Regional Rail Revival
North-East & Shepparton

PREPARED FOR RAIL PROJECTS VICTORIA

NES-AJM-NES-AWD-REP-XEV-NAP-0000239
SHEPPARTON LINE UPGRADE
ECOLOGICAL IMPACT ASSESSMENT

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Appendices

1 Executive Summary

1.1 Overview

Aurecon Jacobs Mott MacDonald Joint Venture (AJM JV) was engaged by Rail Projects Victoria (RPV) to prepare an Ecological Impact Assessment for the Shepparton Line Upgrade Stage 2 (the project), incorporating terrestrial ecology, aquatic ecology and geomorphology disciplines. The report identifies and evaluates ecological values relevant to the project, potential project impacts to those ecological values, subsequent project constraints and opportunities, and the Commonwealth and State legislation and policy requirements and approvals pathways.

The project area is approximately 130 km in length and occurs in discrete sections between Donnybrook and Shepparton. The proposed works include:

- Corridor works comprising:
  - » Platform extensions and minor station upgrades at Nagambie, Murchison East and Mooroopna.
  - » Level crossing upgrades (including Combined Services Route (CSR) cable routing works).
  - » A crossing loop extension at Murchison East.
- A stabling yard either within the McGill Street industrial area or within the existing Shepparton Railway Station.

This assessment determined ecological values present or with the potential to be present within the project area, including native vegetation, threatened species and their habitat and threatened ecological communities. Potential impacts to these ecological values were then considered, with the likely associated permit and approval requirements determined. The key findings of the report are summarised in Table 1.1.

TABLE 1.1: SUMMARY OF POTENTIAL ECOLOGICAL IMPACTS, LEGISLATIVE IMPLICATIONS AND NEXT STEPS

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	**Matters of National Environmental Significance (MNES) outside the Melbourne Strategic Assessment (MSA) area** • Three (3) threatened ecological communities occur within the project area. **These are not to be impacted** and are designated as 'No Go Zones'. • Four (4) threatened flora species with a moderate to high (or confirmed) likelihood of occurring within the project area. These are **not to be impacted** with potential habitat for these species designated as 'No-Go Zones'. • Ten (10) threatened fauna species with a moderate to high likelihood of occurring within the project area. These are **not to be impacted** with specific mitigation measures to be enacted.	• No MNES are expected to be impacted by the proposed works. This assumes that the 'No Go Zones' identified in Appendix A and mapped in Appendix B are implemented and enforced. • Pre-clearance surveys for Matted Flax-lily are to be undertaken within the works area at Wallan between November and February, and any individuals found must be avoided through construction measures. • Vegetation clearance at Seymour should be supervised by an appropriately qualified fauna spotter to ensure the absence of the Striped Legless Lizard and the Pink Tailed Worm Lizard. Habitat found to be occupied by either of these species must be avoided. • Mitigation measures are detailed further in Section 6.2.
The Melbourne Strategic Assessment	**Time-stamped values** • Time-stamped values including native vegetation and threatened species habitat are mapped within	• Payment of Habitat Compensation Obligations (HCOs) is required to account for impacts to time-stamped values within the MSA area. A set fee of

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS
	the project area. Time-stamped values are required to be cleared to facilitate the proposed works. **MSA conservation areas** • The proposed works intersect with one MSA conservation area (No. 34 – Growling Grass Frog), which includes one 'area of strategic importance' within that conservation area (a buffer around a waterbody).	$35,439.57 in HCOs must be paid to DELWP prior to commencing work within the MSA area. • A permit to undertake works in a conservation area must be obtained from DELWP to undertake works within conservation area number 34, a Growling Grass Frog conservation area where the Donnybrook works area crosses Merri Creek. This area is identified as 'NGZ-01' in Appendix A and mapped in Appendix B. • Specific mitigation measures are to be enacted within the 5 m works corridor that passes through the area of strategic importance. • Outside of the 5 m works corridor, the area of strategic importance is to be a designated No-Go Zone. • Pre-clearance surveys for Basalt Peppercress are recommended to be undertaken within the works area at Donnybrook in Summer (within the MSA area), and any individuals found should be avoided through construction measures
Environment Effects Act 1978 (EE Act)	**267.28 ha of native vegetation within the project area** **Of that 267.28 ha, 24.04 ha of native vegetation is likely to require removal including:** • 20.91 ha of native vegetation patches • 0.17 ha of time-stamped native vegetation • 91 scattered trees **One individual referral criterion has been met (meeting either of these criteria necessitates a referral) through:** • The removal of 14.22 ha of endangered ecological vegetation classes (EVCs), including 11 ha of native vegetation patches, 0.17 ha of time-stamped native vegetation, and 91 scattered trees (trigger threshold 10 ha); or • The removal of 12.47 ha of vegetation of 'very high conservation significance', including 12.3 ha of native vegetation patches and 0.17 ha of time-stamped native vegetation (trigger threshold 10 ha).	• It is recommended that the project be referred to the Minister for Planning under the EE Act as the project triggers an individual criterion of the *Ministerial Guidelines for Assessment of Environment Effects* (DSE, 2006) associated with the removal of native vegetation. • For self-assessment of this project against the criteria, see Appendix C.
Flora and Fauna Guarantee Act 1988 (FFG Act)	**FFG-listed threatened ecological communities** • Western (Basalt) Plains Grassland; 0.49 ha within the project area, 0.06 ha to be removed • Victorian Temperate Woodland Bird Community 30.63 ha within the project area, 3.87 ha to be removed **FFG-listed and protected species** • 14 **threatened** flora species listed under the FFG Act with a moderate to high likelihood of occurring within the project area. • 25 **threatened** fauna species listed under the FFG Act with a moderate to high likelihood of occurring within the project area. • Numerous flora species **protected** under the FFG Act occur within the project area.	• Mitigation measures must be adhered to (as per Section 6.3.3) to ensure the project is consistent with the objectives of the FFG Act. • A permit to take under the FFG Act will be required for 0.06 ha of Western (Basalt) Plains Grassland, 3.71 ha of Victorian Temperate Woodland Bird Community, and numerous FFG Act-listed species, detailed in Section 6.3.3 (threatened communities) and Appendix D (protected species).
Planning and Environment Act 1987 (P&E Act), and the incorporated document *Guidelines for the removal, destruction or*	**267.28 ha of native vegetation within the project area** **Of that 267.28 ha, 24.04 ha of native vegetation is likely to require removal including:** • 20.91 ha of native vegetation patches • 0.17 ha of time-stamped native vegetation	• Planning approval is required under the P&E Act for the removal of native vegetation. • Offsets will need to be obtained prior to the commencement of project works as per the Guidelines. A preliminary offset target can be found in Appendix E. • The offset target in Appendix E does not include native vegetation removal within the MSA area.

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS
lopping of native vegetation ('the Guidelines')	• 91 scattered trees	Impacts to this vegetation are accounted for through the payment of HCOs. Clarification should be sought from the Hume and Whittlesea LGAs as to whether additional offsets are required in addition to the payment of HCOs within the MSA area under local Native Vegetation Precinct Plans. • Detailed design of the project may alter the native vegetation impacts and offset target. • Detailed design and construction should follow the avoid and minimise principle.
The Wildlife Act 1975	**Removal of fauna habitat** • Habitat fragmentation and clearance • Direct impact through clearance of denning and nesting locations	• Fauna salvage must occur throughout any locations where vegetation removal, including single trees are to be removed. • The wildlife handler/ ecologist employed to do so must hold a permit under the Wildlife Act to handle or capture wildlife.
Catchment and Land Protection Act 1994 (CaLP Act)	**CaLP Act-listed weeds** • Various CaLP Act-listed weeds were observed within the project area. These are detailed in Appendix D. • Various CaLP Act-listed pest animals or evidence of these animals were observed throughout the project area	• Undertake measures to prevent the spread of weeds within and from the project area and the control of pest animals. (rabbits, foxes, cats, Feral dog)

1.2 Stabling Options

Although the preferred stabling option is yet to be determined, the stabling options form a part of the overall impact assessment. Depending on the option chosen, the following amendments may need to be made to this impact assessment:

- The amount of native vegetation clearance considered in this impact assessment may need to be increased by up to 0.2 ha of native vegetation patches, and 1 scattered tree depending on the stabling option chosen. The required offset target would need to be re-calculated, with the offset target potentially increasing, following selection of the preferred stabling option.

Due to the relatively small amount of native vegetation within the stabling option areas, it is considered that the selection of the preferred stabling option and elimination of other options will not change the approvals required for the project as presented in this report.

1.3 Conclusions

In summary, the following conclusions are made on the need for approvals and next steps for the proposed works in relation to the ecological impacts to the project area (including both the Corridor Works and potential areas required for the stabling options):

- Undertake further avoidance and minimisation measures throughout the design and construction process.
- RPV to confirm 'No Go Zones' listed in Appendix A and mapped in Appendix B can be implemented to ensure avoidance of MNES within the project area. This will ensure no significant impacts to any MNES protected under the EPBC Act for the project.
- It is recommended that the project be referred to the Minister for Planning under the EE Act. As per the *Ministerial Guidelines for Assessment of Environment Effects* (DSE 2006), the following flora and fauna-related criteria have been met:
  - » One (1) individual referral criterion met (meeting either of these criteria necessitates a referral) through:

    - The removal of 14.22 ha of endangered ecological vegetation classes (EVCs), including 11 ha of native vegetation patches, 0.17 ha of time-stamped native vegetation, and 91 scattered trees (trigger threshold 10 ha); or
    - The removal of 12.47 ha of vegetation of 'very high conservation significance', including 12.3 ha of native vegetation patches and 0.17 ha of time-stamped native vegetation (trigger threshold 10 ha).
  - Only one (1) combination referral criterion met (meeting two or more of these criteria necessitates a referral):
    - The removal of 24.04 ha of native vegetation including 20.91 ha of native vegetation patches, 0.17 ha of time-stamped native vegetation and 91 scattered trees (trigger threshold 10 ha).

- Pre-clearance surveys for Matted Flax-lily must be undertaken within the works area at Wallan between November and February. Any Matted Flax-lily individuals found within the works area at Wallan must be avoided by construction.

- Pre-clearance surveys for Basalt Peppercress should be undertaken within the works area at Donnybrook in Summer. Any Basalt Peppercress individuals found within the works area at Donnybrook should be avoided by construction.

- Vegetation clearance at Seymour should be supervised by an appropriately qualified fauna spotter to ensure the absence of the Striped Legless Lizard and the Pink Tailed Worm Lizard. Habitat found to be occupied by either of these species must be avoided.

- The Planning Scheme Amendment (PSA), which is being prepared to provide planning approval for the project, will address native vegetation removal and required offsets in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017b).

- Clarification should be sought from the Hume and Whittlesea LGAs in the MSA area as to whether additional offsets are required in addition to the payment of HCOs under local Native Vegetation Precinct Plans. These additional offsets would be procured through the above-mentioned PSA.

- A "permit to take" under the FFG Act will be required for:
  - Removal of protected flora species
  - Removal of threatened ecological communities

- Mitigation measures are recommended to mitigate potential impacts to the identified ecological values during construction in accordance with the Environmental Management Framework for the project.

2 Introduction

Aurecon Jacobs Mott MacDonald Joint Venture (AJM-JV) was engaged by Rail Projects Victoria (RPV) to prepare an Ecological Impact Assessment for the Shepparton Line Upgrade Stage 2 (the project), which extends between Donnybrook and Shepparton, Victoria. This document provides an Ecological Impact Assessment for the terrestrial ecology, aquatic ecology and geomorphology disciplines.

The purpose of this document is to identify and evaluate the known ecological values relevant to the project, identify potential project impacts to those ecological values and subsequent project constraints and opportunities, and identify the likely Commonwealth and State legislation and policy requirements and approvals pathways.

This document has been prepared using information gathered from desktop assessments and results from field assessments conducted to date.

2.1 Project Description

The project has been developed to address rail capacity constraints on the Shepparton line. This project will deliver a more reliable train service, helping pave the way for VLocity trains to run to Shepparton.

The project has been divided into corridor works (comprising station upgrades, level crossing upgrades and a crossing loop) and stabling options:

- Corridor works comprising:
  - » Platform extensions and minor station upgrades at Nagambie, Murchison East and Mooroopna.
  - » Level crossing upgrades (including CSR cable routing works).
  - » A crossing loop extension at Murchison East.
- A stabling yard either within the McGill Street industrial area or within the existing Shepparton Railway Station.

The proposed project investigation boundary (herein referred to as the ‘project area’) defines the area in which the project components are to be contained. It includes parts of roads and bridges which intersect and are not within the VicTrack reserve boundary to ensure a contiguous project area. It provides the basis for (and additionally informs) the assessment of potential impacts. The project area incorporates the construction impact footprint, including works access areas and tracks, materials laydown areas, and other areas affected by the project.

The scope of works of the project is further detailed in the AJM JV Environmental Specialist Scope of Works Revision F (NES-AJM-NES-AWD-SOW-XLP-NAP-000139) document.

2.2 Purpose

This document provides the findings of the Ecological Impact Assessment of the project. The specific objectives of this document are to:

- Determine the likelihood of occurrence of threatened or rare species and their suitable habitats, and protected ecological communities within the project area.

- Identify the type, quality and extent of native vegetation present within the project area, in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017b) and the *Vegetation Quality Assessment Manual* (DSE 2004).

- Identify and map opportunities and constraints, including areas of environmental value to be avoided from development impact.

- Undertake an ecological impact assessment of the project to inform permit and approval requirements.

2.3 Previous Investigations

A previous preliminary ecological investigation report was prepared for the project to document the potential presence of ecological values within the project area:

- NES Early Ecology Field Work Report (AJM JV 2018), Reference: NES-AJM-NES-AWD-REP-XEV-NAP-0000239 *8 November 2018 Revision A.*

The outcomes of that document have been incorporated into the current document.

2.4 Project Area Description and Environmental Context

The project area encompasses approximately 514 ha of land, including approximately a 130 km extent of the existing rail corridor, from Donnybrook in the south to Shepparton in the north (Figure 2.1). The project area includes the full width of the rail reserve with some overlap into private properties at Murchison East to facilitate laydown areas. Donnybrook is located approximately 30 km north of the Melbourne Central Business District (CBD), while Shepparton is located approximately 165 km north northeast of the Melbourne CBD.

Administrative areas intersected by the project area include five Local Government Areas (LGAs): Hume, Whittlesea, Mitchell, Strathbogie and Greater Shepparton. Catchment Management Authority (CMA) areas intersected are the Port Phillip and Western Port and the Goulburn Broken CMA areas.

The southern end of the project area intersects the Melbourne Strategic Assessment (MSA) area, for which a separate suite of legislation and policy applies. Less than 4km of the overall project area falls within the MSA area, including the southern-most level crossing areas:

- Donnybrook level crossing – entire development extent

- Part of the Wallan level crossing – southern extent

The existing rail corridor includes public land to which the FFG Act applies.

The project area spans a variety of environments, including four bioregions: the Victorian Volcanic Plain (VVP), Central Victorian Uplands (CVU), Highlands - Northern Fall (HNF) and the Victorian Riverina (VR). The sections of railway between Donnybrook and Seymour traverse the VVP bioregion closer to Melbourne, then transition into dissected upland and valleys of the CVU and HNF bioregions. The Seymour to Shepparton railway traverses the flatter areas of the Goulburn Valley. These areas consist of flat plains sloping towards the north-west (Butler, Blackburn et al. 1973) which are typical of the VR bioregion, with intermittent incursions of the CVU bioregion.

Major waterways crossed by the project include the Goulburn and Broken River channels and floodplains. Minor named waterways intersected include Merri Creek and larger tributaries of the Goulburn River. Various minor unnamed waterways are intersected, including smaller tributaries and drainage channels.

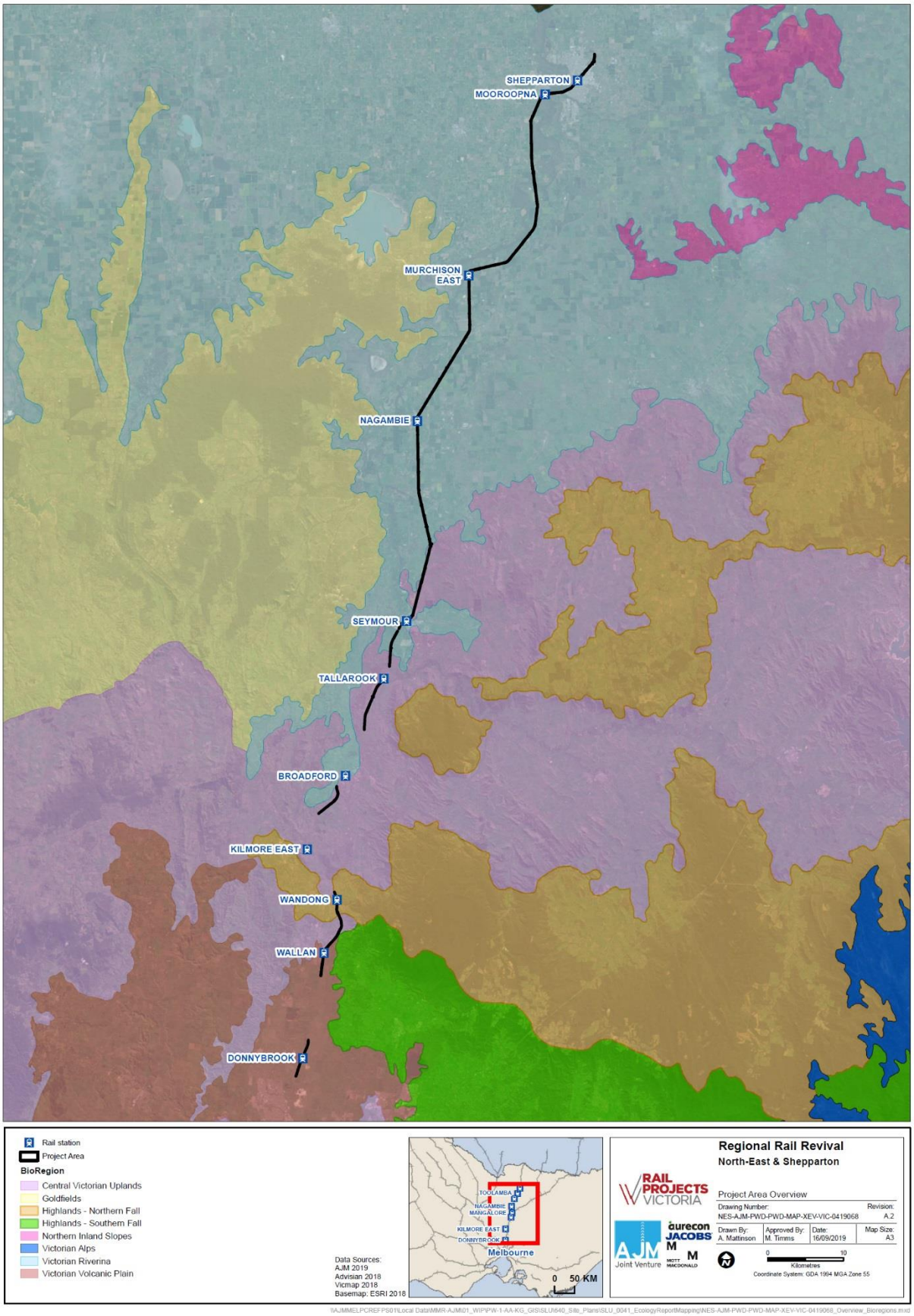

FIGURE 2.1 PROJECT INVESTIGATION AREA

3 Legislation and Policy Context

Commonwealth and State legislation drives the requirement for ecological assessment. This document identifies the legislation and policy triggered by the project as it may potentially impact on protected ecological values, requiring permitting and/or approval prior to works commencing.

A summary of the legislative instruments and policies referred to throughout the document is provided in Appendix F, including:

- Commonwealth
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), pertaining to:
    - Part 3: Matters of National Environmental Significance (MNES)
    - Part 10: Strategic Assessments (regarding the Melbourne Strategic Assessment (MSA))
- State
  - *Environment Effects Act 1978* (EE Act)
  - *Planning and Environment Act 1987* (P&E Act), including the
    - Guidelines for the removal, destruction or lopping of native vegetation ('the Guidelines');
  - *Flora and Fauna Guarantee Act 1988* (FFG Act)
  - *Catchment and Land Protection Act 1994* (CaLP Act)
- Non-statutory
  - DELWP Victorian Advisory Lists of Rare or Threatened taxa (VicAdv)

The assessment within this document has been conducted with consideration of proposed works detailed in the AJM JV Environmental Specialist Scope of Works Revision F (NES-AJM-NES-AWD-SOW-XLP-NAP-000139) document. Where proposed works vary from the Scope of Works Revision F, further assessments and approvals may be required to comply with the legislation and policies detailed in Appendix F.

4 Methods

4.1 Assessment Approach and Management Framework for Regional Rail Revival Projects

The environmental management governance framework for RPV, together with approval requirements under Commonwealth and State legislation, enable Regional Rail Revival (RRR) projects, such as the Shepparton Line Upgrade, to avoid and minimise impacts to biodiversity and other environmental values, where possible. The assessment within this document has been completed in accordance with this framework.

A flow diagram of how environmental values, including biodiversity, are assessed and considered through the design, approval and construction process for RRR projects is provided in Figure 4.1. The framework allows for the implementation of the following steps:

- Avoid and minimise impacts first.
- Mitigate impacts where avoidance is not possible.
- Offset where residual impacts cannot be avoided.

The aim of this document is to consolidate Desktop and Field Assessment results, identifying:

- Ecological values relevant to the project.
- Ecological values recognised as significant and requiring consideration of legislative protection from potential project impact.
- Ecological values that may pose potential constraint to the project.

The methods applied in the Desktop and Field Assessments are provided below. The outcomes of this document are intended to inform project design development and the development of primary approvals required for the project.

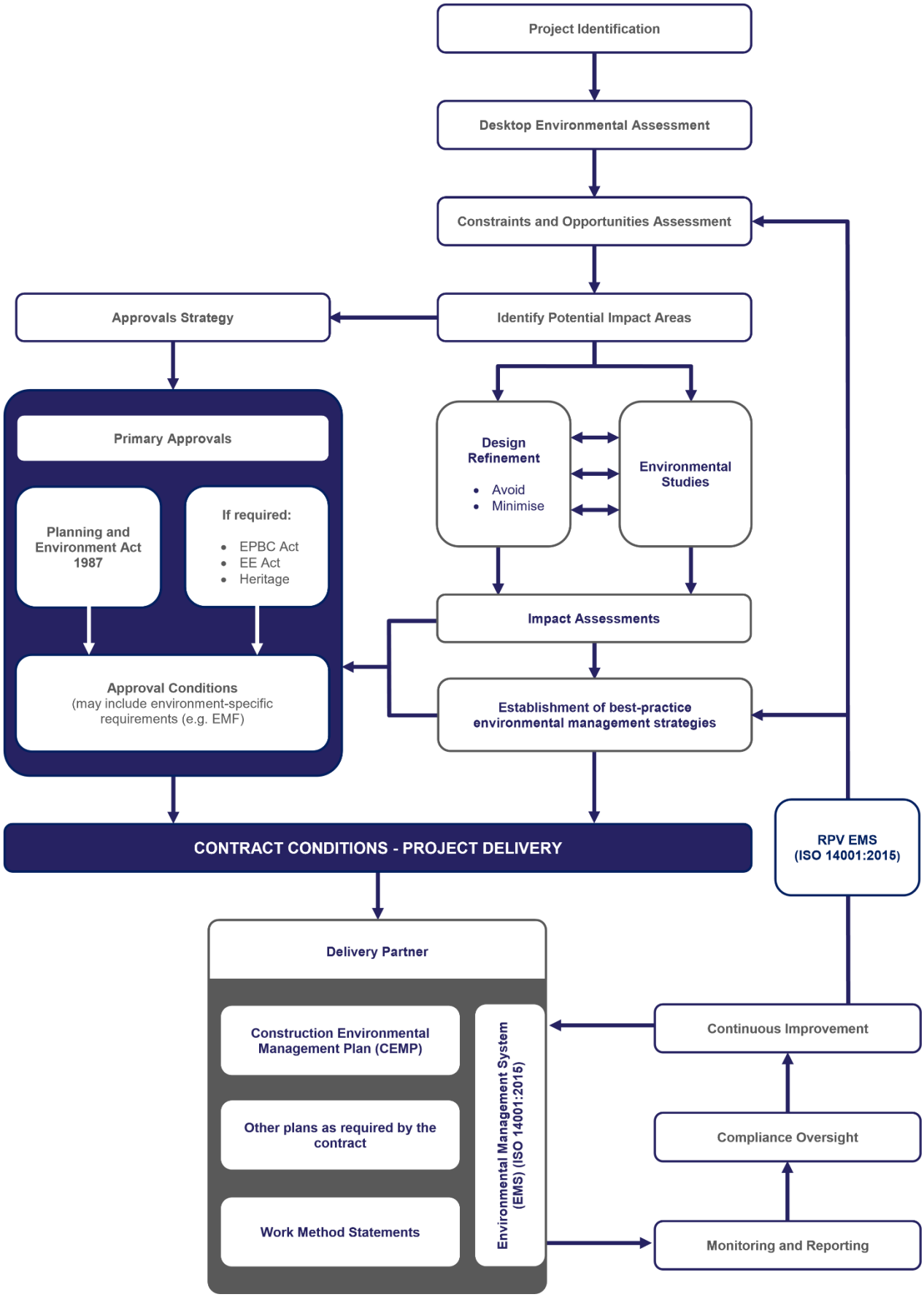

FIGURE 4.1 RPV ENVIRONMENTAL MANAGEMENT GOVERNANCE WORKFLOW

4.2 Desktop Assessment

The Desktop Assessment reviewed the following databases and documents to provide information on native vegetation, threatened ecological communities, and threatened flora and fauna species and their habitats previously identified or modelled to occur within the project area.

4.2.1 BIODIVERSITY DATABASE SEARCHES

4.2.1.1 Commonwealth

4.2.1.1.1 Areas within the MSA area

The following MSA datasets were reviewed:

- Time Stamped Native Vegetation: the extent and quality of native vegetation within the area subject to the MSA have been mapped. This dataset is used to determine offsets required for the removal of native vegetation within the MSA area.
- Habitat Compensation Obligations: all areas not covered by existing roads, buildings or infrastructure have a HCO based on whether the land is considered native vegetation, or whether potential habitat for the following species has been mapped within the areas subject to the *Biodiversity Conservation Strategy* (BCS) (DEPI 2013a):
  - » Golden Sun Moth (*Synemon plana*)
  - » Growling Grass Frog (*Litoria raniformis*)
  - » Matted Flax-lily (*Dianella amoena*)
  - » Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*)
- Conservation Area boundary: Areas with high ecological values are identified as Conservation Areas to be retained as per the BCS. Specific permitting is required where impacts are unable to be avoided in mapped Conservation Areas.

4.2.1.1.2 Areas outside of the MSA area

Most of the project area (i.e. 130 km alignment) falls outside of the MSA area and as such, the EPBC Act applies pertaining to the protection of MNES.

The Protected Matters Search Tool (PMST), administered by the Commonwealth Department of Energy and the Environment (DoEE), was accessed to identify project-relevant MNES and other relevant matters that are required to be protected in accordance with the EPBC Act. A PMST report was generated including a 5 km search buffer of the Shepparton Line Upgrade alignment (19 July 2018 for Seymour to Shepparton, and 14 January 2019 Donnybrook to Seymour). The buffer was used to capture species previously recorded nearby that would likely occur within the project area but have not been specifically recorded within the project area boundary (e.g. mobile fauna and dispersed flora species).

4.2.1.2 State

The following biodiversity information sources were considered in preparing the Desktop Assessment:

- Victorian Biodiversity Atlas (VBA), which includes historical records of terrestrial and aquatic species presence including:
  - » Flora species.

  - » Vertebrate fauna species.
  - » Invertebrate fauna species.

- Ecological Vegetation Classes (EVCs), being modelled mapping of native vegetation classed according to the EVC classification used for vegetation assessment in Victoria.

- Sites of Biological Significance (Biosites), which provides locations of sites recognised and mapped as providing biological significance. These areas are not protected, in themselves, though may be indicative of areas where threatened species are known, or a likely, to occur. This database is no longer administered, though still provides a useful resource for identifying potentially sensitive biodiversity areas that may be relevant to project (DSE 2008).

- Planning Overlays, which suggest the presence of significant biodiversity areas or other relevant biodiversity or landscape values. This includes mapped occurrences of the following Overlays:
  - » Vegetation Protection Overlay
  - » Environmental Significance Overlay
  - » Land Subject to Inundation Overlay
  - » Significant Landscape Overlay
  - » Erosion Management Overlay
  - » Public Acquisition Overlay

4.2.2 LIKELIHOOD OF OCCURRENCE ASSESSMENT

Threatened flora and fauna species records sourced from the database searches are subject to a Likelihood of Occurrence Assessment to identify which of the species detected would likely occur within the project area and be potentially impacted by the project. The likelihood of occurrence of a threatened species is classified into three classes; high, moderate, and low. Those species identified as having a high or moderate likelihood of occurrence are subject to further consideration during the Field Assessment and the need to conduct Targeted Surveys determined based on available habitat observed in the field.

The methods for classifying the threatened species likelihood of occurrence is provided in Table 4.1.

A similar process is applied for determining the likelihood of occurrence of threatened ecological communities within the project area; the classification criteria provided below in Table 4.2.

TABLE 4.1 CRITERIA FOR DETERMINING THE LIKELIHOOD OF OCCURRENCE OF THREATENED SPECIES BEING PRESENT WITHIN THE PROJECT AREA

LIKELIHOOD	CRITERIA
High	• Recent (<30 years old) records of species from DELWP databases • Review of aerial photography indicates potential habitat available within the project area • Review of habitat and distribution literature indicates the project area is appropriate for the species
Moderate	• Historical records of species from DELWP databases • Review of habitat distribution literature indicates the project area is appropriate for this species • Review of aerial photography indicates potential habitat in the project area
Low	• Species has not been previously recorded within DELWP databases • Review of aerial photography indicates no potential habitat in the project area • Review of literature regarding habitat and distribution indicates the project area is unlikely to be utilised by the species

TABLE 4.2 CRITERIA FOR DETERMINING THE LIKELIHOOD OF OCCURRENCE OF THREATENED ECOLOGICAL COMMUNITIES BEING PRESENT WITHIN THE PROJECT AREA

LIKELIHOOD	CRITERIA
High	• Mapping by DELWP indicates that EVCs likely to be present at the project site are of a similar composition to the threatened ecological community • Review of aerial photography indicates that remnant vegetation is likely to be present at the project site • Review of literature and general knowledge of vegetation in the area indicates the project site is appropriate for this ecological community
Moderate	• Mapping by DELWP indicates that EVCs likely to be present at the project site are of a similar composition to the threatened ecological community • Review of literature and general knowledge of vegetation in the area indicates the project site is suitable for this ecological community • It is difficult to determine from aerial photography whether the community is present, such as grassland communities
Low	• Mapping by DELWP indicates that EVCs likely to be present at the project site are not of similar composition to the threatened ecological community or that no remnant vegetation is present • Review of aerial photography indicates that no remnant vegetation is likely to be present • Review of literature and general knowledge of vegetation in the area indicates that the vegetation community is unlikely to be present at the project site

4.2.3 LITERATURE REVIEW

A review of relevant literature was conducted of previously prepared reports and publications that were publicly available or supplied by the client. The outcomes are incorporated into the interpretation of the results in this document. Documents reviewed are included within the references (Section 9).

Available aerial imagery was also considered at each phase of this assessment.

4.3 Field Assessment

The aim of the Field Assessment was to verify and update the findings of the Desktop Assessment (Section 4.2) and identify the presence of other relevant ecological values.

A high-level field reconnaissance activity (described in the Early Ecology Field Assessment (AJM JV 2018)) was initially conducted to ascertain an indicative extent and condition of ecological values present and to determine the need for season-dependent targeted surveys to detect specific threatened species and the suitability of available habitats within the project area. A traffic-light constraints map was produced informing the project of areas of high, moderate and low ecological constraint to the project which was updated as the field work progressed.

General ecology field assessments were conducted by AJM JV ecologists as per the field assessment schedule below (Table 4.3). Surveys were conducted as per the targeted survey schedule below (Table 4.4). All surveys were undertaken by qualified and experienced ecologists.

4.3.1 NATIVE VEGETATION

Native vegetation in the project area was identified and classified into EVCs, mapped, and subject to Vegetation Quality Assessment (VQA) to quantify the condition of the EVCs against defined benchmarks (DELWP 2019). This information enables the identification of threatened ecological communities (EPBC Act) and Listed Threatened Communities (FFG Act), potential threatened species habitat, and (where relevant), for use in determining mitigative offset requirements for the project.

To facilitate calculations of offsets required under the P&E Act, native vegetation was mapped in accordance with the Guidelines (DELWP 2017a) as either a patch, scattered tree or other native vegetation:

- Patch:
  - An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or
  - any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
  - any mapped wetland included in the current wetlands map, available in DELWP systems and tools.
- Scattered tree:
  - A native canopy tree that does not form part of a remnant patch. A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3m in height and is normally found in the upper layer of the relevant vegetation type.
- Other native vegetation:
  - Native vegetation that is not a remnant patch or scattered tree was incidentally identified such as scattered understorey trees.

Patches were further categorised into EVCs and then into Habitat Zones. These areas were GPS mapped and assessed using the habitat hectare method described by DSE (2004) in the *Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectare scoring method* – Version 1.3. Any Large Trees contained within patches were identified as Canopy Trees, GPS mapped and their Diameter at Breast Height (DBH) recorded.

Native vegetation within the MSA area was compared against relevant time-stamped native vegetation mapping. The time-stamped mapping was found to be representative of the native vegetation present within the MSA area, and has been used to determine the native vegetation approval requirements for native vegetation removal within the MSA area.

4.3.2 LOSS CALCULATION METHODOLOGY

The extent of vegetation loss was calculated by overlaying the project impact footprint with the mapped native vegetation. As the design is still subject to alteration and refinement, and because this document is intended to inform mitigation measures to avoid potential impacts, the final extent of potential impacts is subject to refinement. The current understanding of the project impact footprint was determined by allowing a 5 m construction corridor in CSR works areas, and applying polygons approximating the likely works area around civil works area.

The extent of vegetation loss was assessed in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a). Scattered trees were considered lost when greater than 10% of the Tree Protection Zone (TPZ) was impacted. The TPZ was calculated as 12x the Diameter at Breast Height (DBH) (cm). Patches were considered to be impacted when the project impact footprint intersected either a patch boundary, or the TPZ of a canopy tree within a patch by more than 10%.

Where a patch of wooded vegetation was determined to be impacted, the extent of impact to the patch was determined using the ‘accurate mapping’ method outlined in (DELWP 2018a). To undertake the ‘accurate mapping’ method, aerial imagery was overlaid with the project impact footprint, and native vegetation mapping, including patches, canopy trees and their associated tree protection zones. Aerial imagery was used to trace the drip-line of any trees determine to be affected by project impact footprint, thus defining the portion of the patch that was impacted. A diagram depicting the implementation of this method can be seen in Figure 4.2.

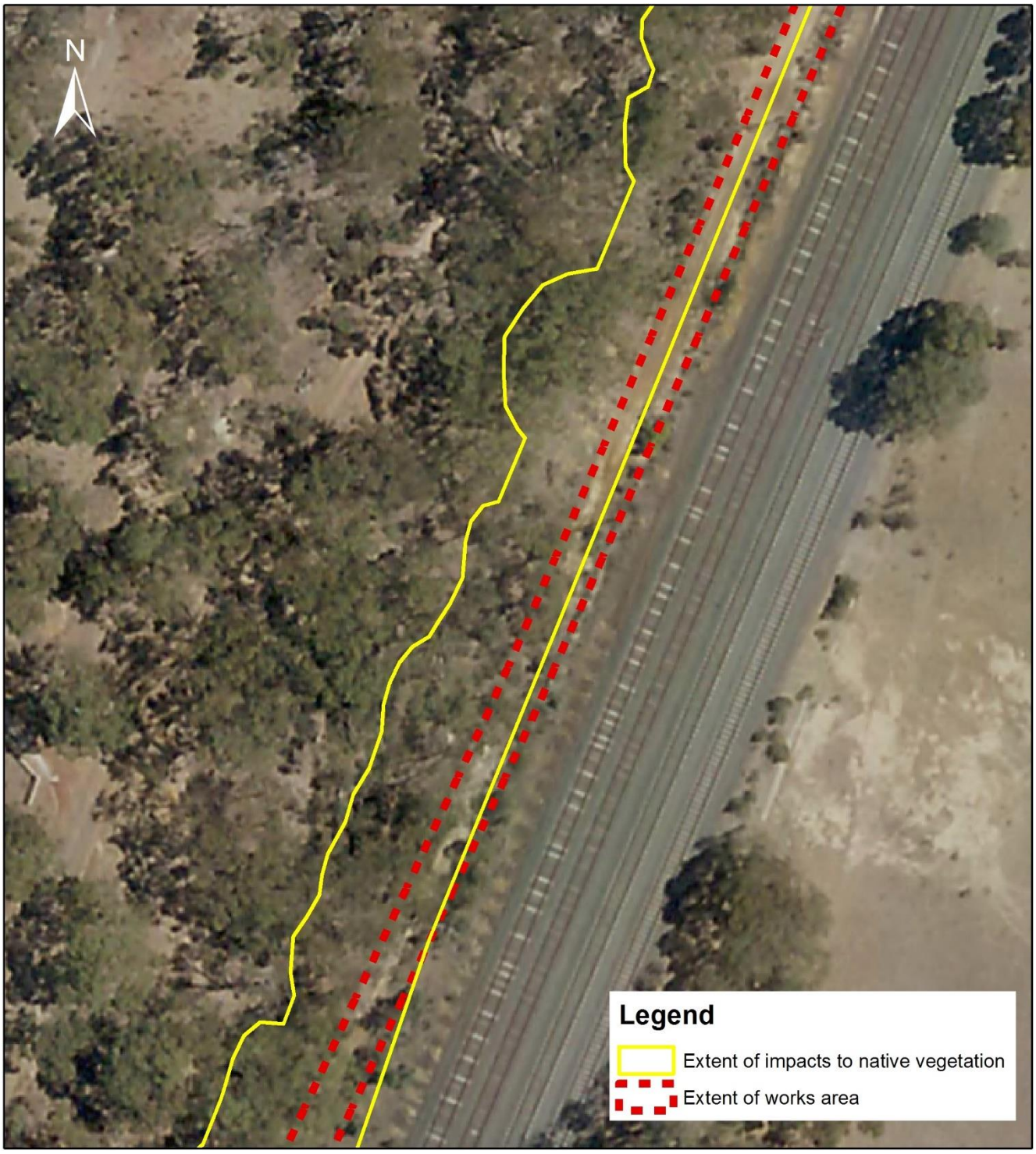

FIGURE 4.2: APPLICATION OF THE *ACCURATE MAPPING* METHOD FOR DETERMINING THE EXTENT TO IMPACTS OF WOODED PATCHES. IN THIS EXAMPLE, THE WORKS AREA RUNS ALONG THE EASTERN BOUNDARY OF AN AREA OF WOODED NATIVE VEGETATION. THE AREA OF IMPACTS HAS BEEN EXTENDED OUTSIDE THE WORKS AREA TO THE WEST BY TRACING AROUND THE CANOPIES OF IMPACTED TREES.

TABLE 4.3 FIELD ASSESSMENT SCHEDULE

ASSESSMENT TYPE	ASSESSMENT PURPOSE	TIMING (MONTH/ SEASON)	EFFORT
Preliminary terrestrial ecology reconnaissance	Verification of desktop assessment results pertaining to native vegetation and fauna habitats.	July and August (winter), 2018	Two teams of two qualified ecologists (four in total), over a total of 6 days for the initially scoped 70 km of the project area, which at that stage included only the Seymour to Shepparton extent. Note that as the entirety of the project area was subject to vegetation assessment (see below) there was no need to undertake further preliminary reconnaissance for subsequently added scope.
Vegetation assessment	Undertake a vegetation assessment including the following tasks: • Mapping of native vegetation (DSE 2004) • VQA (habitat hectares) (DELWP 2017a) • Identification and extent mapping of FFG Act Communities • Identification of EPBC Act threatened ecological communities in accordance with the community-specific listing advice, and extent mapping • Identification and assessment of potential habitat for threatened flora and fauna that may occur in the project area • Identification and mapping of threatened flora and fauna species observed opportunistically during the above tasks	October 2018 to June 2019	Teams of two qualified ecologists over the duration of the project until June 2019. The entirety of the project area was surveyed.
Aquatic ecology and geomorphology reconnaissance	Verification of desktop assessment results in relation to: • Aquatic fauna habitats and aquatic fauna species. • Geomorphologic systems and functioning associated with the project area.	October and November 2018 (spring)	One team of two senior consultants, totalling 4 days over the then scoped 97 km project area (scope Revision C) within defined areas relevant to these disciplines, including waterways, waterbodies and floodplain systems. Note threatened aquatic species have been assumed present within the waterways of the project area, and thus further aquatic survey was not required.

4.4 Targeted Surveys

The project area was assessed to detect the presence of suitable habitat for threatened species. Where potential impacts to suitable habitat were identified, the need for further assessment was considered. The targeted surveys undertaken were considered necessary to detect the presence of threatened species such that direct impact could be avoided, minimised, or suitably mitigated (or offset). Targeted surveys were undertaken to determine the presence of threatened fauna in a particular location. Where the presence of that fauna could not be ruled out, and the area constituted important habitat for that species, specific mitigation measures have been recommended. All targeted surveys were undertaken by two suitably qualified and experienced ecologists. The targeted survey schedule is provided in Section 4.4.1.4.

TABLE 4.4 TARGETED SURVEY SCHEDULE

ASSESSMENT TYPE	ASSESSMENT AIM AND METHOD	TIMING (MONTH/ SEASON)
Striped Legless Lizard)	• Three transects of 50 tiles each were established in suitable habitat within the western side of the VLINE rail corridor, approximately 1.3 km north of the Seymour Railway Station. • The survey was conducted in accordance with the Commonwealth EPBC Act Survey Guidelines for Australia's Threatened Reptiles (2011).	• September – December (weekly checks) (spring and summer) • Concluded on 17th January, 2020 as per advice from DELWP
Swift Parrot and Regent Honeyeater	• Habitat surveys were conducted to identify areas of potential constraint to the project. • The survey to detect Swift Parrots was conducted in accordance with the methods detailed in the Commonwealth EPBC Act Survey Guidelines for Australia's Threatened Birds (2010).	• August (winter)
Targeted aquatic surveys (fish, crustaceans)	• The survey was conducted in accordance with the Commonwealth EPBC Act Survey Guidelines for Australia's Threatened fish (2004).	• Pranjip Creek - 29 January 2019 (summer)

4.4.1 THREATENED FAUNA

Targeted surveys were not performed for all threatened species that were determined to have a moderate to high likelihood of occurrence in the Early Ecology Field Work Report (AJM JV 2018). In the absence of targeted surveys, the project employs the 'precautionary principle', and assumes the species are present where relevant habitat is identified, as outlined in applicable Commonwealth / State documentation.

Targeted surveys were not conducted to detect EPBC Act / FFG Act protected ground-dwelling and arboreal mammal species, including Brush-tailed Phascogale, Common Bent-wing Bat, Eastern Horseshoe Bat, Grey-headed Flying-fox and Squirrel Glider. Rather where suitable habitat for these species was recorded in some portions of the study area, these species were assumed present in those areas.

Where targeted surveys were completed in accordance with State and Federal guidelines the outcomes of those targeted assessments have been used to inform the likely presence of these species within the project area. The results of these surveys are discussed in Section 5.4.2.

4.4.1.1 Striped Legless Lizard

The Targeted Survey for Striped Legless Lizard was conducted in accordance with the *Federal survey guidelines* (Department of Sustainability Environment Water Population and Communities 2011). The methods included:

- Establishment of three (3) 250 m long transects in suitable habitat in the project area within the western side of the Vline rail corridor, approximately 1.3 km north of the Seymour Railway Station (presented in Appendix G). The suitable habitat included native grassland with a cracking soil substrate. Each transect contained 50 artificial shelter sites (roofing tiles, 'French Terracotta' style with dimensions of 430 mm x 340 mm), used to provide temporary habitat for the species. Tiles were placed at intervals of 50 m, labelled and their GPS location recorded.
- The survey was conducted during ideal seasonal and daily climate conditions: the survey took place between September 2018 and February 2019, when the species is most active (October to November (Department of Sustainability Environment Water Population and Communities 2011)). The species is most active during morning and early afternoon on days typically with temperatures below 28 degrees where possible.
- Weekly checks were conducted between September and December 2018. Checks concluded on the 17th of January 2020, as per advice from DELWP that sufficient survey had been completed.

- Although the target species for these surveys was the Striped Legless Lizard, (a species with recent VBA records in the vicinity of the project area), the survey method used is also considered appropriate for the detection of the Pink-tailed Worm Lizard (Department of Sustainability Environment Water Population and Communities 2011). As there are no VBA records of the Pink-tailed worm Lizard in the vicinity of the project area, this species was considered to be less likely to be present than the Striped Legless Lizard. However, due to the cryptic nature of the Pink-tailed Worm Lizard, potential presence within the project area was not ruled out during the desktop phase, and thus it was ensured that the Striped Legless Lizard targeted survey parameters were appropriate for the detection of the Pink-tailed Worm Lizard.

4.4.1.2 Swift Parrot

The Swift Parrot targeted survey was conducted in accordance with the national survey guidelines. The methods included:

- Slow-moving vehicle transects (mapped in Appendix G) with 20-minute point surveys in areas of suitable habitat. Winter flowering had ended by this time and only a small number of Grey Box and River Red Gum had begun spring flowering to offer potential forage.

- Surveys were conducted at dawn and dusk on each day between 20 and 24 August 2018[1] as birds are most detectable during these times as they are more active and vocal. Detection occurs through either sighting or call (DEWHA 2010).

- The vehicle transects were commenced at Seymour at the intersection of the railway and the Hume Highway, and terminated at Wahring at the intersection of the railway and Ewarts Road. Within this area, 25 transects of 20-minute point surveys were completed over the survey period. Due to the length of the transects, each transect contained a variable number of 20-minute point surveys. Total time spent undertaking these surveys totalled 25 hours of survey effort in suitable habitat.

4.4.1.3 Fish

Targeted aquatic surveys were conducted in two minor waterways connected to the Goulburn River. The Goulburn Rivers offer suitable habitat to several threatened fish species (based on positive identifications from surveys published in the VBA database or model likely habitat published in the PMST), composed of: the Silver Perch (critically endangered), Murray Cod (vulnerable), Trout Cod (vulnerable), Murray River Rainbowfish, Southern Pygmy Perch (Murray River Lineage) and Freshwater Catfish.

The location where Targeted Survey occurred was selected due to its connection to waterways where these fish were likely to occur and the potential for threatened fish to be potentially impacted by the project. The location was the railway intersection with Pranjip Creek. At this location, surveys were undertaken using bait traps and dip netting (detailed in Appendix E).

Targeted aquatic surveys were undertaken on 29 January 2019. Fish were trapped using two methods; dipnetting and bait traps. Ten bait traps were deployed overnight and dipnetting was conducted across all available habitats. This Targeted Survey aimed to identify presence of species.

The survey was only able to be scheduled during dry periods of the year due to project timing, which is not the ideal time for performing targeted aquatic surveys. Thus, the presence of threatened aquatic species has been assumed and no further aquatic surveys are required.

[1] The Survey Guidelines for Australia's Threatened Birds (DEWHA 2010) identifies mainland surveys for Swift Parrots should be conducted between March and July. However, the Swift Parrot is known to migrate through Victoria to the Tasmanian breeding grounds during August and this survey was conducted with the hope of detecting individuals moving through the area at the end of the southerly migration.

4.4.1.4 Mammals

Targeted surveys to detect threatened ground-dwelling and arboreal mammal species, including Brush-tailed Phascogale, Common Bent-wing Bat, Common Dunnart, Eastern Horseshoe Bat, Grey-headed Flying-fox and Squirrel Glider were not conducted in suitable habitat identified within the project area. Rather, this assessment has applied the 'precautionary principle', assuming that these species are present in areas of suitable habitat, and applicable mitigation measures are applied to avoid potential impacts to these species.

4.5 Assumptions and Limitations

The following assumptions and limitations apply to this document:

- This document has been prepared in response to the approved AJM-JV NES – Environmental Specialist Scope of Works document Revision F (NES-AJM-NES-AWD-SOW-XLP-NAP-000139).
- Access to private property was not available during the current Field Assessment and ecological values associated with private properties at Murchison East are not included within this document. Once access to private property is available for ecological assessment, an update to this document may be required to inform ecological values and potential impacts of the project to those values.
- This document is intended only for the purpose of identifying potential ecological constraints within the project area. Information presented in this document is based on available information at the time of the assessment. Changes to the ecological conditions occur over time through natural and human influences and may alter the conclusions of this document.
- Information from the Desktop Assessment component is based on existing data only and is therefore only as reliable as the number of surveys previously undertaken (i.e. an area where many surveys have been completed in the past, will, most likely, have a more extensive list of species than areas where very little survey work has been undertaken). In addition to the number of previous surveys undertaken, there are other reasons why species, including threatened species, may not have previously been recorded, such as listed fauna species moving in and out of the area may not have been observed or recorded within the actual project area boundary, though would likely occur from time-to-time.
- The only species recorded during the general terrestrial ecology Field Assessments were those that could be easily identified, heard or have distinct signs, such as tracks, scats and diggings, at the time of the assessments. Typically, cryptic and nocturnal species are unlikely to be identified during the field assessments, hence the requirement for Targeted Surveys.
- Targeted Surveys were undertaken for threatened fauna species as listed in the methods (Section 4.4.1).
- Aquatic ecology surveys are ideally conducted during late winter and spring when seasonal and climatic conditions provide both warmer and lighter conditions and breeding cues are functioning. However, due to project timing, surveys conducted for this project were conducted during summer (January). The presence of surface water was limited, and the surveys were not able to detect a truly representative suite of species within the areas surveyed. Thus, the presence of threatened aquatic species has been assumed and no further aquatic surveys are required.
- The Survey Guidelines for Australia's Threatened Birds (DEWHA 2010) identifies mainland surveys for Swift Parrots should be conducted between March and July. However, the Swift Parrot is known to migrate through Victoria to the Tasmanian breeding grounds during August and this survey was conducted with the hope of detecting individuals moving through the area at the end of the southerly migration.
- Calculations and figures are based on design details available at the time of writing. Where design details change the outcomes of this document may require updating.

- Spatial data layers assessed were the most current available at the time of the assessment. Any changes to these layers may require the outcomes of this document to be updated.

- Assessment of impacts to ecological values undertaken within this report assumes that all mitigation measures within detailed in Section 6.2 are implemented and enforced.

5 Ecological Values Within the Project Area

This section discusses the presence of ecological values within the project area. Discussion of mitigation measures and residual risk of impacts to these values is discussed in Section 6. This section consolidates the findings of the NES Early Ecology Field Work Report (NES-AJM-NES-AWD-REP-XEV-NAP-0000164 (AJM JV (2018)), and the Desktop Assessment AJM JV (2018), with the results of the subsequent Field Assessment and Targeted Surveys.

The general ecological character of the project area is a highly modified environment due to previous agricultural land uses and urbanisation. However, some tracts of fragmented remnant vegetation, wetlands and natural hydrological systems remain and form vital habitat for native species for both local habitation and regional biodiversity movement, further discussed in Appendix I. Some natural ecological values have been retained within the rail corridor due to the current land management practices retaining areas of native vegetation and/or habitat in areas not utilised for operational requirements. A detailed geomorphological description of the project area is presented in Appendix J, and an associated list of waterways present are detailed in Appendix K. Only accessible areas were included within the Field Assessment. No private properties were included and will require assessment at a later stage where works in private property is envisaged.

5.1 Vegetation

5.1.1 NATIVE VEGETATION AND ECOLOGICAL VEGETATION CLASSES

The field assessment identified a total of 267.28 ha of native vegetation within the project area, comprising 184.08 ha of native vegetation patches and 559 Scattered Trees. This figure includes native vegetation mapped within the stabling options, and thus may decrease by up to 0.2 ha and 1 scattered tree depending on the stabling option chosen. Native vegetation was subject to VQA and is further discussed in Appendix L.

The project area interacts with four bioregions and the native vegetation reflects these bioregional variations. These bioregions include the VVP, CVU, HNF and VR bioregions. Modelled mapping of the bioregional boundaries was used to aid EVC identification in the field. However, on-the-ground interpretation of bioregional influence (e.g. topography, soils, and vegetation assemblages) indicated the actual bioregional boundaries varied slightly from the modelled boundaries. As such, some EVCs have been identified with bioregional information that differs to the modelling.

The VVP bioregion is a flat basaltic plain with stony rises, and in the project area, occurs between Donnybrook and Wallan. The dominant EVCs in this bioregion included EVC 132 Plains Grassland and EVC 55 Plains Grassy Woodland, though the project area in this bioregion was dominated by EVC 83 Swampy Riparian Woodland. A mixture of EVCs occur in association with waterways and swamps, including EVC 126 Swampy Riparian Complex and EVC 18 Riparian Forest, EVC 937 Swampy Woodland, EVC 124 Grey Clay Drainage-line Aggregate and EVC 191 Riparian Scrub.

The CVU bioregion transitions in and out of the southern portion of the project area, between Wallan and Avenel. This bioregion features higher elevations with granite hills and fertile outwash slopes. The dominant

EVCs of this bioregion in the project area included EVC 55 Plains Grassy Woodland, EVC 175 Grassy Woodland, and EVC 47 Valley Grassy Forest.

The HNF bioregion occurs on the northerly aspect of the Great Dividing Range with moderately steep slopes. The extent of this bioregion within the project area is minimal (Wallan and Heathcote Junction areas only) and the two related EVCs within the project area included EVC 127 Valley Heathy Forest and EVC 23 Herb-rich Foothill Forest.

The VR bioregion dominated the project area, extending from Tallarook to Lemnos. This bioregion features a flat to gently undulating landscape with alluvium deposits remnant of former stream channels and wide floodplain areas. Within the project area, the dominant EVCs of this bioregion included EVC 55 Plains Grassy Woodland, EVC 803 Plains Woodland, and EVC 295 Riverina Grassy Woodland with various other riparian and swamp vegetation associations.

A summary of the native vegetation patches across each bioregion is provided in Table 5.1. Detailed descriptions of each EVC are provided in Appendix L. Native vegetation is mapped in Appendix B. Some EVCs that occurred within the project area have the potential to form threatened ecological communities if they meet specific criteria. Threatened ecological communities that are associated with these EVCs are listed in Table 5.1. Where an EVC has an associated threatened ecological community, the potential presence of the threatened ecological community was investigated. Threatened ecological communities that were determined to be present within the project area are discussed in Section 5.3.

5.1.1.1 Noxious Weeds

Weed species can be declared by the CaLP Act to require adequate management across the landscape. Declared species were identified within the project area during the Field Assessment (listed in Appendix D) and require management consideration by the project.

The CaLP Act requires management controls be applied based on specific CMA areas. The project area intersects two CMA areas: the Port Phillip and Western Port CMA area to the south of Heathcote Junction, and the Goulburn Broken CMA to the north.

5.1.1.2 Other Vegetation

Much of the vegetation that occurs throughout the project area was assessed to not constitute native vegetation (DSE 2004). Such vegetation included areas dominated by exotic grasses and woody weeds; ornamental plantings of exotic and native species – often associated with gardens and urban areas; and plantings of native and exotic species such that were associated with agricultural land use (such as windrows).

TABLE 5.1: EVC EXTENT WITHIN THE PROJECT AREA FOR EACH BIOREGION AND RELATION TO EPBC/FFG ACT THREATENED COMMUNITIES

BIOREGION	EVC	BIOREGIONAL CONSERVATION STATUS[2]	EXTENT WITHIN THE PROJECT AREA (HA)	POTENTIALLY ASSOCIATED THREATENED ECOLOGICAL COMMUNITIES[3]	
				COMMONWEALTH SIGNIFICANCE	STATE SIGNIFICANCE
Victorian Volcanic Plain	53: Swamp Scrub	Endangered	0.04	-	-
	55_61: Plains Grassy Woodland	Endangered	0.37	• EPBC Act Critically Endangered Grassy Eucalypt Woodland of the Victorian Volcanic Plain • EPBC Act Critically Endangered Natural Temperate Grassland of the Victorian Volcanic Plain	• FFG Act Listed Grey Box – Buloke Grassy Woodland Community
	83: Swampy Riparian Woodland	Vulnerable	3.61	-	-
	125: Plains Grassy Wetland	Endangered	1.17	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-
	653: Aquatic Herbland	Endangered	0.11	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	
	821: Tall Marsh	Vulnerable	1.31	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-
Central Victorian Uplands	18: Riparian Forest	Vulnerable	0.87	-	-
	23: Herb-rich Foothill Forest	Depleted	2.90	-	-

[2] Bioregional Conservation Status (BCS) as per (DELWP 2018b) and (Frood and Papas 2016); where no status was listed the status of the adjacent bioregion was used.

[3] EVCs have the potential to form threatened ecological communities if they meet specific criteria. Where an EVC has an associated threatened ecological community, the potential presence of that threatened ecological community was investigated. The extent of threatened ecological community presence is discussed further in Section 5.3.

BIOREGION	EVC	BIOREGIONAL CONSERVATION STATUS[2]	EXTENT WITHIN THE PROJECT AREA (HA)	POTENTIALLY ASSOCIATED THREATENED ECOLOGICAL COMMUNITIES[3]	
				COMMONWEALTH SIGNIFICANCE	STATE SIGNIFICANCE
	47: Valley Grassy Forest	Vulnerable	3.28	-	-
	55: Plains Grassy Woodland	Endangered	21.23	• EPBC Act Endangered Grey Box (*Eucalyptus* microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act listed Grey Box – Buloke Grassy Woodland Community • FFG Act listed Victorian Temperate Woodland Bird Community
	56: Floodplain Riparian Woodland	Endangered	5.23	-	• FFG Act listed Victorian Temperate Woodland Bird Community
	61: Box Ironbark Forest	Vulnerable	7.47	-	-
	68: Creekline Grassy Woodland	Endangered	0.64	-	-
	83: Swampy Riparian Woodland	Endangered	1.14	-	-
	127: Valley Heathy Forest-	Vulnerable	4.18	-	-
	132: Plains Grassland	Endangered	0.09	-	-
	175: Grassy Woodland	Endangered	16.22	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act listed Victorian Temperate Woodland Bird Community
	292: Red Gum Swamp	Endangered	0.17	-	-
	803: Plains Woodland	Endangered	1.53	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act Listed Grey Box – Buloke Grassy Woodland Community
	821: Tall Marsh	Endangered	0.03	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-
Victorian Riverina	55: Plains Grassy Woodland	Endangered	41.89	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act Listed Grey Box – Buloke Grassy Woodland Community

BIOREGION	EVC	BIOREGIONAL CONSERVATION STATUS[2]	EXTENT WITHIN THE PROJECT AREA (HA)	POTENTIALLY ASSOCIATED THREATENED ECOLOGICAL COMMUNITIES[3]	
				COMMONWEALTH SIGNIFICANCE	STATE SIGNIFICANCE
	55_62: Riverina Plains Grassy Woodland	Endangered	2.99	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act Listed Grey Box – Buloke Grassy Woodland Community
	56: Floodplain Riparian Woodland	Vulnerable	18.81	-	• FFG Act listed Victorian Temperate Woodland Bird Community
	68: Creekline Grassy Woodland	Endangered	0.53		-
	125: Plains Grassy Wetland	Endangered	2.80	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-
	132: Plains Grassland	Endangered	0.37	-	-
	175: Grassy Woodland	Endangered	4.42	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	-
	292: Red Gum Swamp	Vulnerable	7.94		• FFG Act listed Victorian Temperate Woodland Bird Community
	295: Riverine Grassy Woodland	Vulnerable	10.57	-	• FFG Act listed Victorian Temperate Woodland Bird Community
	803: Plains Woodland	Endangered	20.44	• EPBC Act Endangered Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	• FFG Act Listed Grey Box – Buloke Grassy Woodland Community
	814: Riverine Swamp Forest	Depleted	1.08	-	-
	821: Tall Marsh	Depleted	0.65	• EPBC Act Critically Endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-
Total native vegetation patches			184.08 ha		
Total native vegetation including patches and 559 scattered trees			267.28 ha		

5.2 Wetlands

5.2.1 WETLANDS OF INTERNATIONAL IMPORTANCE

No Wetlands of International Importance (Ramsar wetlands) were identified as being potentially relevant to the project.

5.2.2 DELWP MAPPED WETLANDS

DELWP mapping of current wetlands (DELWP 2017d) shows that wetlands are mapped within the project area. These wetlands are considered areas of native vegetation under the Guidelines (DELWP 2017a). Eight wetlands are mapped within the project area accounting for 1.16 ha. The character of these wetlands varied, with some resembling wooded terrestrial systems, and others appearing to be clear of native vegetation at the time of assessment. Where more terrestrial vegetation (e.g. Plains Woodland) appeared to dominate the mapped wetland area, VQA was undertaken as per the terrestrial EVC present. Where native vegetation was absent, or of low quality a modelled VQA score had to be applied. This is due to unsuitable conditions for wetland assessment as mapped wetland areas had not been recently inundated at the time of assessment (DELWP 2017a). Wetlands within the project area are listed in Appendix M. As the extents of these wetlands are considered to be native vegetation, they contribute the vegetation extent figures in Table 5.1 and are shown within native vegetation mapping (Appendix B).

5.3 Threatened Ecological Communities

Four (4) threatened ecological communities listed under the EPBC Act and two (2) threatened communities listed under the FFG Act were found to occur within the project area. Table 5.2 lists the threatened communities that are present within the project area.

TABLE 5.2: THREATENED COMMUNITIES THAT OCCUR WITHIN THE PROJECT AREA

THREATENED COMMUNITY	CONSERVATION STATUS	TOTAL EXTENT PROJECT AREA	LOCATION WITHIN THE PROJECT AREA
EPBC Act threatened ecological communities			
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Figure 5.1)	Endangered	37.23 ha; entirely outside of the MSA area	• This threatened ecological community occurs at various locations on the VR and the CVU bioregions. Occurrences of this community are mapped in Appendix B. • This threatened ecological community does not occur within the MSA area.
[4]Natural Temperate Grassland of the Victorian Volcanic Plain	Critically endangered	0.49 ha; entirely within the MSA area	• This threatened ecological community occurs only within the MSA area in the Donnybrook works area, as per time-stamped native vegetation.
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically endangered	2.65 ha outside of the MSA area 1.34 ha within the MSA area	• This threatened ecological community occurs at the southern extent of the Wallan works area and north of Toolamba. These instances are mapped in Appendix B. • This threatened ecological community also occurs within the MSA at the southern extent of the Wallan works area.

[4] Only occurs within the MSA area

THREATENED COMMUNITY	CONSERVATION STATUS	TOTAL EXTENT PROJECT AREA	LOCATION WITHIN THE PROJECT AREA
White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands	Critically endangered	0.83 ha; entirely outside the MSA area.	• Occurs at two locations in the CVU bioregion, at the Broadford south crossing and south of Tallarook
FFG Act threatened communities			
Western (Basalt) Plains Grassland	Listed	0.49 ha	• Occurs only within the MSA area in the Donnybrook works area, as per time-stamped native vegetation mapping.
Victorian Temperate Woodland Bird Community	Listed	30.66 ha	• Various locations within the rail corridor on the VR and the CVU bioregions

FIGURE 5.1: AN AREA OF NATIVE VEGETATION CLASSIFIED AS THE 'GREY BOX GRASSY WOODLANDS AND DERIVED NATIVE GRASSLANDS OF SOUTH-EASTERN AUSTRALIA' THREATENED ECOLOGIOCAL COMMUNITY) IDENTIFIED EAST OF MURCHISON EAST (ENDANGERED, EPBC ACT)

FIGURE 5.2: VEGETATION CLASSIFIED AS THE WHITE BOX-YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLANDS AND DERIVED NATIVE GRASSLANDS THREATENED ECOLOGICAL COMMUNITY IDENTIFIED SOUTH OF TALLAROOK (CRITICALLY ENDANGERED, EPBC ACT)

5.4 Threatened and Migratory Species

5.4.1 THREATENED FLORA LISTED UNDER THE EPBC ACT AND FFG ACT

Five (5) threatened flora species listed under the EPBC Act and fourteen (14) listed under the FFG Act were determined to have a moderate to high (or confirmed) likelihood of occurring in the project area. These species are listed in Table 5.3 and have been categorised into functional groups for impact assessment in Section 6. Threatened species listed under the EPBC Act and FFG Act considered to have a Low likelihood of occurring in the project area are listed within Appendix N and Appendix O.

TABLE 5.3: THREATENED FLORA LISTED UNDER THE EPBC ACT AND/ OR THE FFG ACT WITH A MODERATE TO HIGH (OR CONFIRMED) LIKELIHOOD OF OCCURRING WITHIN THE PROJECT AREA

SCIENTIFIC NAME	COMMON NAME	FUNCTIONAL GROUP	CONSERVATION STATUS		LIKELIHOOD OF PRESENCE
			EPBC	FFG	
Threatened flora of Commonwealth significance					
Carex tasmanica	Curly Sedge	Wetland flora	Vulnerable	Listed	Moderate
Dianella amoena	Matted Flax-lily	Grassland/woodland flora	Endangered	Listed	Confirmed present
Lepidium hyssopifolium	[5]Basalt Peppercress	Grassland/woodland flora	Critically endangered	Listed	Moderate
Senecio psilocarpus	Swamp Fireweed	Wetland flora	Vulnerable	Listed	Moderate
Xerochrysum palustre	Swamp Everlasting	Wetland flora	Vulnerable	Listed	Confirmed present
Threatened flora of State significance only					
Allocasuarina luehmannii	Buloke	Woodland flora	-	Listed	Moderate
Brasenia schreberi	Water Shield	Wetland flora	-	Listed	Moderate
Calotis anthemoides	Cut-leaf Burr-daisy	Woodland flora	-	Listed	Moderate
Comesperma polygaloides	Small Milkwort	Woodland flora	-	Listed	High
Coronidium gunnianum	Pale Swamp Everlasting	Wetland flora	-	Listed	High
Cullen Parvum	Small Scurf Pea	Grassland/woodland Flora	--	Listed	Moderate
Cullen tanax	Tough Scurf Pea	Grassland/woodland flora	-	Listed	Moderate
Diuris palustris	Swamp Diuris	Grassland/woodland flora	-	Listed	Moderate
Geranium sp. 1	Large-flower Crane's-bill	Grassland/woodland flora	-	Listed	Moderate

5.4.1.1 Wetland Flora

Several threatened wetland flora species have a moderate to high likelihood of occurring within the project area. These species are likely to be restricted to larger, higher quality areas of wetland vegetation and waterways. **Swamp Everlasting** was determined to be present within high quality wetland patches south of Wallan (Appendix B), with **Curly Sedge**, **Swamp Fireweed**, **Pale Swamp Everlasting** and **Water Shield** having a moderate likelihood of occurring within these high-quality wetlands. These wetlands have also been classified as the EPBC Act-listed threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. One patch of this community was also found in the northern portion of the project area near Mooroopna. These patches were the only areas likely to support threatened wetland flora species. Outside of these two areas, wetland habitat within the project area was determined to be restricted to smaller, fragmented and generally degraded wetlands (including DELWP mapped wetlands), which were determined to be unlikely to support threatened wetland flora species.

[5] Unlikely to occur outside of the MSA area

When considering the presence of threatened flora listed as vulnerable under the EPBC Act (in this case, Swamp Everlasting, Curly Sedge and Swamp Fireweed), it is important for impact assessment purposes to determine whether the population present constitutes an important population. Important populations are defined as a population that is necessary for a species' long-term survival and recovery (DoE 2013) such as those that are:

- described in recovery plans.
- a key source population for breeding or dispersal.
- a key genetic resource.
- a population near the limit of the species range.

The population of Swamp Everlasting present south of Wallan (Appendix B) was determined to be an important population owing to its size (>100 individuals). Within areas of the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains threatened ecological community where Swamp Everlasting, Curly Sedge and Swamp Fireweed, are moderately likely to occur the presence of important populations of these species cannot be ruled out as targeted surveys at the appropriate time of year have not been undertaken for wetland species within the project area.

Mitigation measures and assessment of likelihood of residual impact following the implementation of mitigation measures are discussed in Section 6.

5.4.1.2 Grassland Woodland Flora – Presence and Potential Impacts

Several threatened flora species that occupy grassland and woodland habitat types have the potential to be present on the VVP bioregion (in the south of the project area).

Large flower Crane's Bill and **Tough Scurf Pea** were determined to have a moderate likelihood of occurring within high quality grasslands and Grassy Woodlands in the south of the Wallan works area. In addition, the last record of **Small Scurf Pea** in the project area is in the vicinity of the project area at Wallan. This record is from the year 2000, with no newer records since the millennium drought in the vicinity. However, without conducting targeted surveys the presence of this species cannot be ruled out. These species therefore have a have a moderate likelihood of presence within the project area within remnant woodlands in the south of Wallan. Most of the Donnybrook works area was found to be degraded and didn't support native vegetation. Areas that did support native grassland were recolonised spoil piles with low herb species diversity. As such these species are unlikely to be present within the Donnybrook works area.

One occurrence of **Matted Flax-lily** (approximately 60 ramets) (Figure 5.3) was found within remnant woodlands in the south of the Wallan works area (outside the MSA area). It is considered highly likely that further occurrences of Matted Flax-lily will occur within the immediate vicinity and moderately likely further north through the Wallan works area, north to the Merri Creek crossing South of Heathcote Junction Station. The uncertainty around the precise extent of Matted Flax Lily is due to the vegetation surveys not being undertaken at the appropriate time of year. Matted Flax Lily is unlikely to occur elsewhere in the project area.

Previous records indicate that **Basalt Peppercress** has a moderate likelihood of occurring outside patches of native vegetation within the project area at Donnybrook (within the MSA area). The uncertainty around the precise location of this species is due to its ruderal and cryptic nature. This species will readily colonise disturbed areas. Further, outside of flowering season this species is not easily identified.

Cut-leaf Burr Daisy, **Small Milkwort**, **Buloke**, and **Swamp Diuris** have all been previously recorded within the vicinity of the project area within the Central Victorian Uplands and Riverina bioregions and were considered to have a moderate likelihood of presence. These species are expected to occur within high quality woodland

remnants, particularly communities classified as the EPBC-listed threatened community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia.

FIGURE 5.3 (A) SWAMP EVERLASTING (EPBC ACT – VULNERABLE; FFG ACT – LISTED; VICADV – VULNERABLE) AND (B) MATTED FLAX-LILY (EPBC ACT – ENDANGERED; FFG ACT – LISTED; VICADV – ENDANGERED) IDENTIFIED SOUTH OF WALLAN.

5.4.2 THREATENED FAUNA LISTED UNDER THE EPBC ACT AND FFG ACT

Ten (10) threatened fauna species listed under the EPBC Act and twenty-four (24) listed on the FFG Act were determined to have a moderate to high likelihood of occurring within the project area. These species are summarised in Table 5.4 and have been categorised into functional groups to inform the impact assessment in Section 6. Habitat descriptions for terrestrial fauna are further discussed in Appendix I.

All other threatened fauna considered to have a low likelihood of occurrence within the project area (including those listed in Table 5.4) are listed in Appendix N and Appendix O. Further details about targeted surveys undertaken for threatened species listed under the EPBC Act are described in Appendix G and Appendix H.

TABLE 5.4: THREATENED FAUNA LISTED UNDER THE EPBC ACT AND / OR FFG ACT WITH A MODERATE TO HIGH LIKELIHOOD OF OCCURRING WITHIN THE PROJECT AREA

SCIENTIFIC NAME	COMMON NAME	FUNCTIONAL GROUP	CONSERVATION STATUS		LIKELIHOOD OF PRESENCE
			EPBC	FFG	
Threatened fauna of Commonwealth significance					
Anthochaera phrygia	Regent Honeyeater	Terrestrial avifauna	Critically Endangered	Listed	High
Aprasia parapulchella	Pink-tailed Worm-Lizard	Legless lizards	Vulnerable	Listed	Moderate
Bidyanus bidyanus	Silver Perch	Aquatic fauna	Critically Endangered	Listed	High
Delma impar	Striped Legless Lizard	Legless lizards	Vulnerable	Listed	Moderate:
Grantiella picta	Painted Honeyeater	Terrestrial avifauna	Vulnerable	Listed	High
Lathamus discolor	Swift Parrot	Terrestrial avifauna	Critically Endangered	Listed	High
Litoria raniformis	Growling Grass Frog	Aquatic fauna	Vulnerable	Listed	High
Maccullochella macquariensis	Trout Cod	Aquatic fauna	Endangered	Listed	High
Maccullochella peelii	Murray Cod	Aquatic fauna	Vulnerable	Listed	High
Pteropus poliocephalus	Grey-headed Flying-fox	Grey-headed Flying Fox	Vulnerable	Listed	Moderate
Threatened fauna of state significance only					
Ardea intermedia	Intermediate Egret	Wetland avifauna	-	Listed	Moderate
Burhinus grallarius	Bush Stone-curlew	Terrestrial birds	-	Listed	High
Chthonicola sagittatus	Speckled Warbler	Terrestrial avifauna	-	Listed	Moderate
Euastacus armatus	Murray Spiny Crayfish	Aquatic fauna	-	Listed	Moderate
Geopelia cuneata	Diamond Dove	Terrestrial avifauna	-	Listed	Moderate
Lophoictinia isura	Square-tailed Kite	Terrestrial avifauna	-	Listed	Moderate
Melanodryas cucullata	Hooded Robin	Terrestrial avifauna	-	Listed	Moderate
Melanotaenia fluviatilis	Murray River Rainbowfish	Aquatic fauna	-	Listed	Moderate
Ninox connivens	Barking Owl	Terrestrial avifauna	-	Listed	Moderate
Ninox strenua	Powerful Owl	Terrestrial avifauna	-	Listed	Moderate
Petaurus norfolcensis	Squirrel Glider	Arboreal/semi-arboreal mammals	-	Listed	High
Phascogale tapoatafa	Brush-tailed Phascogale	Arboreal/semi-arboreal mammals	-	Listed	High
Pomatostomus temporalis	Grey-crowned Babbler	Terrestrial avifauna	-	Listed	Moderate
Stagonopleura guttata	Diamond Firetail	Terrestrial avifauna	-	Listed	Moderate
Tandanus tandanus	Freshwater Catfish	Aquatic fauna	-	Listed	Moderate

5.4.2.1 Terrestrial Avifauna

Woodlands are highly likely to be utilised by threatened avifauna. This includes migratory birds such as the **Swift Parrot** which would utilise the habitat annually but on a sporadic basis to travel between its breeding and over-wintering habitat, as well as the more permanent residents (including **all other terrestrial avifauna** species in

Table 5.4). Woodland vegetation throughout the project area provides varying degrees of habitat quality for these species. The best examples of habitat within the project area included patches of large, hollow-bearing trees and high diversity in the mid and ground storey vegetation layers, that represented the Grey Box Grassy Woodlands and Derived Native Grasslands of South Eastern Australia threatened ecological community and FFG Act-listed threatened Victorian Temperate Woodland Bird Community due to their avifauna diversity.

Targeted surveys conducted in suitable box-ironbark habitat in the project area between Seymour and Murchison East did not detect the presence of Swift Parrot. The surveys conducted in August aimed to observe individuals as they migrated south to their breeding habitat in Tasmania. However, individuals may not have been observed due to season variation in migration patterns. The optimal survey period is between March – July. Because of this limitation, there is still a high likelihood of the species using the project area as foraging habitat.

Potential impacts to terrestrial avifauna from the project would include the direct removal of trees with nesting hollows presently occupied by threatened species. Removal of hollow bearing trees is considered a threatening process under the FFG Act. Removal of hollow bearing trees that constitute nesting hollows for threatened species is assessed for significant impact under the EPBC Act and FFG Act depending on the listing status of the species.

5.4.2.2 Aquatic Fauna

Major waterways within the project area were considered important habitat for all threatened fish species (including Murray Spiny Crayfish) listed in Table 5.4. Smaller waterways were important dispersal habitat for the Growling Grass Frog. Construction in or near waterways can cause substantial reductions in water quality due to erosion and sedimentation, and therefore has the potential to impact species that live in those waterways.

5.4.2.3 Legless Lizard

Potential habitat for Striped Legless Lizard and Pink-tailed Worm Lizard exists within the project area. Targeted surveys, which were conducted for Striped Legless Lizards, were also deemed appropriate for the purposes of detecting Pink-tailed Worm Lizards within the project area due to the similar survey requirement of that species with searches carried out in the morning during warmer months as per Osborne et al. (1991), and the *Federal survey guidelines* (Department of Sustainability Environment Water Population and Communities 2011) Targeted surveys did not record the presence of either species, so the likelihood of occurrence was modified from high to moderate. Moderate was selected as both are cryptic in nature and difficult to detect. Both have the potential to occur in native grasslands and grassy woodlands north of Seymour, and in areas of suitable habitat across three areas of suitable habitat near Kilmore East.

Striped Legless Lizard is also considered to have a moderate likelihood of occurring within the MSA area in remnant grasslands to the south of the Merri Creek crossing in the south of the project area at Donnybrook. Impacts to threatened species listed under the EPBC Act within the MSA area are accounted for through the payment of HCOs. As such the occurrence of this species at this location will not be considered for impact.

5.4.2.4 Grey-headed Flying-fox

The Grey-headed Flying-fox has no permanent colonies within the project area, and as such is only expected to utilise the project area for nocturnal foraging. The ability of this species to disperse large distances means that it has access to food resources across the broader landscape. The likelihood of impact to this species is therefore considered to be low.

5.4.2.5 Wetland Avifauna

Seasonal wetlands within the project area (those classified as Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains) and watercourses within the project area form potential foraging habitat for this species. This species is likely to use that habitat only sporadically.

5.4.2.6 Arboreal and Semi-arboreal Mammals

The Squirrel Glider and the **Brush-tailed Phascogale** are present in the broader landscape surrounding the project area, although there are relatively few recent records within 5 km of the project area. Nonetheless, these species are known to utilise linear fragments of habitat and thus it is considered that these species have a moderate likelihood of utilising woodland habitat within the project area, particularly where larger tracts of woodland where hollow bearing trees are present. Much of the high-quality habitat for this species is also classified as the Grey Box Grassy Woodlands and Derived Native Grasslands of South Eastern Australia threatened ecological community.

The proposed works have the potential to reduce the suitability of the project area for these species through vegetation removal and habitat fragmentation. Vegetation removal, including the removal of large old hollow-bearing trees reducing available nesting sites for these species. These species are also vulnerable to fragmentation, a threatening process listed under the FFG Act. These species are particularly vulnerable to the loss of canopy connectivity, and increased gap sizes between patches of suitable habitat. The Squirrel Glider has been shown to be less likely to disperse across linear canopy gaps in habitat once the gap between the canopy of two areas of vegetation increases past 30 m (van der Ree, Cesarini et al. 2010).

Phascogales are more vulnerable to gaps in habitat as they lack the ability to glide. Increasing the gap between areas of habitat, at all strata levels (ground, mid-storey, and canopy layers), for this species increases the predation risk by feral species, such as European Red Fox *Vulpes vulpes* and Feral Cat *Felis catus* (Another threatening process under the FFG Act) as the Phascogale are forced to come-to-ground to disperse.

5.4.3 THREATENED AND RARE SPECIES LISTED ON THE VICTORIAN ADVISORY LISTS

Additional threatened species listed only on the VicAdv were also assessed for likelihood of occurrence within the project area. These species are detailed in Appendix N. Impacts to these VicAdv species are assessed using derived datasets (DELWP habitat models) rather than the presence or absence of species determined through an ecological assessment. Impacts to these species, and associated species offset requirements are discussed in Section 6.3.4.2.

Two threatened flora spices listed on the VicAdv were observed within the project area. These species are *Dianella tarda* (Late-flowering Flax-lily) and *Acacia verniciflua* (1-nerved variant) (Seymour Wattle) and are listed solely under the Victorian Advisory List of Threatened Plants. These observed occurrences of these species within the project area are mapped in Appendix B.

One fauna species, *Pseudophryne bibronii* (Brown Toadlet) listed on the VicAdv was observed within the project area. The species was observed underneath the terracotta roof tiles along transect 1 during the targeted Striped Legless Lizard surveys to the north of Seymour.

There are no legislative implications from the presence of these species within the project area. Impacts to this species are taken into consideration by DELWP through the requirement of species-specific offsets resulting from the NVR.

5.4.4 MIGRATORY SPECIES

Twenty (20) migratory birds listed under the EPBC Act have been identified by the PMST report (Appendix O) as having the potential to occur within a 5 km radius of the project area. Some of these birds are also listed as Endangered and so have already been assessed above (if moderately or highly likely to occur within the project area), or in: the Curlew Sandpiper, Swift Parrot, Eastern Curlew, and Painted Snipe. Consideration of these four species is not repeated in this section. It is considered that the remaining 16 Listed Marine birds are either unlikely to occur within the project area due to a lack of suitable habitat or are unlikely to be significantly impacted by the project due to their mobile nature or intermittent presence. As such, further assessment of Listed Marine species by the project is not required.

5.4.5 PROTECTED SPECIES

Species listed as protected under the FFG Act were recorded within the project area. These species are detailed in Appendix D.

The project may result in the removal of some protected, but not threatened, flora species that were detected within the project area including:

- Members of the following plant families
  - » Asteraceae
  - » Epacridaceae
  - » Orchidaceae
- Members of the following genera:
  - » Acacia - Wattles - excluding *Acacia dealbata*, *Acacia decurrens, Acacia implexa, Acacia melanoxylon, Acacia paradoxa*
  - » *Grevillea*
  - » *Stylidium*
  - » *Thysanotus*
  - » *Xanthorrhea*

5.5 Ecological Values Within the Melbourne Strategic Assessment Area

This section presents the field assessment results as relevant to the two level crossing areas that are located within the MSA area at Donnybrook and Wallan.

5.5.1.1 Habitat Compensation Obligations

DEPI (2013b) modelling indicates the project area intersects time-stamped native vegetation and threatened species habitat mapping listed in Table 5.5 and mapped in Appendix B. Disturbance of land associated with time-stamped mapping requires financial contributions (by way of HCOs) toward the management of the Western Grassland Reserve offset allocations, calculated by multiplying the number of hectares disturbed by the prescribed biodiversity unit fee value. It is noted that the HCOs have been amortised across the entire MSA area, except for developed areas (e.g. buildings, roads, quarries) and do not necessarily indicate the presence of actual habitat. Subsequent MSA fee obligations are also provided (Table 5.5).

TABLE 5.5: HABITAT COMPENSATION OBLIGATIONS WITHIN THE PROJECT AREA

PROJECT COMPONENT	HABITAT COMPENSATION TYPE	EXTENT (HA)	FEE / HA
Level crossing works (Donnybrook and the southern extent of Wallan)	Native Vegetation	1.82	$95,075
	Growling Grass Frog	9.01	$7,529
	Golden Sun Moth	1.14	$7,914
	Matted Flax-lily	13.031	$11,196

*to be confirmed using the formal Habitat Compensation Offset Statement pending issue by DELWP and pending design finalisation.

5.5.2 CONSERVATION AREAS

The Donnybrook level crossing works project area adjoins and intersects the mapped Conservation Area No. 34 of the Growling Grass Frog Master Plan (DELWP 2017c) (Northern Growth Corridor: Growling Grass Frog Corridors, Category 1) of the Merri Creek riparian zone (mapped in Appendix B).

A change in land use that results in the loss of habitat within a Conservation Area identified in the Biodiversity Conservation Strategy for Melbourne's Growth Corridors(DEPI 2013c) including habitat mapped for Growling Grass Frog, requires approval by DELWP. Such approvals are obtained through the DELWP Works in Conservation Area (WICA) application process.

One 'Area of Strategic Importance' for Growling Grass Frog habitat is mapped within Conservation Area No. 34. Areas of Strategic Importance are subject to condition 2 of the Commonwealth Government's approvals for urban development within the MSA (DELWP 2017c). This area of strategic importance is a buffer zone, designed to protect an existing waterbody outside the rail corridor. Where works within conservation areas result in a net loss of habitat, approval from the Commonwealth Minister for the Environment and Energy is required. This Commonwealth approval is initiated through the WICA process rather than an EPBC Act Referral. In the case of Growling Grass Frog conservation areas, any loss of Areas of Strategic Importance would trigger this additional Commonwealth approval through the WICA application process (DELWP and Commonwealth approval would therefore both be required prior to issue of permit).

Mitigation measures are to be put in place to ensure that there is no net loss of Growling Grass Frog habitat within the area of strategic importance, or the associated existing waterbody outside the corridor. This is discussed further in Section 6.3.2.

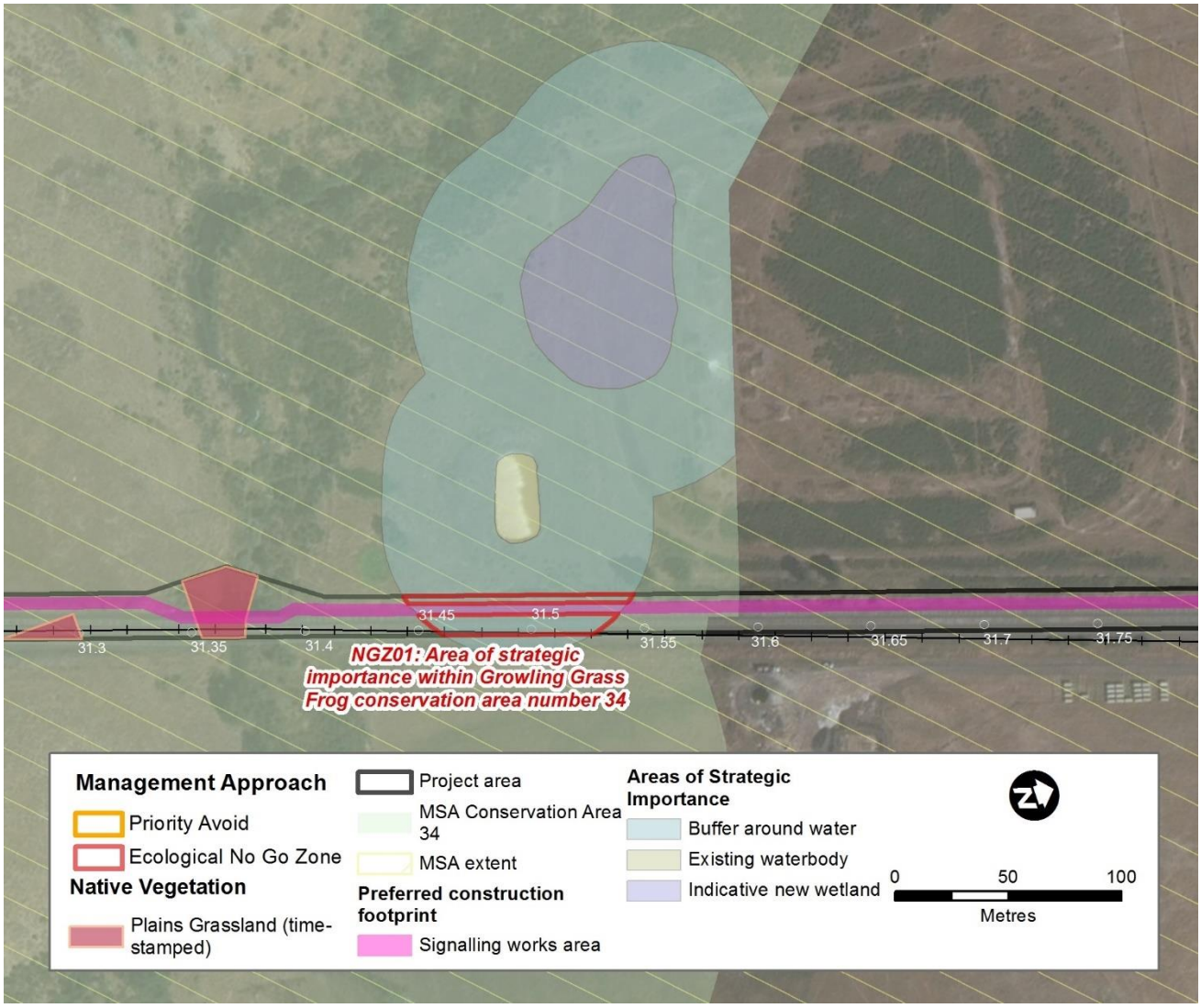

FIGURE 5.4: THE CONSTRUCTION CORRIDOR AS IT PASSES THROUGH GROWLING GRASS FROG CONSERVATION AREA NO. 34 AND THE AREA OF STRATEGIC IMPORTANCE AREA OF STRATEGIC

6 Ecological Impact Assessment

6.1 Ecological Impact Assessment Process

Likely ecological impacts and offset requirements for RRR projects (such as the Shepparton Line Upgrade) are determined as per the process outlined in Figure 6.1.

As the Detailed Design will not be completed until after the delivery partner is engaged, the precise location and extent of works, and the construction method and timing is not known at the time of gaining environmental approvals for the project. The anticipated ecological impact and offset requirements provided in this report are therefore calculated based on the approved Reference Design for the project. Mitigation measures will be included in the Environmental Management Framework that will be approved pursuant to the Incorporated Document introduced into the relevant Planning Schemes by the Planning Scheme Amendment. The obligation to ensure these mitigation measures are implemented will be passed onto the delivery partner.

In accordance with the Regional Rail Revival Biodiversity Strategy and Management Framework (RRR-AJM-ZWD-AWD-REP-XEV-NAP-0000118 Rev B), an integrated approach to avoiding, mitigating and offsetting impacts was undertaken with the AJM and RPV ecology, planning and design teams. This involved holding collaborative workshops which overlaid ecological assets such as remnant vegetation, large trees and known sites for EPBC-listed species and communities with early design options to preferentially avoid or determine least-impact solutions. This was an iterative process and enabled the Reference Design to avoid and minimise interactions with ecological values.

A preliminary estimate to be made of the likely impact to ecological values and the resulting approvals and offsets required was based on this anticipated impact. Potential impacts result from works that are unable to avoid ecological values, such as native vegetation and habitat within the alignment and interaction with individual threatened species. Strategies for avoidance may include applying No-Go Zones, prescribing construction methodologies, and/or timing of construction.

Section 6.2 recommends mitigation measures to RPV to ensure avoidance of significant impacts to identified ecological values within the project area. Where RPV confirms that mitigation measures can be implemented, the strategies will be enforced by RPV through Project Scope and Technical Requirements (PS&TRs) or equivalent. The current estimate of the likely impact to ecological values as detailed in this section assumes that all mitigation measures outlined for each ecological value are met by the delivery partner.

The final determination of impacts to ecological values prior to handing over the project to the delivery partner is known as the ‘preferred construction footprint’ as specified in Appendix B. Any project works undertaken outside the preferred construction footprint as specified in Appendix B will require an additional risk assessment through the Environmental Management Framework and may result in additional regulatory implications.

Once the delivery partner is engaged, offset requirements will be refined to reflect the actual extent and location of works. As the project proceeds through Detailed Design phases, there will be additional opportunities to reduce impacts on native vegetation and large trees.

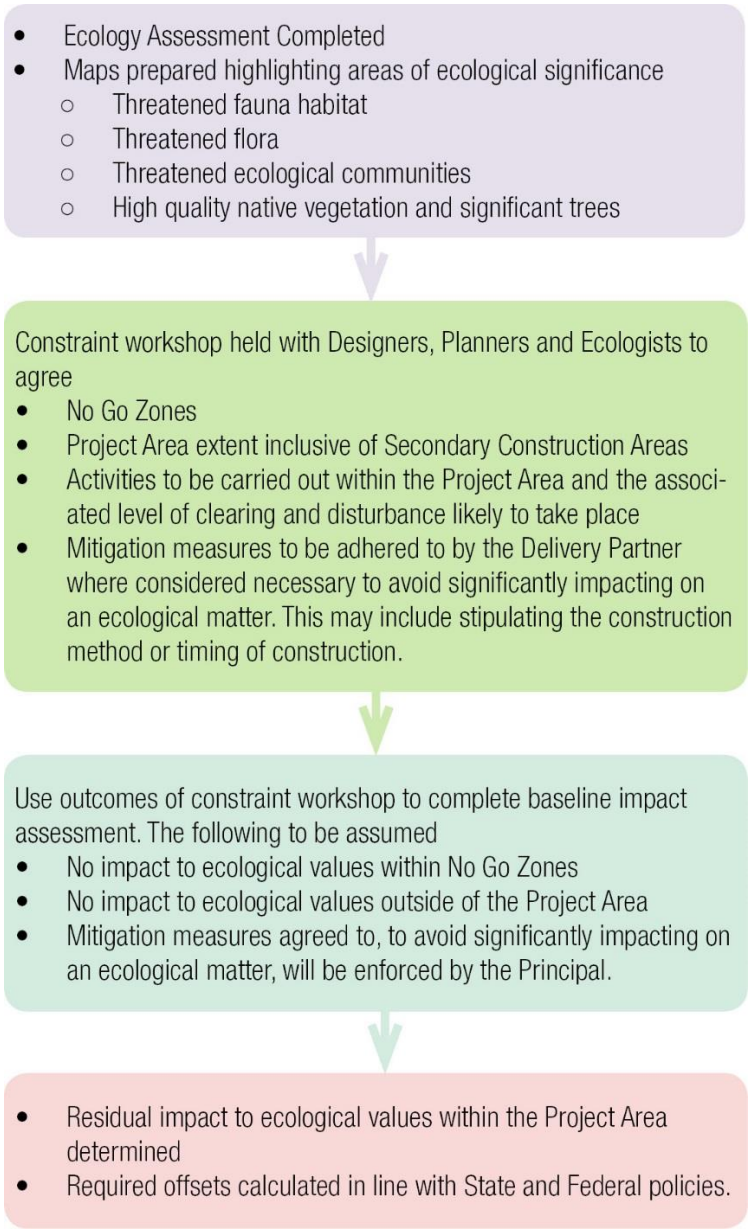

FIGURE 6.1: PROCESS USED TO DETERMINE LIKELY IMPACTS AND OFFSET REQUIREMENTS

6.2 Mitigation Measures

Several mitigation measures are recommended in this section to mitigate potential immediate and ongoing impacts to ecological values caused by the proposed works. These mitigation measures are applied in Section 6.3 to assist in impact assessment of the proposed works on the ecological values within the project area. Where applicable, mitigation measures have two levels of compliance:

REQUIRED

The required level of compliance outlines the performance-based objectives of the mitigation measure and responds to legislative or regulatory requirements. This is the minimum standard that the project must adhere to for this ecological impact assessment to remain valid.

BEST PRACTICE

The best practice level of compliance provides mitigation measures that are considered to be best-practice in ensuring that the integrity of the natural environment is maintained throughout the building process and beyond. These measures should be considered during design and construction phases and included in Construction Environmental Management Plans to further reduce impacts on threatened biodiversity.

6.2.1 AVOIDANCE MEASURES

Avoidance measures aim to avoid impacting the relevant ecological values through designing around the effective and functional location of the identified ecological values and constraints, and setting up No-Go Zones to protect the value, including staying outside of Tree Protection Zones or values protected by legislation.

Areas of elevated importance to avoid impacts are identified and designated as **No-Go Zones** and **Priority Avoid Areas** in Appendix B. Effort should be made to then minimise impacts to areas of native vegetation and DELWP mapped wetlands. Methods to avoid and minimise are discussed below.

6.2.1.1 Establishment and protection of No-go zones

No Go-Zones are areas which, if impacted upon, have the potential to cause impacts to MNES. Potential impacts upon MNES would necessitate a referral under the EPBC Act. No-Go Zones identified for this project include:

- Areas that support any threatened ecological community listed under the EPBC Act and/or;
- Areas with a high (or confirmed) likelihood of supporting threatened flora species listed under the EPBC Act.

REQUIRED

- The No-Go Zones identified in this report (listed in Appendix A and mapped in Appendix B) are to be avoided by the detailed design and construction works, with no admittance to the areas. The value to be protected by the No-Go Zone must not be impacted, as determined by the relevant significant impact guidelines (Department of the Environment 2013).
- No-Go Zones identified in this report, are to be avoided by construction activities. The No-Go Zones are to be included on all site maps, including all Environmental Management Plans and related documentation (including the Construction Environment Management Plan).
- The No-Go Zone must encompass the perimeter of identified area. Perimeters of areas currently identified as No-Go Zones are listed in Appendix A and mapped in Appendix B. The extent of this perimeter may only be reduced where an existing cleared access track or hardstand area is present, or if a TPZ is identified in accordance with Australian Standard AS 4970-2009 Protection of Trees on Development Sites, or by a qualified arborist. In this case, exclusion fencing will be erected at the perimeter of the existing access track, hardstand area or modified TPZ.
- The No-Go Zone must be fenced with high-visibility safety bunting or temporary construction fencing (including erosion fencing if necessary). The area is to be signed as a ‘No-Go Zone’. Fencing should enable fauna to move through areas of habitat.
- Sediment fencing must be erected where there is risk of materials breaching the No-Go Zone. These materials should be disposed of in an appropriate manner.
- The erection of the fencing surrounding No-Go-Zones (threatened ecological communities, mapped threatened species habitat and threatened flora species) must be supervised or reviewed by a qualified and experienced ecologist to ensure that the values supported within that No-Go Zone are not impacted. The fencing is to be maintained for the duration of the works.

- The induction of all staff to the site must include a discussion of the importance of sensitive environmental areas, and activities which are prohibited from these areas (No-Go Zones).
- No construction vehicles, machinery or equipment, lay down of materials or unauthorised personnel are allowed within No-Go Zone.
- Foot access of personnel to No-Go Zones for the purpose of guiding bores must be accompanied by a qualified ecologist. This impact assessment assumes that these areas will not be impacted by the proposed works.

6.2.1.2 Avoid and minimise impacts to native vegetation

REQUIRED

- Efforts to avoid and minimise impacts to native vegetation will be made in accordance with the Guidelines and any native vegetation removal regulatory approvals.

BEST PRACTICE

- Efforts to avoid and minimise impacts to native vegetation should be made in accordance with the Guidelines with the following considerations:
  - » Priority Avoid areas (listed in Appendix A and mapped in Appendix B) should be avoided where possible. As these areas were determined to be some of the highest quality vegetation within the project area outside of no-go zones, prioritising these areas for reductions in vegetation clearance demonstrates adherence to the obligation to avoidance and minimisation of vegetation loss. These are areas that were determined to contain high quality habitat for ecological values within the project area including:
    - Areas of moderate-high quality fauna habitat, often including trees with hollows.
    - Areas of vegetation with relatively intact understorey vegetation with high native flora species diversity with minimal exotic flora invasion.
    - Areas determined to support FFG Act-listed threatened communities.
  - » Where vegetation is to be removed the following measures are recommended to minimise impacts to native fauna:
    - Removal of native vegetation to be designed in a way as to minimise fragmentation of habitat.
    - Natural canopy connectivity (<10-20 m) should be retained as a priority.
    - Where fragmentation of habitat is required to enable vehicle access for temporary construction purposes only, access tracks are to be revegetated as soon as possible following construction. This includes revegetation following the removal of the ground-layer or mid-storey only, as these provide food resources for many species.
    - Trees and shrubs with value as food resources are to be revegetated in groups in strategic locations between habitat patches to improve local habitat connectivity.
    - Logs and tree stumps should be relocated into adjacent habitat as close to where they were originally located as possible.

6.2.1.3 Tree Protection and Removal

REQUIRED

- Trees near the proposed works site are to be determined to be either retained or lost as determined by AS4970-2009.

- Trees that will be removed and protected must comply with any regulatory approval conditions.
- Where scattered trees are to be retained in close proximity to proposed work sites, tree protection plans are to be prepared by a qualified arborist that will ensure that trees proposed to be retained are adequately protected from the impact of construction or related activities, prior to those works being undertaken. Tree protection plans are to be developed in accordance with AS4970-2009 Protection of Trees on Development Sites.
- Should the arborist determine that the works cannot proceed without impacting on the survivability of an indigenous tree, the tree will be required to be offset in accordance with the Guidelines.

6.2.1.4 Pre-clearance targeted flora survey and avoidance

REQUIRED

- Prior to commencing works in the Wallan works area, targeted Matted Flax Lily surveys must be undertaken within the construction footprint of the Wallan works area. These surveys must be undertaken between November and February in accordance with the relevant targeted survey guidelines. Any individuals found must be avoided by construction or regulatory approvals for the removal or destruction obtained.

BEST PRACTICE

- Prior to commencing works in the Donnybrook works area, targeted Basalt Peppercress surveys should be undertaken within the construction footprint of the Donnybrook works area. These surveys should be undertaken during Summer in accordance with the relevant targeted survey guidelines. Any individuals found should be avoided by construction.

6.2.2 FAUNA PROTECTION MEASURES

6.2.2.1 Compliance with the EPBC Act, FFG Act and Wildlife Act during habitat removal

REQUIRED

- The presence of EPBC-listed threatened and FFG-listed threatened fauna within construction areas must be determined immediately prior to habitat clearance. Any threatened fauna present must be avoided through construction.
- Where habitat is identified for removal, including singular trees, hollow-bearing trees and logs, engage an ecologist / wildlife handler to check for fauna occupancy. Where fauna are identified, fauna are to be safely relocated prior to the removal of habitat.
- Prior to commencing works within the Growling Grass Frog Conservation Area No. 34 at Donnybrook (mapped in Appendix B), a permit to undertake works in a conservation area must be obtained from DELWP. Works must incorporate the following mitigation measures to ensure the area of strategic importance within the conservation area is not impacted:
  - » Avoidance Measures: A 5 m construction corridor associated with trenching to lay a CSR cable passes through the area of strategic importance. Works are to be restricted to this 5 m corridor. Outside of this 5 m corridor, the area of strategic importance is to be designated as a 'No-Go zone'.
- Waterways and Wetlands Measures: Measures such as sedimentation fencing must be implemented to ensure that the existing wetland to be protected by the area of strategic importance is not impacted by the proposed works.

- Clearance of any vegetation at Seymour between Seymour-Avenel road, and High Street must be supervised by a fauna spotter to ensure the absence of these species. Should these species be determined to be present, works must stop, with the habitat occupied by these species to be avoided by construction.

- Any interaction with wildlife through habitat clearing activities must be undertaken by a person holding a Section 28A *Wildlife Act 1975* authorisation.

BEST PRACTICE

- Where a threatened species listed under the FFG Act has been identified to utilise a tree hollow through pre-clearance survey, that hollow should be replaced.

- Works taking place in areas of Plains Grassland in the Donnybrook works area (mapped in Appendix B) should be supervised by a fauna spotter holding a Section 28A Wildlife Act authorisation. Any Striped Legless Lizards displaced by trenching works in these areas should be captured and released in the immediate vicinity, albeit outside the construction corridor.

- Habitat within the project area should be strategically reconnected using habitat linkage structures (e.g. canopy bridges, gliding poles and at-ground vegetation links) approximating the recommended configuration in Appendix Q, with an ecologist determining the final configuration of these structures on the ground.

6.2.3 FFG ACT-PROTECTED FLORA SPECIES MEASURES

The following process will apply to FFG Act-protected flora species and threatened communities that are required to be removed from public land:

REQUIRED

- Appropriate 'Permit to Take' to be in obtained prior to planned removal.

- All conditions of permit to be adhered to.

- Where FFG Act communities are to be retained, high visibility para-web fencing or temporary mesh fencing will be erected around native vegetation in proximity to the works area and signed as a 'No-Go' zone.

BEST PRACTICE

- A register of protected flora taken would assist reporting back to DELWP as required by FFG Act permit conditions. Such a register can assist with future approvals arising from the often increase in protected flora being taken as design modifications progress and construction occurs.

6.2.4 GENERAL CONSTRUCTION MEASURES

REQUIRED

- The spread of noxious weeds and pest animals must be controlled in accordance with the CaLP Act.

- Where possible, all vehicles, machinery and equipment will move along formed/designated access tracks to prevent the spread and establishment of weeds and diseases. Vehicles and machinery will access the project area through defined entry and exit points. Additional measures to prevent the spread and establishment of weeds and disease must be provided within the Construction Environmental Management Plan (CEMP).

- Construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation and waterways; and placed in previously cleared or hardstand areas

6.2.5 WATERWAYS AND WETLANDS MEASURES – AQUATIC FAUNA, EROSION AND SEDIMENTATION MITIGATION

REQUIRED

- No works other than the routing of CSR cables are to be undertaken within waterways.
- Water quality of wetlands within and adjacent to the project area and watercourses that intersect the project area is to be maintained at pre-construction levels.
- Environmental management for erosion and sediment control, in accordance with EPA Victoria construction guidelines (Publications 275, 480 and 960) will be implemented for works in the vicinity of waterways and wetlands.
- Control measures are required to ensure sediments, and other refuse associated with rail construction, is disposed of in an appropriate manner and should not affect the water quality of adjacent waterways or wetlands.
- Where rail bridges are present over waterways and waterbodies, avoid disturbance to waterways and waterbodies through attaching cabling to rail bridge. As an indicative rule, trenching should not encroach within 20 m of a significant waterway to avoid potential impact to waterways that may trigger the need for further assessment and specific mitigation measures.
- For culverts crossing perennial waterways, wetlands and drains where water is present in the channel, cabling must be passed through a bored tunnel underneath the channel. Entry and exit bores to be located to avoid impacting banks and associated riparian vegetation.
- For culverts crossing seasonally dry streams, wetlands or drains, undertake trenching works only if impacts to native vegetation can be avoided and undertake works during dry periods when there is no water present within the stream or drain, provided the structural integrity of the channel bank is not compromised.

6.3 Assessment of Residual Impacts to Ecological Values

6.3.1 IMPACTS TO MNES OUTSIDE THE MSA AREA

6.3.1.1 Threatened Ecological Communities

The proposed works are not expected to impact any of the threatened ecological communities protected under the EPBC Act that occur within the project area if the above mitigation actions are implemented and State based regulatory approvals complied with.

One threatened ecological community (Natural Temperate Grassland of the Victorian Volcanic Plain) is contained entirely within the MSA area, with impacts to this community accounted for through HCOs. The likelihood of significant impact to the three remaining threatened ecological communities (Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia; and White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands) has been reduced to low using measures to avoid and mitigate impacts to these communities. Assessment of significant impacts to EPBC-listed threatened ecological communities is detailed in Appendix P. Threatened Ecological Communities and the residual risk of impact to these communities is detailed in Table 6.1 below.

TABLE 6.1: THREATENED COMMUNITIES LISTED UNDER THE EPBC ACT THAT OCCUR OUTSIDE THE MSA AREA AND THEIR LIKELIHOOD OF SIGNIFICANT IMPACT AS A RESULT OF THE PROPOSED WORKS

THREATENED COMMUNITY	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	EXTENT OF REMOVAL (HA)	LIKELIHOOD OF SIGNIFICANT IMPACT
Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	**Avoidance measures** • Areas supporting this community have been designated as No-Go Zones (listed in Appendix A and mapped in Appendix B) **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species	0	Low
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically endangered	**Avoidance measures** • Areas supporting this community have been designated as No-Go Zones (listed in Appendix A and mapped in Appendix B) **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	0	Low
White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands	Critically endangered	**Avoidance measures** • Areas supporting this community have been designated as No-Go Zones (listed in Appendix A and mapped in Appendix B) **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	0	Low

6.3.1.2 Threatened Species

No threatened species listed under the EPBC Act are likely to be significantly impacted by the proposed works if mitigation measures referred to in Table 6.2 are adhered to. These determinations are summarised in Table 6.2, with the more detailed assessment of each species against its relevant significant impact criteria in Appendix P. These determinations of impact do not include Large-fruit Fireweed and Golden Sun Moth which were deemed likely to only occur in the MSA area, and thus consideration of significant impact to these species is not required.

Table 6.2: Threatened Species listed under the EPBC Act that occur outside the MSA AREA and likelihood of significant impact as a result of the proposed works

SPECIES	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	LIKELIHOOD OF SIGNIFICANT IMPACT
Flora			
Curly Sedge *Carex tasmanica*	Vulnerable	**Avoidance measures** • Areas with a moderate to high likelihood of supporting this species have been designated No-	Low

SPECIES	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	LIKELIHOOD OF SIGNIFICANT IMPACT
		Go Zones (listed in Appendix A and mapped in Appendix B) • No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	
Matted Flax-lily *Dianella amoena*	Endangered	**Avoidance measures** • Areas with a high likelihood of supporting this species, or where the species has been confirmed present have been designated No-Go Zones (listed in Appendix A and mapped in appendix B) • The construction footprint in Wallan, where Matted Flax-lily has been determined to have a moderate likelihood of presence is to be subject to a pre-clearance targeted survey (November-February), with individuals observed to be avoided by construction. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	Low
Swamp Fireweed *Senecio psilocarpus*	Vulnerable	**Avoidance measures** • Areas with a moderate to high likelihood of supporting this species have been designated No-Go Zones (listed in Appendix A and mapped in appendix B) • No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	Low
Swamp Everlasting *Xerchrysum palustre*	Vulnerable	**Avoidance measures** • Areas with a moderate to high likelihood of supporting this species have been designated No-Go Zones (listed in Appendix A and mapped in appendix B) • No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	Low
Fauna			
Regent Honeyeater *Anthochaera phrygia*	Critically endangered	**Avoidance measures** • Areas determined to be high quality habitat for this species have been designated as No-Go Zones (listed in Appendix A and mapped in appendix B)	Low

SPECIES	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	LIKELIHOOD OF SIGNIFICANT IMPACT
		• No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	
Silver Perch *Bidyanus bidyanus*	Critically endangered	**Waterways and wetlands measures** • The only works to take place in the vicinity of waterways are CSR cable routing works • For bridge crossings, the CSR cable is to be attached to the bridge, with no associated construction works to enter the channel itself. • For culvert crossings the CSR is to be under-bored for perennial waterways. Trenching through waterways may only take place when the stream is dry, provided the structural integrity of the channel is not compromised **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low
Striped Legless Lizard *Delma impar* and **Pink-tailed Worm-lizard** *Aprasia parapulchella*	Vulnerable	**Avoidance measures** • Areas outside the MSA area with a moderate to high likelihood of supporting this species have been designated as No-Go Zones (listed in Appendix A and mapped in appendix B) **Fauna protection measures** • Vegetation clearance works at Seymour between Seymour-Avenel Road and High street to be supervised by fauna spotters. Should these species be identified to be present, works must stop, with any habitat supporting these species to be avoided by construction. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low
Painted Honeyeater *Grantiella picta*	Vulnerable	**Avoidance measures** • Areas determined to be high quality habitat for this species have been designated as No-Go Zones (listed in Appendix A and mapped in appendix B) **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low
Swift Parrot *Lathamus discolor*	Critically Endangered	**Avoidance measures** • Areas determined to be high quality habitat for this species have been designated as No-Go Zones (listed in Appendix A and mapped in appendix B)	Low

SPECIES	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	LIKELIHOOD OF SIGNIFICANT IMPACT
		• No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	
Growling Grass Frog *Litoria raniformis*	Vulnerable	**Waterways and wetlands measures** • The only works to take place in the vicinity of waterways are CSR cable routing works • For bridge crossings, the CSR cable is to be attached to the bridge, with no associated construction works to enter the channel itself. • For culvert crossings the CSR is to be under-bored for perennial waterways. Trenching through waterways may only take place when the stream is dry, provided the structural integrity of the channel is not compromised **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low
Trout Cod *Maccullochella macquariensis*	Endangered	**Waterways and Wetlands measures** • The only works to take place in the vicinity of waterways are CSR cable routing works • For bridge crossings, the CSR cable is to be attached to the bridge, with no associated construction works to enter the channel itself. • For culvert crossings the CSR is to be under-bored for perennial waterways. Trenching through waterways may only take place when the stream is dry, provided the structural integrity of the channel is not compromised. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low
Murray Cod *Maccullochella peelii*	Vulnerable	**Waterways and Wetlands Measures** • The only works to take place in the vicinity of waterways are CSR cable routing works • For bridge crossings, the CSR cable is to be attached to the bridge, with no associated construction works to enter the channel itself. • For culvert crossings the CSR is to be under-bored for perennial waterways. Trenching through waterways may only take place when the stream is dry, provided the structural integrity of the channel is not compromised. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	Low

SPECIES	CONSERVATION STATUS	ASSUMED MITIGATION MEASURES	LIKELIHOOD OF SIGNIFICANT IMPACT
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable	**N/A – unlikely to be impacted by the proposed works**	Low

6.3.2 IMPACTS TO MNES WITHIN THE MSA AREA

6.3.2.1 Values Represented by Time-stamped Mapping

MNES that occur within the MSA area (as determined by time-stamped mapping) and the HCO amount required to be paid to facilitate the proposed works are detailed in Table 6.3. The clearance of these MNES is approved under the EPBC Act provided the appropriate HCOs are paid, and a referral of the project to the DEE under the EPBC act would not require re-examination of the approval requirements for the parts of the project area within the MSA area.

TABLE 6.3: MNES THAT OCCUR WITHIN THE MELBOURNE STRATEGIC ASSESSMENT AREA AND ASSOCIATED HCO AMOUNT REQUIRED TO FACILITATE THE PROPOSED WORKS

HABITAT COMPENSATION OLIGATION	VALUE / HA	EXTENT OF WORKS AREA SUBJECT TO HABITAT COMPENSATION OBLIGATION	HABITAT COMPENSATION OBLIGATIONS REQUIRED TO BE PAID
Growling Grass Frog	$7,529	2.23 ha	$16,780.53
Golden Sun Moth	$7,914	0.18 ha	$1,406.55
Matted Flax-lily	$11,196	0.16 ha	$1,817.61
Native vegetation	$95,075	0.17 ha	$15,434.89
Total			$35,439.57

6.3.2.2 Threatened Species Not Represented by Time-stamped Mapping

Although impacts to MNES within the MSA area accounted for through the payment of HCOs, best practice mitigation measures are suggested for two threatened species not represented by time-stamped mapping, that have a moderate likelihood of occurring within the MSA area. Those are:

- **Basalt Peppercress**: Prior to commencing works in the Donnybrook works area, targeted Basalt Peppercress surveys should be undertaken within the construction footprint of the Donnybrook works area. These surveys should be undertaken during Summer in accordance with the relevant targeted survey guidelines. Any individuals found should be avoided by construction.

- **Striped Legless Lizard**: Works taking place in areas of Plains Grassland in the Donnybrook works area (mapped in Appendix B) should be supervised by a fauna spotter holding a Section 28A Wildlife Act authorisation. Individuals displaced by trenching works in these areas should be captured and released in the immediate vicinity, albeit outside the construction corridor.

6.3.2.3 MSA Conservation Areas and Areas of Strategic Importance

The proposed works also intersect with Growling Grass Frog Conservation Area No. 34, and one area of strategic importance within that conservation area. Habitat for Growling Grass Frog within and protected by these areas will not be impacted by the proposed works. **Waterways and wetlands measures** will be enacted within this area to ensure that Merri Creek is not impacted by the proposed works, with the signalling cable to be attached to the existing rail bridge, and appropriate erosion and sedimentation controls to be put in place to

ensure works in the vicinity of Merri Creek do not impact Merri Creek. These same erosion and sedimentation measures will also be enacted within the 5 m wide construction corridor that passes through the area of strategic importance that intersects the project area (a buffer zone to protect an existing dam outside the project area). Through enacting these controls within this area, the ability of the buffer zone – to protect the existing dam – will not be compromised with no impacts to growling grass frog habitat within that dam. Further, areas within that area of strategic importance that fall outside of the 5 m construction corridor are to be designated as a **No-Go Zone** to ensure the ability of those areas to protect the existing dam are not compromised with no impacts to growling grass frog habitat within that dam.

A WICA permit is required to undertake works in a conservation area.

6.3.3 IMPACTS TO MATTERS PROTECTED UNDER THE FFG ACT

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and management of potentially threatening processes. The key threatening process associated with this project is the clearing of native vegetation. Mitigation measures (Table 6.4) must be implemented to ensure that the proposed works are in line with the objectives of the FFG Act.

Two threatened communities listed under the FFG Act were identified within the project area. The key threatening process relevant to these communities is native vegetation clearing. The threatened communities and the mitigation measures required to ensure that the proposed works are in line with the FFG Act are listed in Table 6.4.

TABLE 6.4: FFG-LISTED THREATENED COMMUNITIES AND THE MITIGATION MEASURES REQUIRED TO ENSURE THE PROJECT IS CONSISTENT WITH THE OBJECTIVES OF THE FFG ACT

THREATENED COMMUNITY	CONSERVATION STATUS	MITIGATION MEASURES	EXTENT OF REMOVAL	PERMIT TO TAKE REQUIRED
Victorian Temperate Woodland Bird Community	Listed	**FFG protected flora species measures** • A permit to take will be obtained prior to the removal of this community **Avoidance measures** • Native vegetation impacts were avoided and minimised where possible. Patches of vegetation determined to represent this threatened ecological community were designated 'priority avoid' areas and were prioritised for avoidance as design progressed **General construction measures** • Where areas of this community are to be retained best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	3.87	Yes
Western (Basalt) Plains Grassland	Listed	**FFG protected flora species measures** • A permit to take will be obtained prior to the removal of this community **Avoidance measures** • Native vegetation impacts were avoided and minimised where possible. Patches of vegetation determined to represent this threatened ecological community were designated 'priority avoid' areas and were prioritised for avoidance as design progressed **General construction measures** • Where areas of this community are to be retained best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion,	0.06	Yes

THREATENED COMMUNITY	CONSERVATION STATUS	MITIGATION MEASURES	EXTENT OF REMOVAL	PERMIT TO TAKE REQUIRED
		sedimentation and introduction of weeds or pest species.		

6.3.3.1 Threatened Species Listed under the FFG Act

Fourteen (14) threatened flora species listed under the FFG Act were determined to have a moderate to high likelihood of occurring within the project area. These species have been allocated a functional group. These functional groups, and the mitigation measures required to ensure that the proposed works are in line with the objectives of the FFG Act are listed in Table 6.5 and are described further in Section 6.2.

TABLE 6.5: FFG-LISTED THREATENED SPECIES AND THE MITIGATION MEASURES REQUIRED TO ENSURE THE PROJECT IS CONSISTENT WITH THE OBJECTIVES OF THE FFG ACT

FUNCTIONAL GROUP	CONSERVATION STATUS	MITIGATION MEASURES	PERMIT TO TAKE REQUIRED
Wetland flora	Listed	**Avoidance measures** • Areas with a moderate to high likelihood of supporting these species have been designated No-Go Zones (listed in Appendix A and mapped in appendix B) • No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: The only observed threatened flora species (Swamp Everlasting) occurs within a No-Go Zone (patches 358, 772 and 803). Other threatened wetland flora are also likely to be restricted to this No-Go Zone if they occur within the project area.
Grassland and woodland flora	Listed	**Avoidance measures** • Areas with a high likelihood of supporting these species, or where the species has been confirmed present have been designated No-Go Zones, (listed in Appendix A and mapped in appendix B), or subject to pre-clearance targeted survey requirement (see below) • The construction footprint in Wallan, where Matted Flax-lily has been determined to have a moderate likelihood of presence is to be subject to a pre-clearance targeted survey, with individuals observed to be avoided by construction. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: The only observed threatened flora species (Matted-Flax lily) occurs within a No-Go Zone. To account for the possibility of individuals outside of this No-Go Zone, pre clearance surveys will be undertaken.
Terrestrial avifauna	Listed	**Avoidance measures** • Areas representing high quality habitat for these species have been designated No-Go Zones. Areas representing moderate quality habitat have been designated priority avoid areas and were prioritised for avoidance as design progressed (listed in Appendix A and mapped in appendix B) • No-Go Zones for these species are synonymous with those implemented for the threatened ecological community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: Species may sporadically forage within the project area. Impacts to higher quality foraging habitat for this species has been minimised. Vegetation expected to be removed by the proposed works is unlikely to be of critical importance for these species.

FUNCTIONAL GROUP	CONSERVATION STATUS	MITIGATION MEASURES	PERMIT TO TAKE REQUIRED
Aquatic fauna	Listed	**Waterways and wetlands measures** • The only works to take place in the vicinity of waterways are CSR cable routing works • For bridge crossings, the CSR cable is to be attached to the bridge, with no associated construction works to enter the channel itself. • For culvert crossings the CSR is to be under-bored for perennial waterways. Trenching through waterways may only take place when the stream is dry, provided the structural integrity of the channel is not compromised. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal of habitat including erosion, sedimentation and introduction of weeds or pest species.	No: Minimal impacts to waterways.
Wetland avifauna	Listed	**Avoidance measures** • Areas with a higher likelihood of providing foraging habitat for the species have been designated No-Go Zones (listed in Appendix A and mapped in appendix B). Utilisation of these areas is likely to be limited to sporadic foraging. • No-Go Zones for this species are synonymous with those implemented for the threatened ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: High quality wetland areas have been designated as No-Go zones. Other wetlands were found to be of low quality and are unlikely to represent critical habitat for these species.
Legless lizards	Listed	**Avoidance measures** • Areas with a moderate to high likelihood of supporting this species have been designated No-Go Zones (listed in Appendix A and mapped in appendix B) **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: Areas with the potential to support these species outside the MSA area have been designated no-go zones.
Arboreal and semi-arboreal mammals	Listed	**Avoidance measures** • Areas representing high quality habitat for these species been designated No-Go Zones (listed in Appendix A and mapped in appendix B) • No-Go Zones for these species are synonymous with those implemented for the threatened ecological community, Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia **Fauna habitat and connectivity loss measures** • Installation of artificial habitat linkage structures to compensate for loss of habitat and fragmentation • Installation of nest boxes to compensate for loss of hollow-bearing trees. **General construction measures** • Best-practice environmental management to be employed to prevent impacts via means other than direct removal including erosion, sedimentation and introduction of weeds or pest species.	No: High-quality habitat for these species has been prioritised for avoidance. Vegetation removed is unlikely to be of critical importance for these species. Habitat fragmentation from the project will be mitigated through the installation of habitat linkage structures.
Grey-headed Flying Fox	Listed	None: No critical habitat for this species within the project area	No:

FUNCTIONAL GROUP	CONSERVATION STATUS	MITIGATION MEASURES	PERMIT TO TAKE REQUIRED
			No critical habitat for this species within the project area

6.3.3.2 Protected Species Listed Under the FFG Act

Species listed as protected under the FFG Act were observed within the project area. A permit to take will be required for the removal of these species. These species are detailed in Appendix D.

6.3.4 IMPACTS TO NATIVE VEGETATION

Areas of native vegetation that are to be removed or impacted due to the proposed works will require approval and offsetting under the Guidelines under the P&E Act. Due to the large quantity of vegetation to be removed, impacts to vegetation have been assessed under the detailed assessment pathway (Appendix R). Additional requirements of assessment under the detailed assessment pathway including impacts to threatened species are addressed elsewhere in this report.

6.3.4.1 Extent of Native Vegetation Removal

As detailed in Section 5.1, the total extent of native vegetation within the project area was determined to be 267.28 ha. This vegetation consists of both patches and scattered trees. Under the current design, 20.91 ha of native vegetation patches and 91 scattered trees would require removal to facilitate the proposed works (this figure does not include time-stamped native vegetation which was discussed in Section 6.3.2). A breakdown of native vegetation removal per EVC is detailed in Table 6.6. Descriptions of these EVCs including photographs are detailed in Appendix L.

TABLE 6.6: VEGETATION REMOVAL REQUIRED TO FACILITATE THE PROPOSED WORKS BY ECOLOGICAL VEGETATION CLASS.

BIOREGION	EVC	BIOREGIONAL CONSERVATION STATUS	EXTENT OF VEGETATION TO BE REMOVED (HECTARES)
Central Victorian Uplands	23: Herb-rich Foothill Forest		0.07
Central Victorian Uplands	47: Valley Grassy Forest		0.83
Central Victorian Uplands	55: Plains Grassy Woodland		2.20
Central Victorian Uplands	56: Floodplain Riparian Woodland		0.21
Central Victorian Uplands	61: Box Ironbark Forest		0.62
Central Victorian Uplands	68: Creekline Grassy Woodland		0.18
Central Victorian Uplands	83: Swampy Riparian Woodland		0.24
Central Victorian Uplands	127: Valley Heathy Forest-		0.42
Central Victorian Uplands	132: Plains Grassland		0.02
Central Victorian Uplands	175: Grassy Woodland		5.13

BIOREGION	EVC	BIOREGIONAL CONSERVATION STATUS	EXTENT OF VEGETATION TO BE REMOVED (HECTARES)
Central Victorian Uplands	292: Red Gum Swamp		0.03
Central Victorian Uplands	821: Tall Marsh		0.00
Victorian Riverina	55: Plains Grassy Woodland		5.92
Victorian Riverina	56: Floodplain Riparian Woodland		0.99
Victorian Riverina	125: Plains Grassy Wetland		0.19
Victorian Riverina	132: Plains Grassland		0.01
Victorian Riverina	175: Grassy Woodland		0.15
Victorian Riverina	292: Red Gum Swamp		0.99
Victorian Riverina	803: Plains Woodland		2.46
Victorian Riverina	VRiv0821: Tall Marsh		0.00
Victorian Volcanic Plain	83: Swampy Riparian Woodland	Vulnerable	0.02
Victorian Volcanic Plain	821: Tall Marsh	Vulnerable	0.21
Total removal of threatened communities listed under the EPBC Act[6]			**0.00 ha**
Total removal of native vegetation patches			**20.91**
Total native vegetation removal (including 91 scattered trees, and time-stamped native vegetation)			**24.04**[7]
Total extent of removal of endangered EVCs (including 91 scattered trees and time-stamped native vegetation)			**14.22**
Total extent of removal of vegetation with 'very high conservation significance' (including time-stamped native vegetation)			**12.47**

6.3.4.2 Native Vegetation Offsets

Native vegetation offsets will need to be secured prior to undertaking the proposed works. A summary of the offset target as relevant to the current vegetation removal extent is provided in Table 6.7 and Appendix E. This offset target is derived from a scenario test. A Native Vegetation Removal Report will need to be acquired from DELWP following the finalisation of the extent of vegetation removal. It should be noted that the below offsets requirement does not include native vegetation within the MSA area. Impacts to this vegetation are accounted for through the payment of HCOs. Clarification should be sought from the Hume and Whittlesea LGAs as to whether additional offsets are required in addition to the payment of HCOs under local Native Vegetation Precinct Plans.

TABLE 6.7: NATIVE VEGETATION OFFSET REQUIREMENTS

OFFSET CRITERION	OFFSET REQUIREMENT
General Offset Amount	11.881 general habitat units

[6] No patches of native vegetation that qualified as threatened communities listed under the EPBC Act are to be cleared.

[7] This figure includes scattered trees and thus cannot be derived by summing the hectare figures within this table.

Vicinity	Goulburn Broken, Port Phillip and Westernport Catchment Management Authority (CMA) or Greater Shepparton City, Mitchell Shire, Strathbogie Shire Council
Minimum strategic biodiversity score	0.412
Large trees	169

6.3.4.3 Application Requirements: Avoidance and Minimisation of Impacts to Native Vegetation

As per the application requirements detailed in the Guidelines, measures have been taken to avoid and minimise impacts to native vegetation. The specifics of the approaches used to avoid and minimise are detailed in Section 6.2. As per those mitigation measures, where vegetation removal cannot be avoided entirely, lower quality patches are preferentially lost in favour of retaining high quality vegetation. Higher quality areas such as these have been designated as No-Go Zones or Priority Avoid areas. These areas are listed in Appendix A and mapped in Appendix B. The application of these approaches has resulted in the avoidance and minimisation of native vegetation removal and reductions to the overall vegetation removal required the proposed works. A variety of exercises including collaborative, cross-discipline workshops were held in the lead up to the submission of this report with the aim of avoiding and minimising impacts to native vegetation. These workshops and the resulting reduction in vegetation removal are detailed in Table 6.8.

TABLE 6.8: EXERCISES UNDERTAKEN TO AVOID AND MINIMISE IMPACTS TO NATIVE VEGETATION AND THE PROJECTED NATIVE VEGETATION REMOVAL REQUIRED TO FACILITATE THE PROPOSED WORKS FOLLOWING THE EXERCISE

AVOID AND MINIMISE EXERCISE	DATE	DESCRIPTION	PROJECTED VEGETATION REMOVAL EXTENT
Terrestrial ecology reconnaissance	September-October 2018	High-level constraints mapping undertaken to assist in avoiding high quality ecological values in the early stages of design	Unknown
↓			
Vegetation mapping	November 2018 – May 2019	Detailed vegetation mapping undertaken to allow vegetation avoidance in the design process	224.24 ha[8]
↓			
Avoid and minimise workshop	23 January 2019	Planning and determining appropriate avoid and minimise activities.	224.24 ha
↓			
Avoid and minimise workshop	27 February 2019	Planning and determining appropriate avoid and minimise activities.	224.24 ha
↓			
Avoid and minimise workshop	6 May 2019	Discussing and implementing design changes aimed at avoidance and minimisation	80 ha
↓			

[8] This figure is smaller than the total extent of native vegetation within the project area (267.28 ha), as additional areas were added to scope following the initial veg mapping exercise.

AVOID AND MINIMISE EXERCISE	DATE	DESCRIPTION	PROJECTED VEGETATION REMOVAL EXTENT
Avoid and minimise workshop	7 May 2019	Discussing and implementing design changes aimed at avoidance and minimisation	52.20 ha
		↓	
Updated CSR alignment, determined vegetation	09 July 2019	Adjustments to CSR alignment made aimed at avoidance and minimisation. Loss calculation determined using 'accurate mapping' method as discussed in Section 4.3.2.	24.04 ha (Figure includes 20.91 ha ha of native vegetation patches, 0.17 ha of time-stamped native vegetation and 91 scattered trees)

6.3.4.4 Avoidance and Minimisation of Impacts to High-Quality Native Vegetation

Reductions in native vegetation avoidance were targeted toward classes of native vegetation that are indicative of high-quality vegetation, or high-quality habitat for threatened flora and fauna. These classes are listed in Table 6.9 below, along with quantity of vegetation of these classes that exists within the project area, and the final extent of clearance.

TABLE 6.9: CLASSES OF NATIVE VEGETATION WITHIN THE PROJECT AREA THAT DENOTE HIGH-QUALITY VEGETATION AND REDUCTIONS IN CLEARANCE OF THIS VEGETATION

NATIVE VEGETATION CLASS	EXTENT WITHIN THE PROJECT AREA	EXTENT OF REMOVAL
Threatened ecological communities listed under the EPBC Act	39.37 ha	0.00 ha
Threatened ecological communities listed under the FFG Act	31.12 ha	3.93 ha
Vegetation of 'very high conservation significance'	113.09	12.47 ha
Large old trees	1,138 trees	169 trees
Vegetation designated as 'priority avoid'[9]	44.51 ha	4.03 ha

[9] 'Priority avoid' denotes patches of high vegetation quality that did not necessarily fall into the other categories in Table 6.9. The priority avoid class is specific to this assessment. Criteria used to determine priority avoid areas are discussed in Section 6.2.1.2.

7 Legislative and Policy Obligations

A summary of the likely legislative requirements identified in preparing this document is provided below. This summary is provided prior to the completion of additional field assessments and, as such, the information provided herein may be revised as additional information becomes available.

Where additional works are proposed to be undertaken within the project area, or where design and construction details are refined, further assessments and approvals may be required to adhere to the legislation and policies described in Table 7.1.

TABLE 7.1: SUMMARY OF LEGISLATIVE IMPLICATIONS ACROSS THE ENTIRE PROJECT AREA

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS REQUIRED
Commonwealth		
EPBC Act	**Threatened ecological communities** • 3 threatened ecological communities were identified within the project area, outside the MSA area. • These threatened ecological communities **will not** be significantly impacted by the proposed works, assuming the mitigation measures detailed within this report are met. **Threatened species** • 14 threatened species with the potential to occur within the project area outside the MSA area. None of these will be impacted by the proposed works. assuming the mitigation measures detailed within this report are met.	• Enforce mitigation measures associated with MNES including establishment of No-Go Zones. • Undertake a targeted survey of the works area at Wallan between November and February to avoid any Matted Flax-lily that may be present. • Vegetation clearance at Seymour should be supervised by an appropriately qualified fauna spotter to ensure the absence of the Striped Legless Lizard and the Pink Tailed Worm Lizard. Habitat found to be occupied by either of these species must be avoided.
MSA	**MSA Conservation areas** • CSR works at Donnybrook encroach on MSA conservation area 34 (a Growling Grass Frog conservation area). **MSA Habitat Compensation Obligations** • $35,439.57 in HCOs are required to facilitate the proposed works to compensate for the loss of threatened species habitat and threatened ecological communities within the MSA area.	• Payment of any outstanding HCOs in areas subject to the MSA area. • A Works in Conservation Areas (WICA) approval will be required from DELWP to support a no impact in a Conservation Area requirement. • The WICA process will also determine if approval for the works are required from the Commonwealth. The trigger for Commonwealth approval is if the works include areas and impacts to Growling Grass Frog Areas of Strategic Importance mapped in the Growling Grass Frog Master Plan. • A No-Go Zone should be put in place to ensure no impacts to the Area of Strategic Importance to Growling Grass Frog. • Pre-clearance surveys for Basalt Peppercress are recommended to be undertaken within the works area at Donnybrook in Summer (within the MSA area), and any individuals found should be avoided through construction measures
State		
EE Act	**267.28 ha of native vegetation within the project area**	• It is recommended the project is referred to the Minister for Planning under the EE Act.

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS REQUIRED
	Of that 267.28 ha, 24.04 ha of native vegetation removal including: • 20.91 ha of native vegetation patches • 0.17 ha of time-stamped native vegetation • 91 scattered trees • **Two individual criteria under the Ministerial Guidelines for referral triggered** (Appendix C) • 14.22 ha Endangered EVCs are required to be cleared to facilitate the proposed works, including 11 ha of native vegetation patches, 0.17 ha of time-stamped native vegetation, and 91 scattered trees (trigger limit = 10 ha). • 12.47 ha of vegetation that is of 'very high conservation significance' is required to be cleared to facilitate the proposed works, including 12.3 ha of native vegetation patches and 0.17 ha in time-stamped native vegetation (trigger limit = 10 ha).	
FFG Act	Two threatened communities have been identified within the project area, partial removal of these communities is required to facilitate the proposed works: • Western Basalt Plains Grassland (0.06 ha required to be removal) • Victorian Temperate Woodland Bird (3.71 ha required to be removed) Two threatened flora species identified within the project area: Matted Flax-lily and Swamp Everlasting. Critical habitat for these species not impacted by the proposed works, assuming mitigation measures detailed in this report are met. Numerous flora species listed as 'protected' under the Act will require removal.	• Adhere to mitigation measures detailed in this report throughout construction. • A permit to take under the FFG Act will be required for 0.06 ha of Western (Basalt) Plains Grassland, 3.71 ha of Victorian Temperate Woodland Bird Community, and numerous FFG Act-listed species, detailed in Section 5.4 (threatened species) and Appendix D (protected species).
P&E Act and the Guidelines	**267.28 ha of native vegetation within the project area** **Of that 267.28, 24.04 ha of native vegetation removal including:** • 20.91 ha of native vegetation patches • 0.17 ha of time-stamped native vegetation • 91 scattered trees	• Planning approval is required under the P&E Act for the removal of native vegetation. • Detailed design of the project may alter the native vegetation impacts and offset target. • Detailed design should follow the avoid and minimise principle. • 0.17 ha of this extent will be compensated through the payment of HCOs. Clarification should be sought from the Hume and Whittlesea LGAs as to whether this vegetation requires offsets to be secured in addition to the payment of native vegetation HCOs under local Native Vegetation Precinct Plans.
Wildlife Act 1975	Removal of fauna habitat	• All measures must be taken to prevent impact to native wildlife during construction. • Adhere to mitigation measures detailed in this report throughout construction. • Salvage of fauna must take place prior to and during vegetation removal by a qualified fauna handler / ecologist. • A permit under the Wildlife Act will be required if animals will be impacted, including handled or captured.
Catchment and Land Protection Act 1994 (CaLP Act)	• Various CaLP Act-listed weeds were observed within the project area.	• Adhere to measures to prevent the spread of weeds and pests within and from the project area.

POLICY / LEGISLATION	RELEVANT MATTERS	ACTIONS REQUIRED
	• Various CaLP Act-listed pest animals or evidence of these animals were observed throughout the project area	

8 Conclusions and Next Steps

8.1 Ecological Values within the Project Area

A summary of the ecological values within the project area is presented in Table 8.1.

TABLE 8.1: SUMMARY OF ECOLOGICAL VALUES IN PROJECT AREA

ECOLOGICAL VALUE	PRESENCE WITHIN THE PROJECT AREA
Native vegetation	**267.28 ha of native vegetation within the project area including:** • 184.08 ha of native vegetation patches • 559 scattered trees
Threatened communities of Commonwealth significance	• 36.00 ha of Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • 0.49 ha Natural Temperate Grassland of the Victorian Volcanic Plain, contained entirely within the MSA area • 2.15 ha Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains outside the MSA area, 1.3 ha within the MSA area • 0.83 ha White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands
Threatened communities of State significance	• 0.49 ha Western (Basalt) Plains Grassland • 30.63 ha Victorian Temperate Woodland Bird Community
Threatened flora of Commonwealth Significance	• Swamp Everlasting and Matted Flax-lily – both confirmed present within the project area south of Wallan station • 2 other threatened flora species with a moderate to high likelihood of occurring within the project area
Threatened flora of State significance	• Swamp Everlasting, and Matted Flax-lily – both confirmed present within the project area south of Wallan station • 12 further threatened flora species listed under the FFG Act with a moderate to high likelihood of occurring within the project area
Threatened fauna of Commonwealth significance	• 10 threatened fauna species listed under the EPBC Act with a moderate to high likelihood of occurring within the project area
Threatened fauna of State significance	• 25 threatened fauna species listed under the FFG Act with a moderate to high likelihood of occurring within the project area

8.2 Impacts to Ecological Values within the Project Area

Table 8.2 provides a summary of ecological impacts associated with the proposed works.

TABLE 8.2: SUMMARY IF ECOLOGICAL VALUES IMPACTED UNDER THE CURRENT DESIGN

ECOLOGICAL VALUE	IMPACTS ASSOCIATED WITH THE PROPOSED WORKS
Native vegetation	**24.04 ha of native vegetation removal including:** • 20.91 ha of native vegetation patches • 0.17 ha of time-stamped native vegetation • 91 scattered trees
Threatened communities of Commonwealth significance	**No impact** No MNES are likely to be impacted by these works, assuming all mitigation measures detailed in this report are adhered to including the implementation of No-Go Zones

ECOLOGICAL VALUE	IMPACTS ASSOCIATED WITH THE PROPOSED WORKS
Threatened communities of State significance	**Removal of threatened communities protected under the FFG Act** • 3.87 ha of the Victorian Temperate Woodland Bird Community threatened ecological community • 0.06 ha of the Western (Basalt) Plains Grassland threatened ecological community **No further impact** • Assuming the mitigation measures within this report are adhered to.
Threatened flora of Commonwealth Significance	**No impact** No MNES are likely to be impacted by these works, assuming all mitigation measures detailed in this report are adhered to.
Threatened and protected flora of State significance	**Removal of flora listed as protected under the FFG Act** • FFG-protected flora (as detailed in Appendix D) **No further impact** Assuming the mitigation measures within this report are adhered to.
Threatened fauna of Commonwealth significance	**No impact** No MNES are likely to be impacted by these works, assuming all mitigation measures detailed in this report are adhered to.
Threatened fauna of State significance	**No impact** No threatened flora listed under the FFG Act are likely to be impacted by these works, assuming all mitigation measures detailed in this report are adhered to.
MNES within the MSA area	**Removal of time-stamped native vegetation and time-stamped threatened species habitat** • The project requires the payment of $35,439.57 in HCOs to account for removal of time-stamped native vegetation and threatened species habitat. **No further impact** Other values, including area of strategic importance within the MSA area will not be impacted, assuming the mitigation measures within this report are adhered to.

Removal of additional vegetation may be required depending on the chosen stabling option. Depending on the option, the extent of vegetation may increase by up to 0.2 ha and up to 1 scattered tree. This potential increase is considered minor and unlikely to change the impacts summarised in the table above.

8.3 Next Steps

Table 8.3 provides a summary of the next steps required under each legislation for the project to proceed.

TABLE 8.3: SUMMARY OF ACTIONS REQUIRED UNDER LEGISLATION REQUIRED ACROSS THE PROJECT AREA

RELEVANT POLICY/LEGISLATION	NEXT STEPS REQUIRED
EPBC Act	• No MNES are expected to be impacted by proposed works, assuming the mitigation measures in this report are adhered to. • Pre-clearance surveys for Matted Flax-lily should be undertaken within the works area at Wallan between November and February, and Basalt peppercress within the works area at Donnybrook in Summer. Any individuals found should be avoided through construction measures. • Vegetation clearance at Seymour should be supervised by an appropriately qualified fauna spotter to ensure the absence of the Striped Legless Lizard and the Pink Tailed Worm Lizard. Habitat found to be occupied by either of these species must be avoided.
MSA	• HCOs of $35,439.57 must be paid prior to commencing work. • A WICA permit to undertake works in a conservation area must be obtained to undertake works within conservation area number 34, a Growling Grass Frog conservation area. • Mitigation measures detailed within this report must be adhered to to) to ensure the Growling Grass Frog, and areas of strategic importance for the Growling Grass Frog are not significantly impacted.

RELEVANT POLICY/LEGISLATION	NEXT STEPS REQUIRED
EE Act	• It is recommended that the project be referred to the Minister for Planning under the EE Act as the project triggers an individual criterion of the *Ministerial Guidelines for Assessment of Environment Effects* (DSE 2006) associated with the removal of native vegetation.
FFG Act	• Mitigation measures must be adhered to (as per Section 6.3.3) to ensure the project is consistent with the objectives of the FFG Act. • A permit to take under the FFG Act will be required for 0.06 of Western (Basalt) Plains Grassland, 3.87 ha of Victorian Temperate Woodland Bird Community, and FFG-protected species, detailed in Appendix D.
P&E Act	• Planning approval is required under the P&E Act for the removal of native vegetation. • Offsets will need to be obtained prior to the commencement of project works. • Clarification should be sought from the Hume and Whittlesea LGAs as to whether additional offsets are required in addition to the payment of HCOs for vegetation removal within the MSA area. • Detailed design of the project may alter the native vegetation impacts and offset target. • Detailed design should follow the avoid and minimise principle.
Wildlife Act 1975	• Salvage of fauna must take place prior to and during vegetation removal by a qualified fauna handler / ecologist. • A permit under the Wildlife Act will be required to undertake this salvage.
CaLP Act	• Undertake measures to prevent the spread of weeds and pest animal species within and from the project area.

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Appendix A

Summary of No-Go Zones and Priority Avoid Areas

Appendix A - Summary of No-Go Zones and Priority Avoid Areas

TABLE A.1: SUMMARY OF NO-GO ZONES AND THEIR LOCATION

NO-GO ZONE (NGZ) IDENTIFIER	LOCALITION (CHAINAGE)	DESCRIPTION/ IMPORTANCE
NGZ01	31.45	• Area of strategic importance within Growling Grass Frog conservation area number 34
NGZ02	44.7	• Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains • Threatened species habitat
NGZ03	45.25	• Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains • Threatened species habitat
NGZ04	46.2	• Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains • Matted Flax Lily and Swamp Everlasting detected • Threatened species habitat
NGZ05	68.9	• Potential Striped Legless Lizard habitat
NGZ06	69.05	• Potential Striped Legless Lizard habitat
NGZ07	69.25	• Potential Striped Legless Lizard habitat
NGZ08	70.65	• White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands • Threatened species habitat
NGZ09	88.6	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ10	89.35	• White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands • Threatened species habitat
NGZ11	89.55	• White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands • Threatened species habitat
NGZ12	91.95	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ13	100.35	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ14	102.6	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ15	105.5	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ16	105.5	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ17	106.4	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ18	106.4	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ19	107.6	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

NO-GO ZONE (NGZ) IDENTIFIER	LOCALITION (CHAINAGE)	DESCRIPTION/ IMPORTANCE
		• Threatened species habitat
NGZ20	108.55	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ21	109.15	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ22	111.8	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ23	112.4	• Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ24	128.3	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ25	132.35	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ26	139.1	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ27	149.9	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ28	152.2	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ29	152.55	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ30	152.8	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ31	165.1	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat
NGZ32	168	• Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains • Threatened species habitat
NGZ33	173.7	• Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Threatened species habitat

TABLE A.2: SUMMARY OF PRIORITY AVOID AREAS AND THEIR LOCATION

PRIORITY AVOID (PA) IDENTIFIER	LOCALITION (CHAINAGE)	DESCRIPTION/ IMPORTANCE
PA01	47.1	• Growling Grass Frog dispersal habitat
PA02	50.95	• Growling Grass Frog dispersal habitat
PA03	56	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA04	56.35	• Hollow bearing trees

PRIORITY AVOID (PA) IDENTIFIER	LOCALITION (CHAINAGE)	DESCRIPTION/ IMPORTANCE
		• Habitat for FFG-listed threatened fauna
PA05	73	• V/Line significant vegetation
PA06	84	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA07	84.25	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA08	95.85	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA09	96.05	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA10	96.45	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA11	108.2	• Good quality derived grasslands
PA12	115.5	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA13	115.55	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA14	132.9	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA15	133.4	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA16	137.15	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA17	136.8	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA18	153.4	• High proportional cover of native species with minimal weed invasion
PA19	153.35	• High proportional cover of native species with minimal weed invasion
PA20	164	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA21	163.4	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA22	163.5	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA23	153.6	• High quality vegetation
PA24	164	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA25	164.05	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA26	164.2	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA27	164.35	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA28	164.4	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA29	164.4	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA30	164.65	• Hollow bearing trees

PRIORITY AVOID (PA) IDENTIFIER	LOCALITION (CHAINAGE)	DESCRIPTION/ IMPORTANCE
		• Habitat for FFG-listed threatened fauna
PA31	164.6	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA32	164.65	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA33	164.6	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA34	164.7	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA35	164.75	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA36	164.8	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA37	164.9	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA38	170.65	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA39	171	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA40	175.2	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA41	177.45	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA42	177.35	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA43	177.65	• Hollow bearing trees, FFG fauna habitat + significant waterway
PA44	178.95	• Hollow bearing trees • Habitat for FFG-listed threatened fauna
PA45	179.05	• Hollow bearing trees • Habitat for FFG-listed threatened fauna

Appendix B

Native Vegetation Mapping and Ecological Management Approach