



## CHAPTER

### 08 Biodiversity and habitat



08

## 8 Biodiversity and habitat

This chapter provides an overview of the potential biodiversity and habitat impacts associated with the construction, operation and decommissioning of the Project. This chapter is based on **Technical Report A: Biodiversity Impact Assessment**.

The Project spans a range of biodiversity values, including protected vegetation and fauna (particularly listed threatened species and their habitat and listed ecological communities). Within the Project Area, some locations contain significant biodiversity values that are protected by state and commonwealth legislation. This chapter considers both terrestrial and aquatic (e.g. waterways and wetlands) ecology values and is relevant to two evaluation objectives discussed in Section 8.1.

The construction and operation of the Project may impact biodiversity and native species habitat within the Project Area through the removal of vegetation, and interaction with Project activities. As such, the avoidance of native vegetation has been an important design parameter for the Project from its inception and has informed the selection of the Proposed Route. It is also acknowledged that Aboriginal peoples have strong links to the land and the flora and fauna values contained within it. Accordingly, the consideration of culturally significant flora and fauna is discussed in **Chapter 9: Aboriginal cultural heritage**.



### Biodiversity values

Biodiversity values include native vegetation and associated habitats, threatened flora and fauna species, migratory species and threatened ecological communities (TECs). Investigations undertaken for the EES identified the type, distribution and condition of biodiversity values across the Project.

### 8.1 Evaluation objective

The scoping requirements identify the following evaluation objectives relevant to biodiversity and habitat:

#### Evaluation objectives

Avoid, and where avoidance is not possible, minimise potential adverse effects on protected native vegetation and animals (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements consistent with state and Commonwealth policies.

Maintain the functions and values of aquatic environments, surface water and groundwater quality and stream flows and prevent adverse effects on protected beneficial uses.

In response to these evaluation objectives, impacts of the Project on biodiversity and habitat were assessed and measures to avoid, minimise or manage potential impacts have been identified. These measures are discussed throughout this chapter and have informed the development of Environmental Performance Requirements (EPRs). EPRs set out the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning to avoid, minimise and manage identified impacts. Cumulative impacts associated with relevant future projects were also assessed.

Further information on how the Project has been designed to avoid and minimise impacts is provided in **Chapter 5: Project development** and **Chapter 6: Project description**.

Other aspects covered in the Environment Effects Statement (EES) evaluation objectives and relevant to biodiversity and habitat are addressed in the following EES chapters and supporting attachment:

- **Chapter 19: Noise and vibration**
- **Chapter 24: Groundwater**
- **Chapter 25: Surface water**
- **Chapter 27: Matters of National Environmental Significance**
- **Attachment VI: Offset Management Strategy.**

## 8.2 Method

This section summarises the method adopted in **Technical Report A: Biodiversity Impact Assessment**, which was informed by **Chapter 4: EES assessment framework and approach**. The key steps in assessing the impacts associated with biodiversity and habitat included:

- Defining a study area appropriate for biodiversity and habitat as presented in Figure 8.1. This included the Project Land, with a 10-km buffer. This area comprises approximately 500,000ha, which is considered sufficient to contextualise the biodiversity values present in the wider landscape.
- Reviewing applicable Commonwealth and Victorian legislation, and relevant local, state and national standards, guidelines and policies.
- Conducting a desktop review to characterise the landscape, and determine the existing biodiversity and habitat conditions including native vegetation, threatened ecological communities (TECs), and threatened flora and fauna previously recorded or modelled to occur within the study area, including:
  - Public web-based databases developed by the state and commonwealth government departments, government agencies, and scientific institutions, that model, map, and record the presence of biodiversity values. These included the Protected Matters Search Tool (PMST), Victorian Biodiversity Atlas (VBA), BirdLife Australia (BLA) Birddata Atlas, eBird data, NatureKit, National Atlas of Groundwater Dependent Ecosystem (GDEs) Atlas, GIS datasets sourced from the Victorian Government (Data.Vic), DEECA Habitat Distribution Models (HDM), DEECA Habitat Importance Models (HIM).
  - Publications released by local councils and Catchment Management Authorities (CMAs) located within the study area, related to the presence and management of biodiversity values.
  - Published targeted surveys, habitat assessments, and environmental reports relevant to the study area. Aerial photography, topographic maps and LiDAR.
  - A full list of the data sources and literature accessed are listed in Section 5.4 of **Technical Report A: Biodiversity Impact Assessment**.



### Threatened Ecological Communities

An ecological community is a naturally occurring group of native plants, animals, and other organisms that interact in a unique habitat.

TECs are ecological communities that have experienced significant reductions in their pre-colonisation extent and are therefore subject to conservation listing and protection under Commonwealth and/or State legislation. For this assessment, the term TEC has been used to refer to 'threatened ecological communities' listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act); or 'Listed Threatened Community' under the *Flora and Fauna Guarantee Act 1988* (Vic) (FFG Act), including both listed threatened flora communities and listed threatened fauna communities.

- Consulting with the relevant regulatory authorities and key stakeholders including local councils and CMAs, the Department of Energy, Environment and Climate Action (DEECA), the Department of Climate Change, Energy, the Environment and Water (DCCEEW), Pentland Hills Landcare Group (Myrniong Biolink Project), Friends of Werribee Gorge and Long Forest Mallee Inc., Parks Victoria, Southern Rural Water, and Victorian National Parks Association, and reviewing the pins dropped by community members onto the Project's Social Pinpoint online mapping tool, which identified locations, features and values of importance.
- Assessing the likelihood of occurrence for flora and fauna species in the Project Area, as defined by the criteria set out in Section 5.5 of **Technical Report A: Biodiversity Impact Assessment**. This included the threatened species and communities listed in the EES scoping requirements, as well as those identified in the desktop review as having records or potentially occurring within the study area. This considered the results of all field investigations and species with a low or higher likelihood of occurrence in the Project Area were considered in the impact assessment.
- Conducting field surveys and targeted surveys for the relevant biodiversity values. This chapter uses the results of these investigations from between 2019 and August 2024 where there was a determined need via the desktop assessment and where land access was available. Surveys consisted of:
  - Preliminary field assessments to guide further surveys and assess the likelihood of threatened species' presence. This involved a rapid evaluation of native vegetation and habitat quality without entering private property.
  - General field surveys focused on areas identified as potentially containing biodiversity values. It included four components: Vegetation Quality Assessment (VQA), TEC assessment, threatened species habitat assessment and general fauna survey. These assessments determined the need for further targeted surveys.
  - Potential habitat was identified and targeted flora and fauna surveys conducted for selected species with a likelihood of occurrence above "low". Where access was available, surveys were undertaken during appropriate (seasonal) times and in accordance with relevant survey guidelines. For some fauna groups, targeted surveys were not undertaken due to the presence of extensive existing records or due to their highly mobile nature, and in which case it was assumed potential habitat would be utilised. Locations where threatened flora has been recorded are shown in Appendix I and the locations of targeted fauna surveys are detailed in Appendix J and Appendix K of **Technical Report A: Biodiversity Impact Assessment**.
  - The field surveys undertaken for the Project focused on land within the Project Area identified as potentially containing biodiversity values, allowing the existing conditions to be further characterised. No field surveys were required for 16 per cent of the land parcels (and nine per cent of the area) within the Project Area, as these were identified as not supporting biodiversity values (e.g., due to cropping and other land uses). Of the remaining area intended to be investigated, some land parcels were unable to be investigated or were partially investigated due to land access restrictions. Where access was limited, habitat and native vegetation mapping was undertaken using available information (e.g., desktop sources). In total, 76 per cent of the Project Area identified as requiring field survey has had all field survey completed. Where access was limited, habitat and native vegetation mapping was undertaken using available information (e.g. desktop sources).
  - Ecological surveys of areas restricted by access limitations are still to be completed, and are being undertaken on an ongoing basis as access issues are resolved. For the purpose of this assessment, a conservative approach has been taken, with the use of desktop information, including modelled data to map the extent of native vegetation and assuming the potential presence of native vegetation, TECs and threatened species habitat where surveys have not yet been undertaken.
- Conducting a risk screening process to identify the key issues during construction, operation and decommissioning for investigation within the technical report.

- Developing an Integrated Native Vegetation model, based on modelled and field mapped native vegetation, to assess the area of native vegetation required to be partially or completely removed. This Integrated Native Vegetation assessment used modelled data for parcels where surveys have not been undertaken or were only partially completed due to access issues.
- Reviewing the risk of bird and bat collision with the transmission line and towers. This included a review of available literature and databases and additional desktop investigation for species of concern.
- Identifying and assessing the potential impacts on biodiversity values potentially present within the Project Area, including listed TEC, flora and fauna and their habitat, native vegetation, and key landscape values including conservation areas and established linkage corridors, during construction, operation and decommissioning. The impacts to TECs and national and state threatened flora and fauna (EPBC Act and FFG Act) were evaluated according to the following ratings, in relation to the extent, magnitude and duration of the impacts:
  - Low: Generally the impact is so small it is considered negligible or not noticeable / measurable.
  - Low – moderate: Some impact may occur and may affect some individuals or an area of TEC but would probably not result in meaningful or demographic change with regard to a population, or a significant portion of a TEC, and for EPBC Act listed species / TEC is unlikely to be a significant impact.
  - Moderate: Impact potentially meaningful at the population level (e.g., may result in loss of genetic diversity, or a significant proportion of a population / TEC), and for EPBC Act listed species / TEC may be a significant impact.
  - High: Likely to influence the demographics of a population and / or, for EPBC Act listed species / TEC likely to have a significant impact.
- Identifying relevant future projects that could lead to cumulative impacts when considered together with the Project (refer to **Chapter 4: EES assessment framework and approach** for the full cumulative impact assessment method).
- Developing EPRs in response to the impact assessment to define the required environmental outcomes that the Project must achieve through the implementation of mitigation measures during construction, operation and decommissioning. Measures to reduce the potential impacts were proposed in accordance with the mitigation hierarchy (avoid, minimise, manage, rehabilitate and offset) and have informed the development of EPRs.
- Following the application of mitigation measures that would comply with the EPRs, determining residual impacts associated with the construction, operation and decommissioning of the Project, and evaluating their significance.
- Developing an Offset Management Strategy which describes the approach on how the Project will offset impacts to protected flora and fauna which are unavoidable, in accordance with the EPBC Act Environmental Offsets Policy and Victorian Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017a).



#### **'Listed' flora, fauna and TECs**

Certain floral species, faunal species, and TECs are 'listed' in the *FFG Act 1988 (Vic)* and / or the *EPBC Act 1999 (Cth)*. These species are officially recognised for their conservation significance and are awarded legal protection.

#### **Significant impact**

'Significant impact' is a defined term under the EPBC Act. The framework for determining whether an action will result in a significant impact on EPBC Act listed threatened species or ecological communities is set out in the *Matters of National Environmental Significance - Significant impact assessment guidelines 1.1* (DoE, 2013).



### Scales of assessment and impact

Biodiversity values are not confined to specific locations as fauna and migratory species move through the natural environment. As such, spatial relationships impact biodiversity across the broader landscape.

This chapter discusses biodiversity values across a range of scales to inform existing conditions and define surveys requirements and to define impacts for the Project, including:

**Biodiversity and habitat study area:** This included the Project Land, with a 10-km buffer applied (approximately 500,000ha). The study area has been used for the existing conditions assessment to provide a comprehensive overview of the biodiversity values in proximity to the Project.

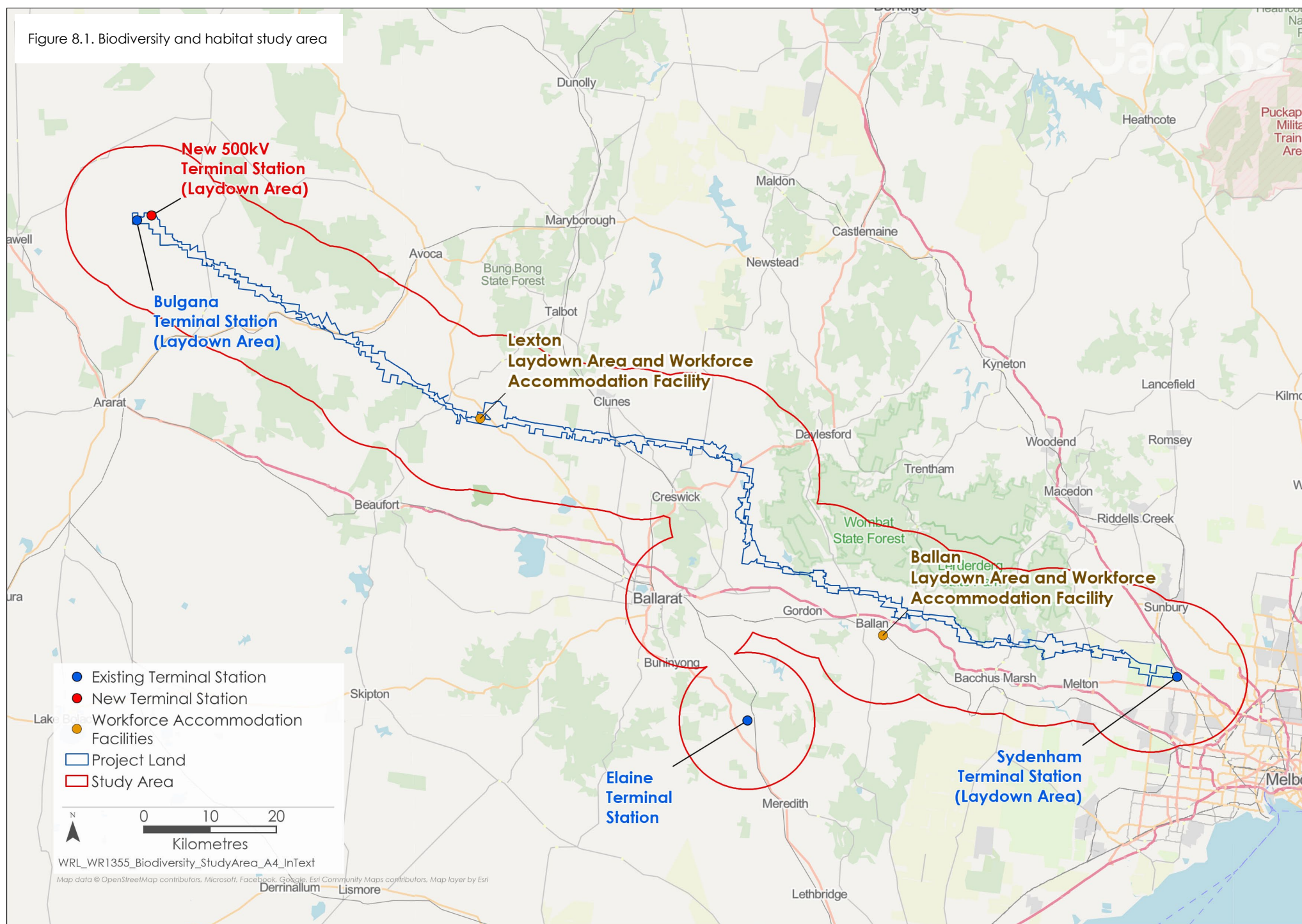
**Project Land:** The Project Land (approximately 21,200ha) encompasses all land parcels that could be used for the purpose of temporary Project construction and permanent operational components based on the Proposed Route. The Project Land defines the minimum area for which existing conditions are considered in the technical reports, which provides adequate coverage to allow for any potential changes generally in accordance with the proposed draft Planning Scheme Amendment.

**Project Area:** The Project Area (approximately 2,200ha) is contained within the Project Land and relates to the area that would be required to construct and / or operate the Project based on the specific footprint of infrastructure and works for the Project design. The Project Area is used in the biodiversity impact assessment to evaluate the likely impact on ecological values, encompassing all areas that would be used to support the construction and operational components of the Project.

**Construction Footprint:** The Construction Footprint is indicative, contained within the Project Area and encompasses the land required to facilitate construction of the Project, including the vegetation removal needed to achieve the operational safety clearance zone for the transmission line. Components included in the Construction Footprint, such as access tracks, indicative stringing pads, and tower assembly areas, are shown in the **EES Attachment VI: Map Book**. The Construction Footprint is used to calculate the clearing required to construct the Project.



Figure 8.1. Biodiversity and habitat study area



## 8.3 Existing conditions

This section summarises the existing conditions for biodiversity and habitat according to the following themes:

- Conservation reserves and biolinks
- Native vegetation
- TECs
- Threatened flora
- Noxious weeds
- Threatened fauna
- Listed migratory species
- Waterways and wetlands.

The Project traverses a range of environments from Bulgana in the west through to Sydenham in the east. On a regional scale, four Victorian bioregions occur within the study area: Wimmera (Wim); Goldfields (Gold); Central Victorian Uplands (CVU); Victorian Volcanic Plain (VVP). Each of these have distinct biodiversity values, landscapes, and conservation status for native vegetation types.

Where possible, the existing conditions focus on the biodiversity values within and nearby to the Project Area, which was the focus for field surveys. However, values identified in the wider 10 km buffer study area have also been considered, taking into account fauna movement and the importance of adjacent habitat.



### Bioregions

Bioregions are mapped areas with similar geology and climate. These provide a basis for understanding the distribution of vegetation, habitats, and specific flora and fauna species.

### 8.3.1 Conservation reserves and biolinks

Conservation reserves are protected areas designated for conservation and the protection of specific biodiversity and landscape features. These reserves often contain large intact expanses of native vegetation and associated habitat and can provide important 'biolinks', connecting different habitats across the landscape. This connectivity supports biodiversity by enabling species to disperse, migrate, and adapt to changes, including those caused by climate change.

The study area contains 22 conservation reserves managed by Parks Victoria and local councils which consist of historic and scenic reserves, streamside and water frontage reserves, and land reserved for water supply protection. Of these, three conservation reserves are intersected by, or located directly adjacent to, the Project, including:

- Lexton H5 Bushland Reserve, of which approximately 3ha of this reserve occur within the Project Area
- Bullarook Creek Streamside Reserve, of which approximately 3ha of this reserve occur within the Project Area
- Mount Steiglitz Scenic Reserve, which is not within the Project Area but is located adjacent to the Project and is wholly within Project Land.

Other current or proposed conservation reserves located within the study area, but not impacted by the Project, include:

- Banchory Grove Grassland Nature Conservation Reserve
- Ben Major State Forest
- Ben More Bushland Reserve
- Bolwarrah Flora Reserve
- Creswick Regional Park
- Glendhu Historic and Cultural Features Reserve
- Joel Joel Nature Conservation Reserve
- Lerderderg State Park
- Lexton H6 Bushland Reserve
- Long Forest Nature Conservation Reserve



- Melton Gilgai Woodland Nature Conservation Reserve
- Mount Beckworth Scenic Reserve
- Organ Pipes National Park
- Sandy Creek / Elmhurst Streamside Reserve
- Tourello Streamside Reserve
- Werribee Gorge State Park
- Wombat State Forest
- Yangardook Bushland Reserve.

The location of conservation reserves within the study area is shown in Appendix M of **Technical Report A: Biodiversity Impact Assessment**.

### 8.3.2 Native vegetation

Native vegetation within the study area varies in both quality and extent, ranging from areas of isolated degraded grasslands to largely intact high quality forest expanses. In Victoria, native vegetation communities are defined and managed as Ecological Vegetation Classes (EVCs). These are assigned a Bioregional Conservation Status (BCS) depending on the extent of their loss within each of Victoria's bioregions.

Most of the native vegetation modelled to occur by DEECA comprises small and fragmented patches. However, some more connected, linear patches of native vegetation are modelled to occur along waterways and within road corridors. Conservation reserves and areas of steeper terrain were also shown to support larger contiguous areas of native vegetation. Approximately 76,301ha of native vegetation, classified as EVC, is modelled to occur within the study area, accounting for approximately 15 per cent of the total area. This included 45 different EVCs, with BCS ranging from 'least concern' to 'endangered', as detailed in Appendix L of **Technical Report A: Biodiversity Impact Assessment**.

The type and extent of patches of native vegetation throughout the Project Area was determined using an Integrated Native Vegetation assessment approach, which incorporated both DEECA modelled data and field survey data. For land parcels where field surveys have not been undertaken due to access issues, or only partially completed, an Integrated Native Vegetation assessment approach has been developed (see Section 5.12.2 of **Technical Report A: Biodiversity Impact Assessment**) using DEECA modelled data, aerial imagery and LiDAR data to provide an estimate of the potential extent of the native vegetation in these areas. The results of this assessment are presented in Table 8.1, detailing the field-verified information (confirmed extent) and others using modelled data (potential extent).

Significant patches of identified EVCs within the Project Area included a large area of contiguous native vegetation, mostly Grassy Dry Forest EVC (Figure 8.2), between Lexton and Shays Flat, and an area of Plains Grassland EVC (Figure 8.3) near Merrimu Reservoir, which included areas of EPBC Act and *Flora and Fauna Guarantee Act 1988* (Vic) (FFG) Act listed threatened grassland communities.



#### Ecological Vegetation Classes

A classification system for native vegetation communities used in Victoria, in which a native vegetation community is classified based on a combination of its floristics, lifeforms and their ecological characteristics. EVCs are used to manage and conserve biodiversity.

#### Bioregional Conservation Status (BCS)

A measure of the current extent and quality of each EVC, when compared to its original (pre-1750) area and condition, to reflect the 'threatened' conservation status of the EVC within the bioregion. An EVC's BCS may be stated as Presumed Extinct (PEX), Endangered (E), Vulnerable (V), Depleted (D), Rare (R) or Least Concern (LC).



Figure 8.2. Representative photos of Grassy Dry Forest EVC within the Project Area



Figure 8.3. Representative photos of Plains Grassland EVC within the Project Area

The quality of native vegetation within the Project Area was assessed and recorded during field surveys. The quality was determined through field survey where access was possible and modelled condition scores were applied where field survey did not occur (as per the Integrated native vegetation assessment layer). Vegetation quality can be influenced by several factors related to land use history and current management. The average vegetation quality score of native vegetation patches was 0.39 (out of 1), indicating a generally low quality of native vegetation.

Table 8.1. Native vegetation extent within the Project Area (Integrated Native Vegetation assessment)

EVC #	EVC name	Modelled potential extent (ha)	Confirmed field mapped extent (ha)	Total extent (ha)
18	Riparian Forest	1.68	2.83	4.51
20	Heathy Dry Forest	0	2.66	2.66
21	Shrubby Dry Forest	0.50	9.50	10
22	Grassy Dry Forest	4.96	80.95	85.91
23	Herb-rich Foothill Forest	16.06	32.55	48.61
47	Valley Grassy Forest	5.44	4.43	9.87
53	Swamp Scrub	1.22	0	1.22
55	Plains Grassy Woodland	10.74	6.15	16.89
56	Floodplain Riparian Woodland	0	0.19	0.19
61	Box Ironbark Forest	0	1.81	1.81
64	Rocky Chenopod Woodland	8.50	3.50	12
67	Alluvial Terraces Herb-rich Woodland	0.86	21.70	22.56
68	Creekline Grassy Woodland	2.34	17.77	20.11
70	Hillcrest Herb-rich Woodland	0	0.36	0.36
76	Grassy Woodland / Alluvial Terraces Herb-rich Woodland Mosaic	4.91	0	4.91
83	Swampy Riparian Woodland	1.25	0.62	1.87
125	Plains Grassy Wetland	0	8.20	8.2
132_61	Plains Grassland – Heavier-soils	2.34	54.57	56.37

EVC #	EVC name	Modelled potential extent (ha)	Confirmed field mapped extent (ha)	Total extent (ha)
152	Alluvial Terraces Herb-rich Woodland / Plains Grassy Woodland Complex	0.28	0	0.28
164	Creekline Herb-rich Woodland	2.48	0	2.48
175	Grassy Woodland	24.42	71.18	95.6
198	Sedgy Riparian Woodland	0.35	0.14	0.49
641	Riparian Woodland	0	0.13	0.13
653	Aquatic Herbland	0	0.25	0.25
693	Plains Woodland / Plains Grassland Mosaic	4.44	0	4.44
803	Plains Woodland	0.14	1.29	1.43
851	Stream Bank Shrubland	1.02	0.95	1.97
NA	DEECA Wetland	10.90	0	10.9
<b>Total</b>		<b>104.81</b>	<b>321.13</b>	<b>425.94</b>

Field surveys recorded 229 scattered indigenous trees in the Project Area, and an additional 62 trees were mapped within the Project Area using aerial photography for areas not yet surveyed. Scattered trees are crucial biodiversity features in modified agricultural landscapes, providing a range of habitat-related biodiversity values. Commonly recorded *Eucalyptus* species include River Red Gum (*Eucalyptus camaldulensis*), Yellow Gum (*E. leucoxylon*), Red Box (*E. polyanthemos*), Yellow Box (*E. melliodora*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), and non-eucalypt species Buloke (*Allocasuarina luehmannii*).

There were 1,112 large canopy trees identified within patches recorded throughout the Project Area during field surveys and an additional 116 estimated to occur within patches in areas yet to be surveyed.

### 8.3.3 Threatened ecological communities

The scoping requirements for the Project outlined five EPBC Act listed TECs requiring assessment in the EES and the protected matters search tool (PMST) search identified two additional EPBC Act listed TECs with a modelled occurrence within the study area (Table 8.2). Of the seven EPBC Act listed TECs assessed, two were recorded within the Project Area during the targeted field assessment as shown Figure 8.4 and Figure 8.5. The location and extent of communities is shown in Figure 8.6.



Figure 8.4. Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia, example from the Darley area



Figure 8.5. High-quality example of EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain recorded in the vicinity of Kingston Road Stock Route.

Six FFG Act listed threatened flora communities are considered relevant to the study area based on DEECA modelling of both FFG Act listed threatened flora communities and equivalent EVCs. An additional two FFG Act listed fauna communities are also present in the study area and not associated with vegetation communities. All eight communities were assessed for likelihood of occurrence with the Project Area based on results of both desktop analysis and field assessment as summarised in Table 8.3. Of the eight FFG Act listed threatened communities assessed, four were confirmed present in the Project Area during field surveys. The location and extent of communities is shown in Figure 8.7.

TECs with a low-moderate or above likelihood within the Project Area were subject to further assessment to determine the Project's potential impact. Each TEC was assigned a potential impact rating and those with a low-moderate or above potential impact were again assessed to determine residual impacts (Section 8.6.2) and relevant offset obligations.

Table 8.2 EPBC Act listed threatened ecological communities relevant to the Project: known and potential likelihood of occurrence

Community	EPBC Act Listing	Description	Modelled occurrence within the study area	Likelihood of occurrence within the Project Area
<b>Grassy Eucalypt Woodland of the Victorian Volcanic Plain</b>	CR	Temperate grassy eucalypt woodlands specifically associated with the Victorian Volcanic Plain bioregion.	Modelling suggests that this TEC is most likely to occur in the western extent of the VVP bioregion, around Clunes and Creswick.	<b>Low.</b> This TEC was recorded in the south-eastern part of the study area in the vicinity of Exford, south of the Werribee River, and well outside the Project Area. Low likelihood of occurrence within unsurveyed areas of the Project Area, with 10.20ha of EVC equivalents (potential extent) occurring in these areas.
<b>Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia</b>	EN	Woodland to open forest dominated by Grey Box over a sparse shrub layer and diverse but sparse ground cover and includes 'derived grasslands' that have resulted from the loss of the characteristic tree layer but retain an intact ground layer.	Modelling suggests that this TEC most likely occurs within the eastern area of the CVU bioregion, to the north of Bacchus Marsh, and that it may also occur to around Elmhurst. Known populations exist in the Long Forest Nature Conservation Reserve and surrounding area.	<b>Present.</b> 12.48ha has been recorded within the Project Area. This TEC makes up a large proportion of the remaining native vegetation within the Project Area between the Lerderderg River in the west and Djerrivarrh Creek in the east. Low likelihood of occurrence within unsurveyed areas of the Project Area, with 15.96ha of EVC equivalents (potential extent) occurring in these areas.
<b>Mallee Bird Community of the Murray Darling Depression Bioregion</b>	EN	A type of fauna community found in the Murray Darling Depression bioregion. It is an assemblage of bird species that are dependent on the mallee vegetation that characterises this bioregion.	None	<b>N/A.</b> The Project Area is outside the natural range for this TEC.
<b>Natural Grassland of the Murray Valley Plains</b>	CR	A native grassland community specifically associated with the Murray Valley Plain, including the Murray Fans, Victorian Riverina and Robinvale Plains.	This TEC is partially associated with the Wimmera bioregion of the Murray Darling Depression, which occurs along the Wimmera River in the westernmost part of the study area.	<b>N/A.</b> The Project Area is outside the natural range for this TEC.
<b>Natural Temperate Grassland of the Victorian Volcanic Plain</b>	CR	A native grassland community specifically associated with the Victorian Volcanic Plain bioregion.	Modelled occurrence tends to occur in small, scattered patches. The TEC is known from some of the high-quality remnants under conservation management.	<b>Present.</b> 38.05ha recorded in Project Area comprising 16 patches, 14 located between Merrimu and Melton and two along Kingston Road in Allendale. Low likelihood of occurrence within unsurveyed areas of the Project Area, with 2.33ha of EVC equivalents (potential extent) occurring in these areas.



Community	EPBC Act Listing	Description	Modelled occurrence within the study area	Likelihood of occurrence within the Project Area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	CR	Temporary freshwater herbaceous wetlands that are inundated on a seasonal basis occurring on the lowland plains of south-eastern Australia.	Desktop mapping based on modelled EVC equivalents suggests scattered occurrence within the study area.	<b>Low.</b> Targeted field surveys did not identify this TEC. Low likelihood of occurrence within unsurveyed areas of the Project Area, with no EVC equivalents (potential extent) occurring in these areas.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CR	Woodland dominated (or was formerly dominated) by a range of eucalypts, most commonly including White Box ( <i>Eucalyptus albens</i> ), Yellow Box and / or Blakely's Red Gum ( <i>E. blakelyi</i> ); and also includes 'derived grasslands' that have resulted from the loss of the characteristic tree layer but retain an intact ground layer.	This TEC may occur in the western extent of the study area where it is more than likely to be retained in roadside areas and other locations not subject to significant grazing.	<b>High.</b> Likely occurrence within western extent of the Project Area however none recorded to date. There is 173ha of EVC equivalent modelled to occur in the Project Area, of this 145ha has been surveyed and does not contain the TEC and there is 28ha remaining to be surveyed. Desktop information and preliminary survey indicate some of these areas are likely to support the TEC although most will not. As such the occurrence of the TEC within the Project Area is expected to be much less than the modelled EVC equivalents given the limited extent of Yellow Box dominated vegetation and the generally poor condition of understorey vegetation present within similar field-mapped vegetation.

EN/en = Endangered, CR/cr = Critically Endangered, VU/vu = Vulnerable

Table 8.3 FFG Act listed threatened ecological communities relevant to the Project: known and potential likelihood of occurrence

Community	Description	Modelled occurrence within the study area	Likelihood of occurrence within the Project Area
<b>Creekline Grassy Woodland (Goldfields) Community</b>	Characterised by River Red Gum over a range of grasses and sedges that fringe waterways within the Goldfields Bioregion.	1,192ha is modelled to occur within the study area based on EVC equivalents, the majority occurring in the Goldfields bioregion (1,167ha) and the remainder in adjacent areas of the Wimmera bioregion (25ha).	Present. Eight patches (9.69ha) are known to occur in the Project Area, recorded on several vegetated waterways in the Crowlands / Glenlofty areas of the Goldfields bioregion. High likelihood of occurrence within unsurveyed areas of the Project Area, with 1.75ha of EVC equivalents (potential extent) occurring in these areas.
<b>Grey Box – Buloke Grassy Woodland Community</b>	Woodland dominated by Grey Box with a Buloke sub-dominant canopy / lower stratum with a ground layer of primarily grasses and herbs. Occurs on flat or very gently undulating plains in northern and central Victoria and tends to develop in the absence of fire on sites with relatively fertile soils.	514ha is modelled to occur within study area by DEECA, of which only 0.3ha is modelled to occur within the Project Land, all in the Goldfields bioregion and all associated with modelled EVC 55.	High. Field surveys did not identify this TEC. High likelihood of occurrence within unsurveyed areas of the Project Area, with 9.87ha of EVC equivalents (potential extent) occurring in these areas.
<b>Lowland riverine Fish Community of the Southern Murray-Darling Basin</b>	Fish community occurring in the lowland reaches and associated floodplains of the Murray, Darling and Murrumbidgee rivers and their tributaries within the States of Victoria, New South Wales and South Australia.	2.6ha is modelled to occur within the study area, all within the Wimmera bioregion and all associated with EVC 132.	Low. Field surveys did not identify this TEC. While the geographical boundary of the community is not well documented it is thought to be further to the north of the Project Area. Low likelihood of occurrence within unsurveyed areas of the Project Area.
<b>Northern Plains Grassland</b>	Open grassland community restricted to the naturally treeless plains of northern Victoria, dominated by largely perennial tussocky grasses and an occasional, sparse occurrence of trees or large shrubs.	2.6ha is modelled to occur within the study area, all within the Wimmera bioregion and all associated with EVC 132.	Low. Field surveys did not identify this TEC. The Project Area is outside the documented distribution of this TEC and this community is not modelled to occur within the Project Area. Low likelihood of occurrence within unsurveyed areas of the Project Area.
<b>Rocky Chenopod Open Scrub Community</b>	Characterised as a low, open scrub community with a shrubby understorey growing on exposed sites with skeletal soils.	963ha is modelled to within the study area, the majority within the CVU bioregion (924ha) and the remainder in the VVP bioregion (39ha).	Present. Four patches (4.23ha) are known to occur in the Project Area. Three patches south of Lerderderg State Park; and one east of Merrimu Reservoir. Moderate likelihood of occurrence within unsurveyed areas of the Project Area, with 26.83ha of EVC equivalents (potential extent) occurring in these areas.
<b>Western (Basalt) Plains Grasslands Community</b>	Open grassland community mainly found on undisturbed clay soils on the basalt plains of western Victoria.	6,148ha is modelled to occur within the study area, the majority in the VVP bioregion (6,116ha) and associated with EVC 132 (6,146ha), and the remainder in adjacent areas of the CVU bioregion or associated with Plains Grassland / Plains Grassy Woodland Mosaic.	Present. Twenty three patches (54.57ha) known to occur in the Project Area. Eighteen patches are recorded on the Melfon Plain and five patches on the volcanic plain portion west of Merrimu Reservoir. High likelihood of occurrence within unsurveyed areas of the Project Area, with 2.33ha of EVC equivalents (potential extent) occurring in these areas.

Community	Description	Modelled occurrence within the study area	Likelihood of occurrence within the Project Area
<b>Western Basalt Plains (River Red-gum) Grassy Woodland Community</b>	Temperate grassy eucalypt woodlands specifically associated with the basalt plains of western Victoria.	14,255ha is modelled to occur within the study area, all within the VVP bioregion. The majority is associated with modelled EVC 55 and the remainder EVC 68.	Moderate. Field surveys did not identify this TEC. Moderate likelihood of occurrence within unsurveyed areas of the Project Area, with 10.02ha of EVC equivalents (potential extent) occurring in these areas.
<b>Victorian Temperate Woodland Bird Community</b>	Defined by a suite of 24 bird species mainly associated with drier woodlands on the slopes and plains of the Great Dividing Range that have experienced significant declines in numbers.	A well-known assemblage of bird species associated with dry woodland relatively common in the study area west of Long Forest.	Present. There are 80.28ha of suitable dry woodland is known to occur in the Project Area. Given the extensive presence of the indicator bird species for this community in the Project Area, it is thought all of this habitat will be utilised by members of the community. Moderate likelihood of occurrence within unsurveyed areas of the Project Area, with 21.20ha of EVC equivalents (potential extent) occurring in these areas.



Figure 8.6 EPBC Act listed threatened ecological communities within the Project Area

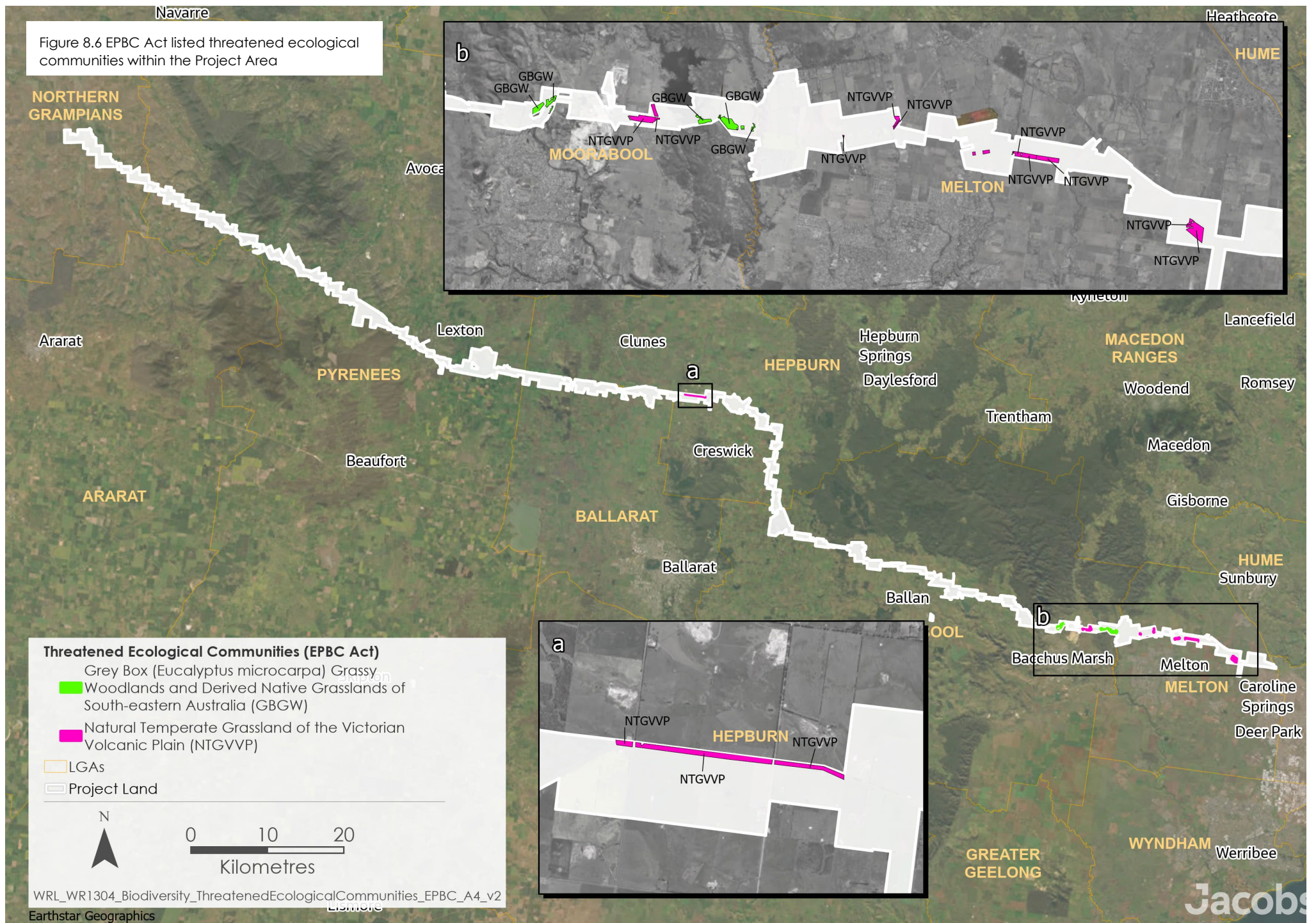
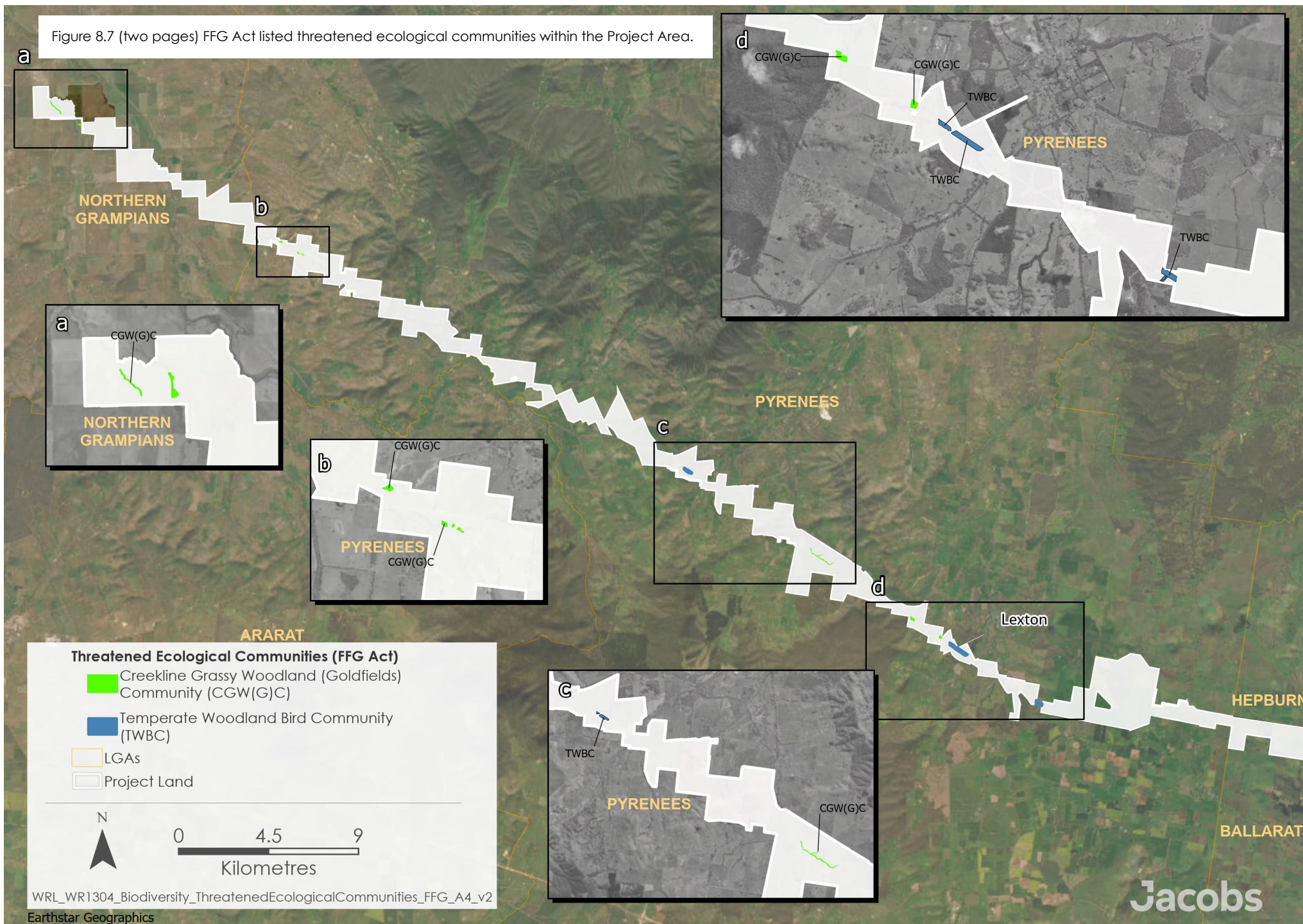




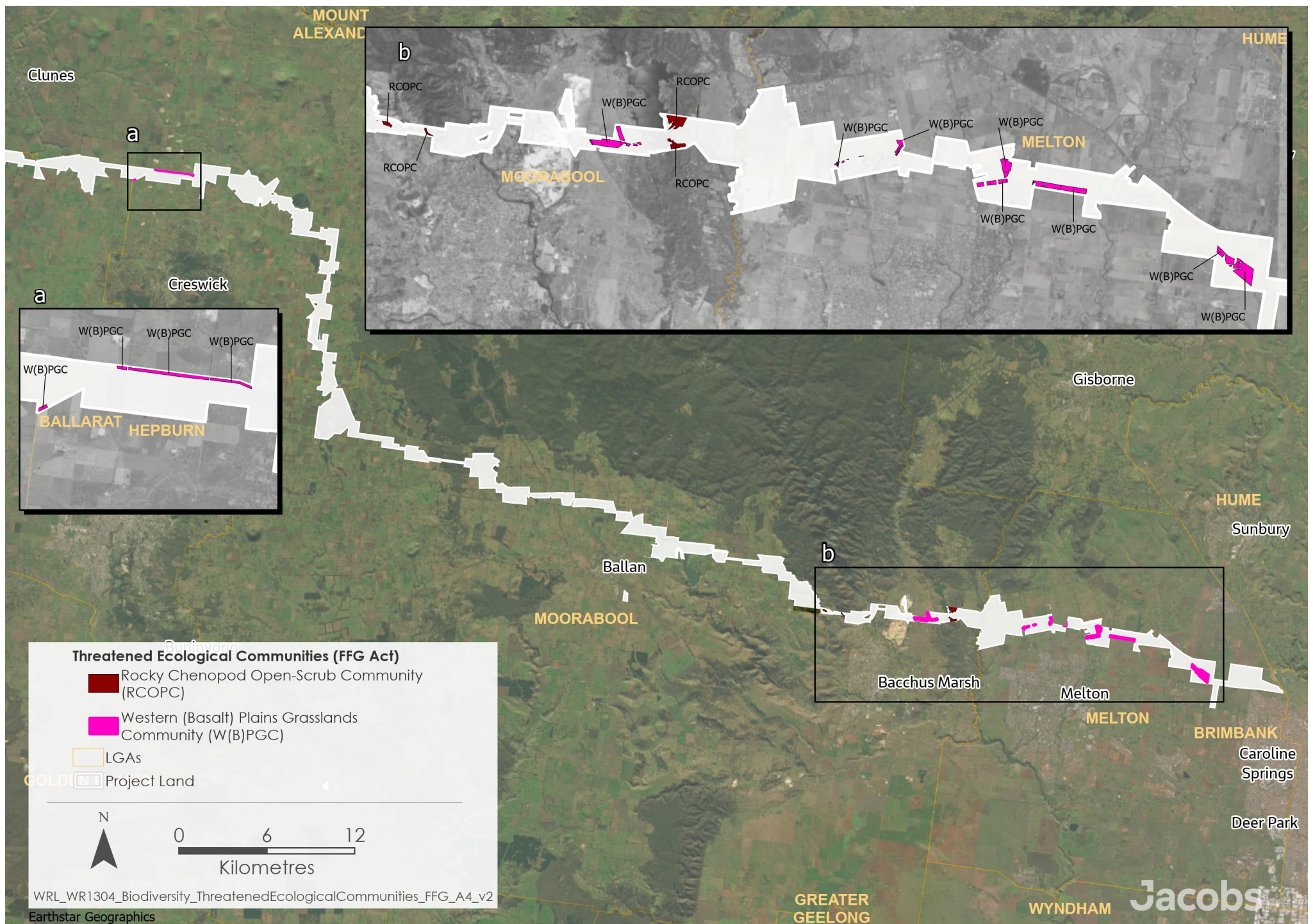
Figure 8.7 (two pages) FFG Act listed threatened ecological communities within the Project Area.



WRL\_WR1304\_Biodiversity\_ThreatenedEcologicalCommunities\_FFG\_A4\_v2

Earthstar Geographics





#### 8.3.4 Threatened flora

A likelihood of occurrence assessment of all threatened flora species previously recorded in the study area in the VBA or identified as having potential habitat in the study area by the PMST is provided in Appendix F of **Technical Report A: Biodiversity Impact Assessment**. Species specifically listed in the EES scoping requirements were also included in this assessment. Species were initially assessed for their likelihood of occurrence in the Project Land and subsequently assessed for their likelihood of occurrence within the Project Area. There are 49 threatened flora species and four species specified within the EES scoping requirements assessed as having low-moderate or above likelihood of occurrence within the Project Land.

Species with a low-moderate or above likelihood of occurrence within the Project Area (or specified within the EES scoping requirements) were subject to further assessment to determine the Project's potential impact and are listed in Table 8.4. Each species was assigned a potential impact rating, and those with a low-moderate or above potential impact were further assessed to determine residual impacts and offset obligations as relevant as discussed in Section 8.11.

Table 8.4 Threatened flora with a low-moderate or above likelihood of occurrence within the Project Area or specified in the EES scoping requirements.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in the Project Area
<i>Acacia aspera</i> subsp. <i>parviceps</i> (Rough Wattle)	-	en	Low-Moderate. Some areas of highly disturbed and modified habitat are present.
<i>Acacia deanei</i> subsp. <i>paucijuga</i> (Deane's Wattle)	-	vu	Low-Moderate. Species has not been recorded within the Project Area, but some highly disturbed and modified habitat remains.
<i>Acacia nanodealbata</i> (Dwarf Silver-wattle)	-	vu	Low-Moderate. Species has not been recorded within the Project Area, but some highly disturbed and modified habitat remains.
<sup>A</sup> <i>Acacia rostriformis</i> (Bacchus Marsh Wattle)	-	vu	Present. Recorded in areas of native vegetation from Lerderderg State Park through to Long Forest Nature Conservation Reserve. 1285 individuals recorded during field survey. It is likely that additional plants will be recorded in non-surveyed locations in this area, as evidenced from aerial imagery and field survey of adjacent properties.
<i>Allocasuarina luehmannii</i> (Buloke)	-	cr	Present. 25 individuals recorded at two localities at each end (western and eastern) of the Project Area. Present in the far western portion of the Project Area in the west of the Glenlofty Range and on the Melton Plane, east of McPherson Park. It is likely that additional plants will be recorded in non-surveyed locations, particularly in the vicinity of Bulgana Terminal Station, as evidenced from aerial imagery and field survey of adjacent properties.
<i>Austrostipa breviglumis</i> (Cane Spear-grass)	-	en	High. A single population of approximately 30 individuals located in woodland to the immediate south of Lerderderg State Park, growing within Shrubby Dry Forest within the Project Land, but outside the Project Area. The population covers approximately 8 x 8m and is situated immediately south of the Project. Some potential remains for species to be present within inaccessible rocky areas of the Project Area.
<i>Austrostipa exilis</i> (Heath Spear-grass)	-	vu	Low-Moderate. Some suitable habitat present; but the Project avoids Long Forest environs.
<i>Bossiaea cordigera</i> (Wiry Bossiaea)	-	en	Low-Moderate. Numerous records throughout Creswick Regional Park, across Wombat State Forest and Lerderderg State Park; however, field surveys have not recorded the species.
<i>Bossiaea wombata</i> (Wombat Bossiaea)	-	cr	Low-Moderate. Potential habitat present within areas of open forest of reasonable condition adjoining the Wombat State Forest. However, species has not been recorded.
<i>Calotis lappulacea</i> (Yellow Burr-daisy)	-	vu	Low-Moderate. Species not recorded within open woodland habitat surveyed, including potential woodland on the western edge of the Melton Plain through to Lerderderg State Park.
<i>Chloris ventricosa</i> (Plump Windmill Grass)	-	en	Low-Moderate. May be present as part of the winter saturated soil area of the Melton Plain, however species very rare and not recorded in winter wet grassland habitat within Project Area.
<i>Comesperma polygaloides</i> (Small Milkwort)	-	cr	Low-Moderate. Potential occurrence in areas of grassland, native (unimproved) pasture and woodland areas between Lexton and Creswick and in the east of the Project Land, However, habitat that remains within the Project Area is disturbed and the species has not been recorded.



Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in the Project Area
<i>Coronidium gunnianum</i> (Pale Swamp Everlasting)	-	cr	Low-Moderate. Species recorded adjacent to Project Area in a roadside grassland patch adjoining McCorkell Road, Toolern Vale. However, no individuals are recorded within the Project Area and remaining potential habitat has been largely modified.
<i>Cullen parvum</i> (Small Scurf-pea)	-	en	Low-Moderate. Species not recorded within potential grassland habitat on private property during surveys, however, the species is cryptic.
<i>Cullen tenax</i> (Tough Scurf-pea)	-	en	Low-Moderate. Species not recorded within potential grassland habitat on private property during surveys; however, the species is cryptic.
<sup>^</sup> <i>Dianella amoena</i> (Matted Flax-lily)	EN	cr	Moderate. The species has not been recorded within the Project Area and there are no VBA records for the species within the Project Area. Potential habitat may occur in some of the roadside grassland / grassy woodland present, particularly between Lexton - Newlyn (volcanic plain north of Creswick) and east from Bolwarrah, specifically Lexton Bushland Reserve and adjoining areas.
<i>Dianella longifolia</i> var. <i>grandis</i> s.l. (Glaucous Flax-lily)	-	cr	Present. One individual recorded within the Project Area during field surveys, along Sandy Creek, immediately north-east of Elmhurst. It is possible additional plants will be recorded in non-surveyed locations, given its broad distribution and ability to persist in relatively degraded habitats.
<i>Dianella tarda</i> (Late-flower Flax-lily)	-	cr	Low-Moderate. Recent record in the Lexton vicinity however has not been recorded during field surveys.
<i>Dipodium pardalinum</i> (Spotted Hyacinth-orchid)	-	en	Moderate. Species not recorded; in Project Area however, some limited areas of potentially suitable habitat may occur in unsurveyed locations, notably in the Bolwarrah area.
<i>Discaria pubescens</i> (Australian Anchor Plant)	-	cr	Low-Moderate. Species not recorded however limited highly disturbed and modified potential habitat may remain in proximity to waterways and wetlands between Lexton in the west and Ballan in the east.
<sup>^</sup> <i>Diuris basaltica</i> (Small Golden Moth Orchid)	EN	cr	Low-Moderate. Species not recorded in Project Area to date and is considered unlikely to occur given the highly degraded nature of native grassland present.
<i>Diuris behrii</i> (Golden Cowslips)	-	en	Low-Moderate. Species not recorded within Project Area. Project Area only supports limited area of grassy woodland present with intact understorey / ground cover.
<i>Eucalyptus baueriana</i> subsp. <i>thalassina</i> (Werribee Blue-box)	-	en	Low-Moderate. Species known from areas near the Project Land however not recorded within the Project Area during field surveys.
<i>Eucalyptus brookeriana</i> (Brooker's Gum)	-	en	Present. 208 individuals recorded in areas of native vegetation in the western flank of Haydens Hill to the south of Wombat State Forest. Additional plants may be present within non-surveyed locations, particularly in the vicinity of known populations.
<i>Eucalyptus ignorabilis</i> s.s. (Grey Scentbark)	-	vu	Moderate. Species is likely more common than the records suggest; however, not recorded within the Project Area during field surveys.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in the Project Area
<i>Eucalyptus leucoxylon</i> subsp. <i>connata</i> (Melbourne Yellow-gum)	-	en	Present. 3073 individuals recorded in areas of native vegetation from Lerderderg State Park through to Djerriwarrh Creek. Dominates canopy south of Lerderderg State Park and common east of Merrimu Reservoir. Additional plants may be present within non-surveyed locations, though the number of additional plants is expected to be low (in comparison to the large numbers recorded in other locations).
<i>Eucalyptus yarraensis</i> (Yarra Gum)	-	cr	Present. 95 individuals recorded within the Project Area during field surveys. Recorded east of the Haydens Hill area within the roadside vegetation and adjoining southern paddock at the intersection of Callaghans Lane and McHugh Road (Gordon). A cluster of scattered individuals was also located on Long Swamp Road (Newlyn) and further west, east of Newlyn Reservoir along Newlyn Reservoir Road. Additional plants may be present within non-surveyed locations, particularly in the vicinity of known populations.
<i>Geranium solanderi</i> var. <i>solanderi</i> s.s. (Austral Crane's-bill)	-	en	Low-Moderate. Not recorded during surveys, limited remaining potential habitat is low quality and subject to disturbance.
<i>Goodia medicaginea</i> (Western Golden-tip)	-	en	Low-Moderate. May occur in bushland areas between Long Forest and Lerderderg but not recorded during field surveys.
<i>Grevillea dryophylla</i> (Goldfields Grevillea)	-	en	Low-Moderate. DEECA habitat distribution modelling identifies habitat to the west of Lexton. However, species not recorded during field survey.
<i>Grevillea repens</i> (Creeping Grevillea)	-	en	Low-Moderate. Species may occur in small, isolated remnants in the area of Wombat State Forest through to Creswick Regional Park but not recorded during field surveys.
<sup>^</sup> <i>Lachnagrostis adamsonii</i> (Adamson's Blown-grass)	EN	en	Low. While the species has not been previously recorded within the Project Area, there are small areas of habitat that could support the species. Small areas considered to contain saline depressions occur to the north-east of Melton and Allendale areas but with limited extent in Project Area.
<sup>^</sup> <i>Lepidium hyssopifolium</i> s.s. (Basalt Peppergrass)	EN	en	Low-Moderate. Most of the potential habitat near Moorabool Reservoir in areas not subject to cultivation, were assessed and species not recorded and no other known records nearby the Project.
<sup>^</sup> <i>Leucochrysum albicans</i> subsp. <i>tricolor</i> (Hoary (White) Sunray)	EN	en	Low. Species not recorded during field survey. Species considered unlikely to occur, based on accepted range and the distribution of limited existing records within the wider vicinity of the study area, more common to the south-west. Suitable habitat very limited due to condition of grassland habitat recorded.
<i>Leucopogon microphyllus</i> var. <i>pilibundus</i> (Hairy Beard-heath)	-	en	Low-Moderate. Species known from the Lerderderg Gorge and adjoining areas however not recorded within the Project Area during field survey. Habitat, i.e. rocky slopes are not present within the Project Area.
<i>Nicotiana suaveolens</i> (Austral Tobacco)	-	en	Present. 263 individuals recorded in areas of native vegetation to the south of Lerderderg State Park. There is a low-moderate likelihood that additional plants may be present within non-surveyed locations, particularly in the vicinity of Lerderderg State Forest.



Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in the Project Area
<i>Olearia minor</i> (Satin Daisy-bush)	-	en	Low-Moderate. Areas with some potential for occurrence in the vicinity of Lerderderg State Park largely surveyed, conspicuous species not located.
<i>Pimelea hewardiana</i> (Forked Rice-flower)	-	en	Moderate. Existing records largely confined to the Long Forest Nature Conservation Reserve, where it is known from rocky sites. Species not recorded during field surveys.
<sup>^</sup> <i>Pimelea spinescens</i> subsp. <i>spinescens</i> (Spiny Rice-flower)	CR	cr	Low-Moderate. Limited habitat within the Project Area, and no recent records within the Project Area or Project Land and the species was not recorded during field surveys. There is limited potential that it otherwise occurs in unsurveyed habitat, as desktop evidence indicates these are likely poor in quality.
<i>Podolepis linearifolia</i> (Basalt Podolepis)	-	en	Low-Moderate. Grassland habitat remaining within the Project Area is mostly of low quality and subject to a range of land management practices / conditions considered key threatening processes for the species. The species was not recorded during field survey and the degraded condition of native grassland where present indicates they are unlikely to support the species.
<sup>^</sup> <i>Prasophyllum validum</i> (Sturdy Leek-orchid)	VU	en	Low. Not recorded within Project Area. This species is considered unlikely to persist on private property subject to moderate grazing or pasture improvement but may persist in managed roadside remnants.
<i>Pseudanthus orbicularis</i> (Tangled Pseudanthus)	-	vu	Low-Moderate. Areas with some potential for occurrence in the vicinity of Lerderderg State Park however surveys have not recorded this conspicuous species.
<sup>^</sup> <i>Pterostylis truncata</i> (Brittle Greenhood)	-	cr	Present. Approximately 2775 individuals Recorded during field survey, immediately west of Merrimu Reservoir. There is a low-moderate likelihood that additional plants may be present within non-surveyed locations, particularly in the vicinity of Lerderderg State Forest.
<i>Pultenaea reflexifolia</i> (Wombat Bush-pea)	-	vu	Low-Moderate. Potential to occur in bushland areas associated with Lerderderg State Park and Wombat State Forest however species not recorded during field survey.
<i>Rhagodia parabolica</i> (Fragrant Saltbush)	-	vu	Present. Approximately 13,198 individuals recorded in areas of native vegetation from Lerderderg State Park through to Long Forest Nature Conservation Reserve. Additional plants are likely to be present within non-surveyed locations, though the overall number is expected to be relatively low based on interrogation of aerial photography and 'over the fence' assessment of non-surveyed properties.
<i>Roepera billardiarei</i> (Coast Twin-leaf)	-	en	Low-Moderate. Some limited records on the edge of the range. However, the Project Area is outside expected distribution for the species and the species has not been recorded during field surveys.
<sup>^</sup> <i>Rutidosia leptorhynchoides</i> (Button Wrinklewort)	EN	en	Low-Moderate. Most potential habitat has been surveyed and the species has not been recorded. Limited remaining potential habitat is generally poor in quality.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in the Project Area
<b><i>Senecio campylocarpus</i> (Floodplain Fireweed)</b>	-	en	Low-Moderate. A rare species with restricted habitat with the Project Area. The species has not been recorded within the Project Area.
<b><i>Senecio cunninghamii</i> var. <i>cunninghamii</i> (Branching Groundsel)</b>	-	en	Low-Moderate. The species may persist in some of the roadside conservation areas where livestock has been excluded and biomass reduction management undertaken but is considered largely absent from the private property investigated. However, the species has not been recorded during field surveys.
<b><sup>^</sup><i>Senecio macrocarpus</i> (Large-fruit Groundsel)</b>	VU	cr	Low. Presence likely precluded by grazing pressure across much of its range covered by the Project Area as it is described as highly palatable to livestock (Sinclair, 2010). The species has been lost from much of its historical range where grazing occurs. The species was not observed and is considered unlikely to be present based on the site conditions and land management practices observed.
<b><sup>^</sup><i>Senecio psilocarpus</i> (Swamp Fireweed)</b>	VU	-	Moderate. Surveys in the limited potential habitat in Project Area did not detect the species although one individual was recorded on Project Land at Masons Swamp (DEECA Wetland 55625) within a grassy wetland area, immediately adjacent to the Project Area. Other nearby unsurveyed areas may support the species, although available evidence indicates this is lower quality habitat than surveyed areas.
<b><i>Tripogonella loliiformis</i> (Rye Beetle-grass)</b>	-	en	Low-Moderate. Limited suitable stoney rise habitat present within the Project Area. Other relevant grassland areas unlikely to support the species due to land management issues. Species not recorded during field assessment.
<b><i>Westringia glabra</i> (Violet Westringia)</b>	-	en	Moderate. May occur in areas immediately south of Lerderderg State Park where complete survey coverage of areas considered to provide some habitat potential has not been achieved.

<sup>^</sup> Taxa required for assessment as part of EES scoping requirements

EN/en = Endangered, CR/cr = Critically Endangered, VU/vu = Vulnerable

### 8.3.5 Noxious weeds

Noxious weed species, as listed under the *Victorian Catchment and Land Protection Act 1994*, are common in disturbed and modified areas. In some cases, they are invasive into areas of native vegetation, particularly areas of high human disturbance near townships, along roadsides and on highly cultivated land. Forty-eight species of noxious weeds have been recorded in the study area (refer to Section 6.7.3 of **Technical Report A: Biodiversity Impact Assessment**).

Many noxious weed species have been allocated based on their impact on agriculture. However, there are other exotic species that present an equal or greater threat to biodiversity that are not listed as noxious. These include Spanish Heath (*\*Erica lusitanica*) and Atlantic Ivy (*\*Hedera hibernica*) that are present in the study area and expanding in extent (White et al., 2018). It is also important to consider that other species are emerging as problematic in the region; Spiny Broome (*\*Calicotome spinosa*) is reported as one weed establishing in the Blampied area and Broad Kernel Espartillo (*\*Amelichloa caudata*) is establishing in the Creswick – Clunes area.

### 8.3.6 Threatened fauna

A likelihood of occurrence assessment (within the Project Area) of all threatened fauna species previously recorded in the study area in the VBA, BLA Birddata Atlas, or identified as having potential habitat in the study area by the PMST is provided in Appendix F of **Technical Report A: Biodiversity Impact Assessment**. Species specifically listed in the EES scoping requirements were also included in this assessment.

Species were initially assessed for their likelihood of occurrence in the Project Land and subsequently assessed for their likelihood of occurrence within the Project Area. Table 8.5 lists the 40 threatened fauna species assessed as having a likelihood of occurrence of low-moderate or above within the Project Area. It also includes seven species specified within the EES scoping requirements that were determined as having a low likelihood of occurrence.

Species with a low-moderate or above likelihood within the Project Area (or specified within the EES scoping requirements) were subject to further assessment to determine the Project's potential impact. Each species was assigned a potential impact rating and those with an above low-moderate or above potential impact were again assessed further to determine residual impacts (Section 8.10 and offset obligations, as relevant). Results of targeted field survey of threatened fauna are provided in Appendix J and K of **Technical Report A: Biodiversity Impact Assessment**.

Table 8.5 Threatened fauna with a low-moderate or above likelihood of occurrence within the Project Area or specified in the EES scoping requirements.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in Project Area
<b>Amphibians</b>			
<i>*Litoria raniformis</i> (Growling Grass Frog)	VU	vu	High. Potential aquatic and riparian habitat was identified for Growling Grass Frog within and nearby the Project Area, scattered between west of Lexton to east of Melton.
<i>Pseudophryne bibronii</i> (Brown Toadlet)	-	en	Present. The species was recorded in densely vegetated gullies within the Bolwarrah bushland area in and around the Lexton Bushland Reserve. All other areas of potential habitat assessed during targeted survey did not record the species and are thought to be unlikely to support the species. However, species habitat is difficult to confirm without property access so there remains the possibility small areas of habitat may have been overlooked on inaccessible parcels. Roadside surveys of these areas did not identify any further areas of potential habitat.
<b>Birds</b>			
<i>*Anthochaera phrygia</i> (Regent Honeyeater)	CR	cr	Low. Species unlikely to occur in the Project Area based on accepted ranged and habitat present. Habitat distribution modelling includes woodlands in the western extent of the Project Area, however, due to the limited extent of native vegetation remaining within that area, the species is considered to have a low likelihood of occurrence.
<i>*Botaurus poiciloptilus</i> (Australasian Bittern)	EN	cr	Low. Not known in the Project Area or immediate surrounds. Records and DEECA distribution mapping show a clear preference for coastal wetlands (particularly Port Phillip and Western Port Ramsar sites, and the lower reaches of connected waterways). The species is also known from wetlands and rice fields of the mid-Murray
<i>*Grantiella picta</i> (Painted Honeyeater)	VU	vu	Moderate. Some individuals of the species are likely to seasonally forage through relevant habitat within the Project Area, but are not thought to breed in, or make significant use of the habitat.
<i>*Hirundapus caudacutus</i> (White-throated Needle-tail)	VU	vu	High. The species may regularly overfly the Project Area along with much of the state.
<i>*Lathamus discolor</i> (Swift Parrot)	CR	cr	Known. The local migration route generally follows regularly visited stopping points up through the Brisbane Ranges and Long Forest, which may change to the east or west depending on rainfall in any given year and the flowering response of the various flowering eucalypt species relied on during their travels. Areas of important feed trees (Melbourne Yellow-gum and Grey Box) occur in high concentrations in some areas of the Project Area.
<i>*Pedionomus torquatus</i> (Plains-wanderer)	CR	cr	Low. The species is considered locally extinct. None of the grassland habitat within the Project Area was thought suitable for the species.
<i>*Rostratula australis</i> (Australian Painted-snipe)	EN	cr	Low. Preferred habitat of shallow freshwater wetlands and areas of exposed mud and dense fringing vegetation is limited or completely lacking in the Project Area.
<i>Accipiter novaehollandiae</i> (Grey Goshawk)	-	en	Moderate. Species may range into Project Area during drought events but is generally associated with more arid areas.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in Project Area
<i>Anseranas semipalmata</i> (Magpie Goose)	-	vu	Moderate. While only limited records for the species exist in the study area, along the Lerderderg River to the south of the Project Land, it is noted that a sizeable flocking event was observed by ornithologists at Balliang (south of the Project Land) in 2020. The species may make use of flooded areas during seasonal floods.
<i>Antigone rubicunda</i> (Brolga)	-	en	Moderate. The Project Area is outside the main Brolga utilisation area. Individuals have been observed in the study area, however, these observations are generally in areas not generally considered important habitat, such as stubble fields. There is likely some movement corridors through the central portion of the study area, with individuals dispersing through the area to habitat to the north. The species otherwise tends to have localised movement patterns.
<i>Ardea alba modesta</i> (Eastern Great Egret)	-	vu	Moderate. The species may make use of areas of habitat in the Project Area, particularly permanent water sources. It is likely that the species may traverse throughout the Project Area.
<i>Biziura lobata</i> (Musk Duck)	-	vu	Present. Five individuals observed opportunistically on Moorabool Reservoir. Species is likely to traverse the study area and make particular use of any permanent, deep water wetlands.
<i>Callocephalon fimbriatum</i> (Gang-gang Cockatoo)	EN	en	Present. 11 individuals observed opportunistically in the vicinity of Lerderderg State Park, Long Forest Nature Conservation Reserve and on the Melton Plain. Also recorded on a SongMeter south of Wombat State Forest. Multiple records (>50) within the study area, including recent records. The species is considered likely to make opportunistic use of the suitable forest and woodland habitat scattered throughout the Project Area.
<i>Climacteris picumnus</i> (Brown Treecreeper)	VU	-	Present. Observed opportunistically across several forested areas, including at Long Forest, Lerderderg and north of Lexton. The species is considered likely to make use of the suitable forest and woodland habitat scattered throughout the Project Area.
<i>Falco subniger</i> (Black Falcon)	-	cr	Moderate. While there are limited records for the species within Project Land, given its highly mobile nature it is likely that it may traverse the Project Area. Foraging may occur in most rural areas and breeding may take place in old large old trees.
<i>Gallinago hardwickii</i> (Latham's Snipe)	VU		High - Species recorded during field assessment west of Bolwarrah, outside of the Project Area. The species is likely to utilise wetlands with suitable fringing and emergent aquatic vegetation across the eastern extent of the study area.
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	-	en	Moderate. The species is known from Merrimu Reservoir. No breeding sites were located in proximity to the Project Area.
<i>Hieraaetus morphnoides</i> (Little Eagle)	-	vu	Present. Two individuals observed in the vicinity of Lerderderg State Park and Long Forest Nature Conservation Reserve (potentially the same individual). The species may traverse much of the Project Area particularly in areas of open woodland.
<i>Lophoictinia isura</i> (Square-tailed Kite)	-	vu	Moderate. Given the highly mobile nature of the species it is likely to traverse the Project Area. Foraging may occur in rural areas and breeding generally occurs on treed water courses.



Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in Project Area
<i>Melanodryas cucullata</i> (Hooded Robin)	EN	vu	Moderate. The species is occasionally observed near Long Forest area and tends to occur far more frequently across the northern slopes of the Great Divide.
<i>Neophema chrysostoma</i> (Blue-winged Parrot)	VU	-	Known. The third-party observation and the additional VBA records around the Project Area suggest species may temporarily seek refuge around forested areas nearby the Project Area, however these areas are considered marginal habitat that may temporarily support species migrating through.
<i>Ninox connivens</i> (Barking Owl)	-	cr	Moderate. Targeted survey has not recorded the species. The species may make use of habitat around the Long Forest area but is unlikely to utilise habitat elsewhere in the Project Area.
<i>Ninox strenua</i> (Powerful Owl)	-	vu	Present. One individual –recorded during call play-back survey in areas of native vegetation around Haydens Hill to the south of Wombat State Forest. Though not recorded in other areas of potential habitat, due to the cryptic and mobile nature of the species it is possible that it may make use the suitable forest habitat scattered throughout the Project Area.
<i>Oxyura australis</i> (Blue-billed Duck)	-	vu	High - Species is likely to traverse the study area and make particular use of any permanent, deep-water wetlands.
<i>Pyrrholaemus sagittatus</i> (Speckled Warbler)	-	en	High. The species is likely to make use of open woodland areas, particularly around Lerderderg and Lexton.
<i>Stagonopleura guttata</i> (Diamond Firetail)	VU	vu	Present. Four individuals recorded in the Long Forest area, south of the Project Area, and may also be present in the Lerderderg environs. There is a large number of previous records within the study area and suitable habitat present in several of the forested areas of the Project Land, particularly around Long Forest.
<i>Stictonetta naevosa</i> (Freckled Duck)		vu	Moderate. The species may fly over the Project Area to reach areas of suitable habitat i.e. freshwater lakes and well-vegetated marshes, but it considered unlikely to make significant use of the Project Area.
<i>Tyto novaehollandiae</i> (Masked Owl)	-	cr	Moderate. Targeted survey has not recorded the species. The species has not been recorded in the last 20+ years within the study area. The species may make use of forest habitat around the Lerderderg State Forest (Wombat Forest) area but is unlikely to utilise habitat elsewhere in the Project Area.
<b>Invertebrates</b>			
<i>*Synemon plana</i> (Golden Sun Moth)	VU	vu	Present. Recorded at seven sites during opportunistic surveys, west of Lexton in areas of unimproved pasture. Potential habitat has been identified throughout the Project Area where field survey has not been undertaken due to land access issues.
<i>Engaeus merosetosus</i> (Western Burrowing Crayfish)	-	en	Present. Chimney recorded west of Haydens Hill in Masons Swamp and Wilsons Reservoir, as well as likely occurrence in similar riparian / floodplain areas on yet to be accessed properties associated with nearby water courses such as Werribee River.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in Project Area
<b>Mammals</b>			
<i>*Dasyurus maculatus</i> (Spot-tailed Quoll)	EN	en	Low. Given the large home range requirement, the lack of recent records associated with relevant habitat in the vicinity of the Project Area and the accepted current distribution (being largely confined to the mountain region to the northeast of Victoria), the species is considered unlikely to occur in the very small extent of relevant habitat associated with the Project Area.
<i>*Isoodon obesulus</i> (Southern Brown Bandicoot)	EN	en	Low. The limited extent of dense understorey, principally due to the 'grassy' nature of much of the local native vegetation, and the loss of the limited areas of dense understorey from livestock practises results in very limited potential habitat is present the Project Area. Based on the accepted current species distribution and the nature of the habitat present within the Project Area, the species is considered unlikely to occur.
<i>Miniopterus orianae oceanensis</i> (Common Bent-winged Bat (eastern subspecies))	-	cr	Moderate. Targeted survey has not recorded the species and suitable maternal sites have not been recorded. Given the highly mobile nature of the species it remains possible that individuals may forage across the Project areas, particularly in forested or wetland areas.
<i>Ornithorhynchus anatinus</i> (Platypus)	-	vu	Known to occur. the species is present in several waterways crossed by the Project Area. A number of suitable habitat areas were mapped within the Project Area.
<i>*Petauroides volans</i> (Southern Greater Glider)	EN	en	High Targeted survey has not recorded the species within the Project Area, although areas of connected potential habitat are present. Potential habitat recorded in the Hayden Hill bushland area where habitat is connected and in proximity to a known population.
<i>Phascogale tapoatafa</i> (Brush-tailed Phascogale)	-	vu	Present. Recorded on eight remote cameras around Lexton Bushland Reserve and vicinity of Long Forest Nature Conservation Reserve. It is also potentially present in the forested area south of Lerderderg State Park which were not accessible for targeted survey (considered present for the purposes of this assessment).
<i>*Pteropus poliocephalus</i> (Grey-headed Flying-fox)	VU	vu	Known to occur. Known to regularly fly over portions of the eastern extent of the Project Area, however, no significant camps have been recorded during targeted survey, noting a seasonal camp was observed, 2 km south of the Project Area at Darley. DEECA Regions have advised that the colony along the Lerderderg River has been present for several years. Whilst this population does not use the camp all year, given it has been used for multiple consecutive years, it is considered to be a seasonal camp location.
<i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail Bat)	-	vu	Moderate. Targeted survey has not recorded the species. Given the highly mobile nature of the species it remains possible that individuals may forage across the Project areas, particularly in forested or wetland areas.
<i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)	-	vu	Moderate. Not recorded during artificial shelter survey in suitable grassland areas and no signs observed during general surveys. Several areas of suitable grassland habitat have been mapped.
<i>Sminthopsis murina murina</i> (Common Dunnart)	-	vu	Moderate. Not recorded during remote camera survey in suitable forested areas. May still make use of suitable forested areas, particularly around Long Forest.

Taxon	EPBC Act listing	FFG Act listing	Likelihood of occurrence in Project Area
<b>Reptiles</b>			
<b>*<i>Delma impar</i> (Striped Legless Lizard)</b>	VU	en	Moderate. The species was not recorded during targeted surveys in the small extent of accessible habitat identified, however its presence cannot be ruled out in areas not subject to survey yet.
<b><i>Pogona barbata</i> (Bearded Dragon)</b>	-	vu	Moderate - This usually conspicuous species has not been recorded during survey. The species may still make opportunistic use of habitat within the Project area, particularly in the northwest.
<b><i>Pseudemoia pagenstecheri</i> (Tussock Skink)</b>	-	en	Present. The species was recorded as part of the tile grid survey on the Melton Plain. Potential occurrence in the Project Area beyond this is considered low, with the majority of the species range intersected by the Project Area being subject to intensive agriculture.
<b><i>Tympanocryptis pinguicollis</i> (Victorian Grassland Earless Dragon)</b>	CR	cr	Low-Moderate. The only known extant population was discovered near Bacchus Marsh in 2022, outside of the Project Area. Given the very limited known extent of this species it seems unlikely the areas of potential habitat in the Project Area support the species, however its potential presence cannot be excluded.
<b><i>Varanus varius</i> (Lace Monitor)</b>	-	en	Moderate. This usually conspicuous species has not been recorded on arboreal remote camera survey or general surveys of forested areas, however some habitat may remain in the Project Area.

\*Taxa required for assessment as part of EES scoping requirements  
EN = Endangered, CR = Critically Endangered, VU= Vulnerable

## Bird and bat 'species of interest' and important habitats for collision risk review

Of the bird and bat species modelled to occur or previously recorded within the study area, 17 bird species and one bat species are included in the list of 'species of interest' for wind turbine collision published by the former Department of Environment, Land, Water and Planning (DELWP) (now DEECA), which is used due to limited guidance specific to transmission lines in the Australian context. Some additional species are also considered in the collision assessment, which do not appear in DELWP's list of 'species of interest' for wind turbine collision but are considered out of diligence due to a demonstrated taxonomic or morphological predisposition to collision with power lines or electrocution. (BirdLife International, 2007) guidance was also considered as part of the assessment. These species are detailed in Appendix R of **Technical Report A: Biodiversity Impact Assessment**.



### Species of interest

'Species of interest' are specific bird and bat species identified due to their conservation and ecological traits, which make them particularly vulnerable to collisions with wind turbines. These species often have flight patterns and habitats that may also increase the risk of collision with transmission lines and towers.

Based on the likelihood of occurrence of different species, a Project-specific list of 'species of interest' for the collision risk review was developed, as shown in Table 8.6. This list includes additional species not listed that have certain physical traits or behaviours that make them more prone to collision with transmission lines.

Field surveys and reviews of aerial photography also identified several important bird habitats, topographical bottlenecks, and possible migratory paths, including:

- Wetlands (Lake Learmonth, Lake Burrumbeet, Mt Cole Reservoir, Newlyn Reservoir, and Hepburn Lagoon) that support fast-flying waterfowl, White-bellied Sea-Eagles, and Black Swans.
- Forested areas (Mt Buangor State Park, Creswick Regional Park, Wombat State Forest, and Lerderderg State Park) that are likely to be inhabited by raptors and provide foraging habitat for the EPBC-listed Painted Honeyeater and White-throated Needletail.
- Topographical features (Lerderderg Gorge, Werribee Gorge, Pentland Hills, Mt Buangor, and Mt Cole) that are likely to provide hunting and nesting habitat for Wedge-tailed Eagles and other raptor 'species of concern'. In the western section of the Project Area, in proximity to the Glenlofty Range, the Project is located between important habitat areas associated with the Mt Cole and Pyrenees Range where an important avian corridor occurs.

The topography and native vegetation present in Lerderderg State Park and Wombat State Forest also make them attractive areas for opportunistic foraging by bats dispersing from known camps near Geelong and Bendigo. Similarly, the Bacchus Marsh area also contains orchards which attract foraging flying-foxes.

Table 8.6. Project-specific list of bird and bat 'species of interest' for collision risk review

Species	EPBC Act status	FFG Act status	Likelihood of occurrence in the Project Area
Australian Pelican ( <i>Pelecanus conspicillatus</i> )*	-	-	High
Black Falcon ( <i>Falco subniger</i> )	-	cr	Moderate
Black Swan ( <i>Cygnus atratus</i> )*	-	-	Known
Brolga ( <i>Antigone rubicunda</i> )	-	en	Moderate
Bush Stone-curlew ( <i>Burhinus grallarius</i> )	-	cr	Low
Chestnut-rumped Heathwren ( <i>Calamanthus pyrrhopygius</i> )	-	vu	Low
Fork-tailed Swift ( <i>Apus pacificus</i> )	-	-	High
Grey Goshawk ( <i>Accipiter novaehollandiae</i> )	-	en	Moderate

Species	EPBC Act status	FFG Act status	Likelihood of occurrence in the Project Area
Little Eagle ( <i>Hieraaetus morphnoides</i> )*	-	vu	Present
Magpie Goose ( <i>Anseranas semipalmata</i> )	-	vu	Moderate
Musk Duck ( <i>Biziura lobata</i> )	-	vu	Present
Painted Honeyeater ( <i>Grantiella picta</i> )	VU	vu	Moderate
Square-tailed Kite ( <i>Lophoictinia isura</i> )	-	vu	Moderate
Swift Parrot ( <i>Lathamus discolor</i> )	CR	cr	Known
Wedge-tailed Eagle ( <i>Aquila audax</i> )*	-	-	Present
White-bellied Sea-Eagle ( <i>Haliaeetus leucogaster</i> )	-	en	High
White-throated Needletail ( <i>Hirundapus caudacutus</i> )	VU	vu	High
Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )	VU	vu	Known

\*Species marked with an asterisk do not appear in DELWP's list of 'species of interest' for wind turbine collision.

The Project crosses several Important Bird Areas (IBAs), including 'flyways' associated with likely movement corridors or utilisation areas traversed by different bird groups. Three IBAs are considered within the Project Area, including:

- The western IBA with woodland bird species likely moving between Mount Cole and the Pyrenees Ranges via the Glen Lofly Range.
- The central low area where wetland complexes to the south of the Project Area, including Lake Burrumbeet and Lake Learmonth link through to Middle Swamp and Tullaroop Reservoir in the north and several small wetlands around Dean link to Hepburn Lagoon in the north.
- Eastern area of the Central Victorian Uplands, where the Project Area occurs in proximity to the escarpment areas on the southern flanks of the Lerderderg-Wombat conservation areas. Numerous raptor species are known to range out over the landscape, such as White-bellied Sea Eagle and Wedge-tailed Eagle.

### 8.3.7 Listed migratory species

Eighteen EPBC Act listed migratory species have previously been recorded in the study area in the VBA and by BirdLife Australia BirdData Atlas, with an additional four listed migratory species identified as having potential habitat in the study area in the PMST. Of the 22 listed migratory species identified as potentially occurring in the study area, four have a likelihood of occurrence of low-moderate or above within the Project Area, described in Table 8.7:

- Latham's Snipe (*Gallinago hardwickii*) (Vulnerable)
- Glossy Ibis (*Plegadis falcinellus*)
- Fork-tailed Swift (*Apus pacificus*)
- White-throated Needletail (*Hirundapus caudacutus*) (Vulnerable).

Two of the identified species, Latham's Snipe and White-throated Needletail, are also listed as being vulnerable threatened species under the EPBC Act.

Latham's Snipe and Glossy Ibis may occasionally utilise the limited wetland habitats within the Project Area but are more likely to fly over as they move between better quality wetland habitats in the broader area.



Fork-tailed Swift and White-throated Needle-tail are mostly aerial species that are likely to fly over the Project Area but are unlikely to reside or utilise the Project Area for breeding (both species only breed outside Australia).

It is unlikely that the Project Area supports habitat considered important for foraging or breeding activity for any listed migratory species or for an ecologically significant proportion of a population.

Table 8.7. Migratory species with a low-moderate or above likelihood within the Project Area

Species	EPBC Act status	Likelihood of occurrence within the Project Area
<b>Fork-tailed Swift (<i>Apus pacificus</i>)</b>	Migratory Marine	<b>High</b> – The species has previously been recorded in the broader landscape outside the Project Area, particularly around the Melton Plain. Due to the aerial nature of the species, it is considered likely that the species may regularly fly over the Project Area.
<b>*White-throated Needle-tail (<i>Hirundapus caudacutus</i>) (VU)</b>	Vulnerable – Migratory Terrestrial	<b>High</b> – The species may regularly overfly the Project Area along with much of the state.
<b>Latham's Snipe (<i>Gallinago hardwickii</i>) (VU)</b>	Vulnerable – Migratory Wetland	<b>High</b> – Species recorded during field assessment west of Bolwarrah, outside of the Project Area. The species is likely to utilise wetlands with high emergent aquatic vegetation across the eastern extent of the study area.
<b>Glossy Ibis (<i>Plegadis falcinellus</i>)</b>	Migratory Marine	<b>High</b> – The species is considered likely to fly over the Project Area whilst moving between higher quality wetland habitats surrounding the Project Area.

\*Taxa required for assessment as part of EES scoping requirements

### 8.3.8 Waterways and wetlands

The following seven river basins intersect the Project Area:

- Wimmera-Avon Rivers
- Avoca River
- Loddon River
- Barwon River (Elaine Terminal Station only)
- Moorabool River
- Werribee River
- Maribyrnong River.

River basins in the western and central parts of the Project Area (Wimmera-Avon Rivers, Avoca River, Loddon River) drain north towards the Murray River. Those in the eastern part of the Project Area (Barwon River, Moorabool River, Werribee River and Maribyrnong River) drain south-east towards Port Phillip Bay. The condition of these waterways varies from very poor to very good, with the better condition generally occurring in conservation reserves and on steeper terrain, while those in poorer condition generally occur on the plains where the local environment has been modified as part of agricultural development.

No wetlands listed under the Ramsar Convention are located within or adjoining the Project Area. The nearest Ramsar wetlands are associated with the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site located 25km south of the Project Land.

There are 17 DEECA mapped wetlands that intersect the Project Area. These identified wetlands range in condition from high-quality wetland areas retaining a diversity of habitat types, including areas of open water and emergent vegetation, to areas currently under cultivation. Most DEECA mapped wetlands are farm dams developed within drainage lines, retaining little habitat.



#### Ramsar Convention

The Ramsar Convention is an international treaty established in 1971 to conserve and wisely use wetlands. In Australia, Ramsar wetlands are protected under the EPBC Act as MNES.

Two wetlands are listed in the Directory of Important Wetlands in Australia (DIWA): Lake Wendouree and the Lerderderg River. Only the Lerderderg River wetland is within proximity of the Project, located approximately 300m north of the Project Area. Hepburn Lagoon provides the most significant wetland habitat, however this is located outside of the Project Area and therefore has been avoided by the Project.

### 8.3.9 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are ecosystems that rely wholly or partly on groundwater as part of their hydrology. Groundwater may sustain both aquatic and terrestrial biodiversity by supporting vegetation through deep root access, providing discharge to waterways as base flow or in some cases subterranean flow, and providing important inflows to sustain wetlands.

A review of the GDE Atlas (Bureau of Meteorology, 2021) found that many of the waterways, particularly in the western extent of the Project Area, and wetlands in proximity to the central part of the Project Area have a base flow interaction with groundwater and are likely to have a temporal dependency particularly during long periods of low rainfall. With respect to the GDE conditions, riparian and wetland vegetation within the Project Area has some degree of interaction with groundwater and this would likely become more pronounced during periods of low rainfall.

## 8.4 Avoidance

The avoidance of native vegetation and biodiversity values has been an important design parameter for the Project from its inception as the primary measure to reduce impacts on biodiversity. Initially, the Project sought to avoid large, contiguous areas of native vegetation and habitat, and prevent the creation of easements that would fragment national parks, state and regional parks, and state forests. The location and extent of native vegetation and biodiversity values were important design considerations when identifying and developing the Project, with information from field surveys guiding refinements. **Attachment I: Project development and assessment of alternatives**, details the approach and outcomes of the assessment of various corridor and route options considered for the Project.

A summary of the key design refinements undertaken to avoid and minimise impacts to biodiversity values includes:

- Locating the Project to avoid Wombat State Forest, Werribee Gorge State Park, Creswick Regional Park, Lerderderg State Park and the Long Forest Nature Conservation Reserve and identified areas of the critically endangered EPBC Act listed Grassy Eucalypt Woodland of the Victorian Volcanic Plain
- Locating the Project to avoid fragmenting large contiguous areas of native vegetation and habitat such as Mt Beckworth Scenic Reserve and Ben More Bushland Reserve
- Identifying a high-quality area of the critically endangered EPBC Act listed Natural Temperate Grassland of the Victorian Volcanic Plain on the Kingston Road Travelling Stock Route and refining the Project to avoid these identified areas
- Making changes to the Project around Merrimu to avoid important biodiversity values around Long Forest Flora and Fauna Reserve
- Making changes to the Project around Hayden's Hill to avoid important biodiversity values and reduce potential impacts to the Southern Greater Glider and threatened flora species. This avoidance also reduced the overall impacts of fragmentation, the overall native vegetation loss and reduced specific impact to Brooker's Gum (en) and Spotted Hyacinth Orchid (en)
- Co-locating the Project with an existing 200kV transmission line where possible to reduce fragmentation in the surrounding areas of high quality bushland, including Lexton Bushland Reserve
- Making changes to the Project around Darley to minimise impacts to EPBC Act and FFG Act listed species and TECs such as Grey Box Grassy Woodlands and Derived Native Grasslands of Southeastern Australia and Melbourne Yellow-gum (cr)
- Refining transmission tower locations, waterway crossings and access tracks to avoid wetland and riparian areas and native grassland, where possible.

## 8.5 Overview of Project impacts on biodiversity

This section provides an overview of the activities associated with the construction and operation of the Project that could impact biodiversity. In accordance with relevant policies, guidelines and standards, the impact assessment detailed in Section 8.6 considers impacts to ecological values across the life of the Project as a whole, and therefore construction and operational impacts have been considered together.

The Project may impact biodiversity and native species habitat within the Project Area through the removal of vegetation. The assessment of vegetation removal is based on both modelled data and field mapped data. The Integrated Native Vegetation assessment approach was used to model data for parcels where field surveys have not yet been undertaken due to access issues or were only partially completed. A total of 76 per cent of the Project Area has been surveyed, and for the remaining extent modelled data has been used.

### 8.5.1 Potential impacts during construction

The majority of biodiversity impacts will occur during the construction stage of the Project. Key activities include the construction of transmission towers, installation of conductors, and temporary construction areas including tower assembly sites, stringing pads, laydown areas, distribution line crossovers, hurdles, access tracks and vegetation removal in the proposed easement. These activities will result in both complete and partial removal of native vegetation and habitat across the Construction Footprint. This includes the vegetation removal assessed during the initial development of the transmission line. It also incorporates, during the construction stage, minimum clearance space requirements and management of potential bushfire risk to conductors and towers in accordance with the *Electricity Safety Act 1998* and Regulations. As such, additional vegetation and habitat clearance beyond the extent assessed for the construction stage is not likely to occur, unless there is a change in the regulatory requirements specified for the safe operation of transmission lines, including bushfire mitigation.

Indirect impacts during construction will include the loss, alteration and fragmentation of habitat, as well as potential pollution associated with noise, dust, sedimentation, erosion, water quality, light, toxic chemicals (particularly in relation to the potential for leaks and spills from vehicles and machinery, and terminal station sites (see **Chapter 25: Surface water**), and where there is potential for disturbance of contaminated or acid sulphate soils (see **Chapter 23: Contaminated land**), traffic, and plant movement. Fragmentation could occur as vegetation and habitat clearing commences during the construction stage and would continue through the operation stage in areas where clearance is maintained (e.g. easement corridors). The potential impacts of habitat fragmentation include:

- Fauna movement for foraging, dispersal, and migration
- Smaller woodland birds, as they avoid cleared areas which limits their range and movement
- Arboreal species (e.g., phascogales, possums, koalas) who may be forced to traverse the ground when moving, increasing their risk of predation
- Exotic species (e.g., noisy miners, foxes, blackberry) who penetrate deeper into core native vegetation areas as large contiguous areas are fragmented, diminishing conditions for native flora and fauna.



#### Complete and partial vegetation removal

Construction activities will often involve ground disturbance and the complete removal of vegetation within the Construction Footprint to enable the installation of infrastructure. Elsewhere in the easement, vegetation may require modification to provide fuel reduction to manage bushfire risk and maintain clearances from conductors and towers. Whilst complete loss is assumed in these areas for the purpose of the assessment, often much of the native vegetation will likely be retained in a fuel-modified state.

Partial loss (50%) of vegetation has been assumed in specific areas where only vegetation above 3m requires removal and other understorey vegetation can be retained.

Route selection and design have largely avoided fragmentation of large contiguous native vegetation areas, but clearing in some key linkage areas could still result in fragmentation impacts to some species (see Section 8.6), including fragmentation of the existing 220kV transmission easement from Bulgana to Lexton and fragmentation of the Haydens Hill bushland area; however, a southern route for the Project was chosen in this area to minimise impacts on higher quality habitat and known habitats for arboreal species and the threatened Southern Greater Glider.

As discussed in Section 8.3, biodiversity and habitat values are spread broadly across the Project Area, with a number of key areas where biodiversity values are more concentrated, including the Lexton Bushland Reserve, Haydens Hill bushland area and the lands adjoining the Lerderderg State Park. However, given the highly modified and disturbed land use for much of the Project Area and the relatively low volume of native vegetation (approximately 19 per cent of the Project Area (426ha/2200ha) retains native vegetation), potential biodiversity impacts are relatively limited in comparison to the scale of the Project

### 8.5.2 Potential impacts during operation

During the operation stage of the Project, potential impacts would include:

- Clearing of vegetation during operation: Ongoing vegetation management to maintain safety clearances under the transmission line, including maintenance of permanent access tracks as required. This includes managing trees to maintain minimum clearance space around transmission towers and transmission lines, involving cutting and pruning vegetation and mitigating fire risks associated with fuel loads below the transmission line. AusNet will apply their Vegetation Management Plan, which outlines the practices to comply with the Code of Practice for Electric Line Clearance under the Electricity Safety (Electric Line Clearance) Regulations 2020.
- Habitat fragmentation and loss of fauna movement: This includes impacts on foraging, dispersal, and migration, which will occur due to the ongoing presence of Project infrastructure (as discussed in Section 8.6.4).
- Disturbance of fauna associated with electromagnetic fields (EMF): direct impacts from EMF on biodiversity and indirect impacts through possible changes to fauna behaviour (refer to **Chapter 17: EMI and EMF** for further detail on EMF).
- Collision risk for fauna: The transmission line could pose a collision risk for fauna (see below, and Section 8.6.4) causing injury or death.

Operational vegetation management activities are integrated into the construction and operation impact assessment, as impacts of vegetation management during operation are predominantly considered through the initial vegetation removal impact at the construction stage.

#### Collision and electrocution

The presence of the transmission towers and conductors and related infrastructure (e.g., terminal stations) in the Project Area requires consideration for the potential to create a collision and/or electrocution risk for some bird and bat species during operation. Research suggests that electricity distribution lines pose a higher electrocution risk to birds than transmission lines and both can be hazardous for bird collisions (Manville, 2005).

Collision risk is associated with bird and bat species likely to occur in the same space occupied by the transmission line infrastructure (flight behaviour), considered against their perception or ability to perceive the infrastructure in relation to conductor height. The collision risk is directly associated with the perception ability of the particular bird or bat species. It is noted that there is significant variation in the risk of collision and electrocution between the smaller and less obvious distribution lines, which are also closer together, making electrocution more likely, and the much larger, more obvious conductors on a transmission line (BirdLife International, 2007). Additionally, not every bird colliding or coming into contact with the lines will suffer electrocution unless they simultaneously come into contact with electrical grounding wires or a second live wire (Bernardino, et al., 2018). Electrocution is relatively uncommon on large transmission lines due to the large expanses between conductors making it less likely birds will contact multiple wires. Birds like Peregrine Falcons (*Falco peregrinus*), which can dive at



speeds exceeding 320km per hour while hunting prey (Ponitz, 2014) can face catastrophic risks if they collide with any object, including transmission lines. Even slower-flying birds like swans, pelicans and bustards with flight speeds as low as 30km per hour can suffer injury and or die from collisions (Silva, 2014).

To determine the likely impacts of the Project on existing collision risk, a collision risk assessment has been undertaken for the Project in accordance with recognised windfarm guidelines (Lumsden et al., 2019). The method associated with the windfarm guidelines has been used due to the absence of specific transmission line guidelines. These guidelines are considered to be appropriate for general assessment of collision risk. The assessment utilises a risk matrix to determine the 'level of concern' for a priority species, which is a function of likelihood and consequences of collision (as shown in Table 8.8).

Table 8.8 'Species of concern' risk matrix (Lumsden et al., 2019)

		Consequence of collision		
		Low	Moderate	High
Likelihood of Collision	Low	Minimal concern	Minimal concern	Mild concern
	Moderate	Minimal concern	Mild concern	Concern
	High	Mild concern	Concern	Extreme concern

The level of concern is assessed to be either 'minimum concern'; 'mild concern'; 'concern'; or 'extreme concern'. A species of extreme concern is considered to be of high risk for both likelihood of collision and consequence of collision; similarly, a species is deemed to be of concern if the species is at high risk of one factor and moderate risk for the other factor.

The collision assessment considered collision and electrocution risks during construction and operation, with the greatest potential for impact being during the operation stage after the transmission line has been energised. Table 8.9 details the level of concern for priority species assessed as having an elevated risk of collision with the operational infrastructure.

Table 8.9 'Priority species' assessed as having an elevated risk of collision

Scientific name	Common name	Conservation status		Likelihood of occurrence within the Project Area	Level of concern
		EPBC Act	FFG Act		
<i>Pelecanus conspicillatus</i>	Australian Pelican*	-	-	High	Mild concern
<i>Falco subniger</i>	Black Falcon	-	cr	Moderate	Minimal concern
<i>Cygnus atratus</i>	Black Swan*	-	-	Known	Concern
<i>Antigone rubicunda</i>	Brolga*	-	en	Moderate	Mild concern
<i>Burhinus grallarius</i>	Bush Stone-curlew	-	cr	Low	Minimal concern
<i>Calamanthus pyrrhopygius</i>	Chestnut-rumped Heathwren	-	vu	Low	Minimal concern
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory	-	High	Mild concern
<i>Accipiter novaehollandiae</i>	Grey Goshawk	-	en	Moderate	Minimal concern
<i>Hieraetus morphnoides</i>	Little Eagle*	-	vu	Present	Mild concern
<i>Anseranas semipalmata</i>	Magpie Goose	-	vu	Moderate	Mild concern
<i>Biziura lobata</i>	Musk Duck	-	vu	Present	Minimal concern

Scientific name	Common name	Conservation status		Likelihood of occurrence within the Project Area	Level of concern
		EPBC Act	FFG Act		
<i>Grantiella picta</i>	Painted Honeyeater	VU	vu	Moderate	Minimal concern
<i>Lophoictinia isura</i>	Square-tailed Kite	-	vu	Moderate	Mild concern
<i>Lathamus discolor</i>	Swift Parrot	CR	cr	Known	Mild concern
<i>Aquila audax</i>	Wedge-tailed Eagle*	-	-	Present	Concern
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	en	High	Concern
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU, migratory	vu	High	Mild concern
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	Known	Mild concern

\*Common names marked with an asterisk are additional species which do not appear in DELWP's list of 'species of interest' for wind turbine collision, but which are considered here out of diligence due to a demonstrated taxonomic or morphological predisposition to collision with power lines or electrocution.

The long and linear nature of the Project results in the transmission line crossing several IBAs as discussed in Section 8.3.6. Three potential collision risk associated with the Project within these IBAs include:

- The western IBA is associated with woodland bird species – Woodland birds are generally sub-canopy species and are considered to present a low collision risk.
- Lake Burrumbeet and Lake Learmonth link through to Middle Swamp and Tullaroop Reservoir in the north and several small wetlands around Dean link to Hepburn Lagoon in the north – Several wetland bird species (such as Black Swan and Brolga) present an elevated collision risk. This area is considered high risk for Brolgas.
- Numerous raptor species associated with the eastern area of the Central Victorian Uplands, such as White-bellied Sea Eagle and Wedge-tailed Eagle, are considered to have a moderate collision risk.

In summary, a variety of avian species are known to utilise habitat in and around the Project Area and were considered in the collision risk assessment. Transmission networks have a much lower risk of collision than distribution networks, with a large proportion of bird and bat fatalities resulting from electrocution rather than collision in the context of the distribution network. Given the sizing and spacing of the conductors associated with transmission lines, electrocution risk is very low. The location of the Project Area, away from the main areas utilised by threatened bird species at higher risk, which are generally associated with the large wetland complexes and coastal zones well to the south of the Project Area, reduces overall risk.

Within the Project Area there are some areas which pose a higher risk for collision or electrocution of birds due to their proximity to preferred bird habitat (e.g., wetlands, forested areas, feeding sites). Whilst population level impacts are not anticipated to occur for any species, measures to further reduce impacts associated with the transmission line will be made and are discussed in Section 8.6.4.

Several bat species were considered in the collision risk review, with several bat species known to be present in the Project Area. It is acknowledged that, although under-represented in available records, the EPBC Act listed Grey-headed Flying-fox is a seasonal visitor to the area, likely using the areas of native vegetation in Wombat State Forest and Lerderderg State Park to forage on the flowers of various eucalypt species. Grey-headed Flying-foxes are also likely to forage opportunistically in orchard areas around Bacchus Marsh. Most bats are considered low risk given their perception abilities. The Grey-headed Flying-fox is assessed as being of 'mild' concern for collision, this is considered further within the impact assessment in Section 8.6.4.

## 8.6 Construction and operation impact assessment

This section outlines the key issues identified through the risk screening process and associated impacts to biodiversity and habitat during construction and operation of the Project. In addition, it lists the 'potentially threatened processes' as defined by the FFG Act that threaten the survival, abundance, or development of different species or ecological communities. These include habitat destruction and fragmentation, the introduction of invasive species, climate change, and pollution. The residual impact ratings and significant impact assessments presented in this section consider impacts associated with construction and operation through assessment of the whole of Project impact on each ecological value. Mitigation measures to comply with the EPRs will be implemented, which will result in an equivalent, or reduced, residual impact. The key issues and impacts identified for biodiversity and habitat are discussed according to the following ecological values:

- **Native vegetation:** complete or partial removal of areas of native vegetation, and potential damage to retained areas of native vegetation due to adjacent construction and maintenance activities. The removal of native vegetation results in a net loss of native vegetation cover and habitat fragmentation, leading to biodiversity impacts associated with restricting the general mobility of several fauna groups. Clearing activities may also lead to the spread or introduction of weeds, pests and pathogens.
- **TECs:** complete or partial removal of areas of TECs, and potential damage to retained areas of TECs due to adjacent construction and maintenance activities.
- **Threatened flora:** removal, loss or degradation of habitat for flora (including threatened floral species listed under the EPBC Act and FFG Act) through clearing areas of habitat and habitat modification such as canopy removal.
- **Threatened fauna:** removal, loss or degradation of habitat for fauna (including threatened faunal species listed under the EPBC Act and FFG Act) through vegetation clearing, the introduction of obstacles (including Project infrastructure and fragmentation of habitat) and / or increased noise, dust and light.
- **Impacts to wetland areas:** siting of transmission towers and construction activities in proximity or within wetland areas, and vegetation removal resulting in a loss of riparian habitat and changes in sediment loads.

In addition, this section discusses the range of activities associated with the construction and operation of the Project that could impact biodiversity, both directly and indirectly:

- **Direct impacts to native vegetation and habitat** through clearance activities, including the development of the transmission line and associated easement where vegetation occurs, where clearing is required to facilitate construction and comply with the Australian standard AS / NZS 7000:2016 Overhead Line Design and AusNet's Electricity Safety Management Scheme. Direct construction impacts include Project components where native vegetation occurs and impacts are considered unavoidable, including access track creation, construction laydown areas and stringing pads.
- **Indirect impacts from changes to the abiotic environment** (e.g., non-living parts of nature such as soil, water, sunlight etc.) through removal of canopy species, habitat fragmentation, weed invasion and general disturbance from works activities.

### 8.6.1 Native vegetation

Impacts to native vegetation were assessed in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017a) using both field data and modelled data. The Integrated Native Vegetation assessment approach is described in full in Section 5.12.2 of **Technical Report A: Biodiversity Impact Assessment**.

Following the avoidance and minimisation approaches to native vegetation clearance applied throughout the Project development and design process, 238.61ha of native vegetation assessable under the Guidelines will be lost as a result of the Project. This native vegetation loss is comprised of:

- 229.71ha of native vegetation patches comprised of 24 EVCs across three bioregions (Goldfields, Central Victorian Uplands, Victorian Volcanic Plain)
- 844 large canopy trees within patches
- 213 scattered trees (147 large and 66 small, which contributes to an area of 8.90ha).

A breakdown of native vegetation impacted by the Project by EVC is provided in Table 8.10. Impacts to both field mapped and modelled native vegetation are mapped in Appendix O.1 of **Technical Report A: Biodiversity Impact Assessment**.

Table 8.10 Summary of native vegetation patch impacts and average habitat scores

EVC name	Bioregion*	EVC#	BCS**	Extent impacted (ha)***			Average habitat score	
				Modelled potential extent	Confirmed field mapped extent	Total	Modelled	Field data
Alluvial Terraces Herb-rich Woodland	CVU; Gold	67	E	0.57	14.48	15.05	0.32	0.35
Alluvial Terraces Herb-rich Woodland / Plains Grassy Woodland Complex	CVU	152	E	0.14	0	0.14	0.28	0
Aquatic Hermland	VVP	653	E	0	0.04	0.04	0	0.24
Box Ironbark Forest	CVU	61	V	0	1.71	1.71	0	0.61
Creekline Grassy Woodland	CVU; Gold; VVP	68	E	1.89	9.99	11.88	0.37	0.31
Creekline Herb-rich Woodland	CVU	164	V	1.52	0	1.52	0.34	0
Floodplain Riparian Woodland	VVP	56	E	0	0.13	0.13	0	0.13
Grassy Dry Forest	CVU; Gold	22	D	2.88	48.67	51.55	0.35	0.50
Grassy Woodland	CVU; Gold	175	E, V	14.76	43.79	58.54	0.34	0.37
Grassy Woodland / Alluvial Terraces Herb-rich Woodland Mosaic	CVU; Gold	76	E	4.90	0	4.90	0.49	0
Grassy Woodland / Heathy Dry Forest Complex	Gold	896	E	0.05	0	0.05	0.20	0

EVC name	Bioregion*	EVC#	BCS**	Extent impacted (ha)***			Average habitat score	
				Modelled potential extent	Confirmed field mapped extent	Total	Modelled	Field data
Heathy Dry Forest	Gold	20	LC	0	2.05	2.05	0.47	0.42
Herb-rich Foothill Forest	CVU; VVP	23	D, V	10.38	20.16	30.54	0.35	0.53
Hillcrest Herb-rich Woodland	CVU	70	D	0	0.29	0.29	0	0.16
Plains Grassland	CVU; VVP	132	E	1.00	6.74	7.75	0.70	0.31
Plains Grassy Wetland	Gold; VVP	125	E	0	4.42	4.42	0	0.24
Plains Grassy Woodland	CVU; VVP	55	E	7.02	3.73	10.75	0.31	0.26
Plains Woodland	CVU; Gold; VVP	803	E	0.14	1.36	1.50	0.29	0.34
Plains Woodland / Plains Grassland Mosaic	CVU; VVP	693	E	2.15	0	2.15	0.61	0
Riparian Forest	CVU; VVP	18	V	1.10	1.36	2.46	0.51	0.43
Riparian Woodland	Gold	641	E	0	0.12	0.12	0	0.13
Rocky Chenopod Woodland	CVU	64	V	3.85	1.99	5.84	0.43	0.38
Sedgy Riparian Woodland	VVP	198	V	0.19	0	0.19	0.22	0
Shrubby Dry Forest	CVU	21	LC	0.23	1.22	1.44	0.59	0.68
Stream Bank Shrubland	CVU; VVP	851	V, E	0.57	0.49	1.06	0.55	0.44
Swamp Scrub	CVU; VVP	53	E	0.89	0	0.89	0.62	0
Swampy Riparian Woodland	CVU; VVP	83	E	0.73	0.41	1.14	0.38	0.28
Valley Grassy Forest	CVU; Gold	47	V	3.51	1.65	5.16	0.45	0.28
DEECA Wetland	CVU; Gold; VVP	NA	ND	6.44	0	6.44	0.36	0
<b>Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>64.90</b>	<b>164.81</b>	<b>229.71</b>	<b>0.41 (overall average)</b>	<b>0.39 (overall average)</b>

\* Bioregions listed as those in which the impact to the specific EVC occurs

\*\* BCS: (E) = Endangered, (V) = Vulnerable, (D) = Depleted, (LC) = Least Concern, ND=Not described.

\*\*\* Area impacted based on Integrated Native Vegetation assessment

Of the 229.71ha of native vegetation patches to be impacted, the EVC with the most clearing is EVC 175 Grassy Woodland with 58.54ha, followed by EVC 22 Grassy Dry Forest with 51.55ha and EVC 23 Herb-rich Foothill Forest with 30.54ha.



The largest area in which impacts will occur is represented by the Easement Corridor (land that will be subject to an easement for management of the transmission line) (44 per cent), followed by the Vegetation Risk Clearance Footprint (vegetation requiring removal to meet minimum clearance space requirements or for fuel load reduction) (27 per cent) and the Vegetation Clearance Construction Footprint (all areas of potential ground disturbance associated with construction of Project infrastructure) (26 per cent). Impacts to native vegetation occur across three bioregions: Central Victorian Uplands, Goldfields and the Victorian Volcanic Plain.

Bioregional Conservation Status (BCS) is based on the amount of vegetation remaining, in relation to that thought to originally occur prior to colonisation. The full breakdown of unavoidable EVCs by BCS is shown in Table 8.11 and Figure 8.8.

Table 8.11 Summary of native vegetation patch impacts by BCS

Bioregional Conservation Status	Extent (ha) impacted
Depleted	82.21
Endangered	87.67
Vulnerable	49.90
Least Concern	3.64
Not Described (DEECA mapped wetlands)	6.44
<b>Total</b>	<b>229.71</b>

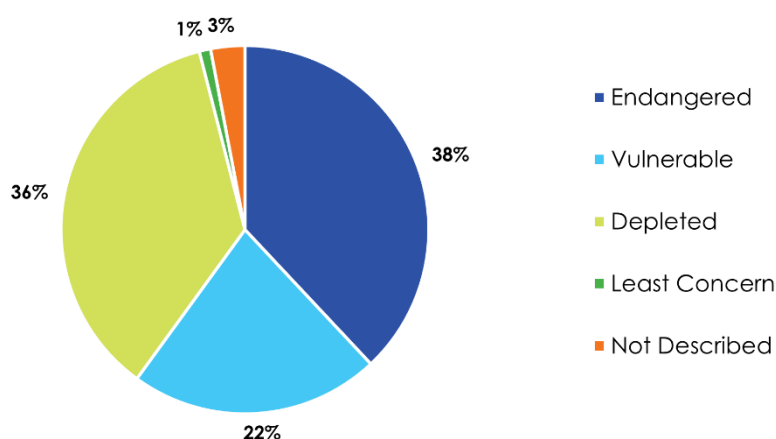


Figure 8.8 Proportional inclusion of EVC relevant to BCS

### Avoidance and minimisation measures

Measures to further avoid and minimise impacts are considered in (EPR BD1) where prior to finalisation of detailed design, ecological surveys will be completed (in those areas where land access has not previously been available) to inform further refinements and identify no go zones to reduce impacts to native vegetation. Measures to avoid native vegetation loss, beyond that which was assessed as unavoidable, will also be included in the Vegetation Management Plan (EPR BD2). In addition to design responses to avoid and minimise impacts to biodiversity discussed in Section 8.4, EPRs related to clearing of native vegetation (which are also relevant to Sections 8.6.2 to 8.6.5) include the development and implementation of a comprehensive Construction Environmental Management Plan (CEMP) (EPR EM2), and Biosecurity Management Plan (EPR EM8) will require the presence of local noxious and environmental weeds to be recorded, and include required management activities, such as vehicle and equipment hygiene and material certification (where relevant). In addition, measures to achieve the EPRs described in **Chapter 19: Noise and vibration, Chapter 24: Groundwater, and Chapter 25: Surface water** will also reduce the residual impacts to ecological values.

With these mitigation and management measures in place, impacts on native vegetation will be minimised so far as reasonably possible. Overall, the residual impacts to native vegetation are considered to be moderate and ecological values are unlikely to be significantly altered across the wider landscape in which the Project occurs. Further to these EPRs, offsets are proposed to compensate for the loss of native vegetation in accordance with the DELWP *Guidelines for the removal, destruction or lopping of native vegetation*. Offsets are discussed further in Section 8.11.

### **8.6.2 Threatened ecological communities (TECs)**

As discussed in Section 8.3.3, two EPBC Act listed TECs were recorded within the Project Area: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia and Natural Temperate Grassland of the Victorian Volcanic Plain. Both of these TECs are considered to have a potential impact of high given the nature and extent of the impacts within the Construction Footprint and a significant impact under the EPBC Act is considered likely.

An additional EPBC Act listed TEC (White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland) was determined to have a high likelihood of occurrence and is considered to have a potential impact of moderate given the TEC has not been recorded during field surveys but is likely to occur within the western extent of the Construction Footprint. The residual impact rating also remains at moderate and a significant impact under the EPBC Act is considered possible, given avoidance of this community could be difficult if a significantly sized patch is identified. Impacts to these communities are summarised in Table 8.12 and discussed further in **Chapter 27: Matters of National Environmental Significance**.

The Project may impact six FFG Act listed TECs, four of which have been confirmed present during field surveys and the remaining two have a low-moderate or above likelihood of occurrence. Impacts to these communities as summarised in Table 8.12 and described in full in Section 9.2.1 of **Technical Report A: Biodiversity Impact Assessment**.

Table 8.12 Summary of impact to EPBC Act listed TECs with a low-moderate or above potential impact

TEC	EPBC Act Listing	Likelihood of occurrence within the Project Area	Potential impact rating	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
<b>Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia</b>	EN	Present	High	6.79ha of confirmed extent occurs within the Construction Footprint where impacts are expected to include the complete loss required for ground disturbance activities.  A further 9.82ha of potential habitat is modelled to occur within the Construction Footprint, within areas yet to be surveyed.	High	While mitigation measures will minimise the extent to which understorey vegetation comprising these two TECs is degraded (in those areas not requiring ground disturbance), the required canopy removal will, in most instances, result in the loss of the TEC within the Construction Footprint.	Likely
<b>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</b>	CR	High	Moderate	This TEC has not been recorded during field assessments. However, 17.00ha of potential habitat extent has been modelled to occur within the Construction Footprint, within areas yet to be surveyed. Based on a desktop review and preliminary surveys this is unlikely to meet requirements to support the TEC and the worst-case scenario is that up to 5ha of this will support the TEC and may be impacted.	Moderate	EPR BD1 and BD8 – complete ecological surveys and finalise design to identify any areas where impacts can be reduced. EPR BD2 no go zones identify areas of TEC for retention that will not be impacted. Contractor induction will reduce instances of accidental damage to TECs. EPR EM8 biosecurity measures will reduce long-term degradation of retained areas of TEC, and minimise the chance of increased weed abundance.	Possible

TEC	EPBC Act Listing	Likelihood of occurrence within the Project Area	Potential impact rating	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
Natural Temperate Grassland of the Victorian Volcanic Plain	CR	Present	High	4.47ha of TEC recorded in the Construction Footprint. A further 0.90ha of potential habitat is modelled to occur within the Construction Footprint, within areas yet to be surveyed.	Moderate	Unlike treed TECs (which require removal of canopy and often substantial impacts to understorey vegetation) these grassland TECs will require little to no clearance of vegetation where they occur outside of the Vegetation Clearance Construction Footprint. Therefore, mitigation measures such as no go zones, contractor induction, and pest hygiene will aim to protect the bulk of these TECs located within the Project Area from accidental clearance during the construction stage of the Project. EPR EM8 biosecurity measures will reduce long-term degradation of retained areas of TEC.	Likely

Table 8.13 Summary of impact to FFG Act listed TECs with a low-moderate or above potential impact

TEC	Likelihood of occurrence within the Project Area	Potential impact rating	Rationale	Residual impact rating	Rationale
Creekline Grassy Woodland (Goldfields) Community	Present	Moderate	6.05ha confirmed extent of this TEC occurs within the Construction Footprint. A further 1.26ha of modelled potential habitat occurs within the Construction Footprint, in areas not yet surveyed.	Moderate	While mitigation measures listed will minimise the extent to which understorey vegetation comprising the TEC is degraded (in those areas not requiring ground disturbance), the required canopy removal will, in most instances, result in the loss of the TEC within the Construction Footprint. This applies equally to those TECs which have a derived grassland component, as the condition of understorey was rarely sufficient to meet condition thresholds for this component of the TEC.
Grey Box - Buloke Grassy Woodland Community	High	Low - Moderate	Not recorded within the Project Area during field surveys. However, 5.84ha of modelled potential habitat occurs within the Construction Footprint, in areas not yet surveyed. Desktop evidence indicates a small extent of this supports this community and consequently the potential impact is considered low - moderate.	Low - Moderate	

TEC	Likelihood of occurrence within the Project Area	Potential impact rating	Rationale	Residual impact rating	Rationale
Rocky Chenopod Open Scrub Community	Present	Moderate	2.44ha occurs within the Construction Footprint. A further 14.89ha of modelled EVC equivalents for this TEC occurs within the Construction Footprint in areas not yet surveyed.  Whilst only 2.44ha of confirmed TEC will be impacted by the Project this potential impact is considered to be moderate given the overall restricted extent of the community within the landscape.	Moderate	EPR BD1 identifies no go zones areas of TEC for retention that will not be impacted. Contractor induction will reduce instances of accidental damage to TECs.  EPR EM8 biosecurity measures will reduce long-term degradation of retained areas of TEC. EPR EM8 will also minimise the chance of feral predator increases (affecting the species that make up the Victorian Temperate Woodland Bird Community)
Victorian Temperate Woodland Bird Community (habitat)	Present	Low - Moderate	43.42ha of habitat (recorded) within the Construction Footprint, and 4.30ha of modelled habitat occurs within the Construction Footprint. Given the large extent of this community across the local areas and beyond, potential impacts are not considered to be highly significant and have been rated low-moderate.	Low - Moderate	
Western Basalt Plains (River Red Gum) Grassy Woodland	Moderate	Low - Moderate	Not recorded within the Project Area during field surveys. However, 6.74ha of modelled potential habitat occurs within the Construction Footprint, in areas not yet surveyed. Whilst the community has not been recorded within the Project Area, under a precautionary approach potential impact is considered low - moderate as small areas of this community may be present within areas not yet subject to field assessment.	Low - Moderate	
Western (Basalt) Plains Grasslands Community	Present	Moderate	6.33ha recorded patches occurs within the Construction Footprint. A further 0.90ha of modelled potential habitat occurs within the Construction Footprint, in areas not yet surveyed.  Some areas will be impacted due to ground disturbance activities (e.g., tower assembly areas, stringing pads, access tracks, etc). However other areas could potentially be protected as no go zones given this vegetation is unlikely to require fuel reduction.	Low - Moderate	Unlike treed TECs (which require removal of canopy and often substantial impacts to understorey vegetation) these grassland TECs will require little to no clearance of vegetation where they occur outside of the Vegetation Clearance Construction Footprint. Therefore, mitigations measures such as no go zones, contractor induction, and pest hygiene will aim to protect the bulk of these TECs located within the Project Area from accidental clearance during the construction stage of the Project.  EPR EM8 biosecurity measures will reduce long-term degradation of retained areas of TEC.



## Avoidance and minimisation measures for TECs

Impacts to TECs will be managed through the implementation of the EPRs related to the protection of native vegetation as discussed in Section 8.6.1, and completion of ecological surveys to reduce extents of native vegetation and TEC's prior to finalising development plans (EPR BD1), the implementation of a Vegetation Management Plan (EPR BD2) and Biosecurity Management Plan (EPR EM8). Although these mitigation and management measures will help reduce the degradation of the understorey vegetation in areas where the ground is not disturbed, the removal of canopy trees will impact the TECs within the Construction Footprint.

A conservative approach has been undertaken where field assessment is incomplete due to access constraints, and habitat for TECs is assumed present in locations where modelled EVC mapping informed the Integrated Native Vegetation Assessment. Further surveys will be undertaken in these areas to confirm actual presence and condition of TECs to inform design refinements and reduce impacts to the extent practicable (EPR BD1 and BD8).

Following these further surveys, the establishment of no go zones through the Vegetation Management Plan (EPR BD2) will identify areas of TEC for retention that will not be impacted. Ongoing monitoring during the construction stage by the Principal Contractor will identify where management is required to address potential degradation of TECs, and the pest hygiene measures will be implemented to reduce long-term degradation of retained areas of TEC.

Following the implementation of these recommended EPRs, the impacts will be less than those currently reported under the conservative approach, however the residual impact ratings will remain the same as those specified in Table 8.12 and Table 8.13, due to direct reduction in habitat extent, with the exception of the grassland TECs (Natural Temperate Grassland of the Victorian Volcanic Plain, and Western (Basalt) Plains Grasslands Community). Unlike treed TECs (which require removal of canopy and often substantial impacts to understorey vegetation) these grassland TECs will require little to no clearance of vegetation where they occur outside of the Vegetation Clearance Construction Footprint. Therefore, mitigation measures such as no go zones, contractor induction, and pest hygiene will aim to protect these TECs located within the Project Area from impacts during the construction stage of the Project and the residual impacts will reduce to moderate and low-moderate respectively.

The EPBC Act listed TECs are discussed in further detail in **Chapter 27: Matters of National Environmental Significance**.

### 8.6.3 Threatened flora

Of the six EPBC Act listed threatened floral taxa with a low-moderate or higher likelihood of occurrence in the Project Area, three had a low-moderate or above potential impact and were considered further as a part of the significant impact assessment with regards to residual impacts. These three species are summarised in Table 8.14 and discussed further in **Chapter 27: Matters of National Environmental Significance**.

Forty-three species of threatened flora listed solely under the FFG Act were considered to have a low-moderate or above likelihood of occurrence in the Project Area (refer to Section 7.4.2 of **Technical Report A: Biodiversity Impact Assessment**). Of these, ten species were considered to have a low-moderate or above potential impact as listed in Table 8.15. Remaining species were considered to have a low potential impact largely due to the limited extent or quality of suitable habitat occurring within the Project Area and have not been considered further regarding residual impacts.

Table 8.14 and Table 8.15 present a summary of impacts to threatened flora species with a low-moderate or above potential impact. These summary tables present both the potential impact rating (before mitigation measures and EPRs are applied) followed by the residual impact rating and rationale.

Table 8.14 Assessment of potential impacts for EPBC Act listed flora with a low moderate or above potential impact

Species	EPBC Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
<b>Matted Flax-lily (<i>Dianella amoena</i>)</b>	EN	Moderate	Low - Moderate	No individuals detected. 40.25ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. May be within roadside grasslands and along fence lines on private property but hasn't been recorded during surveys. The most likely spots are between Lexton and Newlyn, and east from Bolwarrah, though grazing affects these areas.	Low - Moderate	Mitigation measures (no go zones, contractor induction, weed hygiene, monitoring, threatened species management plans, retention of understorey vegetation in riparian areas) will allow for the ongoing retention of individuals of these species in locations outside of the finalised Construction Footprint.	Unlikely
<b>Small Golden Moth Orchid (<i>Diuris basaltica</i>)</b>	EN	Low - Moderate	Low - Moderate	Now known only from three wild populations, remote from the study area. Species not recorded in Project Area to date and is considered unlikely to occur given degraded nature of native grassland recorded thus far. However, 1ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint	Low - Moderate	Some retention of plants within areas of the Construction Footprint not covered by the Vegetation Clearance Construction Footprint will also occur but cannot be quantified. Completion of survey will allow for the identification of unknown occurrences of these species in previously non-surveyed locations and impacts avoided through no go zones and design amendments where possible.	Unlikely
<b>Swamp Fireweed (<i>Senecio psilocarpus</i>)</b>	VU	Moderate	Moderate	No individuals detected. 4.11ha of modelled potential habitat occurs in areas not yet surveyed within the Construction Footprint. Suitable wetland habitat areas are limited in extent in Project Area and generally avoided by the Project.	Low - Moderate	The residual impact rating for Swamp Fireweed has been reduced to the Low-Moderate rating of Matted Flax-lily and Small Golden Moth Orchid given the potential for the Project to avoid impacts (due to the small habit and often treeless habitat) should the species be identified within the Construction Footprint.	Unlikely

Table 8.15. Assessment of potential impacts for FFG Act listed flora with a low-moderate or above potential impact

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
<b>Brittle Greenhood</b>	cr	Present	High	1,388 individuals are presumed to be impacted in the Construction Footprint. A further 20.60ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. As the species is generally below 15cm in height, fuel reduction is not necessary for the species and in theory 100 per cent of individuals could be retained and fuel reduction standards met. However, under a precautionary approach, individuals have been considered indirectly impacted through the removal of canopy resulting in potentially unsuitable growing conditions (e.g., from increased solar radiation and / or competition from other understorey species such as the locally invasive Sifton Bush ( <i>Cassinia sifton</i> ) which is abundant in adjoining treeless vegetation). It is anticipated that these indirect impacts will result in some loss, estimated at 50 per cent of individuals.	High	Mitigation measures (no go zones (EPR BD1), contractor induction, weed hygiene, monitoring (EPR BD2), threatened species management plans (EPR BD4)) may minimise impacts to this species. However, while no direct impacts to this species are required, the removal of canopy from the location may result in the long-term decline of this population of Brittle Greenhood (as growing conditions may become less favourable for the species and / or weed invasion may pose a serious risk). The residual impact rating has therefore not been reduced, given the precautionary assumption that 50 per cent of the population may succumb to the aforementioned threats. Completion of surveys will allow for the identification of unknown occurrences of these species in previously non-surveyed locations.
<b>Buloke</b>	cr	Present	Moderate	The 27 individuals are required to be removed predominantly due to their location within the Vegetation Risk Clearance Footprint, where vegetation is required to be removed to reduce fuel load. A further 47.25ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint.	Moderate	For these four species (Buloke, Brooker's Gum, Melbourne Yellow Gum, Yarra Gum), mitigation measures (no go zones (EPR BD1), contractor induction, weed hygiene (EPR BD2), monitoring, threatened species management plans (EPR BD4)) will allow for the ongoing retention of individuals of these species in locations outside of the Construction Footprint. Completion of surveys will allow for the identification of unknown occurrences of these species in previously non-surveyed locations.
<b>Brooker's Gum</b>	en	Present	Moderate	The Project has refined design to specifically avoid higher quality vegetation and large numbers of Brooker's Gum located within the northern extent of the Haydens Hill area, however 233 individuals are still required to be removed to facilitate the construction and operation of the Project. A further 22.83ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint.	Moderate	While these actions will minimise long-term impacts to these species in the Project Area, the residual impact rating cannot be lowered given the main impacts are a result of the direct removal of plants to facilitate the construction and operation of the transmission line.

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
Melbourne Yellow Gum	en	Present	High	Approximately 400 individuals are considered unavoidable due to their location within the Construction Footprint, predominantly within the Vegetation Clearance Construction Footprint and the Vegetation Risk Clearance Footprint. A further 19.42ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. Impacts are concentrated around the bushland areas immediate north of Darley, however a large proportion of the individuals within this section of the Project Area are small (e.g. <20cm dbh) and growing in dense patches. Many of the individuals present are under stress, with many dead or dying individuals evident, and many showing epicormic regrowth. As a result, the dense patches are 'thinning' out which is a common ecological process in areas of dense eucalypt growth.	High	
Yarra Gum	cr	Present	Moderate	63 Individuals within the Haydens Hill area will be impacted. Additional individuals are likely to be present across the Rocky Lead Creek flood plain, near Dean, where field access has not been available. A further 40.32ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. The viability of the population of Yarra Gum in this area is not anticipated to be affected by Project impacts, considering the size of the population and that pollination is expected to continue across fragmented areas.	Moderate	

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
Cane Spear-grass	en	High	Low - Moderate	No Cane Spear-grass individuals have been recorded within the Construction Footprint. 33.51ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. Due to the inaccessible rocky terrain in this area there remains the potential for the species to be present within the Construction Footprint and therefore under a precautionary approach, potential impact is considered low-moderate.	Low - Moderate	
Glaucous Flax-lily	cr	Present	Moderate	The individual recorded is outside the Construction Footprint and therefore will not be impacted by the Project. 40.25ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. The species is considered to have limited presence in other areas within the expected distribution of the species due to land use, specifically pasture improvement and grazing pressures.	Low - Moderate	Mitigation measures (no go zones (EPR BD1), contractor induction, weed hygiene (EPR BD2), monitoring, threatened species management plans (EPR BD4), retention of understorey vegetation in riparian areas (EPR BD6)) will allow for the ongoing retention of individuals of these species in locations outside of the Construction Footprint. Some retention of plants within areas of the Construction Footprint not covered by the Vegetation Clearance Construction Footprint will also occur but cannot be quantified. Completion of surveys will allow for the identification of unknown occurrences of these species in previously non-surveyed locations.
Floodplain Fireweed	en	Low - Moderate	Low - Moderate	The species was not recorded within the Project Area, including in the section of the Project Area adjacent to the recorded location of the species within the Project Land. A further 4.11ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. The species was recorded in the Project Land 160m southwest of the Project Area and the seasonally inundated potential habitat within the Project Area is restricted and not proposed for impact by the Project.	Low - Moderate	The residual impact rating for these species has been reduced given the potential for the Project to avoid impacts to these species (given their small habit and often treeless habitat) should they be identified within the Construction Footprint (which they have not to date).



Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
<b>Bacchus Marsh Wattle</b>	vu	Present	Moderate	Approximately 500 individuals will be impacted. A further 21.53ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint. As the species is generally below three metres and certainly below eight metres it is presumed the Easement Corridor can sustain the species at a cover level consistent with fuel reduction standards. It is estimated that in areas of partial clearance, 25 per cent of individuals can be retained, as the vegetation cover is already relatively sparse. While it is presumed that 100 per cent loss will occur in other areas of the Construction Footprint, it is also proposed that some individuals will be selectively retained as long as the fuel standards are met.	Moderate	Mitigation measures (no go zones (EPR BD1), contractor induction, weed hygiene, monitoring (EPR BD2), threatened species management plans (EPR BD4), retention of understorey vegetation in 'partial clearance' and riparian areas (EPR BD6)) will allow for the ongoing retention of individuals of these species in locations inside ('partial clearance' areas) and outside of the Construction Footprint. Some additional retention of plants within areas of the Construction Footprint not covered by the Vegetation Clearance Construction Footprint will also occur but cannot be quantified. Completion of surveys will allow for the identification of unknown occurrences of these species in previously non-surveyed locations (EPR BD1). While these actions will minimise long-term impacts to these species in the Project Area, the residual impact rating cannot be lowered given the main impacts are a result of the direct removal of plants to facilitate the construction and operation of the transmission line.
<b>Fragrant Saltbush</b>	vu	Present	Moderate	Recorded in areas of native vegetation from Lerderderg State Park through to Long Forest Nature Conservation Reserve, with approximately 3,081 plants occurring within the Construction Footprint. A further 33.05ha of modelled potential habitat not yet surveyed occurs within the Construction Footprint.  Additional plants are likely to be present within non-surveyed locations of the Project Area, though the overall number is expected to be relatively low based on interrogation of aerial photography and 'over the fence' assessment of non-surveyed properties.	Moderate	

### Avoidance and minimisation measures for threatened flora

Measures to reduce the potential impacts to threatened flora were proposed in accordance with the mitigation hierarchy (avoid, minimise, manage, rehabilitate and offset) and have informed the development of EPRs. These include:

- Completion of surveys and micro-siting design to avoid impacts to the extent practicable where surveys have not yet been undertaken due to access constraints. Surveys are required in areas where access is currently not available to confirm ecological values and inform micro-siting of design to further avoid and minimise impacts. This activity is captured in the completion of ecological surveys and finalisation of the design (EPR BD1), and development and implementation of a Vegetation Management Plan (EPR BD2).
- Utilisation of no go zones in areas where no impacts are to take place; particular care is required so that threatened species habitat in the easement corridor is protected where access is not required to undertake any required vegetation clearance or associated construction works. This activity is captured in the development and implementation of a Vegetation Management Plan and Threatened Flora Management Plans (EPR BD2).
- Development of Threatened Flora Management Plans (under EPR BD2) including processes to follow should new occurrences of the threatened flora be identified during construction.
- Inclusion of measures to prevent potential impacts to threatened flora species in the CEMP, including biosecurity, hygiene and management of weeds, pest animals and harmful pathogens (EPR EM8).

With the implementation of measures that will be applied through the EPRs, some species will see a reduction in impact rating from the initial impact rating stated in Table 8.15. For example, the residual impacts rating for Glaucous Flax-lily and Swamp Fireweed is low-moderate, a reduction from the initial impact rating of moderate. The residual impact rating for these species has been reduced given the potential for the Project to avoid impacts to these species (given their small habit and often treeless habitat) should they be identified within the Construction Footprint (which they have not to date).

However, for most other flora species the residual impact rating cannot be lowered given the main impacts are a result of the direct removal of plants to facilitate the construction and operation of the Project. This is particularly relevant to threatened tree species Buloke, Brooker's Gum, Melbourne Yellow-gum, and Yarra Gum.

Similarly, the residual impact rating of Brittle Greenhood is considered to remain high. Whilst there may be no direct removal of Brittle Greenhood, individuals may be indirectly impacted during construction and operation to remove taller vegetation in accordance with the risk clearance standards. Furthermore, the removal of the canopy from this location may result in the long-term decline of this population (as growing conditions may become less favourable for the species and / or weed invasion may pose a serious risk). This is due to the indirect impacts post canopy removal, which may result in the long-term decline of this population due to unsuitable growing conditions that may arise from increased solar radiation and / or weed invasion.

The residual impact rating for Bacchus Marsh Wattle and Fragrant Saltbush will also remain at moderate. While mitigation measures will minimise long-term impacts to these species, the residual impact rating cannot be lowered given the main impacts are a result of the direct removal of plants to facilitate construction and operation of the Project.

#### 8.6.4 Threatened fauna

Of the 15 EPBC Act listed threatened fauna species assessed as having a low-moderate or above likelihood of occurrence within the Project Area, 13 had a low-moderate or above potential impact and were considered further with regards to residual impacts. These species are summarised in Table 8.16 and discussed further in **Chapter 27: Matters of National Environmental Significance**.

Twenty-six species of threatened fauna listed solely under the FFG Act were considered to have low-moderate or higher likelihood of occurrence in the Project Area (refer to section 7.4.3 of **Technical Report A: Biodiversity Impact Assessment**). Of these, 10 species were considered to have above a low potential impact (Table 8.17). The remaining species were considered to have a low potential impact largely due to the limited extent or quality of suitable habitat occurring within the Project Area, and have not been considered further regarding residual impacts.

Table 8.16 and Table 8.17 list the impacts to threatened fauna species with a low-moderate or above potential impact. These summary tables present both the potential impact rating, before mitigation measures and EPRs are applied) followed by the residual impact rating and rationale.

Table 8.16 Assessment of potential impacts for EPBC Act listed fauna with a low-moderate or above potential impact

Species	EPBC Act listing	Likelihood of occurrence in the Project Area	Potential impact	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
<b>Amphibians</b>							
<b>Growling Grass Frog (<i>Litoria raniformis</i>)</b>	VU	High	Moderate	No individuals recorded during field survey. 0.02ha of field-mapped habitat and 0.72ha of modelled potential habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 and EPR BD6 minimises habitat loss, aquatic vegetation alteration, water flow regime and possible fragmentation. EPR BD2 also minimises potential terrestrial (over-wintering habitat) impacted. EPR BD3 and EPR BD4 minimises impact to any resident individuals. EPR EM8 minimises the chance of Chytrid Fungus spread.	Unlikely
<b>Birds</b>							
<b>Blue-winged Parrot (<i>Neophema chrysostoma</i>)</b>	VU	High	Low - Moderate	No individuals recorded during field survey. 86.14ha of field-mapped potential breeding and foraging habitat and 22.64ha of modelled potential breeding and foraging habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 and EPR BD6 minimises potential habitat (both breeding and foraging habitat) loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predator population increases, and the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely
<b>Brown Treecreeper (<i>Climacteris picumnus</i>)</b>	VU	Present	Moderate	4 individuals recorded in the Project Area during field survey. 62.31ha of habitat and 6.95ha of modelled potential habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predator population increases, and the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely
<b>Diamond Firetail (<i>Stagonopleura guttata</i>)</b>	VU	Present	Low - Moderate	No individuals recorded during in the Project Area during field survey. 52.92ha of field mapped potential habitat and 3.68ha of modelled potential habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD2 and EPR BD3 minimises impact to individuals. EPR EM8 minimises the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely

Species	EPBC Act listing	Likelihood of occurrence in the Project Area	Potential impact	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
<b>Gang-gang Cockatoo</b> ( <i>Callocephalon fimbriatum</i> )	EN	Present	Low - Moderate	<ul style="list-style-type: none"> <li>11 individuals recorded in the Project Area during field survey.</li> <li>26.67ha of field mapped breeding and foraging habitat and</li> <li>6.75ha of modelled potential foraging habitat (not yet surveyed) may be impacted by the Project</li> </ul>	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predator population increases, and the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely
<b>Hooded Robin</b> ( <i>Melanodryas cucullata</i> )	EN	Moderate	Low - Moderate	No individuals recorded during field survey. 31.69ha of habitat and 3.14ha of modelled potential habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD2 and EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predator population increases, and the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely
<b>Painted Honeyeater</b> ( <i>Grantiella picta</i> )	VU	Moderate	Low*	No individuals recorded during field survey. 37.79ha of habitat and 4.26ha of modelled potential habitat (not yet surveyed) may be impacted by the Project.	N/A	N/A	N/A
<b>Swift Parrot</b> ( <i>Lathamus discolor</i> )	CR	High	Low - Moderate	No individuals recorded during field survey. 16.89ha of foraging habitat and 1.33ha of modelled potential foraging habitat (not yet surveyed) may be impacted by the Project.	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD3 and EPR BD4 minimises impact to individuals. EPR BD8 minimises feral predator population increases, and the chance of Beak and Feather disease spread as well as Phytophthora impacting habitat trees.	Unlikely
<b>Invertebrates</b>							
<b>Golden Sun Moth</b> ( <i>Synemon plana</i> )	VU	Present	Moderate	40 individuals recorded in the Project Area. 9.71ha of confirmed habitat (species recorded within) and 11.29ha of potential field mapped habitat (targeted survey for species not yet completed) may be impacted by the Project.	Moderate	EPR BD2 minimises habitat loss in confirmed and potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction.	Possible



Species	EPBC Act listing	Likelihood of occurrence in the Project Area	Potential impact	Rationale	Residual impact rating	Rationale	Significant Impact Assessment
<b>Mammals</b>							
<b>Southern Greater Glider</b> ( <i>Petauroides volans</i> )	EN	Moderate	Moderate	No individuals recorded during field survey. 12.06ha of potential field mapped habitat may be impacted by the Project. There is a risk that the Easement Corridor will increase fragmentation of habitat.	Low - Moderate	EPR BD2 and EPR BD6 minimises potential habitat loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 and EPR BD4 minimises impact to individuals. EPR BD3 minimises the impact of fragmentation on the species. EPR EM8 minimises the risk of weed invasion reducing habitat quality post construction as well as Phytophthora impacting habitat trees.	Possible
<b>Grey-headed Flying-fox</b> ( <i>Pteropus poliocephalus</i> )	VU	Known	Low - Moderate	No individuals recorded. 10.17ha of potential foraging habitat may be impacted by the Project.	Low - Moderate	EPR BD2 minimises potential habitat loss and EPR BD6 minimise loss of potential future camp habitat. EPR BD3 minimises impact to individuals. EPR EM8 minimises the chance of Phytophthora impacting important foraging habitat trees.	Unlikely
<b>Reptiles</b>							
<b>Striped Legless Lizard</b> ( <i>Delma impar</i> )	VU	Moderate	Moderate	No individuals recorded during field survey. 1.44ha of habitat may be impacted by the Project.	Moderate	EPR BD2 minimises habitat loss in potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction.	Possible
<b>Victorian Grassland Earless Dragon</b> ( <i>Tympanocryptis pinguicolla</i> )	CR	Low - Moderate	Moderate	No individuals recorded during field survey. 3.48ha of field mapped potential habitat may be impacted by the Project.	Moderate	EPR BD2 minimises habitat loss in potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction.	Possible

\* Painted Honeyeater has been included within this table as it listed within the EES scoping requirements and has a moderate likelihood of occurrence with the Project Area

Table 8.17 Assessment of potential impacts for FFG Act listed fauna with a low-moderate or above potential impact

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
<b>Amphibians</b>						
<i>Pseudophryne bibronii</i> (Brown Toadlet)	en	Present	Moderate	Ground disturbance for access tracks in habitat areas in Haydens Hill bushland area and Lexton Bushland reserve will lead to the loss of habitat in which the species is recorded. 0.66ha of confirmed habitat is anticipated to be impacted by the Project.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 minimises potential habitat loss with EPR BD3 indicating priority areas for the species and the retention of vegetation to still provide nesting habitat substrate. EPR BD2, EPR BD3 and EPR BD4 minimises impact to individuals. EPR EM8 minimises decreases in habitat quality from feral herbivore pressure. EPR EM8 also minimises the chance of Chytrid Fungus spread.
<b>Birds</b>						
<i>Ninox connivens</i> (Barking Owl)	cr	Moderate	Low - Moderate	Some habitat loss will result from the Project, including the loss of hollow-bearing trees, but loss of habitat is proportionally limited in relation to that available in the wider area. 23.96ha of field-mapped potential habitat will be impacted by the Project.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 minimises potential habitat loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 and EPR BD4 minimises impact to individuals and impact to the breeding output of the species. EPR EM8 minimises the risk of weed invasion reducing habitat quality post construction as well as Phytophthora impacting habitat trees.
<i>Tyto novaehollandiae</i> (Masked Owl)	cr	Moderate	Low - Moderate	Some loss of potential habitat. 23.96ha of field-mapped potential habitat will be impacted by the Project of desktop mapped potential habitat will be impacted by the Project		
<i>Ninox strenua</i> (Powerful Owl)	vu	Present	Low - Moderate	Some habitat loss will result from the Project, including the loss of hollow-bearing trees, but loss of habitat is proportionally limited in relation to that available in the wider area. 23.96ha of habitat (both confirmed and field-mapped potential habitat) is anticipated to be impacted by the Project.		

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
<i>Lophoictinia isura</i> (Square-tailed Kite)	vu	Moderate	Low - Moderate	Limited habitat loss across the likely home ranges of local individuals and suitable breeding habitat on waterways are largely avoided by Project infrastructure. The loss of scattered trees will decrease roosting habitat. A total of 74.28ha of field mapped potential habitat and modelled potential habitat occurs within the Construction Footprint and may be impacted.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 and EPR BD6 minimises potential habitat loss (both breeding and foraging habitat). EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predation risk as well as decreases in habitat quality from weed invasion.
<i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)	en	Moderate	Low - Moderate	The Project will have limited impact on suitable habitat. Foraging areas (large wetlands) are largely avoided by Project infrastructure. While no current breeding sites have been recorded, future suitable breeding habitat has the potential to be impacted within the Project Area. Potential impact is considered. 15.63ha of potential habitat (both field mapped and modelled) will be impacted by the Project.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 and EPR BD6 minimises potential habitat loss (both breeding and foraging habitat). EPR BD3 minimises impact to individuals. EPR EM8 minimises feral predation risk as well as decreases in habitat quality from weed invasion.
<b>Invertebrates</b>						
<i>Engaeus merosefusus</i> (Western Burrowing Crayfish)	en	Present	Moderate	Wetland habitats and waterways largely avoided by Project infrastructure, however 0.01ha of habitat is to be impacted during vegetation clearance.	Low - Moderate	EPR BD2 and EPR BD6 minimises habitat loss, aquatic vegetation alteration, water flow regime and possible fragmentation. EPR BD3 and EPR BD4 minimises impact to any resident individuals. EPR EM8 minimises the chance of weed spread decreasing habitat quality.
<b>Mammals</b>						
<i>Phascogale tapoatafa</i> (Brush-tailed Phascogale)	vu	Present	Moderate	The habitat at Long Forest is largely avoided by the Project. Some habitat loss and increase in fragmentation will occur at Lexton and south of Lerderderg State Park. The loss of tree hollows associated with the Project may reduce the breeding capacity for the species where present. 16.60ha of habitat (both confirmed and modelled potential habitat) is anticipated to be impacted by the Project	Low - Moderate	EPR BD2 minimises potential habitat loss. EPR BD2 will also minimise the loss of hollows (a critical resource) in the landscape. EPR BD3 and EPR BD4 minimises impact to individuals. EPR BD4 minimises the impact to the breeding output of the species. EPR EM8 minimises the risk of weed invasion reducing habitat quality post construction as well as Phytophthora impacting habitat trees.

Species	FFG Act listing	Likelihood of occurrence within the Project Area	Potential impact	Rationale	Residual impact rating	Rationale
<i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)	vu	Moderate	Low - Moderate	Some potential habitat will be impacted in suitable grassland areas. Grassland impacts will be largely localised to tower sites.  The species was not recorded during artificial shelter survey and no sign was noted during general survey. 21.00ha field mapped potential grassland habitat will be impacted by the Project.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 minimises habitat loss in confirmed and potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction via weed invasion.
<i>Ornithorhynchus anatinus</i> (Platypus)	vu	Known	Low - Moderate	Several potential habitat areas (generally bank habitat) will undergo vegetation clearance, but no instream works will occur within those areas. The Project is not expected to impact water flow or quality. 0.03ha of habitat may be impacted by the Project across two locations along Birch Creek in Smeaton.	Low - Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 minimises habitat loss in confirmed and potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction via weed invasion.
<b>Reptiles</b>						
<i>Pseudemoia pagenstecheri</i> (Tussock Skink)	en	Present	Moderate	Some habitat will be impacted in areas where the species was recorded near Melton. Grassland impacts will be largely localised to tower sites and access tracks. 3.35ha of habitat (2.04ha of confirmed habitat and 1.31ha of field mapped and modelled potential habitat) is anticipated to be impacted by the Project.	Moderate *Reduction in impact will be meaningful but not enough to drop the rating to Low	EPR BD2 minimises habitat loss in confirmed and potential habitat. EPR BD3 and EPR BD4 minimises impact to the species breeding and impact to individuals. EPR EM8 minimises the risk of reducing habitat quality post construction via weed invasion.

## Avoidance and minimisation measures for threatened fauna

Measures to reduce the potential impacts to threatened fauna were proposed in accordance with the mitigation hierarchy (avoid, minimise, manage, rehabilitate and offset) and have informed the development of EPRs.

The Threatened Fauna Management Plans (EPR BD4) will set out requirements and methods for designating no go zones and preventing unauthorised access or disturbance to these areas. Where habitat is identified for removal, a qualified and experienced ecologist or wildlife handler will check for fauna occupancy immediately prior to clearance activities, so that native fauna is removed and released at a suitable release site outside the impact zones (EPR BD3 and EPR BD4). This would include inspecting hollows and trees identified for removal for the presence of fauna. If the individual is identified as a threatened fauna species listed under the FFG Act or the EPBC Act, then a threatened species relocation method will be enacted prior to clearing. Options for the relocation of the species would be discussed with the appropriate regulating bodies (such as DEECA or DCCEE) prior to the individual being disturbed.

Standard construction measures that the Project will adopt include limiting construction activities around known sensitive breeding areas for species such as threatened owls and eagles listed under the EPBC Act and FFG Act, implementing measures to manage construction noise and dust (EPR AQ1, EPR EM2, EPR NV1, EPR NV2, and EPR NV3) and maintaining appropriate distances between waterways and tower construction activities (EPR SW1).

As part of the CEMP (EPR EM2), measures to minimise short and long-term adverse impacts on riparian, riverbed and aquatic habitat, and aquatic fauna connectivity during construction activities will be developed and implemented in consultation with the relevant CMAs (EPR BD6). This would include adherence to standard erosion and sediment control measures as outlined in EPA guidelines, and reinstatement of any construction areas to control erosion issues. With the implementation of no go zones (EPR BD2), this will minimise habitat loss, aquatic vegetation alteration, water flow regime and possible fragmentation. Further, the Biosecurity Management Plan (EPR EM8) will minimise the chance of spreading pathogens and disease including Chytrid Fungus (among amphibians, notably Growling Grass Frog and Brown Toadlet), Beak and Feather disease (e.g. among parrot species such as Gang Gang Cockatoo), and Phytophthora impacting habitat trees (benefiting hollow dependant species such as Southern Greater Glider, and other fauna that utilise Phytophthora sensitive flora for food and habitat resources).

To further minimise habitat loss and fragmentation, through implementation of EPR BD2, EPR BD3 and EPR BD4, hollow salvage and replacement will be undertaken which involves removing the portion of a felled tree that has a tree hollow and attaching it to a large tree, close by, to help maintain habitat in the landscape. Maintenance or re-establishment of specific areas of understorey will also be undertaken to provide cover for ground species and continuity of habitat for subcanopy bird species, some of which are highly sensitive to clearings, in areas of suitable habitat or established biodiversity corridors, and the placement of glider poles and rope bridges between areas of habitat may partially mitigate fragmentation impacts.

With regard to collision risk during operation, further monitoring and appropriate mitigation strategies and measures would be targeted in the identified 'hotspot' areas, this includes development of a Collision Risk Management Plan (EPR BD5) incorporating the following mitigation measures:

- Identify key collision risk areas for the Project, focussing on areas of high bird utilisation and habitat for species identified as high risk
- Vertical line marking: vertical line marking (bird 'flappers') or bird diverters are simple and cost-effective installations which make the transmission line easier for birds to visualise and improve their depth perception in relation to the transmission line (Avian Power Line Interaction Committee, 2006). Vertical line markings should be applied to areas where species of concern are found with details provided in specific species management plans.
- Structural design mitigation: Recommendations from BirdLife International should be incorporated into the Project design to reduce the risk to birds and other flying species from collision with the transmission line. These recommendations include using suspended insulators over upright insulators and using larger diameter ground wires.



Installation of line marking measures to increase detection by flying species, particularly in areas identified as more likely to have 'species of concern' transiting through them, are a proven technique for mitigating collision risk. These mitigation measures, along with identifying key collision risk areas and implementing the recommended design features of energised components, can minimise the risk of both collision and electrocution to most 'species of concern'. Through implementation of these mitigation measures, it is anticipated the risk of collision and electrocution associated with the Project can be reduced. The residual impacts will vary depending on species. However, the overall residual impact related to fauna from collision and electrocution is anticipated to be moderate to low in line with the overall residual impact rating for threatened fauna provided in Section 8.6.

With the proposed mitigation measures in place, the residual impacts will reduce from moderate to low-moderate for Growling Grass Frog, Brown Treecreeper, Southern Greater Glider, Brown Toadlet, Western Burrowing Crayfish, and Brush-tailed Phascogale. For the remaining species, although the reduction in impact following implementation of mitigation will be meaningful, the impact significance ratings are considered to remain the same as the potential impact rating, as there is not a large enough reduction to result in a change in impact category. Generally, the largest contribution to the predicted impacts on fauna species is related to the direct removal of vegetation/habitat, and although the proposed EPRs and associated mitigation measures will minimise further impacts on these species, they do not result in a substantial reduction of the vegetation/habitat clearing proposed. Therefore, the mitigation measures can only provide a marginal reduction in predicted impact to these species (residually remaining in the same impact category for most species).

### Listed migratory species

The Project traverses several important areas of habitat through easement clearing, potentially impacting fauna movement required for dispersal, migration and to respond to catastrophic events such as bushfire. Two migratory species listed as threatened under the EPBC Act are considered likely to move through the Project Area as part of their annual migration (Table 8.18).

Impacts from the Project to these two migratory species were determined to be low; therefore, they were not considered further regarding residual impacts.

Table 8.18 Migratory species with a low-moderate or above likelihood within the Project Area

Species	EPBC Act status	Likelihood of occurrence within the Project Area	Potential impact	Rationale
<b>*White-throated Needletail</b> ( <i>Hirundapus caudacutus</i> )	Vulnerable – Migratory Terrestrial	High	Low	Due to the aerial nature of this species, known to only infrequently land, impacts during construction are likely to be negligible, as the species is considered unlikely to make landfall within the Project Area. No breeding habitat will be impacted by the Project.
<b>Latham's Snipe</b> ( <i>Gallinago hardwickii</i> )	Vulnerable – Migratory Wetland	Present	Low	Limited impact to breeding habitat is expected as wetland habitats and waterways are largely avoided by Project infrastructure.

\*Taxa required for assessment as part of EES scoping requirements

### Other fauna species

Other fauna species listed under the EPBC Act and FFG Act and non-listed fauna species are generally considered unlikely to be significantly impacted and will be managed through a Fauna Management Plan (EPR BD3), which captures all fauna in addition to threatened species. This plan will include managing impacts to fauna through pre-clearance inspections and measures to manage open excavations during construction.

Concern was also raised regarding the FFG Act listed Brolga. This species makes irregular use of the area, with the main Victorian population occurring well to the southwest section of the Project Area. While suitable wetland habitat is largely avoided by Project infrastructure, the vulnerability of the Brolga (*Antigone rubicunda*) to collisions with power lines is well known. However, there is limited information differentiating the smaller and lower distribution lines from the larger, taller and more obvious transmission lines. On advice from DEECA the species was considered to be at higher risk between Hepburn and Lexton than in other sections of the Project Area. Mitigation strategies to avoid negative impacts on the Brolga (*Antigone rubicunda*), particularly between Hepburn and Lexton, would be implemented in accordance with the *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population* (DSE, 2011). These generally align with the standard controls required, particularly around visual aids.

#### **8.6.5 Impacts to wetland areas**

The Project is unlikely to impact Ramsar or DIWA listed wetlands due to the separation distances to the nearest downstream wetlands and the implementation of proposed EPRs to manage water quality issues as specified in **Chapter 22: Geology and soils** and **Chapter 25: Surface water**.

However, eight DEECA mapped wetlands are considered unavoidable and may be impacted by ground disturbance activities during construction. An additional seven DEECA mapped wetlands are located in parts of the Construction Footprint where vegetation clearance will occur to establish the minimum clearance space required around the transmission line.

Impacts to DEECA mapped wetlands are generally low, with only three having moderate impacts (Table 8.19). Of these the most significant is Masons Swamp (Wetland 55625), which supports Western Burrowing Crayfish (en) habitat, Swamp Fireweed (VU) and Floodplain Fireweed (en).

As required under the *Guidelines for the removal, destruction or lopping of native vegetation*, DEECA mapped wetlands have been assessed as native vegetation and those impacted by the Construction Footprint have been included in the native vegetation loss calculation (Section 8.6.1) and offset requirements for the Project. The residual impacts will vary depending on the specific wetland being considered; however, the overall residual impact related to wetlands is anticipated to be low-moderate.

Table 8.19 Summary of impacted wetlands with moderate impacts

DEECA wetland # and Wetland type	Watering regime (DEECA)	Dominant vegetation type (field observation)	Extent in the Project Area	Area within Construction Footprint	Impact assessment
<b>55625</b> <b>Permanent freshwater swamps (Masons Swamp)</b>	Periodically Inundated - Seasonal or Episodic	Variety of land uses, including plantations, cropped areas and swampy areas	15.85ha – 10.41ha surveyed 5.44ha not surveyed (modelled potential habitat)	9.45ha – including 1.96ha VCCF* 0.52ha VRCF** 6.97ha EC***	<b>Moderate.</b> Connected depressions are tributaries of the Moorabool West Branch River, are seasonally inundated and retain sedgy aquatic habitat. Three towers (F138DL; F4487DL; F136DL) and associated access tracks will cross this wetland. Tower F4487DL overlaps with Western Burrowing Cray habitat along tributary. Threatened flora (Swamp Fireweed (VU) and Floodplain Fireweed (en)) recorded adjacent but not within Construction Footprint. Not all of Project Area has had field survey and potential more individuals present. Some impact to moderate quality wetland attributes occurs.
<b>55739</b> <b>Temporary freshwater swamps</b>	Periodically Inundated - Episodic	Forest / woodland (modelled potential habitat)	1.95ha – Not surveyed (modelled potential habitat)	1.09ha – including 0.15ha VRCF 0.93ha EC	<b>Moderate.</b> Moorabool River West Branch floodplain. Appears mostly exotic grassland with a thin band of woody vegetation along river. Intersected by Project between Towers F4407DL and F4406DL. Limited impact to wetland associated with fuel load reduction, but potentially some impact to Brooker's Gum (en).
<b>70473</b> <b>Grassland patch</b>	Periodically Inundated - Seasonal or Episodic	Sedge / grass / forb	2.13ha – All surveyed	1.23ha – including 0.16ha VCCF 0.03ha VRCF 1.08ha EC	<b>Moderate.</b> Mapped as Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) (EVC 132) with core portion of wetland outside and the north of the Project Area. An access track is proposed through an area of grassland that is regularly slashed / harvested for hay. Rock piles indicate ground has been ripped and provides limited fauna habitat. The area impacted may support some seasonal waterlogging, otherwise is dominated by terrestrial species. Limited impact to wetland values likely.

\*VCCF – Vegetation Clearance Construction Footprint

\*\* VRCF – Vegetation Risk Clearance Footprint

\*\*\* EC – Easement Corridor Construction Footprint

## 8.7 Decommissioning impacts

As decommissioning activities will be similar to those that occur during construction, the impacts related to biodiversity and habitat are assessed to be the same as for the construction stage. Potential impacts relate mainly to the removal of Project infrastructure and the rehabilitation of the easement. However, it is assumed that vegetation management within the easement would no longer be required following decommissioning of the Project. As such, periodic tree removal and understorey thinning would cease, and natural regeneration would take place.

Accordingly, the EPRs developed to manage impacts during construction would also be applicable for decommissioning in accordance with the conditions of the time. This would also be managed by a Decommissioning Management Plan (EPR EM11) which would include mitigation measures for biodiversity and habitat. The plan would provide for easement restoration and rehabilitation, which could include passive rehabilitation (such as encouraging natural regrowth and regeneration over the easement) or active rehabilitation (planting of local native species). Further details on easement restoration and rehabilitation are provided in **Chapter 6: Project description**.

Given the expected lifespan of the Project, it is likely that the current standards, guidelines, and controls for managing biodiversity impacts would no longer apply at the time of decommissioning. As such, the Decommissioning Management Plan (EPR EM11) will determine how to avoid, manage or mitigate impacts given the circumstances and conditions at the time.

## 8.8 Cumulative impacts

Cumulative impacts have been assessed by identifying relevant future projects that could contribute to cumulative impacts on biodiversity and habitat values, considering their spatial and temporal relationships to the Western Renewables Link Project. The projects considered as potentially relevant to biodiversity and habitat include:

- 2022 Melbourne Airport Master Plan
- Beaufort Bypass (Western Highway)
- Brewster Wind Farm
- Coimadaí Sand Quarry
- Elaine Solar Farm
- Lerderderg River Nature Trail
- Lerderderg-Wombat National Park
- Melbourne Airport Business Park (MABP) – Sky Road West Warehouse Developments
- Melbourne Renewable Energy Hub
- Merrimu PSP / Bacchus Marsh Urban Growth Framework
- Navarre Green Power Hub
- Nyaninyuk Wind Farm
- Outer Metropolitan Ring Road / E6
- Powercor Mt Cottrell Zone terminal substation
- Sunbury Line Level Crossing Removals
- Sydenham Terminal Station Rebuild
- Toolern Vale Solar Farm
- Victoria to New South Wales Interconnector West (VNI)
- Watta Wella Renewable Energy Project
- West Gate Tunnel
- Western Irrigation Network Scheme.

Quantifying the cumulative biodiversity impact from the Western Renewables Link Project is complex due to its size and the number of landscape elements (e.g., bioregions, habitats, and vegetation types) it may impact. However, the combination of construction activities and infrastructure development associated with the Western Renewables Link Project will result in potentially significant adverse cumulative impacts to vegetation and/or habitats.

The cumulative impact on biodiversity and habitat values from the relevant future projects was assessed based on the likely impacts on threatened species and TECs, where this information is publicly available. The outcomes of this assessment are summarised in Table 8.22.

Based on the relevant future projects that can be assessed, it is anticipated that approximately 1,641ha of cumulative native vegetation will be impacted, including 1753 large canopy trees. In total, 229.71ha of this associated with the Western Renewables Link Project, including 844 large canopy trees. However, due to avoiding large areas of continuous vegetation, the Western Renewables Link will have a higher proportional impact on indigenous scattered trees, particularly in agricultural environments. It will require the removal of 213 scattered trees, whilst the total cumulative impact will result in the removal of 477 scattered trees.

The Western Renewables Link Project has the potential to be a major contributor to cumulative impacts related to three listed TECs. This is based on the precautionary approach of including potential impact extents for areas yet to be surveyed, and therefore impacts are likely to be overstated at this stage of the Western Renewables Link Project. Each biodiversity value impacted by the Western Renewables Link Project has been assigned a scale for both the Western Renewables Link Project's contribution to cumulative impact as shown in Table 8.20, and the significant cumulative impact across the landscape as described in Table 8.21.

Table 8.20 Guide to determining contribution to cumulative impact

Contribution to significant impact	Criteria
Minor	<10%
Moderate	>10-<50%
Major	>50%

Table 8.21 Guide to determining significant cumulative impact across landscape

Scale	Guide to determining significant impact
Low	Generally impacts are localised and small, considered negligible or not noticeable when considered at the landscape level.
Low - Moderate	Cumulative impacts would probably not result in meaningful or demographic change with regard to a population or significant proportion of a TEC or EPBC Act listed species at the landscape level.
Moderate	Impact potentially meaningful at the population / landscape level (e.g. may result in loss of genetic diversity or a significant proportion of a population / TEC).
High	Impact likely to influence the demographics of a population and / or likely a significant impact for TECs or EPBC Act listed species.

A cumulative impact is considered possible for the biodiversity values identified associated with the combined clearing of vegetation or habitat from the relevant future projects and the Project. The impact to biodiversity values from the Western Renewables Link Project combined with relevant future projects are presented in Table 8.22, which provides the 'worst case' scenario to both confirmed and potential habitat. The significant cumulative impacts will vary depending on the specific biodiversity value being considered; however, the overall impact across the landscape is anticipated to be moderate to low.



Table 8.22 Summary of cumulative impacts to biodiversity values

Biodiversity value	Project impact			Contribution to cumulative impact	Significant cumulative impact across landscape
	Combined impact of relevant future projects	WRL Project impact*	Cumulative impact		
Native vegetation					
Native vegetation as EVC	1401.91ha 909 large trees	229.71ha 844 large trees	1640.53ha 1753 large trees	Major	Moderate
Scattered trees	270 trees	213 trees	477 trees	Major	Moderate
Commonwealth values					
EPBC Act listed threatened communities					
Grey Box ( <i>Eucalyptus microcarpa</i> ) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	104ha	16.61ha	120.61ha	Moderate	Moderate
Natural Temperate Grassland of the Victorian Volcanic Plain	113.293ha	5.37ha	118.663ha	Minor	Moderate
White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland	5.64ha	5.00ha	10.64ha	Major	Low-moderate
EPBC Act listed threatened fauna					
Growling Grass Frog	149.84ha	0.74ha	150.58ha	Minor	Moderate
Swift Parrot	68.02ha	18.22ha	86.24ha	Moderate	Low-moderate
Golden Sun Moth	107.19ha	21.00ha	128.19ha	Moderate	Moderate
Striped Legless Lizard	11.69ha	1.44ha	13.13ha	Minor	Moderate
EPBC Act listed flora					
Matted Flax-lily	4 individuals	40.25ha	40.25ha	None**	Low
State values					
FFG Act listed threatened communities					
Grey Box – Buloke Grassy Woodland	4.11ha	5.84	9.95ha	Major	Low
Rocky Chenopod Open-Scrub Community	0.51ha	18.00ha	18.51ha	Major	Moderate
Western (Basalt) Plains Grasslands Community	201.72ha	7.23ha	208.95ha	Minor	Moderate
Victorian Temperate Woodland Bird Community	69.34ha	60.06ha	129.40ha	Moderate	Low-moderate
FFG Act listed fauna					
Brush-tailed Phascogale	22.9ha	16.6ha	39.5ha	Moderate	Low-moderate
Tussock skink	0.08ha	3.35ha	3.43ha	Minor	Low
Brown Toadlet	1.68ha	0.66ha	2.34ha	Moderate	Low

Biodiversity value	Project impact			Contribution to cumulative impact	Significant cumulative impact across landscape
	Combined impact of relevant future projects	WRL Project impact*	Cumulative impact		
FFG Act listed flora					
Buloke	6 individuals	27 individuals	33 individuals	Minor	Low
Yarra Gum	8 individuals	63 individuals	71 individuals	Moderate	Low

\* The WRL Project impact presents the worst-case scenario which includes both potential and confirmed extent.

\*\* No individuals have been recorded but 40.25ha of potential habitat remains to be surveyed. If any individuals are recorded in the future the determination would change.

## 8.9 Environmental Performance Requirements

Potential impacts identified through **Technical Report A: Biodiversity Impact Assessment** have informed the development of EPRs for the Project. EPRs set out the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning. While some EPRs are performance based to allow flexibility in how they will be achieved, others include more prescriptive measures that must be implemented. Compliance with the EPRs will be required as a condition of the Project's approval. Table 8.23 details the proposed EPRs developed for biodiversity and habitat.

Table 8.23 Environmental Performance Requirements

EPR code	Requirement
<b>EPR BD1</b>	<p><b>Complete ecological surveys and finalise design</b></p> <ol style="list-style-type: none"> <li>1. Prior to the finalisation of the detailed design for an area, complete ecological survey of the area if yet to be surveyed (additional surveys) and identify native vegetation and threatened species habitat that may be impacted by the Project <ol style="list-style-type: none"> <li>a. Surveys must be completed in areas not previously surveyed due to access limitations, as shown on the plans in Appendix A of <b>EES Technical Report A: Biodiversity Impact Assessment</b> as "Survey Not Completed". These surveys must be completed for areas that have not been surveyed at all as well as areas that have been partially surveyed</li> <li>b. The additional surveys must include, to the extent necessary, where impacts cannot be avoided or not already completed: <ol style="list-style-type: none"> <li>i. mapping of native vegetation (including TECs);</li> <li>ii. identification of threatened flora and fauna habitat; and</li> <li>iii. targeted survey for threatened flora and fauna (or assume presence in suitable habitat for mobile species and species with a limited seasonal survey period).</li> </ol> </li> </ol> </li> <li>2. Identify all native tree protection zones associated with access tracks outside the Easement Corridor and abutting the easement and if practicable modify the location of the access track to avoid the tree protection zones</li> <li>3. Reduce the extent of vegetation identified to be removed in the Easement Corridor (the Easement Corridor Construction Footprint) by: <ol style="list-style-type: none"> <li>a. identifying any areas of disturbance to enable removal of vegetation identified in the Vegetation Clearance Risk Footprint in the Easement Corridor; and</li> <li>b. undertaking further design to identify no go zones within the Easement Corridor – being the native vegetation and habitat that can be avoided and that does not need to be removed within the Easement Corridor and is to be retained.</li> </ol> </li> <li>4. Prior to the finalisation of the detailed design for an area, mapping is to be updated in Appendix O of <b>EES Technical Report A: Biodiversity Impact Assessment</b> to include the outcomes of the additional survey, the no go zones, updated Easement Corridor Construction Footprint and areas associated with tree protection zones.</li> </ol>

EPR code	Requirement
	<p>5. When finalising the detailed design for an area the updated mapping must be considered and infrastructure moved on the basis of the new information to avoid native vegetation, TECs and threatened taxa to the extent practicable.</p>
EPR BD2	<p><b>Develop and implement a Vegetation Management Plan</b></p> <ol style="list-style-type: none"> <li>Prior to commencement of construction, develop and implement a Vegetation Management Plan in consultation with DEECA and DCCEEW to protect and monitor native vegetation (including TECs) and other biodiversity values in the areas where native vegetation is to be retained. The Vegetation Management Plan will be a sub plan to the CEMP.</li> <li>The Vegetation Management Plan must include but not be limited to:             <ol style="list-style-type: none"> <li>Designating and implementing controls to prevent unauthorised access or disturbance to the no go zones identified in the Easement Corridor and shown on the updated Appendix O mapping in <b>Technical Report A: Biodiversity Impact Assessment</b>.</li> <li>Implementing controls to minimise disturbance to tree protection zones associated with access tracks construction.</li> <li>Within the areas identified for Partial Clearance, understorey vegetation is to be maintained and clearing limited to canopy trees only with minimal disturbance to the understorey understorey (refer to Appendix O.1 mapping in <b>EES Technical Report A: Biodiversity Impact Assessment</b>)</li> <li>A hollow replacement strategy that includes identification of tree hollows and requirements for removal and areas of re-establishment in adjoining habitat (e.g., strapped onto suitable trees where available) where practicable and subject to landholder agreement. In particular, consideration of tree hollows must be given in the following areas:                 <ol style="list-style-type: none"> <li>Impacted forest habitat located at Lexton, Lerderderg and Haydens Hill, hollows with an opening greater than 20cm diameter (to support owl species, Gang-gang Cockatoo (EN, en) and potentially Southern Greater Glider (EN, en) at Haydens Hill)</li> <li>Impacted woodland habitat located at Lexton and Lerderderg, hollows with an opening greater than 5cm diameter (to support the smaller arboreal fauna group, potentially Brush-tailed Phascogale (vu), that inhabits these areas).</li> </ol> </li> <li>Measures to maximise reuse of cleared native vegetation such as logs, salvaged hollows and other coarse woody debris for habitat in suitable areas (i.e. vegetated areas where practicable), subject to landholder consent</li> <li>Develop tailored construction methods and measures to minimise removal of native vegetation in patches of native vegetation where full removal is not required, and to minimise ground disturbance in patches of native vegetation where works are required where practicable</li> <li>Requirements for reestablishment of areas of native vegetation removed during construction works in areas that are not required to be maintained clear of native vegetation during operation of the transmission line (e.g. temporary access tracks)</li> <li>Procedures and methods for briefing all contractors and sub-contractors on requirements for the protection of flora and fauna habitat, and response procedures if unexpected threatened species are identified.</li> </ol> </li> <li>The Vegetation Management Plan must include measures to minimise impacts to threatened flora, in areas identified as being habitat or potential habitat for the following threatened flora:             <ol style="list-style-type: none"> <li>Matted Flax-lily (<i>Dianella amoena</i>) (EN, cr)</li> <li>Small Golden Moth Orchid (<i>Diuris basaltica</i>) (EN, cr)</li> <li>Swamp Fireweed (<i>Senecio psilocarpus</i>) (VU)</li> <li>Bacchus Marsh Wattle (<i>Acacia rostriformis</i>) (vu)</li> <li>Cane Spear-grass (<i>Austrostipa breviglumis</i>) (en)</li> <li>Melbourne Yellow-gum (<i>Eucalyptus leucoxylon subsp. connata</i>) (en)</li> <li>Yarra Gum (<i>Eucalyptus yarraensis</i>) (cr)</li> <li>Brittle Greenhood (<i>Pterostylis truncata</i>) (cr)</li> <li>Fragrant Saltbush (<i>Rhagodia parabolica</i>) (vu)</li> <li>Floodplain Fireweed (<i>Senecio campylocarpus</i>) (en)</li> <li>Glaucous Flax-lily (<i>Dianella longifolia</i> var. <i>grandis</i> s.l.) (cr).</li> </ol> </li> <li>The threatened flora measures must address or satisfy as a minimum the following requirements:             <ol style="list-style-type: none"> <li>A seasonal survey of identified potential threatened flora habitat where survey has not been completed under BD1 for seasonal species</li> <li>Identification on the relevant maps prepared under EPR BD1 for confirmed habitat or potential habitat for the threatened flora listed above</li> </ol> </li> </ol>

EPR code	Requirement
	<ul style="list-style-type: none"> <li>c. A process to be followed to avoid as far as practicable any new occurrences of threatened flora which are identified during surveys required under BD1 and BD2(4a)</li> <li>d. Details of species awareness materials to be presented to construction personnel at Project induction and toolbox meetings</li> <li>e. For Brittle Greenhood (cr) (between towers F4515DL and F4374DL S), use of heavy machinery is to be avoided where practicable, and ground disturbance is to be minimised for all construction works including tree removal.</li> </ul> <p>5. The Vegetation Management Plan must define post construction monitoring requirements and time frame required to confirm compliance with management plans, including:</p> <ul style="list-style-type: none"> <li>a. The condition and extent of native vegetation, including TECs, and threatened flora</li> <li>b. Works associated with revegetation and remediation</li> <li>c. Weed management.</li> </ul>
EPR BD3	<p><b>Develop and implement a Fauna Management Plan</b></p> <p>1. Prior to the commencement of construction, develop and implement a Fauna Management Plan in consultation with DEECA to avoid and minimise impacts to native fauna during construction. The Fauna Management Plan must be a sub plan to the CEMP and include as a minimum the following requirements:</p> <ul style="list-style-type: none"> <li>a. To undertake pre-clearing inspections and supervise habitat removal by a qualified and experience ecologist or wildlife handler. Any fauna protected under the <i>Wildlife Act 1975</i> that is disturbed in the process must be safely relocated to the nearest suitable habitat outside the Construction Footprint</li> <li>b. Measures to avoid entrapment of fauna in excavations (e.g., by ensuring excavations are not left open overnight or installing temporary fencing to prevent fauna access and undertaking daily inspections of excavations before starting works for the day) where practicable</li> <li>c. Fauna that may be displaced due to habitat removal or encountered on site during construction works, must be managed in compliance with the <i>Wildlife Act 1975</i></li> <li>d. Measures to map active eagle (such as Wedge-tailed Eagle, White bellied Sea Eagle) nest locations in suitable breeding habitat- forested areas with large trees and measures to minimise impacts such as applying spatial or temporal buffers to works in proximity to active nests during breeding season</li> <li>e. Identify opportunities where nest box and artificial hollows could be installed where hollow salvage is not practicable, or in areas that could benefit from the addition of them, subject to landholders providing consent for placement on their land, and requirements to deploy nest boxes and artificial hollows in specified circumstances.</li> </ul>
EPR BD4	<p><b>Develop and implement Threatened Fauna Management Plans</b></p> <p>1. Prior to the commencement of construction, develop and implement Fauna Management Plans, in consultation with DEECA and DCCEEW where relevant, to minimise potential impacts to identified or potential habitat for threatened fauna species. The plans must be prepared for the following species:</p> <ul style="list-style-type: none"> <li>a. Brown Toadlet (<i>Pseudophryne bibronii</i>) (en)</li> <li>b. Western Burrowing Crayfish (<i>Engaeus merozetosus</i>) (en)</li> <li>c. Growling Grass Frog (<i>Litoria raniformis</i>) (VU, vu)</li> <li>d. Swift Parrot (<i>Lathamus discolor</i>) (CR, cr)</li> <li>e. Barking Owl (<i>Ninox connivens</i>) (cr)</li> <li>f. Powerful Owl (<i>Ninox strenua</i>) (vu)</li> <li>g. Masked Owl (<i>Tyto novaehollandiae</i>) (cr)</li> <li>h. Golden Sun Moth (<i>Synemon plana</i>) (VU, vu)</li> <li>i. Fat-tailed Dunnart (<i>Sminthopsis crassicaudata</i>) (vu)</li> <li>j. Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>) (vu)</li> <li>k. Southern Greater Glider (<i>Petauroides volans</i>) (EN, en)</li> <li>l. Platypus (<i>Ornithorhynchus anatinus</i>) (vu)</li> <li>m. Tussock Skink (<i>Pseudemoia pagenstecheri</i>) (en)</li> <li>n. Striped Legless Lizard (<i>Delma impar</i>) (VU, en)</li> <li>o. Victorian Grassland Earless Dragon (<i>Tympanocryptis pinguicolla</i>) (CR, cr).</li> </ul> <p>2. The threatened fauna management plans must include requirements for:</p> <ul style="list-style-type: none"> <li>a. Identification on the relevant maps prepared under EPR BD1 for confirmed habitat or potential habitat for the threatened fauna listed above</li> </ul>

EPR code	Requirement
	<ul style="list-style-type: none"> <li>b. Avoiding construction activities in identified habitat for threatened fauna if occupied during breeding season to the extent practicable, (in particular for: Brush-tailed Phascogale; Growling Grass Frog (VU, vu); Powerful Owl (vu); Barking Owl (cr))</li> <li>c. Retention of groundstorey and shrub layer in the easement where possible and identify opportunities to increase cover particularly in areas of habitat for woodland birds, Brown Toadlet (en) and Brush-tailed Phascogale (vu)</li> <li>d. Apply recommendations from the Growling Grass Frog Crossing Design Standards (DELWP, 2017b) where required access tracks cross or impact on mapped aquatic habitat for the species.</li> <li>e. Identification and installation of measures to support movement for Brush-tailed Phascogale (vu) and Southern Greater Glider (EN, en) in identified habitat that is fragmented by the Project Area. This is likely to require rope bridges (near Lexton between F6120DL and F6123DL, Darley between F4649DL and F4387DL, Djerriwarrh Creek between F4608DL and F4609DL) and glider poles (at Haydens Hill between F4399DL and F4404DL) across the transmission line easement at approximately 50m intervals where retained canopy vegetation is available on both sides of the clearing. The height of glider poles shall be established in accordance with the Electricity Safety Regulations and subject to landholder discussion and agreement of placement.</li> <li>f. Define reporting and post construction monitoring requirements and time frames to: <ul style="list-style-type: none"> <li>i. Confirm compliance with management plans to demonstrate impacts have been managed; and</li> <li>ii. Determine effectiveness of installed habitat (e.g. salvaged hollows, artificial hollows, nest boxes) and connectivity measures (e.g. glider poles and rope-bridges).</li> </ul> </li> <li>g. Preparation of species awareness materials on threatened fauna to be presented to construction personnel at Project induction and toolbox meetings (e.g. glider poles and rope-bridges)</li> <li>h. Installation of signage along access routes through habitat for threatened fauna to raise awareness of wildlife crossings and implementation measures such as reduced vehicle speeds to minimise the risk of collisions with wildlife.</li> </ul>
EPR BD5	<p><b>Develop and implement a Collision Risk Management Plan</b></p> <ol style="list-style-type: none"> <li>1. Prior to the commencement of construction, develop and implement a Collision Risk Management Plan, in consultation with DEECA, to minimise the potential for bird and bat collisions with transmission line infrastructure. The plan should: <ul style="list-style-type: none"> <li>a. Identify key collision risk areas for the Project, focussing on areas of high bird utilisation, habitat for species identified as high risk or in proximity to key habitat features (wetlands, riparian corridors, movement corridors)</li> <li>b. Describe mitigation measures to be implemented for key collision risk areas during construction and operation of the Project (e.g. larger wire diameters or vertical line marking such as bird flappers or diverters)</li> <li>c. Describe a carcass monitoring plan (post construction) to assess success of mitigation measures applied and to identify any further areas of collision concern, that require mitigation measures to be applied.</li> </ul> </li> </ol>
EPR BD6	<p><b>Develop and implement measures to manage riparian and aquatic habitat</b></p> <ol style="list-style-type: none"> <li>1. Prior to commencement of construction, develop and implement measures to avoid and minimise, to the extent reasonably practicable, short and long-term adverse impacts on riparian, riverbed and aquatic habitat, and aquatic fauna connectivity during construction activities. The measures must be developed in consultation with the relevant catchment management authorities, and be documented in the CEMP. Measures should include as a minimum but not limited to: <ul style="list-style-type: none"> <li>a. Retaining understorey and ground cover vegetation in the riparian area, and tree stumps to maintain bank stability and retaining in-stream habitat features such as woody snags where practicable</li> <li>b. Identifying areas of revegetation and location where fencing will enhance the success of the revegetation (in consultation with landholders)</li> <li>c. Standard erosion and sediment control measures as outlined in EPA Victoria construction guidelines (Publications 275, 1820.1 and 1834.1) along waterways during the construction period</li> <li>d. Establishment of native vegetation in any riparian areas disturbed during construction that are not otherwise required for the operation of the Project.</li> </ul> </li> </ol>
EPR BD7	<p><b>Develop and implement an Operational Vegetation and Habitat Management Plan</b></p> <ol style="list-style-type: none"> <li>1. Prior to the commencement of operation of the Project, develop and implement an Operational Vegetation and Habitat Management Plan in consultation with DEECA that sets out the requirements and methods for protection of native vegetation and flora and fauna habitat during operations and in accordance with the Electricity Act Regulations.</li> </ol>

EPR code	Requirement
	<p>2. The plan should include, as a minimum:</p> <ul style="list-style-type: none"> <li>a. Within areas identified as containing high densities of threatened flora (between Swans Road and Camerons Road, Darley), where native understorey vegetation is to be maintained within the easement area (outside permanent hardstand sites and access tracks), clearing of native vegetation must be limited to canopy trees &gt;3m only, ensuring minimal disturbance to the understorey (refer to Appendix O.3 of <b>EES Technical Report A: Biodiversity Impact Assessment</b>)</li> <li>b. Within identified habitat for Brittle Greenhood (cr) (between towers F4515DL and F4374DL S) (refer to Appendix O.3 of <b>EES Technical Report A: Biodiversity Impact Assessment</b>), use of heavy machinery is to be avoided where practicable, and ground disturbance is to be minimised</li> <li>c. Implementation of appropriate measures to manage the risk of the spread and treat the introduction of pest animals, weeds and pathogens</li> <li>d. Processes to manage any spread of weeds and pathogens resulting from ongoing maintenance works within easement.</li> </ul>
EPR BD8	<p><b>Complete ecological surveys and finalise design for TEC – White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (WBYB)</b></p> <p>Complete ecological surveys and finalise design for TEC – White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (WBYB).</p> <p>Prior to the finalisation of the detailed design for an area, complete survey for areas yet to be surveyed and where impacts to WBYB TEC cannot be avoided.</p> <p>Undertake design refinements and establish no go zones to avoid or minimise impacts to WBYB TEC so that impacts do not exceed the area of removal as assessed within <b>EES Technical Report A: Biodiversity Impact Assessment</b>. When finalising the detailed design update mapping in accordance with BD 1. Impacts that cannot be avoided will require offsets under the EPBC Act.</p>

Other EPRs contribute to a reduction in the magnitude, extent and duration of impacts for biodiversity and habitat values. Additional EPRs related to biodiversity and habitat include:

- EPR AQ1 – Develop and implement an Air Quality Management Plan
- EPR EM2 – Develop and implement a Construction Environmental Management Plan
- EPR EM8 – Develop and implement a Biosecurity Management Plan
- EPR EM11 – Develop and implement a Decommissioning Management Plan
- EPR NV1 – Develop and implement a Construction Noise and Vibration Management Plan
- EPR NV2 – Minimise construction outside of Normal Working Hours
- EPR NV3 – Minimise construction vibration impacts on amenity
- EPR SW1 – Site works to reduce the potential for surface water impact.

The EPRs for biodiversity will work in conjunction with the EPRs for surface water, groundwater, noise and vibration, to manage identified potential impacts to biodiversity. It has also been identified in the cultural values assessment (**Chapter 9: Aboriginal cultural heritage**) that particular species and remnant vegetation hold cultural significance. Therefore, outputs from engagement through EPR ACH2 will be applied alongside biodiversity mitigations where relevant. Refer to the relevant technical chapters and **Chapter 29: Environmental Management Framework** for full detail of these EPRs.

Monitoring will be undertaken during the construction and operation stages of the Project, as required by the relevant Management Plans. A monitoring plan will be developed, that details monitoring activities and timeframes. This plan will consider the ongoing presence, extent and quality of threatened flora species and TECs within the Project easement, weed densities in areas of native vegetation, the effectiveness and integrity of specific mitigation measures (such as rope bridges and glider poles), revegetation efforts, and collision mortality rates in birds and bats. The objectives of proposed monitoring programs for the Project required by the EPRs, and the proposed change management process for design refinement in accordance with the endorsed Development Plans, are outlined in **Chapter 29: Environmental Management Framework**.



## 8.10 Summary of residual impacts

Development of the Project sought to avoid areas of native vegetation and ecological value. Application of measures to comply with EPRs seeks to further reduce impacts to biodiversity within the Project Area. Residual impacts (after implementation of mitigation measures) are summarised below for construction and operation. For most species, although the reduction in impact following implementation of mitigation will be meaningful, the impact significance ratings are considered to remain the same as the potential impact rating as there is not a large enough reduction to result in a change in impact category. Generally, the greatest impact on biodiversity during construction and operation is related to the removal of vegetation/habitat. While the proposed EPRs and associated mitigation measures will minimise further impacts, they do not result in a substantial reduction of the vegetation/habitat clearing proposed. Therefore, the mitigation measures provide a marginal reduction in predicted impact to these species and the residual impact remains in the same impact category for most species.

It is noted that these residual impacts include consideration of impacts to the Easement Corridor, which is a conservative approach as it assumes impacts to all areas of the Easement Corridor, even where no works or vegetation removal may be planned. Therefore, residual impacts will be further reduced through the application of additional survey information and detailed design refinement to reduce the area of impact within the easement. Prior to the start of construction, completion of surveys is required to confirm the locations of ecological values that have been assumed (where survey has not yet been undertaken), and identify the extent of native vegetation and species habitat. The outcomes of the finalised surveys will inform micro-siting and the development of no go zones to reduce the overall area of impact within the easement, where practicable (EPR BD1).

The residual impacts to biodiversity from construction and operation include:

- Residual impacts to native vegetation during construction and operation are considered to be moderate. This considers impacts due to ongoing vegetation management within the easement during operation. Loss of native vegetation has been avoided through design and implementation of a Vegetation Management Plan (EPR BD2) will further reduce impact.
- Residual impacts to TECs during construction and operation are considered to be high to low-moderate (depending on species) as the Project will result in unavoidable impacts to three EPBC Act listed TECs and six FFG Act listed TECs. Of these, only the Grey Box (*Eucalyptus microcarpa*) Grassy Woodland and Derived Native Grasslands of South-eastern Australia is considered to have a high residual impact. Three EPBC Act listed TECs are likely to be significantly impacted, including:
  - Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia, where 12.48ha has been recorded within the Project Area and which 6.79ha may be impacted by the Project. A further 9.82ha of EVC equivalent for this TEC may potentially occur in the Project Area where a field survey has not been completed. The residual impact is expected to be high and a significant impact under the EPBC Act is likely due to reduction in the extent of an ecological community, potential fragmentation of an ecological community, and likely change in the species composition of an occurrence of an ecological community.
  - Natural Temperate Grassland of the Victorian Volcanic Plain, where 38.05ha has been recorded within the Project Area and which 4.47ha may be impacted by the Project. A further 0.90ha of EVC equivalent for this TEC may potentially occur in areas of the Construction Footprint where a field survey has not been completed. The residual impact is expected to be moderate and a significant impact under the EPBC Act is likely due to reduction in the extent of an ecological community.
  - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – This community has not been recorded within the Project Area. However, 17ha of potential habitat is modelled to occur within the Construction Footprint, in areas not yet surveyed. Desktop review indicates that some of these areas are likely to support the TEC, and this worst-case assessment assumes 5ha may be impacted. A significant impact is possible given avoidance of this community could be difficult if a significantly sized patch is identified.

- Moderate impacts are anticipated for two of the six FFG Act listed TECs, including:
  - Creekline Grassy Woodland (Goldfields) Community, where 9.69ha has been recorded within the Project Area and which 6.05ha may be impacted by the Project. A further 1.26ha of potential habitat (areas not yet surveyed) occurs within the Construction Footprint. The residual impact is expected to be moderate as some fragmentation of patches will occur at a local scale; however, this occurs within a highly fragmented landscape where the additional impacts are unlikely to cause a substantial change in the species composition or long-term persistence of the TEC.
  - Rocky Chenopod Open Scrub Community, where 4.23ha has been recorded within the Project Area and which 2.44ha may be impacted by the Project. A further 14.89ha of potential habitat (areas not surveyed) may also be impacted. The residual impact is expected to be moderate given the restricted extent of the community within Victoria (less than 200ha). However, impacts are considered highly conservative and that the areas of TEC identified for disturbance are degraded and fragmented in nature.
- Residual impacts to threatened flora during construction and operation are considered to be high to low-moderate (depending on species) and will be managed via Threatened Flora Management Plans which includes the controls to prevent unauthorised disturbance. The Project will result in unavoidable impacts to three EPBC Act listed species (two of which are listed under both The EPBC Act and the FFG Act) and 10 species listed only under the FFG Act. However, the EPBC Act listed flora are unlikely to be significantly impacted. The residual impact for some species cannot be reduced where direct removal is required to facilitate the construction and operation of the Project, particularly impacting trees and species greater than 3m in height, such as the Melbourne Yellow-Gum, or where species are sensitive to potential canopy loss such as the Brittle Greenhood. These two FFG Act listed flora species will have a high residual impact:
  - Brittle Greenhood, where approximately 1,388 individuals and 20.60ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be high as the long-term survival of the population is considered at risk.
  - Melbourne Yellow Gum. Approximately 400 individuals and 19.42ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be high as there will need to be substantial canopy reduction in some patches including along the northern boundary fence of MacPherson Park.
- Five FFG Act listed flora species will have a moderate residual impact, including:
  - Buloke. 27 individuals and 47.25ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as clearing is required, the number of individuals to be cleared and modelled potential extent is relatively small compared to the total known extent.
  - Brooker's Gum. 233 individuals and 22.83ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as at a state level, impact to 233 individuals may be considered notable when compared to the lower end of the inferred population range of 5,000 to 35,000. However, fragmentation impacts are not anticipated to affect the viability of the population, with pollination expected to continue across fragmented areas.
  - Yarra Gum. 63 individuals and 40.32ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as considering the species' relatively restricted distribution at the state level, clearing may carry greater significance. However, at the local level, the viability of the population is not anticipated to be affected by the Project, considering the size of the population and that pollination is expected to continue across fragmented areas.

- Bacchus Marsh Wattle. 500 individuals and 21.53ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as 500 individuals are to be cleared, considering the local abundance of the species and continuous nature of the vegetation within the Project area, the impact to the species is considered unlikely to affect the viability of the population. Additionally, as the species will persist under the conductors, it is unlikely that the Project will cause population fragmentation.
- Fragrant Saltbush. Approximately 3,081 individuals and 33.05ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as the Project is anticipated to impact a notable number of individuals, when considering the species' abundance within the Project Area and surrounds. This impact is not anticipated to affect the viability of the population.
- Residual impacts to threatened fauna during construction and operation are considered to be moderate to low. This includes impacts associated with fragmentation, and collision and electrocution during operation. Threatened Fauna Management Plans will be developed and implemented prior to construction and will require a qualified and experienced ecologist or wildlife handler to be present during the clearing of identified habitat trees to facilitate relocation and minimise impacts so far as reasonably practicable. The Project will result in unavoidable impacts to 13 EPBC Act listed threatened fauna species (11 of which are listed under both acts) and 25 species listed only under the FFG Act. Residual impacts are considered to be moderate for four of these species, including:
  - Golden Sun Moth (EPBC and FFG Act). Forty individuals recorded in the Project Area with 9.71ha of confirmed habitat and 11.29ha of potential habitat (not yet surveyed) that may be impacted by the Project. The residual impact rating is expected to be moderate and a significant impact under the EPBC Act impact is possible as the Project could lead to the long-term decrease in the size of an important population and reduce the area of occupancy an important population.
  - Striped Legless Lizard (EPBC and FFG Act). 1.44ha of field mapped potential habitat may be impacted by the Project. The residual impact is expected to be moderate and a significant impact under the EPBC Act impact is possible as the Project may reduce the area of occupancy of an important population to a small degree.
  - Victorian Grassland Earless Dragon (EPBC and FFG Act). 3.48ha of field mapped potential habitat may be impacted by the Project. The residual impact is expected to be moderate and a significant impact under the EPBC Act impact is possible as the species is restricted and loss of utilised habitat may lead to a decrease in area of occupancy.
  - Tussock Skink (FFG Act). 2.04ha of confirmed habitat and 1.31ha of potential habitat (not yet surveyed) may be impacted by the Project. The residual impact is expected to be moderate as the species is susceptible to ground disturbance and the impacts are considered to be a reduction in species occupancy.
- Residual impacts to bird species from collision with the operational infrastructure will vary depending on species; however, these are considered to be moderate to low. Whilst population level impacts are not anticipated to occur for any species, measures to further reduce any impact associated with the transmission line will be made. This includes development of a Collision Risk Management Plan (EPR BD5), incorporating specific mitigation measures to reduce collision risk such as vertical line marking and sensitive structural designs.
- Residual impacts to wetland areas during construction and operation are considered to be moderate to low. Impacts to eight DEECA mapped wetlands are considered unavoidable, and further impacts may occur due to the removal of vegetation.
- Residual impacts to fauna behaviour due to EMF emitted during operation are considered to be low. There is no evidence that supports the possibility that the Project will have a negative impact on foraging success, reproductive behaviour, navigation or movement of wildlife.

- Residual impacts to biodiversity and habitat values during decommissioning will be managed in accordance with the conditions of the time and will be incorporated into the Decommissioning Management Plan (EPR EM11).
- Impacts will be offset in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a) and *EPBC Act Environmental Offsets Policy* (DSEWPaC, 2012), discussed further in Section 8.11.

With the implementation of measures to comply with EPRs, it is considered that the Project meets the biodiversity and habitat aspects of the following evaluation objectives:

- “Avoid, and where avoidance is not possible, minimise potential adverse effects on protected native vegetation and animals (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements consistent with state and Commonwealth policies.”
- “Maintain the functions and values of aquatic environments, surface water and groundwater quality and stream flows and prevent adverse effects on protected beneficial uses.”

## 8.11 Offset requirements

**Attachment VI: Offset Management Strategy** outlines the approach to biodiversity offsets for the Project, in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPaC, 2012) (for offsets required under Commonwealth laws) and *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a) (for offsets required under State laws). A summary of estimated State offsets required is outlined in Table 8.24. A summary of estimated Commonwealth offsets required is outlined in Table 8.25.

The Project has adopted a precautionary approach, therefore the offset calculations have been assessed for the ‘worst case scenario’, whereby both confirmed and potential impacts are included as a total area. This includes consideration of the easement corridor, which is highly conservative as it assumes vegetation will be impacted where no works or vegetation removal is currently planned. However, through design refinements and adoption of no go zones the area of impact within the easement will be reduced.

These offset requirements are considered indicative, and will be reduced during the post-approval process, through design refinement, as the area of impact will be reduced following further field surveys, implementation of EPRs (i.e., no go zones) and identification of further opportunities for design refinement.

Table 8.24 Native vegetation offset requirements under the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a)

Offset requirements		
General offset	General offset amount	2.832 general offset units
	Vicinity	Corangamite, North Central, Port Phillip and Westernport, Wimmera Catchment Management Authority (CMA) or Ballarat City, Hepburn Shire, Melton City, Moorabool Shire, Northern Grampians Shire, Pyrenees Shire Councils
	Minimum strategic biodiversity value score	0.277
	Large trees	44 large trees
Species offset	Species offset amount	24.821 SHU* Spotted Hyacinth-orchid, <i>Dipodium pardalinum</i> 23.146 SHU Victorian Grassland Earless Dragon, <i>Tympanocryptis pinguicolla</i> 102.005 SHU Golden Sun Moth, <i>Synemon plana</i> 20.275 SHU Wiry Bossiaea, <i>Bossiaea cordigera</i> 29.596 SHU Brooker's Gum, <i>Eucalyptus brookeriana</i> 86.892 SHU Gum, <i>Eucalyptus yarraensis</i> 6.790 SHU Small Golden Moths, <i>Diuris basaltica</i> 33.951 SHU Goldfields Grevillea, <i>Grevillea dryophylla</i> 16.956 SHU Ben Major Grevillea, <i>Grevillea floripendula</i> 12.247 species units of habitat for Brittle Greenhood, <i>Pterostylis truncata</i> 26.292 SHU Fragrant Saltbush, <i>Rhagodia parabolica</i> 20.415 SHU Heath Spear-grass, <i>Austrostipa exilis</i> 23.397 SHU Melbourne Yellow-gum, <i>Eucalyptus leucoxylon</i> subsp. <i>connata</i> 4.483 SHU Golden Bush-pea, <i>Pultenaea gunnii</i> subsp. <i>tuberculata</i> 24.135 SHU Wombat Bush-pea, <i>Pultenaea reflexifolia</i> 0.672 SHU Red-sheath Tussock-grass, <i>Poa amplexicaulis</i> 57.628 SHU Matted Flax-lily, <i>Dianella amoena</i> 21.541 SHU Bacchus Marsh Wattle, <i>Acacia rostriformis</i> 15.054 SHU Shiny Leionema, <i>Leionema lamprophyllum</i> subsp. <i>obovatum</i> 2.789 SHU Gum-barked Bundy, <i>Eucalyptus goniocalyx</i> subsp. <i>laxa</i> 3.494 SHU Werribee Blue-box, <i>Eucalyptus baueriana</i> subsp. <i>thalassina</i>
	Large trees	947 trees
The total number of large trees that the offset must protect		991 large trees (inclusive of above totals) to be protected in either the general, species or combination across all habitat units protected

\* Species Habitat Unit (SHU)

Table 8.25 EPBC Act offset requirement

Offset type	Significant impact	Field mapped and modelled data combined to represent an estimated worst-case scenario	Area impacted (ha)	Quality score	Quantum of impact (ha)	Area to be offset (ha)
TEC						
Grey Box ( <i>Eucalyptus microcarpa</i> ) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Likely	Field mapped	6.79	5	3.4	55
		Modelled data	9.82	5	4.91	79.03
		Worst-case TEC impact	16.61	5	8.31	140
Natural Temperate Grassland of the Victorian Volcanic Plain	Likely	Field mapped	4.47	3	1.34	38
		Modelled data	0.9	3	0.27	7.45
		Worst-case TEC impact	5.37	3	1.61	45
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland	Possible	Field mapped	0.00	-	-	-
		Modelled data	17.00*	-	-	-
		Worst-case# TEC impact	5.00*	3	1.50	41.38
Threatened species						
Golden Sun Moth habitat	Possible	Field mapped	9.71	4	3.88	58
		Modelled data	11.29	4	4.52	65.81
		Worst-case habitat impact	21.00	4	8.4	125
Southern Greater Glider habitat	Possible	Field mapped	12.06	4	4.82	77.68
Victorian Grassland Earless Dragon habitat	Possible	Field mapped	3.48	3	1.04	30
Striped Legless Lizard	Possible	Field mapped	1.44	3	0.39	6.5

<sup>#</sup> Desktop review, preliminary survey and general survey of nearby areas indicate that most of these areas are unlikely to support the TEC (White Box-Yellow Box-Blakely's Red Gum Grassy Woodland) due to incorrect floristics (e.g., lack of Yellow Box) or relatively small size and poor quality of patches that do not meet the condition thresholds to qualify.

\*While 17ha of modelled potential extent occurs, it is estimated that no more than 5ha is likely to qualify as the TEC. This will be further refined with on-ground surveys.





ISBN 978-1-7641235-5-6

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