

HAZELWOOD REHABILITATION PROJECT

Attachment 4

Preliminary ecology appraisal report

Prepared for ENGIE Hazelwood ABN: 40 924 759 557



Preliminary ecology appraisal report

Hazelwood Rehabilitation Project Referrals

25-Nov-2021 Hazelwood Rehabilitation Project Doc No. Document No



Delivering a better world

Preliminary ecology appraisal report

Hazelwood Rehabilitation Project Referrals

Client: ENGIE Hazelwood

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Abbreviations

Term	Definition
AECOM	AECOM Australia Pty Ltd
BCS	Biodiversity Conservation Status
CPS	Components, processes and services
CR	Critically Endangered
DAWE	Department of Agriculture, Water and Environment
DELWP	Department of Environment, Land, Water and Planning
ECD	Ecological character descriptions
EES	Environment Effects Statement
EN	Endangered
EPA	Environment Protection Authority Victoria
EVC	Ecological vegetation class
GDE	Groundwater Dependant Ecosystems
GL	Gigalitre
GRGGW	Gippsland Red Gum (<i>Eucalyptus tereticornis subsp. mediana</i>) Grassy Woodland
HARA	Hazelwood Ash Retention Area
HCP	Hazelwood Cooling Pond
HPC	Hazelwood Power Corporation Pty Ltd
HPP	Hazelwood Power Partnership
LAC	Limits of acceptable change
m AHD	Metres Australian Height Datum
MNES	Matters National of Environmental Significance
MRD	Hazelwood Morwell River Diversion
MRFD	Hazelwood Morwell River Flood Diversion
PMST	Protected Matters Search Tool
RCP	Rehabilitation and Closure Plan
RL	Relative level
TEC	Threatened ecological community
VBA	Victorian Biodiversity Atlas
VU	Vulnerable

Executive Summary

AECOM Australia Pty Ltd (AECOM) has been commissioned by ENGIE Hazelwood to assist with the preparation of referrals under the *Environment Effects Act 1978* (Vic) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) for the ENGIE Hazelwood Rehabilitation Project (the Project). This Project involves the rehabilitation of the former Hazelwood Mine and Power Station to a safe, stable and sustainable landform. It builds on other rehabilitation activities at the site under existing approvals that are underway or completed.

Critical to informing both the referral and the Minister's consideration of the impacts of the Project is an understanding of the contemporary ecological values that exist within and adjacent to, the boundaries of the Hazelwood Mine and Power Station.

Much historical survey work has been completed within the Project Area, dating back to the referral of the West Field Project. Since that time, numerous ecological investigations have been undertaken, some to evaluate the impacts associated with the continuous operation of the Mine and Power Station, and more recently, to begin to understand the potential ecological impacts of the Project.

AECOM have undertaken a review of available literature to synthesise the findings of past ecological investigations within the Project Area. This has been augmented by a desktop review of State and Commonwealth government databases for records of significant species and ecological communities within the study area and surrounding landscape. This has allowed for a preliminary appraisal of the potential ecological impacts associated with the Project, and for the development of initial mitigation strategies designed to minimise potential impacts of the Project on those matters of particular ecological significance, For the purposes of this appraisal, significant ecological values were considered to be species, communities and wetlands that are protected under the *Flora and Fauna Guarantee Act 1988* (Vic) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Despite the number of past reports relevant to the Project Area, the contemporary extent and quality of remnant vegetation is not completely understood. Whilst many of the relevant ecological reports do provide a reasonable discussion of the quality of the vegetation on site at the time of the assessment, these patches were then subsequently removed in connection with the relevant works. Other reports have been based solely on desktop database reviews, and it is unclear whether these aging datasets bear any resemblance to the existing on-site conditions. Accordingly, a revised desktop analysis has been provided for this appraisal.

Covering about 4000 hectares, the Project Area was revealed to have suffered from a longer-term history of significant modification during its life as a coal mine and Power Station and for agricultural use. Only scattered and isolated patches of native vegetation remain. These areas of remnant vegetation vary in condition from relatively intact indigenous vegetation with low weed levels to stands of trees with a completely exotic understory. It is possible, although unlikely, that the remnant vegetation on site may be of sufficient quality to be considered representative of the three Commonwealth-listed vegetation communities that have been modelled to occur within the Project Area- Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland (GRGGW) and Associated Native Grassland, listed as critically endangered under the *EPBC Act*, Forest Red Gum Grassy Woodland Community, listed as a threatened ecological community (TEC) under the *FFG Act* and/or Central Gippsland Plains Grassland Community.

The Department of Environment, Land Water and Planning (DELWP) modelled vegetation dataset suggests that up to 67 hectares of native vegetation remains within the Project Area. Analysis of the location of the vegetation shows that the vast majority of that vegetation has been modelled as occurring over waterbodies on the site such as the Hazelwood Cooling Pond (HCP). Very few modelled patches actually appear to represent standing remnant vegetation. Given that the HCP is permanently inundated, it is likely to be exempt from the definition of a true wetland, and hence not considered 'native vegetation' as per the definition under Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017).

The literature review and the likelihood of occurrence assessment suggests that up to six significant flora species may persist within the project Area. Of these, four are known to occur, including, Matted

Flax-lily *Dianella amoena* (EPBC: Endangered, FFG: Critically Endangered), Strzelecki Gum *Eucalyptus strzeleckii* (EPBC: Vulnerable, FFG: Critically Endangered), Yarra Gum *Eucalyptus yarraensis* (FFG: Critically Endangered) and Green Scentbark *Eucalyptus fulgens* (FFG: Endangered).

A further two species had not been recorded during past surveys but were considered to have a high likelihood of occurrence – Grey Billy-buttons *Craspedia canens* (FFG: Critically Endangered) and River Swamp Wallaby-grass *Amphibromus fluitans* (EPBC: Vulnerable).

From a fauna perspective, the diversity (rather than the quality) of habitats across the Project Area has influenced a comparatively long list of species of conservation significance that have the potential to persist. The majority of these species were water birds that potentially make use of the watercourses within the Project Area, but make particular use of the HCP. Of these species, most were assessed as possible foraging visitors, including most of these listed as migratory or marine under the EPBC Act. Their presence within the Project Area is likely to be on a temporary and opportunistic basis. For other faunal groups, Grey-headed Flying Fox *Pteropus poliocephalus* (EPBC: Vulnerable), and Dwarf Galaxias *Galaxiella pusilla* (EPBC: Vulnerable) were also considered to have a high likelihood of occurrence with Grey-headed Flying Fox considered to have the potential to use the site for opportunistic foraging. Dwarf Galaxias is considered likely to make use of some of the habitats in the site, but particularly those associated with ephemeral drainage lines and potentially, Eel Hole Creek and Wilderness Creek. The potential use of the Project Area by Australian Grayling *Protoroctes maraena* (EPBC: Vulnerable) is less clearly understood, but the Morwell River may include suitable habitat.

The Gippsland Lakes Ramsar site was listed in 1982 due to its high ecological values and features. It is located east of the Latrobe Valley and south of the Eastern Highlands. The Gippsland Lakes are approximately 70 kilometres east of the Project Area. The Morwell River runs along the western border of the Project Area and flows north into the Latrobe River. The Latrobe River then runs east and flows into Lake Wellington which forms part of the Gippsland Lakes Ramsar site. Notwithstanding that the Morwell River constitutes a modest proportion of the entire Latrobe River catchment, changes to flows and water quality within the Morwell River have the potential to cause changes downstream. Accordingly, further investigations are needed to quantify the extent of the risk of the Project and assess potential impacts to the ecological character of the Gippsland Lakes in accordance with the limits of acceptable change.

Detailed field assessments within the Project Area are required to gain a greater appreciation of the value and location of any ecological assets that persist within the site. That said, the many past reports commissioned provide valuable insight into those ecological assets that remain, as well as describing the location of potential habitats that may encourage continued habitation of significant flora and fauna species at the site. The knowledge of the location of these values will greatly assist in the Project planning phases, allowing the principles of avoidance and minimisation to be practised where practicable, and to allow the development of measurable environmental performance requirements that are responsive to the values of the site. The Project provides significant opportunities to improve the ecological functionality of valuable habitats within the site, and a rare chance to restore highly valuable regional landscape connections through the restoration of waterways that have been modified over the lifespan of the Hazelwood Mine.

1.0 Introduction

The ENGIE Hazelwood Rehabilitation Project (the Project) involves the rehabilitation of the former Hazelwood Mine and Power Station to a safe, stable and sustainable landform.

The purpose of this report is to provide a preliminary appraisal of the potential ecological impacts associated with the Project (based on available desktop information) to inform the preparation of referrals under the *Environment Effects Act 1978* (Vic) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

1.1 Background

The site of the former Hazelwood Mine and Power Station is located in the Latrobe Valley in Victoria, immediately south of the township of Morwell, approximately 150 kilometres east of Melbourne. The broader Hazelwood site comprises approximately 4,000 hectares, including 3,258 hectares covered by Mining Licence MIN5004 (the 1,281-hectare former Hazelwood Mine, comprising a void between 70 and 130 metres deep and including the internal Hazelwood Ash Retention Area (HARA) ash landfill and overburden dump areas), operational SP AusNet Hazelwood Switchyard, decommissioned Hazelwood Power Station (the Power Block), 524-hectare Hazelwood Cooling Pond (HCP) and various other leased areas. The boundary of the Project Area is shown in Figure 1-1.

Key existing licences for the Hazelwood Mine comprise:

- MIN5004 under the Mineral Resources (Sustainable Development) Act 1990 (Vic) (MRSD Act) held by the Hazelwood Power Corporation Pty Ltd (HPC)
- EPA Operational Licence OL0046436 held under the *Environment Protection Act 1970* (Vic) as recently re-issued under the *Environment Protection Act 2017* (Vic) (EP Act) held by the Hazelwood Power Partnership (HPP) entities.



Figure 1-1 Project Area

Rehabilitation and demolition activities began in 2017 after the operational closure of the former Hazelwood Mine and Power Station. A range of rehabilitation activities are currently approved under Mining Licence MIN5004 and separate approvals including:

- Demolition of the Power Block and redundant infrastructure
- Decommissioning of groundwater pumping infrastructure and associated services on the Mine floor
- Earthworks on the northern batters
- Construction of the Hazelwood Morwell River Flood Diversion (Hazelwood MRFD) emergency flood diversion infrastructure, to assist in safeguarding the Yallourn Mine
- Ongoing management activities, including:
 - Water management (collection, treatment, monitoring, reporting)
 - Hydrogeological and geotechnical monitoring and reporting
 - Maintaining and operating infrastructure necessary to maintain safe and stable conditions (e.g. fire service pumps, aquifer bores and pumps)
 - Management of landfills and related audits and reporting to EPA Victoria under existing EPA Operational Licence OL0046436
 - Environmental monitoring and management.
- Environmental investigations and remediation works undertaken pursuant to post-closure Clean up Notices issued by EPA Victoria, which require statutory audits under section 53V (for the Mine void) and section 53X (for the remainder of the Project Area) of the *Environment Protection Act 1970* and development of clean up plans.

These activities therefore do not form part of the proposal that is the subject of the referrals.

Under section 84AZU(3)(b) of the MRSD Act, a Declared Mine Rehabilitation Plan must be prepared by the declared Mine licensee to facilitate the "closure" of the Mine on declared Mine land.

The Project would address the geotechnical, hydrogeological, water quality or hydrogeological factors within the Mine that pose a significant risk to public safety, the environment or infrastructure. This requires the decommissioning, rehabilitation and change of land use on which the project is situated.

1.2 Study objectives

The study objectives are to:

- Review available desktop information in relation to ecological values relevant to the Project
- Identify and describe ecological values at or near the Project Area with particular focus on values protected under the *Flora and Fauna Guarantee Act 1988*, *Planning and Environment Act 1987, Environment Effects Act 1978* and the EPBC Act.
- Undertake a preliminary evaluation of the potential impacts of the Project on the ecological values
- Document uncertainties associated with the preliminary appraisals and identify additional work needed to fully assess the potential impacts of the Project on significant ecological values.

2.0 Project overview

The proposed final landform for the former Hazelwood Mine void is a lake to a relative level (RL) of +45 metres Australian Height Datum (m AHD). The proposed lake would provide for ongoing safety and stability of the Mine void (batters and floor), obviate a requirement for ongoing groundwater pumping in perpetuity, minimise fire risk in the M1 coal seam, and provide opportunities for future investment and uses that might be delivered by Government, the local community or the private sector.

A range of redundant mining plant and infrastructure on the Project Area is being progressively decommissioned and demolished. To date, all infrastructure on the Mine floor has been decommissioned. All disused pipework, fittings and concrete above RL +45m AHD would be removed. Sector ponds (established to collect and settle particulates from surface water runoff) located within the Mine lake footprint have been decommissioned and will be inundated by the rising water level.

The coal batters and overburden batters above the final lake level would be reprofiled to a geotechnically 'stable' batter profile. Ash and asbestos landfills on the Project Area (both within and external to the Mine void) would be capped and rehabilitated in accordance with EPA Operational Licence 46436 and ongoing audits, subject to the site's Clean up Notice.

The Mine lake would require approximately 637 gigalitres (GL) of water to be filled to RL +45m AHD, with a maximum depth of 116 metres and covering an area of 1,145 hectares. It is proposed to be filled from the following primary water sources:

- Groundwater obtained under licence from Southern Rural Water
- Bulk water entitlements obtained through commercial agreements with Gippsland Water.

Based on the indicative annual volumes likely to be available from these water sources, the target fill period is between 10 and 20 years.

The Mine lake is proposed to have an interconnection with an external watercourse following filling to maintain the lake level, with the possibility of re-establishing the currently diverted Morwell River to its original pathway through the site.

The HCP, located outside of the MIN5004 area, has current capacity of approximately 20GL. The HCP would remain a water supply for fire prevention purposes while the Mine lake is filling. As Mine lake levels increase, the HCP would be drained following the re-engineering of the Mine's reticulated fire service system, to be entirely supplied from within the Mine. The HCP water may then be diverted into the Mine lake as a contribution towards the fill. The HCP would then be decommissioned, and the underlying land rehabilitated to reinstate the alignment of Eel Hole Creek.

Following lake filling and final rehabilitation of landforms, the Project Area would go through a phase of aftercare, including monitoring and weed and pest management, and relinquishment. It is envisioned that the rehabilitated Hazelwood site would be transformed into land uses that are suitable for a mix of tourism, agriculture, industry, passive recreation and conservation of natural ecosystems.

3.0 Methods

3.1 Desktop assessment

The following State and Commonwealth-curated databases were accessed for records of significant species and ecological communities within the study area and surrounding landscape, and for other general environmental information:

- Victorian Biodiversity Atlas (VBA) administered by the Victorian Government Department of Environment, Land, Water and Planning (DELWP)
- EPBC Act Protected Matters Search Tool (PMST) administered by the Australian Government Department of Agriculture, Water and the Environment (DAWE)
- Naturekit by DELWP for ecological vegetation classes (EVC)
- Aerial photographs
- VicPlan online administered by DELWP for planning information on zones and environmental overlays.

The review of these databases included a five-kilometre buffer around the Project Area (the 'study area') to capture highly mobile fauna species, and to account for the possible lack of historic survey for threatened species in the Project Area.

3.2 Literature review

A review of previous studies that have been completed at the Hazelwood Mine have been synthesized in this report. Any publicly available and client-supplied reports are included. It is noted that the majority of these reports may not necessarily be specific to ecology and ecological constraints at the Project Area, but the ecological information contained with such reports has been provided where known. Reports that have been included in this review include:

- Hazelwood Mine- West Field Project- Flora and Vertebrate Assessment Study (Biosis Research 2003).
- Hazelwood Mine Rehabilitation and Closure Plan- Volume 2 (ENGIE, 2019).
- Hazelwood Cooling Pond Decommissioning- Ecological Assessment (unknown author and date).
- Habitat and Avifauna Assessment- Hazelwood Mine, Rehabilitation Closure Plan- Stage 1, Morwell
 (Wildlife Experiences 2019)
- Ecological Risk Assessment Morwell River Flow Diversion, Jacobs (2020)
- Native vegetation assessment for disused section of Morwell Rover, Hazelwood (Indigenous Design, 2021)
- Preliminary ecological assessment of the Hazelwood Cooling Pond (Indigenous Design, 2020)
- Preliminary ecological assessment of the Hazelwood Mine Site (Indigenous Design, 2019)

3.3 Likelihood assessment

An assessment was undertaken of the likelihood of threatened and/or migratory species occurring within the study area. This included species:

- Listed as threatened under the EPBC Act
- Listed as migratory under the EPBC Act
- Listed as threatened in Victoria under the Flora and Fauna Guarantee Act 1988 (FFG Act).

This assessment was completed for species recorded on the VBA and/or predicted to occur by the PMST, within five kilometres of the Project Area.

A number of species were eliminated from the VBA list and are not considered further in this report on the basis of:

- Records older than 30 years (pre-1991)
- Some threatened flora species which are outside their natural range but are commonly used for landscaping and amenity, including Spotted Gum *Corymbia maculata* and Giant Honey-myrtle *Melaleuca armillaris*.

The likelihood of occurrence assessment was based on the number of VBA records, year of most recent VBA record, species ecology and the habitat values observed during the desktop review. The likelihood assessment is presented in Appendix A.

The following likelihood categories were used to rate each species' likelihood of occurrence:

- **Unlikely:** No preferred habitat in the Project Area. No recent records of the species within the Project Area. Species unlikely to be present in the Project Area at any time or during any season.
- **Possible:** Habitat is available in the Project Area which partially meets the requirements of the species. A recent record/s of the species within proximity to the Project Area. In the case of fauna, the species may infrequently visit for foraging but would not reside, roost or otherwise depend on habitats in the Project Area for their survival. Migratory and aerial foraging birds may overfly the Project Area.
- **Likely:** Species has historically been recorded in the Project Area (or within very close proximity). The Project Area contains habitat that meets their habitat requirements and is likely to support a population of the species.
- **Present:** Species confirmed to be present within the Project Area during historic field assessment or has regularly been observed in recent times.

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This process was used to short-list species that have the potential to be impacted by the proposed works and therefore prioritise further investigations.

4.0 Results

4.1 Desktop assessment

4.1.1 Protected Matters Search Tool

The PMST identified several Matters of National Environmental Significance (MNES) that may occur, or for which suitable habitat may occur within the study area.

Results of the PMST search requested on 13 September 2021 are summarised in Table 1.

Table 1 Summary of PMST results

MNES	Number of occurrences
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance (Ramsar site areas)	One wetland of international significance external to the study area that receives surface water from the Project Area catchment:Gippsland Lakes
Listed threatened ecological communities	 One listed ecological community: Gippsland Red Gum (<i>Eucalyptus tereticornis subsp. mediana</i>) Grassy Woodland and Associated Native Grassland
Listed threatened species	 Twenty-nine (29) listed threatened species including: Nine (9) birds Two (2) fish Two (2) frog Six (6) mammals Ten (10) plants
Migratory species	Fourteen (14) migratory species
Commonwealth Marine Areas	None

The likelihood of occurrence assessment for threatened species identified through the PMST search is presented in Section 4.4.

4.1.2 Victorian Biodiversity Atlas

The VBA was accessed on 1 October 2021 for records of threatened species recorded within five kilometres of the Project Area within the last 30 years. The following section provides the results of the VBA extract.

Fauna

There were fifty-six (56) species identified in the VBA search that were either listed under the FFG Act, the EPBC Act, listed under the EBPC Act as a migratory or marine species, or listed under a combination of these listings. A summary of these species is presented below:

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- Three (3) species listed under the EPBC Act as either Vulnerable (VU), Endangered (EN) or Critically Endangered (CR):
 - White-throated Needletail Hirundapus caudacutus (VU)
 - Dwarf Galaxias Galaxiella pusilla (VU)
 - Grey-headed Flying-fox *Pteropus poliocephalus* (VU)
- Thirty-nine (39) species were listed under the EPBC Act as a marine or migratory species (or both).
- Twenty-two (22) species were listed under the FFG act as Vulnerable, Endangered, Critically Endangered or Extinct (one (1) reptile, two (2) mammals, two (2) fish and seventeen (17) birds).

Flora

There were thirteen (13) threatened species identified in the VBA search. A summary of these species can be found below:

- There was three (3) species listed under the EPBC act listed as either Vulnerable (VU), Endangered (EN):
 - River Swamp Wallaby-grass Amphibromus fluitans (VU)
 - Matted Flax-lily Dianella amoena (EN)
 - Strzelecki Gum Eucalyptus strzeleckii (VU)
- Twelve (12) species were listed under the FFG act as Vulnerable, Endangered, Critically Endangered or Extinct.

There were a further one-hundred and sixty-four (164) species listed as protected under the FFG Act.

The likelihood of occurrence assessment for threatened species identified through the VBA search is presented in Section 4.4.

4.1.3 Ecological Vegetation Classes

The study area is located within the Gippsland Plain Bioregion of Victoria, which extends east from Melbourne to Lakes Entrance and includes the Mornington Peninsula and South Gippsland. The study area also sits just outside of the Strzelecki Ranges Bioregion. Based on DELWP EVC modelling (DELWP, 2018), there is potential for eight EVCs to occur within five kilometres of the Project Area. These EVCs and their Biodiversity Conservation Status (BCS) in the Gippsland Plain Bioregion are listed in Table 2. Within the Project Area, approximately 79.9 hectares of native vegetation is modelled to occur (see Figure 4-1). An additional 578.22 hectares of man-made water bodies is also modelled to occur within the Project Area.

Twenty-five (25) DELWP wetlands from the Victorian Wetland Inventory (DELWP, 2021), with a total area of 716.7 hectares, have been mapped within or abutting the Project Area. This is a separate dataset to the modelled EVC dataset; however, overlap is likely. DELWP mapped wetlands may be considered to be patches of native vegetation in accordance with the DELWP published *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines).

EVC number	EVC name	Area (ha) within Project Area	Bioregional conservation status		
			Gippsland Plain		
29	Damp Forest	Not mapped within Project Area	Endangered		
23	Herb-rich Foothill Forest	Not mapped within Project Area	Vulnerable		

Table 2 EVC mapping within study area derived from NatureKit (DELWP, 2018)

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EVC number	EVC name	Area (ha) within Project Area	Bioregional conservation status		
			Gippsland Plain		
16	Lowland Forest	Not mapped within Project Area	Vulnerable		
151	Plains Grassy Forest	30.6	Vulnerable		
55	Plains Grassy Woodland	25.83	Endangered		
53	Swamp Scrub	7.48	Endangered		
126	Swampy Riparian Complex	Not mapped within Project Area	NA		
83	Swampy Riparian Woodland	15.98	Endangered		
998	Water Body - man-made	578.22	NA		

4.1.4 Named waterways and wetlands

The study area contains the following named waterways:

- Morwell River (runs along the western boundary of the Project Area)
- Waterhole Creek (approximately two kilometres north-east of the Mine)
- Wilderness Creek (located in the south-west of the Project Area)
- Eel Hole Creek (located in the south of the Project Area)
- Bennetts Creek (runs on the eastern boundary of the Project Area).

The potential impacts of the Project on waterways is discussed in Section 1.1. Morwell River, Eel Hole Creek and Wilderness Creek have been engineered to divert water flows around the Mine void.

The Morwell River Diversion (MRD) is a diversion for the Morwell River waters within the MIN5004 area constructed in the early 2000s and includes the MRD and Morwell Backwater levees. It is located for part of its course within the western boundary of the Project Area. The length is approximately 7000 metres long with a width of 125 metres and depth of 25 metres.

Eel Hole Creek is located in the south-western corner of the MIN5004 area and discharges into the Morwell River upstream of the earthen embankment. The diversion was completed in the early 2000s. Eel Hole Creek receives water from the HCP.

The Wilderness Creek Diversion is located in the western corner of the MIN5004 area and comprises a 2600-metre long low-flow, meandering channel in a relatively narrow, deeply incised floodplain with alternating in-channel benches. Wilderness Creek was relocated to discharge into the Morwell River downstream of its earthen embankment and receives runoff from a local catchment.

Twenty-five (25) DELWP wetlands have been mapped within or abutting the Project Area. DELWP mapped wetlands are considered to be patches of native vegetation in accordance with the DELWP published *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines).

Lastly, the Gippsland Lakes Ramsar site is located approximately 70 kilometres east of the Project Area. The Morwell River runs along the western border of the Project Area and flows north into the Latrobe River. The Latrobe River then runs east and flows into Lake Wellington which forms part of the Gippsland Lakes Ramsar site. This is further discussed in section 5.6.

4.1.5 Environmental overlays

No environmental, landscape or vegetation protection overlays apply to the study area, except for a small area to which an environmental significance overlay applies at the north of the Project Area adjacent to the Strzelecki Highway. No Project works are proposed within this area.



Figure 4-1 DEWLP modelled EVCs

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4.2 Conservation areas

A number of conservation areas have been established within the Project Area.

The Hazelwood Mine also manages ecological conservation areas on and off the Project Area to meet its legal obligations for biodiversity offsets and general enhancement of conservation values beyond those requirements. The net gain conservation areas were developed as a result of removal of Strzelecki Gum during the West Field Project. These areas are located in the Eel Hole Creek Offset Area and Strzelecki Highway Conservation Area. The Eel Hole Creek Offset Area is located both within and outside of the MIN5004 area and protects listed EVCs described as Riparian Forest/Warm Temperate Forest and Plains Grassy Forest. The conservation area adjacent to the Strzelecki Highway is off site area on two parcels of land owned by ENGIE Hazelwood and was established to conserve land colonised by populations of Strzelecki Gum.

Additionally, as part of EPBC Act compliance for the West Field Project, ENGIE Hazelwood was required to provide replacement plantings of Strzelecki Gum on Crown Land beside Morwell River. The requirement was to 'Plant and Maintain not less than 160 *E. strzeleckii* Trees'. To meet this requirement ENGIE Hazelwood planted 371 Strzelecki Gum together with 150 Silver Wattle *Acacia dealbata*, on the west side of Morwell River, north of the MRD entry point in June 2006. In 2008, an additional 43 Strzelecki Gum were planted, bringing the total to 414 trees being planted in the plot.

4.3 Literature review

Hazelwood Mine- West Field Project- Flora and Vertebrate Assessment Study (Biosis Research 2003)

This report was prepared to support the preparation of the Environment Effects Statement (EES) for the International Power Hazelwood West Field Project. It provides the results of field assessments for the project, identifies the potential ecological impacts of the project, and provides suggested measures for mitigation of these impacts. Biosis Research undertook a detailed site assessment of the West Field Project, which comprises 1110 hectares of land within the broader Hazelwood Project Area. The following field-based investigations were undertaken:

- Four day 'general' botanical survey in December 2002
- Targeted survey for Strzelecki Gum *Eucalyptus strzeleckii* over 4 days in June 2002
- Net Gain assessments were completed in September 2003
- Fauna surveys completed over four days in December 2002.

The botanical survey identified the existence of three flora species of national significance- Strzelecki Gum, River-swamp Wallaby-grass *Amphibromus fluitans* and Yarra Gum *Eucalyptus yarraensis*. A fourth species (Howitt's Wattle *Acacia howitii*) was incorrectly identified as being of Commonwealth significance.

In addition to the significant species, 377 medium to very large trees were recorded.

Of the 172 indigenous fauna species identified as either using or having the potential to use the study area, none were considered to be of Commonwealth significance. Koala was recorded from overstory vegetation in the western half of the study area.

In total, the West Field Project required the removal of 0.68 habitat hectares of Swamp Scrub (Endangered), 1,17 hectares of Plains Grassy Woodland. Within the study area, Biosis Research mapped a total of 7.76 hectares of Swamp Scrub, and 2.79 hectares of Plains Grassy woodland. It would also potentially impact 350 individual Strzelecki Gum, approximately 33% of the population within the study area.

Of the 8 EPBC Act-listed fauna species considered to have the potential to exist at the study area, only Australian Painted Snipe and Grey-headed Flying Fox were considered to have some potential to utilise habitats at the study area. The flowering Eucalypts were considered to contribute to a potential wider foraging resource for Swift Parrot.

Hazelwood Mine Rehabilitation and Closure Plan- Volume 2 (ENGIE, 2019)

The Hazelwood Rehabilitation and Closure Plan (RCP) provides for the rationale for the ongoing rehabilitation of the areas within the Hazelwood Mining Licence (MIN5004). Volume 2 of the RCP provides a description of the environmental and geological context of the Mine setting and (relevant to this review) section 2.9 and 2.10 provides a description of the flora and fauna values of the study area.

Much of the information in this document is synthesized from past reports prepared for the Project Area, and in particular the EES for the West Field Project. Six Ecological Vegetation Classes (as recognised under current DELWP policy documents) were identified from the West Field Project study area (see Table 3 below). Their BCS has been updated to reflect current listings, which were correct at the time of the production of the technical reports for the West Field Project but have since changed.

Table 3	EVCs	identified	with	ENGIE	(2019)
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EVC number and Name	Bioregional Conservation Status (BCS)
16- Lowland Forest	Vulnerable
23- Herb-rich Foothill Forest	Vulnerable
29- Damp Forest	Endangered
53- Swamp Scrub	Endangered
191- Riparian Scrub	Vulnerable
83- Swampy Riparian Woodland	Endangered

263 indigenous plant species and 123 exotic plant species were identified within the study area. Of these, only two species of conservation significance were recorded on the study area- Strzelecki Gum and Yarra Gum.

A desktop review into the presence or likely presence of Groundwater Dependant Ecosystems (GDE) revealed six GDE's (or close groups of GDE's) within proximity to the West Field Project study area. These include:

- Eel Hole Creek
- Waterhole Creek
- Morwell River
- Bennetts Creek
- Wilderness Creek
- A grouping of deep marsh wetlands.

ENGIE (2019) also identified locations adjoining the old Strzelecki Highway road that were set aside for the purpose of protecting existing remnant vegetation. These areas were set aside on ENGIE Hazelwood-owned land to establish the offsets required following the EPBC Act referral of the West Field Project. 371 Strzelecki Gum were planted in this area on the west side of Morwell River in June 2006 with another 43 trees planted in 2008, making a total of 414 trees that have been planted on that land.

During the study area assessments to inform the West Field Project EES, six fauna species of State significance were recorded – Koala *Phascolarctos cinereus*, Great egret *Ardea alba*, Little egret *Egretta garzetta nigripes*, Royal spoonbill *Platalea regia*, Blue-billed duck *Oxyura australis*, and Hardhead *Aythya australis*.

No fauna species of national significance were identified during the field surveys. The reports further concluded that of the 29 species identified as 'migratory' under the EPBC and therefore having a potential reliance of the Ramsar wetland of the Gippsland Lakes, none were considered to rely on the habitats within the subject study area.

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Hazelwood Cooling Pond Decommissioning- Ecological Assessment (Unknown Author. undated)

This investigation was commissioned to inform the options available for the rehabilitation of the HCP following its decommissioning, and to explore the benefits to the local ecology of the various available rehabilitation configurations.

The primary goal for the rehabilitation of the HCP is to create a safe and stable landform with no enduring obligations for ENGIE and to provide and contribute to the ecological values of the region.

The report highlights the ecological significance of the Morwell River Wetlands downstream of Eel Hole Creek that cover a combined area of 62 hectares and were established by ENGIE to replace those wetlands lost due to mining operations. The report suggests that the wetlands provide habitat for threatened species including Growling Grass Frog, Dwarf Galaxias and Flinders Pygmy Perch; however, no evidence is provided as to their actual presence.

The ecological context for the study area draws heavily on desktop information, but up to five EVCs are modelled as having occurred on the study area prior to 1750. Some 803 flora species and 343 fauna species are also considered to have the potential to exist.

Habitat and Avifauna Assessment- Hazelwood Mine, Rehabilitation Closure Plan- Stage 1, Morwell (Wildlife Experiences 2019)

This report was commissioned by ENGIE to inform the proposed Rehabilitation Closure Plan and specifically to provide an understanding of the likely avian species present in the Sector Ponds 4-9. This report was designed for inclusion into the Preliminary Ecological Assessment of the Hazelwood Mine Site. Whilst noting that this work comprised a desktop assessment, and brief-field-based habitat assessment, four conservation-significant species were considered as having a moderate or high likelihood of occurrence within those ponds- Eastern Great Egret *Ardea modesta*, Hardhead *Aythya australis*, Latham's Snipe *Gallinaga hardwickii* and Lewin's Rail *Lewinia pectoralis pectoralis*. Of these species, only Lewin's Rail was considered to have potential to use these ponds for breeding, with the other three considered to be temporary visitors.

Ecological Risk Assessment – Morwell River Flow Diversion, Jacobs (2020)

Jacobs was commissioned by EnergyAustralia Yallourn to conduct a risk assessment of the potential diversion scenarios for the Morwell River and to develop appropriate mitigations to minimise risk to environmental flows and beneficial uses. Diversion of the river is necessary to enable repairs to be made in the Yallourn Morwell River Diversion so as to alleviate the risk of floodwaters entering the Maryvale Mine pit and jeopardising Victoria's power supply.

In producing an ecological risk assessment for the proposed division of the Morwell River, Jacobs provide some context on the current condition of the Morwell River, which is rated as 'Poor', due primarily to the impacts from river diversions on the form of the watercourse and due to its poor water quality. At the study area of the four major river diversions that have enabled the underlying brown coal reserves to be mined, the vegetation on the banks is dominated by exotic herbs and grasses as well as Willows. The West Gippsland Water Strategy (2014-2022) does not consider the lower reaches of the Morwell River (including the diversion) to be a priority for management given its reduced ecological value.

This report synthesizes the results of the 2020 environmental flow update for the Latrobe River (Alluvium, 2020) which identifies a number of migratory and non-migratory fish species that might persist within the Morwell River. Of those migratory species (which are defined as species which undertake movements between fresh and estuarine or marine environments) shortfin eel, tupong and lamprey may be present. Australian Grayling (EPBC Act-listed) has not been recorded in the Morwell River but is present in the Latrobe River downstream of the Morwell River. Migratory species recorded in the Morwell River include flatheaded gudgeon, pygmy perch and river blackfish. Dwarf Galaxias have also been recorded in the Morwell River Wetlands. The Morwell River Diversion channel is not considered to provide ideal habitat for most fish species as it lacks hydraulic diversity and in-stream habitat.

Native vegetation assessment for disused section of Morwell River, Hazelwood (Indigenous Design, 2021)

Indigenous Design were commissioned by ENGIE to understand the implications of Clause 52.17 of the Latrobe Planning Scheme to the removal of vegetation along a 320-metre length of the disused Morwell River waterway to the Morwell River in order to divert water into the Mine.

Field surveys were undertaken in July 2021 to assess the extent and quality of native vegetation within the study area.

The field assessment to inform this report confirmed the presence of nine Strzelecki Gum in the north of their study area. This was the only species of conservation significance recorded. These trees formed the canopy of vegetation identified as Swampy Riparian Woodland, considered Endangered in the Gippsland Plain Bioregion. In all cases these patches were of very poor quality, represented by an indigenous shrub later, growing over exotic grassy and broad leaf weed species. One patch supported a small number of Strzelecki Gum.

Preliminary ecological assessment of the Hazelwood Cooling Pond (Indigenous Design, 2020)

Indigenous Design were commissioned by ENGIE to undertake a desktop analysis and preliminary field investigation to identify the potential presence of any significant communities, species or habitats that might be impacted by the eventual rehabilitation of the Hazelwood Cooling Pond.

The desktop assessments undertaken during the delivery of this report identified the potential for 18 flora species and 48 fauna species of conservation significance to occur within proximity to the HCP. Four Ecological Vegetation Classes and one wetland were also considered to have the potential to occur. Following a likelihood assessment, it was considered that 10 flora species and 16 fauna species were given a likelihood of occurrence of 'possible' or greater.

The field verification confirmed the presence of five significant flora species, however a determination was made that three of them had been planted as they were outside of their natural ranges. The remaining two were Strzelecki Gum and Matted Flax-lily, both listed under the EPBC Act. One significant fauna species was identified- the White-bellied Sea-eagle, as were eight habitat types that provide habitat for threatened fauna species.

Preliminary ecological assessment of the Hazelwood Mine Site (Indigenous Design, 2019)

In 2019, Indigenous Design provided ENGIE with an assessment of the ecological values that exist within the mining licence boundary MIN5004. This report has been designed to provide ENGIE with an appreciation of the ecological risks of the Rehabilitation and Closure Plan. This iteration of the report provides the first two of five planned stages of assessment and details the results of the desktop review and preliminary study area inspection. Some 80 ecological information sources were reviewed in detail, and the results of this review were augmented by a preliminary field investigation

A comprehensive desktop review of a range of existing sources was undertaken by Indigenous Design. From this analysis it was determined that the study area supported, or had the potential to support:

- 27 flora species and 61 fauna species of conservation significance
- Two vegetation communities of conservation significance
- 6 existing offsets study areas with some level of statutory protection
- Indigenous vegetation in the form pf patches and scattered trees.
- A number of pest plant and animal species that have CaLP-Act implications.

In addition, four Ecological Vegetation Classes were considered to have the potential to exist within the study area- Swamp Scrub, Plains Grassy Woodland, Swampy Riparian woodland and Plains Grassy forest. All but Plains Grassy Forest (which is considered Vulnerable) are listed as Endangered EVCs in the Gippsland Plain. DELWP EVC modelling suggests that indigenous vegetation covers 35 hectares or 1% of the area of the MIN5004 licence.

4.4 Likelihood of threatened species assessment

The likelihood assessment identified a number of threatened species that have the potential to occur within the Project Area. A summary of species that were assessed as having a likelihood of possible or greater has been provided in and respectively. The complete likelihood assessment can be found in Appendix A.

AECOM

Hazelwood Rehabilitation Project Preliminary ecology appraisal report – Hazelwood Rehabilitation Project Referrals

Table 4 Summary of significant flora likelihood assessment.

Scientific Name	Common Name	Conservation Status		Source, year,	Habitat present?	Likelihood of	Rationale	
		EPBC Act	FFG Act	records	(1/1)	Occurrence		
Amphibromus fluitans	River Swamp Wallaby-grass	VU		PMST, VBA, 2003, 5	Y	Possible	Study area falls within the species' natural distribution. Species may persist within Project Area.	
Craspedia canens	Grey Billy-buttons		Critically Endangered	VBA, 2004, 11	Y	Possible	Species' natural distribution encompasses study area. Species may persist within Project Area.	
Dianella amoena	Matted Flax-lily	EN	Critically Endangered	PMST, VBA, 2012, 22	Y	Likely	Species recently recorded nearby and within Project Area.	
Eucalyptus fulgens	Green Scentbark		Endangered	VBA, 2008, 14	Y	Present	Species' natural distribution encompasses study area. Species previously recorded within Project Area.	
Eucalyptus strzeleckii	Strzelecki Gum	VU	Critically Endangered	PMST, VBA, 2019, 1398	Y	Present	Species recently recorded nearby and within Project Area.	
Eucalyptus yarraensis	Yarra Gum		Critically Endangered	VBA, 2011, 14	Y	Present	Species' natural distribution encompasses study area. Species previously recorded within Project Area.	

Table 5 Summary of significant fauna likelihood assessment.

Scientific Name	Common	Life Form	Conservation Status		Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	- NO. OF RECORDS	(Y/N)	Occurrence	
A 1 11								
Accipiter novaehollandiae	Grey Goshawk	Bird		Endangered	VBA, 2000, 3	Y	Possible	May occasionally use the study area for foraging and roosting but populations are unlikely to depend on study area.
Actitis hypoleucos	Common Sandpiper	Bird	Ma, Mi	Vulnerable	PMST	Y	Possible	May occasionally use the study area for foraging but is otherwise unlikely to depend on study area. Non-breeding visitor to Australia.
Ardea alba modesta	Eastern Great Egret	Bird	Ma	Vulnerable	VBA, 2019, 3	Y	Likely	Species is likely to use the study area for foraging and roosting, but populations are unlikely to depend on study area. This species typically breeds in colonies located in discrete areas of Australia away from study area.
Aythya australis	Hardhead	Bird		Vulnerable	VBA, 2019, 23	Y	Likely	Species may use aquatic habitat present within Project Area.
Biziura lobata	Musk Duck	Bird	Ma	Vulnerable	VBA, 2011, 8	Y	Possible	Species may use aquatic habitat present within Project Area.
Botaurus poiciloptilus	Australasian Bittern	Bird	EN	Critically Endangered	PMST	Y	Possible	Species may use aquatic habitat present within Project Area, species favours dense aquatic vegetation, which is present within study area.
Bubulcus ibis	Cattle Egret	Bird	Ма		VBA, 1995, 1	Y	Possible	Species may use the study area for foraging and roosting, but populations are unlikely to depend on study area. This species typically breeds in colonies located in discrete areas of Australia away from study area.
Calidris acuminata	Sharp-tailed Sandpiper	Bird	Mi, Ma		VBA, 1978, 1	Y	Possible	May occasionally use the study area for foraging during their migration passage but is otherwise unlikely to depend on study area. Non-breeding visitor to Australia.
Egretta garzetta nigripes	Little Egret	Bird		Endangered	VBA, 2018, 6	Y	Possible/Likely	Species may use aquatic habitat present within Project Area for foraging. This species typically breeds in colonies located in discrete areas of Australia away from study area.
Falco subniger	Black Falcon	Bird		Critically Endangered	VBA, 2001, 3	Y	Likely	May occasionally use the study area for foraging and roosting but populations unlikely to depend on study area.
Galaxiella pusilla	Dwarf Galaxias		VU	Endangered	PMST, VBA, 2018, 5	Y	Likely	Species may use drainage lines and floodplains within the study area.
Gallinago hardwickii	Latham's Snipe	Bird	Mi, Ma		VBA, 2018, 11	Y	Present	Species has been recorded in project area by previous ecological surveys. Non-breeding visitor to Australia.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Bird	Ма	Endangered	VBA, 2018, 4	Y	Present	Species recorded in Project Area by previous ecological surveys.
Hieraaetus morphnoides	Little Eagle	Bird		Vulnerable	VBA, 2001, 5	Y	Possible	May occasionally use the study area for foraging and roosting but populations unlikely to depend on study area.

Scientific Name	Common	Life Form	Conservation Status		Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act		(Y/N)	Occurrence	
Hydroprogne caspia	Caspian Tern	Bird	Mi, Ma	Vulnerable	VBA, 2017, 1	Y	Possible	Species may occasionally visit study area on route to more suitable areas of habitat. Only three significant regular breeding colonies are known in Victoria: Corner Inlet, Mud Island in Port Philip Bay and Mallacoota. Species is unlikely to depend on study area.
Ixobrychus dubius	Australian Little Bittern	Bird		Endangered	VBA, 2018, 2	Y	Possible	Species may use aquatic habitat present within Project Area, species favours dense aquatic vegetation, which is present within study area.
Lewinia pectoralis	Lewin's Rail	Bird		Vulnerable	VBA, 2019, 3	Y	Likely	Species may use aquatic habitat present within Project Area for foraging, roosting, and breeding, species favours dense aquatic vegetation, which is present within study area.
Lissolepis coventryi	Swamp Skink	Reptile		Endangered	Indigenous Design, 2018, 2	Y	Likely	Species recently recorded near the Morwell River Bridge. Suitable habitat may occur within Project Area.
Nannoperca sp. 1	Flinders Pygmy Perch	Fish		Vulnerable	VBA, 2020, 33	Y	Likely	Species may use aquatic systems within the study area. Recent records
Ninox strenua	Powerful Owl	Bird		Vulnerable	VBA, 2004, 3	Y	Possible	May occasionally use the study area for foraging and roosting. Species unlikely to breed within the Project Area as species requires extremely large hollows.
Ornithorhynchus anatinus	Platypus	Mammal		Vulnerable	VBA, 2011, 2	Y	Possible	Species may use aquatic systems within the study area. Recent records
Oxyura australis	Blue-billed Duck	Bird		Vulnerable	VBA, Indigenous Design, 2018, 4	Y	Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in specific wetlands in Australia.
Plegadis falcinellus	Glossy Ibis	Bird	Mi, Ma		VBA, 1995, 1	Y	Possible	May occasionally use the study area for foraging. This species typically breeds in discrete areas of Australia away from study area such as the Murray Darling Basin and Riverina areas in NSW and Victoria.
Prototroctes maraena	Australian Grayling	Fish	VU	Endangered	PMST	Y	Possible	Species may use aquatic systems within the study area. Recent records.
Pseudemoia rawlinsoni	Glossy Grass Skink	Reptile		Endangered	Indigenous Design, 2014, 5	Y	Possible	Species may persist within in Project Area in wetland habitat. Recent records.

Scientific Name	Common	Life Form	Conservation Status		Source, year,	Habitat Procont	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	- No. of records	(Y/N)	Occurrence	
Pteropus poliocephalus	Grey-headed Flying-fox	Mammal	VU	Vulnerable	PMST, VBA, 2019, 1	Y	Possible	Species likely to fly over study area and may forage on flowering and fruiting trees within the study area but is otherwise unlikely to depend on study area for survival.
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	Mammal		Vulnerable	Indigenous Design, 2018, 1	Y	Possible	Species may occur in study area due and utilise areas of wooded vegetation.
Spatula rhynchotis	Australasian Shoveler	Bird		Vulnerable	VBA, 2011, 8	Y	Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in swamps in inland Australia.
Stictonetta naevosa	Freckled Duck	Bird		Endangered	HMEA, 2016, 2	Y	Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in swamps in inland Australia.
Varanus varius	Lace Goanna	Reptile		Endangered	VBA, 1995, 1	Y	Possible	Species may persist in low numbers within the Project Area where there is treed habitat.

5.0 Discussion

5.1 Native vegetation

The study area is located within the Gippsland Plain Bioregion of Victoria, which extends east from Melbourne to Lakes Entrance and includes the Mornington Peninsula and South Gippsland. The study area also sits just outside of the Strzelecki Ranges Bioregion. The Project Area covers about 4000 hectares, much of which has been disturbed over its life as a coal mine and Power Station and for agricultural use. Only scattered and isolated patches of native vegetation remain. These areas of remnant vegetation vary in condition from relatively intact indigenous vegetation with low weed levels to stands of trees with a completely exotic understory. Areas of pasture generally support mature, hollow-bearing eucalypts.

Despite the number of past ecological surveys within the subject area, the contemporary extent and quality of remnant vegetation is not completely understood. Many of the relevant ecological reports for the study area (in particular those relevant to the West Field Project) provide a reasonable discussion of the quality of the vegetation to provide for an impact assessment; however, these patches were then subsequently removed in connection with the relevant works.

Almost without exception, the majority of the other reports provide an analysis for the modelled datasets curated by DELWP, and it is unclear whether these datasets bear any resemblance to the existing onsite conditions. Native vegetation modelling (DELWP, 2018; DELWP, 2019) suggests that there is up to 79.9 hectares of native vegetation on site, and a further 578.22 hectares occupied by wetland, though it is noted that many of these are outdated and incorrect. The Victorian Wetland Inventory (DELWP, 2021) maps a total area of 716.7 hectares of wetland within or abutting the Project Area. The desktop review identified 6 references to native vegetation offsets, with 4 of these ecological values "Known" to occur within the site. Whilst these references are unlikely to have been classified as per the above definitions, they provide sufficient evidence that the site supports native vegetation.

Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017) requires that 'wetlands' are considered as native vegetation for the purposes of impact assessments. That is, where wetlands are proposed to be removed or otherwise impacted by an action, the wetland is to be considered as native vegetation for the purposes of impact and offset calculations. This has significantly implications for the Project given the need to rehabilitate the HCP (amongst other suggested 'wetlands' within the Project Area. A recent update the 2017 Native Vegetation Regulations (DELWP 2021) has clarified the definition of a wetland, and allows for man-made and permanently inundated waterbodies to be removed from consideration. This is significant as it allows for the waterbodies within the Project Area to be removed from the definition of native vegetation, significantly reducing the quantum of impact to native vegetation.

For those few reports which provides details of on-ground evaluation of vegetation quality, remnant patches were considered to be of low species and structural diversity, often only identifiable in the landscape due to a shrub layer, typically dominated by Black Wattle *Acacia mearnsii* or similar ubiquitous indigenous species. Ground layer vegetation was almost always comprised of grassy and broad-leaf weed species. However, one study undertook a vegetation quality assessment for a small disused section of the study area. This area is a small stretch of the Morwell River in the southwest of the site which identified four patches of Swampy Riparian Woodland, three large Scattered Trees, and one Large Tree in a Patch. Within this vegetation, nine Strzelecki Gum individuals were identified, comprising two large Scattered Trees and one Large Tree in a Patch and four small trees in a patch.

5.2 Threatened ecological communities

Three threatened ecological communities (TECs) have been identified as having the potential to occur within the Project Area, including:

- Gippsland Red Gum (*Eucalyptus tereticornis subsp. mediana*) Grassy Woodland (GRGGW) and Associated Native Grassland. Listed as critically endangered under the *EPBC Act*.
- Forest Red Gum Grassy Woodland Community. Listed as a TEC under the FFG Act.

Central Gippsland Plains Grassland Community. Listed as a TEC under the FFG Act.

The Preliminary Ecological Assessment of the Hazelwood Cooling Pond (Indigenous Design, 2020) did identify some vegetation with some aspects that did correspond with GRGGW, in particular, the presence of Gippsland Red Gums. However, the trees were believed to have been planted and therefore the community was not considered present. The same conclusion was met for the FFG Act listed Forest Red Gum Grassy Woodland Community.

The Preliminary Ecological Assessment of the Hazelwood Mine (Indigenous Design, 2019) also identified GRGGW as potentially occurring within the Project Area but did not find any direct evidence of presence. Indigenous Design (2019) also identified FFG listed Central Gippsland Plains Grassland Community as potentially occurring within the Project Area, particularly where EVC 55: Plains Grassy Woodland has been mapped.

It is recommended that targeted surveys for TECs be completed in spring to investigate TEC presence and distribution within the Project Area.

5.3 Threatened flora

The likelihood assessment identified six (6) species of threatened flora that have the potential of occurring within the Project Area, including:

- River Swamp Wallaby-grass Amphibromus fluitans (EPBC: Vulnerable)
- Grey Billy-buttons Craspedia canens (FFG: Critically Endangered)
- Matted Flax-lily Dianella amoena (EPBC: Endangered, FFG: Critically Endangered)
- Green Scentbark Eucalyptus fulgens (FFG: Endangered)
- Strzelecki Gum Eucalyptus strzeleckii (EPBC: Vulnerable, FFG: Critically Endangered)
- Yarra Gum *Eucalyptus yarraensis* (FFG: Critically Endangered)

All flora species have been recorded within the Project Area or near the Project Area except for River Swamp Wallaby-grass and Grey Billy-buttons.

River Swamp Wallaby-grass is an aquatic species that has been recorded growing in natural and manmade water bodies such as Swamps and Dams (DoEE, 2019). This species also requires fertile soils and fluctuating water levels, these conditions may be present within the Project Area.

Grey Billy Buttons prefers damp grassy conditions (Bull, 2014) which are also likely to be present within the Project Area.

Further targeted surveys are required confirm the presence/absence of species that haven't been confirmed within the Project Area. Additional surveys are required to quantify habitat and extent of species that are already known to occur within the Project Area.

5.4 Threatened fauna

5.4.1 Avian fauna

A number of threatened aquatic bird species such as ducks, waders, rails and egrets were identified in the likelihood assessment:

- Common Sandpiper Actitis hypoleucos (EPBC: Marine, Migratory | FFG: Vulnerable)
- Eastern Great Egret Ardea alba modesta (EPBC: Marine | FFG: Vulnerable)
- Hardhead Aythya australis (FFG: Vulnerable)
- Musk Duck Biziura lobata (EPBC: Marine | FFG: Vulnerable)

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- Australasian Bittern *Botaurus poiciloptilus* (EPBC: Endangered | FFG: Critically Endangered)
- Cattle Egret Bubulcus ibis (EPBC: Marine)
- Sharp-tailed Sandpiper Calidris acuminata (EPBC: Marine, Migratory)
- Little Egret Egretta garzetta nigripes (FFG: Endangered)
- Latham's Snipe Gallinago hardwickii (EPBC: Marine, Migratory)
- Caspian Tern Hydroprogne caspia (EPBC: Marine, Migratory | FFG: Vulnerable)
- Australian Little Bittern *Ixobrychus dubius* (FFG: Endangered)
- Lewin's Rail Lewinia pectoralis (FFG: Vulnerable)
- Blue-billed Duck Oxyura australis (FFG: Vulnerable)
- Glossy Ibis Plegadis falcinellus (EPBC: Marine, Migratory)
- Australasian Shoveler Spatula rhynchotis (FFG: Vulnerable)
- Freckled Duck Stictonetta naevosa (FFG: Endangered)

Most of these species were assessed as possible foraging visitors to the study area within the Mine sector ponds, HCP and other creek line habitat. Some of these species such as the Common Sandpiper, Latham's Snipe and Sharp-tailed Sandpiper are non-breeding visitors to Australia and are unlikely to be reliant on the study area for survival. Additionally, species such as the Eastern Great Egret, Little Egret, Hardhead and Glossy Ibis do breed in Australia but in specific locations such as the Murray Darling Basin and Riverina areas of NSW and Victoria. Their presence within the study area is likely to be on a temporary and opportunistic basis.

Four Latham's Snipe were recorded in 2016 within the Morwell Open Cut (H Anton via eBird). However, as the Latham's Snipe is a non-breeding visitor to Australia, important migratory and foraging habitat for Latham's Snipe is considered to occur where 18 or more individuals are supported (SWIFT, undated). Further surveys may be required to assess if habitat within the study site meets this threshold.

The Lewin's Rail, which is listed as Vulnerable under the FFG Act, was the only aquatic bird species that was identified as a potentially breeding species that could occur within the study area. This finding is consistent with the Habitat and Avifauna Assessment (Wildlife Experiences, 2019). However, as this species is highly mobile and given the available habitat surrounding the Project Area, it is unlikely that this species will be significantly impacted.

Other non-aquatic bird species that were identified in the likelihood assessment include:

- Grey Goshawk Accipiter novaehollandiae (FFG: Endangered)
- Black Falcon Falco subniger (FFG: Critically Endangered)
- Little Eagle *Hieraaetus morphnoides* (FFG: Vulnerable)
- White-bellied Sea Eagle Haliaeetus leucogaster (EPBC: Marine FFG | Endangered)
- Powerful Owl Ninox strenua (FFG: Vulnerable).

All these species were assessed as potentially occurring within the study area on an opportunistic basis, mainly to forage. However, as these species are highly mobile, it is unlikely that these species are dependent on the study area. Furthermore, these species have not been recorded utilising the study area for breeding despite extensive ecological and bird surveys.

5.4.2 Mammals

Three mammals were identified as potentially occurring within the Project Area, including:

- Grey-headed Flying Fox *Pteropus poliocephalus* (EPBC: Vulnerable | FFG: Vulnerable)
- Yellow-bellied Sheath-tailed Bat Saccolaimus flaviventris (FFG: Vulnerable)

Platypus Ornithorhynchus anatinus (FFG: Vulnerable).

The Grey-headed Flying Fox and the Yellow -bellied Sheath-tailed Bat are likely to use the study area opportunistically and since both species are highly mobile and have large foraging ranges, they are unlikely to be dependent on the study area.

The Platypus, which is listed as Vulnerable under the FFG Act, was also identified as a species that could potentially occur within the Project Area. This species may use the aquatic habitat and systems within and surrounding the Project Area. Further investigations are recommended to understand the use of the Project Area by the species and any potential impacts as a result of the rehabilitation.

5.4.3 Reptiles

Three reptiles were identified as potentially occurring within the Project Area as follows:

- Lace Monitor Varanus varius (FFG: Endangered)
- Glossy Grass Skink Pseudemoia rawlinsoni (FFG: Endangered)
- Swamp Skink Lissolepis coventryi (FFG: Endangered)

The Lace Monitor may use treed habitat occurring within the study area and may opportunistically feed on carrion or roadkill within and surrounding the Project Area. However, this species has not been recorded within the Project Area for over 20 years and the study area is unlikely to support an important population of this species.

The Swamp Skink, which is listed as Endangered under the FFG Act, has recently been recorded near the Project Area as part of the Targeted Fish Survey - Morwell River Bridge (Jenkin, 2018). It is considered highly likely that the Swamp Skink utilises densely vegetated areas associated within watercourses within the Project Area. This finding is consistent with previous ecological assessments (Indigenous Design, 2019).

The Glossy Grass Skink, which is listed as Endangered under the FFG Act, has also been identified as a species that is likely to occur within the Project Area. This species is reliant on grassy areas with logs and rocks associated with water courses and swampy areas (PWS, 2019).

It is recommended that targeted surveys be employed to further understand the presence and distribution of these species.

5.4.4 Fish

Three fish species were identified as potentially occurring within the Project Area, as follows:

- Australian Grayling Prototroctes maraena (EPBC: Vulnerable | FFG: Endangered)
- Dwarf Galaxias Galaxiella pusilla (EPBC: Vulnerable | FFG: Endangered)
- Flinders Pygmy Perch Nannoperca sp. 1 (FFG: Vulnerable).

The Australian Grayling prefers freshwater streams and rivers, typically with a gravel substrate, with a moderate flow rate that are cool and clear (DoEE, 2019a). Whilst there may be areas of suitable habitat for the species within the Morwell River, Jacobs (2020) state the species has not been recorded, but is present in the Latrobe River downstream of the confluence of the Morwell and Latrobe Rivers. Further investigation of the use of the Project Area by this species may be warranted, as it is currently unclear if there is potential habitat for the species.

The Dwarf Galaxias prefers shallow slow moving to still water bodies such as drainage lines, swamps with some aquatic vegetation. This species may use suitable habitat within the Project Area, however the location of potential habitat within the Project Area requires further investigation. Whilst the species is highly unlikely to utilise the waterbodies within the Mine void, HCP, or the Morwell River, it is known to make use of temporary waterbodies (including puddles), and the location of these can vary significantly depending on season. Both Eel Hole Creek (upstream and downstream of the HCP) and Wilderness Creek provide potential habitat for the species.

Lastly, the Flinders Pygmy Perch prefers small systems with a low flow rate such as streams, small lakes, and irrigation channels with emergent vegetation (NFA, 2019). Within the Project Area, it is likely that the only potential habitat suitable for the species is Eel Hole Creek upstream and downstream of \\aumel1fp001.au.aecomnet.com\projects\606X\60668312\400_Technical\02 Referrals\Att 4 Ecology\Att 4 - Preliminary Ecology Appraisal_V3_20211125.docx Revision 3 - 25-Nov-2021

the HCP. Subject to a contemporary understanding of the density of aquatic vegetation in this section of the creek, it may only provide marginal habitat for the species. Wilderness Creek may also provide the requisite habitat requirements.

Further targeted surveys may be required to confirm presence/absence and distribution of these species within the Project Area.

5.5 Non-threatened fauna

The study area is also highly likely to support several non-threated fauna species that are iconic native species and often the subject of public concern. These species include:

- Koala Phascolarctos cinereus
- Eastern Grey Kangaroo Macropus giganteus
- Short-beaked Echidna Tachyglossus aculeatus
- Bare-nosed Wombat Vombatus ursinus
- Rakali Hydromys chrysogaster
- Swamp Wallaby *Wallabia bicolor*
- Waterfowl (Purple Swamp Hen *Porphyrio porphyrio*, Eurasian Coot *Fulica atra*, Dusky Moorhen Gallinula *tenebrosa*)
- Cormorants (Little Pied Cormorant *Microcarbo melanoleucos*, Pied Cormorant *Phalacrocorax varius*, Little Black Cormorant *Phalacrocorax sulcirostris*, Great Cormorant *Phalacrocorax carbo*)
- Australian Pelican Pelecanus conspicillatus
- Ducks and Swans (Black Swan *Cygnus atratus*, Pacific Black Duck *Anas superciliosa*, Australian Wood Duck *Chenonetta jubata*)

These species will also need to be considered and management and translocation plans may need to be developed to mitigate and minimise impacts to these species. Additionally, Australian native animals are protected under the *Wildlife Act 1975* which is discussed further in section 6.2.5.

5.6 Gippsland Lakes Ramsar site

The Gippsland Lakes Ramsar site was listed in 1982 due to its high ecological values and features. It is located east of the Latrobe Valley and south of the Eastern Highlands. The Gippsland Lakes are approximately 70 kilometres east of the Project Area. The Morwell River runs along the western border of the Project Area and flows north into the Latrobe River. The Latrobe River then runs east and flows into Lake Wellington which forms part of the Gippsland Lakes Ramsar site.

The Gippsland Lakes is comprised of a group of connected estuarine lagoons or lakes that are separated from the sea by sand dunes. The major lakes that form the Gippsland Lakes include Lake Wellington, Lake Victoria and Lake King. Numerous other wetlands, marshes and smaller lagoons, which form the boundary of the Ramsar site, fringe the primary lakes. There are also disjunct water bodies that form part of the Ramsar site such as Sale Common which is a freshwater wetland located along the Latrobe River in the town of Sale which is the western most part of the Ramsar site.

Numerous major rivers feed into the Ramsar site including the Latrobe, Macalister, Thomson, Avon (flowing into Lake Wellington), Mitchell, Nicholson and Tambo (flowing into Lake King) (Figure 5-1). The Gippsland Lakes are reliant on these riverine inputs.

Some of the key ecological values of the Gippsland Lake include, environments supporting a range of threatened species, waterbird breeding, fish nurseries, fish spawning habitat and complex ecological communities such as subtidal seagrass and algal beds. The Gippsland Lakes also support a range of socio-economic values such as recreational activities, tourism, fishing and boating. Furthermore, the Gippsland Lakes support and enable several industries and services such as receiving treated sewage from Warragul, Moe and Morwell and wastewater from electricity generation.

A Ramsar wetland is a wetland that has been designated under Article 2 of the Ramsar Convention, or which has been declared by the Federal Environment Minister to be a declared Ramsar wetland under the EPBC Act. As a signatory to the Ramsar convention, Australia is expected to conserve and maintain the ecological character of all Ramsar wetlands in its territory. To achieve this, ecological character descriptions (ECD) are being prepared for all Ramsar site (DSEWPaC, undated). The ecological character description of the Gippsland Lakes Ramsar site has been prepared (DoSEWPC, 2010).

Ecological character descriptions provide a benchmark against which to assess any future change in ecological character. They identify and describe the components, processes and services (CPS) that are critical to the ecological character of the Ramsar site. They also set limits of acceptable change (LAC) for each critical CPS. Limits of acceptable change are a tool by which change can be measured and provides a benchmark for monitoring change in ecological character and management effectiveness.

Some key threats identified in the ECD of the Gippsland Lakes include altered water regimes, salinity, pollution, pest plants and animals, natural resource utilisation, dredging, activation of acid sulphate soils, recreation and tourism usage, fire and erosion.

Whilst the Gippsland Lakes Ramsar site is a considerable distance from the Project Area and the contribution of flows from the Morwell River to the wetland is potentially small, the potential effects of changes in flow and water quality in the Morwell River on the Ramsar site have not been comprehensively assessed. Proposed altered water regimes to the Morwell River to facilitate the filling of the Mine void may impose risks to the Gippsland Lakes Ramsar site including altering the riverine input of the Latrobe River into Lake Wellington. Additionally, there may be risks to Sale Common which is a freshwater wetland located along the Latrobe River which forms part of the Ramsar site. Risks to the Gippsland Lakes Ramsar site associated with the Hazelwood Rehabilitation Project include:

- Changes to salinity due to decreased riverine inputs
- Increases in sedimentation and turbidity due to earth works
- Any migration of contamination from the Mine site.

AECOM recommends further investigations to quantify the extent of the above risks and assess potential impacts to the ecological character of the Gippsland Lakes in accordance with the LAC listed in the ECD.



Figure 5-1 Regional drainage plan



Figure 5-2 Gippsland Lakes Ramsar site map (Source: DSE unpublished)

The Latrobe system, comprising the Latrobe River, its tributaries and the Lower Latrobe Wetlands, supports plant and animal species of high conservation significance. The Lower Latrobe Wetlands are located on the floodplain of the Latrobe River between its confluence with Thomson River, and they form part of the Gippsland Lakes system. The waterways within the Project Area all contribute to the provision of flow within the broader Latrobe catchment and ultimately, to the Gippsland Lakes Ramsar site.

That said, the quality of the waterways within the Project Area is poor, with all suffering from a longerterm history of modification. All named watercourses within the Project Area have been altered from their pre-European condition and course, with all diverted to flow around the Mine void.

The MRD is considered to be of poor ecological condition, with a channelised form, and proximal vegetation dominated by exotic herbs, grasses and some Willow trees. It is not considered to provide ideal habitat for most native fish species, lacking in stream habitat and hydrological diversity (Jacobs, 2020).

Eel Hole Creek was diverted from the mine void in the early 2000s. Within the Project Area it consists of two distinct section of 'creekline' habitat, separated by the HCP. The creekline habitat is considered to provide habitat for a range of common aquatic species, which are provided shelter from the emergent and fringing vegetation that exists, both up and downstream of the HCP. It is suggested in Indigenous Design (2020) that there is some potential for these areas of creekline to provide habitat for significant species such as Dwarf Galaxias, but the presence of any significant species has not been determined.

Wilderness Creek is a meandering channel that was diverted to discharge into the Morwell River, and has not been subject to the level of survey that both Eel Hole Creek and the MRD have been. It is noted in Indigenous Design (2019) as providing typical creekline habitat, supporting clusters of instream vegetation. It is noted that the creek is likely to be seasonally ephemeral, but may retain pools of water during drier months. Indigenous Design (2019) further hypothesize that the creek may provide habitat for Dwarf Galaxias and Flinders Pygmy Perch although no targeted surveys have been undertaken.

5.8 Potential mitigations

Realistic, practical and site-specific mitigation measures should be prepared in response to mandated Environmental Performance Requirements (or similar) that may be developed through the approvals process. The review of available data has highlighted a number of ecological assets within the study area or hydrologically linked to the study area that should be a focus for avoidance and minimisation of impacts. As such, some initial mitigation measures are proposed below, and have been provided relevant to the matter to be protected.

5.8.1 Native vegetation

Notwithstanding that parts of the Project Area are highly disturbed as a consequence of mining and power generation, previous reports highlight the potential for the presence of remnant native vegetation patches and scattered trees. Of the EVCs either recorded, or considered to have the potential to occur, many are considered Endangered within the Gippsland Plain Bioregion.

Any application to remove native vegetation (normally regardless of the ultimate approvals pathway is required to show adherence to the 'avoid and minimise' principles of Victoria's *Guidelines for the removal, destruction or lopping of native vegetation.*

Mitigation – Ensure that works are excluded from existing established conservation areas. Undertake a detailed site assessment of other areas potentially subject to disturbance to map and assess remaining remnant vegetation so as to adhere to the avoid and minimise principles during the design of the rehabilitation of the Project Area.

Mitigation – For any impacts to native vegetation that is unavoidable, commensurate offsets are to be achieved.

5.8.2 Significant flora species

It is known that the Project Area supports at least four significant flora species – Strzelecki Gum, Matted Flax-lily, Green Scent-bark, and Yarra Gum.

It is recommended that a detailed Project Area census is undertaken to understand the size and distribution of these species throughout the Project Area. Once their locations are known, the protection of these species should be a priority.

Mitigation – Undertake a targeted flora survey in all suitable habitats to record the location of all flora species of conservation significance. Where practical, these species should be protected, and their habitats enhanced during the rehabilitation of the Project Area.

5.8.3 Significant fauna species

Past assessments have made mention of the potential for the Project Area to support hollow-bearing trees. The loss of hollow-bearing trees from the landscape is a threatening process under the FFG Act. A field survey to make the location of these habitat assets will allow for the consideration of their protection during the rehabilitation of the Project Area.

Mitigation – Targeted surveys are needed for those significant species considered to have the potential to occur in the Project Area, and for those species previously recorded to ensure that their habitat are protected and enhanced during the rehabilitation of the Project Area.

5.8.4 Significant ecological communities

Past assessments have been unable to conclusively determine the existence of vegetation communities of significance. Indigenous Design (2019, 2020) have suggested that some vegetation mapped during their assessments may be synonymous with significant communities, but suggest that at least some of the vegetation was planted and hence precluded from being considered as a threatened community.

Mitigation – It is recommended that targeted surveys for TECs be completed in spring to investigate TEC presence and distribution within the Project Area. Any communities found should be protected from impact where practicable.

5.8.5 Waterways and wetlands

Past reports have shown that the watercourses within the Project Area (in particular Eel Hole Creek and Wilderness Creek) support little in the way on native vegetation and are in poor condition. So whilst any potential works on these creeks are not likely to impact significant fauna and flora species, their degraded state presents significant opportunity for restoration. This applies to the MRD too, as some of this watercourse is contained within concrete pipes.

Mitigation – Develop a waterway ecological restoration plan for all watercourses and wetlands within the Project Area to be implemented during the rehabilitation. The rehabilitation process provides a significant opportunity to restore these habitats to increase their ecological functionality. As a start, revegetation works should be undertaken along the watercourses using species representative of the likely pre-European EVCs.

Mitigation – The restoration of waterways within the Project Area should prioritise the importance of providing fish passage through the Project Area, as well as being responsive to the requirements of the threatened species that may inhabit the Project Area.

Mitigation – The west Gippsland Waterway Strategy 2014-2022 sets out a range of objectives for the management of the natural values of the West Gippsland region. Any rehabilitation and restoration works necessary should ensure alignment with the objectives of this plan.

5.8.6 The Gippsland Lakes Ramsar site

There is some potential for the future rehabilitation of the Project Area to lead to a change in the ecological character of the Gippsland Lakes Ramsar site. This change may have implications under the EPBC Act. As highlighted in Jacobs (2020), DELWP commissioned an assessment of the ecological effects that may result from the implementation of the Latrobe Valley Regional Rehabilitation Strategy (LVRRS) which concluded that the Latrobe River catchment is already significantly stressed, and any further impact from further altering its hydrological regime (as may occur for the harvesting of water to

fill the Mine lake) could be detrimental to Lake Wellington and the Lower Latrobe Wetlands, and potentially the Ramsar site.

Mitigations – To ensure that the downstream impacts of harvesting water to fill the Mine void are minimised, the maximum safe and practicable volumes should be passed through to the Latrobe from the Morwell River.

Mitigations – To minimise the potential for impacts to the broader Latrobe Catchment and the Ramsar site, events that require the complete cessation of flow through the MRD should be minimised in number and restricted in duration. Hydrological connection with the Latrobe River should be maximised to ensure that the ecological functionality of the system is not further compromised.

Mitigations – A Monitoring and Management Plan should be developed for the final chosen solution to ensure that any risks and impacts to the Ramsar site that are associated with the rehabilitation of the Project Area are continuously monitored. As well as evaluating the impacts of any potential reduced or even ceased flow, the plan should also track the potential risks of a reduction in water quality that might be associated with the restoration of flow following temporary reductions and complete cessation.

6.0 Legislative implications

6.1 Commonwealth

6.1.1 Environment Protection and Biodiversity Act 1999

The aim of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to provide for the conservation of biodiversity and the protection of the environment, particularly those aspects that are considered to be MNES. The Act defines nine MNES, these are:

- Listed threatened species and ecological communities
- Migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBAR)
- Wetlands of International Importance (listed under the Ramsar Convention)
- Commonwealth Marine areas
- World Heritage properties
- National Heritage places
- Great Barrier Reef Marine Park
- Nuclear actions
- A water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, actions that are likely to have a significant impact upon MNES require referral and potentially approval from the Federal Environment Minister to undertake those actions.

Implications

As discussed in section 5.0 a number of MNES protected under the EPBC Act may be impacted by the project, including flora, fauna, threated ecological communities and a Ramsar site. Potential implications under the EPBC Act are presented below.

Flora

Matted Flax-lily and Strzelecki Gum are known to occur within the Project Area. Furthermore, River Swamp Wallaby Grass is also considered likely to occur. The Project should avoid any impacts to species habitat if feasible. Should it be considered likely that habitat for these species will be impacted by the rehabilitation, targeted surveys for these species should be completed. The need to refer the Project under the EPBC Act in relation to these species will depend on the outcomes of a Significant Impact Assessment.

Fauna

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It is considered that a number of bird and one bat species listed under the EPBC Act may occur in the study area on a temporary or opportunistic basis to forage and potential use as intermittent roosting habitat. It is unlikely that these species use the Project Area to breed as many of the bird species are non-breeding visitors to Australia or breed in specific regions in Australia. Most of these bird species are listed as Marine or Migratory under the Act and the Project Area is not considered to form important habitat for these species, and as such, a significant impact is not anticipated. Four Latham's Snipe were recorded in 2016 within the Morwell Open Cut (H Anton via eBird). However, as the Latham's Snipe is a non-breeding visitor to Australia, important migratory and foraging habitat for Latham's Snipe is considered to occur where 18 or more individuals are supported (SWIFT, undated). It is unlikely that the study area meats this threshold, but further investigations may be required.

Despite this, the Project design should avoid any impacts to species if possible, such as minimise the clearing of vegetation and retain wetland habitat. Bird and bat species considered are discussed in section 5.4.1 and 5.4.2 respectively.

The Australian Grayling and the Dwarf Galaxias, both listed as vulnerable under the Act, were considered as potentially occurring within the Project Area. AECOM has recommended further investigations to confirm presence or absence. Should it be considered likely that habitat for these species will be impacted, impacts should be considered in relation to EPBC Act Significant Impact Guidelines.

Threatened ecological communities

The Gippsland Red Gum (Eucalyptus tereticornis subsp. mediana) Grassy Woodland (GRGGW) and Associated Native Grassland, listed as critically endangered under the EPBC Act, was considered as having the potential to occur within the Project Area. AECOM recommends that targeted survey be complete during spring to confirm presence or absence of this community. Should it be considered likely that the ecological community will be impacted, impacts to these communities should be considered in relation to EPBC Act Significant Impact Guidelines.

Wetlands of international importance (Ramsar wetland)

The Ramsar listed Gippsland Lakes was identified as a wetland that may be impact by the Project. The Gippsland Lakes is approximately 70 kilometres east of the Project Area. The Morwell River runs along the western border of the Project Area and flows north into the Latrobe River. The Latrobe River then runs east and flows into Lake Wellington which forms part of the Gippsland Lakes Ramsar site.

Proposed altered water regimes to the Morwell River to facilitate the filling of the Mine void may pose risks to the Gippsland Lakes Ramsar site including altering the riverine input of the Latrobe River into Lake Wellington. Additionally, there may be risks to Sale Common which is a freshwater wetland located along the Latrobe River which forms part of the Ramsar site. Risks may include:

- Changes in salinity to Lake Wellington and connected wetlands due to decreased riverine inputs
- Increases, sedimentation and turbidity due to earth works associated with Morwell River.

AECOM recommends further investigations to quantify the extent of the above risks and assess potential impacts to the ecological character of the Gippsland Lakes against the limits of acceptable change listed in the Ecological Character description. Should it be considered likely that the wetland will be impacted, impacts should be considered in relation to EPBC Act Significant Impact Guidelines.

6.2 Victorian

6.2.1 Planning and Environment Act 1987

The Planning and Environment Act 1987 (P&E Act) is the primary State legislation governing the use, development and environmental protection of land in Victoria. The planning legislation provides a framework for integrating planning policies and environmental considerations (e.g. clearing of native vegetation) on local, regional and State levels through instruments such as planning permits and Precinct Plans. These policies and considerations are enacted through the Victorian Planning Provisions incorporated under the municipal planning scheme.

The Latrobe Planning Scheme covers key matters relating to the environment, landscape and heritage, environmental risk, natural resource management, economic development, transport and infrastructure.

Implications

Most of the Project Area is covered by a special use zone or a public use zone and rehabilitation works are permitted uses for these areas. Nevertheless, due to other planning zones and overlays within the Project Area and the potential for some native vegetation removal, planning approval will be required under the *Planning and Environment Act 1987*.

6.2.2 Native Vegetation removal guidelines

The Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017b) (the Guidelines) are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria. The Guidelines provide instructions on how an application for a permit to remove native vegetation is to be assessed under the P&E Act. This includes requirements to undertake a site assessment and methodology, and specific conditions that may form part of a granted permit, such as offsetting.

Under the Guidelines, there are three pathways under which an application to remove native vegetation can be assessed as - Basic, Intermediate or Detailed assessment pathways. The assessment pathway determines the types of offsets that are required to be implemented for the removals of vegetation. This is determined via an assessment of location, extent of vegetation and if any large trees are to be removed, and the level of risk to biodiversity by a particular project.

Implications

The Project Area is highly likely to support native vegetation. An on-ground field assessment conducted by a DELWP accredited VQA assessor is required to confirm presence and map native vegetation. This assessment should ideally be undertaken in spring. The results of VQAs are generally considered to be valid for a period of two years. As such, whilst existing vegetation mapping could be used to inform detailed design a new detailed VQA assessment is likely to be required to support the permit application.

Twenty-five (25) DELWP wetlands have also been mapped within or abutting the Project Area. DELWP mapped wetlands are considered to be patches of native vegetation in accordance with the DELWP published *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines).

6.2.3 Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (FFG Act) was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna and to enable management of potentially threatening processes. One of the main features of the FFG Act is the listing process. Native species and communities of flora and fauna, and the processes that threaten native flora and fauna are listed in the schedules of the FFG Act. This assists in identifying species and communities that require management to survive. It also identifies the processes that require management to minimise threats to native Victorian flora and fauna species and communities.

Implications

FFG Act threatened flora species known to occur in the Project Area or assumed present include:

- Matted Flax-lily Dianella amoena (EPBC: Endangered, FFG: Critically Endangered)
- Green Scentbark Eucalyptus fulgens (FFG: Endangered)
- Strzelecki Gum Eucalyptus strzeleckii (EPBC: Vulnerable, FFG: Critically Endangered)
- Yarra Gum *Eucalyptus yarraensis* (FFG: Critically Endangered)

Furthermore, additional species are considered to have a possible or above likelihood of occurrence in the Project Area, targeted surveys are required to confirm their presence or absence and to map habitat of species. These species include:

• Grey Billy-buttons Craspedia canens (FFG: Critically Endangered)

- Australian Grayling *Prototroctes maraena* (EPBC: Vulnerable | FFG: Endangered)
- Dwarf Galaxias Galaxiella pusilla (EPBC: Vulnerable | FFG: Endangered)
- Flinders Pygmy Perch Nannoperca sp. 1 (FFG: Vulnerable)
- Lace Monitor Varanus varius (FFG: Endangered)
- Glossy Grass Skink *Pseudemoia rawlinsoni* (FFG: Endangered)
- Swamp Skink Lissolepis coventryi (FFG: Endangered)
- Platypus Ornithorhynchus anatinus (FFG: Vulnerable)
- Lewin's Rail Lewinia pectoralis (FFG: Vulnerable).

Two TECs were assessed to have a possible likelihood of occurrence in the Project Area, targeted surveys are required to confirm presence or absence and to map extent. These communities include:

- Forest Red Gum Grassy Woodland Community. Listed as a TEC under the FFG Act.
- Central Gippsland Plains Grassland Community. Listed as a TEC under the FFG Act.

In accordance with the FFG Act, if suitable habitat for these species is to be impacted by the Project following detailed design, a permit would be required under the Act. To inform the need for a permit, targeted surveys may be required to confirm presence/absence and map the extent of habitat.

It is considered that a number of bird and one bat species listed under the FFG Act may occur in the study area on a temporary or opportunistic basis to forage and potentially use as intermittent roosting habitat. It is unlikely that these species use the Project Area to breed as many of the bird species are non-breeding visitors to Australia or breed in specific regions in Australia. Therefore, the Project Area is not considered to form important habitat for any of these species, and as such, a significant impact is not anticipated. Despite this, the Project design should avoid any impacts to species if possible, such as minimise the clearing of vegetation and retain wetland habitat. Bird and bat species considered are discussed in section 5.4.1 and 5.4.2 respectively.

Flora species listed as 'Protected' under the FFG Act require a 'Permit' to Take Protected Flora' if on public land.

6.2.4 Environment Effects Act 1978

Under Victoria's *Environment Effects Act 1978* (EE Act), projects that could have a 'significant effect' on Victoria's environment can require an EES to be developed. This Act applies to any public works 'reasonably considered to have or be capable of having a significant effect on the environment'. The Minister for Planning is the responsible person for assessing whether the EE Act applies.

Implications

A referral of the Project to the Victorian Minister for Planning is currently underway. The need or otherwise for an EES to be prepared will be a decision made by the Minister for Planning and will be based on a review of all relevant information included in the referral documentation.

6.2.5 Wildlife Act 1975

The *Wildlife Act* 1975 (Wildlife Act) forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. The purpose of the Act is to establish procedures in order to promote:

- The protection and conservation of wildlife.
- The prevention of taxa of wildlife from becoming extinct.
- The sustainable use of and access to wildlife.

The Wildlife Act makes it an offence to hunt, take or destroy protected or threatened wildlife without authorisation.

Implications

Potential exists for scattered trees and remnant vegetation within the study to support arboreal mammals, microbats and nesting avifauna. If such vegetation were to require removal to facilitate the Project, salvage and relocation of such fauna is likely to be required under the Wildlife Act. Prior to removal, trees would need to be inspected for signs of fauna usage.

6.2.6 Catchment and Land Protection Act 1994

The Catchment and Land Protection Act 1994 (CaLP Act) establishes a framework for management and protection of catchments through the management of land and water resources. The CaLP Act is the principle legislation relating to the management of pest plants and animals in Victoria. Under the Act, landowners have a responsibility to avoid causing or contributing to land degradation, including taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and where possible, eradicate established pest animals as declared under the CaLP Act. Invasive species can cause environmental and/or economic harm or are considered to have the potential to cause such harm. They can also present risks to human health.

Implications

Past detailed ecological assessments of the site have identified a number of CALP Act listed species as present within the Project Area. During the construction phase of this project, the proponent will be required to prevent the growth and spread of regionally controlled weeds. Measures to fulfil requirements of the CaLP Act, particularly in relation to the control of weeds, should be detailed in a Construction Environment Management Plan prior to works commencing.

6.2.7 Water Act 1989

The *Water Act 1989* is the legislation that governs water entitlements and establishes the mechanisms for managing Victoria's water resources. When works and activities are undertaken on or adjacent to waterways, there is a risk they may cause environmental damage. The *Water Act 1989*, through adoption of the Model Waterways Protection By-law, enables Catchment Management Authorities (CMAs) to prevent environmental degradation of waterways, including flora, fauna and habitat, by regulating works and activities on and around waterways. It empowers CMAs to issue permits with conditions to ensure that works and activities that occur on waterways have minimal impact to the environmental condition of waterways. Within the Port Phillip and Westernport CMA, Melbourne Water is responsible for issuing 'works on waterway permits' within Melbourne Water's management area.

Implications

The study area contains multiple named waterways including:

- Morwell River (runs along the western boundary of the Project Area)
- Waterhole Creek (approximately two kilometres north-east of the Mine)
- Wilderness Creek (located in the south-west of the Project Area)
- Eel Hole Creek (located in the south of the Project Area)
- Bennetts Creek (on the eastern boundary of the Project Area).

In accordance with the Water Act, a 'works on waterway permit' would be required in the event one or more of these waterways are impacted by the Project.

6.2.8 Fisheries Act 1995

The primary purpose of the *Fisheries Act 1995* is to regulate, manage, develop, and conserve Victorian fisheries, aquatic habitat and ecosystems, aquaculture industries and associated aquatic biological resources including aquatic ecological processes.

A key provision of the Act is that a person must not, unless permitted under the Act or any other Act, create an obstruction across or within a bay, inlet, river or creek or across or around an inter-tidal flat such that fish will be left stranded, immature fish could be destroyed, or free passage of fish could be obstructed.

Fish species listed under the FFG are also protected under the Fisheries Act and may not be taken without authorisation under both Acts. Furthermore, a permit under the Fisheries Act is required to catch and release including translocation.

Under the Act, it is a requirement to avoid causing or contributing to the spread of noxious fish species listed in the Act under Section 75.

Implications

Any infrastructure or temporary structures that impede or obstruct the passage of fish must be permitted and approved under the Act.

If fish translocation is needed a permit is required.

7.0 Conclusion and recommendations

The following table summarises the potential ecological values and risks identified by this assessment, the further investigations recommended and approvals implications.

Table 6 Summary of ecological risks identified

Ecological values and risks	Recommended further investigations	Possible permit requirements
 Native vegetation - Several ecological vegetation classes (EVCs) were modelled to occur within the study area, including: EVC 16- Lowland Forest EVC 23- Herb-rich Foothill Forest EVC 29- Damp Forest EVC 53- Swamp Scrub EVC 191- Riparian Scrub EVC 83- Swampy Riparian Woodland 	An on-ground field assessment conducted by a DELWP accredited VQA assessor is required to confirm presence, extent and quality of any native vegetation that may persist This assessment should ideally be undertaken in spring.	• The principles of the Victoria's Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017) will apply to the assessment of impacts to native vegetation regardless of the ultimate approvals pathway for the Project. This will include the need to secure commensurate offsets for any unavoidable native vegetation impacts.
DELWP mapped wetlands - Twenty-five (25) DELWP wetlands have been mapped within or abutting the Project Area	None required.	• DELWP mapped wetlands are considered to be patches of native vegetation in accordance with the Victoria's Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines).
 Threatened ecological communities - Three threatened ecological communities (TECs) have been identified as having the potential to occur within the study area, including: Gippsland Red Gum (<i>Eucalyptus tereticornis subsp. mediana</i>) Grassy Woodland (GRGGW) and Associated Native Grassland. Listed as critically endangered under the <i>EPBC Act</i>. Forest Red Gum Grassy Woodland Community. Listed as a TEC under the <i>FFG Act</i>. Central Gippsland Plains Grassland Community. Listed as a TEC under the <i>FFG Act</i>. 	An on-ground field assessment to confirm presence and map extent of threatened communities is required. This assessment can be undertaken in conjunction with the native vegetation assessment and should ideally be undertaken in spring.	The existence of any TECs will be addressed through the preparation of an existing conditions ecological assessment that will inform the approvals for the Project.
 Threatened flora - This assessment identified six (6) species of threatened flora that have the potential of occurring within the study area, including: River Swamp Wallaby-grass Amphibromus fluitans (EPBC: Vulnerable) Grey Billy-buttons Craspedia canens (FFG: Critically Endangered) 	Targeted surveys are recommended to map the extent of habitat and individuals within study area and confirm presence of species that potentially occur within the study area. Recommended survey period for each species is presented below:	 The existence of any significant flora species will be addressed through the preparation of an existing conditions ecological assessment that will inform the approvals for the Project. FFG Act: In accordance with the FFG Act, if suitable habitat for these species is to be impacted by the project following detailed design, a permit would be required under the

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Ecological values and risks	Recommended further investigations	Possible permit requirements
 Matted Flax-lily <i>Dianella amoena</i> (EPBC: Endangered, FFG: Critically Endangered) Green Scentbark <i>Eucalyptus fulgens</i> (FFG: Endangered) Strzelecki Gum <i>Eucalyptus strzeleckii</i> (EPBC: Vulnerable, FFG: Critically Endangered) Yarra Gum <i>Eucalyptus yarraensis</i> (FFG: Critically Endangered) 	 River Swamp Wallaby-grass <i>Amphibromus fluitans</i> (November to March) Grey Billy-buttons <i>Craspedia canens</i> (August to February) Matted Flax-lily <i>Dianella amoena</i> (November to February) Green Scentbark <i>Eucalyptus fulgens</i> (All year round) Strzelecki Gum <i>Eucalyptus strzeleckii</i> (All year round) Yarra Gum <i>Eucalyptus yarraensis</i> (All year round). Yarra Gum <i>Eucalyptus yarraensis</i> (All year round). 	Act. A permit is also required "to take" listed protected species.
 Threatened fauna - The following fauna species were identified as species that could be potentially impact by the project. Australian Grayling <i>Prototroctes maraena</i> (EPBC: Vulnerable FFG: Endangered) Dwarf Galaxias <i>Galaxiella pusilla</i> (EPBC: Vulnerable FFG: Endangered) Flinders Pygmy Perch <i>Nannoperca sp. 1</i> (FFG: Vulnerable) Lace Monitor <i>Varanus varius</i> (FFG: Endangered) Glossy Grass Skink <i>Pseudemoia rawlinsoni</i> (FFG: Endangered) Swamp Skink <i>Lissolepis coventryi</i> (FFG: Endangered) Platypus <i>Ornithorhynchus anatinus</i> (FFG: Vulnerable) Lewin's Rail <i>Lewinia pectoralis (FFG: Vulnerable)</i> 	 Targeted surveys are recommended to confirm presence/absence and to map the extent of habitat within study area. Recommended survey period for each species is presented below: Australian Grayling <i>Prototroctes maraena</i> (December to April) Dwarf Galaxias <i>Galaxiella pusilla</i> (December to April) Flinders Pygmy Perch <i>Nannoperca sp. 1</i> (December to April) Lace Monitor <i>Varanus varius</i> (November to March) Glossy Grass Skink <i>Pseudemoia rawlinsoni</i> (September to April) Swamp Skink <i>Lissolepis coventryi</i> (September to April) Platypus <i>Ornithorhynchus anatinus</i> (December to April) Lewin's Rail <i>Lewinia pectoralis</i> (September to February). 	 The existence of any significant fauna species will be addressed through the preparation of an existing conditions ecological assessment that will inform approvals for the Project. FFG Act: In accordance with the FFG Act, if suitable habitat for these species is to be impacted by the Project following detailed design, a permit would be required under the Act. A permit is also required "to take" listed protected species. Wildlife Act: If any native fauna species are required to be relocated a person with Wildlife Authorisation under the Act is required to catch and release fish. Additionally, a permit is required if waterways are obstructed and fish passage is compromised.

Ecological values and risks	Recommended further investigations	Possible permit requirements
 Non threated fauna - The study area is highly likely to support several non-threated fauna species that are iconic native species and often the subject of public concern. These species include: Kola Phascolarctos cinereus Eastern Grey Kangaroo Macropus giganteus Short-beaked Echidna Tachyglossus aculeatus Bare-nosed Wombat Vombatus ursinus Rakali Hydromys chrysogaster Swamp Wallaby Wallabia bicolor These species will also need to be considered and management plans may need to be developed to mitigate and minimise impacts to these species.	None required as these species should be presumed present.	 Wildlife Act: If any native fauna species are required to be relocated a person with Wildlife Authorisation under the act is required to undertake the works. Additional considerations: These species will also need to be considered and management and translocation plans may need to be developed to mitigate and minimise impacts to these species.
Ramsar listed wetland - The Gippsland Lakes is approximately 70 kilometres east of the study area. The Morwell River runs along the western border of the Project Area and flows north into the Latrobe River. The Latrobe river then runs east and flows into Lake Wellington which forms part of the Gippsland Lakes Ramsar site.	Further investigations are required to understand the potential impact to the Ramsar Wetland. Furthermore, potential impacts to the ecological character of the Gippsland Lakes should be assessed against the LAC listed in the ECD.	It is considered likely that addressing the risks to the Ramsar Wetland will form a key study to undertaken to inform approvals for the Project
 Watercourses - The study area contains multiple named watercourses including: Morwell River (runs along the western boundary of the Project Area) Waterhole Creek (approximately 2 km north-east of the mine) Wilderness Creek (located in the south-west of the Project Area) Eel Hole Creek (located in the south-east of the Project Area) Bennetts Creek (located in the east of the Project Area) 	Further investigations are required to assess impacts to aquatic ecological values.	Water Act: In accordance with the Water Act, a 'works on waterway permit' would be required in the event one or more of these waterways are impacted by the Project.

Ecological values and risks	Recommended further investigations	Possible permit requirements
Invasive and pest species: Past detailed ecological assessments of the study area have identified a number of CALP Act listed flora and fauna species as present within the study area.	Targeted surveys should be employed to identify and map extent of CALP listed flora and fauna species.	• CaLP Act: The proponent will be required to prevent the growth and spread of regionally controlled weeds. Measures to fulfil requirements of the CaLP Act, particularly in relation to the control of weeds, should be detailed in an environmental management plan (or similar) prior to works commencing.

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Likelihood of threatened species assessment

Table A-1 Flora likelihood assessment table

Scientific Name	Common Name	Conse Status	rvation	Source, year, No.	Habitat present?	Likelihood of	Rationale
		EPBC Act	FFG Act	of records	(Y/N)	Occurrence	
Acacia boormanii	Snowy River Wattle		Endangered	Indigenous Design, 2013, 2	N	Unlikely	If species is present in Project Area it is likely to be planted revegetation. No further consideration.
Acacia howittii	Sticky Wattle		Vulnerable	VBA, 2002, 1	N	Unlikely	If species is present in Project Area it is likely to be planted revegetation. No further consideration.
Amphibromus fluitans	River Swamp Wallaby- grass	VU		PMST, VBA, 2003, 5	Y	Possible	Study area falls within the species' natural distribution. Species may persist within Project Area.
Caladenia tessellata	Thick-lip Spider- orchid	VU		PMST	N	Unlikely	Species unlikely to occur within Project Area due to being outside of the natural range. No recent records. No further consideration.
Chiloglottis jeanesii	Mountain Bird-orchid		Vulnerable	VBA, 2002, 2	N	Unlikely	Unsuitable habitat within project area and no recent records. No further consideration
Craspedia canens	Grey Billy- buttons		Critically Endangered	VBA, 2004, 11	Y	Possible	Species' natural distribution encompasses study area. Species may persist within Project Area.
Cyathea cunninghamii	Slender Tree-fern		Critically Endangered	VBA, 1997, 1	N	Unlikely	Unsuitable habitat within Project Area and no recent records. No further consideration
Dianella amoena	Matted Flax- lily	EN	Critically Endangered	PMST, VBA, 2012, 22	Y	Likely	Species recently recorded nearby and within Project Area.
Eucalyptus fulgens	Green Scentbark		Endangered	VBA, 2008, 14	Y	Present	Species' natural distribution encompasses study area. Species previously recorded within Project Area.
Eucalyptus kitsoniana	Bog Gum		Critically Endangered	Indigenous Design, 2018, 2	N	Unlikely	Study area falls on the edge of species distribution. If species is present in Project Area it is likely due to planting. No further consideration.

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Scientific Name	Common Name	Conse Status	rvation	Source, year, No.	Habitat present?	Likelihood of	Rationale
		EPBC Act	FFG Act	of records	(Y/N)	Occurrence	
Eucalyptus strzeleckii	Strzelecki Gum	VU	Critically Endangered	PMST, VBA, 2019, 1398	Ŷ	Present	Species recently recorded nearby and within Project Area.
Eucalyptus yarraensis	Yarra Gum		Critically Endangered	VBA, 2011, 14	Y	Present	Species' natural distribution encompasses study area. Species previously recorded within Project Area.
Glycine latrobeana	Clover Glycine	VU	Vulnerable	PMST	N	Unlikely	Unsuitable habitat within Project Area and no recent records. No further consideration
Lepidium hyssopifolium	Basalt Peppercress	EN	Endangered	PMST	N	Unlikely	Species unlikely to occur within Project Area due to being outside of the natural range. No recent records. No further consideration.
Platysace ericoides	Heath Platysace		Endangered	VBA, 2003, 2	N	Unlikely	Study area falls on the edge of species distribution. No suitable habitat within Project Area. No further consideration.
Pterostylis chlorogramma	Green- striped Greenhood	VU	Endangered	PMST	N	Unlikely	Species' natural distribution encompasses study area although there are only nine locations within Victoria, none of which occur near the Project Area. Species unlikely to occur within Project Area. No further consideration
Pterostylis grandiflora	Cobra Greenhood		Endangered	VBA, 2011, 4	N	Unlikely	Unsuitable habitat within Project Area and no recent records. No further consideration
Senecio psilocarpus	Swamp Fireweed	VU		PMST	N	Unlikely	Study area falls on the edge of species distribution. No suitable habitat within Project Area. No further consideration.
Thelymitra epipactoides	Metallic Sun-orchid	EN	Endangered	PMST	N	Unlikely	Unsuitable habitat within Project Area and no recent or historical records. No further consideration
Xerochrysum palustre	Swamp Everlasting	VU	Critically Endangered	PMST	N	Unlikely	Unsuitable habitat within Project Area and no recent records. No further consideration

Table A-2 Fauna likelihood assessment table

Scientific Name	Common	Life form	Conservation Status		Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	NO. OF RECORDS	Present (Y/N)	Occurrence	
Accipiter novaehollandiae	Grey Goshawk	Bird		Endangered	VBA, 2000, 3	Y	Possible	May occasionally use the study area for foraging and roosting but populations are unlikely to depend on study area.
Actitis hypoleucos	Common Sandpiper	Bird	Ma, Mi	Vulnerable	PMST	Y	Possible	May occasionally use the study area for foraging but is otherwise unlikely to depend on study area. Non-breeding visitor to Australia.
Anthochaera phrygia	Regent Honeyeater	Bird	CR	Critically Endangered	PMST	N	Unlikely	Although study area falls within natural distribution of species, it is unlikely to be present due to unsuitable habitat and lack of records despite extensive previous surveys. No further consideration.
Apus pacificus	Fork-tailed Swift	Bird	Mi, Ma		VBA, 2001, 3	N	Unlikely	Species may occasionally use air space above study area but is unlikely to depend on study area. Non-breeding visitor to Australia. This species is typically known from drier more inland areas. No further consideration.
Ardea alba modesta	Eastern Great Egret	Bird	Ма	Vulnerable	VBA, 2019, 3	Y	Likely	Species is likely to use the study area for foraging and roosting, but populations are unlikely to depend on study area. This species typically breeds in colonies located in discrete areas of Australia away from study area.
Aythya australis	Hardhead	Bird		Vulnerable	VBA, 2019, 23	Y	Likely	Species may use aquatic habitat present within Project Area.
Biziura lobata	Musk Duck	Bird	Ma	Vulnerable	VBA, 2011, 8	Y	Possible	Species may use aquatic habitat present within Project Area.

Scientific Name	Common	Life form	Conservation Status		Source, year,	Habitat	Likelihood of	Rationale	
	Name		EPBC Act	FFG Act	No. of records	Present (Y/N)	Occurrence		
Botaurus poiciloptilus	Australasian Bittern	Bird	EN	Critically Endangered	PMST	Y	Possible	Species may use aquatic habitat present within Project Area, species favours dense aquatic vegetation, which is present within study area.	
Bubulcus ibis	Cattle Egret	Bird	Ma		VBA, 1995, 1	Y	Possible	Species may use the study area for foraging and roosting, but populations are unlikely to depend on study area. This species typically breeds in colonies located in discrete areas of Australia away from study area.	
Calidris acuminata	Sharp-tailed Sandpiper	Bird	Mi, Ma		VBA, 1978, 1	Y	Possible	May occasionally use the study area for foraging during their migration passage but is otherwise unlikely to depend on study area. Non-breeding visitor to Australia.	
Calidris ferruginea	Curlew Sandpiper	Bird	CR, Mi, Ma	Critically Endangered	PMST	N	Unlikely	Species unlikely to utilise study area. Species prefers extensive tidal flats. Non- breeding visitor to Australia. No further consideration.	
Dasyurus maculatus maculatus	Spot-tailed Quoll	Mammal	EN	Endangered	PMST	N	Unlikely	Species extremely unlikely to occur in Project Area, extremely rare and locally extinct in most of historical distribution and is now restricted to remote areas of Victoria. No recent records. No further consideration.	
Egretta garzetta nigripes	Little Egret	Bird		Endangered	VBA, 2018, 6	Y	Possible/Likely	Species may use aquatic habitat present within study area for foraging. This species typically breeds in colonies located in discrete areas of Australia away from study area.	
Falco hypoleucos	Grey Falcon	Bird	VU	Vulnerable	PMST	N	Unlikely	Natural distribution does not encompass the Project Area. No further consideration.	

Scientific Name Com	Common	Life form	Conserv	ation Status	Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	No. of records	Present (Y/N)	Occurrence	
Falco subniger	Black Falcon	Bird		Critically Endangered	VBA, 2001, 3	Y	Likely	May occasionally use the study area for foraging and roosting but populations unlikely to depend on study area.
Galaxiella pusilla	Dwarf Galaxias	Bird	VU	Endangered	PMST, VBA, 2018, 5	Y	Likely	Species may use drainage lines and floodplains within the study area.
Gallinago hardwickii	Latham's Snipe	Bird	Mi, Ma		VBA, Indigenous Design, 2018, 11	Y	Present	Species has been recorded in Project Area by previous ecological surveys. Non- breeding visitor to Australia.
Grantiella picta	Painted Honeyeater	Bird	VU	Vulnerable	PMST	N	Unlikely	Natural distribution does not encompass the project area. No recent or historical records. No further consideration.
Haliaeetus leucogaster	White- bellied Sea- Eagle	Bird	Ма	Endangered	VBA, 2018, 4	Y	Present	Species recorded in Project Area by previous ecological surveys.
Hieraaetus morphnoides	Little Eagle	Bird		Vulnerable	VBA, 2001, 5	Y	Possible	May occasionally use the study area for foraging and roosting but populations unlikely to depend on study area.
Hirundapus caudacutus	White- throated Needletail	Bird	VU, Mi, Ma	Vulnerable	PMST, VBA	N	Unlikely	Species may occasionally use air space above study area but is unlikely to depend on study area. Non-breeding visitor to Australia. No further consideration.
Hydroprogne caspia	Caspian Tern	Bird	Mi, Ma	Vulnerable	VBA, 2017, 1	Y	Possible	Species may occasionally visit study area on route to more suitable areas of habitat. Only three significant regular breeding colonies are known in Victoria: Corner Inlet, Mud Island in Port Philip Bay and Mallacoota. Species is unlikely to depend on study area.
lsoodon obesulus obesulus	Southern Brown	Mammal	EN	Endangered	PMST	N	Unlikely	Project Area is unlikely to support species due to lack of suitable habitat such as

Scientific Name	Common	Life form	Conserva	ation Status	Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	No. of records	Present (Y/N)	Occurrence	
	Bandicoot (eastern)							shrubby areas. No recent or historical records. No further consideration.
lxobrychus dubius	Australian Little Bittern	Bird		Endangered	VBA, 2018, 2	Y	Possible	Species may use aquatic habitat present within Project Area, species favours dense aquatic vegetation, which is present within study area.
Lathamus discolor	Swift Parrot	Bird	CR, Ma	Critically Endangered	PMST	N	Unlikely	Species unlikely to occur in Project Area. No recent or historical records. No further consideration.
Lewinia pectoralis	Lewin's Rail	Bird		Vulnerable	VBA, 2019, 3	Y	Likely	Species may use aquatic habitat present within Project Area for foraging, roosting, and breeding, species favours dense aquatic vegetation, which is present within study area.
Lissolepis coventryi	Swamp Skink	Reptile		Endangered	Indigenous Design, 2018, 2	Y	Likely	Species recently recorded near the Morwell River Bridge. Suitable habitat may occur within Project Area.
Litoria aurea	Green and Golden Bell Frog	Amphibian	VU		PMST	N	Unlikely	Study area occurs on edge of species' natural distribution. No recent records. No further consideration.
Litoria raniformis	Growling Grass Frog	Amphibian	VU	Vulnerable	PMST	N	Unlikely	Species considered rare in local area. No recent records. No further consideration.
Mastacomys fuscus mordicus	Broad- toothed Rat	Mammal	VU	Vulnerable	PMST	N	Unlikely	Species has largely declined from area due to extensive clearing, competition with feral species and predation by cats and foxes. Species is unlikely to persist in Project Area. No recent records. No further consideration.
Melanodryas cucullata	Hooded Robin	Bird		Vulnerable	VBA, 1999, 1	N	Unlikely	Species unlikely to occur in Project Area due to habitat requirements. No recent records. No further consideration.

Scientific Name	Common	Life form	Conserv	ation Status	Source, year,	Habitat Present (Y/N)	Likelihood of Occurrence	Rationale
	Name		EPBC Act	FFG Act	No. of records			
Myiagra cyanoleuca	Satin Flycatcher	Bird	Mi, Ma		VBA, 2000, 7	N	Unlikely	Species unlikely to occur in Project Area due to habitat requirements which includes Eucalypt forests. No recent records. No further consideration.
Nannoperca sp. 1	Flinders Pygmy Perch	Fish		Vulnerable	VBA, 2020, 33	Y	Likely	Species may use aquatic systems within the study area. Recent records
Ninox connivens	Barking Owl	Bird		Critically Endangered	VBA, 2000, 2	N	Unlikely	Species considered rare in local area and is typically known from drier and more wooded habitats. No recent records. No further consideration.
Ninox strenua	Powerful Owl	Bird		Vulnerable	VBA, 2004, 3	Y	Possible	May occasionally use the study area for foraging and roosting. Species unlikely to breed within the Project Area as species requires extremely large hollows.
Numenius madagascariensis	Eastern Curlew	Bird	CR, Mi, Ma	Critically Endangered	PMST	N	Unlikely	Species unlikely to utilise study area. Species prefers extensive tidal flats. Non- breeding visitor to Australia. No further consideration.
Ornithorhynchus anatinus	Platypus	Mammal		Vulnerable	VBA, 2011, 2	Y	Possible	Species may use aquatic systems within the study area. Recent records
Oxyura australis	Blue-billed Duck	Bird		Vulnerable	VBA, Indigenous Design, 2018, 4	Y	Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in specific wetlands in Australia.
Petauroides volans	Greater Glider	Mammal	VU	Vulnerable	PMST	N	Unlikely	Species unlikely to occur in Project Area due to habitat requirements which includes intact Eucalypt forests. No recent records. No further consideration.
Plegadis falcinellus	Glossy Ibis	Bird	Mi, Ma		VBA, 1995, 1	Y	Possible	May occasionally use the study area for foraging. This species typically breeds in discrete areas of Australia away from study

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Scientific Name	Common	Life form	m Conservation Status		Source, year,	Habitat	Likelihood of	Rationale
	Name		EPBC Act	FFG Act	No. of records	Present (Y/N)	Occurrence	
								area such as the Murray Darling Basin and Riverina areas in NSW and Victoria.
Potorous tridactylus tridactylus	Long-nosed Potoroo	Mammal	VU		PMST	N	Unlikely	Species unlikely to occur in Project Area due to habitat requirements which includes intact Eucalypt forests with moderate understorey. No recent records. No further consideration.
Prototroctes maraena	Australian Grayling	Fish	VU	Endangered	PMST	Y	Possible	Species may use aquatic systems within the study area. Recent records
Pseudemoia rawlinsoni	Glossy Grass Skink	Reptile		Endangered	Indigenous Design, 2014, 5	Y	Possible	Species may persist within Project Area in wetland habitat. Recent records.
Pteropus poliocephalus	Grey- headed Flying-fox	Mammal	VU	Vulnerable	PMST, VBA, 2019, 1	Y	Possible	Species likely to fly over study area and may forage on flowering and fruiting trees within the study area but is otherwise unlikely to depend on study area for survival.
Rhipidura rufifrons	Rufous Fantail	Bird	Mi, Ma		VBA, 2007, 9	N	Unlikely	Species unlikely to occur in Project Area due to habitat requirements which includes Eucalypt forests. No further consideration.
Rostratula australis	Australian Painted Snipe	Bird	EN	Critically Endangered	PMST	N	Unlikely	Species unlikely to occur in Project Area. No recent or historical records. No further consideration.
Saccolaimus flaviventris	Yellow- bellied Sheathtail Bat	Mammal		Vulnerable	Indigenous Design, 2018, 1	Y	Possible	Species may occur in Project Area and utilise areas of wooded vegetation.
Spatula rhynchotis	Australasian Shoveler	Bird		Vulnerable	VBA, 2011, 8		Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in swamps in inland Australia.
Stictonetta naevosa	Freckled Duck	Bird		Endangered	Indigenous Design, 2016, 2	Y	Possible	Species may opportunistically use aquatic habitat present within Project Area. Breeds in swamps in inland Australia.

Scientific Name	e Common Life fo Name	Life form	Life form Conservation S		Status Source, year,		Likelihood of	Rationale
			EPBC Act	FFG Act	No. offections	(Y/N)	Occurrence	
Varanus varius	Lace Goanna	Reptile		Endangered	VBA, 1995, 1		Possible	Species may persist in low numbers within the study area where there is treed habitat.