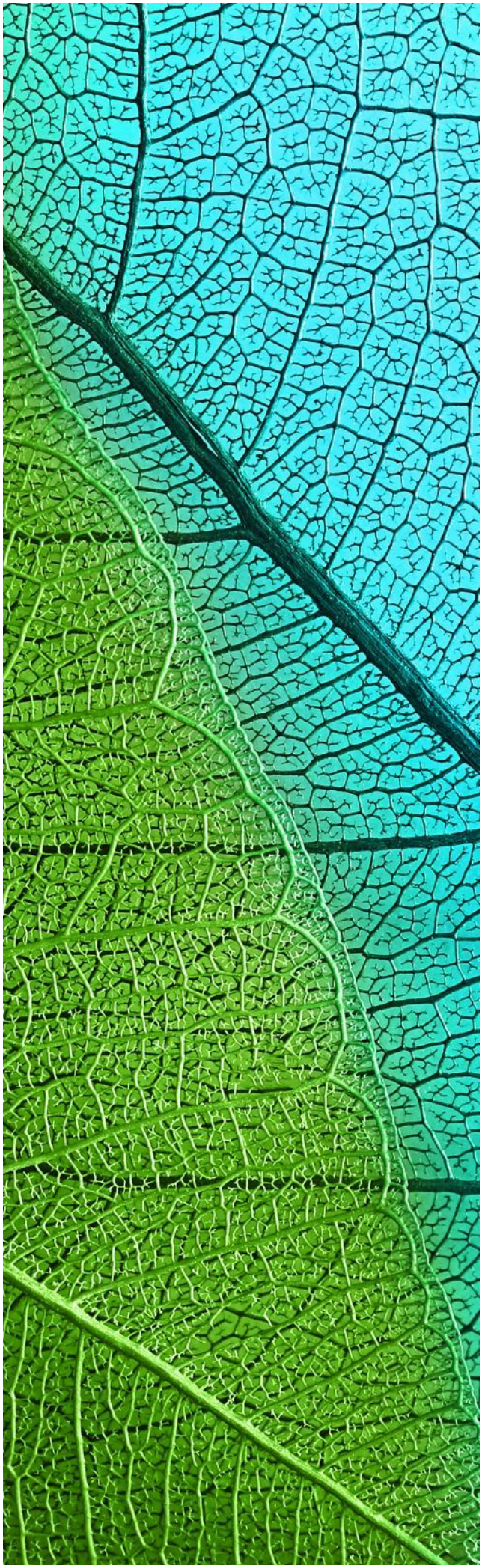

Hazelwood North Solar Farm

Flora and Fauna Assessment

Prepared for
Manthos Investments Pty Ltd
c/- Robert Luxmoore Pty Ltd

October 2023
Report No. 22077.02 (1.4)

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Contents

Tables

Figures

Appendices

1. Executive summary

Nature Advisory Pty Ltd undertook a Flora and Fauna assessment of an approximately 1,100-hectare area of land in Hazelwood North including the assessment of potential for threatened species or communities listed under the Environment Protection and Biodiversity Conservation Act (EPBC Act) or Flora and Fauna Guarantee Act (FFG Act). The construction of a solar farm and battery is proposed for the study area.

The study area primarily consisted of paddocks of exotic pasture species, occasionally fringed by planted treed vegetation of native and exotic origin. Native vegetation was comparatively sparse and largely restricted to creek lines and road reserves. In the north of the study area, low-quality swathes of Plains Grassy Wetland (EVC 125) and small, discrete patches of low-quality Swamp Scrub (EVC 53) were commonplace within creek tributaries. Towards the south of the study area, creeks supported more dense growth of higher quality Swamp Scrub and Plains Grassy Wetland (EVC 125). Additionally, the road reserves of Walshs Road supported low quality grassland, derived from Plains Grassy Woodland (EVC 55).

Fauna habitat within the study area comprised grassland, scrub, treed vegetation and aquatic habitat. Aquatic habitat provided habitat for the FFG Act listed Flinders Pygmy Perch, which was recorded during targeted aquatic surveys.

The following native vegetation was recorded in the study area:

- 90 patches of native vegetation, totalling 27.945 hectares (including 14 large trees in patches); and
- 38 scattered trees (namely 11 large scattered trees and 27 small scattered trees).

An Environmental Significance Overlay (ESO) covers the northern part of the study area requiring a permit to remove, destroy or lop any vegetation including dead vegetation, except for vegetation that was either planted or grown as a result of crop raising or grazing animal production.

The current solar farm and battery footprint will result in the loss of a total extent of 2.342 hectares of native vegetation. This comprised the following:

- 2.202 hectares of native vegetation in patches (including no large trees in patches);
- Two large scattered trees, equating to an area loss of 0.140 hectares.

A planning permit under Clause 52.17 of the Latrobe Planning Scheme is required for the removal of native vegetation.

A *Native Vegetation Removal* (NVR) report for this proposal is provided in Appendix 8.

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

- 0.780 general habitat units, with following offset attribute requirements:
  - A minimum strategic biodiversity value (SBV) of 0.381
  - Located within the West Gippsland CMA boundary or the Latrobe municipal district.
  - Include protection of at least two large trees.

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

The following FFG Act values listed as threatened or protected are susceptible to impacts from the proposed development along Firmin's Lane.

- Possible Strzelecki Gum x1
- *Acacia* (protected) x6

A Protected Flora Permit would be required from DEECA to remove the plant taxa comprising the abovementioned protected values from public land. Application forms for Protected Flora Permits can be obtained from DEECA offices or from the customer service centre.

Targeted surveys were undertaken for the following EPBC Act listed flora species that had potential to occur:

- River Swamp Wallaby-grass and Purple Blown-grass within creeks and drainage lines along road sides where impacts are proposed.
- Matted Flax-lily within suitable habitat (Plains Grassy Woodland) where this is proposed to be impacted, especially within road reserves.

None of these species were recorded.

One possible Strzelecki Gum (EPBC Act listed) was identified adjacent to access point upgrades proposed on Firmin's Lane. Based on the current layout, this species may be impacted through consequential removal associated with the upgrade. It is therefore recommended that measures are adopted to allow for retention of this tree to avoid the requirement of an EPBC Act Referral.

Aquatic targeted surveys were undertaken in September 2022 (Aquatica Environmental 2022) to determine the presence or absence of the following listed fauna species considered to be susceptible to impacts from the development.

- Dwarf Galaxias (EPBC Act: Vulnerable)
- Flinders Pygmy Perch (FFG Act: Vulnerable)

Only Flinders Pygmy Perch was recorded and will require mitigation measures if any suitable habitat is proposed to be impacted.

The tables below summarise the compliance of the information in this report with the application requirements of the *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA 2017a).

No further ecological surveys are required for the project, as they have all been completed.

Based on the assessment of the site and assuming the retention of the potential Strzelecki Gum on Firmin's Lane, an EPBC Act referral will not be required as no EPBC Act listed species or communities were found to occur within suitable habitat that could be impacted by the proposed project. A referral to the State Minister for Planning will also not be required under the EE Act.

	Application requirement	Response
1.	Information about the native vegetation to be removed.	See Section 6.3.1.
2.	Topographic and land information relating to the native vegetation to be removed.	See Section 5.1.
3.	Recent, dated photographs of the native vegetation to be removed.	See Appendix 6.
4.	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or contiguous land in the same ownership as the applicant, in the five-year period before the application for a permit is lodged.	Not applicable.
5.	An avoid and minimise statement.	See Section 7.3.1.
6.	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed.	Not applicable.
7.	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	Not applicable.
8.	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations (at decision guideline 8).	Not applicable.
9.	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	See Appendix 9.

Additional requirements for applications in the Detailed assessment pathway		
	Application requirement	Response
10.	A site assessment report of the native vegetation to be removed, including the following: ▪ A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches. ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	See Appendix 2 and Appendix 3.
11.	Information about impacts on rare or threatened species habitat, including the following: The relevant section of the Habitat importance map for each rare or threatened species requiring a species offset. For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: ▪ the species' conservation status; ▪ the proportional impact of the removal of native vegetation on the total habitat for that species; and ▪ whether the habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat.	See Appendix 7.

2. Introduction

Manthos Investments Pty Ltd, on behalf of Robert Luxmoore Pty Ltd, engaged Nature Advisory Pty Ltd to conduct a Flora and Fauna assessment at the Hazelwood North Solar Farm. This included the assessment of potential for threatened species or communities listed under the Environment Protection and Biodiversity Conservation Act (EPBC Act) or Flora and Fauna Guarantee Act (FFG Act) of an approximately 1,100-hectare area of land in Hazelwood North (refer to Figure 1 for the study area and section 5.1 for the site description). The specific area investigated, referred to herein as the 'study area', comprised private land situated between the Princes Highway and Hazelwood Road. The construction of a solar farm and battery storage is proposed for the study area.

An initial Flora & Fauna Assessment was undertaken in May 2022 including the following scope:

Desktop Assessment:

- Existing information on the flora, fauna and native vegetation of the study area and surrounds was reviewed, including:
  - *Victorian Biodiversity Atlas* administered by the Department of Energy, Environment, and Climate Action (DEECA);
  - The *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Protected Matters Search Tool*; and
  - DEECA's *Native Vegetation Information Management system* (NVIM).

Site inspection – proposed solar farm and battery site (1,100 hectares)

- A site survey of the study area was undertaken involving:
  - High-level characterisation and mapping of native vegetation on the site, as defined in Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (the 'Guidelines');
  - Compilation of a flora and fauna species lists for the site;
  - Assessment of the nature and quality of native fauna habitat; and
  - Assessment of the likelihood of occurrence of EPBC Act- and *Flora and Fauna Guarantee Act 1988* (FFG Act)-listed flora, fauna and communities on the site.

An additional investigation was commissioned in September 2022 to provide information on the extent and condition of native vegetation in the study area according to Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DEECA 2017a), 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 policy frameworks including the *Environment Effects Act 1978* (EE Act).

Specifically, the scope of this additional native vegetation investigation included:

- A site survey involving the following:
  - Characterisation and mapping of native vegetation on the site proposed to be removed, as defined in Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (the 'Guidelines'); and

  - Assessment of native vegetation proposed to be removed in accordance with the Guidelines, including habitat hectare assessment and/or scattered tree assessment.
- Updates to the Flora and Fauna Assessment report included the following:
  - A statement of the methods used and sources of information consulted for the investigation, including any limitations, where applicable;
  - Results of the site survey, documenting the quality native vegetation proposed for removal on the site;
  - A determination of the extent of any proposed native vegetation removal based on the development layout (Preliminary Concept Rev 09);
  - A *Native Vegetation Removal* (NVR) report identifying any native vegetation removal, offset requirements and assessment pathway for a permit;
  - Discussion of implications of the findings for the proposed use of the land, specifically addressing relevant legislative and policy requirements; and
  - Recommendations for mitigation and management strategies, and any further investigation required.

Targeted surveys were undertaken for the following threatened flora species that had potential to occur:

- River Swamp Wallaby-grass and Purple Blown-grass within creeks and drainage lines along road sides where impacts are proposed.
- Matted Flax-lily within suitable habitat (Plains Grassy Woodland) where this is proposed to be impacted, especially within road reserves.

This report is divided into the following sections:

Section 3 provides the legislative background including details of all relevant Commonwealth, State and local legislation and policies.

Section 4 describes the sources of information, including the methods used for the field survey.

Section 5 presents the assessment results, including details of the native vegetation, flora and fauna of the study area.

Section 6 discusses the proposed impacts of the project.

Section 7 details the implications of the findings under the relevant legislation and policy.

This investigation was undertaken by a team from Nature Advisory comprising Arend Kwak (Ecologist), Nhung Thi Hong Nguyen (Senior GIS Analyst), Emma Wagner (GIS Analyst), Chris Armstrong (Senior Botanist & Project Manager) and Dr Inga Kulik (Director).

3. Planning and Legislative Considerations

3.1. Local planning provisions

The study area is located within the Latrobe local government area and is currently zoned Farming Zone – Schedule 1 in the Latrobe Planning Scheme.

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

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

3.2. Overlays

The study area is subject to the following eight overlays in the Latrobe Planning Scheme. Most of these overlays only apply to part of the study area.

- *Bushfire Management Overlay (BMO)* – This overlay applies to subdivisions, dwellings, outbuildings and associated developments and is therefore considered to be irrelevant to the current investigation.
- *Development and Design Overlay – Schedule 1 (DDO1)* – This overlay applies to the high-pressure gas pipeline in the south-western corner of the site. Note, the DDO1 will soon be replaced with the Buffer Area Overlay – Schedule 1 which also relates to the pipeline.
- *Development and Design Overlay – Schedule 3 (DDO3)* – This overlay is considered to be irrelevant to the current investigation.
- *Development and Design Overlay – Schedule 5 (DDO5)* - This overlay is considered to be irrelevant to the current investigation.
- *Development and Design Overlay – Schedule 6 (DDO6)* - This overlay is considered to be irrelevant to the current investigation.
- *Development and Design Overlay – Schedule 10 (DDO10)* - This overlay is considered to be irrelevant to the current investigation.
- *Land Subject to Inundation Overlay (LSIO)* – Although creeks traverse the site, the solar farm and battery footprint is not situated in areas of flood risk and this overlay is therefore considered to be irrelevant to the current investigation.
- *State Resource Overlay – Schedule 1 (SRO1)* - This overlay is considered to be irrelevant to the current investigation.
- *Environmental Significance Overlay (ESO)* – This overlay covers the northern part of the site and requires a permit to remove, destroy or lop any vegetation including dead vegetation, except for vegetation that was either planted or grown as a result of crop raising or grazing animal production.
- *Environmental Significance Overlay – Schedule 1 (ESO1)* –This schedule specifically relates to areas of potential brown coal extraction and is therefore considered to be irrelevant to the current investigation.

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:

- *Regrowth:* Native vegetation that is to be removed, destroyed or lopped that has naturally established or regenerated on land lawfully cleared of naturally established native vegetation, and may be classified as one of the following: Only leave relevant points in
  - Less than 10 years old; or
  - Austral Bracken (*Pteridium esculentum*); or
  - Within the boundary of a timber production plantation, as indicated on a Plantation Development Notice or other documented record and has established after the plantation; or
  - Less than ten years old at the time of a property vegetation plan being signed by the Secretary to DEECA (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987*) and is shown on that plan as being 'certified regrowth'; and 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.

  Regrowth comprised small eucalypt recruits (<2m in height), which occasionally occurred adjacent to scattered trees in the study area. The regrowth exemption was found to apply, given the small size, immaturity and lack of flowering capabilities of these recruits (see Photo 1).

Photo 1: Eucalypt recruits (foreground) associated with a large scattered tree.

- *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.

Planted vegetation occurred in the form of rows of Blue-gum occurring in the centre and southwestern portion of the study area. These trees were identified as being planted due to their uniform age and even spacing (see Photo 2).

Photo 2: Planted Blue-gum, occurring in the southwest of the study area.

3.3.2. Application requirements

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

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) (DEECA 2018a).
- Statewide biodiversity information maintained by DEECA.

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

3.3.3. Referral to DEECA

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

Any application to remove, destroy or lop native vegetation must be referred to DEECA 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* (EPBC Act) protects a number of threatened species and ecological communities that are considered to be of national

conservation significance. Any significant impacts to these species require the approval of the Australian Minister for the Environment.

If there is a possibility of a significant impact on nationally threatened species, communities or listed migratory species, a referral under the EPBC Act should be considered. The Minister will decide whether the project will be a 'controlled action' under the EPBC Act after 20 business days, in which case the project can only be undertaken with the approval of the Minister. This approval depends on a further assessment and approval process, e.g. bilateral assessment (lasting between three and nine months, depending on the level of assessment).

Implications under the EPBC Act for the current proposal are discussed in Section 7.4.

3.5. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) lists threatened and protected species and ecological communities (DEECA 2017b, DEECA 2018b). Any removal of protected flora, including threatened flora species and plants that constitute threatened communities listed under the FFG Act from public land, requires a Protected Flora Licence or Permit under the Act that can be obtained from DEECA.

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

Implications under the FFG Act for the current proposal are discussed in Section 7.5.

3.6. EE Act

One or a combination of several criteria may trigger a requirement for a referral to the Victorian Minister for Planning who will determine whether an Environmental Effects Statement (EES) will be 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 that trigger a Referral are listed below.

<u>One or more</u> of the following would trigger a Referral:

- Potential clearing of 10 or more hectares of native vegetation from an area that meets the following criteria:
  - 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'; or

- 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 or more hectares 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, including the following:
  - 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
  - Potentially significant effects on habitat values of a wetland supporting migratory bird species.

Implications under the *Environment Effects Act 1978* (EE Act) for the current proposal are discussed in Section 7.6.

3.7. CaLP Act

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

Weed species listed under the CaLP Act that have been recorded in the study area are discussed in Section 7.7.

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

- Latrobe Planning Scheme
- Hazelwood North Solar Farm – Preliminary Ecological Assessment, Nature Advisory Report 22077(1.0), June 2022

4.1.2. Native vegetation

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

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

4.1.3. Listed matters

Existing flora and fauna species records and 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° 13' 57.77" S and longitude 146° 28' 54.34" 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 DEECA.

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

4.2. Field methods

The initial field assessment was conducted on the 23rd and 24th May, 2022 and the detailed native vegetation assessment was undertaken on 14th and 15th September 2022. During these assessments, the study area was surveyed initially by vehicle and then areas supporting native vegetation and/or fauna habitat were inspected in more detail on foot.

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

[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).

4.2.1. Native vegetation

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

- Patch; or
- Scattered tree.

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

Patch

A patch of native vegetation may be defined as one of the following:

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

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

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

Scattered tree

A scattered tree may be defined as the following:

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

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

4.2.2. Flora species and habitats

Records of flora species were made in conjunction with sampling methods used to undertake habitat hectare assessments of the 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* (DEECA 2017b).

[2] A native canopy tree is a mature tree (i.e. able to flower) that is taller 3 metres and 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 onto the ground.

The potential for habitats to support listed flora species was assessed based on the following criteria:

- 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 regarding the potential occurrence of a listed species, the assumption was made that this could be in an area of suitable habitat.

4.2.3. Fauna species and habitats

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

- Incidental searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows).
- Turning over logs/rocks and other ground debris for reptiles, frogs and mammals.
- Daytime bird observations.
- General searches for reptiles and frogs, including identification of frog calls in seasonally wet areas.
- General searches for bat habitat including waterbodies and potential roosting sites such as dead trees with hollows and underneath the bark of trees.

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

Habitat connectivity of the study area (i.e. degree of isolation/fragmentation), including linkages to other habitats in the region, was determined using field observations, recent aerial photography and *NatureKit* (DEECA 2022a).

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

4.2.4. Threatened ecological communities

The likelihood of listed threatened ecological communities occurring in the study area was determined by checking general field observations 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 and FFG Act-listed community descriptions (SAC 2015).

4.2.1. Threatened flora species

A targeted survey for thee threatened flora species, River Swamp Wallaby-grass, Purple Blown-grass and Matted Flax-lily, was undertaken on 24th November 2022 within suitable habitat that could potentially be impacted by the proposed solar farm, battery and infrastructure.

The survey area was traversed on foot by botanists using the following method:

- Parallel transects spaced five metres apart were traversed and visually inspected for the threatened species. This methodology is in accordance with the relevant federal guidelines for this species (DEWHA 2009a). Transects were tracked using a handheld GPS.
- Any threatened species located during the survey would be marked with a handheld GPS (accuracy 1-3 m).

4.3. Limitations of field assessment

The site assessment was conducted during spring after periods of extended rain falls. The short duration and seasonal timing of field assessments can result in some species not being detected when these may occur at other times. Additionally, some flora species and lifeforms may be undetectable at the time of survey or unidentifiable due to a lack of flowers or fruit.

Timing of the survey and condition of vegetation were otherwise considered suitable to ascertain the extent and condition of native vegetation and fauna habitats.

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

Determination of EVCs considers vegetation types that would have naturally occurred in the landscape prior to European impacts. Significant past alteration of the study area's landform, hydrology and soil composition, and past vegetation clearance has resulted in the emergence of an artificial site ecosystem and the reestablishment of vegetation that is likely to be notably different from that which would have naturally occurred in the study area. Determination of EVCs in altered areas was therefore based on consideration of the following:

- Modelled EVC mapping (DEECA 2022a);
- Observations of adjacent landforms that had not been significantly altered;
- Observations of nearby natural vegetation;
- Any observed indigenous flora species that are useful for determining EVCs; and
- Relevant published EVC benchmark descriptions.

If this information was insufficient to reasonably determine which EVC would have naturally occurred and the observed vegetation resembled an EVC that is likely to have naturally occurred in the region, EVC determination was based on the structure and floristic composition of current observed vegetation.

5. Assessment results

5.1. Site description

The study area for this investigation (Figure 1) was approximately 1,100 hectares of private land located at Hazelwood North, approximately 3.45 kilometres south-west of the Traralgon town centre and about 140 kilometres east-south-east of the Melbourne CBD. The site is bordered by the Princes Highway to the north and west, semi-rural dwellings and Hazelwood Road to the east and semi-rural dwellings and Firmins Lane to the south.

The study area supported shallow sedimentary soils on an undulating landscape. The land declined towards tributaries associated with Wades Creek and Boyds Creek, which traversed the site in a north-south direction.

The land has historically been utilised as a pine plantation, with paddocks also supporting cropping and stock grazing. Surrounding land predominantly supported similar agricultural functions, as well as semi-rural dwellings.

The following vegetation and flora habitat was observed in the study area:

- Vegetation in the study area mostly consisted of paddocks of exotic pasture species. Prominent pasture species across the site included Brown-top Bent, Toowoomba Canary-grass, Paspalum and Rye. Exotic herbaceous species such as Flatweed, Ribwort, Dock and Spear Thistle were commonly interspersed.
- Native vegetation was comparatively sparse and typically restricted to creek lines. In the north of the study area, low-quality swathes of Native Rush and Tall Sedge were commonplace within creek tributaries.
- Small, discrete patches of Swamp Scrub (EVC 53) were also numerous and comprised Swamp Paperbark and Black Wattle.
- A patch of Plains Grassy Forest (EVC 151), primarily consisting of Apple Box and sparse native groundcover, was also present in the north of the study area
- Towards the south of the study area, creeks supported more dense growth of Swamp Scrub. These dense stands of Swamp Paperbark were occasionally interspersed with Black Wattle, Snowy Daisy-bush, Manna Gum and Prickly Moses. Herbaceous groundcover included Fireweed, Bidgee-widgee, Willow Herb and Common Raspwort. Swamp Scrub was also frequently fringed by Thatch Saw-sedge and Spiny-head Mat-rush.
- A large swathe of Kunzea and Thatch Saw-sedge was present in the south-eastern corner of the site. This occurred adjacent to a large patch of Plains Grassy Wetland (EVC 125), comprising Native Rush, Tall Sedge, Common Spike-rush and Pithy Sword-sedge.
- Additionally, the road reserves of Walshs Road supported Plains Grassy Woodland (EVC 55). This comprised a remnant grassy groundcover of Spear-grass, Wallaby-grass, Kangaroo Grass and Weeping Grass.
- The study area was fringed by planted treed vegetation, comprising natives such as Bog Gum, Blue Gum and Apple-box. Exotic Monterey Pine was also commonly planted across the site.

Fauna habitat within the study area comprised:

- Grassland: Occupied the majority of the study area and primarily comprised an array of exotic grasses. Some native grassland was also present along Walshs Road.

- Treed vegetation: Primarily associated with planted treed vegetation, this habitat type was situated along property boundaries and occasionally occurred in the form of scattered trees.
- Scrub: This habitat type occurred along creek lines and was primarily composed of dense stands of Swamp Paperbark.
- Aquatic habitat: Associated with artificial farm dams and ephemeral creeks. This habitat type was usually fringed by native rushes and sedges.

The following key fauna habitat areas occurred within the region:

- Traralgon South Flora and Fauna Reserve occurred approximately 6.65 kilometres south-east of the study area. Native vegetation in the study area was isolated from this habitat by roads, plantations and semi-rural dwellings associated with the Hazelwood North township.
- Wirilda Environment Park occurred approximately 9.31 kilometres north-west of the study area. Native vegetation in the study area was isolated from this habitat by roads, plantations and semi-rural dwellings.
- Morwell National Park occurred approximately 13.59 kilometres south-west of the study area. Native vegetation in the study area was isolated from this habitat by roads, semi-rural dwellings and the Churchill township.
- Moondarra State Park occurred approximately 20.91 kilometres north-west of the study area. Native vegetation in the study area was isolated from this habitat by roads, plantations, semi-rural dwellings and the Maryvale township.

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

5.2. Native vegetation

5.2.1. Patches of native vegetation

Pre–European EVC mapping (DEECA 2022a) indicated that the study area and surrounds would have supported Lowland Forest (EVC 16), Damp Forest (EVC 29) Swamp Scrub (EVC 53_61), Plains Grassy Woodland (EVC 55), Swampy Riparian Woodland (EVC 83) and Plains Grassy Forest (EVC 151), 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_61), Plains Grassy Woodland (EVC 55), Plains Grassy Wetland (EVC 125) and Plains Grassy Forest (EVC 151) were present within the study area (Figure 1). A description of these EVCs are provided in the EVC benchmarks in Appendix 7.

90 patches (referred to herein as habitat zones) comprising the abovementioned EVCs, were identified in the study area (Table 1). This totalled an area of 27.945 hectares of native vegetation in patches and included 14 large trees.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
A, AK, AO, AP, BL	Plains Grassy Woodland (EVC 55)	These habitat zones typically occurred adjacent to roadsides and access tracks. They were characterized by dense growth of Thatch Saw-sedge, with Native Rush and Spiny-headed Mat-rush occasionally interspersed. Bryophyte cover was negligible (<1%) and soil crust was absent. Weed cover was high (50%) and mostly attributed to perennial pasture species, such as Kikuyu, Cocksfoot, Onion Grass and Paspalum. Litter cover was very high (50%) and exotic in origin.
B	Plains Grassy Forest (EVC 151)	This habitat zone occurred in the northernmost corner of the study area. It comprised a healthy canopy of Apple Box (>70% health), overlying a groundcover of Weeping Grass, and a lesser occurrence of Spear Grass and Wallaby Grass. Bryophytes and soils crust were absent. Weed cover was very high (70%) and mostly consisted of Panic Veldt-grass, Rye and Brown-top Bent. Litter cover was high (30%) and attributed to leaf litter from the overlying Apple Box.
C, D	Plains Grassy Woodland (EVC 55)	These habitat zones fringed a small farm dam in the north of the study area. They consisted of young Manna Gum, Black Wattle, Prickly Tea-tree and Sallow Wattle, over a groundcover of Weeping Grass. Bryophytes and soil crust were absent. Weed cover was moderate (35%) and comprised Flatweed, Onion Grass, Brown-top Bent and Blackberry. Monterey Pine was also present in HZ D. Litter cover was high (40%) and native in origin.
E, F, AH, AN, AR AU, CD	Swamp Scrub (EVC 53)	These species-depauperate habitat zones were mostly concentrated in creeks in the north of the study area. They typically comprised dense growth of Swamp Paperbark, with Black Wattle and Sallow Wattle occasionally interspersed. Bryophytes and soil crust were absent. Weed cover was very low (5%) and mostly attributed to assorted pastures. There was also a notable presence of Blackberry in some patches. Litter cover was very low (5%) and native in origin.
G, K, L-P, Q-T, W-Z AA-AC, AI, BM	Swamp Scrub (EVC 53)	These habitat zones primarily occurred as small, discrete patches adjacent to creeks and tributaries. They were species-depauperate, and primarily consisted of Black Wattle, Blackwood and Swamp Paperbark. Native Rush species were also occasionally interspersed. Bryophytes and soil crust were absent. Weed cover was moderate (35%) and associated with exotic pastures, as well as Blackberry and Water Buttons. Organic litter was native in origin and negligible in cover (<1%).

Habitat Zone	EVC	Description
H	Swamp Scrub (EVC 53)	This habitat zone traversed a portion of Boyds Creek, in the north of the study area. It mostly consisted of assorted Native Rush species, with Black Wattle, Swamp Paperbark, Prickly Tea-tree and Sallow Wattle occasionally fringing portions of the habitat zone. Bryophytes and soil crust were absent. Weed cover was very high (60%) and associated with assorted pastures, Blackberry and Cumbungi. Litter cover was very low (5%) and exotic in origin.
I, U, V, AE, AJ, AT, BK, CH, CG	Plains Grassy Wetland (EVC 125)	Situated along creeks and wet depressions, these habitat zones primarily comprised an array of Native Rush species and a lesser occurrence of Tall Sedge. Common Spike-rush was also frequently interspersed in waterlogged areas. Bryophytes and soil crust were absent. Weed cover was high (60%) and attributed to exotic pastures, Blackberry, Water Buttons and Cumbungi. Litter cover was very high (70%) and exotic in origin. Bare ground was often negligible and therefore associated recruitment potential was very low.
J, AJ	Plains Grassy Woodland (EVC 55)	These species depauperate habitat zones occurred on hillsides, adjacent to an access track. It consisted of Black Wattle and a sparse groundcover of Wallaby Grass. Bryophytes and soil crust were absent. Weed cover was high (65%) and associated with perennial pasture species. Organic litter was low (1%) and native in origin, being attributed to the overlying Black Wattle.
AD, AF, CC, CE, CF	Plains Grassy Wetland (EVC 125)	These habitat zones were associated with small farm dams, scattered throughout the study area. They were typically characterized by dense growth of Tall Spike-rush, and a lesser occurrence of Common Spike-rush and Small-fruit Pondweed. Bryophyte and soil crust cover was absent. Weed cover was moderate (35%) and mostly associated with Onion Grass, Brown-top Bent and Yorkshire Fog, which fringed the farm dams. Some habitat zones also supported exotic Cumbungi. Bare ground within the dam, and therefore recruitment potential, was moderate (30%).
AL, BN, BO, BZ, CA, CB	Swamp Scrub (EVC 53)	Occurring in creeks in the south of the study area, these habitat zones typically consisted of dense Swamp Paperbark. Habitat Zone AN was an exception and supported a more diverse array of native shrubs and trees. Prominent shrubs and trees included Manna Gum, Black Wattle, Prickly Tea-tree, Snowy Daisy-bush, Sallow Wattle and Prickly Moses. A range of native graminoids were also interspersed and included Native Rush, Thatch Saw-sedge, Tall Sedge and Spiny-headed Mat-rush. Native herbaceous groundcover was usually sparse and attributed to Shrubby Fireweed, Jagged Fireweed, Kidney-weed and Bidgee-widgee. Bryophyte cover was negligible (<1%) and soil crust was absent. Weed cover was typically moderate-high (35-65%) and attributed to species such as Monterey Pine, Blackberry, Brown-top Bent, Flatweed and Onion Grass. Litter cover was high (50-65%) and native in origin.

Habitat Zone	EVC	Description
AM	Swamp Scrub (EVC 53)	This habitat zone was associated with a farm dam in the south of the study area. It primarily comprised immature Swamp Gum, Sallow Wattle, Prickly Tea-tree and Swamp Paperbark. Native groundcover consisted of Weeping Grass, Native Rush, Spear Grass and Common Bog-sedge, with Common Raspwort and Bidgee-widgee also interspersed. The dam also supported Tall Spike-rush and Common Spike-rush. Bryophyte and soil crust cover were negligible (<1%). Weed cover was high (60%) and most attributed to exotic perennial pasture species. Litter cover was moderate (40%) and derived from exotic pastures.
AQ	Plains Grassy Woodland (EVC 55)	This habitat zone occurred in the southeastern corner of the study area. It consisted of dense swathes of Kunzea and Thatch Saw-sedge. There was also a notable occurrence of Wallaby Grass and assorted herbs, such as Pale Sundew, Jagged Fireweed, Bidgee-widgee and Variable Willow-herb. Weed cover was low-moderate (20%) and primarily associated with perennial pastures. Litter cover was high (35%) and native in origin.
AS, AX, AY BA, BR-BY	Plains Grassy Woodland (EVC 55)	These habitat zones were primarily concentrated along the southern road reserve of Walshs Road. They consisted of Spear Grass and Kangaroo Grass, with Wattle-head Mat-rush occasionally interspersed. Bryophte cover was negligible (<1%), while soil crust cover was moderate (5%). Weed cover was moderate (35%) and primarily attributed to perennial pastures. Litter cover was very high (60%) and native in origin.
AV, AW, AZ, BB-BL, CI, CJ	Plains Grassy Woodland (EVC 55)	These habitat zones were primarily situated along the northern road reserve of Walshs Road. They comprised Kangaroo Grass, which was often co-dominant with Weeping Grass. Wattle-head Mat-rush, Common Bog-sedge and Sheep's Burr were occasionally interspersed. Bryophyte cover was moderate (10%), while soil crust cover was negligible (<1%). Weed cover was moderate (30%) and associated with perennial pasture species. Organic litter cover was high (40%) and native in origin.
BP	Plains Grassy Wetland (EVC 125)	This habitat zone occurred in the southeastern portion of the site and was associated with wetland habitat, arising from the adjacent creek tributary. It was characterized by the presence of various Native Rush species, Tall Sedge and Pithy Sword-sedge. Native herbaceous groundcover was also present and consisted of Jagged Fireweed, Persicaria, Bidgee-widgee and Lesser Loosestrife. Bryophytes and soil crust were absent. Weed cover was very high (75%) and attributed to an array of perennial pastures, as well as Water Button, Monterey Pine and Cumbungi. Organic litter cover was high (40%) and exotic in origin. Bare ground cover, and associated recruitment potential, was low-moderate (10%).

Habitat Zone	EVC	Description
BQ	Plains Grassy Forest (EVC 151)	Situated along the eastern road reserve of Davey Jones Lane, this habitat zone comprised a healthy canopy (>70% health) of Apple Box and Manna Gum. Sparse native shrubbery and treed vegetation was present and consisted of Black Wattle, Blackwood, Swamp Paperbark and Sallow Wattle. Native groundcover was mostly situated along the property fence line and included Thatch Saw-sedge, Spiny-headed Mat-rush and Spear Grass. There was also a notable occurrence of Austral Bracken in the northern portion of the patch. Bryophytes and soil crust were absent. Weed cover was very high (80%) and mostly associated with perennial pastures. Organic litter cover was very high (80%) and attributed to the slashed remnants of the exotic groundcover.
CK, CL	Swamp Scrub (EVC 53)	These habitat zones occurred in the Firmin's Lane road reserve, adjacent to a planned access point. They comprised a dry variant of Swamp Scrub, as demonstrated by the presence of characteristic shrubs such as Swamp Paperbark and Prickly Tea-tree overlying a grassy groundcover of Kangaroo Grass, Thatch Saw-sedge, Spiny-headed Mat-rush and Native Rush. Native herbs such as Fireweed, Common Raspwort and Bidgee-widgee were occasionally interspersed. Bryophyte cover was highly variable between these patches (2% - CK, 20% - CL). Weed cover was moderate (20-35%) and mostly attributed to Brown-top Bent, Yorkshire Fog and Sweet Vernal. Litter cover was moderate-high (60% and native - CK, 35% and exotic - CL).

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

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	Plains Grassy Woodland (EVC 55)	0.158	12	0
B	Plains Grassy Forest (EVC 151)	0.141	30	3
C	Plains Grassy Woodland (EVC 55)	0.024	30	0
D	Plains Grassy Woodland (EVC 55)	0.03	29	0
E	Swamp Scrub (EVC 53)	0.017	27	0
F	Swamp Scrub (EVC 53)	0.051	27	0
G	Swamp Scrub (EVC 53)	0.015	21	0
H	Swamp Scrub (EVC 53)	0.43	21	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
I	Plains Grassy Wetland (EVC 125)	0.12	11	0
J	Plains Grassy Woodland (EVC 55)	0.115	15	0
K	Swamp Scrub (EVC 53)	0.035	21	0
L	Swamp Scrub (EVC 53)	0.009	21	0
M	Swamp Scrub (EVC 53)	0.004	21	0
N	Swamp Scrub (EVC 53)	0.022	21	0
O	Swamp Scrub (EVC 53)	0.008	21	0
P	Swamp Scrub (EVC 53)	0.011	14	0
Q	Swamp Scrub (EVC 53)	0.03	21	0
R	Swamp Scrub (EVC 53)	0.032	21	0
S	Swamp Scrub (EVC 53)	0.006	21	0
T	Swamp Scrub (EVC 53)	0.007	21	0
U	Plains Grassy Wetland (EVC 125)	0.011	11	0
V	Plains Grassy Wetland (EVC 125)	0.012	11	0
W	Swamp Scrub (EVC 53)	0.036	21	0
X	Swamp Scrub (EVC 53)	0.02	21	0
Y	Swamp Scrub (EVC 53)	0.002	21	0
Z	Swamp Scrub (EVC 53)	0.019	18	0
AA	Swamp Scrub (EVC 53)	0.011	21	0
AB	Swamp Scrub (EVC 53)	0.251	21	0
AC	Swamp Scrub (EVC 53)	0.023	21	0
AD	Plains Grassy Wetland (EVC 125)	0.015	28	0
AE	Plains Grassy Wetland (EVC 125)	3.11	12	0
AF	Plains Grassy Wetland (EVC 125)	0.045	28	0
AG	Plains Grassy Woodland (EVC 55)	0.031	15	0
AH	Swamp Scrub (EVC 53)	0.02	26	0
AI	Swamp Scrub (EVC 53)	0.062	14	0
AJ	Plains Grassy Wetland (EVC 125)	1.211	11	0
AK	Plains Grassy Woodland (EVC 55)	0.011	12	0
AL	Swamp Scrub (EVC 53)	3.516	35	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
AM	Swamp Scrub (EVC 53)	0.049	18	0
AN	Swamp Scrub (EVC 53)	0.067	23	0
AO	Plains Grassy Woodland (EVC 55)	0.007	12	0
AP	Plains Grassy Woodland (EVC 55)	0.122	12	0
AQ	Plains Grassy Woodland (EVC 55)	3.688	32	0
AR	Swamp Scrub (EVC 53)	0.373	17	0
AS	Plains Grassy Woodland (EVC 55)	0.024	13	0
AT	Plains Grassy Wetland (EVC 125)	0.352	11	0
AU	Swamp Scrub (EVC 53)	0.011	21	0
AV	Plains Grassy Woodland (EVC 55)	0.006	13	0
AW	Plains Grassy Woodland (EVC 55)	0.004	13	0
AX	Plains Grassy Woodland (EVC 55)	0.009	13	0
AY	Plains Grassy Woodland (EVC 55)	0.036	13	0
AZ	Plains Grassy Woodland (EVC 55)	0.004	13	0
BA	Plains Grassy Woodland (EVC 55)	0.011	13	0
BB	Plains Grassy Woodland (EVC 55)	0.013	13	0
BC	Plains Grassy Woodland (EVC 55)	0.022	13	0
BD	Plains Grassy Woodland (EVC 55)	0.05	13	0
BE	Plains Grassy Woodland (EVC 55)	0.015	13	0
BF	Plains Grassy Woodland (EVC 55)	0.01	13	0
BG	Plains Grassy Woodland (EVC 55)	0.011	13	0
BH	Plains Grassy Woodland (EVC 55)	0.014	13	0
BI	Plains Grassy Woodland (EVC 55)	0.007	13	0
BJ	Plains Grassy Woodland (EVC 55)	0.083	13	0
BK	Plains Grassy Wetland (EVC 125)	0.747	12	0
BL	Plains Grassy Woodland (EVC 55)	1.289	12	0
BM	Swamp Scrub (EVC 53)	0.345	14	0
BN	Swamp Scrub (EVC 53)	1.024	34	0
BO	Swamp Scrub (EVC 53)	0.115	39	0
BP	Plains Grassy Wetland (EVC 125)	1.959	21	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
BQ	Plains Grassy Forest (EVC 151)	0.668	33	11
BR	Plains Grassy Woodland (EVC 55)	0.034	13	0
BS	Plains Grassy Woodland (EVC 55)	0.007	13	0
BT	Plains Grassy Woodland (EVC 55)	0.01	13	0
BU	Plains Grassy Woodland (EVC 55)	0.004	13	0
BV	Plains Grassy Woodland (EVC 55)	0.042	13	0
BW	Plains Grassy Woodland (EVC 55)	0.022	13	0
BX	Plains Grassy Woodland (EVC 55)	0.023	13	0
BY	Plains Grassy Woodland (EVC 55)	0.007	13	0
BZ	Swamp Scrub (EVC 53)	2.624	40	0
CA	Swamp Scrub (EVC 53)	0.800	39	0
CB	Swamp Scrub (EVC 53)	1.64	39	0
CC	Plains Grassy Wetland (EVC 125)	0.027	28	0
CD	Swamp Scrub (EVC 53)	0.007	21	0
CE	Plains Grassy Wetland (EVC 125)	0.031	23	0
CF	Plains Grassy Wetland (EVC 125)	0.019	23	0
CG	Plains Grassy Wetland (EVC 125)	0.056	11	0
CH	Plains Grassy Wetland (EVC 125)	0.853	11	0
CI	Plains Grassy Woodland (EVC 55)	0.013	13	0
CJ	Plains Grassy Woodland (EVC 55)	0.005	13	0
CK	Swamp Scrub (EVC 53)	0.702	33	0
CL	Swamp Scrub (EVC 53)	0.171	34	0
Total		27.945		14

Figure 1: Study area and native vegetation

Figure 1-1: Study area and native vegetation

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 25/09/2023

- Study area
- Contours (10m)
- Watercourse
- DEECA classified wetland

Native vegetation

- Large scattered tree
- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)

N

Metres
0 110

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Figure 1-2: Study area and native vegetation

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 25/09/2023

- Study area
- Contours (10m)
- Watercourse
- DEECA classified wetland

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Forest (EVC 151)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)

N

Metres
0 110

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Figure 1-3: Study area and native vegetation

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 25/09/2023

- Study area
- Contours (10m)
- Watercourse

Native vegetation

- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Swamp Scrub (EVC 53)

ADVERTISED PLAN

N

Metres
0 110

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Figure 1-4: Study area and native vegetation

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 25/09/2023

- Study area
- Contours (10m)
- Watercourse
- DEECA classified wetland

Native vegetation

- Large scattered tree
- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)

ADVERTISED PLAN

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Metres
0 110

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Figure 1-5: Study area and native vegetation

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 25/09/2023

- Study area
- Contours (10m)
- Watercourse
- DEECA classified wetland

Native vegetation

- Large tree in patch
- Large scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Forest (EVC 151)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)

Threatened Flora

- Possible Strzelecki Gum

Protected Flora

- Acacia longifolia

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5.2.2. Scattered trees

Scattered trees recorded in the study area would have once comprised the canopy component of Plains Grassy Woodland (EVC 55) and Plains Grassy Forest (EVC 151).

38 scattered trees occurred in the study area (Figure 1), including the following:

- 11 large scattered trees (≥ 80-centimetre DBH for Plains Grassy Woodland; ≥ 70-centimetre for Plains Grassy Forest); and
- 27 small scattered trees (< 80-centimetre DBH for Plains Grassy Woodland; < 70-centimetre DBH for Plains Grassy Forest).

Details of all scattered trees recorded are listed in Appendix 3.

5.3. Flora species

5.3.1. Species recorded

During the field assessment, 104 plant species were recorded, of which 54 (52%) were indigenous and 50 (48%) were introduced or non-indigenous native in origin (Appendix 4).

5.3.2. Listed species

VBA records (DEECA2022d) and the EPBC Protected Matters Search Tool (DAWE 2022a) indicated that within the search region there were records of, or there occurred potential suitable habitat for, 12 species listed under the Commonwealth EPBC Act, 27 listed under the state FFG Act (including those with protected status), and 9 listed under both Acts. No flora species listed under the EPBC Act were recorded during the field survey. During the initial assessment in May 2022, Strzelecki Gum were thought to potentially occur onsite. The detailed vegetation assessment in Spring 2022 confirmed that this species is not present onsite.

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 for which suitable habitat exists, but recent records are scarce.

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

- River Swamp Wallaby-grass – Vulnerable (EPBC Act)
- Matted Flax-lily – Endangered (EPBC Act); Critically Endangered (FFG Act)
- Southern Blue-gum - Endangered (FFG Act)
- Bog Gum – Critically Endangered (FFG Act)
- Strzelecki Gum – Vulnerable (EPBC Act); Critically Endangered (FFG Act)
- Purple Blown-grass – Endangered (FFG Act)
- Grey Billy-buttons – Critically Endangered (FFG Act)

5.3.3. Targeted surveys for threatened Flora

Targeted flora surveys were undertaken on 24th November 20222 within areas of suitable habitat that could be potentially impacted by the proposed solar farm, battery and associated infrastructure for the following three species:

- River Swamp Wallaby-grass – Vulnerable (EPBC Act)
- Matted Flax-lily – Endangered (EPBC Act); Critically Endangered (FFG Act)
- Purple Blown-grass – Endangered (FFG Act)

Areas surveyed for Matted Flax-lily included woodland areas, in particular within road reserves of Walshs Road whereas wetland areas that could be impacted through track crossing creeklines were surveyed for River Swamp Wallaby-grass and Purple Blown-grass.

None of these three species were recorded during the targeted surveys. The timing of the surveys was chosen to coincide with the flowering season of all three species.

A subspecies of Blue-gum was found to occur in several tracts, in the centre and southwest of the study area. Bog Gum was only found overhanging the north-eastern boundary of the study area and occurs beyond the development footprint. In both instances, the uniform age and placement of trees indicated that they were planted (see Photo 3).

Photo 3: Rows of planted screening vegetation (including Bog Gum) present along the site's north-eastern boundary.

Table 3: Listed flora species and their likelihood of occurrence in the study area

Common Name	Scientific name	EPBC	FFG	FFG-prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Sticky Wattle	*Acacia howittii*		Vulnerable	P	Victorian endemic, confined to east from upper Macalister River area near Mt Howitt south to near Yarram and east to near Tabberabbera, growing in moist forest; widely cultivated and naturalising in some areas (e.g. Daylesford, Greater Melbourne, Dandenong Ranges etc.) (VicFlora 2022).	1	4/03/2009	No suitable habitat within study area, minimal nearby recent records, outside typical range – **Unlikely to occur**
River Swamp Wallaby-grass	*Amphibromus fluitans*	Vulnerable			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).	1	15/01/2004	Suitable habitat present in creeks and roadside ditches – **Potential to occur, but not detected during targeted surveys**
Velvet Apple-berry	*Billardiera scandens s.s.*		Endangered		Dry open forests and woodlands.	1	15/10/2012	No suitable habitat within study area, minimal nearby recent records – **Unlikely to occur**
Eastern Spider-orchid	*Caladenia orientalis*	Endangered	Endangered	P	Heathland and Heathy Woodland in coastal areas between the Mornington Peninsula and Wilsons Promontory (Jeanes & Backhouse 2006).	1	1/02/1981	No suitable habitat within study area, minimal nearby recent records, outside typical range – **Unlikely to occur**
Thick-lip Spider-orchid	*Caladenia tessellata*	Vulnerable		P	Coastal open woodlands, Lowland forest, heathy woodland (Entwisle 1994).	None	N/A	No suitable habitat within study area, no nearby recent records, outside typical range – **Unlikely to occur**
Slender Pink-fingers	*Caladenia vulgaris*		Vulnerable	P		1	4/11/1995	No suitable habitat within study area, minimal nearby recent records, outside typical range – **Unlikely to occur**
Spotted Gum	*Corymbia maculata*		Vulnerable		Coastal Plains and hills. Endemic to the Tara range in East Gippsland (Walsh & Entwistle).	2	9/09/2021	Outside natural range, minimal nearby recent records – **Unlikely to occur**
Grey Billy-buttons	*Craspedia canens*		Critically Endangered	P	Victoria, in lowland grasslands, often on swamp fringes; current records occur between Cranbourne and Traralgon (Everett 1999).	56	17/09/2019	Prevalent nearby recent records, suitable habitat within study area – **Potential to occur**
Bear's-ear	*Cymbonotus lawsonianus*		Endangered	P	Woodlands and drier areas (Jeanes 1999).	3	26/08/2003	Habitat suboptimal, minimal nearby recent records – **Unlikely to occur**
Japanese Lady-fern	*Deparia petersenii subsp. congrua*		Endangered	P		1	26/06/1989	Habitat suboptimal, minimal nearby recent records – **Unlikely to occur**
Matted Flax-lily	*Dianella amoena*	Endangered	Critically Endangered	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).	5	31/10/2017	Four records on or adjacent to Hazelwood Road, some suitable habitat present in Plains Grassy Woodland (EVC 55) patches – **Potential to occur but not detected during targeted surveys**
Glaucous Flax-lily	*Dianella longifolia var. grandis s.l.*		Critically Endangered			1	27/08/1992	Outside typical range, minimal nearby recent records – **Unlikely to occur**
Buxton Gum	*Eucalyptus crenulata*	Endangered	Endangered	P	Known from only two natural populations that are about 64 km apart, and separated by the Great Dividing Range. Yering: Low-lying, wet/swampy habitats that are seasonally cold with deep alluvial loams and a generally flat topography with scattered, periodically inundated depressions. Buxton: poorly drained hollow on the alluvial terraces adjacent to the Acheron River.	1	23/09/2006	Habitat suboptimal, outside natural range, minimal nearby recent records – **Unlikely to occur**
Southern Blue-gum	*Eucalyptus globulus subsp. globulus*		Endangered			2	3/08/2021	Suitable habitat, within range, though few nearby records – **Not recorded during field surveys**
Bog Gum	*Eucalyptus kitsoniana*		Critically Endangered		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.	1	9/09/2021	Planted individuals identified along eastern boundary of the study area – **Does occur, but planted**

Common Name	Scientific name	EPBC	FFG	FFG-prot	Habitat	Number of records	Date of last record	Likelihood of occurrence
Strzelecki Gum	*Eucalyptus strzeleckii*	Vulnerable	Critically Endangered	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).	7	19/03/2021	One possible Strzlecki Gum identified along Firmins Lane, though identification could not be confirmed due to a lack of diagnostic characteristics – **Potential to occur**
Yarra Gum	*Eucalyptus yarraensis*		Critically Endangered		River flats and floodplains of valley sclerophyll forest (Gray & Knight 1993)	7	9/09/2021	No suitable habitat present – **Unlikely to occur**
Clover Glycine	*Glycine latrobeana*	Vulnerable	Vulnerable	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).	None	N/A	No nearby recent records – **Unlikely to occur**
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*		Endangered		Seasonally wet, heavy clay soils (Walsh 1994).	1	23/10/2000	Suitable habitat present in creeks and roadside ditches – **Potential to occur**
Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*		Endangered		Near coastal sandy heaths. Widely planted	4	9/09/2021	No suitable habitat within study area, minimal nearby recent records, outside typical range – **Unlikely to occur**
Heath Platysace	*Platysace ericoides*		Endangered		Coastal plains and dry forest dry soils (Duretto 1999).	2	1/09/2003	No suitable habitat within study area, minimal nearby recent records, outside typical range – **Unlikely to occur**
Round-leaf Pomaderris	*Pomaderris vacciniifolia*	Critically Endangered	Critically Endangered	P	Occurs in damp forest and herb-rich foothill forest north-east of Melbourne in the upper catchments of the Yarra, Plenty and Yea rivers (DAWE 2020).	None	N/A	No suitable habitat within study area, no nearby recent records, outside typical range – **Unlikely to occur**
Dense Leek-orchid	*Prasophyllum spicatum*	Vulnerable	Critically Endangered	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	No suitable habitat within study area, no nearby recent records – **Unlikely to occur**
Green-striped Greenhood	*Pterostylis chlorogramma*	Vulnerable	Endangered	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 suitable habitat within study area, no nearby recent records – **Unlikely to occur**
Fisch's Greenhood	*Pterostylis fischii*		Endangered	P	Among grass and low shrubs in moist areas of open forest, uncommon in Victoria (Jones 1994).	4	1/09/2003	No suitable habitat within study area, minimal nearby recent records, uncommon in Victoria – **Unlikely to occur**
Swamp Fireweed	*Senecio psilocarpus*	Vulnerable		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	Habitat suboptimal, outside natural range, no nearby recent records – **Unlikely to occur**
Metallic Sun-orchid	*Thelymitra epipactoides*	Endangered	Endangered	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	No suitable habitat within study area, no nearby recent records – **Unlikely to occur**
Swamp Everlasting	*Xerochrysum palustre*	Vulnerable	Critically Endangered	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, Themea triandra* and *Villarsia* (DAWE 2020).	None	N/A	Habitat suboptimal, no nearby recent records – **Unlikely to occur**

Notes: EPBC = threatened species status under EPBC Act; **FFG** = threatened species status under the FFG Act, **FFG-prot** = protected species status under the FFG Act.

5.4. Fauna habitats

The study area supported the following four fauna habitat types:

- Grassland;
- Treed vegetation;
- Scrub; and
- Aquatic habitat

Grassland: Grassland habitat occupied the majority of the study area, in the form of grazing paddocks. There was also a limited occurrence of native grassland occurring along Walshs Road. Open grassland, regardless of species composition and origin, can provide feeding habitat for a range of native wildlife. The occurrence of surface rocks and logs was also noted and is indicative of reptile habitat.

Photo 4: Grazing paddocks, which occupied the majority of the study area.

Treed Vegetation: Treed vegetation occurred along property boundaries and as scattered trees throughout the study area. There was also the occasional occurrence of treed vegetation adjacent to the study area's creeks. Much of the treed vegetation was planted and of native origin, though there was a notable occurrence of Monterey Pine. Treed vegetation provides valuable nesting sites for birds and some native mammals. Insectivorous and nectivorous wildlife also benefit from the associated foraging opportunities.

Photo 5: Planted treed vegetation, utilised for sheltering stock and screening.

Scrub: Scrub habitat was primarily restricted to creeks, and most prevalent in the south of the study area. Swamp Paperbark and Kunzea provided the largest and most dense thickets. This habitat type provides valuable nesting and feeding opportunities for small birds and mammals. It also assists native wildlife in evading introduced predators, such as foxes and feral cats.

Photo 6: A dense swathe of Kunzea, present in the south-east of the study area.

Aquatic habitat: This habitat type was associated with creeks traversing the property and artificial farm dams, frequently scattered throughout paddocks. Creeks supported an array of wetland species, with Austral Rush and Tall Sedge being most prevalent. Aquatic habitat associated with dams often supported Pondweed and Duckweed and was typically fringed by various native rush species. Given the presence of fringing vegetation, water birds and amphibians are likely to benefit from the associated shelter and feeding opportunities. Creeks also have the potential to provide habitat connections to larger waterbodies and allow the subsequent movement of native fish and amphibians. Furthermore, an array of fauna likely utilise the farm dams as water sources.

Photo 7: A farm dam, with dense growth of Tall Spike-rush.

5.5. Fauna species

5.5.1. Species recorded

During the field assessment 21 fauna species were recorded. This included 14 birds (one introduced), three mammals (two introduced), one frog and two invertebrate species (Appendix 5).

5.5.2. Listed species

The review of existing information including VBA records (DEECA 2022d) and the results of the EPBC Protected Matters Search Tool (DAWE 2022a) indicated that within the search region there were records of, or potential suitable habitat occurred for, 49 fauna species listed under the Commonwealth EPBC Act and the state FFG Act. The likelihood of occurrence of these species in the study area was assessed and the results are presented in Table 4.

This analysis of potential occurrence of listed fauna species excludes the following:

- Marine fauna given that the study area is inland; and
- Migratory oceanic bird species (such as albatrosses and petrels) and migratory shorebirds given that the study area is inland.

Species considered 'likely to occur' are those with very high potential of occurring 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' are those for which suitable habitat exists, but recent records are scarce. This analysis indicates that six listed fauna species are likely to occur or have the potential to occur. These species include the following:

- Latham's Snipe (EPBC Act: Migratory)
- White-throated Needletail (EPBC Act: Vulnerable, Migratory, FFG Act: Vulnerable)
- Australasian Shoveler (FFG Act: Vulnerable)
- Blue-billed Duck (FFG Act: Vulnerable)
- Hardhead (FFG Act: Vulnerable)
- Flinders Pygmy Perch (FFG Act: Vulnerable), recorded

The susceptibility of these species to impacts from development is discussed in Section 5.5.3.

Table 4: Listed fauna species and their likelihood of occurrence in the study area

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Birds								
Australasian Bittern	*Botaurus poiciloptilus*	Endangered		Critically Endangered	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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Australasian Shoveler	*Spatula rhynchotis*			Vulnerable	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).	6	24/02/1991	Recent records in the area, farm dams on the property provide suitable habitat - **Potential to occur.**
Australian Painted-snipe	*Rostratula australis*	Endangered		Critically Endangered	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 canegrass 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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Barking Owl	*Ninox connivens*			Critically Endangered	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).	1	11/11/2009	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Black Falcon	*Falco subniger*			Critically Endangered	Woodlands, open country and terrestrial wetlands; in arid and semi-arid zones; mainly over open plains and undulating land with large tracts of low vegetation. It is more commonly found in north-western Victoria and is only occasionally found in southern Victoria. It is a highly mobile species, moving in response to food availability and seasonal conditions (Marchant & Higgins 1993).	1	28/10/1999	Paucity of recent records and the study area does not support suitable habitat - **Unlikely 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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Blue-billed Duck	*Oxyura australis*			Vulnerable	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies. V (Marchant & Higgins 1990).	32	28/09/2018	Recent records in the area, farm dams on the property provide suitable habitat - **Potential to occur.**
Caspian Tern	*Hydroprogne caspia*		M (JAMBA)	Vulnerable	Sheltered coastal embayment, including harbours, lagoons, inlets, estuaries and river deltas, usually with sandy or muddy margins (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Common Greenshank	*Tringa nebularia*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Endangered	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Common Sandpiper	*Actitis hypoleucos*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Vulnerable	Inhabits a wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands. In Victoria, mostly found Westernport and Port Phillip Bay (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Critically Endangered	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	M (Bonn A1, ROKAMBA, JAMBA, CAMBA)	Critically Endangered	Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Fork-tailed Swift	*Apus pacificus*		M (CAMBA, ROKAMBA, JAMBA)		The species can occur in wet sclerophyll forest but mainly prefers open forest or plains. It is almost exclusively aerial and feeds up to hundreds on metres above the ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees (Higgins 1999).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered			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).	34	14/04/2020	The study area does not support suitable habitat - **Unlikely to occur**
Grey Falcon	*Falco hypoleucos*	Vulnerable		Vulnerable	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 northwestern regions (Marchant & Higgins 1993).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Grey Goshawk	*Accipiter novaehollandiae*			Endangered	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).	2	22/06/2004	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Hardhead	*Aythya australis*			Vulnerable	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).	52	31/07/2019	Recent records in the area, farm dams on the property provide suitable habitat - **Potential 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).	14	12/01/2019	Recent records in the area, fringes of farm dams and marshy areas along drainage lines in the study area provide suitable habitat - **Potential to occur.**
Little Eagle	*Hieraaetus morphnoides*			Vulnerable	Over wooded and forested lands and open country of Aust. Range extending into arid zone. Most abundant in open forest and woodland (Marchant & Higgins 1993).	9	3/12/2004	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Little Egret	*Egretta garzetta*			Endangered	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).	5	17/09/2018	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Musk Duck	*Biziura lobata*			Vulnerable	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).	10	4/03/1995	Paucity of recent records - **Unlikely to occur**
Osprey	*Pandion cristatus*		M (Bonn A2S)		Rare vagrant to Victoria (Marchant & Higgins 1993). Littoral and coastal habitats and terrestrial wetlands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Painted Honeyeater	*Grantiella picta*	Vulnerable		Vulnerable	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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Pectoral Sandpiper	*Calidris melanotos*		M (Bonn A2H, ROKAMBA, JAMBA)		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Pilotbird	*Pycnoptilus floccosus*	Vulnerable			Mostly found in temperate wet sclerophyll forests and occasionally temperate rainforest, dense undergrowth with abundant debris.	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Plumed Egret	*Ardea plumifera*			Critically Endangered	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).	4	18/03/2018	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Powerful Owl	*Ninox strenua*			Vulnerable	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).	1	11/07/1981	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Regent Honeyeater	*Anthochaera phrygia*	Critically Endangered		Critically Endangered	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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Rufous Fantail	*Rhipidura rufifrons*		M (Bonn A2H)		In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	13	1/11/1980	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Satin Flycatcher	*Myiagra cyanoleuca*		M (Bonn A2H)		Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	9	1/11/1980	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Sharp-tailed Sandpiper	*Calidris acuminata*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Swift Parrot	*Lathamus discolor*	Critically Endangered		Critically Endangered	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).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			Endangered	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).	9	1/04/2019	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	M (CAMBA, ROKAMBA, JAMBA)	Vulnerable	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).	18	20/11/1998	Aerial species, travels widely over vast areas, can occur over the study area - **Potential to occur**.
Yellow Wagtail	*Motacilla flava*		M (CAMBA, JAMBA, ROKAMBA)		Regular non-breeding visitor in northern Australia mainly spring-summer, vagrant to the south. Occupies a wide range of habitats, usually open areas with low vegetation such as crop, grassland and even parkland. Often recorded near water (Higgins, Peter & Cowling 1999)	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Mammals								
Broad-toothed Rat	*Mastacomys fuscus mordicus*	Vulnerable		Vulnerable	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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable		Vulnerable	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).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	Vulnerable		Vulnerable	In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occuring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995); In Tasmania, moist forest with dense shrub layer; in the north edge of rainforest (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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Endangered		Endangered	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	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Southern Greater Glider	*Petauroides volans*	Vulnerable		Vulnerable	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).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	Endangered		Endangered	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Yellow-bellied Glider	*Petaurus australis*	Vulnerable			Largely restricted to the narrow band of wet eucalypt open forest (wet sclerophyll forest) that is an ecotone between rainforest and drier woodland ecosystems (DAWE 2022).	None	N/A	Absence of historical records and the study area does not support suitable habitat - **Unlikely to occur**
Reptiles								
Lace Monitor	*Varanus varius*			Endangered	Well timbered areas from dry woodland to wet southern forests and rainforest (Wilson & Swan 2003).	1	1/11/1989	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Striped Legless Lizard	*Delma impar*	Vulnerable		Endangered	Grassland specialist. Known to occur in some areas dominated by introduced species such as Harding Grass Phalaris aquatica, Serated Tussock Nasella trichotoma and Flatweed Hypocharis radicata and at sites with a history of grazing and pasture improvement. shelter in grass tussocks, thick ground cover, soil cracks, under rocks, spider burrows, and under ground debris such as timber. The majority of sites in Victoria and NSW occur on cracking clay soils with some surface rock which provide shelter for the species (DAWE 2020).	None	N/A	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Fish								
Australian Grayling	*Prototroctes maraena*	Vulnerable		Endangered	Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	3	23/03/2010	Paucity of recent records and the study area does not support suitable habitat - **Unlikely to occur**
Dwarf Galaxias	*Galaxiella pusilla*	Vulnerable		Endangered	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).	2	16/07/2020	Recent records in the area, connectivity with area of recent records, suitable habitat in study area. Not recorded during aquatic surveys in September 2022 - **Unlikely to occur**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Number of records	Date of last record	Likelihood of occurrence
Flinders Pygmy Perch	*Nannoperca sp. 1*			Vulnerable	Merrimans Creek, South Gippsland, and the La Trobe River catchment, east to the Genoa/Wallagaraugh rivers near the Vic & NSW border. A small and possibly translocated population occurs further west in Pebble Creek, a tributary of the Franklin River system in Corner Inlet. The Flinders Pygmy Perch is also found on the eastern side of Flinders Island in Bass Strait, and the far north east of Tasmania (Anson River). Inhabits slow or still waters with abundant aquatic vegetation, including lakes, ponds and slow-flowing rivers and creeks. along with pools in moderately-flowing streams (Bray 2020).	11	14/10/2020	Recent records in the area, connectivity with area of recent records, suitable habitat in study area. Recorded during aquatic surveys in September 2022 - **Does occur**
Frogs								
Green and Golden Bell Frog	*Litoria aurea*	Vulnerable			Permanent water with fringing or emergent vegetation in streams, swamps, lagoons, farm dams and ornamental ponds Cogger 2000). Also occurs in disturbed sites such as disused industrial sites, brick pits, mines and council tips (Tyler 1997).	None	N/A	Absence of historical records - **Unlikely to occur**
Growling Grass Frog	*Litoria raniformis*	Vulnerable		Vulnerable	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	Absence of historical records - **Unlikely to occur**

Notes: EPBC-T = threatened species status under EPBC Act; **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** = threatened species status under the FFG Act.

5.5.3. Susceptibility of listed fauna to impacts

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

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

Targeted surveys were undertaken in September 2022 to determine the presence or absence of the following listed fauna species considered to be susceptible to impacts from the development.

- Dwarf Galaxias (EPBC Act: Vulnerable)
- Flinders Pygmy Perch (FFG Act: Vulnerable)

Birds (non-migratory)

Three listed non-migratory bird species were considered to have the potential to occur in the study area.

- **Australasian Shoveler** (FFG Act: Vulnerable)
- **Blue-billed Duck** (FFG Act: Vulnerable)
- **Hardhead** (FFG Act: Vulnerable)

These species are likely to occasionally visit the study area due to the presence of creeks, tributaries and farm dams and associated vegetation; however, the extent of this habitat is limited within the study area. Given the large amount of habitat available in the surrounding region, it is considered unlikely that these species would be impacted by development in the study area.

Migratory Birds

Two listed migratory bird species (excluding oceanic species) have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Latham's Snipe** (EPBC Act: Migratory)

This species is likely to occasionally visit the study area due to the presence of creeks, tributaries and farm dams and associated vegetation; however, the extent of this habitat is limited within the study area. Given the large amount of habitat available in the surrounding region and that the proposed development will avoid most aquatic habitat, it is considered unlikely that Latham's Snipe would be impacted by the proposed solar farm and battery.

- **White-throated Needletail** (EPBC Act: Vulnerable, Migratory)

This species is likely to occasionally visit the study area due to its vast foraging range, however due to its almost exclusively aerial biology and the terrestrial nature of this development, it is considered unlikely that White-throated Needletail would be impacted by the development in the study area.

Fish

Two listed fish species were considered to have the potential to occur in the study area. The susceptibility of these species to possible impacts from any development in the study area is discussed below.

- **Dwarf Galaxias** (EPBC Act: Vulnerable; FFG Act: Endangered)
- **Flinders Pygmy Perch** (FFG Act: Vulnerable)

Dwarf Galaxias was not recorded during targeted surveys in September 2022 and its likelihood of occurrence was considered low in the study area. This species does occur in connected waterways downstream of the project area and consideration will need to be given to prevent impacts to downstream water quality during construction and operation of the project (Aquatica Environmental 2022).

The Flinders Pygmy Perch was recorded in large numbers during aquatic surveys (Aquatica Environmental 2022) across the waterways in the study area and in constructed farm dams. Creeks, when inundated, provide habitat and avenues for movement for these species through the landscape. Nonetheless, the solar farm and battery footprint avoids impacting creeks. A Construction Environmental Management Plan (CEMP) will be prepared that details erosion control and makes sure construction works and operation of the solar farm does not alter the water quality or disrupt the passage of water through this habitat.

5.6. Listed ecological communities

The EPBC Protected Matters Search Tool (DAWE 2020a) indicated that one ecological community listed under the EPBC Act had the potential to occur in the search region (Table 5). Occurrence of this community in the study area was determined based on an assessment of the native vegetation present against published descriptions and condition thresholds for this community.

Table 5: EPBC Act-listed ecological communities and likelihood of occurrence in the study area

Ecological Community	EPBC Status	Occurrence in the study area
Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland and Associated Native Grassland	CR	The majority of native vegetation in the study area comprised Swamp Scrub and Plains Grassy Wetland, which are contraindicative of this community. Potential remnant patches of Plains Grassy Woodland lack the minimum species diversity. There is also no evidence that the Gippsland Red Gum was a characteristic canopy species of these patches. **Does not occur.**

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

6. Assessment of impacts

6.1. Proposed development

The current proposal will involve the construction of a solar farm and battery storage.

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

- Direct removal:
  - Native vegetation within the solar farm and battery footprint.
  - Native vegetation within the road network footprint (10 m width).
- Consequential removal:

Native vegetation within 3m of road upgrades along Firmins Lane.

No additional removal is expected from the creation of bushfire buffers as these are located within areas of non-native vegetation (Nature Advisory 2022).

Impacts to trees

In accordance with the *Assessor's Handbook* (DEECA 2018a), a tree is deemed lost when earthworks encroach on more than 10% of the Tree Protection Zone (TPZ). A TPZ is defined as an area around the trunk of the tree that 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.

6.2. Design recommendations

The following design recommendations are provided to avoid/minimise impacts to native vegetation, and flora and fauna habitats:

- The majority of native vegetation is situated within the study area's creeks and associated tributaries. Therefore, buffers should be created around these water courses and works should avoid these areas where possible, to minimise impacts. This is especially relevant in the south of the study area, where native vegetation is more prevalent and of greater quality.
- Scattered and planted native trees should be retained where possible, as these are likely to provide fauna habitat for native birds and some mammals.
- Farm dams that support native vegetation should be retained and buffers created around these dams where possible, due to their habitat value for native fauna.
- The possible Strzelecki Gum identified adjacent to Firmin's Lane should be avoided. Currently, it is proposed to be impacted due to consequential impacts. However, if the extent of this access point is moved eastwards or additional protective measures are applied, this tree can be retained.

Further mitigation recommendations to mitigate impacts to native vegetation during construction are provided in Section 7.8.

6.3. Impacts of proposed development

Various design measures have been undertaken for this proposal to avoid and minimise impacts to native vegetation. These are detailed in Section 7.3.1.

6.3.1. Native vegetation

The current solar farm and battery footprint will result in the loss of a total extent of 2.342 hectares of native vegetation as represented in Figure 2 and documented in the *Native Vegetation Removal* (NVR) report provided by DEECA (Appendix 8).

This comprised the following:

- 2.202 hectares of native vegetation in patches (including no large trees in patches);
- Two large scattered trees, equating to an area loss of 0.140 hectares.

The native vegetation to be removed is in an area mapped as an endangered Ecological Vegetation Class.

No native vegetation has been approved for removal on the property within the last five years.

Photographs of native vegetation proposed for removal are provided in Appendix 6.

6.3.2. Modelled species important habitat

The current proposal footprint will not have a significant impact on any habitat for any rare or threatened species as determined in Appendix 8.

6.3.3. Listed flora species

The analysis of the likelihood of occurrence of listed flora species presented in Section 5.3.2 identified that if found to be present, the following species could be impacted by any development in the study area:

- River Swamp Wallaby-grass – Vulnerable (EPBC Act)
- Matted Flax-lily – Endangered (EPBC Act); Critically Endangered (FFG Act)
- Purple Blown-grass – Endangered (FFG Act)
- Southern Blue-gum - Endangered (FFG Act)
- Bog Gum – Critically Endangered (FFG Act)
- Strzelecki Gum – Vulnerable (EPBC Act); Critically Endangered (FFG Act)
- Grey Billy-buttons – Critically Endangered (FFG Act)

Targeted surveys were undertaken in November 2022 and found that none of these species occur within suitable habitat proposed to be impacted. However, a detailed assessment along Firmins Lane in September 2023 identified a possible Strzelecki Gum, though diagnostic characteristics required to confirm this identification were absent at the time of assessment.

Bog Gum and Southern Blue-gum were found to be planted and did not occur within public road reserves, where the FFG Act applies. No further targeted surveys are required for these species.

6.3.4. Fauna habitat

The vast majority of grassland habitat will be lost, as it falls within the footprint of the solar farm and battery. However, there is an abundance of this habitat type in the surrounding landscape. Scrub, aquatic habitat and treed vegetation are likely to suffer minimal impacts, due to the development footprint largely avoiding areas associated with this habitat type (e.g. creeks).

6.3.5. Listed fauna species

The analysis of susceptibility of listed fauna species to impacts presented in Section 5.5.3 identified that the following species could be impacted by any development in the study area:

- Flinders Pygmy Perch (FFG Act: Vulnerable)

Any works on or near waterways should ideally occur during the lower rainfall time of the year (December to April) and aquatic fauna salvage and relocation should be undertaken for any instream works (Aquatica Environmental 2022).

A Construction Environmental Management Plan (CEMP) will be required to ensure no impacts occur on this species and its habitat during construction and in the long-term.

6.3.6. Threatened ecological communities

The proposed development footprint will not impact any threatened ecological communities.

Figure 2: Impacts of the proposed development

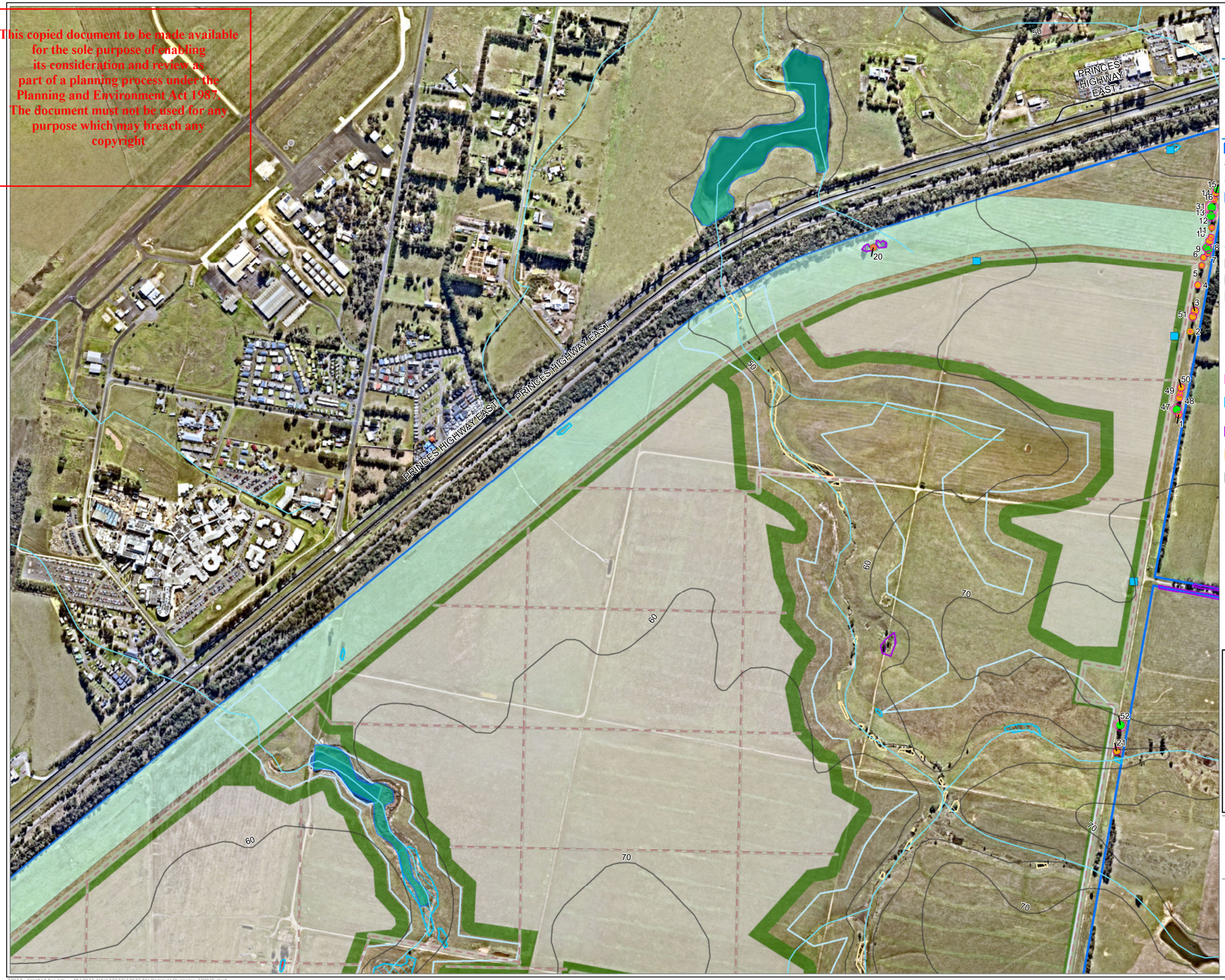

Figure 2-1: Native vegetation to be removed

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 13/10/2023

- Study area
- Contours
- Watercourse
- DEECA classified wetland

Development Layout

- Vehicular access network
- Top of slope creek boundary
- Dam
- Public Acquisition Overlay
- Development footprint
- Fire break

Native vegetation

- Large scattered tree
- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Native vegetation to be removed

ADVERTISED PLAN

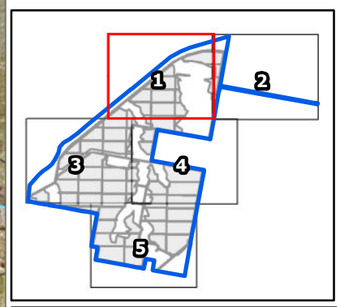

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Figure 2-2: Native vegetation to be removed

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 13/10/2023

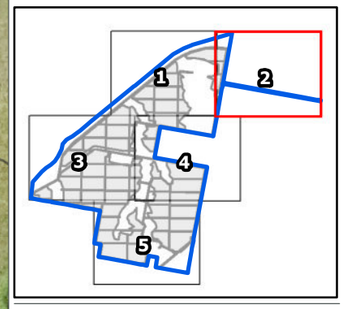
- Study area
- Contours
- Watercourse
- DEECA classified wetland

Development Layout

- Vehicular access network
- Top of slope creek boundary
- Public Acquisition Overlay
- Development footprint
- Fire break

Native vegetation

- Large tree in patch
- Large scattered tree
- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Forest (EVC 151)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)



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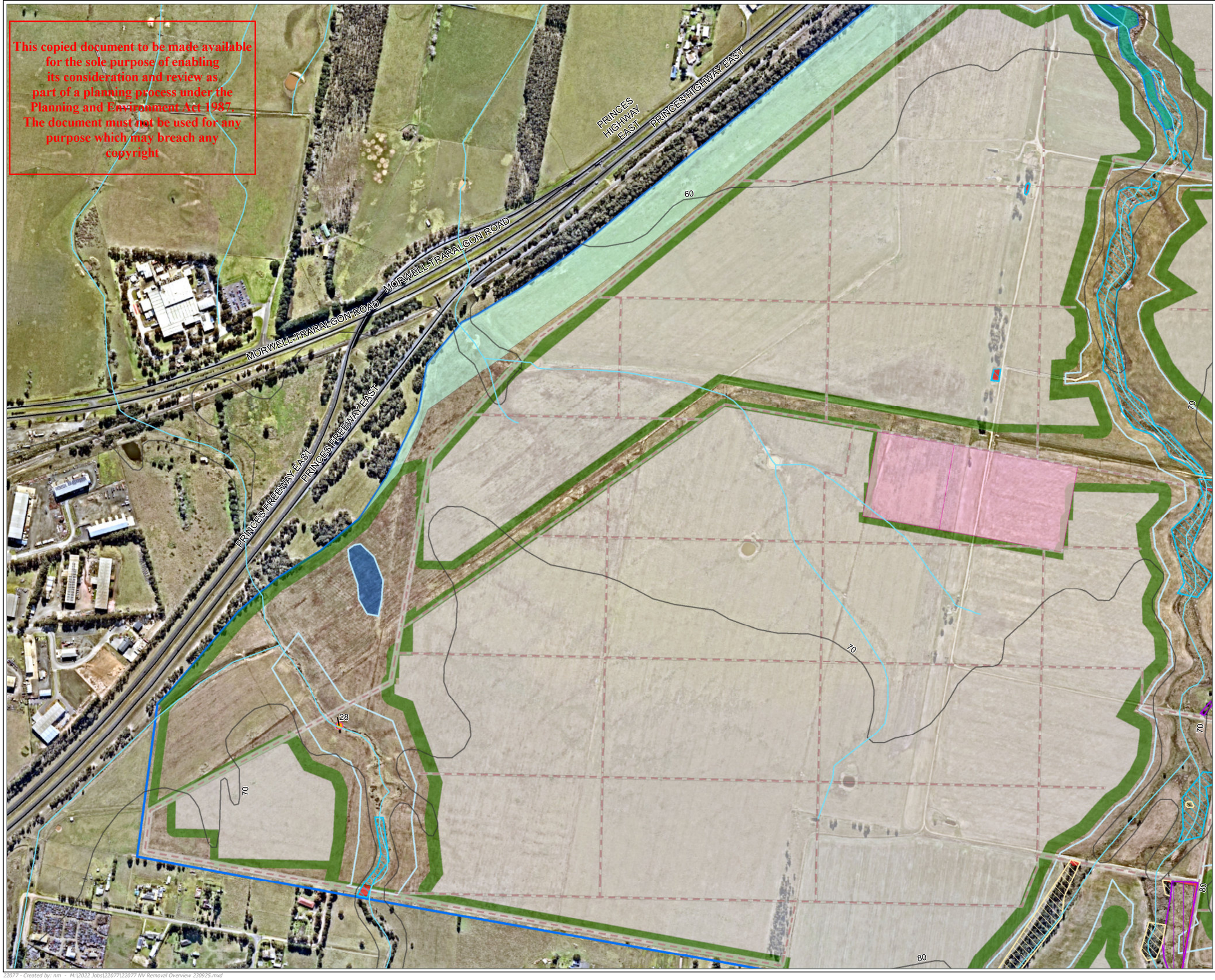

Figure 2-3: Native vegetation to be removed

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 13/10/2023

- Study area
- Contours
- Watercourse
- DEECA classified wetland

Development Layout

- Vehicular access network
- Top of slope creek boundary
- Battery storage and substation
- Dam
- Public Acquisition Overlay
- Development footprint
- Fire break

Native vegetation

- Small scattered tree
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Native vegetation to be removed

ADVERTISED PLAN

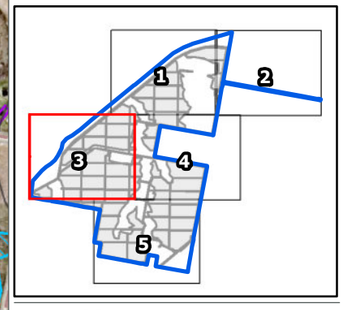

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Figure 2-4: Native vegetation to be removed

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 13/10/2023

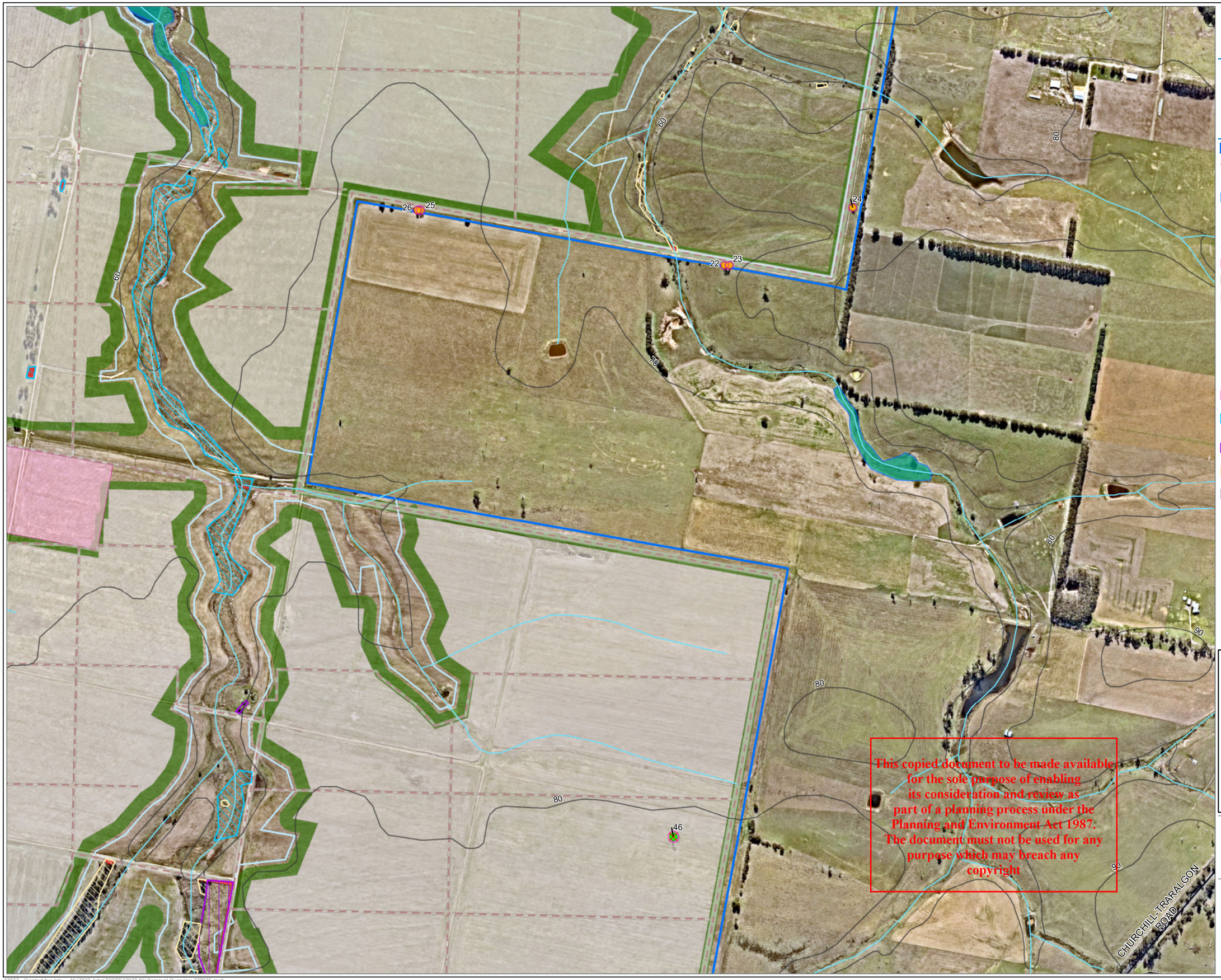
- Study area
- Contours
- Watercourse
- DEECA classified wetland

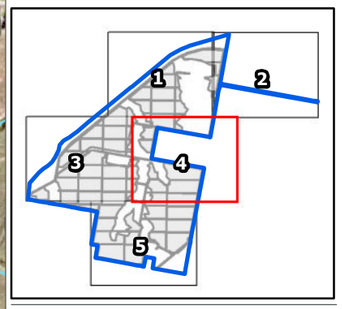
Development Layout

- Vehicular access network
- Top of slope creek boundary
- Battery storage and substation
- Dam
- Development footprint
- Fire break

Native vegetation

- Large scattered tree
- Small scattered tree
- Tree to be removed
- Tree Protection Zone (TPZ)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Native vegetation to be removed





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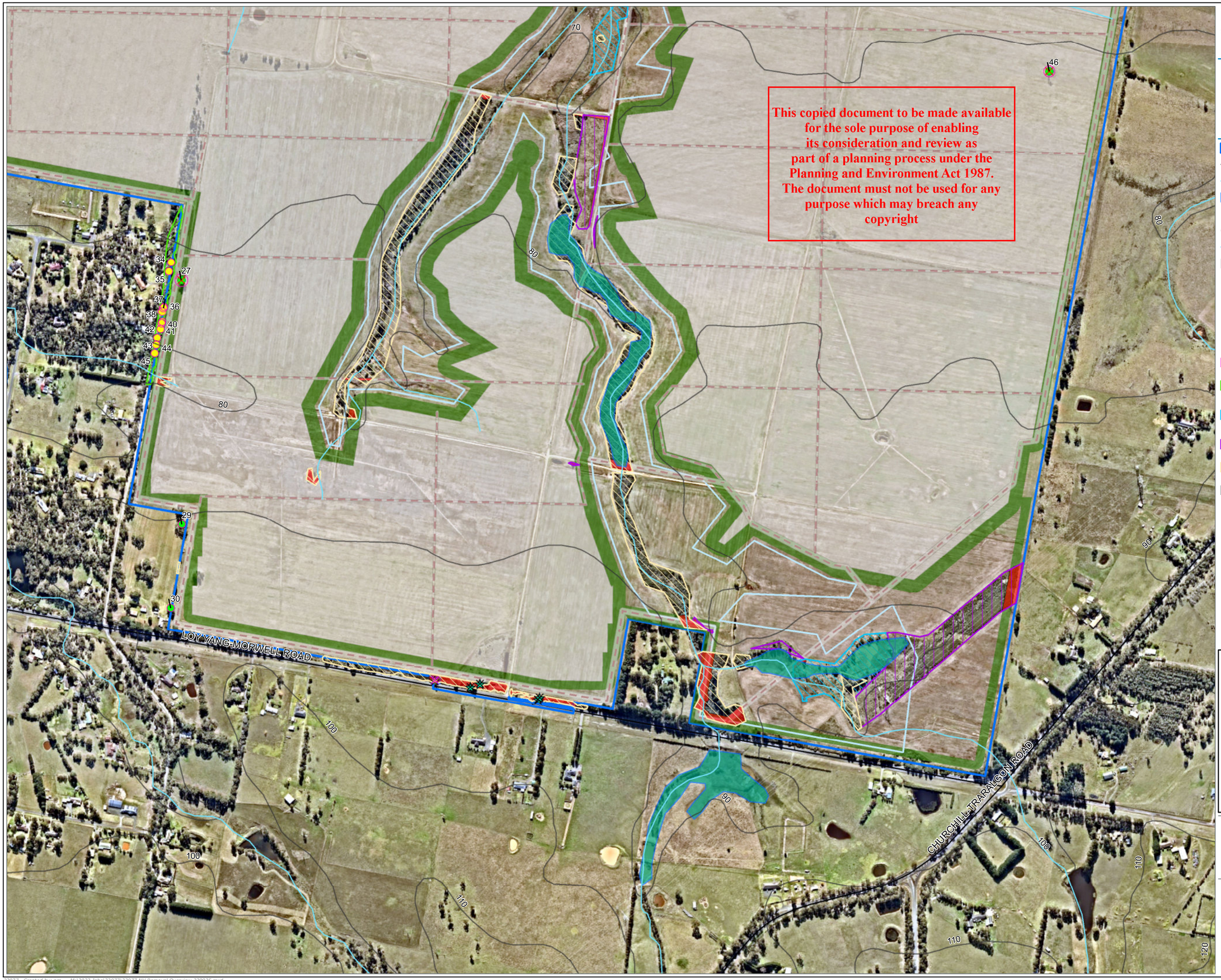


Figure 2-5: Native vegetation to be removed

Project: Hazelwood North Solar Farm
Client: Manthos Investments Pty Ltd
Date: 13/10/2023

- Study area
- Contours
- Watercourse
- DEECA classified wetland

Development Layout

- Vehicular access network
- Top of slope creek boundary
- Development footprint
- Fire break

Native vegetation

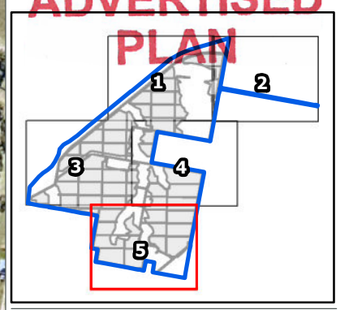
- Large tree in patch
- Large scattered tree
- Tree to be removed
- Tree Protection Zone (TPZ)
- Plains Grassy Forest (EVC 151)
- Plains Grassy Wetland (EVC 125)
- Plains Grassy Woodland (EVC 55)
- Swamp Scrub (EVC 53)
- Native vegetation to be removed

Threatened Flora

- Possible Strzelecki Gum
- Possible Strzelecki Gum to be removed

Protected Flora

- Acacia longifolia
- Protected flora to be removed



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7. Implications under legislation and policy

7.1. Clause 12.01 of the of the Planning Scheme

The overarching purpose of Clause 12.01 is to protect and conserve Victoria's biodiversity. This proposal is in accordance with Clause 12.01, as the majority of native vegetation within the study area will be conserved. This is due to the solar farm and battery footprint avoiding creeks, where remnant native vegetation is concentrated. More specifically, approximately 7% of native vegetation present in the study area will be impacted by works. Native vegetation that will be removed is also considered low quality – evident from poor species diversity and high weed cover. Furthermore, impacted vegetation does not contribute to meaningful habitat links, and therefore the loss of this vegetation will not impact habitat connectivity in the greater landscape. This impacted vegetation therefore does not represent a notable biodiversity value.

7.2. Clause 52.17 of the Planning Scheme

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

7.2.1. Exemptions

The following exemptions listed in Cl. 52.17-7 applies to planted native vegetation within the study area area:

- *Planted vegetation: Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding*

Planted vegetation occurred in the form of rows of Blue-gum occurring in the centre and southwestern portion of the study area. These trees were identified as being planted due to their uniform age and even spacing. Removal of these trees is exempt from requiring a permit under Clause 52.17.

7.3. Implications under the Guidelines

7.3.1. 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. Efforts to avoid and minimise impacts to native vegetation in the current application are presented as follows:

- Site level planning – The solar farm and battery are sited to avoid impacts to creeks, where the majority of native vegetation is present. As a result, only 7% of native vegetation within the study area will be impacted by works. A buffer is also planned for vegetation occurring around the perimeter of the property, to further limit impacts beyond the immediate site.
- Furthermore, no feasible opportunities exist to further avoid and minimise impacts to native vegetation without undermining the key objectives of the proposal.

7.3.2. 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 2.342 hectares of native vegetation (including two 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 6: 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 DEECA based on the above criteria.

7.3.3. Offset requirements

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

- 0.780 general habitat units and must include the following offset attribute requirements:
  - Minimum strategic biodiversity value (SBV) of 0.381
  - Occur within the West Gippsland CMA boundary or the Latrobe municipal district.
  - Include protection of at least two large trees.

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

7.3.4. 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 (DEECA 2022e).

Evidence that the required offset is available is provided in Appendix 9. The required offset would be secured following approval of the application to remove native vegetation.

7.4. EPBC Act

The EPBC Act protects a number of threatened species and ecological communities that are considered to be of national conservation significance.

A detailed assessment along Firmins Lane in September 2023 identified a possible Strzelecki Gum, though diagnostic characteristics required to confirm this identification were absent at the time of assessment.

This possible Strzelecki Gum is currently proposed for removal in association with access point upgrades off Firmins Lane. It is therefore recommended that measures are adopted to allow for retention of this tree to avoid the requirement for an EPBC referral.

7.5. FFG Act

The Victorian FFG Act lists threatened and protected species and ecological communities (DEECA 2018b, DEECA 2017b). 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 DEECA.

The FFG Act only applies to private land in relation to the commercial collection of grasstrees, tree ferns and sphagnum moss.

The following FFG Act values listed as threatened or protected are susceptible to impacts from the proposed development along Firmin's Lane.

- Possible Strzelecki Gum x1
- *Acacia* (protected) x6

A Protected Flora Permit would be required from DEECA to remove the plant taxa comprising the abovementioned protected values from public land. Application forms for Protected Flora Permits can be obtained from DEECA offices or from the customer service centre.

7.6. EE Act

The *Ministerial Guidelines for Assessment of Environmental Effects under the* Environment Effects Act 1978 (DSE 2006) identifies criteria that trigger a Referral to the State Minister for Planning.

Based on the relevant criteria, a Referral to the state Minister for Planning will not be required under the EE Act.

7.7. CaLP Act

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

Property owners who do not eradicate Regionally prohibited weeds or prevent the growth and spread of Regionally controlled weeds for which they are responsible, may be issued with a Land Management Notice or Directions Notice that requires specific control work to be undertaken.

In accordance with the *Catchment and Land Protection Act 1994*, the noxious weed species listed below, that were recorded in the study area, must be controlled.

- Bathurst Burr
- Blackberry
- Flax-leaved Broom
- Paterson's Curse
- Spear Thistle
- Sweet Briar

Precision control methods that minimise off-target kills (e.g. spot spraying) should be used in environmentally sensitive areas (e.g. within or near native vegetation, waterways, etc.).

7.8. Construction mitigation recommendations

Recommendations to avoid and minimise impacts to native vegetation are provided in this report in Section 6.2.

Additional recommendations to mitigate impacts to vegetation and fauna habitat during construction are provided below:

- Implement erosion and sediment control near creek lines during construction to be specified in a Construction Environmental Management Plan (CEMP)
- Establish appropriate vegetation protection zones around areas of native vegetation to be retained prior to works.
- Establish appropriate Tree Protection Zones around scattered native trees to be retained prior to works.
- Ensure all construction personnel are appropriately briefed prior to works, and that no construction personnel, machinery or equipment are placed inside vegetation zones/TPZs.
- A suitably qualified zoologist should undertake a pre-clearance survey of planted trees to be removed during the week prior to removal to identify the presence of any nests or hollows.
- If considered necessary based on the results of the pre-clearance survey, a suitably qualified zoologist should be on site during any tree removal works to capture and relocate any misplaced fauna that may be present.

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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 (DEECA 2017a)

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* (DEECA 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 DEECA.

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: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			55	151	55	55	53	53	53	53	125	55	53	53	53	53	53	53	53
Total area of Habitat Zone (ha)			0.159	0.141	0.024	0.031	0.018	0.051	0.016	0.430	0.121	0.116	0.035	0.009	0.004	0.022	0.008	0.011	0.030
Site Condition	Large Old Trees	/10	0	9	0	0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	No. large trees in habitat zone		0	3	0	0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Tree Canopy Cover	/5	0	3	0	0	0	0	0	0	N/A	0	0	0	0	0	0	0	0
	Lack of Weeds	/15	4	2	4	4	9	9	6	0	0	6	6	6	6	6	6	6	6
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	0	5	10	10	6	6	6	10	0	0	6	6	6	6	6	0	6
	Organic Matter	/5	2	5	5	5	3	3	0	2	2	3	0	0	0	0	0	0	0
	Logs	/5	0	0	5	4	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00	1.15	1.15	1.15	1.15	1.36	1.00	1.15	1.15	1.15	1.15	1.15	1.15	1.15
	Site Condition subtotal		*11*	*29*	*29*	*28*	*26*	*26*	*20*	*20*	*10*	*14*	*20*	*20*	*20*	*20*	*20*	*13*	*20*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Condition Score		**/100**	**12**	**30**	**30**	**29**	**27**	**27**	**21**	**21**	**11**	**15**	**21**	**21**	**21**	**21**	**21**	**14**	**21**

Habitat Zone			R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	53	53	125	125	53	53	53	53	53	53	53	125	125	125	55	53
Total area of Habitat Zone (ha)			0.032	0.007	0.008	0.012	0.013	0.036	0.020	0.002	0.020	0.011	0.251	0.023	0.016	3.110	0.046	0.031	0.021
Site Condition	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	No. large trees in habitat zone		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Tree Canopy Cover	/5	0	0	0	N/A	N/A	0	0	0	0	0	0	0	N/A	N/A	N/A	0	0
	Lack of Weeds	/15	6	6	6	0	0	6	6	6	6	6	6	6	4	0	4	6	9
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	6	6	6	0	0	6	6	6	6	6	6	6	6	0	6	0	5
	Organic Matter	/5	0	0	0	2	2	0	0	0	0	0	0	0	5	2	5	3	3
	Logs	/5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A
	Site condition standardising multiplier*		1.15	1.15	1.15	1.36	1.36	1.15	1.15	1.15	1.00	1.15	1.15	1.15	1.36	1.36	1.36	1.00	1.15
	Site Condition subtotal		*20*	*20*	*20*	*10*	*10*	*20*	*20*	*20*	*17*	*20*	*20*	*20*	*27*	*10*	*27*	*14*	*25*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Condition Score		**/100**	**21**	**21**	**21**	**11**	**11**	**21**	**21**	**21**	**18**	**21**	**21**	**21**	**28**	**12**	**28**	**15**	**26**

Habitat Zone			AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			53	125	55	53	53	53	55	55	55	53	55	125	53	55	55	55	55
Total area of Habitat Zone (ha)			0.062	1.211	0.012	3.516	0.050	0.067	0.008	0.122	3.689	0.373	0.024	0.353	0.011	0.007	0.005	0.010	0.036
Site Condition	Large Old Trees	/10	N/A	N/A	0	N/A	N/A	N/A	0	0	0	N/A	0	N/A	N/A	0	0	0	0
	No. large trees in habitat zone		N/A	N/A	0	N/A	N/A	N/A	0	0	0	N/A	0	N/A	N/A	0	0	0	0
	Tree Canopy Cover	/5	0	N/A	0	1	0	0	0	0	0	0	0	N/A	0	0	0	0	0
	Lack of Weeds	/15	0	0	4	0	0	6	4	4	7	6	4	0	9	4	4	4	4
	Understorey	/25	5	5	5	15	5	5	5	5	15	5	5	5	5	5	5	5	5
	Recruitment	/10	6	0	0	10	6	5	0	0	3	0	0	0	0	0	0	0	0
	Organic Matter	/5	0	2	2	3	4	3	2	2	5	3	3	2	3	3	3	3	3
	Logs	/5	N/A	N/A	0	N/A	N/A	N/A	0	0	0	N/A	0	N/A	N/A	0	0	0	0
	Site condition standardising multiplier*		1.15	1.36	1.00	1.15	1.15	1.15	1.00	1.00	1.00	1.15	1.00	1.36	1.15	1.00	1.00	1.00	1.00
	Site Condition subtotal		*13*	*10*	*11*	*33*	*17*	*22*	*11*	*11*	*30*	*16*	*12*	*10*	*20*	*12*	*12*	*12*	*12*
Landscape Context	Patch Size	/10	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Condition Score		**/100**	**14**	**11**	**12**	**35**	**18**	**23**	**12**	**12**	**32**	**17**	**13**	**11**	**21**	**13**	**13**	**13**	**13**

Habitat Zone			AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			55	55	55	55	55	55	55	55	55	55	55	125	55	53	53	53	125
Total area of Habitat Zone (ha)			0.004	0.011	0.013	0.023	0.050	0.015	0.010	0.011	0.015	0.008	0.083	0.748	1.289	0.346	1.024	0.115	1.960
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	N/A	0	N/A	N/A	N/A	N/A
	No. large trees in habitat zone		0	0	0	0	0	0	0	0	0	0	0	N/A	0	N/A	N/A	N/A	N/A
	Tree Canopy Cover	/5	0	0	0	0	0	0	0	0	0	0	0	N/A	0	0	3	3	N/A
	Lack of Weeds	/15	4	4	4	4	4	4	4	4	4	4	4	0	4	0	0	4	0
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	15	15	10
	Recruitment	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	3
	Organic Matter	/5	3	3	3	3	3	3	3	3	3	3	3	3	2	0	5	5	2
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	N/A	0	N/A	N/A	N/A	N/A
	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	1.36	1.00	1.15	1.15	1.15	1.36
	Site Condition subtotal		*12*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*11*	*11*	*13*	*33*	*38*	*20*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Condition Score		**/100**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**12**	**12**	**14**	**34**	**39**	**21**

Habitat Zone			BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG
Bioregion			GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP	GipP
EVC Number			151	55	55	55	55	55	55	55	55	53	53	53	125	53	125	125	125
Total area of Habitat Zone (ha)			0.668	0.034	0.008	0.011	0.004	0.042	0.022	0.024	0.008	2.625	0.801	1.640	0.027	0.008	0.032	0.020	0.056
Site Condition	Large Old Trees	/10	7	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	No. large trees in habitat zone		11	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Tree Canopy Cover	/5	3	0	0	0	0	0	0	0	0	3	3	3	N/A	0	N/A	N/A	N/A
	Lack of Weeds	/15	0	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0
	Understorey	/25	15	5	5	5	5	5	5	5	5	15	15	15	5	5	5	5	5
	Recruitment	/10	3	0	0	0	0	0	0	0	0	6	6	6	6	5	6	6	0
	Organic Matter	/5	2	3	3	3	3	3	3	3	3	5	5	5	5	3	5	5	2
	Logs	/5	2	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.15	1.15	1.36	1.15	1.36	1.36	1.36
	Site Condition subtotal		*32*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*12*	*38*	*38*	*38*	*27*	*20*	*22*	*22*	*10*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Condition Score		**/100**	**33**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**40**	**39**	**39**	**28**	**21**	**23**	**23**	**11**

Habitat Zone			CH	CI	CJ	CK	CL
Bioregion			GipP	GipP	GipP	GipP	GipP
EVC Number			125	55	55	53	53
Total area of Habitat Zone (ha)			0.854	0.014	0.005	0.702	0.171
Site Condition	Large Old Trees	/10	N/A	0	0	N/A	N/A
	No. large trees in habitat zone		N/A	0	0	N/A	N/A
	Tree Canopy Cover	/5	N/A	0	0	0	0
	Lack of Weeds	/15	0	4	4	7	4
	Understorey	/25	5	5	5	10	15
	Recruitment	/10	0	0	0	6	6
	Organic Matter	/5	2	3	3	5	4
	Logs	/5	N/A	0	0	N/A	N/A
	Site condition standardising multiplier*		1.36	1.00	1.00	1.15	1.15
	Site Condition subtotal		*10*	*12*	*12*	*32*	*33*
Landscape Context	Patch Size	/10	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	0
	Distance to Core	/5	0	0	0	0	0
Total Condition Score		**/100**	**11**	**13**	**13**	**33**	**34**

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

Appendix 3: 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)	Remove/ Retain	Notes
1	Eucalypt	*Eucalyptus sp.*	59	Small scattered tree	7.08	Retain	Dead
2	Narrow-leaf Peppermint	*Eucalyptus radiata*	22	Small scattered tree	2.64	Retain	N/A
3	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	Dead
4	Apple Box	*Eucalyptus bridgesiana*	62	Small scattered tree	7.44	Retain	N/A
5	Apple Box	*Eucalyptus bridgesiana*	48	Small scattered tree	5.76	Retain	N/A
6	Apple Box	*Eucalyptus bridgesiana*	57	Small scattered tree	6.84	Retain	N/A
7	Eucalypt	*Eucalyptus sp.*	52	Small scattered tree	6.24	Retain	Dead
8	Eucalypt	*Eucalyptus sp.*	81	Large scattered tree	9.72	Retain	Dead
9	Eucalypt	*Eucalyptus sp.*	83	Large scattered tree	9.96	Retain	Dead
10	Apple Box	*Eucalyptus bridgesiana*	<80cm	Small scattered tree	9.48	Retain	N/A
11	Apple Box	*Eucalyptus bridgesiana*	60	Small scattered tree	7.2	Retain	N/A
12	Apple Box	*Eucalyptus bridgesiana*	43	Small scattered tree	5.16	Retain	N/A
13	Apple Box	*Eucalyptus bridgesiana*	104	Large scattered tree	12.48	Retain	N/A
14	Narrow-leaf Peppermint	*Eucalyptus radiata*	33	Small scattered tree	3.96	Retain	N/A
15	Narrow-leaf Peppermint	*Eucalyptus radiata*	77	Small scattered tree	9.24	Retain	N/A
16	Narrow-leaf Peppermint	*Eucalyptus radiata*	86	Large scattered tree	10.32	Retain	N/A
17	Narrow-leaf Peppermint	*Eucalyptus radiata*	29	Small scattered tree	3.48	Retain	N/A

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Remove/ Retain	Notes
18	Manna Gum	*Eucalyptus viminalis*	66	Small scattered tree	7.92	Retain	N/A
19	Narrow-leaf Peppermint	*Eucalyptus radiata*	57	Small scattered tree	6.84	Retain	N/A
20	Manna Gum	*Eucalyptus viminalis*	39	Small scattered tree	4.68	Retain	N/A
21	Narrow-leaf Peppermint	*Eucalyptus radiata*	<80cm	Small scattered tree	9.48	Retain	N/A
22	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	N/A
23	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	N/A
24	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	N/A
25	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	N/A
26	Eucalypt	*Eucalyptus sp.*	<80cm	Small scattered tree	9.48	Retain	N/A
27	Apple Box	*Eucalyptus bridgesiana*	124	Large scattered tree	14.88	Remove	N/A
28	Eucalypt	*Eucalyptus sp.*	<70cm	Small scattered tree	8.28	Retain	N/A
29	Eucalypt	*Eucalyptus sp.*	>70cm	Large scattered tree	8.28	Retain	N/A
30	Eucalypt	*Eucalyptus sp.*	>70cm	Large scattered tree	8.28	Retain	N/A
31	Apple Box	*Eucalyptus bridgesiana*	122	Large scattered tree	14.64	Retain	N/A
32	Apple Box	*Eucalyptus bridgesiana*	76	Large tree in patch	9.12	Retain	N/A
33	Apple Box	*Eucalyptus bridgesiana*	127	Large tree in patch	15.24	Retain	N/A
34	Manna Gum	*Eucalyptus viminalis*	>70cm	Large tree in patch	8.28	Retain	N/A
35	Apple Box	*Eucalyptus bridgesiana*	>70cm	Large tree in patch	8.28	Retain	N/A
36	Manna Gum	*Eucalyptus viminalis*	70	Large tree in patch	8.4	Retain	N/A
37	Manna Gum	*Eucalyptus viminalis*	76	Large tree in patch	9.12	Retain	N/A

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)	Remove/ Retain	Notes
38	Manna Gum	*Eucalyptus viminalis*	75	Large tree in patch	9	Retain	N/A
39	Apple Box	*Eucalyptus bridgesiana*	108	Large tree in patch	12.96	Retain	N/A
40	Manna Gum	*Eucalyptus viminalis*	>70cm	Large tree in patch	8.28	Retain	N/A
41	Manna Gum	*Eucalyptus viminalis*	>70cm	Large tree in patch	8.28	Retain	N/A
42	Eucalypt	*Eucalyptus sp.*	>70cm	Large tree in patch	8.28	Retain	Dead
43	Eucalypt	*Eucalyptus sp.*	>70cm	Large tree in patch	8.28	Retain	Dead
44	Apple Box	*Eucalyptus bridgesiana*	>70cm	Large tree in patch	8.28	Retain	N/A
45	Apple Box	*Eucalyptus bridgesiana*	>70cm	Large tree in patch	8.28	Retain	N/A
46	Yellow Box	*Eucalyptus melliodora*	107	Large scattered tree	12.84	Remove	N/A
47	Manna Gum	*Eucalyptus viminalis*	103	Large scattered tree	12.36	Retain	N/A
48	Manna Gum	*Eucalyptus viminalis*	66	Small scattered tree	7.92	Retain	N/A
49	Manna Gum	*Eucalyptus viminalis*	38	Small scattered tree	4.56	Retain	N/A
50	Manna Gum	*Eucalyptus viminalis*	73	Small scattered tree	8.76	Retain	N/A
51	Eucalypt	*Eucalyptus sp.*	77	Small scattered tree	9.24	Retain	Dead
52	Manna Gum	*Eucalyptus viminalis*	112	Large scattered tree	13.44	Retain	Bee hive, hollows

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

Appendix 4: Flora species recorded in the study area

Origin	Common Name	Scientific Name	EPBC	FFG-T	FFG-P	CaLP Act
	Silver Wattle	*Acacia dealbata*				
	Sallow Wattle	*Acacia longifolia*			P	
	Black Wattle	*Acacia mearnsii*			P	
	Blackwood	*Acacia melanoxylon*				
	Prickly Moses	*Acacia verticillate*			P	
	Sheep's Burr	*Acaena echinata*				
	Bidgee-widgee	*Acaena novae-zelandiae*				
*	Sheep Sorrel	*Acetosella vulgaris*				
*	Agapanthus	*Agapanthus sp.*				
*	Brown-top Bent	*Agrostis capillaris*				
*	Sweet Vernal	*Anthoxanthum odoratum*				
*	Capeweed	*Arctotheca calendula*				
	Spear-grass (x2)	*Austrostipa spp.*				
	Duckweed	*Azolla sp.*				
*	Bluebell Creeper	*Billardiera heterophylla*				
*	Prairie Grass	*Bromus catharticus*				
*	Brome Grass	*Bromus sp.*				
	Tall Sedge	*Carex appressa*				
	Common Cassinia	*Cassinia aculeata*				
*	Common Centaury	*Centaurium erythraea*				
*	Spear Thistle	*Cirsium vulgare*				C
*	Pampas Grass	*Cortaderia selloana*				
*	Water Buttons	*Cotula coronopifolia*				
	Water Ribbon	*Cycnogeton procerum*				
*	Couch	*Cynodon dactylon var. dactylon*				
*	Drain Flat-sedge	*Cyperus eragrostis*				
*	Cocksfoot	*Dactylis glomerata*				
	Kidney-weed	*Dichondra repens*				
	Pale Sundew	*Drosera hookeri*				
*	Paterson's Curse	*Echium plantagineum*				C
*	Panic Veldt-grass	*Ehrharta erecta*				
	Common Spike-rush	*Eleocharis acuta*				
	Tall Spike-rush	*Eleocharis sphacelate*				
	Variable Willow-herb	*Epilobium billardiereanum*				
	Apple Box	*Eucalyptus bridgesiana*				
*	Cup Gum	*Eucalyptus cosmophylla*				
	Blue Gum	*Eucalyptus globulus*				

Origin	Common Name	Scientific Name	EPBC	FFG-T	FFG-P	CaLP Act
	Bog Gum	*Eucalyptus kitsoniana*				
	Yellow Box	*Eucalyptus melliodora*				
	Swamp Gum	*Eucalyptus ovata*				
	Narrow-leaf Peppermint	*Eucalyptus radiata*				
	Eucalypt	*Eucalyptus sp.*				
	Thatch Saw-sedge	*Gahnia radula*				
*	Cleavers	*Galium aparine*				
*	Flax-leaved Broom	*Genista linifolia*				
	Soft Crane's-bill	*Geranium potentilloides*				
	Common Raspwort	*Gonocarpus tetragynus*				
	Hop Goodenia	*Goodenia ovata*				
*	Yorkshire Fog	*Holcus lanatus*				
*	Barley	*Hordeum sp.*				
*	Flatweed	*Hypochaeris radicata*				
	Austral Rush	*Juncus australis*				
	Native Rush (x3)	*Juncus spp.*				
	Kunzea	*Kunzea sp.*				
*	Peppercress	*Lepidium sp.*				
	Pithy Sword-sedge	*Lepidosperma longitudinale*				
	Prickly Tea-tree	*Leptospermum continentale*				
*	Perennial Rye-grass	*Lolium perenne*				
	Wattle Mat-rush	*Lomandra filiformis*				
	Spiny-headed Mat-rush	*Lomandra longifolia*				
*	Pimpernel	*Lysimachia arvensis*				
	Lesser Loosestrife	*Lythrum hyssopifolia*				
	Swamp Paperbark	*Melaleuca ericifolia*				
	Weeping Grass	*Microlaena stipoides*				
	Snowy Daisy-bush	*Olearia lirata*				
*	African Daisy	*Osteospermum sp.*				
	Shade Wood-sorrel	*Oxalis exilis*				
*	Paspalum	*Paspalum dilatatum*				
*	Water Couch	*Paspalum distichum*				
*	Kikuyu	*Pennisetum clandestinum*				
	Knotweed	*Persicaria sp.*				
*	Toowoomba Canary-grass	*Phalaris aquatica*				
	Common Reed	*Phragmites australis*				
*	Red Inkweed	*Phytolacca octandra*				
*	Monterey Pine	*Pinus radiata*				
*	Buck's-horn Plantain	*Plantago coronopus*				

Origin	Common Name	Scientific Name	EPBC	FFG-T	FFG-P	CaLP Act
*	Ribwort	*Plantago lanceolata*				
*	Broadleaf Plantain	*Plantago major*				
*	Wireweed	*Polygonum erectum*				
	Small-fruit Pondweed	*Potamogeton cheesemanii*				
	Jersey Cudweed	*Pseudognaphalium luteoalbum*				
	Austral Bracken	*Pteridium esculentum*				
*	Onion Grass	*Romulea rosea*				
*	Sweet Briar	*Rosa rubiginosa*				C
*	Blackberry	*Rubus fruticosus spp. agg.*				C
*	Dock	*Rumex sp.*				
	Wallaby-grass	*Rytidosperma spp.*				
*	Willow	*Salix sp.*				
	Common Bog-sedge	*Schoenus apogon*				
	Jagged Fireweed	*Senecio biserratus*				
	Shrubby Fireweed	*Senecio minimus*				
	Fireweed	*Senecio sp.*				
*	Black Nightshade	*Solanum nigrum s.s.*				
*	Common Sow-thistle	*Sonchus oleraceus*				
*	Chickweed	*Stellaria media*				
*	Garden Dandelion	*Taraxacum officinale spp. agg.*				
	Kangaroo Grass	*Themeda triandra*				
*	Cumbungi	*Typha sp.*				
*	Common Vetch	*Vicia sativa*				
*	Bathurst Burr	*Xanthium spinosum*				C
*	Arum Lily	*Zantedeschia aethiopica*				

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 DEECA. DEECA is responsible for control of State Prohibited Weeds]; P = Regionally Prohibited Weeds [Landowners must eradicate regionally prohibited weeds]; C = Regionally Controlled Weeds [Landowners must prevent the growth and spread of Regionally controlled weeds]; R = Restricted Weeds [Trade in these weeds and propagules, either as plants, seeds or contaminants in other materials is prohibited]).

* = Introduced to Victoria

= Victorian native taxa occurring outside the natural range

Appendix 5: Fauna species recorded in the study area

Origin	Common Name	Scientific Name
	Birds	
	Australasian Pipit	*Anthus novaeseelandiae*
	Australian Magpie	*Cracticus tibicen*
	Australian Raven	*Corvus coronoides*
	Common Bronzewing	*Phaps chalcoptera*
*	Common Starling	*Sturnus vulgaris*
	Crested Pigeon	*Ocyphaps lophotes*
	Galah	*Eolophus roseicapilla*
	Magpie-lark	*Granilla cyanoleuca*
	Nankeen Kestrel	*Falco cenchroides*
	Pacific Black Duck	*Anas superciliosa*
	Purple Swamphen	*Porphyrio porphyrio*
	Stubble Quail	*Coturnix pectoralis*
	Welcome Swallow	*Hirundo neoxena*
	Willie Wagtail	*Rhipidura leucophrys*
	Mammals	
	Eastern Grey Kangaroo	*Macropus giganteus*
*	European Rabbit	*Oryctolagus cuniculus*
*	Red Fox	*Vulpes vulpes*
	Amphibians	
	Common Eastern Froglet	*Crinia signifera*
	Fish	
*	Mosquitofish	*Gambusia affinis*
	Invertebrates	
*	European Honey Bee	*Apis mellifera*
	Jumping Jack	*Myrmecia pilosula*

* = introduced to Victoria

Appendix 6: Photographs of native vegetation proposed for removal

All photographs were taken on 14th – 15th September 2022.

Photo 1: A representative patch of Swamp Scrub (EVC 53).

Photo 2: A representative patch of Plains Grassy Wetland (EVC 125).

Photo 3: Patch AQ – Plains Grassy Woodland (EVC 55).

Photo 4: Tree 27 – a large scattered Apple Box.

Photo 5: Tree 46 – a large scattered Yellow Box.

Photo 6: Possible Strzelecki Gum, adjacent to Firmins Lane.

Appendix 7: EVC benchmarks

Swamp Scrub (EVC 53_61) - Gippsland Plain

Plains Grassy Woodland (EVC 55) - Gippsland Plain

Plains Grassy Wetland (EVC 125) - Gippsland Plain

Plains Grassy Forest (EVC 151) - Gippsland Plain

Appendix 8: Native Vegetation Removal (NVR) report

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: **08/11/2023**
Time of issue: **11:53 am**

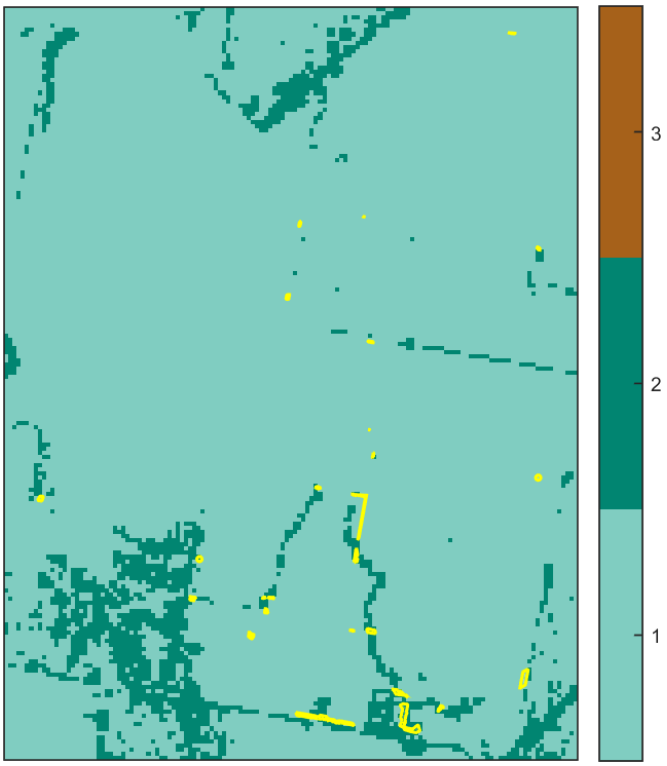
Report ID: NAA_2023_152

Project ID	22077_Hazelwood_Solar_removal_231013

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	2.342 ha
Extent of past removal	0.000 ha
Extent of proposed removal	2.342 ha
No. Large trees proposed to be removed	2
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]	0.780 general habitat units
Vicinity	West Gippsland Catchment Management Authority (CMA) or Latrobe City Council
Minimum strategic biodiversity value score[2]	0.381
Large trees	2 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-AM	Patch	gipp0053	Endangered	0	no	0.180	0.050	0.050	0.750		0.012	General
1-AN	Patch	gipp0053	Endangered	0	no	0.230	0.067	0.067	0.240		0.014	General
1-AO	Patch	gipp0055	Endangered	0	no	0.120	0.008	0.008	0.210		0.001	General
1-AS	Patch	gipp0055	Endangered	0	no	0.130	0.024	0.024	0.900		0.005	General
1-CF	Patch	gipp0125	Endangered	0	no	0.230	0.020	0.020	0.220		0.004	General
1-H	Patch	gipp0053	Endangered	0	no	0.210	0.011	0.011	0.220		0.002	General
1-AB	Patch	gipp0053	Endangered	0	no	0.210	0.021	0.021	0.400		0.005	General
1-AG	Patch	gipp0055	Endangered	0	no	0.150	0.000	0.000	0.260		0.000	General
1-BK	Patch	gipp0125	Endangered	0	no	0.120	0.010	0.010	0.260		0.001	General
1-AI	Patch	gipp0053	Endangered	0	no	0.140	0.011	0.011	0.244		0.001	General
1-BL	Patch	gipp0055	Endangered	0	no	0.120	0.134	0.134	0.260		0.015	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-BZ1	Patch	gipp0053	Endangered	0	no	0.400	0.014	0.014	0.259		0.005	General
1-BZ2	Patch	gipp0053	Endangered	0	no	0.400	0.102	0.102	0.230		0.038	General
1-AL1	Patch	gipp0053	Endangered	0	no	0.350	0.024	0.024	0.240		0.008	General
1-AL2	Patch	gipp0053	Endangered	0	no	0.350	0.019	0.019	0.240		0.006	General
1-AL3	Patch	gipp0053	Endangered	0	no	0.350	0.007	0.007	0.240		0.002	General
1-AL4	Patch	gipp0053	Endangered	0	no	0.350	0.038	0.038	0.240		0.012	General
1-AP	Patch	gipp0055	Endangered	0	no	0.120	0.002	0.002	0.240		0.000	General
1-CA	Patch	gipp0053	Endangered	0	no	0.390	0.065	0.065	0.252		0.024	General
1-AT	Patch	gipp0125	Endangered	0	no	0.110	0.064	0.064	0.413		0.008	General
1-CB	Patch	gipp0053	Endangered	0	no	0.390	0.096	0.096	0.900		0.053	General
1-CG	Patch	gipp0125	Endangered	0	no	0.110	0.001	0.001	0.230		0.000	General
1-AJ	Patch	gipp0125	Endangered	0	no	0.110	0.019	0.019	0.180		0.002	General
1-BP	Patch	gipp0125	Endangered	0	no	0.210	0.028	0.028	0.240		0.005	General
1-AQ	Patch	gipp0055	Endangered	0	no	0.320	0.275	0.275	0.421		0.094	General
1-BN	Patch	gipp0053	Endangered	0	no	0.340	0.588	0.588	0.831		0.275	General
1-AF	Patch	gipp0125	Endangered	0	no	0.280	0.046	0.046	0.160		0.011	General
1-27	Scattered Tree	gipp0055	Endangered	1	no	0.200	0.070	0.070	0.530		0.016	General
1-45	Scattered Tree	gipp0055	Endangered	1	no	0.200	0.070	0.070	0.180		0.012	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-CK	Patch	brid0053	Endangered	0	no	0.330	0.304	0.304	0.260		0.095	General
1-CL	Patch	brid0053	Endangered	0	no	0.340	0.151	0.151	0.351		0.052	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
Flinders Pygmy Perch	*Nannoperca sp. 1*	903041	Vulnerable	Dispersed	Habitat importance map	0.0006
Woolly Waterlily	*Philydrum lanuginosum*	502494	Vulnerable	Dispersed	Habitat importance map	0.0005
Grey Billy-buttons	*Craspedia canens*	504643	Endangered	Dispersed	Habitat importance map	0.0003
Veined Spear-grass	*Austrostipa rudis subsp. australis*	504940	Rare	Dispersed	Habitat importance map	0.0002
Green Scentbark	*Eucalyptus fulgens*	505175	Rare	Dispersed	Habitat importance map	0.0002
Spurred Helmet-orchid	*Corybas aconitiflorus*	500835	Rare	Dispersed	Habitat importance map	0.0002
Fringed Helmet-orchid	*Corybas fimbriatus*	500839	Rare	Dispersed	Habitat importance map	0.0001
Slender Pink-fingers	*Caladenia vulgaris*	504449	Rare	Dispersed	Habitat importance map	0.0001
Austral Moonwort	*Botrychium australe*	500445	Vulnerable	Dispersed	Habitat importance map	0.0001
Swamp Skink	*Lissolepis coventryi*	12407	Vulnerable	Dispersed	Habitat importance map	0.0001
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0001
Matted Flax-lily	*Dianella amoena*	505084	Endangered	Dispersed	Habitat importance map	0.0001
Thick-lip Spider-orchid	*Caladenia tessellata*	500547	Vulnerable	Dispersed	Habitat importance map	0.0001
Southern Toadlet	*Pseudophryne semimarmorata*	13125	Vulnerable	Dispersed	Habitat importance map	0.0001
Yarra Gum	*Eucalyptus yarraensis*	501326	Rare	Dispersed	Habitat importance map	0.0001
Purple Diuris	*Diuris punctata*	501084	Vulnerable	Dispersed	Habitat importance map	0.0001
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0001
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0001
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000

Martin's Toadlet	*Uperoleia martini*	13930	Critically endangered	Dispersed	Habitat importance map	0.0000
Australasian Bittern	*Botaurus poiciloptilus*	10197	Endangered	Dispersed	Habitat importance map	0.0000
Annual Fireweed	*Senecio glomeratus subsp. longifructus*	507144	Rare	Dispersed	Habitat importance map	0.0000
Silky Kidney-weed	*Dichondra sp. 1*	505786	Rare	Dispersed	Habitat importance map	0.0000
Cobra Greenhood	*Pterostylis grandiflora*	502798	Rare	Dispersed	Habitat importance map	0.0000
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	*Lachnagrostis punicea subsp. punicea*	504206	Rare	Dispersed	Habitat importance map	0.0000
Australian Little Bittern	*Ixobrychus dubius*	10195	Endangered	Dispersed	Habitat importance map	0.0000
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0000
Maroon Leek-orchid	*Prasophyllum frenchii*	502709	Endangered	Dispersed	Habitat importance map	0.0000
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
Fisch's Greenhood	*Pterostylis fischii*	502795	Rare	Dispersed	Habitat importance map	0.0000
Australasian Shoveler	*Anas rhynchotis*	10212	Vulnerable	Dispersed	Habitat importance map	0.0000
Dwarf Kerrawang	*Commersonia prostrata*	502965	Endangered	Dispersed	Habitat importance map	0.0000
Hardhead	*Aythya australis*	10215	Vulnerable	Dispersed	Habitat importance map	0.0000
Rough Blown-grass	*Lachnagrostis rudis subsp. rudis*	500159	Endangered	Dispersed	Habitat importance map	0.0000
Rough-grain Love-grass	*Eragrostis trachycarpa*	501197	Rare	Dispersed	Habitat importance map	0.0000
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0000
Lanky Buttons	*Leptorhynchos elongatus*	501941	Endangered	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0000
Common Pipewort	*Eriocaulon scariosum*	501218	Rare	Dispersed	Habitat importance map	0.0000
Masked Owl	*Tyto novaehollandiae novaehollandiae*	10250	Endangered	Dispersed	Habitat importance map	0.0000

New Holland Mouse	*Pseudomys novaehollandiae*	11455	Vulnerable	Dispersed	Habitat importance map	0.0000
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	10498	Vulnerable	Dispersed	Habitat importance map	0.0000
Powerful Owl	*Ninox strenua*	10248	Vulnerable	Dispersed	Habitat importance map	0.0000
Musk Duck	*Biziura lobata*	10217	Vulnerable	Dispersed	Habitat importance map	0.0000
Black Falcon	*Falco subniger*	10238	Vulnerable	Dispersed	Habitat importance map	0.0000
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*	505337	Vulnerable	Dispersed	Habitat importance map	0.0000
Golden Pomaderris	*Pomaderris aurea*	502651	Rare	Dispersed	Habitat importance map	0.0000
White-throated Needletail	*Hirundapus caudacutus*	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Lace Monitor	*Varanus varius*	12283	Endangered	Dispersed	Habitat importance map	0.0000
Prostrate Cone-bush	*Isopogon prostratus*	501791	Endangered	Dispersed	Habitat importance map	0.0000
Orange-tip Finger-orchid	*Caladenia aurantiaca*	500523	Rare	Dispersed	Habitat importance map	0.0000
Coast Grey-box	*Eucalyptus bosistoana*	501253	Rare	Dispersed	Habitat importance map	0.0000
Forest Bitter-cress	*Cardamine papillata*	505034	Vulnerable	Dispersed	Habitat importance map	0.0000
Dwarf Milkwort	*Polygala japonica*	502623	Vulnerable	Dispersed	Habitat importance map	0.0000
Slender Wire-lily	*Laxmannia gracilis*	501889	Rare	Dispersed	Habitat importance map	0.0000
Trailing Hop-bush	*Dodonaea procumbens*	501090	Vulnerable	Dispersed	Habitat importance map	0.0000
Growling Grass Frog	*Litoria raniformis*	13207	Endangered	Dispersed	Habitat importance map	0.0000

Habitat group

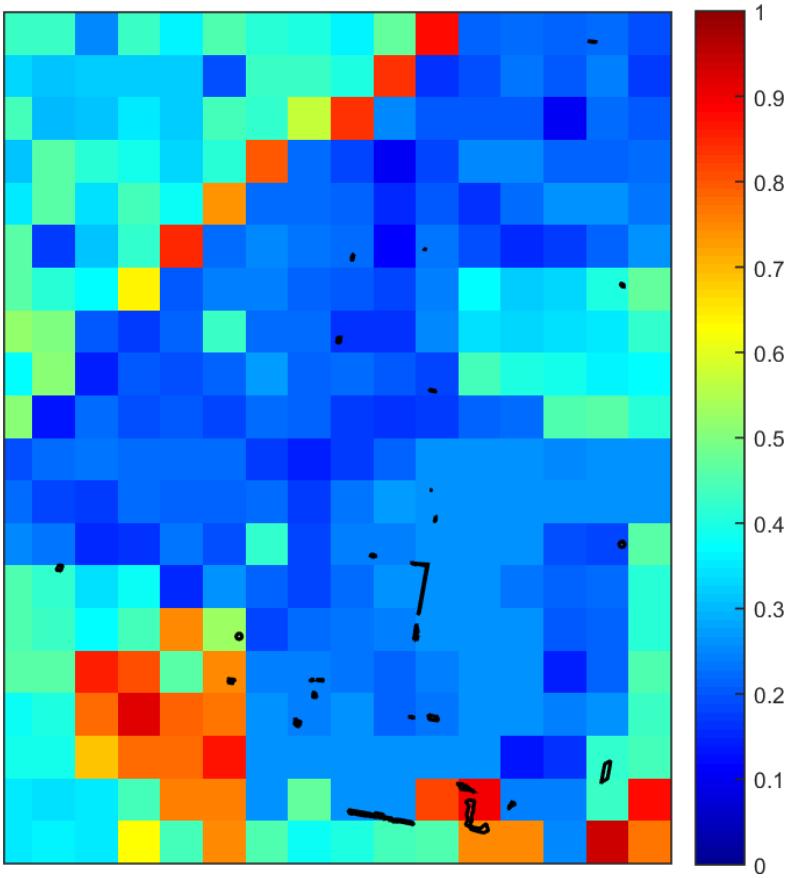
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

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 9: Evidence that native vegetation offset requirement is available