Manna-gum	*Eucalyptus viminalis ssp. pyoriana*	76	Large Scattered Tree	9.1	
77	Manna Gum	*Eucalyptus viminalis*	88	Large Scattered Tree	10.6	
78	Eucalyptus	*Eucalyptus spp.*	90	Large Scattered Tree	10.8	Dead
79	Manna Gum	*Eucalyptus viminalis*	153	Large Scattered Tree	15	

Notes: DBH = Diameter at breast height (130 cm from the ground); **TPZ =** Tree Protection Zone.

Appendix 5: Flora species recorded in the study area

Origin	Common name	Scientific name	EPBC	FFG -T	FFG -P	CaLP Act
	Sallow Wattle	Acacia longifolia subsp. longifolia			p	
	Black Wattle	Acacia mearnsii			p	
	Blackwood	Acacia melanoxylon				
	Spike Wattle	Acacia oxycedrus			p	
	Hedge Wattle	Acacia paradoxa				
	Prickly Moses	Acacia verticillata			p	
	Sheep's Burr	Acaena echinata				
	Bidgee-widgee	Acaena novae-zelandiae				
*	Sheep Sorrel	Acetosella vulgaris				
*	Agapanthus	Agapanthus praecox subsp. orientalis				
	Water Plantain	Alisma plantago-aquatica				
	Scrub Sheoak	Allocasuarina paludosa				
	Swamp Wallaby-grass	Amphibromus spp.				
*	Cape weed	Arctotheca calendula				
	Common Woodruff	Asperula conferta				
	Spear Grass	Austrostipa spp.				
*	Wild Oat	Avena fatua				
	Azolla	Azolla spp.			p	
	Creeping Bossiaea	Bossiaea prostrata				
	Red-leg Grass	Bothriochloa macra				
*	Lesser Quaking-grass	Briza minor				
*	Common Water-starwort	Callitriche stagnalis				
	Tall Sedge	Carex appressa				
	Sedge	Carex spp.				
	Common Cassinia	Cassinia aculeata subsp. aculeata			p	
*	Common Centaury	Centaurium erythraea				
*	Mouse-ear Chickweed	Cerastium spp.				
*	Spear Thistle	Cirsium vulgare				R
	Mountain Clematis	Clematis aristata				
	Prickly Currant-bush	Coprosma quadrifida				
*	Mirror Bush	Coprosma repens				
#	Spotted Gum	Corymbia maculata				
*	Water Buttons	Cotula coronopifolia				
	Sieber Crassula	Crassula sieberiana s.l.				
*	Hawthorn	Crataegus monogyna				C
*	Couch	Cynodon dactylon var. dactylon				
*	Drain Flat-sedge	Cyperus eragrostis				

Origin	Common name	Scientific name	EPBC	FFG -T	FFG -P	CaLP Act
*	Cocksfoot	Dactylis glomerata				
	Black-anther Flax-lily	Dianella revoluta s.l.				
	Kidney-weed	Dichondra repens				
*	Panic Veldt-grass	Ehrharta erecta				
*	Annual Veldt-grass	Ehrharta longiflora				
	Nodding Saltbush	Einadia nutans				
	Common Spike-sedge	Eleocharis acuta				
	Tall Spike-sedge	Eleocharis sphacelata				
	Willow Herb	Epilobium spp.				
	Love Grass	Eragrostis spp.				
	Messmate Stringybark	Eucalyptus obliqua				
	Swamp Gum	Eucalyptus ovata				
	Manna Gum	Eucalyptus viminalis				
	Coast Manna-gum	Eucalyptus viminalis subsp. pryoriana				
	Cherry Ballart	Exocarpos cupressiformis				
	Knobby Club-sedge	Ficinia nodosa				
*	Fumitory	Fumaria spp.				
	Tall Saw-sedge	Gahnia clarkei				
	Thatch Saw-sedge	Gahnia radula				
*	Cleavers	Galium aparine				
	Crane's Bill	Geranium spp.				
	Common Raspwort	Gonocarpus tetragynus				
*	Yorkshire Fog	Holcus lanatus				
	Pennywort	Hydrocotyle spp.				
	Tassel Rope-rush	Hypolaena fastigiata				
	Pale Rush	Juncus pallidus				
	Common Duckweed	Lemna disperma				
*	Common Peppercress	Lepidium africanum				
	Pithy Sword-sedge	Lepidosperma longitudinale				
	Prickly Tea-tree	Leptospermum continentale				
	Common Beard-heath	Leucopogon virgatus			p	
	Wattle Mat-rush	Lomandra filiformis				
	Spiny-headed Mat-rush	Lomandra longifolia				
*	African Box-thorn	Lycium ferocissimum				C
	Swamp Paperbark	Melaleuca ericifolia				
	Scented Paperbark	Melaleuca squarrosa			P	
	Tree Violet	Melicytus dentatus s.l.				
	Snowy Daisy-bush	Olearia lirata			p	

Origin	Common name	Scientific name	EPBC	FFG -T	FFG -P	CaLP Act
	Running Marsh-flower	Ornduffia reniformis				
*	Soursob	Oxalis pes-caprae				R
	Wood Sorrel	Oxalis spp.				
	Slender Knotweed	Persicaria decipiens				
*	Toowoomba Canary-grass	Phalaris aquatica				
	Common Reed	Phragmites australis				
*	Radiata Pine	Pinus radiata				
*	Karo	Pittosporum crassifolium				
#	Sweet Pittosporum	Pittosporum undulatum				
*	Buck's-horn Plantain	Plantago coronopus				
*	Ribwort	Plantago lanceolata				
*	Annual Meadow-grass	Poa annua s.l.				
	Common Tussock-grass	Poa labillardierei				
*	Prunus	Prunus spp.				
	Austral Bracken	Pteridium esculentum subsp. esculentum			p	
	Seaberry Saltbush	Rhagodia candolleana subsp. candolleana				
*	Onion Grass	Romulea rosea				
*	Sweet Briar	Rosa rubiginosa				C
*	Blackberry	Rubus fruticosus spp. agg.				C
	Small-leaf Bramble	Rubus parvifolius				
*	Curled Dock	Rumex crispus				
	Common Wallaby-grass	Rytidosperma caespitosum				
	Bristly Wallaby-grass	Rytidosperma setaceum				
	Wallaby Grass	Rytidosperma spp.				
	Bog Sedge	Schoenus spp.				
	Annual Fireweed	Senecio glomeratus			p	
	Rough Fireweed	Senecio hispidulus s.l.			p	
	Groundsel	Senecio spp.			p	
*	Black Nightshade	Solanum nigrum s.l.				
*	Rough Sow-thistle	Sonchus asper s.l.				
	Fennel Pondweed	Stuckenia pectinata				
	Kangaroo Grass	Themeda triandra				
	Creeping Monkey-flower	Thyridia repens				
*	Clover	Trifolium spp.				
	Broad-leaf Cumbungi	Typha orientalis				

Origin	Common name	Scientific name	EPBC	FFG -T	FFG -P	CaLP Act
*	Small Nettle	Urtica urens				
	Ivy-leaf Violet	Viola hederacea sensu Entwisle (1996)				
*	Rat's-tail Fescue	Vulpia myuros f. myuros				
*	Fescue	Vulpia spp.				
	Tiny Duckweed	Wolffia australiana				
	Small Grass-tree	Xanthorrhoea minor subsp. lutea			p	

Notes: EPBC = threatened species status under the EPBC Act (EX = presumed extinct in the wild; CR = critically endangered; EN = endangered; VU = vulnerable); **FFG-T** = listed as threatened (L) under the FFG Act; **FFG-P**: listed as protected (P) under the FFG Act; **CaLP Act**: declared noxious weeds under the CaLP Act (S = State Prohibited Weeds [any infestations are to be reported to DELWP. DELWP is responsible for control of State Prohibited Weeds]; P = Regionally Prohibited Weeds [Land owners must take all reasonable steps to eradicate regionally prohibited weeds on their land]; C = Regionally Controlled Weeds [Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally controlled weeds on their land]; R = Restricted Weeds [Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited].

* = introduced to Victoria

= Victorian native taxa occurring outside their natural range

Appendix 6: Vertebrate terrestrial fauna species recorded in the broader study area

Origin	Common name	Scientific name	Conservation status		
			EPBC-T	EPBC-M	FFG-T
	Australasian Pipit	*Anthus novaeseelandiae*			
	Australian Hobby	*Falco longipennis*			
	Australian Magpie	*Gymnorhina tibicen*			
	Australian Pelican	*Pelecanus conspicillatus*			
	Australian Raven	*Corvus coronoides*			
	Australian Shelduck	*Tadorna tadornoides*			
	Australian White Ibis	*Threskiornis molucca*			
	Australian Wood Duck	*Chenonetta jubata*			
	Baillon's Crake	*Zapornia pusilla*			
	Black Swan	*Cygnus atratus*			
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*			
	Black-fronted Dotterel	*Elseyornis melanops*			
	Black-shouldered Kite	*Elanus axillaris*			
	Blue-winged Parrot	*Neophema chrysostoma*			
	Brown Falcon	*Falco berigora*			
	Brown Goshawk	*Accipiter fasciatus*			
	Brown Songlark	*Cinclorhamphus cruralis*			
	Brown Thornbill	*Acanthiza pusilla*			
	Brown-headed Honeyeater	*Melithreptus brevirostris*			
	Brush Bronzewing	*Phaps elegans*			
	Chestnut Teal	*Anas castanea*			
	Clamorous Reed Warbler	*Acrocephalus stentoreus*			
*	Common Blackbird	*Turdus merula*			
	Common Bronzewing	*Phaps chalcoptera*			
*	Common Myna	*Acridotheres tristis*			
*	Common Starling	*Sturnus vulgaris*			
	Crimson Rosella	*Platycercus elegans*			
	Dusky Moorhen	*Gallinula tenebrosa*			
	Eastern Great Egret	*Ardea alba modesta*		M (JAMBA, CAMBA)	VU
	Eastern Rosella	*Platycercus eximius*			
	Eastern Yellow Robin	*Eopsaltria australis*			
	Eurasian Coot	*Fulica atra*			
	European Goldfinch	*Carduelis carduelis*			
*	European Greenfinch	*Carduelis chloris*			
*	European Skylark	*Alauda arvensis*			
	Fairy Martin	*Hirundo ariel*			
	Forest Raven	*Corvus tasmanicus*			

Origin	Common name	Scientific name	Conservation status		
			EPBC-T	EPBC-M	FFG-T
	Fork-tailed Swift	*Apus pacificus*		M (JAMBA, CAMBA, ROKAMBA)	
	Galah	*Eolophus roseicapilla*			
	Gang-gang Cockatoo	*Callocephalon fimbriatum*	VU		
	Golden Whistler	*Pachycephala pectoralis*			
	Golden-headed Cisticola	*Cisticola exilis*			
	Great Cormorant	*Phalacrocorax carbo*			
	Grey Butcherbird	*Cracticus torquatus*			
	Grey Currawong	*Strepera versicolor*			
	Grey Fantail	*Rhipidura albiscarpa*			
	Grey Shrike-thrush	*Colluricincla harmonica*			
	Grey Teal	*Anas gracilis*			
	Hoary-headed Grebe	*Poliocephalus poliocephalus*			
*	House Sparrow	*Passer domesticus*			
	Latham's Snipe	*Gallinago hardwickii*		M (JAMBA, CAMBA, ROKAMBA, Bonn A2H)	
	Laughing Kookaburra	*Dacelo novaeguineae*			
	Lewin's Honeyeater	*Meliphaga lewinii*			
	Little Black Cormorant	*Phalacrocorax sulcirostris*			
	Little Egret	*Egretta garzetta nigripes*			EN
	Little Grassbird	*Megalurus gramineus*			
	Little Pied Cormorant	*Microcarbo melanoleucos*			
	Little Raven	*Corvus mellori*			
	Little Wattlebird	*Anthochaera chrysoptera*			
	Magpie-lark	*Grallina cyanoleuca*			
	Masked Lapwing	*Vanellus miles*			
	Nankeen Kestrel	*Falco cenchroides*			
	New Holland Honeyeater	*Phylidonyris novaehollandiae*			
	Noisy Miner	*Manorina melanocephala*			
	Pacific Black Duck	*Anas superciliosa*			
	Peregrine Falcon	*Falco peregrinus*			
	Purple Swamphen	*Porphyrio porphyrio*			
	Rainbow Lorikeet	*Trichoglossus haematodus*			
	Red Wattlebird	*Anthochaera carunculata*			
	Red-browed Finch	*Neochmia temporalis*			
	Red-rumped Parrot	*Psephotus haematonotus*			
*	Rock Dove	*Columba livia*			
	Royal Spoonbill	*Platalea regia*			
	Rufous Whistler	*Pachycephala rufiventris*			

Origin	Common name	Scientific name	Conservation status		
			EPBC-T	EPBC-M	FFG-T
	Sacred Kingfisher	*Todiramphus sanctus*			
	Silvereye	*Zosterops lateralis*			
	Singing Honeyeater	*Lichenostomus virescens*			
	Spotted Pardalote	*Pardalotus punctatus*			
*	Spotted Turtle-Dove	*Streptopelia chinensis*			
	Straw-necked Ibis	*Threskiornis spinicollis*			
	Striated Fieldwren	*Calamanthus fuliginosus*			
	Striated Pardalote	*Pardalotus striatus*			
	Striated Thornbill	*Acanthiza lineata*			
	Sulphur-crested Cockatoo	*Cacatua galerita*			
	Superb Fairy-wren	*Malurus cyaneus*			
	Swamp Harrier	*Circus approximans*			
	Tree Martin	*Petrochelidon nigricans*			
	Wedge-tailed Eagle	*Aquila audax*			
	Welcome Swallow	*Petrochelidon neoxena*			
	White-browed Scrubwren	*Sericornis frontalis*			
	White-bellied Sea-Eagle	*Haliaeetus leucogaster*		Marine	EN
	White-eared Honeyeater	*Lichenostomus leucotis*			
	White-faced Heron	*Egretta novaehollandiae*			
	White-fronted Chat	*Epthianura albifrons*			
	White-naped Honeyeater	*Melithreptus lunatus*			
	White-necked Heron	*Ardea pacifica*			
	White-plumed Honeyeater	*Lichenostomus penicillatus*			
	White-throated Needletail	*Hirundapus caudacutus*	VU	M (JAMBA, CAMBA, ROKAMBA)	VU
	White-throated Treecreeper	*Cormobates leucophaeus*			
	Willie Wagtail	*Rhipidura leucophrys*			
	Yellow-faced Honeyeater	*Lichenostomus chrysops*			
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			
	Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*			
	Black Wallaby	*Wallabia bicolor*			
*	Cat	*Felis catus*			
	Common Wombat	*Vombatus ursinus*			
	Eastern Grey Kangaroo	*Macropus giganteus*			
*	European Hare	*Lepus europeaus*			
*	European Rabbit	*Oryctolagus cuniculus*			
*	Hog Deer	*Cervus porcinus*			
*	Red Fox	*Vulpes vulpes*			
	Red-necked Wallaby	*Macropus rufogriseus*			
	Short-beaked Echidna	*Tachyglossus aculeatus*			

Origin	Common name	Scientific name	Conservation status		
			EPBC-T	EPBC-M	FFG-T
	Easter Brown Snake	*Pseudonaja textilis*			
	Eastern Three-lined Skink	*Acritoscincus duperreyi*			
	Garden Skink	*Lampropholis guichenoti*			
	Jacky Lizard	*Amphibolurus muricatus*			
	Metallic Skink	*Niveoscincus metallicus*			
	Tiger Snake	*Notechis scutatus*			
	Common Froglet	*Crinia signifera*			
	Pobblebonk Frog	*Limnodynastes dumerilii insularis*			
	Spotted Marsh Frog	*Limnodynastes tasmaniensis*			

Notes:

X = recorded in the study area

* = introduced to Victoria

= Victorian native taxa occurring outside their natural range

EPBC-T = threatened species status under EPBC Act:

EX = presumed extinct in the wild

CE = critically endangered

EN = endangered

VU = vulnerable

EPBC-M = migratory status under the EPBC Act – **M** = listed migratory taxa:

Bonn Convention (A2H) - Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family

Bonn Convention (A2S) - Convention on the Conservation of Migratory Species of Wild Animals - species listed explicitly

CAMBA - China- Australia Migratory Birds Agreement

JAMBA - Japan-Australia Migratory Birds Agreement

ROKAMBA - Republic of Korea Australia Migratory Birds Agreement

FFG-T = threatened species status under the FFG Act

Appendix 7: General development recommendations

Consideration should be given to including the measures described below in a construction and operational environmental management plan for the project.

Pre-construction phase:

- Where feasible, development and associated works should be sited at least thirty metres away from rivers, creeks and significant drainage lines.
- The proposed development should be designed in a way that does not alter the site's hydrology in areas that support native vegetation or act as tributaries to rivers, creeks and significant drainage lines.
- Construction contractors should be inducted into an environmental management program for construction works.
- All environmental controls should be checked for compliance on a regular basis.

Construction phase:

- Environmentally sensitive areas including retained native vegetation within 50 metres of works (including access points and routes) should be securely fenced at two metres from the perimeter and appropriately signed. All machinery, vehicles, equipment, personnel, waste materials/spoil and earthworks are to be excluded from these areas.
- Tree Retention Zones (TRZs) are to be established and maintained around all retained scattered trees within 50 metres of works (including access points and routes) for the duration of construction activities. Construction and construction-related activities are to be excluded from the TRZ. Encroachment into the TRZ (including earthworks such as trenching for pipelines or cabling, etc. that disturb the root zone) must not affect more than 10% of the total area of the TRZ. Directional drilling must not be undertaken within TRZs, unless:
    - The directional drilling bore is at least 600 millimetres deep; AND
    - A qualified arborist has confirmed in writing that the radius of the bore will not significantly damage the tree causing it to be lost in the future; AND
    - A qualified arborist has confirmed in writing that the use of directional drilling is appropriate for the specific project/works.
- Any pruning of native trees should be undertaken using a suitably qualified arborist and be carried out in accordance with *Australian Standard 4373 – 2007 Pruning of Amenity Trees* to the satisfaction of the Responsible Authority. An excavator, backhoe, bulldozer blade or loader should not be used to trim branches.
- A suitably qualified arborist (Level 5) should be on-site during all works within Tree Protection Zones of any native canopy tree located within five metres of the works to ensure all efforts are taken to avoid impacts on the root zones, to monitor root damage and carry out any amelioration to disturbed roots.
- Any stockpiling should occur outside of environmentally sensitive areas.
- All machinery should enter and exit works sites along defined routes that do not impact on native vegetation or cause soil disturbance and weed spread.
- All machinery brought on site should be clean and free of weeds and pathogens (including seeds and other propagules).
- All machinery wash down, lay down and personnel rest areas should be defined (fenced) and located in disturbed areas.
- All works must be undertaken in a manner that will minimise soil erosion and adhere to Construction Techniques for Sediment Pollution Control (EPAV 1991).

Post-construction phase:

- Weed control, by an experienced bush regenerator, is to be carried out along disturbed areas after construction to control any weed outbreaks in farmland or native vegetation as well as along watercourses.
- The use of local indigenous plant species, of local genetic provenance, should be considered in the landscaping of any development on the site. Locally indigenous species generally have low water-use requirements, high survival rates and provide habitat to local fauna species.

Decommissioning phase:

- As per construction phase.

Appendix 8: Photographs of native vegetation proposed for removal

Representative photo of habitat zones A, B, C, AB, CM: Aquatic Herbland (EVC 653)

Representative photo of habitat zones D, E, K, M, N, P - T, W, AC - AJ, CJ : Swamp Scrub (EVC 53)

Representative photo of habitat zones F, G, H, CF, CK, CL: Swamp Scrub (EVC 53)

Representative photo of habitat zones I, J, L, O, U, CB, CC, CG, CH, CI: Swamp Scrub (EVC 53)

Representative photo of habitat zones V - Z, AA: Tall Marsh (EVC 821)

Representative photo of habitat zones AK, AL: Swamp Scrub (EVC 53)

Representative photo of habitat zones AN - AU, BR, BS, BV, BX: Swamp Scrub (EVC 53)

Representative photo of zones AV - AZ, BA - BD, BF, BG, BI, BJ - BO, BW: Heathy Woodland (EVC 48)

Representative photo of habitat zones BE, BH, BP, BQ, BT, BU: Heathy Woodland (EVC 48)

Habitat zone BY: Swamp Scrub (EVC 53)

Habitat zone BZ: Heathy Woodland (EVC 48)

Appendix 9: EVC benchmarks

Gippsland Plain:

- Wet Heathland (EVC 8)
- Heathy Woodland (EVC 48)
- Swamp Scrub (EVC 53)
- Aquatic Herbland (EVC 653)
- Tall Marsh (EVC 821)

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 8: Wet Heathland

Description:
A low, generally treeless heathland although sometimes emergent eucalypts may be present. Occurs on lower slopes, flats or depressions, which are infertile and subjected to prolonged water logging. Understorey is often dominated by a range of sedges, grasses and shrubs.

Life Forms:

Life form	#Spp	%Cover	LF code
Medium Shrub	6	40%	MS
Small Shrub	3	5%	SS
Prostrate Shrub	1	1%	PS
Medium Herb	3	5%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	2	10%	LNG
Medium to Small Tufted Graminoid	2	5%	MTG
Medium to Tiny Non-tufted Graminoid	5	20%	MNG
Ground Fern	1	1%	GF
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Melaleuca squarrosa*	Scented Paperbark
MS	*Leptospermum continentale*	Prickly Tea-tree
MS	*Allocasuarina paludosa*	Scrub Sheoak
MS	*Sprengelia incarnata*	Pink Swamp-heath
SS	*Platylobium obtusangulum*	Common Flat-pea
SS	*Epacris obtusifolia*	Blunt-leaf Heath
SS	*Epacris gunnii*	Ace of Spades
MH	*Gonocarpus humilis*	Shade Raspwort
MH	*Gonocarpus tetragynus*	Common Raspwort
LNG	*Gahnia radula*	Thatch Saw-sedge
MTG	*Patersonia occidentalis*	Long Purple-flag
MNG	*Schoenus brevifolius*	Zig-zag Bog-sedge
MNG	*Schoenus lepidosperma*	Slender Bog-sedge
MNG	*Baumea juncea*	Bare Twig-sedge
MNG	*Leptocarpus tenax*	Slender Twine-rush
SC	*Cassytha glabella*	Slender Dodder-laurel
GF	*Lindsaea linearis*	Screw Fern

Recruitment:
Episodic/Fire. Desirable period between disturbances is 30 years.

Organic Litter:
20% cover

Weediness:
There are no consistent weeds in this EVC.

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 48: Heathy Woodland

Description:
Spans a variety of geologies but is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel. Eucalypt-dominated low woodland to 10 m tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken. Geophytes and annuals can be quite common but the ground cover is normally fairly sparse.

Large trees:

Species	DBH(cm)	#/ha
Eucalyptus spp.	50 cm	15 / ha
Banksia serrata	40 cm	

Tree Canopy Cover:

%cover	Character Species	Common Name
10%	*Eucalyptus willisii*	Jimmy's Shining Peppermint
	Eucalyptus obliqua	Messmate Stringybark
	Eucalyptus radiata s.l.	Narrow-leaf Peppermint
	Eucalyptus viminalis ssp. *pryoriana*	Rough-barked Manna Gum
	Banksia serrata	Saw Banksia

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Medium Shrub	5	30%	MS
Small Shrub	5	20%	SS
Medium Herb	2	5%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	1	1%	LNG
Medium to Small Tufted Graminoid	1	5%	MTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Ground Fern	1	5%	GF
Bryophytes/Lichens	na	10%	BL
Soil Crust	na	10%	S/C

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Epacris impressa*	Common Heath
MS	*Leptospermum myrsinoides*	Heath Tea-tree
MS	*Leptospermum continentale*	Prickly Tea-tree
MS	*Monotoca scoparia*	Prickly Broom-heath
SS	*Amperea xiphoclada* var. *xiphoclada*	Broom Spurge
SS	*Leucopogon virgatus*	Common Beard-heath
SS	*Dillwynia glaberrima*	Smooth Parrot-pea
LTG	*Gahnia sieberiana*	Red-fruit Saw-sedge
MTG	*Xanthorrhoea minor* ssp. *lutea*	Small Grass-tree
MNG	*Hypolaena fastigiata*	Tassel Rope-rush
SC	*Cassytha glabella*	Slender Dodder-laurel

Recruitment:
Episodic/Fire. Desirable period between disturbances is 20 years.

Organic Litter:
40 % cover

Logs:
15 m/0.1 ha.

Weediness:
There are no consistent weeds in this EVC.

Published by the Victorian Government Department of Sustainability and Environment April 2004

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 53_61: Swamp Scrub

Description:

Closed scrub to 8 m tall at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The EVC is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket, out-competing other species. Occasional emergent eucalypts may be present. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.

Canopy Cover:

% cover	Character Species	Common Name
50%	*Leptospermum lanigerum*	Woolly Tea-tree
	Melaleuca ericifolia	Swamp Paperbark

Understorey:

Life form	# Spp	% Cover	LF code
Medium Shrub	2	10%	MS
Small Shrub	2	1%	SS
Large Herb	2	5%	LH
Medium Herb	3	15%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	2	10%	LTG
Large Non-tufted Graminoid	3	10%	LNG
Medium to Small Tufted Graminoid	2	5%	MTG
Medium to Tiny Non-tufted Graminoid	2	15%	MNG
Ground Fern	1	5%	GF
Scrambler or Climber	1	1%	SC
Bryophytes/Lichens	na	20%	BL

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Coprosma quadrifida*	Prickly Currant-bush
MS	*Leptospermum continentale*	Prickly Tea-tree
LH	*Lycopus australis*	Australian Gipsywort
LH	*Lythrum salicaria*	Purple Loosestrife
LH	*Persicaria praetermissa*	Spotted Knotweed
MH	*Hydrocotyle pterocarpa*	Wing Pennywort
MH	*Stellaria angustifolia*	Swamp Starwort
MH	*Lobelia anceps*	Angled Lobelia
SH	*Crassula helmsii*	Swamp Crassula
LTG	*Juncus procerus*	Tall Rush
LTG	*Poa labillardierei*	Common Tussock-grass
LNG	*Gahnia radula*	Thatch Saw-sedge
LNG	*Phragmites australis*	Common Reed
LNG	*Baumea rubiginosa* s.l.	Soft Twig-rush
MTG	*Triglochin procerum* s.l.	Water Ribbons
MTG	*Juncus gregiflorus*	Green Rush
MNG	*Eleocharis acuta*	Common Spike-sedge
GF	*Blechnum cartilagineum*	Gristle Fern
SC	*Calystegia sepium*	Large Bindweed

Victoria The Place To Be

Recruitment:
Continuous

Organic Litter:
40 % cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	*Hypochoeris radicata*	Cat's Ear	high	low
LNG	*Holcus lanatus*	Yorkshire Fog	high	high

Published by the Victorian Government Department of Sustainability and Environment February 2005

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 653: Aquatic Herbland

Description:
Herbland of permanent to semi-permanent wetlands, dominated by sedges (especially on shallower verges) and/or aquatic herbs. Occurs on fertile paludal soils, typically heavy clays beneath organic accumulations.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	2	10%	LH
Medium Herb	3	20%	MH
Small or Prostrate Herb	3	15%	SH
Large Non-tufted Graminoid	2	20%	LTG
Medium to Small Tufted Graminoid	2	10%	MTG
Medium to Tiny Non-tufted Graminoid	1	5%	MNG
Total understorey projective foliage cover		**80%**	

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Persicaria decipiens*	Slender Knotweed
MH	*Myriophyllum verrucosum*	Red Water-milfoil
MH	*Potamogeton pectinatus*	Fennel Pondweed
SH	*Lemna disperma*	Common Duckweed
SH	*Azolla filiculoides*	Pacific Azolla
SH	*Mimulus repens*	Creeping Monkey-flower
SH	*Wolffia australiana*	Tiny Duckweed
LNG	*Typha orientalis*	Broad-leaf Cumbungi
LNG	*Phragmites australis*	Common Reed
MTG	*Triglochin procerum s.l.*	Water Ribbons
MNG	*Bolboschoenus caldwellii*	Salt Club-sedge

Recruitment:
Episodic/Flood. Desirable period between disturbances is 5 years.

Organic Litter:
10% Cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	*Aster subulatus*	Aster-weed	high	low
MH	*Cotula coronopifolia*	Water Buttons	high	high

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Gippsland Plain bioregion

EVC 821: Tall Marsh

Description:
Occurs on Quaternary sedimentary geology of mainly estuarine sands, soils are peaty, silty clays, and average annual rainfall is approximately 600 mm. It requires shallow water (to 1 m deep) and low current-scour, and can only tolerate very low levels of salinity. Closed to open grassland/sedgeland to 2-3 m tall, dominated by Common Reed and Cumbungi. Small aquatic and semi-aquatic species occur amongst the reeds.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	3	10%	LH
Medium Herb	2	5%	MH
Small or Prostrate Herb	6	10%	SH
Large Tufted Graminoid	1	5%	LTG
Large Non-tufted Graminoid	2	40%	LNG
Medium to Tiny Non-tufted Graminoid	1	1%	MNG
Total understorey projective foliage cover		**70%**	

LF Code	Species typical of at least part of EVC range	Common Name
LH	*Myriophyllum verrucosum*	Red Water-milfoil
LH	*Myriophyllum salsugineum*	Lake Water-milfoil
LH	*Villarsia reniformis*	Running Marsh-flower
MH	*Rumex bidens*	Mud Dock
MH	*Lilaeopsis polyantha*	Australian Lilaeopsis
MH	*Lepilaena bilocularis*	Small-fruit Water-mat
SH	*Lemna disperma*	Common Duckweed
SH	*Azolla filiculoides*	Pacific Azolla
SH	*Wolffia australiana*	Tiny Duckweed
SH	*Mimulus repens*	Creeping Monkey-flower
LTG	*Triglochin procerum s.l.*	Water Ribbons
LTG	*Juncus ingens*	Giant Rush
LNG	*Schoenoplectus tabernaemontani*	River Club-sedge
LNG	*Phragmites australis*	Common Reed
LNG	*Typha domingensis*	Cumbungi
LNG	*Typha orientalis*	Broad-leaf Cumbungi
MNG	*Lepilaena cylindrocarpa*	Long-fruit Water-mat
MNG	*Eleocharis acuta*	Common Spike-sedge

Recruitment:
Episodic/Flood: desirable period of disturbance is every five years

Organic Litter:
10% cover

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MH	*Cotula coronopifolia*	Water Buttons	high	high
MNG	*Paspalum distichum*	Water Couch	high	high

Appendix 10: Native Vegetation Removal report – (NVR)

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **12/09/2022**
Time of issue: **10:56 pm**

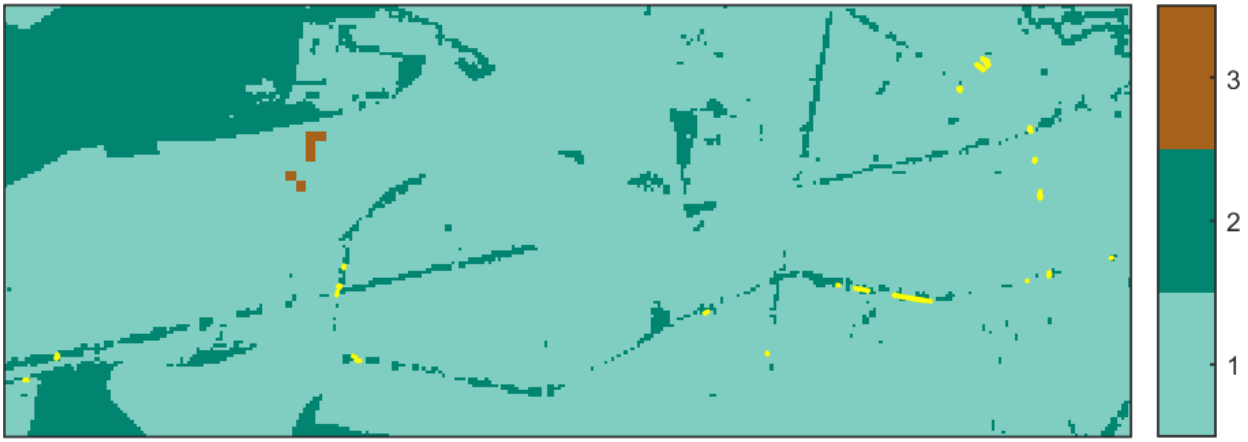
Report ID: NAA_2022_125

Project ID	G2017_14107Alberton_WF_rem_220822

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	0.691 ha
Extent of past removal	0.000 ha
Extent of proposed removal	0.691 ha
No. Large trees proposed to be removed	0
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

1. Location map



Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	0.261 general habitat units
Vicinity	West Gippsland Catchment Management Authority (CMA) or Wellington Shire Council
Minimum strategic biodiversity value score[2]	0.316
Large trees	0 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
1-D	Patch	gipp0053	Endangered	0	no	0.380	0.008	0.008	0.380		0.003	General
1-F	Patch	gipp0053	Endangered	0	no	0.520	0.043	0.043	0.373		0.023	General
1-H	Patch	gipp0053	Endangered	0	no	0.380	0.027	0.027	0.390		0.011	General
1-I	Patch	gipp0053	Endangered	0	no	0.470	0.002	0.002	0.451		0.001	General
1-J	Patch	gipp0053	Endangered	0	no	0.400	0.013	0.013	0.450		0.006	General
1-K	Patch	gipp0053	Endangered	0	no	0.350	0.008	0.008	0.450		0.003	General
1-P	Patch	gipp0053	Endangered	0	no	0.300	0.189	0.189	0.429		0.061	General
1-Q	Patch	gipp0053	Endangered	0	no	0.230	0.019	0.019	0.440		0.005	General
1-R	Patch	gipp0053	Endangered	0	no	0.230	0.073	0.073	0.460		0.018	General
1-S	Patch	gipp0053	Endangered	0	no	0.320	0.007	0.007	0.460		0.002	General
1-AA	Patch	gipp0053	Endangered	0	no	0.460	0.006	0.006	0.450		0.003	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
1-AE	Patch	gipp0053	Endangered	0	no	0.300	0.000	0.000	0.440		0.000	General
1-AH	Patch	gipp0053	Endangered	0	no	0.400	0.013	0.013	0.200		0.005	General
1-AJ	Patch	gipp0053	Endangered	0	no	0.360	0.019	0.019	0.190		0.006	General
1-AM	Patch	gipp0053	Endangered	0	no	0.400	0.002	0.002	0.190		0.001	General
1-AN	Patch	gipp0053	Endangered	0	no	0.400	0.002	0.002	0.190		0.001	General
1-BV	Patch	gipp0053	Endangered	0	no	0.230	0.016	0.016	0.230		0.003	General
1-CB	Patch	gipp0053	Endangered	0	no	0.480	0.010	0.010	0.220		0.004	General
1-CF1	Patch	gipp0053	Endangered	0	no	0.510	0.025	0.025	0.370		0.013	General
1-CH	Patch	gipp0053	Endangered	0	no	0.510	0.011	0.011	0.380		0.006	General
1-CI	Patch	gipp0053	Endangered	0	no	0.360	0.001	0.001	0.380		0.000	General
1-AD	Patch	gipp0053	Endangered	0	no	0.300	0.015	0.015	0.440		0.005	General
1-AI	Patch	gipp0053	Endangered	0	no	0.360	0.003	0.003	0.190		0.001	General
1-BU	Patch	gipp0048	Least Concern	0	no	0.310	0.014	0.014	0.230		0.004	General
1-CF2	Patch	gipp0053	Endangered	0	no	0.510	0.021	0.021	0.380		0.011	General
1-CJ	Patch	gipp0053	Endangered	0	no	0.360	0.017	0.017	0.390		0.006	General
1-C1	Patch	gipp0653	Endangered	0	no	0.430	0.061	0.061	0.380		0.027	General
1-C2	Patch	gipp0653	Endangered	0	no	0.430	0.036	0.036	0.380		0.016	General
1-CM	Patch	gipp0053	Endangered	0	no	0.480	0.009	0.009	0.890		0.006	General
1-CN	Patch	gipp0053	Endangered	0	no	0.480	0.006	0.006	0.450		0.003	General
1-B1	Patch	gipp0653	Endangered	0	no	0.460	0.001	0.001	0.380		0.000	General
1-B2	Patch	gipp0653	Endangered	0	no	0.460	0.002	0.002	0.380		0.001	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-O1	Patch	gipp0053	Endangered	0	no	0.380	0.001	0.001	0.420		0.000	General
1-O2	Patch	gipp0053	Endangered	0	no	0.380	0.000	0.000	0.420		0.000	General
1-CC1	Patch	gipp0053	Endangered	0	no	0.480	0.005	0.005	0.220		0.002	General
1-CC2	Patch	gipp0053	Endangered	0	no	0.480	0.004	0.004	0.220		0.002	General
1-CC3	Patch	gipp0053	Endangered	0	no	0.480	0.000	0.000	0.220		0.000	General

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Bassian Pomaderris	*Pomaderris oraria subsp. oraria*	502665	Rare	Dispersed	Habitat importance map	0.0001
Terek Sandpiper	*Xenus cinereus*	10160	Endangered	Dispersed	Habitat importance map	0.0001
Glossy Grass Skink	*Pseudemoia rawlinsoni*	12683	Vulnerable	Dispersed	Habitat importance map	0.0000
Annual Fireweed	*Senecio glomeratus subsp. longifructus*	507144	Rare	Dispersed	Habitat importance map	0.0000
Strzelecki Gum	*Eucalyptus strzeleckii*	504558	Vulnerable	Dispersed	Habitat importance map	0.0000
Salt Lawrencia	*Lawrencia spicata*	501888	Rare	Dispersed	Habitat importance map	0.0000
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000
Maroon Leek-orchid	*Prasophyllum frenchii*	502709	Endangered	Dispersed	Habitat importance map	0.0000
Bog Gum	*Eucalyptus kitsoniana*	501290	Rare	Dispersed	Habitat importance map	0.0000
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0000
Thick-lip Spider-orchid	*Caladenia tessellata*	500547	Vulnerable	Dispersed	Habitat importance map	0.0000
Silky Kidney-weed	*Dichondra sp. 1*	505786	Rare	Dispersed	Habitat importance map	0.0000
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
Sticky Wattle	*Acacia howittii*	500044	Rare	Dispersed	Habitat importance map	0.0000
Swamp Skink	*Lissolepis coventryi*	12407	Vulnerable	Dispersed	Habitat importance map	0.0000
Fisch's Greenhood	*Pterostylis fischii*	502795	Rare	Dispersed	Habitat importance map	0.0000
Naked Sun-orchid	*Thelymitra circumsepta*	503383	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

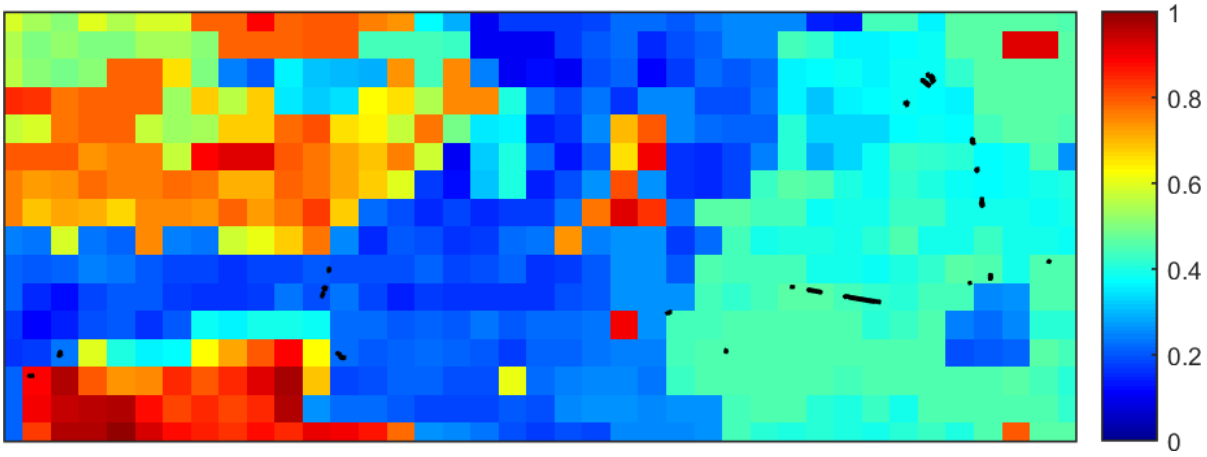
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

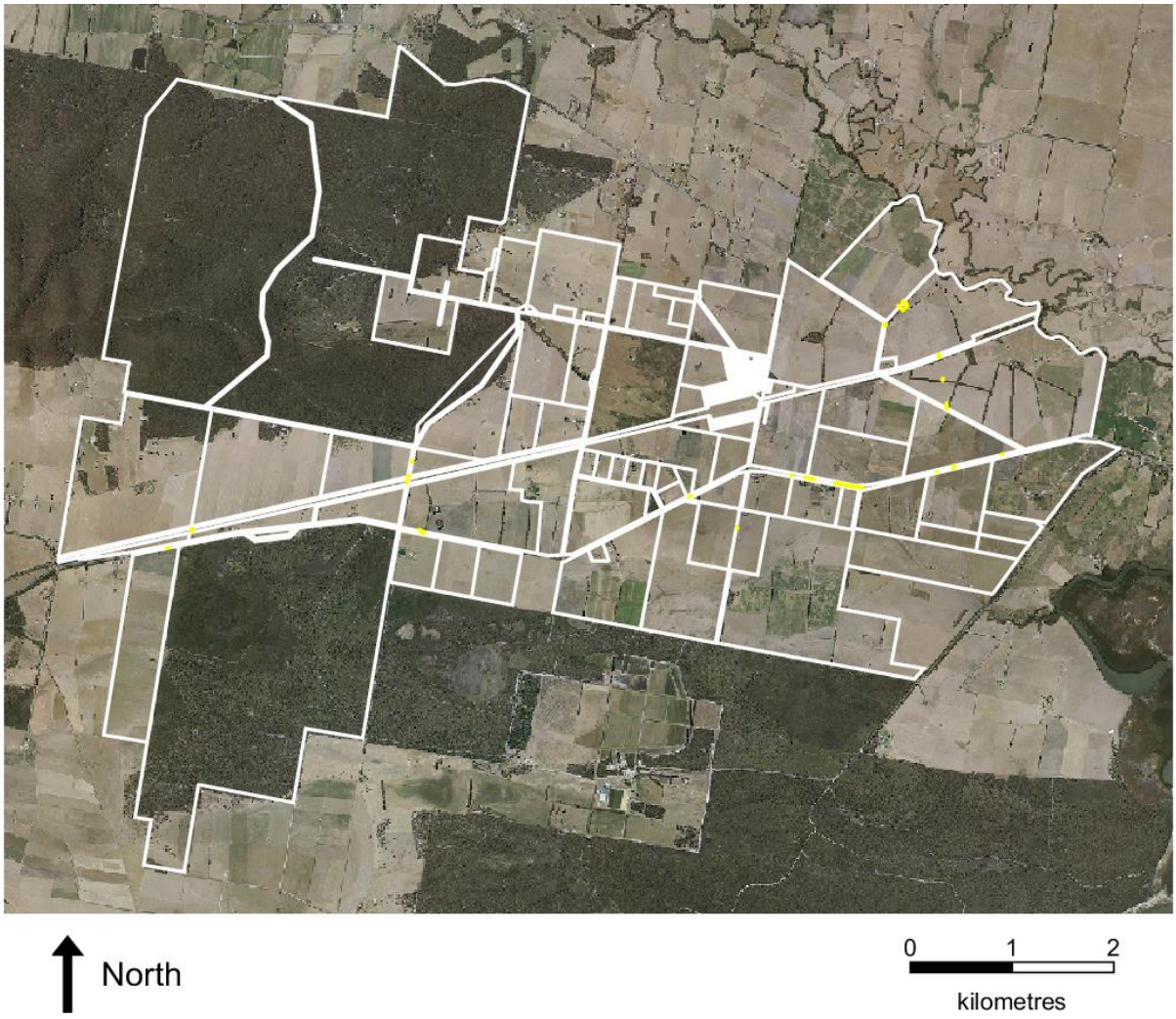
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

Appendix 11: Availability of required Offsets (DELWP search results)

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 08/09/2022 07:22 **Report ID: 15791**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.261	0.316	0	CMA	West Gippsland
			or LGA	Wellington Shire

Details of available native vegetation credits on 08 September 2022 07:22

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0115	2.987	0	West Gippsland	East Gippsland Shire	Yes	Yes	No	Bio Offsets
BBA-0119	6.752	73	West Gippsland	South Gippsland Shire	Yes	Yes	No	VegLink
BBA-0138	24.007	1605	West Gippsland	Wellington Shire	Yes	Yes	No	Ecocentric
BBA-0412	1.374	0	West Gippsland	South Gippsland Shire	No	Yes	No	Bio Offsets
BBA-0759	18.868	659	West Gippsland	Wellington Shire	Yes	Yes	No	Contact NVOR
BBA-1041	0.705	0	West Gippsland	Wellington Shire	Yes	Yes	Yes	VegLink
BBA-2321	1.140	144	West Gippsland	Wellington Shire	Yes	Yes	No	Bio Offsets, VegLink
BBA-2348	3.442	0	West Gippsland	Wellington Shire	Yes	Yes	No	VegLink
BBA-2623	23.877	873	West Gippsland	Baw Baw Shire	Yes	Yes	No	Contact NVOR
BBA-2751	10.316	0	West Gippsland	Wellington Shire	Yes	Yes	No	Contact NVOR
BBA-2757	0.436	0	West Gippsland	Bass Coast Shire	No	Yes	No	Bio Offsets
BBA-2810	7.758	613	West Gippsland	Latrobe City	Yes	Yes	No	VegLink
BBA-2833	5.001	17	West Gippsland	Wellington Shire	Yes	Yes	No	Ethos
BBA-2839	0.929	14	West Gippsland	Baw Baw Shire	Yes	Yes	No	Contact NVOR
BBA-2845	27.551	1069	West Gippsland	Baw Baw Shire	Yes	Yes	No	Contact NVOR
BBA-2849	2.678	0	West Gippsland	Wellington Shire	Yes	Yes	No	VegLink
BBA-2850	5.888	0	West Gippsland	Latrobe City	Yes	Yes	No	VegLink
BBA-2855	3.158	10	West Gippsland	Wellington Shire	Yes	Yes	No	VegLink
BBA-2875	33.014	1052	West Gippsland	Wellington Shire	Yes	Yes	No	Abezco
TFN-C0977	2.959	54	West Gippsland	Baw Baw Shire	Yes	Yes	No	TFN

TFN-C1442	2.726	58	West Gippsland	Baw Baw Shire	Yes	Yes	No	TFN
TFN-C1692	0.618	284	West Gippsland	South Gippsland Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink
TFN-C1734	0.425	1	West Gippsland	Wellington Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink
TFN-C1893	2.005	82	West Gippsland	Wellington Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink
VC_CFL-2320_02	4.818	14	West Gippsland	Wellington Shire	Yes	Yes	No	VegLink
VC_CFL-3717_01	35.916	0	West Gippsland	Wellington Shire	Yes	Yes	No	Contact NVOR
VC_TFN-C2078_01	1.182	69	West Gippsland	Wellington Shire	Yes	Yes	No	Contact NVOR

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no potential sites listed in the Native Vegetation Credit Register that meet your offset requirements.

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

For more information contact the DELWP Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au