Environment Report

Inland Rail - Beveridge to Albury

17-Sep-2021
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Environment Report

Inland Rail - Beveridge to Albury

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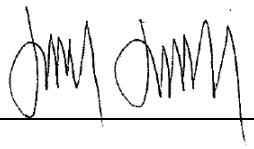
3	17-Sep-2021	Issued for Use	Jeff Smith Market Sector Leader - Environment, Power & Industrial, ANZ	

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Abbreviations

Acronym	Description
ARTC	Australian Rail Track Corporation Ltd
ATMS	Advanced Train Management System
BCS	Bioregional Conservation Status
BIFT	Beveridge Intermodal Freight Terminal
CaLP Act	*Catchment and Land Protection Act 1994*
CIA	Cumulative Impact Assessment
CMA	Catchment Management Authority
CR; cr	Critically endangered
Cth	Commonwealth
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CVU	Central Victorian Uplands bioregion of Victoria
D&C	Design and Construction
DBH	Diameter at Breast Height
DAWE	Department of Agriculture, Water and Environment (formerly DoEE)
DECCW	Department of Environment, Climate Change and Water NSW
DELWP	Department of Environment, Land, Water and Planning
DoE	Department of Environment (now DAWE)
DoEE	Department of Environment and Energy (now DAWE)
DoT	Department of Transport
DSE	Department of Sustainability and Environment (now DELWP)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DAWE)
ECI	Early Contractor Involvement
EE Act	*Environment Effects Act 1978*
EMF	Environmental Management Framework
EMS	Environmental Management Strategy
En; en	Endangered
EnSym	Environmental Systems Modelling Platform Native Vegetation Regulations Tool managed by DELWP
EPA	Environment Protection Authority (Victoria)
EPR	Environmental Performance Requirement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ES	Enhancement Site
ESO	Environmental Significance Overlay

Acronym	Description
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FFMP	Flora and Fauna Management Plan
GBGW	Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands
GDE	Groundwater Dependent Ecosystem
GHU	General Habitat Unit
Ha	Hectare
HHa	Habitat Hectare
HCO	Habitat Compensation Obligations
HZ	Habitat Zone
IBA	Important Bird Area
IPAC	Invasive Plants and Animals Committee
IR AIPP	Inland Rail – Australian Industry Participation Plan
LRFCSMDB	Lowland Riverine Fish Community of the Southern Murray-Darling Basin
LGA	Local Government Area
LSIO	Land Subject to Inundation Overlay
mAHD	Metres Australian Height Datum
MCA	Multi Criteria Assessment
MNES	Matters of National Environmental Significance
MSA	Melbourne Strategic Assessment
MTPFA	*Major Transport Projects Facilitation Act 2009*
NERL	North East Rail Line
NGZ	No-go Zone
NSW	New South Wales
NTGVVP	Natural Temperate Grasslands of the Victorian Volcanic Plain
NVIM	Native Vegetation Information Management (tool managed by DELWP)
NVCR	Native Vegetation Credit Register
NVR	Native Vegetation Removal
P&E Act	*Planning and Environment Act 1987*
PAZ	Priority Avoidance Zone
PEMP	Project Environmental Management Plan
PMST	Protected Matters Search Tool managed by DAWE
PSA	Planning Scheme Amendment
PUZ	Public Use Zone
RDZ	Road Zone

Acronym	Description
RRP	Rehabilitation and Reinstatement Plan
SIA	Significant Impact Assessment
SIMP	Social Impact Management Plan
SBV	Strategic Biodiversity Value
SBO	Special Building Overlay
SES	State Emergency Services
SG	Signal Gantry
SHU	Species Habitat Unit
SLO	Significant Landscape Overlay
SLU	Shepparton Line Upgrade
SuMP	Sustainability Management Plan
TEC	Threatened Ecological Community
TPZ	Tree Protection Zone
TfN	Trust for Nature
TS	Track Slew
TSSC	Threatened Species Scientific Committee (NSW)
TI Act	*Transport Integration Act 2010*
UDF	Urban Design Framework
VBA	Victorian Biodiversity Atlas
VQA	Vegetation Quality Assessment
VHR	Victorian Heritage Register
VHI	Victorian Heritage Inventory
VPO	Vegetation Protection Overlay
VROTS	Species listed as rare or threatened on a DELWP advisory list of threatened species in Victoria (flora, vertebrate fauna, or invertebrates)
VTWBC	Victorian Temperate Woodland Bird Community
VU; vu	Vulnerable
VVP	Victorian Volcanic Plain bioregion of Victoria
WBPGC	Western (Basalt) Plains Grassland Community
WBYBBRGGW	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived Native Grassland
XPT	Sydney-Melbourne Express Passenger Train

Glossary

Term	Explanation
Assessment Report	The Assessment Report that must be prepared by the Victorian Minister for Planning in accordance with the requirements of Item 5.4 of Schedule 1 to the Bilateral Agreement. The Assessment Report will inform the Commonwealth Government Minister for the Environment when making her decision on the Project under the EPBC Act. The Assessment Report may also be considered by Victorian Government decision makers.
Bilateral Agreement	The Bilateral Agreement made between the State of Victoria and the Commonwealth of Australia, on 27 October 2014, under section 45 of the EPBC Act.
Biodiversity	The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part.
Bioregion	A landscape-based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology, and vegetation.
Cumulative Impact Assessment	An assessment that considers the collective impacts or effects of multiple actions on the environment.
Diameter at Breast Height (DBH)	Circumference of a tree in centimetres measured at 1.3 metres (**m**) above ground level.
Ecological Vegetation Class (EVC)	Native vegetation in Victoria is classified into EVCs based on floristic, structural, and ecological features. Each EVC has been assigned a 'benchmark' condition for each of Victoria's bioregions. The EVC benchmark is used for comparison when assessing vegetation quality through a Vegetation Quality Assessment (VQA). The benchmark is also used for determining the size category of Scattered Trees.
Ecology	The study of the interrelationships between living organisms and their environments.
Environmental Management Framework (EMF)	A document prepared in consultation with DELWP that includes a statement of all environmental commitments for the Project. The EMF will be prepared to the satisfaction of the Minister for Planning (Vic) and will be based on the findings of this Environment Report.
Environment Report	This document, which is prepared in accordance with: • DELWP's scoping document; • the requirements of condition (a) of the Minister for Planning's decision on the Project, made on 23 August 2020, under section 8B(3) of the EE Act; and • the requirements of Item 5 of Schedule 1 to the Bilateral Agreement.
Environmental Performance Requirement (EPR)	An environmental outcome that must be achieved during design, construction, and/or operation of the Project.

Term	Explanation
Enhancement Site	Discrete sites where road and rail interfaces do not provide the required horizontal and vertical clearance for double-stacked freight trains. Key works required at enhancement sites include (but are not limited to): • Road bridge replacements; • New road underpasses; and/or • Track lowering.
Exotic vegetation	Any vegetation that is not native to Australia or its States and Territories. This can sometimes include non-indigenous native vegetation.
Habitat Hectare (HHa)	A site-based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation type. For native vegetation: *Habitat hectares of patch = extent in hectares × condition multiplier* For Scattered Trees: *Habitat hectares of Scattered Trees = (number of trees × standard extent) × condition multiplier* Where: Standard extent is a circle with a 15 m radius.
Habitat Fragmentation	Habitat fragmentation is the process of subdividing habitat into smaller segments separated by an inhospitable dividing habitat (Gleeson & Gleeson, 2012) and is recognised under the FFG Act as a threat to native fauna in Victoria.
Habitat Zone (HZ)	A discrete area of native vegetation consisting of a single vegetation type (EVC) with an assumed similar averaged quality. This is the base spatial unit for conducting a habitat hectare assessment.
Landscape connectivity	The spatial arrangement and quality of elements which affect the movement of animals in the landscape (Bennett, 1999). Linkages in the landscape are arrangements of habitats that enhance connectivity for species. Links can be maintained through stepping stones of habitat of varying size and spacing or habitat corridors which provide a continuous connection of habitat (Bennett, 1999; Bennett et al. 2000). Habitat corridors are more likely to be effective or likely to be more important for facilitating movement of fauna where a large part of the landscape is modified and for species that have limited scale of movement (Bennett, 1999).
Matter of National Environmental Significance (MNES)	The EPBC Act defines and protects nine MNES: World Heritage properties, National Heritage places, wetlands of international importance (Ramsar sites), listed threatened species and ecological communities, migratory species protected under international agreements, Commonwealth marine areas, Great Barrier Reef Marine Park, nuclear actions (including uranium mines), and a water resource, in relation to coal seam gas development and large coal mining development.
Native vegetation	Native vegetation (as defined in Victorian planning schemes) are plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses.
Native vegetation – patch	A patch of native vegetation is defined as: *an area of vegetation where at least 25 percent 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 (*DELWP, 2017a).

Term	Explanation
Native vegetation – Scattered Tree	A Scattered Tree is defined as: *a native canopy tree that does not form part of a patch* (DELWP, 2017a). Scattered Trees were classified as large or small based on their Diameter at Breast Height (**DBH**). DBH is measured in centimetres at 1.3 metres (**m**) above ground level. Large Scattered Tree DBH is specified in the relevant EVC benchmark description. Small Scattered Trees are those less than the EVC benchmark for a large tree but greater than 3 m in height (DELWP, 2018a).
Native vegetation – large tree in patch	A large tree in a patch is: *a native canopy tree with a Diameter at Breast Height (DBH) greater than or equal to the large tree benchmark for the relevant bioregional EVC* (DELWP, 2017a). If the large tree is located within the extent of a patch of native vegetation, it is a large tree in a patch.
Native vegetation offset	Any works of other actions to make reparation for the loss of native vegetation arising from the removal of native vegetation. This may include an area of existing remnant vegetation that is protected and managed, an area that is revegetated and protected, an area that is set aside for regeneration or restoration, or any combination of these. The relative size of an offset is graded according to its conservation significance.
No-Go Zone	A designated area protected and fenced off during construction.
Project Area	The project area is defined by Figure 12 (Appendix B) and is the areas of land required for the purposes of developing the Project, and is the term used to collectively describe the package of enhancement sites, track slews, and signal gantries, and the overhead powerline package.
The Project	The Inland Rail Beveridge to Albury Project.
Reference Design	Reference design refers to the design at any specific location on which the impact assessment in this report has been based. The level and stage of design may vary at each location'.
Scoping document	The document prepared for the Project by DELWP titled '*Scope for the environment report under EPBC Act Bilateral (Assessment) Agreement 2014 and EE Act*'.
Signal Gantry	A structure spanning one or more tracks and having two or more points of support.
Significant Impact Assessment (SIA)	An assessment of impacts against the significant impact criteria in *Matters of National Environmental Significance Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999* and/or species-specific guidelines.
Track Slew	The adjustment and re-alignment of existing rail track.
Vegetation Quality Assessment (VQA)	An assessment of vegetation condition undertaken using the Habitat Hectares method as described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004). Individual patches are termed Habitat Zones (**HZ**) in accordance with DELWP terminology.

Term	Explanation
Victorian Rare or Threatened Species (VROTS)	Species listed on an advisory list of rare or threatened species in Victoria (flora, vertebrate fauna, or invertebrates) prepared by the Victorian Government Department of Environment, Water, Land and Planning.

Executive Summary

17-Sep-2021
Prepared for – Australian Rail Track Corporation Ltd – ABN: 75 081 455 754

Executive Summary

This Environment Report outlines the potential environmental effects of the proposed Inland Rail – Beveridge to Albury Project.

The Inland Rail – Beveridge to Albury Project (**the Project**) is Stage 1 of the Victorian portion of the wider Inland Rail program which aims to enable the use of double-stacked freight trains between Melbourne and Brisbane, including utilising the North East Rail Line through regional Victoria. Inland Rail will transform the way freight is moved around the country, connecting regional Australia to its markets more efficiently, driving substantial cost savings for producers and consumers, and delivering significant economic benefits. The proponent for the Project is the Australian Rail Track Corporation Ltd (ARTC).

Preparation of this Environment Report is a requirement of the Project under the Victorian *Environment Effects Act 1978* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Assessment of the Project and this Environment Report is being undertaken by the Victorian State Government under the Bilateral Agreement to avoid process duplication and enable integrated and efficient consideration of relevant Commonwealth and Victorian government matters.

This Environment Report has been prepared in accordance with:

- DELWP's scoping document
- the requirements of condition (a) of the Minister for Planning's decision on the Project, made on 23 August 2020, under section 8B(3) of the EE Act.
- the requirements of Item 5 of Schedule 1 to the Bilateral Agreement.

The primary focus of this Environment Report is to address the scoping requirements contained within *Scope for the Environment Report under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act* (the 'scoping document') by examining the impacts of the Project on native vegetation, habitat and biodiversity values associated with listed threatened species and communities, as well as describe any feasible alternatives and mitigation measures that could avoid or reduce relevant impacts.

The project comprises two main elements of work:

1. **Enhancement Sites, Track Slews and Signal Gantries –** which incorporate the bulk of the works necessary to create the required horizontal and vertical clearances. The major components of works at these sites include bridge replacement works, track lowering, and the movement of the track horizontally to accommodate double-stacked freight trains. Existing signal structures (generally called signal gantry sites) do not provide clearances required for double-stacked freight trains and will require replacement.
2. **Overhead Powerline Sites –** Overhead aerial utility services cross the rail corridor at a number of discrete locations along the alignment. These present non-compliant clearances required for double-stacked freight trains. The overhead powerlines or towers will need to be lifted or replaced with taller ones. The cables will then be lifted onto the new structure or replaced with new ones. In some cases, these utilities may be installed underground by utilising trenching or horizontal direction drilling methods.

This Environmental Report will be publicly exhibited, and the issues raised in any submissions made during the exhibition period will be summarised, or taken into account, by ARTC when finalising the Environmental Report for assessment by the Minister for Planning. The Victorian Minister for Planning will consider the final Environment Report alongside submissions from members of the public and other key stakeholders.

The Minister will then issue a written assessment of the Project's impacts. The document, called the '*Assessment Report'*, will inform the Commonwealth Government Minister for the Environment when making her decision on the Project under the EPBC Act. The Assessment Report may also be considered by Victorian Government decision makers.

Whilst the Project generally occurs within a highly modified environment, dominated by road and rail infrastructure, the findings of several preliminary and detailed studies have demonstrated that native

vegetation, threatened ecological communities, and threatened flora and fauna species occur and may be impacted by the Project.

The result of intensive technical assessments within a broad investigation area, and an assessment of the impact of the Reference Design on the values recorded has determined that the project may have a residual significant impact on one threatened ecological community listed under the *Environment Protection and Biodiversity Conservation Act 1999*. Residual impacts on six species and one ecological community listed under the *Environment Protection and Biodiversity Conservation Act 1999* were not considered to be significant. The project will also result in residual impacts to native vegetation (patches and trees), a state-listed threatened ecological community, habitat for threatened flora and fauna species, hollow-bearing trees, and habitat connectivity. Both Commonwealth offsets and State general habitat offsets will be required to compensate for the identified residual impacts. It is expected that the magnitude of impacts will be reduced by a considerable extent through the implementation of detailed design process and through adoption of construction methodologies on a site by site basis. Both Commonwealth and State offsets will be required to compensate for the identified residual impacts. These have been identified and are in the process of being procured.

The summary table below follows the layout of the Environment Report and identifies relevance to the scoping requirements, findings in relation to those requirements, and indicates the section of the report in which the response is provided.

Requirement	Environment Report section	Summary
Introduction		
Purpose	Chapter 1	The purpose of this Environment Report is to assess the potential environmental effects of the proposed Inland Rail – Beveridge to Albury Project and address the requirements of the EE Act and EPBC Act referral determinations.
Scope of the Environment Report		The *Scope for the Environment Report under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act* (the 'scoping document') was issued by DELWP to guide preparation of the reporting for the Project. The scoping document outlines the reporting requirements, including assessment of impacts on threatened species and communities listed under the EPBC Act, *Flora and Fauna Guarantee Act 1988* (Vic) and/or Victorian threatened species advisory lists.
Description of the project (Scoping Requirement 4)		
Details about the proposed action	Chapter 2 Chapter 12	Australian Rail Track Corporation Ltd is the Proponent for the Inland Rail – Beveridge to Albury Project (the Project). The Project forms the Victorian section of the Inland Rail Program, which contributes to overall objective to accommodate future demands forecast for the existing freight network between Melbourne and Brisbane. To do this, the project will modify existing infrastructure to accommodate double-stacked freight trains. There is currently no continuous inland rail link between Melbourne and Brisbane. The existing interstate rail freight network cannot accommodate long double-stacked freight trains and has long transit times. The Melbourne to Brisbane corridor is one of the most important general freight routes in Australia, supporting key population and employment precincts along the east coast and inland NSW. Freight movement alternatives were considered in various case studies and subjected to a rigorous assessment against criteria consistent with the Infrastructure Australia's Reform and Investment Framework Guidelines (Infrastructure Australia, 2018; Australian Rail Track Corporation, 2015). It was found construction the inland railway option to be the preferred option. The design development of the Project forms three stages – Concept Design (completed), Reference Design (ongoing) and Detailed Design. The Project is currently within the Reference Design stage which is grouped by two phases – initial Reference Design and final Reference Design. The impact assessment in this report is based on varying stages and levels of project design hereafter referred to as 'Reference Design' throughout this report.

Requirement	Environment Report section	Summary
Components, processes, and development stages	Chapter 2	The Project consists of the following key works: • 12 discrete project areas (referred to as 'enhancement sites') generally comprising two major civil construction activities - bridge replacement, and track replacement works • Signal gantries: To increase the vertical elevation between the track and overhead gantries • Track slews: Works to move the rail track horizontally. • Overhead powerlines: To increases the vertical elevation between the track and overhead powerlines The location of the proposed works is outlined in Appendix A and shown in Appendix B.
Works method	Chapter 2 Chapter 7	Much of the necessary civil works will be undertaken during rail occupations (or possessions) when trains do not operate on the rail corridor. Minor works can be completed during 'short track occupancies' on a Sunday night through to Monday morning for 9 hours – providing for 7 hours work with minimal disruption to train services. The construction staging and timing of each enhancement site slightly differs depending on the proposed works. It is estimated that the period between award of the design and construction contract and the commencement of double-stacked freight trains is five years. Design and construction work will be completed in two tranches. The Project will restore and rehabilitate suitable land at the conclusion of works to re-establish connectivity within the rail corridor.
Description of the environment and potential impacts (Scoping Requirement 5)		
Existing and planned uses	Chapter 2	The Project is largely situated in existing rail and road corridors where current land use is routine rail and road operations, and the land is developed with road and rail infrastructure. Sections of the rail corridor are operated by either V/Line or ARTC and road reserves are generally managed by the Department of Transport or local councils. The project area falls within the local government areas of Indigo, Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, and Wodonga. The operation of the Project will not result in a significant change in land use activities. It is not proposed to rezone any of the existing land uses within the project area.

Requirement	Environment Report section	Summary
Ecological investigations	Chapter 4 Chapter 5	The Project has been subject to several preliminary and detailed ecological studies during the design evolution, with studies taking place between 2017 – 2021. These assessments have included both desktop reviews and intensive field-based ecological assessment, including targeted flora and fauna surveys
Existing ecological values	Chapter 6	The Project generally occurs within a highly modified environment of cleared agricultural land, dissected by road and rail infrastructure. Despite a history of regional disturbance, remnant native vegetation and habitat persist on both public and private land. The ecological assessments identified a number of important values for flora and fauna, particularly native vegetation along rail and road corridors that contain large trees. A subset of the native vegetation was synonymous with TECs listed under the EPBC Act and/or FFG Act and habitat for threatened species.
	Section 6.1	**Matters of National Environmental Significance** Three EPBC Act threatened ecological communities were recorded within the ecological assessment investigation area as well as two EPBC Act-listed flora species. Potential habitat was identified within and adjacent to the investigation area for an additional 12 species.
	Section 6.2	**State significant biodiversity values** Native vegetation within the project area consists of patches of remnant vegetation and scattered trees within the rail corridor, road reserves, and private land. The quality of vegetation throughout the project area varies from areas is variable, but those highest quality examples support all elements of typical pre-European vegetation quality (trees, shrubs, ground-cover herbs, sedges, and grasses) as well as important habitat for fauna such as large trees with hollows. Two threatened ecological communities listed under the Flora and Fauna Guarantee Act have been recorded within the ecological assessment investigation area, with a this considered likely to be present. One FFG Act listed flora species and two FFG Act-listed fauna species were recorded during the field investigations. In total, nearly 217 ha of patches of native vegetation, 579 Large Trees in Patches, and 436 Scattered Trees (299 small and 137 large) were recorded during the field assessment.

Requirement	Environment Report section	Summary
Avoidance and mitigation measures (Scoping Requirement 6)		
Design and mitigation measures	Chapter 7	The Project will reduce its potential impact on ecological values through application of a mitigation hierarchy of avoidance, minimisation, rehabilitation, and offset. The focus of mitigation measures is primarily to avoid impacts and secondly to develop, prepare, and implement project-specific measures that reduce impacts to acceptable levels. This includes measures to protect retained vegetation and habitat such as No-Go Zones, and to minimise disturbance, injury, or death of wildlife, and disruption to connectivity. The Project will also restore and rehabilitate suitable land at the conclusion of works to re-establish habitat connectivity within the rail corridor.
Environmental Management Framework	Chapter 10	An Environmental Management Framework will be prepared in consultation with DELWP and relevant Local Councils to the satisfaction of the Minister for Planning prior to the commencement of works. The Environmental Management Framework (**EMF**) will include a statement of all environmental commitments for the Project and provide an overarching framework to manage environmental and amenity impacts during construction. Environmental Performance Requirements will be a set of performance based environmental outcomes within the EMF to be achieved by the Project. Mitigation and management actions outlined in this Environment Report will form the basis of these Environmental Performance Requirements.
Residual impacts and offsets (Scoping Requirement 8)		
Residual impacts on MNES	Section 8.1	Residual impacts are those impacts that remain following the implementation of avoidance and mitigation measures. **Matters of National Environmental Significance** Land clearance associated with construction may result in the loss of areas of native vegetation synonymous with TECs listed under the EPBC Act, 6.334 ha of GBGW and 0.624 ha of WBYBBRGGW. Loss of GBGW was considered to be a significant impact. Impacts to WBYBBRGGW was not considered significant based on advice from DAWE. There are one flora and five fauna species for which loss of some habitat is unavoidable; however, these residual impacts were not considered to be significant.

Requirement	Environment Report section	Summary
Residual impacts on state significant values	Section 8.2	**State significant biodiversity values** Residual impacts of the Project on native vegetation values of state relevance may include 24.289 hectares of patches of native vegetation (including 82 Large Trees in Patches) and 131 Scattered Trees (83 small and 48 large). Potential residual impacts of the Project on other state significant biodiversity values are: • Up to 11.339 hectares of Victorian Temperate Woodland Bird Community • 16 Buloke • Up to 3.824 hectares of potential habitat for Purple Diuris • Losses of individuals of five rare or threatened flora species • Potential impact to Brown Toadlet habitat • Loss of hollow-bearing trees • Disruption to habitat connectivity through widening of gaps.
Offsets	Chapter 9	**Victorian native vegetation offsets** Removal of native vegetation will be offset through general and species offsets in accordance with Victoria's *Guidelines for the removal, destruction or lopping of native vegetation.* The biodiversity offsets for the Project will be likely be achieved via a third party offset on land owned by another party (a native vegetation credit owner). The Project triggers General Habitat Units (**GHU**) owing to the potential removal of 29.203 ha of native vegetation (including patches of native vegetation and Scattered Trees). A total of 15.821 GHU with a minimum strategic biodiversity score of 0.487, and 130 large trees will need to be offset within either the Catchment Management boundary or the Local Government Area of the removals. No Species Habitat Units (**SHU**) are required to be offset. Five properties with commensurate available offsets have been identified. **EPBC Act Offsets** The project will compensate for the 6.334 ha significant residual impact to the GBGW community, noting that quantum of offsets is likely to decrease as the design of the Project is finalised. A draft EPBC Act Offset Strategy has been prepared outlining a proposed offset that meets the requirements of the Project and the EPBC Act Environmental Offset Policy. The offset will be achieved through a third-

Requirement	Environment Report section	Summary
		party provider which means the offset site will be established by the landowner via a security agreement registered on the land title that runs in perpetuity. A memorandum of understanding is currently being drafted to be signed by ARTC and the offset provider to commit the offset provider to holding these offsets specifically for the Inland Rail project. This will ensure that these offsets remain reserved for the project until such time as they are ratified through a security agreement with the Secretary to DELWP under Section 69 of the *Conservation Forests and Lands Act 1987* (a Section 69 agreement). Meanwhile, the EPBC Act Offset Strategy will be finalised in consultation with DAWE and an Offset Management Plan will be prepared in consultation with the landowner who has extensive experience in ecological restoration. The Offset Management Plan will identify management actions required to improve the ecological condition of the site and will also include responsibility, timing, and performance criteria to achieve specific environmental outcomes from the management measures.
Cumulative impact (Scoping Requirements 5 and 8)		
Assess potential cumulative impacts	Chapter 11	Cumulative impacts have been considered in conjunction with the Project for North East Rail Line Upgrade (**NERL**), the Shepparton Line Upgrade Project (**SLU**), and the proposed Beveridge Intermodal Freight Terminal (**BIFT**). The cumulative impact assessment was qualitative only, as no impact data was available for the three project considered, however the cumulative impact of the total loss of values recorded from each project was to have the potential for a material impact on the flora and fauna species that are dependent on remnant vegetation as a habitat resource within the regional landscape. This loss may represent a significant area of habitat that currently provides habitat features such as nesting hollows, roosting and foraging resources. It may also lead to an increase in fragmentation and edge effects on existing patches of vegetation, and the reduction in connectivity across the landscape.

Requirement	Environment Report section	Summary
Social and economic (Scoping Requirement 7)		
Social and economic	Chapter 14	A Social Impact Baseline Assessment and Economic Benefits Assessment have been prepared for the Project to assist in identification, analysis, assessment, management, and monitoring of both the positive and negative impacts. Impacts can affect individuals and their communities at all stages of the project lifecycle. Impacts identified are both positive and negative, short- and long-term. Potential positive impacts include employment and upskilling opportunities, improvement of freight network linkages, access to and from regional markets, reduction in rail costs and increase certainty for fright travelling between Melbourne and Brisbane. Potential negative impacts include a loss of amenity, increase in demand for short term accommodation, impacts on heritage, changes in travel patterns. Management and mitigation measures have been identified that effectively reduce negative impacts or enhance positive impacts.
Other approvals and conditions (Scoping Requirement 9)		
Other approvals and conditions	Chapter 3 Chapter 12	This Environment Report has been prepared as an assessment under the *Environment Effects Act 1978* (Vic) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). In addition, the following legislation is of relevance to the key and secondary approval requirements, and processes for the Project: • *Planning and Environment Act 1987* (Vic) • *Aboriginal Heritage Act 2006* (Vic) • *Heritage Act 2017* (Vic) • *Transport Integration Act 2010* (Vic) • *Major Transport Project Facilitation Act 2009* (Vic) • *Flora and Fauna Guarantee Act 1988* (Vic) • *Wildlife Act 1975* (Vic) • *Water Act 1989* (Vic) • *Environment Protection Act 2017* (Vic) • *Road Management Act 2004* (Vic)

Requirement	Environment Report section	Summary
Monitoring enforcement and review	Chapter 10	A variety of tools will be utilised to monitor, audit, and review environmental performance to ensure that the requirements of the EMF, and planning and environment approvals are achieved. Environment performance monitoring, audit and review procedures will include (but not limited to): • Environmental monitoring as required by the Construction Environment Management Plan (CEMP) (such as noise, water quality, etc). • Utilising results from environmental monitoring to identify potential or actual issues arising from the construction phase and allow rectification measures are sufficient. • Audits of the CEMP. • Regular review of planning and environmental approvals, management plans and the EMF to ensure compliance. • On-site inspections to ensure: • environmental controls are in place and effectively managing identified risks • personnel are implementing the measures outlined in the EMF. • Monthly review and monitoring against objectives, targets, and KPIs of the Project.
Consultation (Scoping Requirement 10)		
Details of any consultation undertaken about the project	Chapter 13	Following ARTCs announcement of the Project in 2014, a community and stakeholder engagement strategy was developed to raise awareness, engage with land owners and occupiers whose land is required for the Project, seek feedback from the community and stakeholders regarding design and development of the project and inform the community about relevant approval processes. Consultation regarding the design of the Project commenced in April 2016 and was undertaken in a staged approach which aligned with stages of the design process. To date, ARTC has engaged with stakeholders through media and news coverage, conducted 5,057 separate communications initiatives (from phone calls to pop-up information discussion events) and directly engaged with over 4,696 distinct stakeholders. ARTC's social media channels have engaged with over 737,322 people and e-Newsletters have been sent to over 15,449 people with an average open rate of over 42%. This Environment Report will be subject to an additional consultation process to ensure that the views and considerations of interested parties are received and responded to in a comprehensive and appropriate format. This will occur in the form of public exhibition and will provide key stakeholders and the community another opportunity to provide feedback to the Project and respond directly to the findings of this report.

Requirement	Environment Report section	Summary
Environmental record of organisation proposing to undertake the project (Scoping Requirement 11)		
The environment record of the proponent	Chapter 2	There have been no proceedings under a Commonwealth or Victorian law for the protection of the environment or the conservation and sustainable use of natural resources with regards to any of the 13 Inland Rail Projects. ARTC have been subject to one Commonwealth proceeding, associated with the Western Victoria Track Upgrade Project. In 2011 the Department of Sustainability, Environment, Water, Population and Communities alleged that ARTC's engaged alliance partner was contracted to undertake re-sleepering and associated works, which resulted in the clearing of vegetation protected under the EPBC Act. By acknowledging the activities of the independent contractor engaged by ARTC may have resulted in loss of protected vegetation and complying with the actions outlined in the enforceable undertaking, no further action was taken against ARTC in relation to the incident. There have been no other Commonwealth proceedings since 2011.
Conclusion (Scoping Requirement 12)		
An overall conclusion as to the environmental acceptability of the proposal	Chapter 15	For a project of the scale and economic significance of Inland Rail, residual environmental impacts are unavoidable. Significant effort has been invested during the preparation of the Reference Design to focus on the complete avoidance of significant ecological values where possible. This has been achieved in a very practical way by committing to protect all occurrences of a number of MNES, most notably Euroa Guinea-flower, Mountain Swainson-pea and Natural Temperate Grassland of the Victorian Volcanic Plain. A significant impact is likely on only one MNES- being Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. For ecological values of state significance, the application of measures to avoid and minimise impacts has avoided the trigger thresholds for impacts to species of state significance, leading to the need to offset only for general habitat units under state policy. Further, it is recognised that as the design is nuanced to respond to additional site constraints and community concerns, the principles of avoid and minimise will drive likely further reductions in the need for vegetation removal, and this is particularly true for the overhead powerline component of the works, where the current adoption of worst case scenarios has significantly over-estimated the potential residual impacts.

Requirement	Environment Report section	Summary
		Throughout the duration of the construction of the project, the Environmental Management Framework will provide a clear and accountable process to ensure that the environmental effects are monitored and managed in accordance with the mitigation measures outlined in this ER. This EMF will include clear and achievable Environmental Performance Requirements, all of which have been informed by the comprehensive technical assessments that underpin this ER. The EPR's will be performance-based and driven by the fundamental principles of avoidance and minimisation of ecological impacts. The EPR's will also seek to resolve any current uncertainly that exists around the Reference Design by including outcomes that will ensure avoidance of any further impact to the most significant ecological values that exist within the investigation area regardless of the finalised design. Ultimate compliance of both the EMF and the EPRs within it will be ensured by ARTC through the ultimate contractual arrangements with the party selected for delivery of the Beveridge to Albury component of the works. Ultimately, the EMF and EPRs will be a condition of the Projects Incorporated Document and will require subsequent endorsement by the Minister for Planning.

Chapter 1.0 Introduction

1.0 Introduction

The Inland Rail – Beveridge to Albury Project (**the Project**) is part of the Australian Rail Track Corporation's (**ARTC**) plan to upgrade sections of the existing North-East Rail Line to enable the use of double-stacked freight trains. The Project is currently the only confirmed section of Inland Rail in Victoria, and collectively, the Inland Rail 13 projects throughout Australia will transform the way freight is moved between Melbourne and Brisbane, facilitate a national rail network, and deliver a significant economic benefit to both Victoria and Australia. Preparatory works are proposed to commence in late 2021. Works are expected to be completed by the end of 2025.

The Project was subject to several preliminary and detailed ecological studies (Chapter 4.0) which resulted in a decision to refer the Project to the Minister for Planning under the Victorian *Environment Effects Act 1978* (**EE Act**) and to the Commonwealth for consideration under the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**).

The Victorian Minister for Planning decided that an Environment Effects Statement (**EES**) was not required for the Project under the EE Act, subject to conditions being met to assess and manage specific impacts (https://www.planning.vic.gov.au/__data/assets/pdf_file/0031/488722/Reasons-for-Decision-2020R-07.pdf). Those conditions included the requirement for preparation of an Environment Report and an Environmental Management Framework (**EMF**) in consultation with the Victorian Government Department of Environment, Land, Water and Planning (**DELWP**) and completed to the satisfaction of the Minister for Planning, prior to the commencement of works.

The Commonwealth Minister for Environment determined that the Project is a controlled action under the EPBC Act. The relevant controlling provisions are sections 18 and 18A (listed threatened species and communities). Assessment of the Project under the EPBC Act is being undertaken through this Environmental Report in accordance with Item 2.1(c) of the Bilateral Agreement between the Commonwealth and Victorian governments.

As such, this Environment Report has been prepared to satisfy the assessment requirements set out by the Victorian Minister for Planning under the EE Act as well as matters required by Item 5 of the Bilateral Agreement to inform the Commonwealth's controlled action determination under the EPBC Act (Attachment A).

1.1 Purpose of the Report

The purpose of this Environment Report is to assess the potential environmental effects of the proposed Inland Rail – Beveridge to Albury Project and address the requirements of the EE Act and EPBC Act referral determinations.

This Environment Report therefore aims to examine:

- potential impacts to biodiversity values, in particular:
  - native vegetation, including impacts to large trees and large hollow-bearing trees
  - flora and fauna species listed under the FFG Act and EPBC Act
  - disruption to habitat connectivity for listed fauna including Brush-tailed Phascogale, Squirrel Glider, Barking Owl, Swift Parrot, and Regent Honeyeater
  - threatened ecological communities listed under the FFG Act and EPBC Act, including but not limited to, the FFG Act-listed Victorian Temperate Woodland Bird Community and EPBC Act-listed Grey Box Grassy Woodlands.
- cumulative impacts of the Project in the context of nearby and coinciding or proposed infrastructure projects
- social and economic impacts
- feasible alternative construction techniques and mitigation measures that could reduce adverse environmental effects.

This Environmental Report will be publicly exhibited, and the issues raised in any submissions made during the exhibition period will be summarised, or taken into account, by ARTC when finalising the Environmental Report for assessment by the Minister for Planning.

Once prepared to the satisfaction of the Minister for Planning, the Environment Report will be used to inform the Project's EMF. Specialist technical studies have been prepared on a range of matters and details of these studies are set out in this Environment Report.

The Victorian Minister for Planning will consider the final Environment Report alongside submissions from members of the public and other key stakeholders.

The Minister will then issue a written assessment of the Project's impacts (*Assessment Report).* The Assessment Report will inform the Commonwealth Government Minister for the Environment when making her decision on the Project under the EPBC Act. The Assessment Report will also be considered by Victorian Government decision makers.

1.2 Scope of the Environment Report

The *Scope for the Environment Report under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act* (the 'scoping document') was issued by DELWP to guide preparation of this Environment Report for the Project (refer Attachment A). The scoping document (DELWP, 2020a) outlines the reporting requirements, including assessment of impacts on threatened species and communities listed under the EPBC Act, *Flora and Fauna Guarantee Act 1988* (Vic) (**FFG Act**) and/or Victorian threatened species advisory lists.

The purpose of the scoping document was to ensure that the Environment Report:

- Effectively responds to the requirements of the Victorian Minister for Planning's decision under the EE Act and the requirements of Item 5 of the Schedule 1 to the Bilateral Agreement.
- Identifies and assesses potential significant environmental effects of the Project and proposed avoidance, mitigation, and management measures.
- Provides sufficient information to allow the Victorian Minister for Planning to assess the impacts of the Project and prepare the Assessment Report for the Project.

The scoping document also outlines the background to the Environment Report and expectations regarding its general content, format and style and approach to considering plans, policies guidelines, and instruments. This Environment Report is structured in accordance with the scoping document.

A summary of the scoping requirements and where they are addressed in this Environment Report is provided in Table 1. A copy of the scoping document (DELWP, 2020a) is provided in Attachment A.

Table 1 Summary of DELWP Scoping Requirements

Location in DELWP Scoping Document	Scoping Requirement	Chapter/Section of Environment Report
Section 4: Description of the Project	*"…include details about the proposed action: its title, the name and postal address of the designated proponent, its objective, background to its development, its relationship to statutory policies, plans and strategies, including the justification for need for the project, how it relates to any other actions, its current status and implications of the project not proceeding…describe the project in sufficient detail to allow an understanding of all components, processes and development stages, and to enable assessment of their likely potential environmental effects…include the precise location of all works to be undertaken (including plans and maps) in relation to potentially affected environmental assets and elements of the action that may have impacts on matters of state or national environmental significance or may have social or*	2.0 Project Description

Location in DELWP Scoping Document	Scoping Requirement	Chapter/Section of Environment Report
	economic impacts... also include details on how the works are to be undertaken (including staging, methods and timing for construction, rehabilitation and operation) and design parameters for those aspects of the structures, elements or operation that may have impacts."	
Section 5: Description of the environment and potential impacts	*"…provide a description of existing and planned land uses within, and in the vicinity of, the proposed project, supported by plans and maps. This description should include information on listed threatened species and ecological communities, as well as threatening processes that may be present in the vicinity of the site…include a description and assessment of the predicted environmental impacts on species and communities, particularly on matters of state and national environmental significance protected by controlling provisions of Part 3 of the EPBC Act and species and communities listed under the FFG Act and Victorian threatened species advisory lists…*"	2.4 Project Area 6.0 Ecological Values
Section 6: Details of proposed avoidance and mitigation measures and alternatives considered	*"…present design and mitigation measures that could substantially reduce and/or mitigate the likelihood, extent and/or duration of potential effects… provide specific and detailed descriptions of the proposed avoidance and mitigation measures to be implemented during project construction, rehabilitation and operation, based on best available practices… include, to the extent practicable, any feasible alternatives to the action that could avoid or reduce environmental impacts"*	7.0 Impact Minimisation and Mitigation 10.0 Environmental Management Framework
Section 7: Social and Economic	*"…identify the social and economic impacts (both positive and negative) of the proposed project, at local, regional, state and national levels…"*	14.0 Social and Economic Impact Assessment
Section 8: Residual Impacts and Offsets	*"…provide details of:* *a) Predicted residual impacts, including on matters of state and national environmental significance, and ecosystem function (including magnitude, extent, and duration) after the proposed avoidance and mitigation measures are taken into account.* *b) Describe residual environmental impacts during construction, rehabilitation, and operation of the project.* *c) Analyse the nature, extent, and significance of direct, indirect, and cumulative residual impacts on matters of state or national environmental significance, including potential short-term and long-term impacts and implications for habitat connectivity for threatened and protected species and for ecosystem function…* *d) Assess the significance of residual impacts that this proposed action may facilitate on matters of state or national environmental significance at the local, regional, state, and national scale and their potential acceptability…* *e) The reasons why further avoidance or mitigation of impacts cannot reasonably be achieved*	8.0 Residual Ecological Impacts 9.0 Proposed Environmental Offsets

Location in DELWP Scoping Document	Scoping Requirement	Chapter/Section of Environment Report
	f) Any impacts that are likely to be unknown, unpredictable, or irreversible. *g) Justify all conclusions based on the best available information, including applicable conservation advices, recovery plans, threat abatement plans and guidance documents.* *h) Any offset package to compensate for significant residual impacts on matters of state or national environmental significance consistent with EPBC Act Environmental Offsets Policy (October 2012) and to meet Victorian native vegetation offset requirements…"*	
Section 9: Other approvals and conditions	*"… include information on any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed project…"*	3.0 Approvals and Assessment Framework 10.2 Monitoring, Audits and Review Procedures 12.0 Environmental Planning Considerations
Section 10: Consultation	*"… include information relating to any consultation undertaken about the project"*	13.0 Consultation
Section 11: Environmental record of organisation proposing to undertake the project	*"…include details of any proceedings under a Commonwealth or Victorian law for the protection of the environment or the conservation and sustainable use of natural resources against the organisation proposing to take the project.* *The proponent organisation's environmental policy and planning framework must be described*"	2.3 Project Proponent
Section 12: Conclusion	*"…provide an overall conclusion as to the environmental acceptability of the proposal, including discussion on compliance with the principles of ecologically sustainable development (ESD) and the objects and requirements of the EPBC Act. Reasons that justify undertaking the proposal in the manner proposed should also be outlined."*	15.0 Conclusion
Section 13: Information sources provided in the environment report	*"For information provided or referenced in the environment report, state the date, source and reliability of the information as well as any uncertainties you are aware of."*	16.0 Information Sources

Chapter 2.0
Project Description

2.0 Project Description

Inland Rail provides an opportunity to accommodate future demands forecasted for the existing freight network between Melbourne and Brisbane and has wide-ranging economic and safety benefits.

2.1 Project Overview

2.1.1 Inland Rail Program

Australia is heavily reliant on efficient supply chains to provide competitive domestic freight links and gateways for international trade. Freight transport services between major population centres, particularly our capital cities, deliver millions of tonnes of freight each year and provide for the distribution of goods throughout the country. With travel speeds of up to 115 kilometres per hour (**km/h**), train lengths of 1,800 metres (**m**), and containers double-stacked, Inland Rail will significantly reduce freight transport costs for industries, provide a real alternative to road transport for interstate freight, be a catalyst for growth for regional businesses, and help to reduce transport-related fuel consumption, carbon emissions and the road toll.

Spanning 1,700 kilometres (**km**) between Melbourne and Brisbane, Inland Rail is the largest freight rail project in Australia. It is broken up in to 13 individual projects across Victoria, New South Wales (**NSW**) and Queensland. Each project can be independently delivered and operated. Once operational, Inland Rail will become part of ARTC freight rail network and complete the missing link in Australia's supply chain.

The Australian Government selected ARTC to deliver Inland Rail, in partnership with the private sector, and has committed $14.5 billion to its delivery.

Inland Rail will provide greater freight carrying capacity, as it is designed for double-stacked freight trains up to 1,800 m long, each of which will be able to carry the same volume of freight as 110 B-double trucks.

Better infrastructure and an effective national freight operation are key to delivering efficient supply chains, improving Australia's global competitiveness, and lifting the nation's wealth and prosperity.

2.1.2 Inland Rail – Beveridge to Albury

The Project considered by this Environment Report is the current confirmed section of Inland Rail in Victoria and referred to in this Environment Report as Inland Rail – Beveridge to Albury Project. It will involve upgrade works along the existing North East Rail Line corridor from Beveridge in Victoria to Albury in NSW. The proposed works will utilise the existing corridor and modify or replace existing infrastructure at discrete locations where there is currently not adequate clearance for double-stacked freight trains.

The main components of the Project include 12 discrete project areas (referred to as 'enhancement sites') (refer to Figure 12 – Appendix B for site locations):

- Broadford-Wandong Road, Wandong (Wandong)
- Hamilton Street, Broadford
- Short Street, Broadford
- Marchbanks Road, Broadford
- Hume Highway, Tallarook (Tallarook)
- Seymour-Avenel Road, Seymour
- Hume Highway, Seymour
- Euroa Station Precinct (Euroa)
- Benalla Station Precinct (Benalla)
- Beaconsfield Parade, Glenrowan (Glenrowan)

- Wangaratta Precinct
- Murray Valley Highway, Barnawartha North (Barnawartha North)

In addition, the Project includes works to signal gantries and track slews as well as ancillary works to overhead powerlines to ensure the appropriate horizontal and vertical clearances are achieved. Further information regarding the proposed works are contained in Section 2.5 (Key Project Works).

The Project is currently the only confirmed section of Inland Rail in Victoria. There is the potential that future works may be required to the rail line south of Beveridge, and although some investigations have been carried out between Tottenham and Beveridge, whether any works will be required between Tottenham and Beveridge will only be determined once a decision on the location of the intermodal freight terminal is made. If an intermodal freight terminal is developed at Beveridge, works between Tottenham and Beveridge may not be required. The potential impacts associated with the intermodal facility being located at Beveridge have been included in the cumulative impact assessment in this report (Refer to Section 11.0).

2.2 Project Justification

Inland Rail provides an opportunity to accommodate future demands forecasted for the existing freight network between Melbourne and Brisbane and has wide-ranging economic and safety benefits.

2.2.1 Existing rail network and capacity

Currently, there is no continuous inland rail link between Melbourne and Brisbane. Interstate rail freight travels between Melbourne and Sydney via Albury, and then between Sydney and Brisbane, generally along the coast. Transit times are long, and the existing network cannot accommodate highly efficient, long double-stacked freight trains.

The existing North – South rail corridor between Melbourne and Brisbane does not provide a service offering that is competitive with road transport. This is largely the result of nineteenth century alignments leading to low travel speeds, poor reliability, and major bottlenecks, most notably in the Sydney metropolitan area.

A large proportion of the existing regional rail systems infrastructure is old and has maintenance and renewal issues. Poor maintenance of rail lines leads to more freight being transported by road, imposing additional maintenance burdens on local governments (Infrastructure Australia, 2016).

2.2.2 Future east coast freight demand

In 2011, the Australian domestic rail freight totalled 261.4 billion tonnes per kilometre (**t/km**), accounting for approximately 46% of total domestic freight. This represents an increase of 91% since 2000–2001 (Infrastructure Australia, 2015).

The Melbourne to Brisbane corridor is one of the most important general freight routes in Australia, supporting key population and employment precincts along the east coast and inland NSW. The current volume of non-bulk and complementary freight moving within this corridor is approximately 21 million tonnes per annum. This is expected to increase to 40 million tonnes per annum by 2050, consisting of manufactured (non-bulk) products, bulk steel, paper, agricultural, and mining products (Infrastructure Australia, 2016).

Inland Rail would help to ease the burden placed on roads by this additional volume of freight by providing an alternative means for transporting the equivalent of more than 200,000 truck movements annually (ARTC, 2015a).

Inland Rail will also intersect the East – West rail corridor at Parkes, better connecting all state mainland capitals and will serve a variety of freight markets, not just Melbourne to Brisbane, with significant demand from regional commodities and interstate freight. Inland Rail will also be a catalyst for other complementary investments in the supply chain including new multimodal terminals, processing facilities and distribution centres along the supply chain (ARTC, 2015a).

2.2.3 History of Inland Rail

The development of an inland rail between Melbourne and Brisbane has been considered for more than a hundred years, first being formally considered in 1902 (ARTC, 2015a). The current Inland Rail

Program was initiated in 2006, as a safe, sustainable solution to the freight challenge that will transform the way freight is moved around the country. The Inland Rail Program has been the subject of significant analysis for the following reasons:

- The existing North – South coastal rail lines will reach capacity in the next three decades. Additional capacity is required to accommodate increasing demand for interstate and regional rail freight in the future.
- The quality of service provided by the existing coastal route is adversely impacting on freight productivity and transport costs.
- The existing North – South coastal rail lines is trafficked by passenger and freight trains. This is impacting on the reliability of rail freight and is constraining opportunities for the expansion of passenger services.
- In the absence of a continuous inland rail link between Melbourne and Brisbane, transporting freight by road has a competitive advantage over rail. This makes it difficult for rail freight to increase its market share.
- Transporting freight by road has associated safety, congestion, and environmental risks (ARTC, 2015a).

Since 2006, two major studies have been commissioned in relation to the development of an inland rail route between Melbourne and Brisbane, the North – South Rail Corridor Study (Ernst & Young, 2006) and the Melbourne – Brisbane Inland Rail Alignment Study (ARTC, 2010). The purpose of these studies was to examine the adequacy of the existing Melbourne to Sydney to Brisbane rail corridor to meet future freight demand, and investigate alternative routes, as well as optimise the preferred corridor route and analyse the likely economic and commercial benefits of an inland rail route between Melbourne and Brisbane.

In November 2013, the Australian Government Minister for Infrastructure and Regional Development announced $300 million in funding for the Inland Rail Program to be used for pre-construction activities, and in 2014, ARTC developed the Melbourne to Brisbane Inland Rail Concept Business Case (ARTC, 2015a), followed by The Case for Inland Rail (ARTC, 2015b).

The Program business case was developed in 2015 to provide a detailed assessment of why Inland Rail is needed and how it could be delivered. The viability, benefits, costs, and risks associated with the Program were all assessed (ARTC, 2015a).

2.2.4 Freight movement alternatives

Alternative freight transport solutions with the potential to address Australia's current and future freight challenges were considered by The Case for Inland Rail (ARTC, 2015b) and the Melbourne – Brisbane Inland Rail (Inland Rail Implementation Group, 2015).

Three capital investment options were assessed by the Program business case:

1. Progressive road upgrades.
2. Upgrading the existing east coast railway.
3. An inland railway.

These capital investment options were subjected to a rigorous assessment against seven equally weighted criteria consistent with Infrastructure Australia's Reform and Investment Framework Guidelines (Infrastructure Australia, 2018; ARTC, 2015a):

- Capacity to serve future inter-capital and regional/ bulk freight market needs on the east coast
- Foster economic growth through improved freight productivity and service quality (including improved reliability and resilience)
- Optimise environmental outcomes
- Alleviate urban constraints
- Enable regional development

- Ease of implementation
- Cost-effectiveness.

Overall, constructing Inland Rail was found to be the preferred option with an average 'high likelihood' of improving outcomes across all criteria. Progressive road upgrades and upgrading the existing coastal rail lines both had an average 'medium likelihood' of improving outcomes across all criteria.

The inland railway option was found to be the best option across all criteria (excluding ease of implementation and enabling regional development outcomes, which progressive road upgrades outranked and ranked equally with Inland Rail). The selected Victorian alignment for the project took in consideration the impact to biodiversity. The option of upgrading the existing brownfield North East Rail line from Beveridge to Albury met the environmental impact criteria as the alignment has been considerably modified since the late 1800s.

The review of alternatives to Inland Rail included assessment of the following options:

- Maritime shipping (including both a dedicated service between Melbourne and Brisbane and using spare capacity on vessels calling at Melbourne and Brisbane as part of an international voyage).
- Air freight.
- Road freight.
- Alternative rail solutions (enhancement of the existing coastal network and construction of a new inland railway).

Overall, in relation to the various alternatives to Inland Rail, the Melbourne – Brisbane Inland Rail Report (Inland Rail Implementation Group, 2015) concluded that:

- While shipping and air will continue to play a role in the interstate freight market, they are not viable alternatives to rail.
- Without Inland Rail, road is the only mode capable of addressing the majority of the future freight transportation needs, with associated direct and indirect costs.

2.3 Project Proponent

Australian Rail Track Corporation Ltd is the proponent for the Project which is a brownfield project that includes upgrade works along the existing North East Rail Line.

2.3.1 Company background

ARTC is a company listed under the *Corporations Act 2001* (Cth) and is owned by the Commonwealth of Australia. ARTC manages more than 8,500 km route of rail track in NSW, Queensland, South Australia, Victoria, and Western Australia and is responsible for:

- Selling access to train operators.
- The development of new business.
- Capital investment in the network.
- Managing train operations.
- Maintaining the network.

ARTC's network services several major capitals, markets, regional freight centres and import/export ports in Australia.

ARTC's contact information is provided below in Table 2.

Table 2 ARTC Contact Information

Inland Rail Contact Information	
Phone (Community and landowner enquiries)	1800 732 761
Phone (General office enquiries)	(07) 3364 8900
Street address (Head Office)	Level 16, 180 Ann Street, Brisbane Qld 4000
Street address (Victorian Office)	39 Bakehouse Road, Kensington Vic 3031
Postal address	GPO Box 2462, Queen Street, Brisbane Qld 4000
Email	inlandrailenquiries@artc.com.au
Website	www.inlandrail.com.au
ABN	75 081 455 754

2.3.2 Environmental record

Environmental Policy and Planning Framework

Across the Inland Rail Program, ARTC works through the appropriate environmental and planning assessment processes for each state to obtain the necessary approvals to start construction.

While Victoria, NSW and Queensland have different legislation, planning assessment in these states broadly involves field studies, environmental assessments, and community consultation.

Generally, environmental policy and planning frameworks are managed through the Inland Rail Programme Environmental Management Plan (**PEMP**) (ARTC, 2018).

The PEMP establishes the framework for ARTC and service providers to implement environmental management measures across all phases of the Inland Rail Programme. It is a controlled document that is updated in accordance with the progression of Inland Rail, the continuous improvement and corrective actions enshrined in the ARTC Environmental Management System (**EMS**) and the changes to legislation, regulations, and/or Project approvals.

The ARTC Inland Rail PEMP establishes the framework for:

- A consistent approach to addressing and documenting environmental risks and management requirements in primary approval documents.
- The design, construction, and commissioning activities for Inland Rail projects to ensure:
  - environmental approvals and licences are obtained in a cost-effective, timely and efficient manner
  - compliance with the project conditions of approval, licences, and other applicable regulatory requirements
  - environmental, social, cultural, and economic risks are appropriately assessed and managed
  - no negligent harm is done to the environment
  - all projects are undertaken with due consideration of the community and stakeholders.

The ARTC Environmental Policy also supports the PEMP by providing a framework for continual improvement of an EMS and sets out commitments of ARTC for managing potential environment risks. In addition, the Inland Rail Environment and Sustainability Policy outlines the commitments of Inland Rail throughout the design, construction and operation phases including (but not limited to):

- Early and meaningful engagement with all stakeholders.
- Protecting the environment by minimising the environmental footprint:
  - through the application of the principles to avoid, minimise, offset to manage impacts to receiving environments and ecological values

- obtaining and complying with all environmental approvals and compliance obligations

- Basing decisions on a balanced consideration of technical, economic, environmental, and social elements.

Proceedings under Commonwealth or Victorian Law

There have been no proceedings under a Commonwealth or Victorian law for the protection of the environment or the conservation and sustainable use of natural resources with regards to any of the 13 Inland Rail Projects.

ARTC have been subject to one Commonwealth proceeding, associated with the Western Victoria Track Upgrade Project. In 2011 the Department of Sustainability, Environment, Water, Population and Communities alleged that ARTC's engaged alliance partner was contracted to undertake re-sleepering and associated works, which resulted in the clearing of vegetation, significantly impacted *Pimelea spinescens* subsp. *spinecens* (Spiny Rice-flower) (critically endangered) and Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (listed endangered ecological community) under the EPBC Act. At the time of clearing, ARTC did not hold an approval pursuant to Part 9 of the EPBC Act. By acknowledging the activities of the independent contractor engaged by ARTC may have resulted in loss of protected vegetation and complying with the actions outlined in the enforceable undertaking, no further action was taken against ARTC in relation to the incident.

There have been no other Commonwealth proceedings since 2011.

2.4 Project Area

The project area encompasses key locations that will be used for permanent structures and temporary construction work sites. The project area is the defined spatial boundary of the Inland Rail – Beveridge to Albury Project which includes the enhancement sites, track slews, signal gantries, and overhead powerline packages combined. The project area predominantly consists of an existing and active rail corridor, except for works being undertaken for overhead powerlines which will mostly occur within electricity easements on private land.

The project area including proposed works associated with the enhancement sites, track slews, and signal gantries impact approximately 5.75% of the area of North East Rail Line (running from Melbourne (south) to Albury (north), forming part of the Sydney-Melbourne rail corridor).

The project area has been identified and refined through an iterative process that has considered design, safety, access, material storage and handling, construction requirements and key environmental features, such as ecology and heritage matters.

A full list of sites contained within the project area is provided in Appendix A and is displayed in Figure 12 (Appendix B).

2.4.1 Existing Land Use

The Project is largely situated in existing rail and road corridors where current land use is routine rail and road operations, and the land is developed with road and rail infrastructure. Travelling from north to south, the project area, mainly consisting of the North East Rail Line runs largely parallel to the Hume Highway from the Murray River at Wodonga to the outskirts of Melbourne. ARTC shares the rail corridor between Mangalore and Melbourne with V/Line's passenger operations, including the Sydney-Melbourne Express Passenger Train (**XPT**).

Sections of the rail corridor are operated by either V/Line or ARTC and road reserves are generally managed by the Department of Transport (**DoT**) or local councils. Project activities will occur on land adjacent to the rail and road reserves including:

- Permanent works such as road or rail realignment and rail earthworks.
- Temporary works such as construction access and haulage routes, construction site compounds, and laydown areas
- Overhead powerline modifications.

Design and construction planning for the Project has sought to utilise land within the existing rail and road reserves to the maximum extent possible to minimise potential environmental impacts.

The project area falls within the local government areas (**LGAs**) of Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, Indigo, and Wodonga. Approximately 70% of the project area (excluding overhead powerlines), is zoned Public Use Zone 4 - Transport (**PUZ4**) or Road Zone Category 1 (**RDZ1**). The proposed works located within Indigo Shire are limited to powerlines only.

Land within these zones is typically heavily modified due to historical and current use of the land for rail and road activities. Overhead powerlines are mostly located outside of transport corridors, with approximately 30% within existing road and rail reserves and the remainder within existing electricity easements over private land.

2.4.2 Planned Land Use

The Project will utilise existing electricity easements over private land, the existing railway corridor, and modify or replace existing infrastructure. The operation of the Project will not result in a significant change in land use activities with the existing North East Rail Line to continue to be used as a major freight railway corridor, and land use or maintenance activities at overhead powerline sites will not significantly change.

The Planning Scheme Amendment currently being prepared for the Project seeks to introduce a Specific Controls Overlay to the project area to allow the use and development of land for the Project. It is not proposed to rezone any of the existing land uses within the project area. Further information regarding the Planning Scheme Amendment is contained in Section 3.1.3.

2.5 Key Project Works

The Project consists of 12 discrete project areas (referred to as ‘enhancement sites’) from Beveridge to Albury where road and rail interfaces do not provide the required 4.5 m horizontal and 7.1 m vertical clearance for double-stacked freight trains. Refer Figure 12 (Appendix B) for an overview map of the enhancement sites.

In addition to the enhancement sites, the Project also includes works to signal gantries and track slews as well as ancillary works to overhead powerlines to ensure appropriate horizontal and vertical clearances are achieved. Refer to Figure 1 for schematic of track slews and signal gantry proposed works.

Telecommunication replacement work is also required for two existing fibre optic cables that cross under the railway line at Tallarook and Seymour. Where track lowering is the preferred solution, these cables will need to be replaced. Replacement cables need to be tied into the node. Locations of the cabling are included in Figure 12 (Appendix B).

2.5.1 Enhancement Sites

There are limitations in the flexibility of design solutions for the enhancement sites, particularly spatial constraints where tie-in to existing infrastructure is required with limited space to achieve the required grade. Design solutions that could provide the required clearance under bridges are limited to:

- Track lowering under bridges
- Realigning the track
- Replacing the bridges
- A combination of track lowering and bridge replacement (i.e. hybrid solution).

The above alternatives are the only design options that can achieve the purpose of the Project and provide the required vertical and horizontal clearance. Table 3 lists the general functional requirements for bridge replacement and track lowering which are the two major civil construction works associated with the 12 enhancement sites (see Table 5 for option selection process details). Figure 1 shows schematics for track lowering and bridge replacement options. The options considered and the preferred design solution for each enhancement site is discussed in Section 2.7.

Table 3 General Functional Requirements: Bridge Replacement and Track Lowering

Major components – enhancement sites	General functional requirements
Bridge replacement	• Bridge replacement to achieve vertical and horizontal clearance for standard gauge double-stacked freight trains. • Provide all bridge super structure, substructures, transition approach slabs, wing walls and retaining walls as required to support the bridge or roadway. • Provide road and bridge furniture. • Provide road works, including pavement construction, adjustments to any existing roads, footpath, shared path, cycleways, or other publicly accessible area or streets as necessary. • Maintain access to properties including businesses during construction. • Remove the existing fence and gates and install new boundary fencing as required. • Provide maintenance road infrastructure works, including existing and new temporary signals and electrical assets. • Reinstate and provide new landscape as part of construction. • Provide a legal discharge point for stormwater drainage. • Provide signal replacement of track signals. • Relocation, modification and/or protection of existing utility services. • Bridge replacement design can be either online (where the existing bridge is upgraded) or offline (where a replacement bridge is built, and the existing bridge can be utilised during construction).
Track lowering	• Track lowering to achieve vertical and horizontal clearance for standard gauge double-stacked freight trains. • Maintain access to properties including businesses during design and construction. • Remove the existing fence and gates, and install new boundary fencing as required. • Provide landscape reinstatement as required. • Provide a legal discharge point for stormwater drainage. • Provide signal replacement of track signals. • Relocation, modification and/or protection of existing utility services.

2.5.2 Track Slews

Track slews are works to move the rail track horizontally to provide clearance for double-stacked freight trains. Track clearance between ARTC standard gauge and both V/Line broad gauge tracks and adjacent standard gauge tracks, must be a minimum of 4 m from track centres for straight (tangent) track. Where track slew works are required, one or both tracks may need to be moved to meet the required clearances.

Track slews are usually constructed utilising hi-rail machinery. Track slews less than 100 millimetres (**mm**) will be undertaken within the existing formation by placing new track. Track slews greater than 100 mm and less than 300 mm will be undertaken by widening the existing formation through grading and proof-rolling and placing new ballast and track. There are only a few track slews greater than 300 mm. These will be undertaken by constructing new formation and placing new ballast and track.

Existing access tracks will be utilised for these works.

There are five track slews that do not achieve the necessary clearance and are proposed to be addressed as part of the Project. The location of these track slews is detailed in Appendix A.

2.5.3 Signal Gantries

Existing signal structures (generally called signal gantry sites) are located in the rail corridor at numerous discrete locations along the alignment. Currently, these signal gantry sites do not provide clearances required for double-stacked freight trains.

There are three types of signal structures:

- Signal mast is a signal or signals installed on a pole or mast. It usually has metal stairs for maintenance purposes.
- Cantilever signal is a signal or signals installed on an overhang which is supported on a pole.
- Signal gantry is a signal or signals installed on a portal frame.

The construction or modification of signalling gantries involves decommissioning and removing redundant signalling equipment, cabinets, and cables. A new taller signal gantry structure is erected in the same location with minimal modification to the current foundation.

Existing access tracks will be utilised for these works.

There are twenty-one signal gantries that do not achieve the necessary clearance and are proposed to be addressed as part of the Project. The location of these signal gantry sites is detailed in Appendix A.

2.5.4 Overhead Powerlines

Overhead aerial utility services cross the rail corridor at numerous discrete locations along the alignment. These present non-compliant clearances required for double-stacked freight trains.

The power poles or towers will need to be lifted or replaced with taller ones. The cables will then be lifted onto the new structure or replaced with new ones. In some cases, these utilities may be installed underground by utilising trenching or horizontal direction drilling methods.

Where possible, existing access tracks will be utilised for these works.

There are 123 overhead powerline sites that are proposed to be addressed as part of the Project. The location of these sites is detailed in Appendix A.

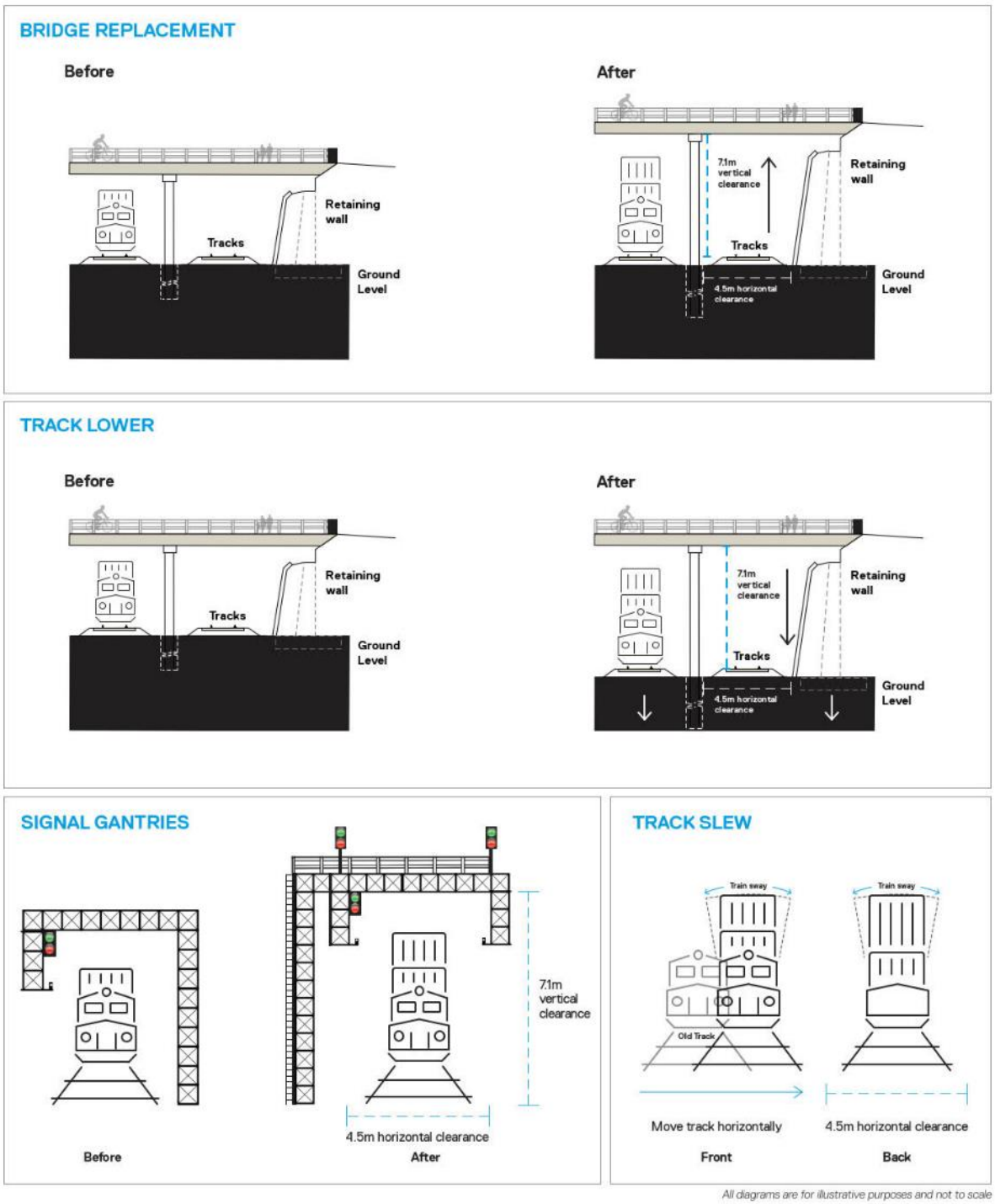


Figure 1 Proposed Works Schematic

2.6 Project Design Development

2.6.1 Project Stages

Stage 1 – Concept Design (complete)

During this stage, the Project's intended objectives, outcomes and benefits, and route options are identified and assessed. This included documenting any known technical issues, regulatory requirements, estimated costs, timings, and potential risks and opportunities. This phase of works was completed between April 2016 and continued to early 2018.

Stage 2 – Reference Design (ongoing)

The development of Reference Designs for the Project was advanced in two tranches to allow for efficiency, flexibility, collaboration, and innovation between designers and construction contractors. ARTC's consultation on Reference Design began in early 2018.

Reference designs for the project are completed in two distinctive design phases:

- Initial Reference Designs
- Final Reference Designs.

Prior to the commencement of the initial Reference Design for the first tranche of project sites (5), ARTC completed several environmental and engineering investigations to refine the options for some of the sites between April 2018 and September 2019. Prior to the commencement of the final Reference Designs for the first tranche of project sites (5), ARTC prepared an Early Contractor Involvement (**ECI**) Strategy and procurement between September 2019 and August 2020.

ECI procurement for the second tranche of project sites (7) will commence in late 2021.

The Reference Design does not currently identify land needed for laydown areas and storage. These areas will be defined during the detailed design and will be required to meet the defined Environmental Performance Requirements for the Project.

Stage 3 – Detailed Design

Once the Project has received approval to proceed, it will transition in to detailed design where results of impact assessments and conditions of approvals will be considered fully in the design, giving an opportunity for avoidance and mitigation strategies to be incorporated alongside design development.

2.6.2 Design Process

This section summarises the development of concept designs for the Project, and the process to select the proposed modification works at each enhancement site.

In assessing options during the development of Project, the following matters were considered:

- *Transport Integration Act 2010*
- Project Objectives
- Technical requirements
- Relevant technical reports
- Stakeholder and community views
- Relevant policies and legislative requirements.

The twelve enhancement sites have gone through two phases of design works: Concept Design and Reference Design.

The Concept Design was undertaken by WSP | Parsons Brinckerhoff in 2016. Several sites were identified along the project route between Tottenham and Albury which required enhancement to accommodate double-stacked freight trains. The study recommended solutions to each of the sites' challenges and provided a preliminary assessment of the associated impacts on existing civil and structural infrastructure, ease of construction and gauged the potential disruption it would have to

pedestrian and vehicular traffic. The Concept Design was used as a basis for the development of the Reference Design.

Initial development of the Reference Design stage was undertaken by KBR in 2017. A joint site inspection was carried out by KBR and ARTC in November 2017 to inform the initial development of the Reference Design; this was attended by the Principal Design Engineers for track and structures. In addition, topographic surveys, traffic assessments, geotechnical and utilities assessments were completed to inform the initial Reference Design development. These assessments also included constructability considerations.

The results of the site inspection and assessments were utilised to establish if the Concept Design was feasible or would require alteration. Further optioneering was considered for complex sites from community, safety, environmental, or legislative perspective. A Multi Criteria Analysis (**MCA**) was completed on such sites to revisit the proposed option(s) and consider additional new options or sub-options that may not have been considered previously.

The MCA is a process for determining the preferred solution for sites by considering multiple criteria. Each criterion has a weighting and consists of further sub-criteria which are given their own weighting. The criteria, sub-criteria and scoring system were developed by ARTC through advice from subject matter experts.

The MCA takes into consideration technical viability, safety, operations, constructability, environmental impacts, community impacts and stakeholder risk. These are explained in more detailed below:

- **Technical viability:** This criterion focused on the impact on design works for the proposed option. The sub-criteria were all scored against the existing base case to determine how the options altered the existing characteristics of the site. The weightings for the sub-criteria were based on the impact to the Project. Alignment and future proofing are weighted less because geotechnical conditions, utilities, flooding and impacts to existing networks are less for a brownfield site than a greenfield site.
- **Safety assessment:** This criterion explored the safety rating of various sites. The scoring for each sub-criterion was based on a comparison of the design option with the existing safety conditions. The weightings for the sub-criteria were based on the impact to project.
- **Operational approach:** This criterion focused on the impact of works required for each option on the daily operation of the different rail authorities present at the site. This sub-criterion was scored as a comparison to existing operations at the site (improvement or worsening of operability). The sub-criterion considered the operability upon completion of the works, based on changed complexity and speed limits on the rail corridor.
- **Constructability and schedule:** This criterion focused on the impact of various options during the construction stage. For this criterion, the options were scored as a comparison between each other. Scores only differed where there were major benefits to a sub-criterion from an option.
- **Environmental and heritage:** This criterion addresses impacts associated with each option informed by technical assessment. The options were scored in comparison to the existing conditions.
- **Community and property impacts:** This criterion explored the impact of various options upon completion of the project. The options were scored in comparison to the existing conditions.
- **Approvals and stakeholder:** This criterion explored the potential risk associated with the duration and government support of approval requirements during the design and planning phase of the project. The options were scored in comparison to the each other.

The MCA was scored in workshops attended by ARTC and specialists. The method of scoring uses a 5-point scale common across the Inland Rail Program. Two rounds of MCAs were completed for the Project over several enhancement sites which were considered complex.

In May 2018, the following enhancement sites underwent an MCA process:

- Wangaratta Precinct
- Euroa

- Benalla
- Hamilton Street, Broadford.

Ongoing consultation with key stakeholders and the community indicated the need to consider additional options at some enhancement sites. In November 2019, another MCA workshop was completed to address the options assessment gaps on the following enhancement sites:

- Glenrowan
- Euroa
- Short Street, Broadford
- Benalla.

Table 4 summarises the changes in design from concept to initial reference as results of further assessment, stakeholder feedback and the MCA optioneering.

Table 4 Summary of changes in design from Concept Design to Initial Reference Design

Enhancement site	Concept Design	Initial Reference Design
Wandong	Bridge replacement	No change
Hamilton Street, Broadford	Track lowering	No change
Short Street, Broadford	Track lowering	Track lowering or bridge replacement
Marchbanks Road, Broadford	Bridge replacement	No change
Tallarook	Track lowering	No change
Seymour-Avenel Road, Seymour	Bridge replacement	No change
Hume Highway, Seymour	Track lowering	No change
Euroa	Bridge replacement	Bridge replacement and track realignment or oversized underpass and track realignment
Benalla	Bridge replacement	Bridge replacement or track realignment
Glenrowan	Track lowering	Bridge replacement
Wangaratta Precinct	Track lowering and track reconfiguration	No change
Barnawartha North	Track lowering	No change

2.7 Enhancement Site overview

The major construction works associated with the Project are at twelve enhancement sites. Design refinements during detailed design stage would be contained within the project area. Where an enhancement site has multiple design options, this Environment Report has based the impact assessment on Option 1. The impact area is further described in Section 5.1.3.

Table 5 outlines the options considered and proposed design for each of the twelve enhancement sites. Appendix A contains the graphics of the design options for each of the twelve enhancement sites.

Table 5 Enhancement Site overview

Wandong	
Options considered	The following options for the Wandong enhancement site were considered: • Offline bridge replacement • Track lowering The track lowering option was considered not feasible due to the following reasons: • Track lowering and slews would potentially impact access to Wandong Station platform. • Highly constrained site access resulting in significant rail track closures on both ARTC and V/Line tracks to facilitate construction. • Extensive retaining wall system would be required to lower the track within an existing cutting. • Track slews would be required to achieve horizontal clearances. • Additional bridge strengthening would be required, with the possibility of major bridge upgrades given new bridge standards. • Construction noise impact to properties for the 800 m of track lowering. The concept design proposed an offline bridge replacement option with a new bridge structure located to the north of the existing bridge (this solution forms part of the proposed design).
Proposed design – Bridge replacement	• Road realignment by replacing the existing bridge on a new alignment immediately north of the existing bridge. • Proposed road is a single two-way carriageway with a lane width of 3.5 m, 1 m shoulders and 2 m verge, including road protection barriers. The design achieves the additional clearance over the railway by raising the bridge and approach roads to the intersections at Epping-Kilmore Road and Broadford-Wandong Road. • A proposed shared use path 2.5 m wide will be located on the south side of the bridge. • Broadford-Wandong Road alignment is designed for a 50 km/h road. This reduction from the existing 60 km/h speed to minimise impacts on land requirements due to constraints of the site.

Hamilton Street, Broadford	
Options considered	The following options were considered: • Bridge replacement • Track lowering The concept design proposed a track lowering option with a complete lowering of the ARTC track. This option required structural support for the existing bridge footings and retaining walls to support the adjacent V/Line tracks. During the development of the proposed design, the track lowering option was reviewed. Assessment of both options revealed that the bridge replacement solution provided several advantages over track lowering: • Track lowering works are significantly more complex due to highly constrained site access and available space considering the broad-gauge track to the west and the existing cutting and road levels. • Bridge replacement reduces the magnitude of earthworks and environmental impacts. • Bridge replacement reduces the impact on native vegetation. • Reduced impacts on track operations and a number of track possessions required in bridge replacement option. • Risks that a bridge reconstruction would still be required due to updated standards for bridge piers.
Proposed design – Bridge replacement	• Replace the bridge on the same alignment by building a 1.5 m higher bridge over the standard gauge line (south). The replacement bridge adopts a single-span configuration with precast concrete beams. • The proposed road has been designed as a two-way single carriageway lane with a lane width of 3.5 m. A proposed shared use path 2.5 m wide will be located on the south side of the bridge, and a 1.5 m wide footpath has been provided on the north following consultation with Mitchell Shire Council. • The design achieves the additional clearance by raising the bridge approach roads as far as the intersection with High Street service road to the north and Ferguson Street to the south. It is proposed that existing access from Hamilton Street to Ferguson Street be closed off and a cul-de-sac introduced as the alignment is not able to be tied in prior to the intersection as per the required road design guidelines. • Ferguson Street would be converted into a no-through lane accessible from Powlett Street. • A new roundabout is proposed at the intersection of Hamilton Street and Ferguson Street due to the raised road levels and to aid traffic speed management.

Short Street, Broadford	
Options considered	The following options have been considered: • Track lowering • Hybrid - partial track lowering and bridge raise • Online bridge replacement • Offline bridge replacement The concept design proposed a track lowering option with slewing the ARTC track away from the southern pier to allow sufficient room for works required for track lowering. As part of an options study, an option to change the track lowering site to a full bridge replacement was investigated and discounted due to the road geometry constraints. An assessment of the options has been undertaken through the MCA, and offline bridge replacement achieved the highest score due to better technical viability, safety, constructability, and schedule considerations. However, the bridge replacement option would require the permanent acquisition of properties. Therefore, the track lowering remains the preferred solution while constructability investigation of both options, including a hybrid bridge and track lower option, continues in the subsequent design phase.
Proposed design options – Track lowering or bridge replacement or hybrid	**Track lowering (Option 1)** • Track lowering for 770 m of ARTC track and slewing the track 2.5 m. The purpose of the horizontal realignment of the track to the east is to avoid a clash with the south pier of the Short Street bridge. The depth of required track lowering under the bridge is 2.25 m. **Bridge replacement (Option 2)** • Construct the bridge offline adjacent to the existing bridge on the south, with road tie ins extending at Rupert Street and Sutherland Street. This option would require private property acquisition. • The proposed road has been modelled as a single two-way carriageway with a lane width of 3.5 m, accommodating a 2.5 m share use path on the north of the bridge. The design achieves the additional clearance over the railway by raising the bridge and regrading approach roads. **Hybrid Option (Option 3)** • Construct the bridge offline adjacent to the existing with configuration as per the bridge replacement option. This option would have the bridge at a lower level than the bridge replacement option which would minimise the amount of work to tie-in to adjoining roads. Some private property acquisition would be required. • The Hybrid option would also involve track lowering for 630m of ARTC track and slewing the track 2.5 m. The purpose of the horizontal realignment of the track to the east is to avoid a clash with the south pier of the Short Street bridge. The depth of required track lowering under the bridge is reduced to 1.64m.

Short Street, Broadford	
	Comparative impacts (matters of state and national environmental significance) Ecological investigations have determined that there are no matters of national environmental significance within the Short Street Project Area; however, three FFG Act protected flora species and one threatened ecological community (Victorian Temperate Woodland Bird Community [**VTWBC**]) are present. Assessment of the track lowering (option 1) concludes that a total of 0.610ha of VTWBC may be impacted. Assessment of the bridge replacement (option 2) and the hybrid option (option 3) is ongoing, however from initial assessment it is determined that impacts to FFG Act protected species and VTWBC are likely to be comparable to option 1.
Marchbanks Road, Broadford	
Options considered	The following options have been considered: • Offline bridge replacement • Online bridge replacement • Track lowering The concept design proposed an offline bridge replacement option with a new bridge structure located to the north of the existing bridge. Track lowering was discounted due to existing horizontal clearance issues between the brick pier and abutment. Underpinning works for a lowering would also likely result in damage to the brick pier. Following consultation with stakeholders and investigation into land acquisition as well as planning and environmental impacts, the need to reinvestigate all options was determined due to the significant loss of native vegetation and land acquisition required for the offline design solution. Both online and offline bridge replacement option were considered, and the design solution has changed from a full offline construction with embankments to a partial offline construction with retaining walls, which significantly reduces impacts to native vegetation. This solution also maintains vehicle access onto the adjacent Hume Freeway during construction so that Broadford residents and emergency vehicle access can be maintained throughout construction.
Proposed design – Bridge replacement	• An offline bridge replacement, immediately north of the existing bridge adopts a single-span configuration with precast concrete beams. • The road will be realigned to a new alignment immediately north of the existing bridge. This will enable the traffic lanes on the bridge to remain open during construction. The proposed road has been modelled as a two-way single carriageway with a lane width of 4 m, 0.5 m shoulders and a 1.5 m verge, including road protection barriers. Approximately 140 m of the Hume Freeway northbound on ramp will also need to be regraded to suit the proposed road levels.

Tallarook	
Options considered	The following options have been considered: • Offline bridge replacement • Track lowering The concept design proposed lowering of the ARTC tracks (Mainline and passing lane) and track slewing for ARTC and V/Line tracks. The track lowering solution was determined to be the preferred solution. During the Reference Design development phase, an offline bridge replacement of the Hume Highway bridges was investigated. Due to the existing site constraints and significant amount of permanent and temporary works associated with a road bridge replacement option to achieve the Hume Highway design speed, it was determined that the track lowering solution remains the preferred option.
Proposed design – Track lowering	• The abutments and piers of the existing Hume Highway bridge will require modification to cater for potential impacts to the existing bridge. The key works are structural modification and strengthening of the substructure and protection of existing piers and abutments. • To provide sufficient space for the V/Line west track to be slewed, the existing west abutment batter will be cut back. A new retaining wall will be constructed to support the newly formed earth embankment. In front of the existing west abutment, a new independent concrete contiguous pile wall will be constructed. • The pier closest to the V/Line tracks will need strengthening and structural works. The east abutment new contiguous pile wall will be constructed in front of the existing soil nail wall.
Seymour-Avenel Road, Seymour	
Options considered	The following options were considered: • Online bridge replacement • Offline bridge replacement • Track lowering The concept design proposed an offline bridge replacement solution as track lowering was not feasible due to current horizontal clearances at the bridge. During the development of Reference Design, it was identified that the offline bridge replacement option has significant impact on native vegetation and will require land acquisition. Therefore, an online bridge replacement option was considered due to reduced impacts.
Proposed design – Bridge replacement	• Existing Seymour-Avenel Road bridge is proposed to be demolished and replaced with a new bridge with the same horizontal alignment as the existing road bridge. The proposed design of the new bridge does not require any rail track alterations. • The bridge configuration is proposed to be a single 35 m span. The bridge width will provide a two-way single carriage of 3.7 m wide with 2 m wide shoulder on both sides. This is wider than the existing 1 m shoulders. The proposed bridge superstructure will have bridge barriers and anti-throw screens across the rail corridor. • Since the existing signposted speed of Seymour-Avenel Road is 100 km/hr, it is proposed to adopt the posted speed as the design speed. This approach will minimise land acquisition, environmental impacts and reduce the extent of larger bridge structures. To minimise environmental and land acquisition impact, the embankment of the new road alignment will be designed for a gradient of 1:2, including the provision of maintenance access at the batter, fencing and drainage.

Seymour-Avenel Road, Seymour	
	• At Granville Drive, the intersection with Seymour-Avenel Road is proposed to be reconstructed to tie in with the existing roadway. No permanent changes are proposed to the remainder of Granville Drive.
Hume Highway, Seymour	
Options considered	The concept design proposed lowering the two ARTC tracks by slewing them away from the V/Line track. Further design development confirmed that the track lowering solution remains the preferred solution, and no other options were considered.
Proposed design – Track lowering	The proposed solution is lowering both ARTC tracks by 1.4 m under the Hume Highway and slewing over 620 m. The track lowering will be achieved by providing a piled retaining wall at either side of the ARTC tracks through the bridge and where required to support the adjacent V/Line track.
Euroa	
Options considered	The following options were considered in 2018: • Bridge replacement • Road under rail (underpass) • Track lowering A bridge replacement received the highest score in the MCA compared to all other options and was developed through the initial Reference Design phase. Track lowering was considered not viable due to flood issues and was therefore not progressed. After additional consultation with stakeholders a new MCA was undertaken to encompass further studies that were undertaken since the initial Reference Design. Additional options were considered in 2019: • Offline bridge replacement - Track reconfiguration - New station access ramp • Road under rail • Level Crossing The offline bridge replacement, which includes track configuration, achieved the highest score. Most works (i.e. establishing access and laydowns, haul road construction, piling works, retaining wall works, earthworks) can occur without significantly impacting road traffic or requiring rail closure.
Proposed design options – Options being considered	**Offline Bridge replacement (Option 1)** • The proposed bridge would be located immediately to the northeast of the existing bridge. It would be approximately 2.4 m higher while the road configuration of Anderson Street would be a single two-way carriageway with a lane width of 3.5 m and a 1.2 m shoulder on each side. • The replacement of the Anderson Street bridge would have a supported span configuration to cross over the existing ARTC tracks and surrounding road. Road barriers would be installed at the edge of the bridge deck and anti-throw screens across the rail corridor. • The existing access ramps from Anderson Street to Railway Street and vehicle access ramps onto Euroa Station would be removed.

Euroa	
	Oversized vehicle underpass (Option 2) • ARTC is considering an alternative vehicle underpass as requested by the community. This option was initially discounted due to flooding risk and long-term maintenance challenges. This option would involve constructing an oversized vehicle underpass with a vertical clearance of 5.9 m to accommodate mass transport. • The depth of the underpass is likely to be approximately 8 – 8.5 m. The proposed road configuration for the underpass will be similar to the bridge (i.e. a single two-way carriageway with a lane width of 3.5 m and a 1.2 m shoulder on each side). The length of the underpass is likely to be around 300 m with grade lines of approximately 7 – 8%. • The underpass would also need to cater for flood mitigation, given the site is located immediately adjacent to flood-prone areas. A levee of approximately 1 m in height surrounding the underpass is likely to be required to increase the infrastructure immunity. A pump solution may also be required to address and manage runoff. **Track realignment and pedestrian access (Option 3)** • The existing east track is proposed to be realigned to the west of the existing station platform and west track. • The existing west platform will be retained as a new east platform, and a new west platform is proposed adjacent to the realigned west track. The new west platform would be 180 m long with provision for futureproofing a platform extension to 240 m long. • A *Disability Discrimination Act 1995* compliant underpass connecting the new west platform, Euroa Station and the Railway Street carpark is proposed. The underpass would be 5 m wide and 3 m high and would consist of a main reinforced box structure, access ramp and short access stairs. As the proposed underpass is situated in a flood-prone area, a pumped drainage system is required to convey runoff for major storm events. • A pedestrian footbridge has been included as a potential option given Euroa is prone to flooding. This pedestrian connectivity solution will be considered further, in consultation with the community of Euora once a decision has been made on the preferred solution at Anderson Street (i.e. vehicle underpass or bridge). • The former east track will be removed, and the V/Line platform demolished, opening the station forecourt, and increasing visual amenity. **Comparative impacts (matters of state and national environmental significance)** Ecological investigations have determined that there are no matters of state and national environmental significance within the Euroa Project Area. Therefore, with regards to impacts on matters of state and national environmental significance, there is no material difference between the three options.
Benalla	
Options considered	The concept design proposed a replacement bridge involving the demolition of the existing bridge and its approaches and constructing a taller bridge to the north on Mackellar Street. It was suggested that new on street angled parking spaces were to be provided on Mackellar Street to offset any lost parking spaces. The existing pedestrian underpass was recommended to be retained and used as the only pedestrian access to Benalla Station.

Benalla	
	Alternative options considered as part of the concept design phase MCA included: • Replacement of the existing bridge on a new alignment • Realignment of the standard gauge tracks to both run north of Benalla Station. During the initial reference design development, an opportunity to improve the design solution by proposing an offline bridge replacement to the east of the existing bridge was considered. This option has the advantage of maintaining vehicle accessibility to Benalla Station while constructing the new bridge. An additional MCA workshop was undertaken, and the following options were considered: • Offline new bridge replacement • New track configurations to retain the existing bridge • Removal of the existing bridge with an upgrade of the existing pedestrian underpass *for Disability Discrimination Act 1995* compliance • Replacement of the existing bridge with a new road underpass. The MCA process indicated the offline bridge replacement to the east of the existing bridge was the preferred option. The option allowed for vehicle access to be maintained during construction. The construction duration for this option was considerably less than the other options reducing the impact to community. The road underpass option was not suitable for Benalla due to frequent flooding events. After additional consultation with stakeholders a new option was considered. The realignment of the east track west of the Station, new pedestrian underpass, new west platform and the demolition of the east platform and related infrastructure is currently under investigation, along with the bridge replacement. The track realignment option would include the demolition of the bridge once the other works have been completed.
Proposed design options – Options being considered	**Track realignment and pedestrian access (Option 1)** • Proposed design for the track realignment is currently under development. This option meets the safety requirements of the whole precinct. It may also improve access to the Station, including direct pedestrian access and removal of the east standard gauge track to improve pedestrian and vehicle conductivity and visibility of the commercial precinct from the Station. • The realignment of the east track would be completed as a matter of priority to reduce passenger and freight impact. The existing west track would be retained with potential realignment work to meet a minimum of 4.5 m track centres and tie into the existing east track. • The existing west station platform will be retained as a new east station platform and a new west platform is proposed adjacent to the realigned west track. The west station platform is proposed to be 180 m long with provision for future-proofing a platform extension to 240 m long. • The existing pedestrian underpass currently connecting Mackellar Street to Railway Place will be backfilled. A pedestrian underpass or footbridge will link the new east platform to the existing west platform. Access to Railway Place from Mackellar Street will be via Nunn Street. The active rail yard located on the west side of the station precinct is likely to continue operating until 2028 making pedestrian movements in this area unsafe. The Nunn Street pedestrian crossing is proposed to be activated to improve pedestrian safety and continue to provide connectivity until the rail yard ceases operation.

Benalla	
	• The proposed underpass would be *Disability Discrimination Act 1995* compliant, connecting the new west platform, Benalla Station and the Mackellar Street is proposed. The underpass would be 5 m wide and 3 m high, and would consist of a main reinforced box structure, access ramp and short access stairs. • As the proposed underpass is situated in a flood-prone area, a pumped drainage system is required to convey runoff for a major storm event. The pedestrian bridge option would include two sets of lifts at each platform to provide convenient and comfortable movement for all abilities. **Bridge replacement (Option 2)** • An offline bridge replacement to the north of the existing bridge structure is proposed. The bridge has a single supported span configuration of approximately 11 m. A two-way single carriageway of 3.7 m wide each is proposed. There are no provisions for pedestrian or cyclist access. • The existing pedestrian underpass serves as the primary pedestrian rail crossing and access to MacKellar Street and Railway Place/Hannah Street and would be maintained. • The station access ramps on Mackellar Street will be converted into a one-way entry/exit arrangement. • Due to the short lengths of the approach ramps and tight turning curves of the proposed road geometry, the road design speed of the bridge will be designed for 40 km/h. A bus turning bay at Benalla Station will be provided to facilitate vehicle turning. **Comparative impacts (matters of state and national environmental significance)** Ecological investigations have determined that there are no matters of state and national environmental significance within the Benalla Project Area. Therefore, with regards to impacts on matters of state and national environmental significance, there is no material difference between the track realignment and pedestrian underpass (option 1) and the bridge replacement (option 2).
Glenrowan	
Options considered	The concept design proposed lowering the East and West Mainline by removing the disused siding track and centralising the Mainlines between the existing bridge piers and abutments. This allowed sufficient room for proposed secant piled walls through the bridge and in front of Glenrowan Station platform. During the initial reference design development, it was revealed that both tracks would require lowering by 2.3 m to allow sufficient vertical clearance. Several other constraints were identified with regards to constructability, safety in design and heritage impacts. One of the main constraints was the proximity of the piling works to the National and State heritage listed Glenrowan Heritage Precinct station platform. This was because the works would extend between at least 250 m to the south and north of the bridge. Significant interest and feedback were received from stakeholders and the Rural City of Wangaratta requesting the development of alternative options. The MCA was undertaken in 2019. A total of six options were analysed: • Track lowering (base case) • New bridge offline immediately adjacent to the existing bridge with a design speed of 50 km/h • New bridge offline at Quarry Road • Hybrid offline bridge replacement at Quarry Road and track lowering

Glenrowan	
	• Hybrid offline bridge replacement immediately adjacent to the existing bridge and 1m track lowering without piled walls • New level crossing at Beaconsfield Parade – dismissed as unviable. While a level crossing is significantly cheaper, this option would reduce community safety by reintroducing the potential for accidents that are currently prevented by the existing bridge. ARTC's nationwide policy against introducing any new level crossings is consistent with the State Government of Victoria's policy. A new bridge offline immediately adjacent to the existing bridge was determined to be the preferred solution. The main MCA criteria that drove the selection were: • Constructability and schedule: There will be minimal requirements for track closures reducing schedule delivery constrains and delays. The track infrastructure will not change, reducing constructability impacts and reducing impact to services. No land acquisition required. • Environment and heritage: Alternative bridge option would require impacts to EPBC listed species woodland. • Approvals and stakeholder risk: level of support provided from regulators and local government for the different options. • Safety assessment: This option eliminates rail worker risk, as there will be no restricted rail area for workers. Emergency services access would be maintained for Glenrowan throughout the construction phase.
Proposed design – Bridge replacement	• New bridge constructed offline immediately to the south of the current bridge. • Designed for a 50 km/h posted speed as the road gradient provides the most negligible impact on heritage values and precinct visual amenity. Road tie-ins impact at Gladstone Street and Church Street will be minimal to negligible. • The proposed road bridge is a six-span bridge, typically consisting of 23 m long super-T spans on piers and a single 13 m span of deck planks over the rail corridor. Piles will support the piers. • A *Disability Discrimination Act 1995* compliant pathway will be constructed to the north of the bridge to provide a safe link for the community and visitors from the township to the Ned Kelly siege site and Glenrowan Station.
Wangaratta Precinct	
Options considered	The concept design proposed for the Wangaratta Precinct was to lower and slew both the east and west tracks to the north of Wangaratta Station, constructing a new platform for the west trach and undertaking an offline bridge replacement of Green Street bridge. The lowering of the rail tracks through the Station would prevent the need to remove the pedestrian bridges. A new station platform in front of the existing Wangaratta Station platform would need to be constructed to accommodate the lowered tracks. The concept design was abandoned as the lowering of the track would structurally impact the pedestrian bridges and the Station, making the rectification measure potentially unsympathetic to the heritage fabric of the structures given their age. The lowering of the rail track in front of the station would also be considered a significant detriment to the heritage values of the Station. It was therefore determined that a pedestrian underpass is a more sympathetic proposal as it allows a pedestrian connection across the tracks without a visually imposing structure dominating the setting of the place.

Wangaratta Precinct	
	During the development of initial reference design, MCA was undertaken, and the following options were considered: • Both tracks slewed to the northwest side of Wangaratta Station with a platform road to access Wangaratta Station. Turnouts and crossovers allow train movements from each track to access the platform. An online bridge replacement for Green Street bridge is required to accommodate the track slews. • Both tracks are slewed to the northwest side of Wangaratta Station. All trains stop on the east track to access Wangaratta Station. Crossovers allow train movements from each track to the platform. An online bridge replacement for Green Street bridge is required to accommodate the track slews. This option was discounted as insufficient space is available to provide crossovers. • Both tracks are slewed to the northwest side of Wangaratta Station. A new platform is constructed along the west track, and the existing platform is maintained along the east track. An online bridge replacement for Green Street bridge is required to accommodate the track slews. This slewing of both tracks and new platform allows for the dive structure to be filled in providing the opportunity to strengthen the quality of the overall local character and connection to the city centre. This is the preferred solution.
Proposed design	**Green Street bridge** • Proposed Green Street bridge arrangement has been configured to provide a single-span bridge over the rail corridor, maintaining existing road levels above the bridge. The structural option proposed is based on bridge deck replacement plus track lowering. The bridge provides for a 1.5 m wide footpath. • The track lowering will require modifications to both abutments. **Wangaratta Station** • Realignment of the existing standard gauge tracks to enable a new second platform to be built on the west side. The new platform will be approximately 180 m long and 4 m wide. The proposed platform structure will include at least 30% canopy cover to provide refuge for Station patronage while waiting for a train to arrive. • An at-grade carpark has been included on the western side to service the new underpass and platform. It has been positioned to facilitate future development of this part of the precinct around the retained Goods Shed and other heritage elements. On the eastern side, access has been maintained to the existing carpark and drop off at the station entrance for cars and buses. The current carparks to the south of the station building are reconfigured to improve access for pedestrians between the new pedestrian underpass and the Station entrance while maintaining convenience and access. **Wangaratta Station pedestrian underpass** • The proposed pedestrian underpass for the Wangaratta Station will be located at the Cusack Street end of the Station. The underpass is proposed to be 5 m wide and 3 m high with *Disability Discrimination Act 1995* compliant approach ramps. Spatial provision has been made for future lifts to provide access from platforms to the underpass. **Wangaratta Station dive structure** • Decommission and remove the current east track and fill the dive cutting. The northern end of the Station forecourt is retained as existing parking and access, with potentially improved access onto Norton Street and Docker Street utilising the filled dive and subsequent and improvement of the public parkland setting.

Barnawartha North	
Options considered	The concept design proposed lowering the east and west tracks on their horizontal alignments. Further design development during the initial reference design phase confirmed that the track lowering solution remains the preferred solution. However, an alternative offline track alignment option was considered to limit track possession to 60 hours. An alternative offline track alignment option was developed that involved permanently slewing the east track to achieve sufficient clearance between tracks to undertake staged lowering works. The alternative arrangement involves slewing the east track over the existing underbridge which would then require replacement.
Proposed design – Track lowering	The tracks are proposed to be lowered by 1.5 m on their current horizontal alignment to achieve the required clearances under the Murray Valley Highway bridge. The limits of works are from an existing drainage underbridge to the south of the bridge, to avoid reconstructing this structure and relocating the drainage outfall. Likewise, the northern limit is an existing drainage culvert that passes beneath the tracks. The current Welladsens Road level crossing will be affected by the proposed track lowering works and will be upgraded to active protection level crossing.

2.8 Construction Activities

2.8.1 Stages of Construction

A high-level overview of the general stages of construction for both a bridge replacement and track lowering enhancement site options is outlined below. It is noted the staging and timing of each enhancement site slightly differs depending on the proposed works.

Bridge Replacement

- Early works includes such as utility relocation, geotechnical and survey investigation.
- Site establishment such as safe work rail fencing, laydown areas, tree protection, removal of required vegetation.
- Utility relocations
- Build temporary bridge (Hamilton Street, Broadford only)
- Civil works and temporary access roads
- Demolition of existing bridge
- Substructure and approaches
- Superstructure
- Road tie ins
- Demobilisation

Track lowering

- Early works includes such as utility relocation, geotechnical and survey investigation.
- Site establishment such as safe work rail fencing, laydown areas, tree protection, removal of required vegetation.
- Utility relocations
- Track and civil works
- Demobilisation.

2.8.2 Schedule and delivery

In active rail corridors, maintenance and construction of track are mostly undertaken during rail occupations (or possessions) when trains do not operate on the rail corridor. In the North East Rail Line corridor, there is an annual rail possession window of 60 hours (several construction sites will have works underway during these possessions.). This limited construction window has been a key consideration in design solutions for the Project because there is limited capacity to extend these occupation windows without significantly impacting the movement of freight around the country or impacting regional passenger services. The major construction activities for project works are scheduled within these possession windows. Minor works can be completed during 'short track occupancies' on a Sunday night through to Monday morning for 9 hours – providing for 7 hours work with minimal disruption to train services.

It is estimated that the period between award of the design and construction contract and the commencement of double-stacked freight trains is five years. Design and construction work will be completed in two tranches to allow efficiency, flexibility, collaboration, and innovation between designers and construction contractors.

The proposed schedule for detailed design and construction is provided in Table 6. These timeframes are indicative only and may be subject to change once the design and construction contract has been awarded. The proposed construction program has been designed to minimise disruption to train services, roads, and the community.

Table 6 Indicative key project schedule dates

Project stages	Start	Finish
Final Reference Design		
Barnawartha North; Wangaratta Precinct; Glenrowan; Seymour-Avenal Road, Seymour; and Tallarook	February 2021	May 2021
Benalla; Euroa; Hume Highway, Seymour; Hamilton Street, Broadford; Short Street, Broadford; Marchbanks Road, Broadford; and Wandong	October 2021	February 2022
Detailed design		
Track slews	March 2022	August 2022
Barnawartha North; Wangaratta Precinct; Glenrowan; Seymour-Avenal Road, Seymour; and Tallarook	September 2021	February 2022
Benalla, Euroa, Hume Highway, Seymour; Hamilton Street, Broadford; Short Street, Broadford; Marchbanks Road, Broadford; and Wandong	May 2022	March 2023
Construction		
Track slews	September 2022	May 2023
Signal gantries	March 2022	December 2023
Barnawartha North	February 2022	October 2022
Wangaratta Precinct	February 2022	April 2023
Seymour-Avenel Road, Seymour	January 2023	December 2023
Hume Highway, Tallarook	February 2022	December 2023
Glenrowan	February 2022	May 2023

Project stages	Start	Finish
Benalla	July 2023	March 2024
Euroa	July 2023	December 2024
Hamilton Street, Broadford	August 2023	November 2023
Short Street, Broadford	August 2023	December 2023
Marchbanks Road, Broadford	December 2023	July 2024
Hume Highway, Seymour	May 2023	September 2023
Wandong	October 2024	April 2025

2.9 Operational Activities

The Project will not result in any significant changes to operational activities with the North East Rail Line which will continue to be used as a freight rail corridor. The forecasted train movements following completion of the Project is undergoing further operational modelling.

2.10 Project Benefits

The Project presents a unique opportunity to establish a competitive freight system through the provision of rail infrastructure which supports a network of intermodal terminals and local sidings for the distribution of commodities at the national, regional, and local level.

With travel speeds of up to 115 km/h, train lengths of 1,800 m, and containers double-stacked, Inland Rail will significantly reduce freight transport costs for industries, provide a real alternative to road transport for interstate freight, be a catalyst for growth for regional businesses, and help to reduce transport-related fuel consumption, carbon emissions and the road toll.

The Victorian section of the Project considered in this Environment Report is one of 13 sections of the wider Inland Rail Program (see Chapter 14.0 for further discussion of economic and social benefits). Foreseeable benefits directly attributed to the broader Inland Rail Program include:

- Improved access to and from regional markets
- Reduced costs for the market
- Improved reliability and certainty of transit time
- Increased capacity of the transport network
- Reduced distances travelled
- Improved safety
- Improved sustainability and amenity for the community

2.10.1 Improved access to and from regional markets

Inland Rail will improve access to and from regional markets through:

- Improved linkages to regional areas for inter-capital freight.
- Improved access in agricultural areas to key local, regional, and international markets, which will improve market drought resilience and the ability to move greater volumes of grain via rail.

2.10.2 Reduced costs for the market

Inland Rail will reduce costs to market through the efficiencies gained by the development of a dedicated freight rail system. Anticipated benefits include:

- Reduced inter-capital freight transport costs for the market are likely to result in lower prices for consumers (predominantly manufactured goods). This also presents an opportunity for flow-through of cost savings to reduce the cost of living for consumer households.
- Reduced lifecycle costs for infrastructure owners/ operators on traditional road freight routes due to lower freight volumes on these assets. This would reduce maintenance costs and enable investments in capacity to be avoided or deferred.
- Reduced transport costs may improve competitiveness of key markets and economic activity, particularly in the agricultural and mining sectors.
- Inter-capital and agricultural freight currently travelling by road is likely to benefit from reduced operating costs due to economies of scale in rail relative to road transport.

2.10.3 Improved reliability and certainty of transit time

The dedicated Inland Rail freight system will deliver greater efficiencies in terms of reliability and certainty through the following measures:

- Improved reliability and certainty of transit time results in productivity and economic efficiency due to operating cost savings, shorter transit times, improved availability, and avoided incidents.
- Benefits associated with higher axle loads, longer trains, lower gradients, and longer curves, resulting in shorter transit times, and avoided incidents and flooding.
- Linkages between existing rail networks, such as the existing Queensland Rail West Moreton System rail corridor and the Brisbane to Sydney rail corridor. Additionally, railway infrastructure within existing corridors used by Inland Rail would be subject to replacement and upgrade. New linkages and upgraded infrastructure would combine to enable faster transit time on existing journeys.

2.10.4 Increased capacity of the transport network

The capacity of the overall transport network will be enhanced by the development of Inland Rail via:

- Increased capacity enabling the opportunity to return unused freight paths to passengers in Sydney and Brisbane during off peak periods (noting that passengers are already given absolute priority in peak periods).
- Improved customer outcomes for rail passengers between Sydney and Brisbane with unused freight paths on the coastal rail lines able to be returned to passenger services. The benefit of increased frequency of passenger services reduces average wait time and provides greater reliability and certainty for passengers.
- Increased freight capacity enabling greater volumes of inter-capital freight to be moved via rail with a reduced reliance on existing state-controlled and local road networks.
- Greater volumes of inter-capital freight to be moved via rail with a reduced reliance on road.
- Road traffic through Sydney will be relieved by allowing greater capacity for public transport, avoiding the need for capacity augmentation on existing routes.
- Agricultural freight, including grain to use rail in accessing key local and international markets.

2.10.5 Reduced distances travelled

Inland Rail will provide a shorter option for the transportation of freight, resulting in a reduced time between the point of source and the market for goods and produce. Through the provision of new linkages between existing rail networks, Inland Rail will also provide a shorter route option for undertaking existing journeys.

2.10.6 Improved safety

Benefits relating to road safety through the development of Inland Rail are expected to:

- Remove 200,000 long-haul truck movements from roads each year.
- Reduce truck volumes in over 20 regional towns.
- Reduce congestion on existing roads and improves safety.

Inland Rail will adopt the Advanced Train Management System (**ATMS**), which is a global positioning system for the control of train movements on the network. Each train 'knows' where it is on the network and can be automatically braked if it exceeds speed or does not have permission to be on a section of track.

2.10.7 Improved sustainability and amenity for the community

Inland Rail will provide a long-haul freight solution that is time and cost competitive when compared to road freight. Consequently, Inland Rail will replace some of the long-haul road freight, resulting in reduced road congestion, fewer vehicular carbon emissions, and reduced noise. It is estimated that transportation of freight on Inland Rail will use up to two-thirds less fuel than that would be required to transport the same volume of freight via the existing road route.

2.11 Implications of the Project not proceeding

The implications of not proceeding with Inland Rail will potentially constrain the future growth of the national economy. The continuing growth in freight demand means rail infrastructure requires upgrading to meet the demand. Without a decision to make a change in rail efficiency and performance, pressure on the road networks will continue to increase, freight costs will continue to rise, consumers will pay more for products, and productivity in important industrial sectors could decline.

Without Inland Rail, the use of the road network will increasingly become the dominant freight transport mode, with rail becoming less relevant. A continued over-reliance on road transport to meet the future freight transportation needs will increase the vulnerabilities to demographic changes that are, even today, driving shortages of long-distance truck drivers and increasing costs.

More specifically, if investment in the Inland Rail freight corridor is not undertaken to increase capacity and minimise supply chain costs, the following risks are highly likely to eventuate:

- National productivity and economic growth will be constrained.
- Freight companies and the consumers of products transported along the corridor are expected to experience excessive freight costs.
- An increase in congestion on both rail and road networks, given the reliance on shared freight/passenger corridors.
- An increase in the number of trucks on urban and regional roads required to move the rising freight volumes.
- Larger trucks (i.e. B-doubles, B-triples) will be mixing with smaller passenger vehicles on major highways.
- Governments will be required to make significant investments in major arterial and regional roads to ensure they can support the increase in the number and size of heavy vehicles.
- There will be a deterioration of safety on the road network with existing infrastructure not supportive of changes in vehicle mix.
- Ongoing fuel use and emissions discharged from an increased number and size of heavy vehicles will have environmental impacts.
- An increase in freight road traffic will have major impacts on urban and regional communities on the freight route such as congestion, amenity, and noise, resulting in safety and environmental issues.
- Significant economic impacts associated with the inability of the freight network to meet the demand for goods and services.

Chapter 3.0 Approvals and Assessment Framework

3.0 Approvals and Assessment Framework

The Project must obtain several statutory approvals to proceed.

It should be noted that this Environment Report, prepared under the EE Act, is not an approval in its own right but is required to be prepared as a condition of the Minister for Planning's decision under the EE Act and will enable the Victorian Minister for Planning to prepare the Assessment Report for the purposes of the Bilateral Agreement. The Assessment Report will inform the Commonwealth Government Minister for the Environment when making her decision on the Project under the EPBC Act. The Assessment Report will also be considered by Victorian Government decision makers.

3.1 Key Approvals

3.1.1 Environment Effects Act 1978

Under Victoria's EE Act, projects that could have a 'significant effect' on Victoria's environment can potentially require an EES. Based on the findings of preliminary assessments, the Project was referred to the Minister for Planning under the EE Act (EES referral number 2020-07). The Minister determined that an EES was not required, subject to conditions which included preparation of an Environment Report and an Environmental Management Framework in consultation with DELWP, completed to the satisfaction of the Minister for Planning, prior to the commencement of works (https://www.planning.vic.gov.au/__data/assets/pdf_file/0031/488722/Reasons-for-Decision-2020R-07.pdf).

A copy of the scoping document issued by DELWP for the preparation of this Environment Report is provided in Attachment A.

As part of the assessment process the Environment Report is exhibited for public comment. Feedback from the community and other stakeholders is sought during a public exhibition process and any submissions from the public on the advertised documentation will be addressed by ARTC in an addendum to the Environment Report and submitted to the Minister for Planning to inform his assessment of the project's impacts.

At the conclusion of the process, the Victorian Minister for Planning will provide an 'Assessment Report' to the Commonwealth Government Minister for the Environment, which will inform the Commonwealth's decision on whether the project is approved, refused or approved with conditions under the EPBC Act. The Assessment Report will also be considered by relevant Victorian Government decision makers to inform decisions on the Project.

The projects approval process is shown in Figure 2. This figure also provides an overview of how the Environment Report fits into key approvals under the EPBC Act, *Planning and Environment Act 1987*, *Aboriginal Heritage Act 2006,* and *Heritage Act 2017*, as discussed in the following sections.

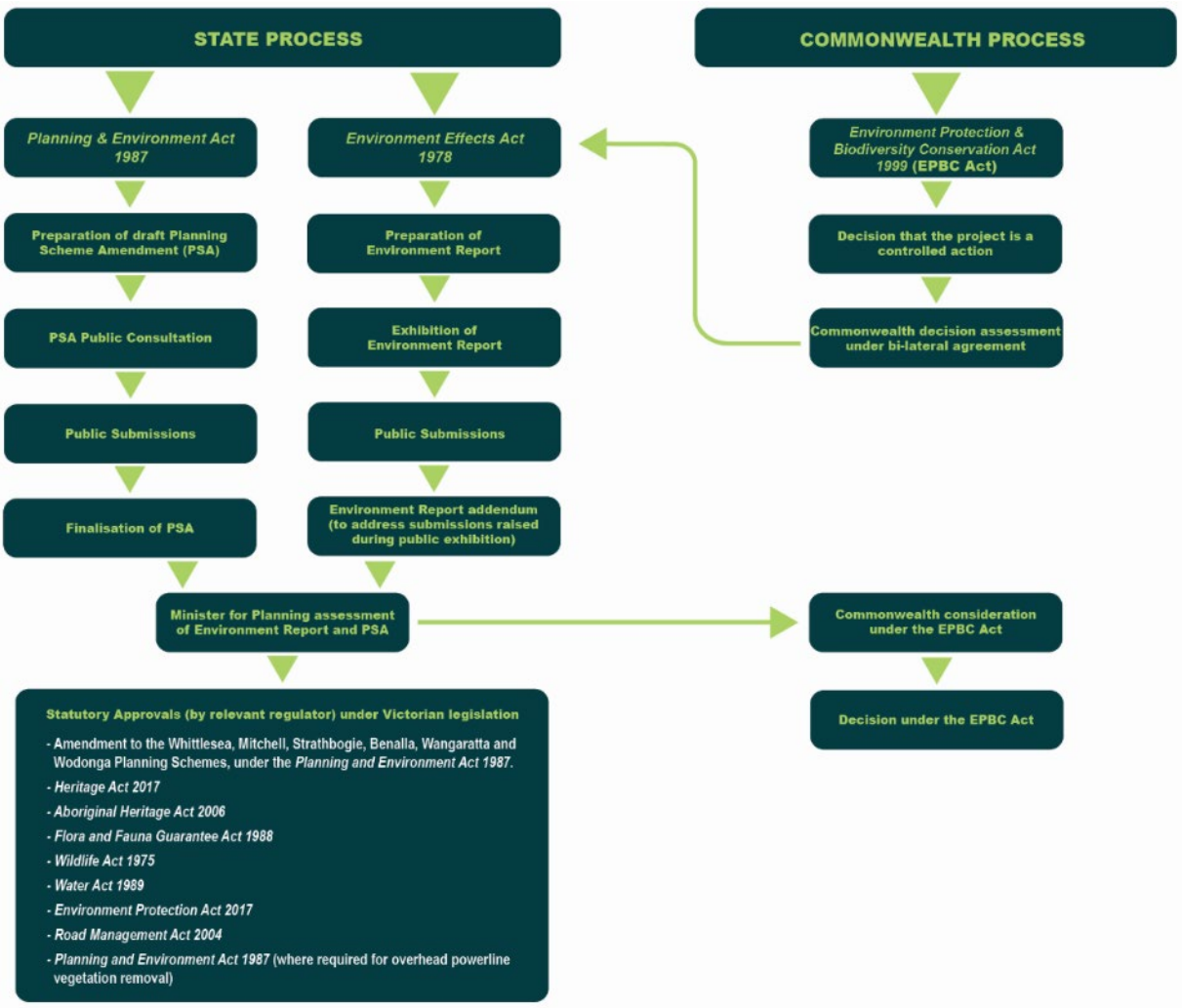


Figure 2 Project approval process

3.1.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's key piece of environmental legislation which provides a national approach to environment and heritage protection and biodiversity conservation.

The EPBC Act focuses on the protection of MNES including World Heritage Properties, National Heritage Places, Ramsar wetlands, nationally listed threatened species and ecological communities and listed migratory species. The EPBC Act states that 'controlled' actions (i.e. actions that are determined as likely to have a significant impact on MNES) are subject to assessment and approval under the EPBC Act.

Two referrals were made by ARTC for the Project. The outcomes are summarised in Table 7.

Assessment of the Project under the EPBC Act is being undertaken via the accredited state assessment process (environmental report process) under the EPBC Act Bilateral (Assessment) Agreement 2014 between the Commonwealth and Victorian governments. This means that at the conclusion of the accredited process, the Victorian Minister for Planning will provide an 'Assessment Report' to the Commonwealth Government Minister for the Environment, which will inform the Commonwealth's decision on whether the project is approved, refused or approved with conditions under the EPBC Act.

Table 7 Overview of referrals submitted under the EPBC Act

Title of Referral	Reference Number	Referral Decision	MNES Potentially Impacted	Proposed Action
Transport - Land/Beveridge to Albury excluding Glenrowan/Victoria/Inland Rail – Beveridge to Albury excluding Glenrowan	2020/8710	Controlled action.	Grey Box (*Eucalyptus microcarpa*) and Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (threatened ecological community) Euroa guinea-flower *Hibbertia humifusa* subsp. *erigens* (threatened species)	To conduct upgrades along the existing North East Line Inland Rail between Beveridge and Albury in Victoria.
Transport - Land/Glenrowan/Victoria/ Inland Rail-Beaconsfield Parade Overpass Project, Glenrowan, Vic	2020/8710	Not a controlled action.	Glenrowan Heritage Precinct (National Heritage Place)	To replace the existing Beaconsfield Parade rail overpass with a new overpass, and associated works.

3.1.3 Planning & Environment Act 1987

The *Planning and Environment Act 1987* (Vic) (**P&E Act**) sets out the framework for planning the use, development, and protection of land in Victoria. This includes the process for amending planning schemes and matters that need to be considered when preparing and assessing a planning scheme amendment (**PSA**).

An amendment to the Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, and Wodonga Planning Schemes (**the Planning Schemes**) is currently being prepared for the Project (the Amendment). The Amendment proposes to introduce the '*Inland Rail – Beveridge to Albury April 2021'* Incorporated Document into the Planning Schemes to facilitate the use and development of the project area for the purpose of the Project (excluding overhead powerline replacement works outside enhancement sites). It is noted that the proposed works located within Indigo Shire are limited to overhead powerlines only, therefore the Amendment does not include the Indigo Planning Scheme.

The Incorporated Document is the key planning approval for the Project and will allow works to proceed alongside the approval of this Environment Report and the EMF. All three documents must be prepared to the satisfaction of the Victorian Minister for Planning.

The EMF will be finalised following approval of the PSA and will be informed by the findings and conclusions of the Environment Report. The EMF will be developed in consultation with DELWP and relevant Councils to the satisfaction of the Minister for Planning. It will provide a statement of all environmental commitments for the Project and provide an overarching framework to manage environmental and amenity impacts during construction. The EMF will cover all works outlined in this Environment Report. See Chapter 10 for further discussion regarding the Project EMF.

Overhead powerline replacement works that occur outside enhancement sites are largely exempt from planning approval under Clause 62.02-1 of the Planning Schemes, as the works are defined as a 'minor utility installation'. However, where native vegetation removal is required to facilitate the works, a planning permit may be required in accordance with Clause 52.17 of the Planning Schemes.

In the instances where a planning permit is required for the removal of vegetation to facilitate overhead powerline replacement works outside enhancement sites, a separate planning permit application will be lodged with the relevant Council.

3.1.4 Aboriginal Heritage Act 2006

Sections of the project area are located within areas of Aboriginal cultural heritage sensitivity due to the presence of registered cultural heritage places and named waterways as defined in the *Aboriginal Heritage Regulations 2007* (Vic). As such, the Project requires the preparation of Cultural Heritage Management Plans (**CHMPs**) under the *Aboriginal Heritage Act 2006* (Vic).

Given the spatial extent of the Project, four CHMP's are currently being prepared in consultation with Aboriginal Victoria, the Yorta Yorta Nation Aboriginal Corporation, the Taungurung Land and Waters Council Aboriginal Corporation, and other Traditional Owner groups.

The CHMP's are summarised in Table 8 and, once adopted, will provide management conditions for any Aboriginal heritage within the project area.

Table 8 Summary of Aboriginal Cultural Heritage Management Plans

CHMP Number	Registered Aboriginal Party	Project area
CHMP 17752	Yorta Yorta Nation Aboriginal Corporation	Glenrowan
CHMP 17402	Yorta Yorta Nation Aboriginal Corporation	Benalla and Wangaratta
CHMP 17401	Taungurung Land and Waters Council Aboriginal Corporation	Tallarook to Euroa
CHMP 17862	Taungurung Land and Waters Council Aboriginal Corporation	Wandong and Broadford

3.1.5 Heritage Act 2017

The *Heritage Act 2017* regulates the protection and conservation of places listed on the Victorian Heritage Register (**VHR**) and archaeological sites listed on the Victorian Heritage Inventory (**VHI**).

Under the *Heritage Act 2017*, works within the registered extent of places listed on the VHR or VHI will require consultation with Heritage Victoria and permits or consents (or exemptions from permits or consents) under the *Heritage Act 2017* (Vic). Table 9 and Table 10 summarise the VHR and VHI sites located within the project area.

The following two permit application are currently being prepared in consultation with Heritage Victoria for Project works located within the:

- Glenrowan Heritage Precinct (H2000)
- Wangaratta Railway Station Complex (H1597)

Following the detailed design phase, any additional permits, or consents (or exemptions) will be determined in consultation with Heritage Victoria.

Table 9 Heritage places listed on the Victorian Heritage Register (VHR) within the Project area

Name	Heritage database	Register number	Address	LGA	Description
Seymour Railway Station	VHR	H1591	Station Street, Seymour	Mitchell Shire	Railway Station Complex
Rail Bridge over Broken River, Ackerly Avenue	VHR	HO1061	Ackerly Avenue, Benalla	Benalla	Railway Bridge

Name	Heritage database	Register number	Address	LGA	Description
Glenrowan Heritage Precinct	VHR	H2000	Siege Street, Church Street, Gladstone Street, Hill Street and Burns Street, Glenrowan	Wangaratta	Historic precinct, site of Kelly Gang Siege, 'The Last Stand'
Wangaratta Railway Station Complex	VHR	H1597	37 Norton Street, Wangaratta	Wangaratta	Railway Station Complex
Chiltern Railway Station and Goods Shed	VHR	H1603	Railway Access Road, Chiltern	Indigo	Railway Station Complex

Table 10 Heritage places on the Victorian Heritage Inventory (VHI) within the Project area

Name	Heritage database	Register number	Address	LGA	Description
Wallan Station Complex	VHI	H7923-0045	2-32 Station Street, Wallan	Mitchell Shire	Former Railway Station Complex
780 Wandong Road	VHI	H7923-0073	780 Wandong Road	Mitchell Shire	House and garden, 780 Wandong Road
Former Balmattum Station	VHI	H8024-0012	Balmattum Siding Road, Balmattum	Strathbogie	Former Railway Station Complex
Former Locksley Station	VHI	H7924-0091	Avenel-Longwood Road, Locksley	Strathbogie	Former Railway Station Complex
Glenrowan Heritage Precinct	VHI	H8125-0015	Siege Street, Church Street, Gladstone Street, Hill Street and Burns Street, Glenrowan	Wangaratta	Historic precinct, site of Kelly Gang Siege, 'The Last Stand'
Former Beveridge Station Complex	VHI	H7823-0054	Beveridge Road, Beveridge	Whittlesea	Former Railway Station Complex

3.2 Secondary Approvals

Several other permits and approvals may be required for specific aspects of Project works. These are summarised in Table 11.

Table 11 Summary of Secondary Approvals

Legislation	Responsible Authority	Approval	Purpose
Flora and Fauna Guarantee Act 1988 (Vic)	DELWP	FFG Act Permit – permit to take.	Permit to remove protected flora.
Wildlife Act 1975 (Vic)	DELWP	Management authorisation for the salvage and handling of fauna.	Required if works will involve the removal or destruction of wildlife.
Water Act 1989 (Vic)	Port Phillip and Westernport, Goulbourn Broken and North East Catchment Management Authority (**CMA**)	Consent for minor works on, over or under a designated waterway or within a Land Subject to Inundation Overlay (**LSIO**) or a Special Building Overlay (**SBO**).	Required to facilitate water crossing works.
Environment Protection Act 2017 (Vic)	Environment Protection Authority (**EPA**)	Works approval for any discharge into a waterway or groundwater during the construction of the Project.	May be required during the construction phase of the Project.
Road Management Act 2004 (Vic)	DoT	Consent for works within a road reserve.	Required to facilitate works within the road reserve.
Planning and Environment Act 1987 (Clause 52.17)	Local Government	Planning permit to remove, destroy, or lop native vegetation	Required to facilitate overhead powerline replacement works outside enhancement sites where native vegetation is being impacted.

3.3 Other Relevant Legislation and Approvals

3.3.1 Transport Integration Act 2010

The *Transport Integration Act 2010* (Vic) (**TI Act**) provides a legislative framework for transport in Victoria. The TI Act seeks to integrate land use and transport planning and decision-making by applying the framework to land use agencies whose decisions can significantly impact on transport. The TI Act requires agencies, including the DoT and planning authorities, to consider the potential impact of land use planning proposals on transport.

The objectives and decision-making principles of the TI Act have been applied at all stages of the development of the Project. The Minister for Planning must consider the objectives and decision-making principles of the TI Act and determine the weight to be given to each of them when assessing this Environment Report and deciding whether to approve the PSA for the Project.

3.3.2 Major Transport Projects Facilitation Act 2009

It is proposed that the Project will be declared under the *Major Transport Project Facilitation Act 2009* (**MTPF Act**) for the purposes of project delivery. The delivery powers of the MTPF Act allow for more streamlined arrangements to manage roads, access, and acquire land, manage utilities, and address local laws.

To access the delivery powers of the MTPF Act, the Premier must be satisfied that the Project is of economic, social, or environmental significance to the State or a region of the State and have regard to the project declaration guidelines published in the Government Gazette.

Following approval of the PSA for the Project, it is proposed that the Minister for Planning designate the Inland Rail Project Area as a project area under Section 95 of the MTPF Act.

Chapter 4.0 Ecological Investigations

4.0 Ecological Investigations

The Project has been subject to several preliminary and detailed ecological studies during the design evolution.

These studies took place between 2017 – 2020 and culminated in the Project being referred to the State Government under the EE Act and to the Australian Government under the EPBC Act. The studies undertaken were:

- *Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services. Tottenham to Albury Biodiversity Assessment* (KBR, 2020a), which included an assessment of biodiversity values and impacts to the north and south of Beveridge. Desktop assessments were conducted by reviewing and confirming data previously collected by WSP/PB, followed by habitat hectares assessments (**HHa**), and mapping of observed threatened species, Threatened Ecological Communities (**TECs**), and threatened species habitat.
- *Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services. Ecology Report - Victorian Temperate Woodland Bird Survey* (KBR, 2020b), which included an assessment of previously identified woodland habitat areas to determine the presence or absence of the Victorian Temperate Woodland Bird Community and listed threatened bird species. Winter surveys were conducted in accordance with the EPBC Act guidelines for swift parrot surveys.
- *Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services. Threatened Flora Survey Report* (KBR, 2020c), which included targeted surveys for three species, Euroa Guinea-flower *Hibbertia humifusa* subsp. *erigens*, Crimson Spider-orchid *Caladenia concolor*, and Purple Diuris *Diuris punctata* var. *punctata*. Targeted surveys were undertaken at three enhancement sites within the current project area. No EPBC Act-listed or FFG Act-listed species were identified.
- *Inland Rail Overhead Powerline investigation areas Desktop Ecological Assessment* (ABZECO, 2019) which included a review of relevant databases and literature to identify biodiversity values within 5 km of each overhead powerline investigation area, as well as any potential legislative implications. A desktop Likelihood of Occurrence Rating Criteria was developed by ABZECO and was used to assign a likelihood of occurrence rating to each record of threatened species or community identified by the Victorian Biodiversity Atlas (**VBA**) search. A risk evaluation rating of high, moderate, or low was also assigned to each overhead powerline investigation area. Targeted surveys were recommended for species and communities that were assigned a moderate or high likelihood of occurrence. Targeted surveys were recommended for four ecological communities, three threatened fauna communities, 19 threatened flora species, and 15 threatened fauna species within the investigation area. Field verification of all overhead powerline investigation areas was recommended.
- *Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services. Overhead Powerline Biodiversity Assessment Report* (KBR, 2020d) which reviewed the recommendations of the desktop assessment (ABZECO, 2019) in relation to the refined project area and scope refinements. A field assessment was undertaken to validate the findings of the desktop assessment and to identify the potential for increased or additional biodiversity values and ecological constraints that would need to be included in the EPBC Act and EE Act referrals for the Project. Rapid field assessments were undertaken at 82 powerline investigation areas that were assigned a low ecological risk rating or considered to have moderate potential for threatened fauna to occur. Targeted flora surveys were carried out at the remaining 18 overhead powerline investigation areas that were assigned a high or moderate likelihood of supporting threatened flora and ecological community. Verification of TECs was completed as part of the targeted flora survey work. It should be noted that, of the 18 overhead powerline investigation areas identified for targeted survey work, only twelve were able to be surveyed due to land access restrictions on private land.

Additional field assessments were undertaken in response to the decision that the Project is to be assessed via the accredited state assessment process of an Environment Report (this document) in order to update the existing conditions information as it relates to the Project's Reference Design and

inform the assessment of impacts on threatened species and communities listed under the EPBC Act, FFG Act and/or Victorian threatened species advisory lists. These assessments were:

- *Inland Rail – Beveridge to Albury Enhancement Sites, Track Slews and Signal Gantries - Ecology: Existing Conditions and Impact Assessment* (AECOM 2021a), which describes existing ecological conditions based on the findings of the previous surveys (2017 – 2019) and detailed ecological assessment conducted between October 2020 and March 2021 for the expanded project area for the enhancement sites, track slews, and signal gantries. This document is referred to as Technical Report A (Attachment B).
- *Inland Rail – Beveridge to Albury Overhead Powerlines – Ecology: Existing Conditions Report* (AECOM 2021b), which describes existing ecological conditions based on the findings of the previous surveys (2017 – 2019) and detailed ecological assessment conducted between October 2020 and March 2021 for the expanded project area for the overhead powerlines. This document is referred to as Technical Report B (Attachment C).
- *Inland Rail – Beveridge to Albury Enhancement Sites – Ecology: Targeted Fauna Survey Spring 2020* (AECOM, 2021c) which outlines the hollow-bearing tree assessment and targeted surveys undertaken for Brush-tailed Phascogale, Squirrel Glider, and Barking Owl at Broadford, Tallarook, and Seymour in October – December 2020. This document is an appendix in Technical Report A (Attachment B).

The methods undertaken by these ecological investigations collectively are outlined in Chapter 5.0.

Chapter 5.0 Ecological Impact Assessment Method

5.0 Ecological Impact Assessment Method

The Project is utilising a structured impact assessment process to identify potential environmental impacts.

Comprehensive ecological impact assessments have been undertaken for the Project. As outlined in Chapter 4.0, detailed technical studies led to referral of the Project under the EE Act and EPBC Act. The primary reason that the Minister for Planning required preparation of an Environment Report was to understand the potential for significant impacts to native vegetation, habitat, and biodiversity values. This chapter describes the methods used to deliver the Project's Ecological Impact Assessment, shown graphically in Figure 3.

Figure 3 Summary of the Ecological Impact Assessment Method

The desktop, field, and impact assessments were informed by the requirements of biodiversity legislation and associated guidelines and advisory documents outlined in Table 12.

Table 12 Biodiversity legislation, policies, and guidelines which informed the assessments.

Type	Legislation	Guidelines and advisory documents
National	*Environment Protection and Biodiversity Conservation Act 1999*	*Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DoE, 2013a) *Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland. A guide to the identification, assessment and management of nationally threatened ecological communities Environment Protection and Biodiversity Conservation Act 1999*. (DSEWPaC, 2011a) *Grey Box (Eucalyptus microcarpa) Grassy Woodlands ad Derived Native Grasslands of South-Eastern Australia: A guide to the identification, assessment and management of a nationally threatened ecological community Environment Protection and Biodiversity Conservation Act 1999* (DSEWPaC, 2012a). *EPBC Act policy statement 3.5 – White box – yellow box – Blakeley's red gum grassy woodlands and derived native grasslands* (DEH, 2006) *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (DAWE, 2012)
State	*Flora and Fauna Guarantee Act 1988*	*Flora and Fauna Guarantee Act* 1988 – *Threatened List* (DELWP, 2019a) *Flora and Fauna Guarantee Act 1988 Protected Flora List – November 2019* (DELWP, 2019b) *Flora and Fauna Guarantee Act 1988 – Threatened List: Characteristics of Threatened Communities* (DELWP, n.d.) *Flora and Fauna Guarantee Act 1988 – Processes List – December 2016* (DELWP, 2016)

Type	Legislation	Guidelines and advisory documents
	Planning and Environment Act 1987	*Guidelines for the removal, destruction and lopping of native vegetation* (DELWP, 2017a) *Vegetation Quality Assessment Manual-Guidelines for Applying the Habitat Hectares Scoring Method* (DSE, 2004) *Biodiversity information explanatory document: Measuring value when removing or offsetting native vegetation* (DELWP, 2017b). *Assessor's handbook: Applications to remove, destroy or lop native vegetation* (DELWP, 2018a). *Applicant's guide: Applications to remove, destroy or lop native vegetation* (DELWP, 2018b).
	N/A	*Advisory List of Rare or Threatened Plants in Victoria – 2014* (DEPI, 2014) *Advisory List of Threatened Vertebrate Fauna in Victoria – 2013* (DSE, 2013) *Advisory List of Threatened Invertebrate Fauna in Victoria – 2009* (DSE, 2009)

5.1 Area Definitions

The following sections outline the area definitions used throughout this report.

5.1.1 Project Area

Project area is the term used to collectively describe the package of the 12 enhancement sites, five track slew upgrades, 21 signal gantries, and the overhead powerline package (Section 2.4). The project area boundary associated with each of these sites is shown in (Figure 12 – Appendix B) and a list of the sites is provided in Appendix A.

5.1.2 Investigation area

The investigation area for the Project is the area assessed for existing ecological conditions at each of the enhancement site, track slew, signal gantry, and overhead powerline locations. The investigation area is defined by the project area boundary plus a 15 m buffer. The purpose of the buffer is to document ecological values immediately adjacent to the project area as a conservative measure of values which may be affected by the Project, and was specifically designed to incorporate the potential for impacts to trees that lie outside (but in proximity to) the project area.

5.1.3 Impact Area

Impact area is the term used to describe the area impacted by the Project and is different when referring to the enhancement sites, track slew, and signal gantry package versus the overhead powerline package.

As discussed in Section 5.4.1, indirect impacts to biodiversity values from track slews and signal gantries will be avoided as works are confined to existing access tracks and the rail corridor. The impact area for the enhancement sites is defined by the initial Reference Design (Figure 16 – Appendix B) plus a 15 m buffer on the initial Reference Design for the purpose of identifying adjacent values (i.e. trees) that could also be indirectly impacted (a full definition of 'indirect' impacts is provided in Section 5.4.1). Where there is only one proposed design at an enhancement site, this is the Reference Design. Where there are multiple design options at an enhancement site, the Reference Design is referred to Option 1 in Section 2.7, which provides an overview of each site.

The overhead powerline package impact area is defined by the project areas without buffer area as it is considered that trees proximal to the overhead powerline project areas are unlikely to be indirectly impacted.

The impact assessment in this report is based on varying stages and levels of project design hereafter referred to as 'Reference Design' throughout this report. The impact area for the Project is shown in Figure 16 (Appendix B).

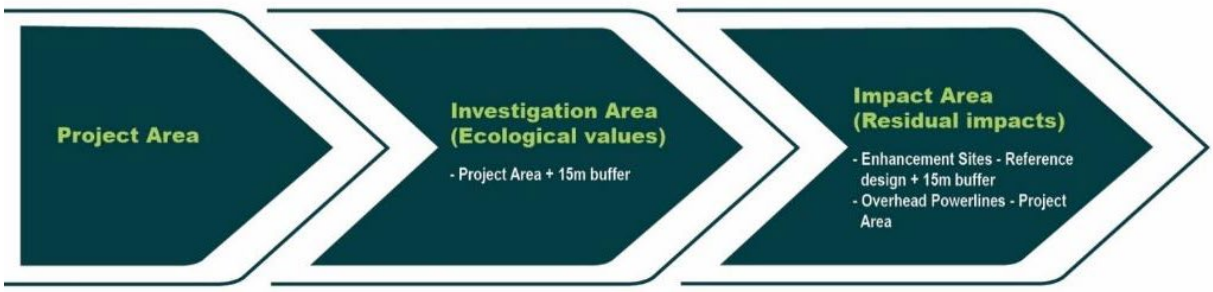


Figure 4 Project area definition hierarchy

5.2 Desktop Assessment

The desktop assessment included a review of biodiversity databases, legislation, guidance, and explanatory documents completed for the Victorian component of the Project to understand the existing ecological values within the Project's geographic region.

5.2.1 Database searches

Database searches were completed as part of the desktop assessments undertaken during previous ecological investigations. The databases were used to inform/identify the primary ecological values known, or with potential to occur, in the project area. Databases reviewed included:

- EPBC Act Protected Matters Search Tool (**PMST**) administered by Department of Agriculture, Water, and the Environment (**DAWE**) to identity MNES within 2 km of the project area.
- Online tools administered by DELWP including:
  - VBA for records of Victoria's rare or threatened flora and fauna species (**VROTS**) within 5 km for flora and within 10 km for fauna due to their transient/mobile nature.
  - NatureKit and Native Vegetation Information Management (**NVIM**) online datasets for information on Ecological Vegetation Classes (**EVCs**), Bioregions, LGAs and CMA boundaries. Maps that are used in the native vegetation removal regulations (native vegetation location map, native vegetation condition map, strategic biodiversity value map, and habitat importance maps for Victoria's rare or threatened species) were also reviewed.
  - MapshareVic to identify mapped wetlands within DELWP's Current Wetlands Map.
  - EVC benchmarks (DELWP, 2020b) to use in assessing native vegetation quality using the Vegetation Quality Assessment (**VQA**) method.
  - VicPlan for information on planning zones and environmental overlays.
  - Environmental Systems Modelling Platform Native Vegetation Regulations Tool (**EnSym**) for native vegetation offset requirements.

A contemporary review of the VBA was completed in February 2021 to identify any recent records for Commonwealth and State significant species within 5 km of the project area.

It is noted that, in line with the changes to the FFG Act (gazetted in May 2021), all threatened taxa will be included on a single list of species under the FFG Act. This list will (when publicly available) supersede the advisory lists. As this list was not available at the time of the current assessment, these changes have not been considered within this report.

5.2.2 Likelihood of occurrence assessment for threatened species

A *likelihood of occurrence assessment* was also completed during the desktop phase of the assessment. This was an evaluation used to help determine the likelihood of occurrence of rare or

threatened flora and communities based on known or predicted occurrence within a set geographic region and the presence of suitable habitat. Threatened species included those:

- Listed as threatened under the EPBC Act
- Listed as threatened in Victoria under:
  - FFG Act – Threatened List (DELWP, 2019a)
  - Victorian advisory lists which are collectively referred to as Victorian Rare or Threatened Species (VROTS). The advisory lists comprise:
    - Advisory List of Rare or Threatened Plants in Victoria – 2014 (DEPI, 2014)
    - Advisory List of Threatened Vertebrate Fauna in Victoria – 2013 (DSE, 2013)
    - Advisory List of Threatened Invertebrate Fauna in Victoria – 2009 (DSE, 2009).

Three broad categories were then used to assess likelihood of species occurring in the project area:

- **High**: the environment in the project area contains most of a species' habitat requirements.
- **Moderate**: there are previous records of the species (within the last 30 years) within 5 km of the project area, and potential linkages for the species in the surrounding landscape.
- **Low**: few habitat components are present for a species and the area appears to have been subject to previous disturbance.

Only those species with a moderate or high likelihood of occurrence were considered to have the potential to occur. Those species with a moderate or high likelihood of occurrence were the focus of subsequent field assessments.

5.2.3 Desktop mapping of ecological values – overhead powerline project areas

Access to private property was only partially available during the overhead powerline field assessment conducted between October 2020 and December 2020 for three investigation areas (1006, 1011, and 1116). Assessment of biodiversity values for these sites was therefore based on a combination of desktop and field assessments. Only investigation area 1009 had no access to private property and was assessed entirely by desktop assessment (Table 13).

In May 2021, after the field assessments were completed, 87 investigation areas were modified in response to an improved understanding of construction requirements and to allow greater flexibility during construction. In some instances, a change was made to avoid identified threatened flora values.

The location and extent of the changes are shown in Appendix C. In most instances, the change in project area was not substantial and most of the investigation area was assessed in the field.

For each investigation area with a modified project area, a desktop assessment was undertaken to determine whether the additional areas not subject to field assessment had the potential to contain native vegetation. The desktop assessment used aerial imagery and knowledge from field assessments of adjacent areas (where available) to interpret the presence of:

- Patches of trees. Treed patches were assigned an EVC based on DELWP modelled EVC datasets and/or observations during the field assessment of adjacent areas. Condition of patches was assigned using the Native Vegetation Condition Map in the NVIM online tool in accordance with section 3.2 of DELWP (2017a). Taking a conservative approach, the upper value of each class was used when assigning native vegetation condition scores to desktop defined patches of native vegetation. Where a patch of vegetation (and/or TEC) was mapped in the field and occurred within or immediately adjacent to an updated project area, its extent was extended.
- Scattered Trees which were assigned to the large tree benchmark of the relevant EVC.
- Treeless vegetation. Areas of potential treeless native vegetation were conservatively identified for all areas where vegetation was visible on the aerial photography, unless information from field assessments of adjacent areas provided confidence that the vegetation was dominated by exotic species.

The number of large trees in patches, the species and DBH of Scattered Trees, the presence of TECs (except instances where occurrence of a TEC was known from adjacent areas), and habitat for threatened species was not able to be determined via the desktop assessment for the additional areas as these values can only be identified via field assessment.

Of the 87 investigation areas with project area additions (Table 13), 64 were identified through the desktop assessment to contain patches of trees, Scattered Trees, and/or potential treeless vegetation (including the four investigation areas where access was partially or not available) and 23 were areas of existing rail infrastructure, paved roads or footpaths, or exotic vegetation.

Field assessment is proposed for the additional areas associated with the 64 investigation areas to validate the values identified by the desktop assessment, confirm EVC and condition of patches and assess the presence of those values unable to be identified through the desktop assessment. The field assessment will include those project areas for which no or only partial access was available during the field assessment. Field assessment is scheduled for the second half of 2021 and the findings will be documented in an addendum to the overhead powerline technical report and incorporated into the final Environment Report post-exhibition if the project schedule permits. Desktop assessment was not conducted on any other sites.

Limitations around the desktop assessment have been described; however, as all but one site have had field assessments conducted elsewhere in the investigation area, it is unlikely that there is a significant discrepancy in what was identified in the field and what was mapped in the desktop assessments.

Table 13 Overhead powerline investigation areas that required the use of desktop data for part or all of the site

Reason for desktop assessment	Field assessment proposed?	Investigation area ID	Number of areas
No/partial access during field assessment (October to December 2020).	Yes	1006*, 1009, 1011*, and 1116*	4
Change in investigation area (May 2021).	Yes	1008, 1012, 1019, 1021, 1022, 1034, N10, N9, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1045, 1047, 1051, 1052, 1057, 1058, 1203, 1060, 1061, 1062, 1065, 1068, 1069, 1070, 1071, 1072, 1076, 1077, 1078, 1080, 1081, 1083, 1084, 1085, 1087, 1088, 1089, 1091, 1100, 1101, 1102, 1105, 1106, 1107, 1108, 1205, 1109, 1110, 1111, 1117, 1118, 1121, 1123, and 1124	60
	No	1001, 1002, 1007, 1023, 1024, 1031, 1048, 1053, 1054, 1063, 1064, 1067, 1075, 1082, 1086, 1090, 1092, 1099, 1103, 1104, 1113, 1119, and 1120	23

**Site had partial access during the field assessment.*

5.3 Field Assessment

Following the desktop assessment, field assessments were undertaken by qualified botanists and zoologists to confirm the presence or potential occurrence of ecological values within the investigation area to be considered in the impact assessment.

Given the spatial extent of the Project, the field surveys and associated reporting were split according to the nature of the key works. Separate field programs were undertaken for the overhead powerline project areas, and the enhancement sites, track slews, and signal gantries project areas.

Preliminary field assessments were undertaken over the summer of 2017/2018 and winter 2019. Detailed field assessments were then conducted in late-spring to early-summer, between 23 October to 18 December 2020, and 15 February to 9 March 2021 to assess additional areas that were subsequently incorporated into the Project and investigation area.

5.3.1 Ecological assessment

A significant program of field surveys was undertaken to confirm the ecological features present in the investigation area. The field assessments included:

- Identification and mapping remnant native vegetation patches.
- VQA (or condition assessment) of all native vegetation patches undertaken by a DELWP-accredited assessor applying the Habitat Hectares scoring method (DSE 2004).
- Identification of any DELWP mapped wetlands.
- Assessment of the likelihood of occurrence of rare or threatened flora and communities (based on the desktop assessment).
- Assessment of the condition of fauna habitat and identifying the potential for threatened and migratory fauna to occur within the project area.
- A hollow-bearing tree assessment.
- An inventory of both native and non-native flora and fauna seen or heard during the field assessment, together with conservation status, origin, and weed status.
- Identification of the presence of significant weed species including those declared under relevant state and national legislation, policy, or strategy.
- A preliminary evaluation of remnant native trees which may require an arborist assessment for the purpose of calculating native vegetation losses.
- An assessment of the extent, type, and condition of vegetation within environmental overlays.

A more detailed outline of field assessment methods is provided in Technical Report A (Attachment B) and Technical Report B (Attachment C).

5.3.2 Targeted surveys

Targeted surveys were undertaken for threatened flora and fauna based on information from desktop reviews that highlighted species with a moderate to high likelihood of occurrence in the project area. Species surveyed were:

- Brush-tailed Phascogale *Phascogale tapoatafa*
- Squirrel Glider *Anthochaera phrygia*
- Barking Owl *Ninox connivens*
- Striped Legless Lizard *Delma impar* (habitat assessment only)
- Swift Parrot *Lathamus discolor*
- Regent Honeyeater *Anthochaera phrygia*

- Painted Honeyeater *Grantiella picta*
- Euroa Guinea-Flower *Hibbertia humifusa* subsp. *erigens*
- Crimson spider-orchid *Caladenia concolor*
- Mountain Swainson-pea *Swainsona recta*
- Purple Diuris *Diuris punctata* var. *punctata*.

Targeted species, survey method, and project area locations are shown in Table 14.

Targeted surveys were not undertaken for five species - Growling Grass Frog *Litoria raniformis*, Golden Sun Moth *Synemon plana*, Matted Flax-lily *Dianella amoena*, Swamp Everlasting *Xerochrysum palustre,* and Swamp Fireweed *Senecio psilocarpus* as impacts to habitat were demonstrably avoided early in the design phase of the Project.

Table 14 Targeted survey method summary for threatened flora and fauna of interest to the Project

Species	Method	Timing and duration	Survey Guidelines	Area/Location
Flora				
Euroa Guinea-flower Crimson spider-orchid Purple Diuris Mountain Swainson-pea	Targeted flora surveys – parallel transect and systematic search	September – October 2019	*Survey Guidelines for Australia's Threatened Orchids* (DoE 2013b)	Eighteen overhead powerline investigation areas (KBR, 2020e) Tallarook and Track Slew 5 - Seymour – Mangalore Seymour-Avenel Road, Seymour and Signal Gantry 19 Hume Highway, Seymour
Fauna				
Brush-tailed Phascogale Squirrel Glider	Daytime survey to identify potential den/nest trees	November – December 2020 1 survey per site	*Survey guidelines for Australia's threatened mammals - Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (DSEWPaC 2011b) – noting that neither species is listed in under the EPBC Act or specifically addressed by the Guidelines *Pre-Harvest Surveys – Targeted Species Survey Procedure* (VicForests 2015; 2017). *Forest Protection Survey Program Survey Design Summary October 2018* (Malloy, 2018) *Flora and Fauna Guarantee Act 1988 Action Statement No. 79 – Brush-tailed Phascogale Phascogale tapoatafa* (DSE, 2003a) *Flora and Fauna Guarantee Act 1988 Action Statement No. 166 – Squirrel Glider Petaurus norfolcensis* (DSE, 2003b)	Marchbanks Road, Broadford Tallarook and Track Slew 5 - Seymour – Mangalore Seymour-Avenel Road, Seymour, and Signal Gantry 19 Hume Highway, Seymour
	Spotlight survey	30 minutes per 500 m; maximum 1 km 3 surveys per site		
	Remote cameras	5 cameras per site 5 weeks (33 nights) equating to 165 trap nights per site		

Species	Method	Timing and duration	Survey Guidelines	Area/Location
Barking Owl	Call playback	12 minutes 5 surveys per site	*Approved Survey Standards: Powerful Owl Ninox strenua.* (DSE, 2011) – in the absence of DELWP-specific survey standards for the Barking Owl.	Short Street, Broadford, and Signal Gantry 11 Marchbanks Road, Broadford Tallarook and Track Slew 5 - Seymour – Mangalore Seymour-Avenel Road, Seymour, and Signal Gantry 19 Hume Highway, Seymour
	Spotlight survey	Up to 15 minutes, 200 m 5 surveys per site		
Striped Legless Lizard	Targeted habitat assessments	N/A	N/A	Areas within the project area that supported predominately native grassland or sparsely treed grassy woodland with indigenous grassy understory. Land supporting cracking clays and rock crevices also assessed.
Swift Parrot Regent Honeyeater Painted Honeyeater	Targeted woodland bird surveys	20 hours diurnal survey (dawn and dusk) over 8 days between 18 - 31 July 2019	*Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (DEWHA, 2010)	Short Street, Broadford, and Signal Gantry 11 Marchbanks Road, Broadford Tallarook and Track Slew 5 - Seymour – Mangalore Seymour-Avenel Road, Seymour and Signal Gantry 19 and Hume Highway, Seymour; treated as one site given the contiguous nature of habitat between the sites.

5.4 Impact Assessment

The impact assessment is based on the Reference Design for the enhancement sites, tracks slews and signal gantries and 123 project areas for the overhead powerlines. The process of Project design is explained in Section 2.6.

5.4.1 Project related impacts

Construction activities proposed for the Project will impact on ecological values contained within and may also affect retained values adjacent to the project area.

The impact assessment for the Project draws on design information for the proposed works, the existing conditions (and therefore the values which could be impacted). and the avoidance and mitigation measures to be implemented for the Project. Residual impacts are those which would remain after the implementation of mitigation measures. As the information which informs the assessment is contained in several sections of the Environment Report, a summary of the location of the information is provided in Table 15.

Table 15 Summary of works type and relevant location of impact assessment information

Project works type	Proposed works	Existing conditions	Mitigation measures	Impacts	Technical information
Enhancement site	Section 2.5.1	Chapter 6 Appendix D*	Chapter 7	Chapter 8 Appendix D*	Attachment B
Track slew	Section 2.5.2	Chapter 6 Appendix D*	Chapter 7	Chapter 8 Appendix D*	Attachment B
Signal gantry	Section 2.5.3	Chapter 6 Appendix D*	Chapter 7	Chapter 8 Appendix D*	Attachment B
Overhead powerline	Section 2.5.4	Chapter 6 Appendix D*	Chapter 7	Chapter 8 Appendix D*	Attachment D

**Appendix D provides a summary of existing conditions and impacts for each site*

Impact definitions

Impact definitions are provided below for terms regularly used throughout this report:

- Potential impacts represent those impacts on ecological values in the absence of any avoidance or minimisation strategies. Potential impacts are described in Chapter 6.0.
- Residual impacts are those impacts which cannot be avoided after the avoidance and/or mitigation measures outlined in Chapter 7.0 have been implemented. Residual impacts are described in Chapter 8.0.
- Direct impacts refer to those impacts that will occur directly as a result of the project, such as clearance of trees and native vegetation, and are contained entirely within the proposed footprint of works i.e. project area.
- Indirect impacts refer to those impacts that may occur adjacent to the project area. The Assessor's Handbook (DELWP, 2018a) and DAWE's Significant Impact Guidelines (DoE, 2013a) suggest that indirect impacts may include assumed losses of native vegetation through encroachment into Tree Protection Zones (**TPZs**), losses from changed water flows, impacts on wetlands from sediment runoff, etc. Indirect impacts are accounted for in the current assessment through inclusion of a 15 m buffer on the Reference Design for enhancement site works as these are most likely to result in indirect impacts.

Residual impacts on native vegetation and threatened species habitat require compensation in the form of offsets. Offsets are not considered to be a mitigation measure and are therefore described separately in Chapter 9.0.

Figure 5 Impact assessment hierarchy

Assumptions and limitations for quantifying vegetation impacts

Impacts presented in this Environment Report are based on an impact area defined by the overhead powerline project areas and the Reference Design with a 15 m buffer for the enhancement site, track slews and signal gantries (Section 5.1).

Calculation of impacts was informed by the following assumptions and limitations:

Enhancement sites

- Where enhancement site project areas intersect overhead powerline project areas, ecology impacts were assessed under the enhancement sites.
- To account for potential impact on TPZs and further loss of native vegetation, a 15 m impact buffer has been applied to the Reference Design (i.e. it is included as part of the impact area). A 15 m buffer was chosen as it is the maximum possible TPZ for a large tree within any EVC.
- All vegetation that falls within the impact area is considered lost unless otherwise excluded.
- An arborist assessment will be undertaken prior to the development of detailed design. The arborist report will inform detailed design, confirm which trees may be unavoidably lost, and recommend protection measures for those trees which may be able to be retained.

Track slew and signal gantry sites

- An assumption has been made that the track slew and signal gantry works will not impact ecological values on the margins of the works area (indirect impacts). ARTC have stated that works will be conducted from the hi-rail and from existing access tracks that were designed (and have been maintained) for machinery such as cranes.
- Data from previous studies (KBR, 2020a, b, c, d) were utilised to inform the assessment. Data validation was not included in the scope of works and it was assumed that all data is accurate and correct. During data analysis, a potential discrepancy in Large Tree in Patch data collected by KBR (2020a) was identified along the margins of the track slews, particularly around Seymour. At Seymour, patches of vegetation along the margins of the track slews mapped by AECOM contained a high density of Large Trees in Patches, while KBR-mapped patches had a low density or no Large Trees in Patches. KBR (2020a) indicated that track slews will not require horizontal clearance and works can be done from within the rail corridor, and therefore impacts will not occur on the margins of the track slews. This is consistent with the assumptions used in the current impact assessment. This may explain the lower density of trees mapped by KBR (2020a) and, while this may be a limitation of the data collection process, it will not affect the outcome of the residual impact assessment outlined in Chapter 8.0.

Overhead powerlines

- Where an overhead powerline project area overlays an enhancement site project area, ecology impacts will be assessed under the enhancement site approval pathway. The remaining assumptions for overhead powerlines relate to those overhead powerline project areas that do not overlap with enhancement sites.
- No indirect impacts outside the overhead powerline project area are anticipated. This is because impacts in the project area do not require large-scale excavation at the margins of the project area.
- The project area modifications to 64 overhead powerline investigation areas described in Section 5.2.3 have not been subject to field assessment.

- ARTC have advised that the overhead powerline project areas contain existing access tracks and that upgrades to existing access tracks are not required. While these have been included in the calculation of impacts, it is anticipated that the overall impact from overhead powerline works will be reduced during detailed design.

General

- Residual impacts resulted in some patches of TECs falling below the extent necessary to meet the criteria for that TEC. Where this occurred, the whole patch of the TEC was considered lost and is included in calculation of residual impacts. TECs impacted by this assumption include:
  - GBGW (extent threshold = 0.5 hectares [**ha**])
  - WBYBBRGGW (extent threshold = 0.1 ha)
- The current assessment has assumed that the ecological information documented by KBR (2020a, b, c, d, & d) is accurate.
- ARTC has advised that installation of 'Next Generation' cabling will be required as part of the Project works. Within the potential preliminary works footprint, there is approximately 2.6 ha of native vegetation present, however, due to the stage of the project design, impacts for these cables cannot currently be assessed and are therefore not included in the impact assessment. While impacts cannot currently be calculated, mitigation measures to manage potential impacts resulting from these works are presented in Chapter 7.0. Locations of the next generation cabling are included in Figure 12 (Appendix B) for reference and a recommendation to include assessment of impacts and acquittal of potential offsets during the detailed design process has been included in Chapter 9.0.
- Technical Reports A (Attachment B) and B (Attachment C) treated the investigation areas of each set of works as separate packages, each with their own 15 m buffer the project area which, when considered co-incidentally, result in overlapping areas of impact. These overlaps have been removed for the purposes of impact quantification within this ER.

5.4.2 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (**GDEs**) were considered as part of an existing conditions assessment for groundwater beneficial uses and groundwater users associated with the enhancement sites (AECOM, 2021d). The National Atlas of Groundwater Dependent Ecosystems administered by the Australian Government Bureau of Meteorology (BOM) was searched for GDEs modelled to occur at the five enhancement sites where track lowering is proposed.

Groundwater monitoring bores were installed at the track lowering enhancement sites to confirm whether groundwater could be intersected during excavation and construction. One perched and five shallow groundwater monitoring bores were installed at:

- Short Street, Broadford
- Tallarook
- Wangaratta Precinct
- Barnawartha North.

An existing monitoring well was used for Hume Highway, Seymour rather than new wells installed.

The presence of ecological values which may be affected by changes to groundwater were considered for any sites with GDEs modelled to occur, and for which there was potential for groundwater to be intersected by the Project. An assessment of the potential for ecological values to be affected by a change in groundwater was then undertaken.

Additional options at Euroa (oversized vehicle underpass) and Benalla (track realignment, new platform, and new shared user underpass) are in the process of being assessed as an Addendum Report to the groundwater technical report. The potential interaction with groundwater at those locations will be considered by that assessment, as will any potential impacts to any GDE's in the event of necessary groundwater drawdown.

5.4.3 Cumulative impacts

The Minister's scoping requirements request that potential cumulative impacts arising from the Project be assessed in conjunction with the impacts of other projects that may affect the same environmental values.

An assessment of cumulative impacts has therefore been included in this Environment Report to provide an understanding of the potential adverse effects on the same environmental asset resulting from multiple projects. The method used to identify relevant projects and consider cumulative impacts is outlined in Chapter 11.0.

Chapter 6.0
Ecological Values

6.0 Ecological Values

Native vegetation, TECs, threatened species, landscape linkages, and hollow-bearing trees occur in the investigation area. Construction works for the Project may impact these ecological values.

The Project generally occurs within a highly modified environment of cleared agricultural land, dissected by road and rail infrastructure.

Despite a history of regional disturbance, remnant native vegetation and habitat values persist on both public and private land within proximity to the works. The ecological assessments identified a number of important values for flora and fauna, particularly native vegetation along rail and road corridors that contain large trees. A subset of the native vegetation was synonymous with TECs listed under the EPBC Act and/or FFG Act and habitat for threatened species. Habitat for threatened flora and fauna species also occurs.

For the purposes of understanding the ecological values with proximity to all proposed works, an investigation area was assessed. The investigation area for the Project is defined in Section 5.1 and repeated for clarity here as the area assessed for existing ecological conditions at each of the enhancement site, track slew, signal gantry, and overhead powerline locations. The investigation area is defined by the project area boundary plus a 15 m buffer.

Construction works proposed for the Project will have impacts on biodiversity contained within and adjacent to the investigation area. These impacts are primarily associated with the removal of vegetation during construction rather than the ongoing operation of the rail line.

This section describes the ecological values recorded within the broad investigation area. Distinction is made between MNES (EPBC Act) and other ecological values to assist regulators in considering the significance of the values recorded.

A summary of the ecological values and the residual impacts on a site-by-site basis has been provided in Appendix D.

6.1 Matters of National Environmental Significance

MNES are ecological values protected under the EPBC Act. Of the nine categories of MNES, nationally threatened species and ecological communities are relevant to the Project. Threatened species and ecological communities protected under the EPBC Act are found within the investigation area (Table 15 and Table 16).

6.1.1 Threatened ecological communities

TECs are a naturally occurring assemblage of plants, animals and other organisms that occupy and interact in a unique habitat. TEC's are listed as vulnerable, endangered, or critically endangered depending on the extent of the community remaining in Australia, threats to their decline and the potential for extinction. They are listed under Commonwealth law to prevent further decline and assist in recovery efforts to ensure the long-term survival of the community.

Three EPBC Act-listed TECs were recorded within the investigation area:

- Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands (**GBGW)** – listed as endangered under the EPBC Act.
- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived Native Grassland (**WBYBBRGGW)** – listed as critically endangered under the EPBC Act.
- Natural Temperate Grasslands of the Victorian Volcanic Plain (**NTGVVP**) – listed as Critically Endangered under the EPBC Act

Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands

The GBGW can be found from eastern South Australia, extending through western, northern, and central Victoria into central NSW. The canopy layer of this community is dominated by Grey Box *Eucalyptus microcarpa* with a variable mid-storey of wattles *Acacia* spp., Sweet Bursaria *Bursaria spinosa,* and Cassinia species *Cassinia* spp., among others. The canopy tree and the mid-storey layer or 'overstorey' can be naturally absent or the overstorey has been purposefully cleared in the past, leaving a diverse ground layer of native grasses including Wallaby grasses *Rytidosperma* spp. and Spear Grasses *Austrostipa* spp., herbaceous flowering plants, and smaller chenopod shrubs (DSEWPaC, 2012a).

EVCs recorded in the project area that are synonymous with this ecological community include Plains Grassy Woodland (EVC 55), Box Ironbark Forest (EVC 61), and Grassy Woodland (EVC 175). These communities generally include a mature Grey Box overstorey and a relatively undisturbed and diverse understorey with a variety of shrubs, grasses, and herbs. These EVCs (and therefore GBGW) occur in the rail reserve and the adjacent roadsides.

Approximately 75.408 ha of GBGW (Plate 1) was recorded within the investigation area with the greatest extent at Hume Highway Tallarook Precinct (Tallarook) and Seymour Avenel Road Overbridge (Seymour).

Plate 1 **Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands, at overhead powerline investigation area 1078.**

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived Native Grassland

The WBYBBRGGW community was once widespread across Queensland, NSW, Australian Capital Territory (**ACT**), and Victoria; however, based on EVC mapping, less than 6% of the pre-1750 extent remains (NSW Threatened Species Scientific Committee [**TSSC**], 2020). The dominant tree species are White Box *Eucalyptus albens*, Yellow Box *Eucalyptus melliodora*, or Blakely's Red Gum *Eucalyptus blakelyi* present over a diverse ground layer of native grasses and herbs (DECCW, 2010).

EVCs recorded in the project area that are synonymous with this ecological community include Plains Woodland (EVC 803) and Grassy Woodland (EVC 175_61). These communities generally include a mature White Box, Yellow Box or Blakely's Red Gum overstorey, and a relatively undisturbed and diverse understorey supporting a variety of shrubs, grasses, and herbs. These EVCs (and therefore WBYBBRGGW) occur in the rail reserve and the adjacent roadsides.

Approximately 4.455 ha of WBYBBRGGW was recorded within the investigation area, occurring at several overhead powerline investigation areas (Plate 2).

Plate 2 **White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland at overhead powerline investigation area 1047.**

Natural Temperate Grasslands of the Victorian Volcanic Plain

NTGVVP is endemic to south-western Victoria within the Victorian Volcanic Plain bioregion. The community is dominated by Kangaroo grass *Themeda triandra*, wallaby grasses *Rytidosperma* spp., spear grasses *Austrostipa* spp., and tussock grasses *Poa* spp. Plains Grassland (EVC 132) is associated with the TEC (DSEWPaC, 2011a).

Two patches of NTGVVP (Plains Grassland - EVC 132) totalling 0.619 ha occur within the investigation area at Track Slew 1 - Wallan Loop (Plate 3). These two patches were large enough and contained sufficient cover of native grass species to be considered the TEC. The patches are located within the heavily disturbed rail corridor near Wallan Station at Track Slew 1 – Wallan Loop.

Plate 3 **Sun-orchids *Thelymitra* sp. within the TEC, Natural Temperate Grasslands of the Victorian Volcanic Plain, adjacent to Track Slew 1 - Wallan Loop.**

Table 16 Summary of EPBC Act-listed TECs in the ecology assessment investigation area.

TEC	Extent (ha)
Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	75.408 ha
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	4.455 ha
Natural Temperate Grasslands of the Victorian Volcanic Plain	0.619 ha

6.1.2 Threatened species

Nationally threatened species are those species listed in any one of several categories under the EPBC Act including extinct, extinct in the wild, critically endangered, endangered, vulnerable, or conservation dependant. Species are listed based on threats to their long-term survival.

Fourteen species listed as threatened under the EPBC Act may occur in the project area. A desktop review identified the threatened flora and fauna species recorded or predicted to occur within five and 10 km of the project area. The desktop review was completed during early investigations for Inland Rail and allowed threatened species with a moderate to high likelihood of occurrence to be shortlisted for further consideration during detailed ecology surveys. In total, six flora species and eight fauna species were considered to have a moderate to high likelihood of occurrence in the project area (Table 17). Twelve of those species are also listed under State legislation.

Construction activities associated with the Project may result in impacts to threatened flora and fauna recorded during field surveys including Euroa Guinea-flower and Mountain Swainson-pea. In addition, suitable habitat is present within and adjacent to the investigation area for Crimson Spider-orchid, Grey-headed Flying-fox, Swift Parrot, Painted Honeyeater, Regent Honeyeater, Striped Legless Lizard, Growling Grass Frog, Sloane's Froglet, and Golden Sun Moth.

Table 17 EPBC-listed threatened species with a moderate to high likelihood of occurrence in the project area

Scientific name	Common name	Conservation Status			Occurrence in investigation area
		EPBC Act	FFG Act	VROT	
Flora					
Caladenia concolor	Crimson spider-orchid	VU	L	en	Potential suitable habitat identified at Seymour-Avenel Road, Seymour and Signal Gantry 19, and Hume Highway, Seymour. Not identified during targeted surveys in 2019.
Hibbertia humifusa subsp. *erigens*	Euroa Guinea-flower	VU	L	vu	**Present** (see Section 6.1.2.1); important population critical to the survival of the species at overhead powerline investigation area 1047.
Swainsona recta	Mountain Swainson-pea	EN	L	en	**Present** (see Section 6.1.2.1); planted population within fenced exclusion area adjacent to overhead powerline investigation area 1078 south of Glenrowan
Dianella amoena	Matted Flax-lily	EN	L	en	Potential suitable habitat was identified at Track Slew 1 - Wallan Loop and Signal Gantry 5. Project area was revised and avoided habitat therefore targeted survey was not undertaken (KBR, 2020a). Three historical records were also identified adjacent to Signal Gantry 2; however, impacts to this area have been avoided (Figure 15 – Appendix B).
Senecio psilocarpus	Swamp Fireweed	VU		vu	Potential suitable habitat was identified at Track Slew 1 - Wallan Loop and Signal Gantry 3, and Signal Gantry 5. Project area was revised and avoided habitat therefore targeted survey was not undertaken (KBR, 2020a).
Xerochrysum palustre	Swamp Everlasting	VU	L	vu	Potential suitable habitat was identified at Track Slew 1 - Wallan Loop and Signal Gantry 3, and Signal Gantry 5. Project area was revised and avoided habitat therefore targeted survey was not undertaken (KBR, 2020a).

Scientific name	Common name	Conservation Status			Occurrence in investigation area
		EPBC Act	FFG Act	VROT	
Fauna					
Pteropus poliocephalus	Grey- headed Flying-fox	VU	L	vu	No individuals recorded during surveys. The project area is not located in proximity to a known roost site (camp) for the species (DECCW, 2009). Species likely overfly and occasionally forage in planted and remnant trees within the project area but unlikely to make significant use of vegetation present.
Lathamus discolor	Swift Parrot	EN	L	en	No individuals recorded during surveys; however, the species may use the project area as an occasional foraging resource and as a dispersal corridor when moving between extensive areas of foraging trees. Sites within the project area most likely to provide habitat for woodland birds are: • Seymour-Avenel Road, Seymour, and Signal Gantry 19 • Hume Highway, Seymour • Tallarook and Track Slew 5 - Seymour – Mangalore • Signal Gantry 16 and Track Slew 2 – Tallarook Loop • Glenrowan
Grantiella picta	Painted Honeyeater	VU	L	vu	
Anthochaera phrygia	Regent Honeyeater	CR	L	cr	
Delma impar	Striped Legless Lizard	VU	L	en	Possible. Potential habitat was identified based on distribution of records for the species. Locations where the species is most likely to occur are located around Wallan and between Broadford and Seymour and potentially around Benalla and Wangaratta. investigation areas most likely to provide habitat for Striped Legless Lizard was: • Short Street, Broadford, and Signal Gantry 11 • Track Slew 1 – Wallan Loop and Signal Gantry 3 • Overhead powerline investigation area 1013 • Overhead powerline investigation area 1088

Scientific name	Common name	Conservation Status			Occurrence in investigation area
		EPBC Act	FFG Act	VROT	
Litoria raniformis	Growling Grass Frog	VU	L	en	There is potential aquatic habitat adjacent to investigation area, and small extents of potential terrestrial foraging habitat at the sites listed below. Sites most likely to provide habitat were: • Overhead powerline investigation area 1001 • Overhead powerline investigation area 1002 • Overhead powerline investigation area 1003 (adjacent land) • Overhead powerline investigation area 1076 (adjacent land) • Track Slew 1 – Wallan Loop and Signal Gantry 3
Synemon plana	Golden Sun Moth	CR	L	cr	Potential habitat was identified. Areas most likely to provide habitat are: • Overhead powerline investigation area 1013 • Track Slew 1 – Wallan Loop and Signal Gantry 3 • Short Street, Broadford, and Signal Gantry 11
Crinia sloanei	Sloane's Froglet	EN	-	-	Potential habitat occurs at overhead powerline investigation area 1110.

Key to table: EN – listed under the EPBC Act, CR – listed under the EPBC Act, VU-listed under the EPBC Act, L – listed under the FFG Act, L# - listed as part of a TEC, cr – critically endangered, en – endangered, vu – vulnerable, nt – near threatened.

**VROT refers to species listed in the Victorian advisory lists for rare and threatened species (VROTS) maintained by DELWP – DSE (2009) for invertebrates, DSE (2013) for vertebrates and DEPI (2014) for plants*

6.1.2.1 Threatened flora

Crimson Spider-orchid

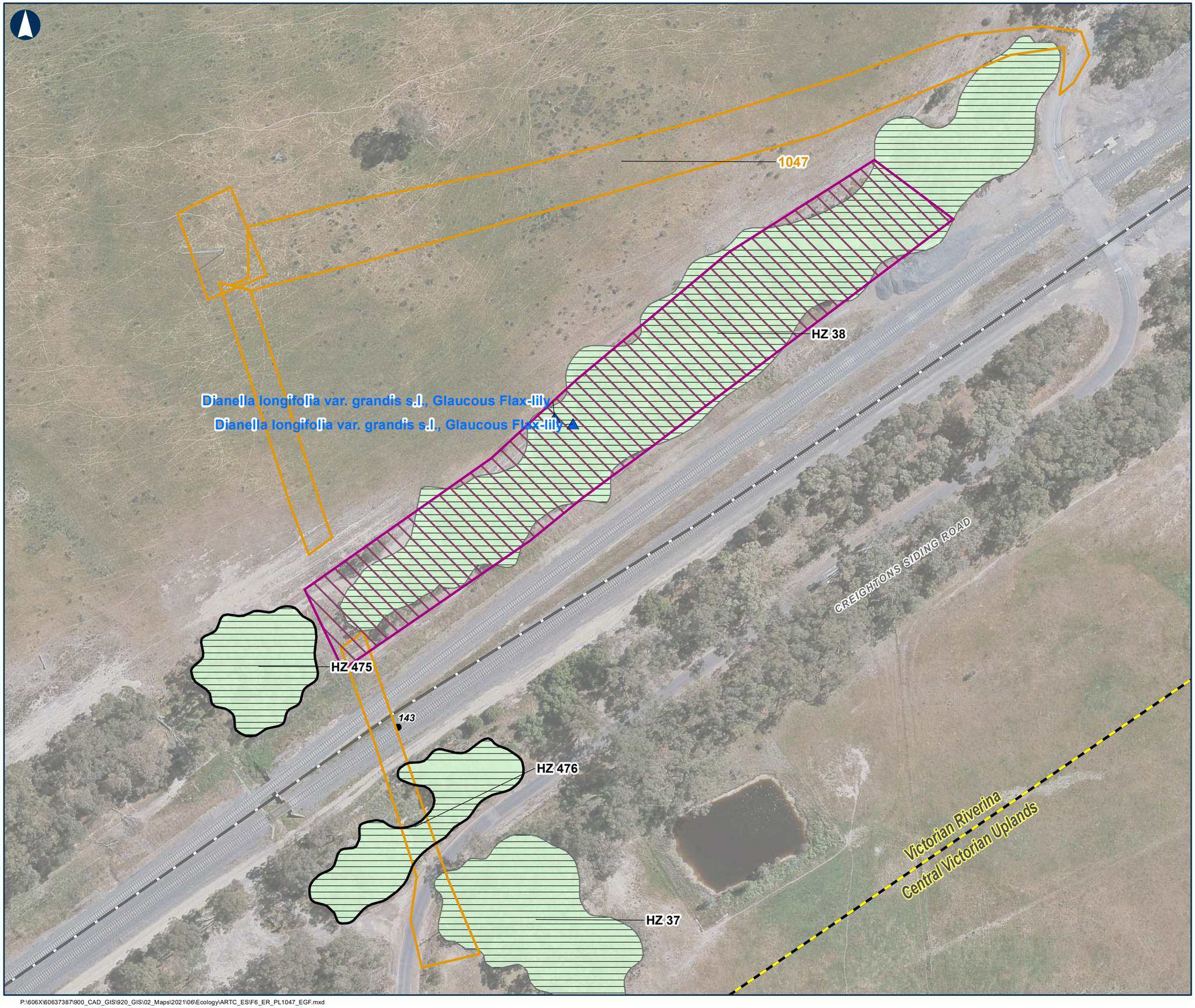
Crimson Spider-orchid distribution extends across the Northern Inland Slopes Bioregion between Beechworth and Chiltern with additional populations also known from the Broadford/Tyaak area. Key habitat for the species is Box-Ironbark Forest that occurs on well-drained soils. Targeted surveys were completed at locations that were identified as suitable habitat for the species, but no plants were recorded (KBR, 2020a). While the species was not recorded within the investigation area, it has previously been recorded within proximity (within 2 km) and suitable habitat was recorded at Seymour-Avenel Road, Seymour and Signal Gantry 19, and Hume Highway, Seymour.

Euroa Guinea-flower

Euroa Guinea-flower is a low-growing to prostrate shrub that is found in north-eastern Victoria where it grows in woodlands on shallow-gravelly soils. It is listed as vulnerable under the EPBC Act, listed as threatened under the FFG Act, and is considered 'vulnerable' in Victoria under the DELWP Advisory list. There are 14 known populations in Victoria listed in the *National Recovery Plan for the Euroa Guinea-flower* (Murphy and Downe, 2006).

A population of approximately 256 Euroa Guinea-flower was recorded at overhead powerline investigation area 1047 in the Strathbogie Shire (Plate 4 and Figure 6). This population, known as 'Creighton Rail Reserve', is one of 16 known important populations (Murphy and Downe, 2006).

Plate 4 Euroa Guinea-flower at overhead powerline investigation area 1047



INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Powerline Site 1047 (Euroa Guinea-flower)

- Overhead Powerline Project Areas
- Threatened Flora Species
- KM Posts
- Railway
- Bioregion
- Euroa Guinea-flower Extent
- Habitat Zones Desktop/No access

Ecological Vegetation Classes

- Grassy Woodland (Low Rises) (175_61)

0 20 40 Meters

Coordinate System: GDA 1994 MGA Zone 55

Date: 9/08/2021 Paper: A3
Author: JB Scale: 1:1,000
Data Sources: DELWP (2020) Figure 6

P:\606X\60637387\900_CAD_GIS\920_GIS\02_Maps\2021\06\Ecology\ARTC_ES\F6_ER_PL1047_EGF.mxd

Mountain Swainson-pea

Mountain Swainson-pea is a perennial forb that produces purple flowers in spring and dies back to ground-level before re-sprouting in autumn/winter. It was formerly widespread across south-eastern Australia but is now extinct in Victoria with the only surviving populations known from NSW and the ACT. Mountain Swainson-pea is listed as endangered under the EPBC Act. It is also listed under the FFG Act and is considered endangered in Victoria.

Mountain Swainson-pea was recorded south of Glenrowan in exclusion fencing adjacent to overhead powerline investigation area 1078. The exclusion plots are likely to support an important population of the species as the species was considered extinct in Victoria (DELWP, 2017c). DELWP Hume region undertook a program from 2015 to 2018 to reintroduce Mountain Swainson-pea into secure public and private sites that support habitat for the species within north-east Victoria (DELWP, 2017c). DELWP (D. Pendavingh, DELWP, pers. comm. 21.06.21) have confirmed that the area adjacent to investigation area 1078 is part of this reintroduction program.

6.1.2.2 Threatened fauna

Grey-headed Flying-fox

Grey-headed Flying-fox is a highly mobile species that is likely to overfly and occasionally forage in planted and remnant trees within the investigation area. The species is not likely to make significant use of any of the vegetation or habitat present. The investigation area is not located in proximity to a known roost site (camp) for the species (DECCW, 2009).

Swift Parrot, Regent Honeyeater and Painted Honeyeater

Swift Parrot, Regent Honeyeater, and Painted Honeyeaters were not observed during targeted woodland bird surveys. The closest important or critical habitat for these threatened birds includes Puckapunyal Military Area, Mangalore Conservation Reserve, and an area south of Avenel (Mangalore Ammunition Depot). These sites are extensive and support good quality Box-Ironbark Forest with a high density of preferred winter-flowering eucalypts for foraging. The sites are listed as an Important Bird Area (**IBA**) as habitat for Swift Parrot, Regent Honeyeater, Painted Honeyeater (Birdlife International, 2021), and the Victorian Temperate Woodland Bird Community.

Investigation areas most likely to provide habitat for woodland birds are:

- Seymour-Avenel Road, Seymour, and Signal Gantry 19
- Hume Highway, Seymour
- Tallarook and Track Slew 5 - Seymour – Mangalore
- Signal Gantry 16 and Track Slew 2 - Tallarook Loop
- Glenrowan

As these investigation areas are generally linear in nature, habitat along roadsides, and the rail reserve is more likely to function as a movement and dispersal corridor than as core habitat.

Swift Parrot are likely to use the woodland within the investigation area only sporadically as a corridor as they move through the landscape seeking foraging resources in more extensive areas of habitat (D. Pendavingh, DELWP, pers. comm 2019).

Regent Honeyeater are highly mobile and are more likely to inhabit larger important foraging areas away from the investigation area; this understanding was confirmed by local DELWP officers at the time of the woodland bird survey (KBR, 2020b). Due to the small number of Yellow Box trees (feed trees) within the investigation area, it is unlikely the area is important habitat for Regent Honeyeater. This understanding was confirmed by local DELWP officers at the time of the survey in 2019.

Painted Honeyeater may use the woodland within the investigation area as a corridor as they move through the landscape, but the woodland habitat does not support extensive areas of mistletoe, the species favoured food source.

Striped Legless Lizard

Striped Legless Lizard may occur in areas of grassland and lightly wooded grassy woodland areas between Beveridge and Seymour, and potentially around Benalla and Wangaratta. Since 2002, there have been records of Striped Legless Lizard from around Strath Creek and Broadford, and in the past five years there have been isolated detections around Greta West (2016), Woorgaree near Beechworth (2018), Whorouly South south-east of Wangaratta (2019), and Oxley (2020). One of its Victorian strongholds is the upper Goulburn River catchment around Seymour, Yea, Alexandra, and Mansfield. (Source: Goulburn Broken Striped Legless Lizard Project website (https://goulburnbrokendelmaimpar.wordpress.com/),

A key threat to Striped Legless Lizard is soil disturbance and compaction. As such, areas disturbed by past rail construction in the rail corridor are unlikely to support species. However, the potential for Striped Legless Lizard to occur in undisturbed grassland or grassy woodland areas offline of the rail but within the project area cannot be discounted.

As an example, Striped Legless Lizard has potential to occur in a grassy woodland patch adjacent to the investigation area at Short Street, Broadford (Plate 5). Although this site may be more heavily treed than typical Striped Legless Lizard habitat, the species has been found in a wide variety of locations in the north east so its potential to occur at this site cannot be discounted.

Plate 5 Potential Striped Legless Lizard habitat outside the Short Street, Broadford investigation area.

Potential habitat for Striped Legless Lizard also occurs adjacent to overhead powerline 1013 near Broadford and in an area of Grassy Woodland (Low Rises) (175_61) vegetation at overhead powerline 1088 near Glenrowan. Overhead powerline 1088 has been identified as potential habitat based on its proximity to the Warby Ranges and relative intactness of the ground surface outside the rail corridor.

Striped Legless Lizard has potential to occur in areas of Plains Grassland and non-native grassland plains grassland within the Track Slew 1 - Wallan Loop investigation area.

Growling Grass Frog

Potential habitat for Growling Grass Frog occurs at several locations including:

- Three locations proximal to Merri Creek, a catchment known to support an important metapopulation of Growling Grass Frog (Clemann & Gillespie, 2012). Potential habitat occurs at:
  - Overhead powerline investigation area 1002 on Kelby Lane, Wallan comprised of aquatic habitat at Merri Creek located 5 m from the project area.
  - Overhead powerline investigation area 1001 along Wallan – Whittlesea Road, Wallan where a small tributary to Mittagong Creek crosses the project area under a culvert to the south. The tributary enters Mittagong Creek near the confluence with the Merri Creek.
  - Habitat adjacent to overhead powerline investigation area 1003 comprised of a pond and Merri Creek.
- Habitat adjacent to overhead powerline investigation area 1076, near Glenrowan. Habitat noted in this area was comprised of an approximately 5 m wide low-lying area that extends parallel to the rail and supports Spike-sedge Wetland (EVC 819). The area is connected to a tributary of Eleven Mile Creek and Show Creek south of Glenrowan. There are two historic records (both from 1982) of Growling Grass Frog on the VBA; one 2.9 km north-east and the other 4.4 km north-west of the investigation area. The persistence of Growling Grass Frog in the local area is unknown, therefore the possibility that this area could provide habitat for the species cannot be discounted.

Growling Grass Frog may be impacted by works at sites associated with the Merri Creek catchment (Signal Gantry 3 and Track Slew 1 – Wallan Loop at Wallan). Proposed works will not directly impact aquatic habitat but will remove some potential terrestrial habitat that may be used for foraging or overwintering.

Sloane's Froglet

Potential habitat for Sloane's Froglet occurs at overhead powerline investigation area 1110 near Wenkes Road in the Chiltern Valley. Brown Toadlet *Pseudophryne bibronii* (FFG Act-listed) was recorded calling in a drainage line at this location during field assessment in 2019.

The existing overhead powerline spans the drainage line, therefore works in this location are likely to be able to avoid the aquatic habitat.

Golden Sun Moth

Potential habitat for Golden Sun Moth (also listed under the FFG Act) occurs within the Track Slew 1 – Wallan Loop and Signal Gantry 3 investigation area. Overhead powerline investigation area 1013 traverses an area of tussock grasses close to records of the species.

Sparsely treed areas with native grassy understorey at Short Street, Broadford (e.g. Plate 5) may also provide habitat for Golden Sun Moth. There are VBA records of Golden Sun Moth within 5 km of Broadford. The potential habitat is outside the intended works area.

6.2 State Significant Biodiversity Values

6.2.1 Native vegetation

Native vegetation is protected under the P&E Act and usually requires a permit to remove.

Native vegetation (as defined in Victorian planning schemes) are plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses. Native vegetation is defined by the Guidelines (DELWP, 2017a). Native vegetation is either a patch, Scattered Tree, or Large Tree in a Patch.

Native vegetation provides habitat for wildlife and delivers a range of ecosystem services that make land more productive and contribute to human wellbeing (COAG Standing Council on Environment and Water, 2012). Native vegetation is also protected under the EPBC and FFG Acts where it meets the criteria for a listed TEC, provides habitat for a listed threatened species, or is a threatened or protected flora species.

Native vegetation in Victoria is classified into EVCs based on floristic, structural, and ecological features. Each EVC has been assigned a 'benchmark' condition for each of Victoria's bioregions. The benchmark is also used for determining the size category of Scattered Trees.

Native vegetation within the project area consists of patches of vegetation, Large Trees in Patches, and Scattered Trees within the rail corridor, road reserves, and private land. The quality of vegetation throughout the project area varies from areas of low quality where EVCs have been modified through past land use (e.g. agriculture and urban development) to areas of higher quality where EVCs contain all components of the community (trees, shrubs, ground-cover herbs, sedges, and grasses) as well as important habitat for fauna such as large trees with hollows.

The highest quality examples of native vegetation are typically found in the rail corridor and along roadsides due to the continuity of native vegetation, width of the vegetation corridor (varying between 20 m and 80 m wide), quality of vegetation (diversity of lifeforms and species), and the presence of large trees. Lowest quality vegetation is associated with private land where the native vegetation has been previously cleared and urban areas - these areas have limited biodiversity value and non-native weed species are often abundant. Vegetation in regional town centres generally includes a mix of planted exotic tree species; however, in some instances, native canopy trees such as River Red-gum remain within local parks.

Some of the native vegetation also occurs in areas covered by environmental overlays (Section 6.2.8).

Patches of native vegetation

A patch of native vegetation is defined as:

- *an area of vegetation where at least 25% of the total perennial understorey plant cover is native, or*
- *an 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'* (DELWP, 2017a).

A total of 411 patches, with a combined extent of 216.619 ha, of native vegetation comprising 20 EVCs occur within the investigation area. Thirteen of the EVCs are endangered in at least one of the four bioregions in which the Project occurs (Table 18).

Plains Grassy Woodland (55), Box-Ironbark Forest (61), Plains Woodland (803), and Grassy Woodland (175_61) were the most dominant EVCs throughout the project area. For a full description of the EVCs within the project area, refer to Technical Report A (Attachment B) and Technical Report B (Attachment C). Note that EVC values in the technical reports may differ to the totals provided in Table 18 as some overlap occurs in the estimation of existing conditions between the two reports.

Table 18 Bioregional Conservation Significance of EVCs, including total extent (ha) recorded, within the investigation area.

EVC Number	EVC Name	Bioregional Conservation Significance				Extent (ha) recorded
		VVP	CVU	NIS	VicRiv	
18	Riparian Forest	V	V			0.248
23	Herb-rich Foothill Forest		D			0.238
47	Valley Grassy Forest		V	E		8.966
55	Plains Grassy Woodland		E		E	46.325
55_61	Plains Grassy Woodland				E	6.695
56	Floodplain Riparian Woodland		E		V	12.186
61	Box-Ironbark Forest		V		V	45.442
67	Alluvial Terraces Herb-rich Woodland			E	V	0.851
68	Creekline Grassy Woodland		E		E	2.882
83	Swampy Riparian Woodland	E				0.674
127	Valley Heathy Forest		V			0.853
132	Plains Grassland	E				0.669
175	Grassy Woodland		E	E		4.635
175_61	Grassy Woodland		E			25.837
175_61	Grassy Woodland (Low Rises)			E	E	8.058
292	Red Gum Swamp		E			0.688
803	Plains Woodland			E	E	16.672
815	Riverine Swampy Woodland				V	0.788
819	Spike-sedge Wetland				V	0.599
821	Tall Marsh	D	D		D	0.821
N/A	DELWP Mapped Wetland				ND	32.493
Total extent of native vegetation within the project area						216.619

**2005 modelled EVC used in desktop-based vegetation assessments where access was not available for field assessment*
D – Depleted
E – Endangered
ND – Not determined
V – Vulnerable

‘Endangered’ EVCs

The Bioregional Conservation Status of an EVC reflects the current extent of a particular EVC within a bioregion compared to its modelled original extent (pre-1750) and its overall condition. EVCs may have a BCS of endangered, vulnerable, depleted, least concern, or rare. Endangered EVCs have been selected for consideration in the impact assessment as most threatened within their respective bioregions.

Endangered EVCs meet the one of or a combination of the following criteria:

- *Contracted to less than 10% of former range; or*
- *Less than 10% of pre-European extent remains; or*
- *Combination of depletion, degradation, current threats, and rarity is comparable overall to the above:*
  - *10–30% pre-European extent remains and severely degraded over a majority of this area; or*
  - *Naturally restricted EVC reduced to 30% or less of former range and moderately degraded over a majority of this area; or*
  - *Rare EVC cleared and/or moderately degraded over a majority of former area* (DELWP, 2020a).

Overall, 13 Endangered EVCs across four bioregions were recorded within the investigation area, representing a total extent of 116.079 ha.

Table 19 summarises extents of Endangered EVCs. Impacts to these patches of vegetation may be an important factor when undergoing decision-making during the design process.

Table 19 Summary of Endangered EVC extents

EVC Number	EVC Name	Extent (ha) recorded
47	Valley Grassy Forest (47)	1.971
55	Plains Grassy Woodland (55)	46.325
55_61	Plains Grassy Woodland (55_61)	6.695
56	Floodplain Riparian Woodland (56)	0.181
67	Alluvial Terraces Herb-rich Woodland (67)	0.793
68	Creekline Grassy Woodland (68)	2.882
83	Swampy Riparian Woodland (83)	0.674
132	Plains Grassland (132)	0.669
175	Grassy Woodland (175)	4.635
175_61	Grassy Woodland (175_61)	25.837
175_61	Grassy Woodland (Low Rises) (175_61)	8.058
292	Red Gum Swamp (292)	0.688
803	Plains Woodland (803)	16.672
Total extent of endangered EVCs within the project area		**116.079**

High Quality native vegetation

While all native vegetation is considered as part of the impact assessment, it does not always identify patches of 'higher quality' vegetation condition compared to those that are heavily disturbed and may just meet the threshold for inclusion as a patch. Table 8 of the Assessor Handbook (DELWP, 2018a) identifies vegetation of higher value as those patches with a score ≥ 0.60 - 1 noting that a score of 1 indicates an area is pristine condition reflective of the condition prior to European settlement. This aligns with the 'Native vegetation Condition' scale on DELWP's NVIM tool whereby highest vegetation condition are those areas in the two highest categories (0.61 – 0.80 and 0.81 – 100). Therefore, any patches that received a habitat score of 0.60 or greater were considered high quality.

Overall, 116.578 ha of high-quality native vegetation was recorded. These areas of vegetation are assessed as higher quality as they scored highly across all VQA scoring parameters and achieved an overall score of ≥ 0.60.

Native canopy trees

Native canopy trees include both Scattered Trees and Large Trees in Patches

A Scattered Tree is *a native canopy tree that does not form part of a patch* (DELWP, 2017a).

Scattered Trees are a native canopy tree defined as a 'mature tree' greater than 3 m in height and normally found in the upper layer of the relevant vegetation type (DELWP, 2017a). Scattered Trees are classified as either large or small. Large Scattered Trees are those with a DBH greater than or equal to the large tree benchmark for the relevant bioregional EVC (DELWP, 2017a). Small Scattered Trees are those trees greater than 3 m in height that have a DBH less than the EVC benchmark for a large tree.

A Large Tree in a Patch is *a native canopy tree with a Diameter at Breast Height (DBH) greater than or equal to the large tree benchmark for the relevant bioregional EVC* (DELWP, 2017a).

If the large tree is located within the extent of a patch of native vegetation, it is a Large Tree in a Patch.

A total of 1,015 trees (299 small Scattered Trees, 137 Large Scattered Trees, and 579 Large Trees in Patches) occur within the investigation area. Large trees are particularly important as they provide habitat (hollows) and foraging resources for native fauna and are a resource that takes many years to establish in the environment. Large Trees also provide ecosystem benefits such as facilitating habitat connectivity across a heavily modified and fragmented landscape.

DELWP mapped wetlands

DELWP mapped wetlands are any wetland included in the DELWP's *current wetlands* layer, available in DELWP systems and tools, and is included when measuring the extent of native vegetation to be removed (DELWP, 2017a).

The Current Wetlands Map from MapshareVic identified two mapped wetlands within the investigation area. Both mapped wetlands related to the Track Slew 3 – Seymour Goulburn River and Signal Gantry 16 investigation area:

- Wetland 60906 (total area of mapped wetland 33.67 ha)
- Wetland 60909 (total area of mapped wetland 6.96 ha)

The extents displayed reflect the total area of each mapped wetland rather than the area contained within the investigation area. Table 20 identifies the extent of the mapped wetlands contained in the project area.

Table 20 Summary of native vegetation in the investigation area

Native vegetation attribute	Existing conditions
Patches of native vegetation	216.619 ha
Endangered EVC extent[1]	116.079 ha
High quality patches of native vegetation[1]	116.578 ha
Large Trees in a Patch	579
Large Scattered Trees	137
Small Scattered Trees	299
DELWP Mapped Wetlands[1]	32.493 ha

[1]Included within the extent of patches of native vegetation

6.2.2 Threatened ecological communities

Victorian TECs include flora and fauna communities listed as 'threatened' under the FFG Act.

Victorian Temperate Woodland Bird Community (VTWBC) and Western (Basalt) Plains Grassland Community (**WBPGC**) occur in the ecological assessment investigation area. Victorian Lowland Riverine Fish Community of the Southern Murray Darling Basin (**LRFCSMDB**) may also be present. A summary of the number of patches and extent of these communities within the investigation area is provided in Table 21 and the location of TECs is shown in Figure 12 (Appendix B).

Victorian Temperate Woodland Bird Community

VTWBC is a group of 24 key bird species considered in decline that are primarily associated with dry woodland environs located to the north of the Great Dividing Range. Suitable habitat for this community consists of eucalypt woodland dominated by a variety of eucalypts such as Gums (River Red Gum and Yellow Gum), Stringybarks, Ironbark (Red Ironbark), and Box (Grey Box, Yellow Box and White Box) though the community can also exist in Buloke *Allocasuarina luehmannii* and cypress-pine *Callitris* spp. woodlands (DEPI, 2014). Another 21 bird species associated with temperate woodlands are also known to persist in other habitats but are included in the final nomination (SAC, n.d.) for the VTWBC.

The key bird species depend on vegetation communities that provide an open structure with sparse shrub cover and a floristically diverse grassy understorey that provides for foraging resources throughout the year. The presence of large woody debris, logs, peeling bark, and abundant tree hollows are also recognised as an important habitat characteristic. The distribution of this community has drastically reduced post-European Settlement with large area of such habitat cleared, fragmented, and degraded primarily as a result of agriculture. The fragments that do exist are often negatively impacted by the presence of introduced predators such as feral cats and Red Foxes.

During surveys carried out for the VTWBC, five key bird species were recorded and a further seven species were considered to have a moderate likelihood of occurrence in the project area. One of the species, Barking Owl, was surveyed for during targeted fauna surveys and was potentially heard at Signal Gantry 19, and Marchbanks Road, Broadford. Barking Owl is likely to use habitat within the project area on an opportunistic basis.

Occurrence in investigation area

As there are no published guidelines detailing a threshold for presence of the VTWBC, the TEC is assumed to be present where woodland EVCs occur and one or more nominated species consistent with the community is recorded.

A total of 124.043 ha VTWBC was recorded within the ecological assessment investigation area (Figure 15). The greatest area of extent occurs at investigation areas associated with the Tallarook and Seymour-Avenel Road, Seymour enhancement sites.

The VTWBC has the potential to be impacted by vegetation clearance and associated effects of habitat fragmentation, loss of hollow-bearing trees, and fauna mortality.

Western (Basalt) Plains Grassland Community

WBPGC is typically found in western Victoria on poorly drained heavy clay soils. It is often synonymous with EVC 132 Plains Grassland and comprises an open grassland dominated by Kangaroo Grass and a diverse array of additional native grasses and perennial herbs (SAC, n.d.).

Occurrence in investigation area

Two patches (0.619 ha) of WBPGC were recorded within the ecological assessment investigation area at Track Slew 1 - Wallan Loop, this community is considered synonymous with the two patches of NTGVVP.

Lowland Riverine Fish Community of the Southern Murray-Darling Basin

LRFCSMDB is defined as the lowland river reaches and associated floodplains of the Murray River tributaries in Victoria. Major streams are the Mitta Mitta, Ovens, Broken, Goulburn, Campaspe, Loddon, and Avoca River. The community primarily occurs in the lowland river reaches, some of its constituent species may also occur in the upland reaches (DELWP, n.d.).

Occurrence in investigation area

Signal Gantry 16 and Track Slew 2 – Tallarook Loop intercept two DELWP mapped wetlands (wetland #60906 and 60909). These mapped wetland areas are tributaries of the Goulburn River and extend to the bank of the Goulburn River. Fauna surveys completed to date have largely focused on presence of terrestrial threatened species (Barking Owl and arboreal mammals). In the absence of aquatic surveys, and based on what is known of the community, LRFCSMDB is assumed present in the Goulburn River. The community may also be present on an intermittent basis when overland flows allow connectivity to the wetlands along tributaries of the Goulburn River.

The LRFCSMDB could occur in the Goulburn River and the oxbow lakes on the floodplain associated with Signal Gantry 16 and Track Slew 2 – Tallarook Loop. Works that impact habitats associated with the community are not proposed and/or are considered minor. Any impact pathway (if realised) will be through construction activities to indirectly damage aquatic habitat or pollute the water through spills and sedimentation.

Table 21 Summary of FFG Act-listed TECs in the investigation area

TEC	Occurrence
Victorian Temperate Woodland Bird Community	**Present,** 124.043 ha
Western (Basalt) Plains Grassland Community	**Present, t**wo patches (0.619 ha)
Lowland Riverine Fish Community of the Southern Murray-Darling Basin	**Possible** Potentially adjacent to project area in the Goulburn River and oxbow lakes on the floodplain associated with Signal Gantry 16 and Track Slew 2 – Tallarook Loop

6.2.3 Threatened species

Threatened flora species are those which are listed as threatened under the FFG Act and/or listed on the *Advisory List of Rare or Threatened Plants in Victoria – 2014* (DEPI, 2014). Other plants are declared to be protected under the FFG Act.

Threatened fauna species are those listed as threatened under the FFG Act and/or listed on the *Advisory List of Threatened Vertebrate Fauna in Victoria – 2014* (DEPI, 2014) and the *Advisory list of Threatened Invertebrate Fauna in Victoria – 2009* (DSE, 2009).

Protected flora are native plants offered protection under the FFG Act. This includes:

- plants that have been declared to be protected under section 46 of the FFG Act
- plants that are listed as threatened under section 10 of the FFG Act
- plants that belong to communities that are listed as threatened under section 10 of the FFG Act.

There are currently two categories of protected flora: 'restricted use protected flora' and 'generally protected flora'.

FFG Act and VROT species

In addition to species listed as MNES under the EPBC Act (see Table 17), several flora and fauna species listed under the FFG Act or listed as a VROT in Victoria have a moderate to high likelihood of occurrence in the investigation area. Most of those species are known to occur in the investigation area and may therefore be impacted by the Project (Table 22).

Construction activities associated with the Project may result in loss of suitable habitat and loss of individuals of threatened flora and fauna recorded during surveys or with potential to occur in the investigation area. Species that may be impacted include Buloke *Allocasuarina luehmannii*, Glaucous Flax-lily *Dianella longifolia* var. *grandis*, Late-flower Flax-lily *Dianella tarda*, Cottony Cassinia *Cassinia ozothamnoides*, Basalt Podolepis *Podolepis linearifolia*, Golden Cowslips *Diuris behrii*, Barking Owl, Brush-tailed Phascogale, and Squirrel Glider. In addition, suitable habitat is present within and adjacent to the investigation area for Purple Diuris, Brown Toadlet, and woodland birds.

Plate 6 Brush-tailed Phascogale at Tallarook enhancement site in December 2020

Table 22 FFG Act-listed and VROT-listed threatened species with a moderate to high likelihood of occurrence in the Project area

Scientific name	Common name	Conservation Status			Occurrence	Existing conditions
		EPBC Act	FFG Act	VROT		
Flora						
Allocasuarina luehmannii	Buloke	-	L	en	**Present**	Twenty-three plants recorded: • Two immature plants at Seymour-Avenel Road, Seymour, and Signal Gantry 19 • Sixteen plants at overhead powerline investigation area 1042 recorded during detailed and targeted flora surveys.
Cassinia ozothamnoides	Cottony Cassinia	-	-	vu	**Present**	Approximately 50 individuals were recorded at overhead powerline investigation area 1041
Dianella longifolia var. *grandis*	Glaucous Flax-lily	-	-	vu	**Present**	Approximately 249 plants recorded: • 40 plants at Signal Gantry 13 • 1 plant at Signal Gantry 14 • 2 plants at Tallarook • 5 plants at Seymour-Avenel Road, Seymour • 30 plants at Hume Highway, Seymour • 161 plants at Track Slew 5 – Seymour – Mangalore and Signal Gantry 20 • 1 plant at overhead powerline investigation area 1042 • 1 plant at overhead powerline investigation area 1040 • 2 plants at overhead powerline investigation area 1047 • 6 plants at overhead powerline investigation area 1041.

Scientific name	Common name	Conservation Status			Occurrence	Existing conditions
		EPBC Act	FFG Act	VROT		
Dianella tarda	Late-flower Flax-lily	-	-	vu	**Present**	Twenty-nine plants recorded: • Four plants at overhead powerline investigation area 1012. • Five plants at overhead powerline investigation area 1045. • Five plants at overhead powerline investigation area 1041. • Fifteen plants at overhead powerline investigation area 1047.
Diuris punctata var. *punctata*	Purple Diuris	-	L	vu	Possible. No individuals identified during targeted surveys. Suitable grassy woodland habitat recorded.	Potential habitat in grassy woodlands around: • Seymour-Avenel Road, Seymour, and Signal Gantry 19, • Hume Highway, Seymour • Powerline investigation area 1088
Diuris behrii	Golden Cowslips	-	-	vu	**Present**	Present at overhead powerline investigation area 1088. The total number of individuals was not specified by KBR (2020e)
Podolepis linearifolia	Basalt Podolepis	-	-	en	**Present**	Present at overhead powerline investigation area 1078. The total number of individuals was not specified by KBR (2020e)
Swainsona recta	Mountain Swainson-pea	EN	L	en	**Present**	Planted individuals adjacent to overhead powerline investigation area 1078.

Scientific name	Common name	Conservation Status			Occurrence	Existing conditions
		EPBC Act	FFG Act	VROT		
Fauna						
Struthidea cinerea	Apostlebird	-	#L		**Present** All of these species are members of the VTWBC TEC which occurs in the project area.	Potential habitat in the investigation area comprises 124.043 ha woodland habitat, approximately 716 hollow-bearing trees for hollow-dwelling species and habitat linkages through the landscape, particularly between Broadford and Mangalore.
Burhinus grallarius	Bush Stone-curlew	-	#L	en		
Stagonopleura guttata	Diamond Firetail	-	#L	nt		
Pomatostomus temporalis	Grey-crowned babbler	-	#L	en		
Melanodryas cucullata	Hooded Robin	-	#L	nt		
Ninox strenua	Powerful Owl	-	#L	vu		
Chthonicola sagittata	Speckled Warbler	-	#L	vu		
Neophema pulchella	Turquoise Parrot	-	#L	nt		
Ninox connivens	Barking Owl	-	#L	en	Potentially present (unconfirmed)	Potential call heard at Seymour-Avenel Road, Seymour and Marchbanks Road, Broadford. Barking Owl likely uses woodland areas around Tallarook, Seymour, and Mangalore in particular as part of their foraging range.
Phascogale tapoatafa	Brush-tailed Phascogale	-	L	vu	**Present** (Plate 6)	Recorded at Tallarook and Track Slew 5 - Seymour – Mangalore investigation site during targeted fauna surveys. Potential habitat for the species also occurs at: Seymour-Avenel Road, Seymour and Signal Gantry 19, Hume Highway, Seymour, Signal Gantry 20 and Track Slew 4 - Seymour Station Habitat values in the investigation area comprises woodland habitat, hollow-bearing trees, and habitat linkages through the landscape, particularly between Broadford and Mangalore.

Scientific name	Common name	Conservation Status			Occurrence	Existing conditions
		EPBC Act	FFG Act	VROT		
Petaurus norfolcensis	Squirrel Glider	-	L	en	Possible	Potential habitat occurs at Tallarook and Track Slew 5 - Seymour – Mangalore, Seymour-Avenel Road, Seymour and Signal Gantry 19, Hume Highway Seymour, and Signal Gantry 20 and Track Slew 4 - Seymour Station. Not recorded during targeted fauna surveys but Sugar Glider (a similar species not listed as threatened in Victoria) was recorded at Tallarook.
Pseudophryne bibronii	Brown Toadlet	-	L	en	**Present.**	Recorded in drainage line, near Wenkes Road west of Chiltern at overhead powerline investigation area 1110. Potential habitat includes terrestrial areas which become flooded by seasonal rains

Key to table: L – listed under the FFG Act, L# - listed as part of a TEC, cr – critically endangered, en – endangered, vu – vulnerable, nt – near threatened.

Protected Flora

Thirty-Six protected flora species were recorded during field assessments, and their listing status and location within the project area are outlined in Table 23.

Table 23 Summary of protected flora species identified in the investigation area

Status	Scientific name	Common name	investigation areas
P	*Acacia acinacea*	Gold-dust Wattle	Identified at: • Tallarook • Hume Highway, Seymour • Track Slew 2 – Tallarook Loop • Track Slew 4 – Seymour Station • Signal Gantry 16 • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Signal Gantry 20 • Overhead powerline investigation areas: 1022, 1041, 1070, 1076, and 1078
P	*Acacia genistifolia*	Spreading Wattle	Identified at: • Signal Gantry 12 • Signal Gantry 13 • Overhead powerline investigation areas: 1040, 1041, 1042, 1043, 1046, 1057
P	*Acacia mearnsii*	Black Wattle	Identified at: • Wandong • Signal Gantry 6 • Signal Gantry 7 • Tallarook • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20
P	*Acacia pycnantha*	Golden Wattle	Identified at: • Tallarook • Short Street, Broadford • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Hume Highway, Seymour • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20 • Overhead powerline investigation areas: 1004, 1013, 1021, 1040, 1041, 1043, and 1057

Status	Scientific name	Common name	investigation areas
P	*Acacia verniciflua s.l.*	Varnish Wattle	Identified at: • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20 • Glenrowan • Overhead powerline investigation areas: 1078, 1086, 1087, and 1108
P	*Acrotriche serrulata*	Honey pots	Identified at: • Seymour-Avenel Road, Seymour • Track Slew 5 – Seymour - Mangalore • Signal Gantry 19 • Signal Gantry 20
L, en, P	*Allocasuarina luehmannii*	Buloke	Identified at: • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Overhead powerline investigation area 1042
P	*Astroloma humifusum*	Cranberry Heath	Identified at: • Overhead powerline investigation areas: 1078 and 1117
P	*Brachyloma daphnoides*	Daphne Heath	Identified at: • Overhead powerline investigation areas: 1078 and 1088
P	*Brunonia australis*	Blue Pincushion	Identified at: • Overhead powerline investigation areas: 1006 and 1078
P	*Calocephalus lacteus*	Milky Beauty-heads	Identified at: • Overhead powerline investigation area 1076
vu, P	*Cassinia ozothamnoides*	Cottony Cassinia	Identified at: • Overhead powerline investigation area 1041
P	*Cheilanthes* sp.	Rock Fern	Identified at: • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20 • Overhead powerline investigation areas: 1081 1086, 1088, and 1106

Status	Scientific name	Common name	investigation areas
P	*Cheiranthera linearis*	Blue Finger-flower	Identified at: • Seymour-Avenel Road, Seymour • Signal Gantry 14 • Signal Gantry 19 • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20 • Overhead powerline investigation areas: 1042, 1043, 1076, and 1117
P	*Chrysocephalum apiculatum s.l.*	Common Everlasting	Identified at: • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Track Slew 5 – Seymour - Mangalore • Signal Gantry 12 • Signal Gantry 13 • Signal Gantry 20 • Overhead powerline investigation areas: 1003, 1041, 1042, 1046, 1047, 1072, and • 1116
P	*Chrysocephalum semipapposum* sp.	Clustered Everlasting	Identified at: • Tallarook • Track Slew 2 – Tallarook Loop • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20 • Overhead powerline investigation areas: 1040, 1041, 1043, and 1078
P	*Coronidium scorpioides s.s.*	Button Everlasting	Identified at: • Overhead powerline investigation areas: 1004, 1006, 1021, and 1043
P	*Correa* sp.	Correa	Identified at: • Overhead powerline investigation area 1004
P	*Cotula australis*	Common Cotula	Identified at: • Seymour-Avenel Road, Seymour • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20
vu, P	*Diuris behni*	Golden Cowslips	Identified at: • Overhead powerline investigation area 1088
P	*Grevillea lanigera*	Woolly Grevillea	Identified at: • Overhead powerline investigation area 1117

Status	Scientific name	Common name	investigation areas
P	*Grevillea* sp.	Grevillea	Identified at: • Overhead powerline investigation area 1042
P	*Hardenbergia violacea*	Purple Coral-pea	Identified at: • Overhead powerline investigation areas: 1003 1004, 1006, 1021, and 1058
VU, L, vu, P	*Hibbertia humifusa* subsp. *erigens*	Euroa Guinea-flower	Identified at: • Overhead powerline investigation area 1047
P	*Laphangium luteoalbum*	Jersey Cudweed	Identified at: • Signal Gantry 6 • Signal Gantry 7 • Signal Gantry 8 • Signal Gantry 10 • Hamilton Street, Broadford • Overhead powerline investigation area 1089
P	*Leptorhynchos squamatus*	Scaly Buttons	Identified at: • Overhead powerline investigation areas: 1004, 1021, and 1046
P	*Microtis* sp.	Onion Orchid	Identified at: • Overhead powerline investigation areas: 1042, 1081, 1086, 1088, and 1117
P	*Orthoceras strictum*	Horned Orchid	Identified at: • Overhead powerline investigation area 1117
P	*Ozothamnus obcordatus*	Grey Everlasting	Identified at: • Track Slew 5 – Seymour - Mangalore • Signal Gantry 20
en, P	*Podolepis linearifolia*	Basalt Podolepis	Identified at: • Overhead powerline investigation area 1078
P	*Prasophyllum* sp.	Leek Orchid	Identified at: • Overhead powerline investigation areas: 1004 and 1116
P	*Senecio quadridentatus*	Cotton Fireweed	Identified at: • Signal Gantry 6 • Signal Gantry 7 • Signal Gantry 8 • Short Street, Broadford • Signal Gantry 11 • Marchbanks Road, Broadford • Tallarook • Track Slew 2 – Tallarook Loop • Overhead powerline investigation areas: 1003, 1004, and 1070

Status	Scientific name	Common name	investigation areas
P	*Thelymitra* sp.	Sun Orchid	Identified at: • Overhead powerline investigation areas: 1004, 1006, 1046, 1058, 1083, 1084, 1086, 1088, and 1116
P	*Thysanotus patersonii*	Twining Fringe-lily	Identified at: • Overhead powerline investigation areas: 1004, 1006, 1021
P	*Vittadinia cuneata*	Fuzzy New Holland Daisy	Identified at: • Short Street, Broadford • Signal Gantry 11 • Tallarook • Track Slew 2 – Tallarook Loop • Hume Highway, Seymour • Seymour-Avenel Road, Seymour • Signal Gantry 19 • Signal Gantry 20 • Track Slew 5 – Seymour - Mangalore • Glenrowan • Overhead powerline investigation areas: 1015, 1076, 1078, 1106, and 1117
P	*Xerochrysum viscosum*	Shiny Everlasting	Identified at: • Signal Gantry 11 • Tallarook • Signal Gantry 20 • Track Slew 5 – Seymour - Mangalore • Track Slew 2 – Tallarook Loop • Glenrowan • Overhead powerline investigation areas: 1003, 1041, 1076, 1078, 1116, and 1117

6.2.4 Non-threatened fauna

With the exception of pest animals declared under the *Catchment and Land Protection Act 1994* (**CaLP Act**) or wildlife declared to be unprotected wildlife, all fauna species indigenous to Victoria are listed as protected under the *Wildlife Act 1975* (Vic) (**Wildlife Act**). The Wildlife Act makes it an offence to hunt, take, or destroy protected or threatened wildlife without authorisation.

Vegetation within the investigation area provides habitat for threatened and non-threatened fauna, particularly arboreal mammals (possums), microbats, birds, ground-dwelling mammals, and reptiles. Construction may remove habitat for those species and individuals could be displaced, injured, or killed, particularly during site clearance if vegetation and habitat is removed. Displaced animals are vulnerable to collision with vehicles and susceptible to predation.

Non-threatened fauna includes a diversity of species, many of which are often absent or rare within urban and peri-urban areas. Such species include Sugar Glider (including known population at Tallarook), Swamp Wallaby *Wallabia bicolor*, Short-beaked Echidna *Tachyglossus aculeatus*, Eastern

Bearded Dragon *Pogona barbata,* and Tawny Frogmouth *Podargus strigoides*. A large number of birds were also recorded. Many other non-threatened species are locally abundant (such as Common Ring-tail Possum *Pseudocheirus peregrinus*) and therefore the risk of impact to the species overall populations is low. The displacement, injury, or death of non-threatened fauna is an animal welfare concern.

6.2.5 Hollow-bearing trees

Hollow-bearing trees are an important habitat resource for wildlife. Hollows have been demonstrated to support a wide range of species with 17% of birds, 42% of mammals, and 28% of reptiles in Australian known to be hollow dependent (Gibbons and Lindenmayer, 1997). In Victoria, hollows are essential for 16 species of mammal and 44 bird species including many threatened species (DSE, 2003c). Lace Monitor *Varanus varius* (listed as threatened under the FFG Act) is also dependent on hollows (DSE, 2003c).

The age of tree, size of hollows, and number of hollows required at any one time by each species varies. For example, bats select large old trees as roosts and individuals move roosts regularly, often daily; in order for a colony to survive, numerous trees with suitable hollows are essential (Bennett et al., 1994). Gliders and phascogales prefer hollows with a tight entrance hole (< 50 mm) and use multiple den sites within their home range (DSE, 2003a, 2003b; van der Ree et al., 2003; Sloanes et al., 2015). Owls tend to use larger, deeper hollows (Mackowski, 1984; Menkhorst, 1984; Scotts, 1991). It is therefore essential that not only many hollows be available but also a variety of sizes and shapes as different species having their own, sometimes unique ecological niche (Recher, 1991).

Hollow-bearing trees occur within the investigation area. Large numbers of trees were observed to contain hollows at the five enhancement sites targeted for survey for Brush-tailed Phascogale, Squirrel Glider, and Barking Owl. Many of those trees were noted to be of particularly high value due to the presence of a large number and variety of hollows, and/or evidence of fauna usage. Large trees identified during the native vegetation assessments (Plate 7) at sites not subject to targeted survey are likely to also contain hollows.

Mapping of hollow-bearing trees as part of targeted fauna survey and estimates of Hollow-bearing trees in investigation areas not subject to targeted habitat assessments highlights the abundance and diversity of hollows potentially impacted by the Project.

It is estimated that approximately 716 hollow-bearing trees occur within the investigation area based on the hollow-bearing trees mapped during the targeted survey (Table 24) and an estimate of large trees mapped as native vegetation that are likely to contain hollows (Table 25). The health of trees within 15 m of the project area could be indirectly impacted, but the hollows themselves will not be removed.

Table 24 Hollow-bearing trees recorded at each investigation area surveyed.

Survey site number	Enhancement site	Number of hollow-bearing trees	Number of hollow-bearing trees that are high value[1]
1	Hume Highway, Seymour	25	3
2	Seymour-Avenel Road, Seymour	75	18
3	Tallarook	61	19
4	Marchbanks Road, Broadford	6	0
5	Short Street, Broadford	5	0
Total		**172**	**40**

[1] *High value hollow-bearing trees are those which contain a large number and variety of hollows*

Table 25 Estimate of large trees that may contain hollows

Type	Number of native canopy trees mapped in the investigation area (Section 6.2.1)	Estimate of trees with hollows*
Large Trees in a Patch	579	376
Large Scattered Trees	137	89
Total	**716**	**465**

**the estimate is based on a ratio of 0.65 hollow-bearing trees for each large tree mapped which is derived from a comparison of hollow-bearing tree mapping and large tree mapping completed at five enhancement sites (AECOM, 2021a).*

Removal of trees containing hollows has the potential to impact on a range of hollow-dependent fauna including Brush-tailed Phascogale, Sugar Glider, parrots, owls, possums, and bats known to occur in the project area. This also includes members of the VTWBC.

Plate 7 Example of a Hollow-bearing tree recorded in the investigation area

6.2.6 Connectivity

Landscape connectivity is a term used to describe the spatial arrangement and quality of elements which affect the movement of animals in the landscape (Bennett, 1999). Linkages in the landscape are arrangements of habitats that enhance connectivity for species. Links can be maintained through stepping-stones of habitat of varying size and spacing or habitat corridors which provide a continuous connection of habitat (Bennett, 1999; Bennett et al. 2000). Habitat corridors are more likely to be effective or likely to be more important for facilitating movement of fauna where a large part of the landscape is modified and for species that have limited scale of movement (Bennett, 1999).

Habitat fragmentation is the process of subdividing habitat into smaller segments separated by an inhospitable dividing habitat (Gleeson & Gleeson, 2012) and is recognised under the FFG Act as a threat to native fauna in Victoria.

The Project occurs in a landscape with limited habitat connectivity. Vegetation along the rail corridor and/or roadsides adjacent to the rail lines is likely to function as a dispersal corridor for wildlife. Important local habitat linkages are evident, particularly between Broadford and Mangalore (Figure 17 – Appendix B) and are likely to provide valuable connection with other local sites of ecological value.

The Project has the potential to exacerbate fragmentation as a listed threatening process by widening existing gaps already present in the road and rail corridors and will therefore increase those barriers to faunal migration. Disruption to connectivity is more likely to be exacerbated for smaller, less mobile species such as small woodland birds (robins, wrens, thornbills, honeyeaters), reptiles, and small mammals (Taylor and Goldingay, 2010). Brush-tailed Phascogale, Sugar Glider, and potentially Squirrel Glider are likely to be affected by a reduction in connectivity, particularly at the Tallarook enhancement site.

The susceptibility of arboreal mammals to widening of existing gaps at the enhancement sites varies between species (Bennett 1999; Gleeson and Gleeson, 2012). Gaps of more than 70 m are a physical barrier to Squirrel Glider movement (Korodaj et al., 2014). Other species rely on overlapping canopy to move through a woodland and would therefore need to cross on the ground once there is a gap in the canopy. Time spent on the ground makes individuals more susceptible to predation and more prone to vehicle strike when crossing the road or rail network.

Wider gaps in habitat are unlikely to significantly disrupt functional connectivity for more mobile woodland birds (which include the threatened Swift Parrot and Barking Owl).

Connectivity within the investigation areas at Broadford, Tallarook, and Seymour

Short Street, Broadford and Marchbanks Road, Broadford enhancement sites

At Broadford, there are likely faunal habitat links through and around the township (Figure 18 – Appendix B). Woodland links through the town are associated with Sunday Creek, Mia Mia Creek, and an unnamed tributary through Catherine Court Reserve, and links around the north of the town are associated with Dry Creek and Sunday Creek. The latter provide linkages to woodland corridors along the Hume Freeway and through the agricultural landscape east to Dabyminga Creek Bushland Reserve and Tallarook State Forest and west to Mount Piper Nature Conservation Reserve.

Tallarook enhancement site

At Tallarook, there are several linkages (Figure 18 – Appendix B). Remnant vegetation along the Gairns Lane roadside and the road reserve adjacent to the rail corridor between the Hume Highway and Sanctuary Road provide local connectivity to the Tallarook Recreation Reserve, Tallarook Wildflower Sanctuary, and Tallarook Bushland Reserve. However, the Hume Highway represents an existing and significant gap in the canopy of the North - South corridor of almost 90 m. Fauna attempting to cross this existing gap would need to cross the freeway reservation or move along the rail line under the overbridge.

Habitat on either side of the rail corridor at Tallarook provides a link between woodland patches to the west and east of the rail line and Hume Highway including the riparian corridor of Dabyminga Creek which in turn links to the Goulburn River. There are current gaps in the canopy formed by the existing

rail corridor (35 – 45 m width), rail crossing on Sharps and Taylors Road (150 m width) and the dual carriageway of the Hume Highway at the end of Sharps and Taylors Road (two gaps of 30 m width separated by a narrow 30 m wide strip of woodland in the central median). Squirrel Glider are known to glide up to 40 m, and Brush-tailed Phascogale prefer gaps no greater than 75 m without additional barriers to movement such as road or rail (van der Ree et al., 2003). Given the larger gap along the Sharps and Taylors Road roadside (~150 m), fauna may be encouraged to cross the rail within proximity to the enhancement site where the gap is narrower.

Seymour-Avenel Road, Seymour enhancement site

At Seymour, linear connectivity extends along road reserves on either side of the rail from Seymour to Mangalore (Figure 18 – Appendix B). Linkages to the east and west of the rail are provided by riparian corridors, roadsides and scattered paddock trees, with paddock trees providing ‘stepping-stones’ for gliders, birds, and bats. These linkages potentially facilitate the movement of animals between larger areas of habitat at Puckapunyal Army Barracks, the Mangalore Conservation Reserve, and along the Goulburn River. Collectively these areas provide a large amount of suitable, connected habitat which is likely to be of higher value to woodland birds than the narrow strips of habitat within the investigation area.

Hume Highway, Seymour

Seymour-Avenel Road, Seymour

Tallarook

Marchbanks Road, Broadford

Hamilton Street, Broadford

Short Street, Broadford

PUCKAPUNYAL CL

PUCKAPUNYAL SSR
PUCKAPUNYAL SSR

STONY CREEK WF

COULBURN RIVER WF

SEYMOUR POLICE PADDOCK RESERVE
COULBURN RIVER C

SEYMOUR RESERVE C

BACK CREEK WF

GARDINER CREEK WF

SUGARLOAF CREEK WF

TALLAROOK C

WHITEHEADS CREEK WF

BYLANDS CREEK WF

SUGARLOAF CREEK - STOCKY CREEK WF

TALLAROOK BR

TALLAROOK RESERVE C

MOLISON CREEK SSR

MOLISON CREEK SSR

PULPIT ROCK BR

TRAWOOL RESV

MOLISON CREEK WF

SUNDAY CREEK WF

LOWRY BR

MILL CREEK WF

HORSESHOE LAGOON FFR

PERKINS CREEK WF

CANNON CREEK WF

FERRIS CREEK WF

WYNDHAM SSR

WYNDHAM SSR

KURKURUC CREEK SSR
KURKURUC CREEK SSR

FALLS CREEK WF

DABY INGA CREEK BR

DABY INGA CREEK BR

KURKURUC CREEK WF

HAMILTONS CREEK SSR

DABY INGA CREEK WF

TALLAROOK SF

MORANDING 1095 BR

BROADFORD G110 BR

DABY INGA CREEK BR

KING PARROT CREEK WF

MORANDING 1102 BR

BROADFORD RESERVE C

DRY CREEK WF

KILMORE CREEK - KURKURUC CREEK WF

MORANDING 1103 BR

MOUNT PI

DABY INGA CREEK BR

KILMORE CREEK WF

MORANDING 1099 BR

TYAAK RESERVE C

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INLAND RAIL

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Overview of landscape connectivity from Broadford to Seymour

- Enhancement Sites
- Victorian Temperate Woodland Bird Community
- Parks and Reserves
- Crown Land

0 2,200 4,400 Meters

Coordinate System: GDA 1994 MGA Zone 55

Date: 5/07/2021
Author: JRB
Data Sources: DELWP (2020)

Paper: A3
Scale: 1:3,118,129
Figure 7

6.2.7 Strategic Biodiversity Value

DELWPs Strategic Biodiversity Value (**SBV**) score combines species habitat distribution models, models of uncertainty of the likelihood of modelled habitat for Victoria's rare or threatened species (VROT), models of vegetation types in Victoria, and a model of native vegetation condition which is represented by a score between 0 and 1. This provides the impact assessment with a landscape-scale lens to inform decision-making around design for the Project. Similar to high quality vegetation, Table 8 of the Assessors Handbook (DELWP, 2018a) specifies that areas scored in the high SBV range are those that are above 0.8. Areas that scored above 0.8 are considered to be strategically important for the purposes of impact assessment and informing the design process

Figure 18 presents the SBV of land within and adjacent to the investigation area as modelled by DELWP. SBV categories within the investigation area ranged from 1 – 15 to 90 – 100. As outlined in Section 7.1.2, areas containing an SBV value of ≥ 0.80 are those considered high value. This information may be used to inform decision-making during the design process when prioritising areas of greater or lesser importance, and is not discussed further in residual impacts (Chapter 8.0).

6.2.8 Environmental overlays

The investigation area was contained within seven LGAs including Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, Indigo, and Wodonga. Environmental overlays were present within the investigation area within four LGAs including:

- Mitchell – ESO3, SMO, VPO1, and VPO2
- Wangaratta – VPO1, VPO2
- Indigo – ESO3
- Benalla – VPO3

The field assessments mapped the location of all native vegetation that fall within the area subject to the overlays. Table 26 summarises the extent of native vegetation that was recorded within the relevant environmental overlays present at the investigation area.

Table 26 Environmental overlays within the investigation area

LGA	Overlay
Mitchell	Environmental Significance Overlay – Schedule 3 *(Watercourse Conservation)*
	Salinity Management Overlay
	Vegetation Protection Overlay – Schedule 1 (*Roadside and Corridor Protection*)
	Vegetation Protection Overlay – Schedule 2 (*Freeway Environs Protection*)
Benalla	Environmental Significance Overlay – Schedule 3 *(Regent Honeyeater Habitat / Lurg Ironbark Vegetation Protection Area)*
Wangaratta	Vegetation Protection Overlay – Schedule 1 (*Glenrowan Township Vegetation Protection Area)*
	Vegetation Protection Overlay – Schedule 2 *(Roadside vegetation of conservation significance)*
Indigo	Environmental Significance Overlay – Schedule 3 *(Watercourse Conservation)*

6.3 Threatening processes

Threatening processes are processes that may threaten the survival, abundance, or ongoing existence of a native species or ecological community. Threatening processes are listed under the EPBC Act or FFG Act; some are recognised under both pieces of legislation.

Removal of native vegetation by the Project has the potential to exacerbate listed threatening processes, particularly land clearance (destruction of the above ground biomass of native vegetation), loss of hollow-bearing trees, and habitat fragmentation. Measures to manage and mitigate the impacts of native vegetation loss, hollow-bearing tree removal, and widening gaps in habitat linkages are the primary means of reducing the potential for the Project to exacerbate these threatening processes.

The Project is unlikely to encourage the occurrence of predators (cats and foxes) or rabbits above current levels in the environment. Although it is unknown whether soil pathogens are present in the impact area or surrounds, all water and soil should be assumed to be infected unless testing shows otherwise.

Regardless, measures to prevent and manage the introduction and spread of weeds or pathogens will be included in a Flora and Fauna Management Plan (**FFMP**) (or equivalent) for the Project.

Threatening processes listed under the EPBC Act and/or FFG Act of relevance to the Project and the potential for the Project to exacerbate those threatening processes are summarised in Table 27.

Table 27 EPBC Act and/or FFG Act-listed threatening processes relevant to the Project

EPBC Act-listed threatening process	FFG Act-listed threatening process	Potential for the Project to exacerbate the threatening process	Rationale
Land clearance	-	Yes	Native vegetation is defined under the EPBC Act as vegetation in which native species constitute more than 70% of the plant cover, or other vegetation containing populations of species listed under the EPBC Act. The Victorian definition of native vegetation cover sets the threshold at 25% cover of perennial native species. As such, the extent of land clearance identified in Section 6.2.1 is likely to be an overstatement of land clearance by definition under the EPBC Act. Project has potential to exacerbate this threatening process – see Section 6.2.1.
-	Habitat fragmentation as a threatening process for fauna in Victoria.	Yes	Project has potential to exacerbate this threatening process, particularly at the Tallarook and Seymour-Avenel Road, Seymour enhancement sites – see Section 6.2.6
-	Loss of hollow-bearing trees from Victorian native forests and woodlands	Yes	Project has potential to exacerbate this threatening process, particularly at Tallarook, Seymour-Avenel Road, Seymour and Hume Highway, Seymour enhancement sites and trees adjacent to the overhead powerline project areas – see Section 6.2.5.

EPBC Act-listed threatening process	FFG Act-listed threatening process	Potential for the Project to exacerbate the threatening process	Rationale
Predation by European Red Fox	Predation of native wildlife by the introduced Red Fox *Vulpes vulpes*	No	Red Fox was observed in the project area; however, the proposed works are unlikely to encourage the occurrence or increase the population of Red Fox in the local area.
Predation by feral cats	Predation of native wildlife by the cat, *Felis catus*	No	Feral cats were not observed in the project area. The Project is unlikely to encourage the occurrence of cats above current levels in the environment.
Competition and land degradation by rabbits	Reduction in biomass and biodiversity of native vegetation through grazing by the Rabbit *Oryctolagus cuniculus*	No	European Rabbit were detected during field assessments. The Project is unlikely to encourage the occurrence of rabbits.
Dieback caused by the root-rot fungus *Phytophthora cinnamomi*	The spread of Cinnamon Fungus *Phytophthora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority	Yes	Cinnamon Fungus is an introduced water mould that attacks the root systems of susceptible native plants including woody perennial plants from the Proteaceae (*Grevillea* spp., *Hakea* spp.), Fabaceae (peas), Dilleniaceae (*Hibbertia* spp.) and Epacridaceae (Heaths) families. Cinnamon Fungus therefore threatens the ecosystems which the susceptible plant species form part of and the animals that depend on them for habitat (DSE, 2008; DoEE, 2018). Little is known about the distribution and type of soil pathogens that may be present in the impact area or in surrounding areas. The Project therefore has the potential to exacerbate this threatening process.
	Use of Phytophthora-infected gravel in construction of roads, bridges, and reservoirs.		
Infection of amphibians with chytrid fungus resulting in chytridiomycosis	Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.	Yes	Chytrid Fungus *Batratchochytrium dendrobatidis* causes Chytridiomycosis in amphibians. Chytridiomycosis an infectious disease that has been found throughout the cool and wet areas of Australia. The fungus invades the surface layers of the frogs' skin disrupting the normal function of the skin leading to 100% mortality in frog populations in eastern Australia populations and fewer deaths in other populations in western areas of Australia (DoEE, 2016).

EPBC Act-listed threatening process	FFG Act-listed threatening process	Potential for the Project to exacerbate the threatening process	Rationale
			It is unknown whether chytrid fungus is present in or adjacent to the impact area. All water and damp soil should be assumed to be infected unless testing shows otherwise. The Project therefore has the potential to exacerbate this threatening process.
-	Increase in sediment input into Victorian rivers and streams due to human activities	Yes	Project has potential to exacerbate this threatening process through surface water runoff from construction areas entering rivers or creeks. Measures to prevent surface water runoff into waterbodies will form part of the Construction Environment Management Plan (**CEMP**) for the Project.
-	Invasion of native vegetation by Blackberry *Rubus fruticosus* L. agg	Yes	Blackberry was recorded at in the project area. The Project has potential to exacerbate this threatening process through spread of weed seed and propagule material during vegetation removal. Control of blackberry will form part of the CEMP for the Project.
-	Invasion of native vegetation by 'environmental weeds	Unlikely with management and mitigation	Control of weeds will form part of the CEMP for the Project and It is not expected the Project will encourage the invasion of environmental weeds into native vegetation.
-	Threats to native flora and fauna arising from the use by the feral honeybee *Apis mellifera* of nesting hollows and floral resources	No	Honeybees were observed occupying some hollows within the project area. The Project is unlikely to encourage the establishment of hives in nesting hollows.

6.4 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems are defined by the ministerial guidelines for groundwater licensing and protection as '*those ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain the communities of plants and animals and ecological processes they support, and ecosystem services they provide*' (Victorian Government, 2015).

Two categories and six types of GDEs in have been identified in Australia (Eamus, 2009; Geosciences Australia, 2017):

- GDEs that rely on surface expression of groundwater
  - wetlands and rivers
  - terrestrial fauna that rely on groundwater as a source of drinking water
- GDEs that rely on the availability of water beneath the surface (subsurface)
  - terrestrial vegetation that relies on groundwater close to the surface (within the root depth of the vegetation) which in turn supports animal communities
  - Aquifer and cave ecosystems,
  - Estuarine systems which rely on submarine groundwater discharge.

The dependency of a GDE on groundwater determines the degree and nature of impact that changes in groundwater quality and quantity may have on the ecosystem. GDEs can vary in the extent they draw upon groundwater and their dependency on groundwater may range on a temporal scale (Colvin et al, 2003). In some instances, GDEs may be solely reliant on groundwater at all times, while others may rely more heavily on groundwater during dry periods (Serov et al, 2012).

It is also important to note that a dependency on groundwater does not mean that vegetation would not persist without groundwater supply. For instance, in years of drought, access to groundwater may not be essential for the survival of a tree but a lack of available water may affect the frequency and abundance of flowering and therefore plant reproduction and availability of resources for fauna species (Holloway et al, 2013).

Groundwater in the investigation area

Potential GDEs were modelled for the five enhancement sites where track lowering is required using the BOM National Atlas of Groundwater Dependent Ecosystems. These five sites are the only areas of project works that have the potential for groundwater interaction. The findings as documented in the groundwater technical report (AECOM, 2021d) for GDEs within 1 km of the enhancement sites are summarised in Table 28.

Table 28 Occurrence of modelled GDEs at track lowering enhancement sites

Enhancement site	Occurrence of potential GDEs (AECOM, 2021d)
Short Street, Broadford	Three high potential aquatic GDEs were modelled as occurring within one kilometre of the enhancement site (Sunday Creek, Dry Creek and Mia Mia Creek). The closest high potential terrestrial GDE is Lions Park.
Tallarook	One high potential aquatic GDE (Dabyminga Creek) is located approximately 450 m east of the enhancement site. There are 6 high potential terrestrial GDEs within one kilometre of the enhancement site. The closest of these is the floodplains and grassy woodlands associated with Dabyminga Creek. A moderate potential terrestrial GDE comprised of grassy plains woodlands along a tributary occurs to the south-east of the enhancement site.

Enhancement site	Occurrence of potential GDEs (AECOM, 2021d)
Hume Highway, Seymour	No potential aquatic or terrestrial GDEs mapped or modelled as occurring within the enhancement site. There are 33 high or moderate potential terrestrial GDEs modelled within one kilometre of the enhancement site including plains grassy woodland and box ironbark forests.
Wangaratta Precinct	One high potential aquatic GDE, the King River, is modelled approximately 900 m to the south east of the enhancement site. The Ovens River located 900 m east of the enhancement site is classified as a low potential aquatic GDE. There are 50 high and 16 moderate potential terrestrial GDEs modelled within one kilometre of the enhancement site. These comprise billabong wetland, riverine swampy woodland, plains grassy woodland, plains woodland and floodplain riparian woodland on irrigated agriculture land, forestry, or other protected areas. The closest high potential terrestrial GDE is the floodplains and grassy woodlands associated with One Mile Creek to the south east of Green Street
Barnawartha North	No potential aquatic GDEs are modelled as occurring within one km of the enhancement site. There are 9 high and two moderate potential terrestrial GDEs modelled to occur. The closest high potential terrestrial GDE is approximately 50 m north of enhancement site and is comprised of a small area of plains grassy woodland adjacent to Welladsens Road.

Groundwater is not a preferred option for water supply for the Project and is unlikely to be used for construction purposes. If active dewatering and/or seepage of groundwater was to occur at track lowering sites during construction, it may impact GDEs present due to reduced groundwater levels and/or flows. However, groundwater levels relative to the design formation (i.e. base of ballast) at the time of the groundwater impact assessment (Table 29) suggests that there is little potential for groundwater to be intersected at the track lowering enhancement sites.

As such the Project is unlikely to result in drawdown of groundwater levels which may affect groundwater users (i.e. bores) or GDE's

Table 29 Groundwater elevations summary

Site Name	Groundwater Elevation (mAHD)	Lowest Design Formation* Elevation (mAHD)	Depth to Groundwater Below Design Level (metres)
Short Street, Broadford	< 200.23 (at MW01)	203.787	> 3.5
Tallarook	173.05 (at BH2054)	181.218	> 7
Hume Highway, Seymour	< 150.57 (BH2064)	154.281	> 3.5
Wangaratta Precinct	< 140.94 (MW03)	145.745	> 4.5
	< 142.13 (MW04)	145.703**	> 3.5
Barnawartha North	< 164.79 (MW05)	172.247	> 7

*Source: AECOM 2021d. NOTE: * - Formation elevation being base of ballast/top of underlying sediments; ** - Floor of pedestrian subway at 4 metres below current rail level (KP233.95)*

The regional groundwater table is at least 3.5 m below the proposed track lowering sites. Overall, it was concluded that the Project poses little risk of causing material adverse impacts to groundwater beneficial use (e.g. GDEs) or groundwater users due to effects on groundwater levels and/or flow (AECOM, 2021d). As such, further consideration of presence of native vegetation and habitat which may rely on groundwater at those locations is not required.

Interim advice in relation to the additional options at Euroa Station Precinct and Benalla Station Precinct suggest there is potential for interaction with groundwater associated with the oversized vehicle underpass at Euroa and the pedestrian underpass at Benalla Station Precinct. There are few ecological values at both the Euroa Station Precinct and Benalla Station Precinct, and it is not considered likely that they are GDE's. While groundwater investigations at Euroa and Benalla are still underway, the potential for any drawdown needed from de-watering will be short-term in nature, and very localised. Detrimental impacts on the recorded vegetation is considered unlikely.

Chapter 7.0 Impact Minimisation & Mitigation

7.0 Impact Minimisation and Mitigation

Impacts to native vegetation and other ecological values are unavoidable. Development of the Reference Design has sought to avoid impacts on ecological assets. The detailed design phase will continue to seek opportunities to avoid, minimise, and/or mitigate impacts through the adoption of ecologically sensitive construction methodologies.

The main biodiversity impacts expected from the Project will occur because of land clearance during construction resulting in vegetation removal. Vegetation removal not only results in a loss of native vegetation (extent and/or quality) but also a reduction in extent of TECs, loss of habitat for threatened plants and resident wildlife (threatened and non-threatened species), loss of hollow-bearing trees, and disruption to habitat connectivity. Collectively these are referred to as 'direct' impacts.

Construction activity has the potential to also indirectly impact on retained values adjacent to (within 15 m of) the area directly impacted by a project. Indirect impacts usually relate to the displacement of wildlife from adjacent habitat through disturbance mechanisms such as noise, light and human activity, and impacts on retained native vegetation and habitat through processes such as soil compaction and root damage within TPZs, sedimentation, weed infestation, and smothering by dust. The Project poses little risk of causing material adverse impacts to GDEs (AECOM, 2021d).

The Project has sought to reduce these potential impacts during development of the Reference Design and through commitments to continue to seek opportunities to avoid or minimise impacts to areas of ecological value during detailed design.

This section outlines how the Project will reduce its potential impact on ecological values through avoidance, mitigation, and rehabilitation. The Project has applied the mitigation hierarchy outlined in the scoping document (DELWP, 2020a) to reduce impacts (Table 30). The focus of mitigation measures is primarily to avoid impacts and secondly to develop, prepare, and implement project-specific measures that reduce impacts to acceptable levels. Thirdly, the Project will restore and rehabilitate suitable land at the conclusion of works to re-establish habitat connectivity within the rail corridor.

Table 30 Mitigation hierarchy

Mitigation Hierarchy	Definition	Environment Report section
1. Avoidance	Measures to avoid adverse effects on the environment.	Section 7.1
2. Minimisation	Measures to reduce the duration, intensity, or extent of impacts that cannot be avoided.	Section 7.2
3. Rehabilitation	Measures taken to improve a degraded environment following exposure to impacts.	Section 7.3
4. Offsets	Measures taken to compensate for residual impacts after implementation of the previous three steps of the mitigation hierarchy.	Chapter 9

Mitigation measures outlined in this chapter have been developed with reference to environmental management measures outlined in Appendix B of the *Inland Rail Programme Environmental Management Plan 0-0000-900-EEC-00-PL-0001* (ARTC, 2018).

Implementation of these measures to avoid and minimise impacts on ecological values has led to a reduction in the potential impact of the Project. Impacts which cannot be avoided, minimised or mitigated by the Project through implementation of the measures outlined below are referred to as residual (or actual) impacts and are described Chapter 8.0.

7.1 Avoidance

Avoidance relates to the commitment of the Project to avoid impacts to ecological assets during development of the Reference Design and minimising loss of ecological assets during detailed design.

The Project has avoided impacts to native vegetation through changes to the Reference Design following the referral of the Project to the Minister for Planning. Detailed project design and the development of construction methodologies will result in further avoidance of impacts to native vegetation as the design is progressed.

7.1.1 Avoidance during Reference Design phase

The Reference Design has sought to avoid ecological values. To date, the values have included:

- Two patches of Plains Grassland EVC at Track Slew 1 – Wallan Loop and Signal Gantry 3 (totalling 0.619 ha). This corresponds with the NTGVVP and WBPGC TECs.
- Potential habitat for Striped Legless Lizard at Short Street, Broadford enhancement site
- Habitat for Brown Toadlet (potential habitat for Sloane's Froglet) will be avoided by works being restricted to the existing pole locations at overhead powerline 1110 (Figure 15 - Appendix B).
- Potential habitat for Golden Sun Moth at overhead powerline 1013 is outside the project area and therefore the impact area (Figure 15 - Appendix B).
- Population of Euroa Guinea-flower at overhead powerline investigation area 1047. The population is not currently fenced or marked, so fencing will be installed to avoid inadvertent impact – see Figure 15 (Appendix B).
- Population of Late-flower Flax-lily at overhead powerline investigation area 1012 – see Figure 15 (Appendix B).

The Project is committed to implementing additional measures to avoid ecological impacts. Actions to achieve this reduction are outlined in Table 32.

7.1.2 Design to avoid native vegetation and habitat loss

During the detailed design phase, the Project will seek to reduce the amount of native vegetation requiring removal and design the Project to impact on areas with the least biodiversity values in preference to areas of higher value.

Areas of native vegetation that will be prioritised for avoidance and minimisation of loss are:

- TECs
- Large Trees (Scattered Trees and Large Trees in Patches)
- Patches of native vegetation that contain Large Trees in Patches
- Sensitive wetlands including Mapped Wetlands
- Patches of native vegetation that consist of an endangered EVC
- Patches of native vegetation with a VQA score of > 0.60
- Patches of native vegetation that have an SBV value of > 0.80 (Figure 18)
- Vegetation protected under an environmental overlay.
- Hollow-bearing trees including large trees (large Scattered Trees and Large Trees in Patches) which are assumed to contain hollows.
- Habitat for rare or threatened species.

Additionally, when the location of construction areas and laydowns are considered during the detailed design phase, placement of these areas will be ≥ 15 m from the nearest native vegetation unless an

arborist assessment and implementation of any relevant mitigation measures identifies that an impact to native vegetation will not occur.

7.1.3 Priority Avoidance Zones and No-Go Zones

A key mitigation measure through which the avoid and minimise principals will be adopted for the project is the delineation of Priority Avoidance Zones (**PAZs**) and No-Go Zones (**NGZs**). The Project's design will be subject to continuing refinement advised by the PAZs, and the determination of the location and the extent of the NGZs will be based on a final design.

Priority Avoidance Zones

Priority Avoidance Zones will be defined by ARTC in consultation with, and to the satisfaction of, DELWP in the detailed design phase to identify areas of ecological value to be avoided during detailed design. The PAZs will prioritise avoidance of native vegetation (patches and Scattered Trees), threatened species habitat and TECs.

The PAZs will be documented in the Project GIS and provided to the construction contractor to inform the detailed design process.

No-Go Zones

No-Go Zones will be defined by the construction contractor as areas where works are not permitted. NGZs will protect sites of known significant ecological values and are not to be revised or altered. These NGZs will form part of the requirements outlined in the Construction Environmental Management Plan for the works.

As the Reference Design is subject to change, determination of the locations and extents of these NGZs will be based on a final design. It is expected that the need for these zones to be determined will form part of the EMF for the project and will be detailed in the FFMP to be prepared in consultation with, and to the satisfaction of, DELWP.

Ultimately, all native vegetation that is not proposed to be impacted by the project will be contained within an NGZ. The NGZs will be documented in the Project GIS and incorporated on site plans included in the CEMP and relevant sub-management plans, including the FFMP.

7.2 Minimisation

Minimisation relates to reducing the duration, intensity, or extent of impacts through protection measures for retained vegetation and habitat and minimisation of disturbance to wildlife.

The Project will implement measures to minimise impacts on retained native vegetation and wildlife. Protection of retained vegetation and habitat during construction and measures to minimise disturbance, injury or death of wildlife will be incorporated into a FFMP, a Tree Management Plan (**TMP**), and a Biosecurity Management Plan (**BMP**) for the Project.

7.2.1 Protect retained vegetation and habitat during construction

Retained values may be impacted by a range of construction activities including but not limited to, earthworks, vehicle parking and equipment and plant storage, and stockpiling of soils and construction materials. Other risks to retained values include potential introduction and/or spread of weeds and pathogens due to movements of machinery, light vehicles, personnel and materials, dust settling on leaves, surface water runoff (erosion and sedimentation) and chemical spills (contamination).

The Project will implement measures outlined in Table 32 to protect retained vegetation and habitat from unintentional impacts during construction (e.g. earth falling into protected areas), introduction and spread of weeds and/or pathogens and erosion, sedimentation, and contamination.

7.2.2 Minimise disturbance, injury, or death of wildlife

There is potential for wildlife to be killed or injured during construction due to:

- Entrapment in open trenches: small ground-dwelling animals are most at risk of being killed or injured in trenches by falls, predation, exposure, starvation, and burial.

- Vehicle collisions: increased local traffic associated with construction activity will increase vehicle movements and therefore the risk of animal-vehicle collisions. Widening of gaps in habitat may force animals to move across roads in order to move through the landscape increasing the risk of being killed on roads.
- Entanglement in fences around construction areas: aerial species bats and gliding mammals are most at risk, particularly if these are constructed with barbed wire (van der Ree, 1999).

Construction works may also unintentionally disturb and displace fauna occupying retained habitat adjacent to the Reference Design Area. Species most at risk are those which are more sedentary such as possums, frogs, and lizards, as they are less likely to move away from the construction works, or species that breed and shelter in hollows.

Mitigation measures to minimise impacts to non-threatened and threatened fauna from construction works are discussed in Section 7.2.2.

There is potential for wildlife to be killed or injured during construction due to entrapment in open trenches, vehicle collisions, and entanglement in fences around construction areas. Construction works may also disturb and displace fauna from adjacent habitat.

Mitigation and management

The Project will implement measures outlined in Table 32 to reduce potential impacts on fauna during construction. These include measures to reduce the risk of fauna becoming entrapped in trenches and engaging appropriately qualified wildlife spotters when habitat is removed. Details of the type of measures and location where the measures must be implemented will be determined as part of developing the FFMP for the Project in consultation with DELWP.

7.2.3 Minimise disruption to connectivity

Disruption to habitat connectivity has been reduced but not entirely avoided by the Reference Design.

Track slews and signal gantry investigation areas are largely contained within the rail corridor and works will be conducted from the rail and will utilise existing access tracks. A reduction in landscape connectivity as a result of works in these areas is unlikely.

Gaps in the canopy exist already for the overhead powerline sites, and the works proposed on these are not likely to further exacerbate connectivity issues.

Mitigation and management

Glider poles will be installed to maintain connectivity for gliders at the Tallarook and Seymour-Avenel Road, Seymour enhancement sites. Glider poles are tall poles fitted with crossbars at the top to provide launching points for gliders. They are particularly valuable as a mitigation for linear infrastructure such as railway lines and utility easements. Glide poles need to be spaced at no more than 25 m apart for 12 m high poles, based on the maximum successful glide distance between poles by Squirrel Gliders (Gleeson and Gleeson, 2012).

The number, type, and location for these structures will be determined as part of developing the FFMP for the Project in consultation with DELWP. The feasibility, cost, and safety implications of installing the structures within the rail corridor will be considered along with ongoing maintenance requirements for the poles.

7.3 Rehabilitation

Rehabilitation relates to reinstating areas where temporary, minor disturbance occurs during construction.

The Project will reinstate areas where temporary, minor disturbance occurs during construction. Opportunities for revegetation and to replace hollows will be developed in consultation with regulators to optimise the benefits for biodiversity in the region. ARTC have developed a Landscape and Rehabilitation Strategy (ARTC, 2021) for the Inland Rail Project that provides a commitment to employing landscape and rehabilitation treatment solutions for all stages of the Inland Rail program.

7.3.1 Restoration and revegetation of disturbed areas

Restoration and revegetation of areas subject to temporary and minor disturbance during the construction phase of the Project (e.g. construction works that result in the partial clearance of ground cover or mid-storey vegetation) will be completed at the conclusion of works. Areas disturbed will be restored by re-planting and re-seeding the disturbed area with a mix of local native plant species in consultation with relevant stakeholders.

The aim of restoration and revegetation will be to promote recovery of species that provide foraging or shelter resources for wildlife to remedy habitat loss and fragmentation. There will likely be a temporal delay in the recovery of native vegetation as some flora species will take longer to recover; therefore, the full assemblage of flora and fauna species may not utilise/recolonise the habitat available for a period of time due to individual species requirements (e.g. suitable breeding habitat for fauna). Regardless, the implementation of restoration actions should contribute to habitat connectivity and help to facilitate movement through the landscape into the future.

7.3.2 Replacement of hollows

The presence of hollow-bearing trees within the impact area means the Project has the potential to exacerbate a potentially threatening process listed under the FFG Act. The Reference Design will impact known hollow-bearing trees and other trees which may also contain hollows that will be removed. Those losses are now primarily restricted to five enhancement sites:

- Hume Highway, Seymour
- Seymour-Avenel Road, Seymour
- Tallarook
- Marchbanks Road, Broadford
- Short Street, Broadford.

Replacement of hollows is unlikely to be as effective in supporting wildlife as retaining hollows in situ. Hollows are not easy to replace as the specific size and shape required by particular species can be difficult to replicate and natural hollows take a very long time to form (Mackowski, 1984; Gibbons and Lindenmayer, 1997). Due to the time taken for hollows to develop, revegetation does not provide a short-term mitigation for their loss.

The Project will investigate opportunities to incorporate artificial hollows. Options to provide artificial replacements for hollows will be explored by the Project during the detailed design phase. Artificial hollow is a term used to describe a ‘hollow structure that aims to mimic a natural tree hollow’ (BCT, 2020, p3). There are several types of artificial hollows – nest boxes, chainsaw cut hollows, and salvaged natural hollows. An initial assessment of the effectiveness and feasibility of application of these types of artificial hollows has been considered in the context of the Project and are outlined in Table 31.

Table 31 Summary of artificial hollow types, description, and effectiveness

Artificial hollow type	Description	Effectiveness	Feasibility for Project
Nest boxes (manufactured hollows)	Prefabricated boxes built to standard specifications dependent on the target species.	Until recently, nest boxes were the primary method used to replace hollows. However, their effectiveness has been shown to be variable depending on the target species, design specifications and material quality (DSE, 2003c; TSRH, 2018). Nest boxes also only provide a short-term solution if not maintained, depending on material used (DELWP, 2018c; BCT, 2020). Plywood nest boxes are generally poorly insulated and produce lower-quality thermal environments (Griffiths et al., 2020).	This will be considered by the Project when developing the FFMP during detailed design.
Nest boxes (new technology)	3D printed modular hollows developed by Habitech	These nest boxes are made from more durable plastic-based materials (UV-stabilised), double-walled for temperature and humidity control, and modular which allows them to be adjusted to suit different sized species. Effectiveness is unknown as this is an emerging technique. However, a more natural shape, more flexible and durable design, and improved thermal mass and insulative properties suggest this product may overcome the limitations of traditional nest boxes.	This will be considered by the Project when developing the FFMP during detailed design.
Chainsaw / drilled hollows	Hollows cut into standing trees or cut into logs and attached to tree trunks (referred to as log hollows).	Novel approach which requires technical training and certification and may pose a risk to tree health (BCT, 2020). Hollows carved directly into live trees design to replicate natural hollows can provide thermally similar habitat to natural hollows (Griffiths et al., 2020). Sugar Gliders and Brush-tailed Phascogales rapidly occupy artificial hollows; both species were detected more often in carved hollows than in nest boxes (Terry et al., 2021).	This will be considered by the Project when developing the FFMP during detailed design.
Salvaged natural tree hollows	Hollow branches or trunks cut from felled trees and refitted to trees not currently containing hollows. Hollow section cut into lengths of >0.5 m to maintain depth between the entrance and base of the chamber. Salvaged timber can be used to cap the bottom of the hollow if it is open (Gleeson and Gleeson, 2012).	There is little information on the effectiveness of salvaged natural hollows compared with nest boxes and chainsaw cut hollows. This approach may also pose a risk to any fauna still occupying the hollows of felled trees. Like nest boxes, periodic maintenance will be required. It is assumed that salvaged natural hollows would provide habitat similar to in situ natural hollows.	This will be considered by the Project when developing the FFMP during detailed design.

7.4 Actions to minimise and mitigate impacts

Actions the Project will implement to minimise and mitigate impacts outlined in this chapter are summarised in Table 32. These actions will be used to inform the Environmental Performance Requirements (**EPRs**) to be developed as part of the Environmental Management Framework (**EMF**) for the Project (Section 10.0).

Implementation of measures associated with minimisation of impacts and rehabilitation/restoration relies upon the development of management plans to outline details of the measures, timeframes, and measurable performance objectives and responsibilities. The preparation and implementation of management plans is therefore included in the table of actions for the Project.

The Project has engaged a Design and Construction (**D&C**) Contractor which will be responsible for the development and implementation of a Construction Environmental Management Plan (**CEMP**) and compliance with the EPRs relevant to design and construction.

Table 32 Actions to minimise and mitigate impacts

Action number	Action description	Timing	Responsibility
Avoidance			
1	Complete track slew and signal gantry works from the rail line and from existing access tracks that have been designed and maintained for movement of heavy machinery.	Construction	D&C Contractor
2	Prioritise placement of laydown areas, stockpiles, fuel storage, site compounds, etc. in areas that have already been cleared or disturbed (e.g. empty lots in rural town centres, cleared agricultural paddocks, or the rail corridor) and at least 15 m away from the nearest native canopy trees unless an arborist assessment and any associated implemented mitigation measures will not result in either remnant vegetation loss or TPZ encroachment.	Detailed design phase	D&C Contractor
3	Remove the need for large-scale excavation at the margins of overhead powerline works where trees occur within 15 m to avoid impacts on the root zones.	Detailed design phase	D&C Contractor
4	Conduct an arborist assessment to identify those trees that will not be adversely impacted by the works, those that may not be impacted if protection measures are implemented, and those where loss is unavoidable.	Detailed design phase	ARTC
5	Induct all contract staff on the presence and location of ecological values and inform them of all relevant protective measures and obligations while undertaking construction activities.	Construction	D&C Contractor

Action number	Action description	Timing	Responsibility
6	Seek to further avoid areas of native vegetation, trees (including hollow-bearing trees), threatened ecological communities and species habitat, and habitat linkages requiring removal during detailed design.	Detailed design phase	D&C Contractor
7	Prioritise areas with least biodiversity values for removal during detailed design.	Detailed design phase	D&C Contractor
8	Define PAZs in consultation with, and to the satisfaction of, DELWP for areas of native vegetation (patches and trees), threatened species and TECs to inform the detailed design process.	Detailed design phase	ARTC
9	Establish NGZs to protect retained areas of native vegetation, threatened ecological communities, threatened species, and/or areas identified as important for connectivity.	Prior to construction at each site	D&C Contractor
10	Maintain a NGZ register to identify individual NGZs, their specific values, and any design program interactions.	Planning Construction	ARTC D&C Contractor
Minimisation			
Prevent construction impacting on retained vegetation and habitat			
11	Restrict movement of vehicles to existing or new access tracks that have been designed and maintained for the movement of heavy machinery.	Construction	D&C Contractor
12	Establish TPZs to prevent inadvertent loss of retained Scattered Trees or trees not within an NGZ. TPZs will defined as per AS 4970-2009 *Protection of Trees on Development Sites.* TPZs are calculated for an individual tree based on its tree Diameter at Breast Height (DBH) multiplied by 12 (TPZ = DBH x 12); a TPZ will not be less than 2 m nor greater than 15 m from the trunk as per AS 4970-2009 *Protection of Trees on Development Sites*.	Prior to construction at each site	D&C Contractor
13	Consult an arborist to determine appropriate protection and/or management measures for potentially impacted trees.	Prior to construction	D&C Contractor
14	Fence TPZs and NGZs with highly visible fencing designed to last the duration of construction works. Fencing will be appropriately signed, and TPZ and NGZ fencing will be installed with at least a 1 m buffer from the protected matter or as directed by the Tree Management Plan.	Prior to construction at each site	D&C Contractor

Action number	Action description	Timing	Responsibility
15	Clearly mark NGZs, TPZs (including their 1 m buffer), and the works area limit on all maps and construction drawings prior to commencement of works. No works are to occur outside the marked footprint for the works.	Detailed design Construction	D&C Contractor
16	Conduct pre-construction inspections to confirm that native vegetation and trees to be retained have been adequately protected from impact. This inspection will be undertaken by a qualified arborist.	Prior to construction at each site	D&C Contractor
17	Regular inspection and maintenance of fencing (TPZ, NGZs, and fauna fencing) throughout construction to ensure continued integrity.	Construction	D&C Contractor
18	Induct all contractors identifying all significant ecological values and NGZs and informing them of all obligations while undertaking construction activities.	Construction	D&C Contractor
Minimise disturbance, injury, or death of wildlife			
19	Manage any open pits or trenches to reduce potential for fauna entrapment. Implement measures such as: • Minimise the period trenches and other excavations are open • Design excavations with slopes less than 45º to provide exit ramps for fauna where practicable and safe to do so • Create 'ladders' to enable fauna to exit the excavations (e.g. branches, ropes, planks) • Ensure fauna are discouraged from work areas by erecting barriers where practicable. • A protocol included in the site induction around the procedure for finding trapped fauna.	Construction	D&C Contractor
20	Design any fencing required to define construction boundaries or to protect NGZs or TPZs in accordance with relevant DELWP guidelines to limit fauna strike and fauna mortality risk and/or maintain habitat connectivity.	Prior to construction	D&C Contractor
21	Time removal of trees to avoid the breeding season of nesting birds and mammals or times when arboreal mammals are less active and more likely to be inhabiting hollows (winter and spring) or in accordance with the Flora and Fauna Management Plan.	Planning	D&C Contractor

Action number	Action description	Timing	Responsibility
22	Design lighting at Tallarook enhancement site to avoid/minimise light spill into adjacent habitat.	Construction	D&C Contractor
23	Minimise night-time works where practical to do so, to reduce impacts of noise and light on nocturnal animals.	Construction	D&C Contractor
24	Install nest boxes 3 months prior to the removal of any trees to provide temporary refuge for displaced wildlife at sites where Large Trees in Patches, Scattered Trees and hollow-bearing trees are to be removed.	Prior to tree removal	D&C Contractor
25	Conduct pre-clearing survey at all sites where vegetation is being removed to assess presence of fauna. This is particularly relevant for the removal of hollow-bearing trees	Prior to construction	D&C Contractor
26	Engage a suitably qualified wildlife handler ('wildlife spotter'), holding a relevant and current authorisation under the *Wildlife Act 1975*, to salvage any wildlife encountered during site clearance works.	Construction	D&C Contractor
27	An appropriately qualified ecologist who can identify Striped Legless Lizards and other fossorial herpetofauna is to be present during any trenching/earthwork activities between Beveridge and Seymour and around Benalla and Wangaratta to conduct salvage and relocation of animals.	Construction	D&C Contractor
28	An appropriately qualified ecologist who can identify Growling Grass Frog and Sloan's Froglet will undertake pre-clearance surveys of the identified habitats within four days prior to works commencing, any species identified will be relocated to suitable locations, as determined by the ecologist conducting the survey.	Construction	D&C Contractor
Control spread and/or introduction of weeds and/or pathogens			
29	Implement hygiene measures to ensure opportunities for the introduction and spread of weeds (importation of seeds and other vegetative material to the site) and pathogens are limited. This will include vehicle inspections and establishment of wash down facilities.	Construction	D&C Contractor
30	Assess suitability of cleared vegetation for mulching/erosion protection on a site-by-site basis. Cleared vegetated material containing or with the potential to contain weed seed material will not be used.	Construction	D&C Contractor
31	Use introduced fill that is clean and certified weed and contaminant free.	Construction	D&C Contractor

Action number	Action description	Timing	Responsibility
32	Treat high risk weeds from construction areas prior to works commencing.	Prior to construction During construction	D&C Contractor
33	Manage any outbreak of noxious and/or Weeds or National Environmental Significance (WoNS) within construction areas that occurs due to construction activity. Prevent spread into adjacent land.	Prior to construction During construction	D&C Contractor
34	Ensure induction of all contract staff details the requirements for vehicles and equipment to be free of mud and plant material prior to entering work sites.	Construction	D&C Contractor
Reduce erosion, sedimentation, and contamination risk to retained vegetation and habitat			
35	Implement measures to manage erosion and sedimentation, address the management, handling, and storage of hazardous chemicals, and manage dust to minimise impacts on retained vegetation and habitat and aquatic environments.	Prior to construction	D&C Contractor
Prepare and implement management plans to guide measures to minimise impacts			
36	Prepare and implement a Tree Management Plan (TMP). The TMP will be developed in consultation with DELWP and will include measures such as: • Identification of which trees are to be retained or removed. • Confirmation of the condition and arboricultural value of the trees to be removed. • Establishment of TPZs (for Large Trees in Patches and Scattered Trees) with fencing and signage. • Clearly mark TPZs on all maps and construction drawings prior to commencement of works. No works are to occur inside the TPZ.	Prior to construction (prepare) During construction (implement)	D&C Contractor
37	Prepare and implement a Flora and Fauna Management Plan (FFMP) to outline control measures to protect ecological values and reduce ecological impacts, define the objectives and targets, roles, and responsibilities for management actions. The FFMP will be developed in consultation with, and to the satisfaction of DELWP, and will include measures such as: • Establishment of NGZ (for identified ecological values) with fencing and signage. • Preparation of updated maps before construction identifying NGZs.	Prior to construction (prepare) During construction (implement)	D&C Contractor

Action number	Action description	Timing	Responsibility
	• Buffer distances, as approved by a qualified ecologist, around identified threatened species habitat, and threatened ecological communities to be retained until the end of the site construction period. • Measures to minimise injury, death, or disturbance to wildlife during construction works including vegetation clearance, excavation, and trenching. • Engagement of a suitably qualified wildlife handler to salvage any wildlife encountered during removal of vegetation. • Installation of 'fauna furniture' (artificial hollows to replace hollow-bearing trees and glider poles) with number, type and placement to be determined in consultation with a qualified zoologist and the agreed location and specification incorporated in site maps and as a Project GIS layer prior to the commencement of works. • Species-specific mitigation measures to reduce likelihood of impacts on threatened species including inspection of suitable habitat by a zoologist prior to commencement of works and, if determined to be necessary, engagement of a suitably qualified wildlife handler to be present during habitat clearance. • Maintenance and monitoring requirements and checklists to ensure proper functioning of protection measures as well as compliance with environmental protection targets. • Requirements for submission of data to the Victorian Biodiversity Atlas/DELWP. • Induction of all contractors to identify significant environmental issues and inform them of all relevant protective measures and obligations while undertaking construction activities. Maps identifying NGZs will be provided as part of this induction.		
38	Prepare and implement a Biosecurity Management Plan (BMP) to describe how the Project will manage and control impacts on indigenous fauna and flora values from biosecurity threats (weeds, pathogens, and pest animals) during construction and operational phases. The BMP will be developed in consultation with DELWP and include: • Site hygiene and waste management to deter pest animals. • Weed surveillance and treatment during construction and rehabilitation activities. • Pesticide and herbicide use, documentation, and limitations on use (i.e. not used in sensitive environmental areas, drainage lines that flow to waterways, and aquatic habitats; broadscale use does not result in an increased erosion and sediment risk).	Prior to construction (prepare) During construction (implement)	D&C Contractor

Action number	Action description	Timing	Responsibility
	• Hygiene protocols to prevent the introduction and/or spread of weeds and pathogens. • Vehicle, machinery, and imported fill hygiene protocols and documentation. • Erosion and sediment control risk associated with broadscale weed removal or treatment.		
39	Prepare and implement a Construction Environmental Management Plan (CEMP) which includes: • Guidance on the best practice installation of sediment and erosion control measures. • Direction to stabilise stockpiles not in daily use. • Advice on batter slope gradients to minimise erosion risk. • Advice on the siting and scale of stockpiles, construction compounds, fuel storage, and laydown areas and other construction areas informed by a flood risk assessment. • Direction that maintenance activities and refuelling will be carried out at an appropriate distance with appropriate spill protection measures in place to avoid impacts to vegetation, habitat, and waterways, in accordance with relevant regulatory requirements. • A response plan to deal with accidental spills and leaks. Spill kits will be available on site and will be appropriate for the substances in use. • A response plan to deal with accidental spills and leaks that may impact aquatic areas, particularly in proximity to Track Slew 2 – Tallarook Loop which is adjacent to DELWP mapped wetlands and the Goulburn River. Aquatic spill kits will be available on site and will be appropriate for the substances in use. • Dust suppression measures including management of stockpiles, and storage of materials, particularly where materials may become windborne (i.e. covering, spraying). • Directions to stabilise disturbed areas as soon as practical.	Prior to construction (prepare) During construction (implement)	D&C Contractor

Action number	Action description	Timing	Responsibility
Rehabilitation			
40	Restore and reinstate areas subject to temporary and minor disturbance during the construction phase of the Project (e.g. construction works that result in the partial clearance of ground cover or mid-storey vegetation) at the conclusion of works. Areas disturbed will be restored by re-planting and re-seeding the disturbed area with a mix of local native plant species. Re-instatement will be completed in accordance with the *Inland Rail Landscape and Rehabilitation Framework* 0-0000-900-ELE-00-GU-0001_0 (ARTC, 2021).	End of construction	D&C Contractor
41	Install artificial trees hollows to compensate for the loss of hollow-bearing trees at the Marchbanks Road, Broadford, Tallarook, Seymour-Avenel Road, Seymour, Hume Highway, Seymour, Glenrowan, and Wangaratta Precinct enhancement sites. Replacement of hollows (number, type, placement) will be determined on a site-by-site basis.	Prior to construction	D&C Contractor
42	Prepare and implement a Rehabilitation and Reinstatement Plan (RRP) to guide the approach to rehabilitation following the completion of construction. The RRP will be developed in consultation with DELWP and include measures such as: • Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas. • Identification of flora species and plant and/or seed stock sources. • Procedures, timeframes, measurable performance objectives, and responsibilities for monitoring the success of rehabilitation and/or reinstatement/stabilisation areas. • Corrective actions if the outcomes of rehabilitation and/or reinstatement/stabilisation do not achieve the objectives adopted.	Prior to construction (prepare) During construction (implement)	D&C Contractor

7.5 Affordability of mitigation measures

The Project recognises that a commitment to implement the mitigation measures outlined in this Environment Report and subsequently in the Environmental Management Framework requires a commitment of funds, not only for implementation but also for ongoing maintenance (where applicable).

The Reference Design assessed in this Environment Report represents a technically and commercially feasible design solution for the Inland Rail Project in Victoria. There are alternative design options at Benalla, Euroa, and Short Street, Broadford enhancement sites, but these options are also technically and commercially feasible design options.

ARTC is currently procuring a design and construct contractor for the design and construction of five of the enhancement sites (Seymour-Avenel Road, Seymour, Tallarook, Glenrowan, Wangaratta, and Barnawartha North), track slews, and signalling.

As part of the procurement process, tenderers will be required to demonstrate how their design solution complies with the EMF and EPRs, as well as the environmental outcomes and conditions arising from the planning and environmental approval process.

The specific details of avoidance and mitigation measures to be implemented will depend on the successful tenderer’s design approach. In some cases, measures to avoid and mitigate impacts will form part of the overall design and construction methods for specific enhancement sites, such as the use of steeper batters to reduce the area of disturbance or retention wall in areas of sensitive vegetation.

The costs for the implementation of the mitigation measures outlined in the EMF and the EPRs will be provided by the bidders for the works. For this reason, the cost for the specific measures cannot be meaningfully estimated as part of this Environment Report. Nevertheless, based on the previous major project completed by ARTC to date, it is estimated that between 1-5% of the project's total cost per enhancement site will be utilised to address mitigation measures and achieve compliance. The cost allocation at each enhancement site will depend on the level of flora and fauna management required, compliance monitoring and the rehabilitation required at the site after construction. This excludes offset securement, spoil management including disposal and non-biodiversity and heritage related measures.

Chapter 8.0 Residual Ecological Impacts

8.0 Residual Ecological Impacts

Residual impacts will occur as a result of the Project, despite the implementation of avoidance, mitigation, and restoration measures. Residual impacts include native vegetation loss and associated reduction in extent of TECs, loss of hollow-bearing trees, removal of habitat for threatened species, and reduced habitat connectivity.

Residual impacts are those impacts that remain following the implementation of avoidance and mitigation measures.

Implementation of the measures outlined in Chapter 7.0 to avoid and minimise impacts on ecological values has led to a reduction in the potential impact of the Project. The remaining impacts are referred to as residual (or actual) impacts of the Project and are outlined in this Chapter.

For Tables 32-40 (overleaf), residual impacts were calculated based on the Reference Design, taking into account any avoidance and mitigation measures (Chapter 7), and impact calculation exemptions (Section 5.4.1.2). NGZ's and PAZ's are yet to be defined.

8.1 Matters of National Environmental Significance

8.1.1 Threatened ecological communities

Land clearance associated with construction will result in the loss of areas of native vegetation synonymous with TECs listed under the EPBC Act. The residual impacts, following application of avoidance, mitigation, and restoration measures, are summarised in Table 33 and shown in Figure 15.

Table 33 Summary of EPBC Act-listed TECs and residual impacts.

TEC	Residual impact		Significant impact likely?[1]
	Reference Design area	Buffer area	
Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	2.376 ha	3.958 ha	**Yes,** 6.334 ha of GBGW may be impacted by the Project. Based on the modelled extent of the community of 343,641 ha remaining in Victoria (TSSC, 2020), this impact would be a reduction in extent of GBGW by < 0.000019%. Minor fragmentation of the community will occur. See Appendix E.
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	0.624 ha	0.00 ha	No, DAWE have considered the specific nature of impacts of this project and advised that a significant impact is unlikely.
Natural Temperate Grasslands of the Victorian Volcanic Plain	0 ha	0 ha	No, as impacts will be avoided, a significant impact to NTGVVP is not likely (Section 7.1.1).

[1]*Where clearing will reduce a patch of a TEC to below the extent threshold needed to meet the criteria of the TEC, impact to the whole patch of TEC has been included in the Reference Design area calculations. An additional 0.332 ha has been included.*

The extent of impact on GBGW is an increase from the predicted impact of 3.543 ha at the time of the referral of the Project as a result of design changes made to the Reference Design, the addition of the

15 m buffer to consider indirect impacts at enhancement sites as required by DELWP, and the addition of overhead powerline impacts to the project. Most of the impacts to GBGW are concentrated at enhancement sites (4.956 ha) with the remainder resulting from overhead powerline works (1.378 ha).

An assessment of residual impacts on GBGW was undertaken against the significant impact criteria outlined in *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DoE 2013a) (Appendix E).

The residual impacts of the Project may result in significant impacts to GBGW due to:

- reduction in the extent of the ecological community.
- Fragmentation or increased fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.

As such, these impacts will need to be offset (Chapter 9.0).

At the time of referral for the Project, impacts to WBYBBRGGW were not anticipated; however, as a result of the addition of the overhead powerline works, 0.624 ha is now expected to be impacted. As DAWE have advised that a significant impact is unlikely for this threatened ecological community (Table 34) an assessment against the significant impact criteria was not undertaken for WBYBBRGGW.

Avoidance and minimisation of impacts to both these communities will be a priority during the finalisation of the design.

8.1.2 Threatened species

Implementation of the minimisation and mitigation measures outlined in Chapter 7.0 will reduce the potential impacts of the Project and avoid most impacts on threatened species. However, there are some species for which loss of some habitat is unavoidable (Table 34). As such, a significant impact assessment has been completed against the relevant criteria for those species (Appendix E). None of the species are likely to be significantly impacted by the Project.

Table 34 Summary of EPBC Act-listed threatened species and residual impacts

Common Name	Residual impact	Significant impact likely?
Flora		
Crimson spider-orchid	Loss of potential suitable habitat for the species but a targeted survey conducted by KBR (2020d) did not identify any individuals.	The loss of potential suitable habitat was not considered to constitute a significant impact because: • The potential habitat is small and isolated. • No known populations of the species have previously been recorded and targeted survey by (KBR, 2020d) did not identify any individuals. • It is unlikely to be a population critical to the survival of the species. For further information, refer to the SIA in Appendix E.
Euroa Guinea-flower	No residual impact. Impact area for overhead powerline investigation area 1047 was modified to avoid impacts to the population of this species.	No impact likely as population avoided and no residual impacts.

Common Name	Residual impact	Significant impact likely?
Mountain Swainson-pea	No residual impact. Mountain Swainson-pea was recorded adjacent to investigation area 1078 and impacts to this will be avoided.	No impact likely as population avoided and no residual impacts.
Swamp Fireweed	No residual impact. Impacts to this species were avoided in an earlier design phase of the Project (KBR, 2020a).	No impact likely as population avoided and no residual impacts.
Swamp Everlasting	No residual impact. Impacts to this species were avoided in an earlier design phase of the Project (KBR, 2020a).	No impact likely as population avoided and no residual impacts.
Fauna		
Grey-headed Flying-fox	Loss of 11.339 ha of woodland habitat	The loss of 11.339 ha of woodland habitat was not considered to constitute a significant impact because: • Woodland habitat provides only occasional foraging and dispersal habitat for the species. • The loss of woodland habitat is localised, and it is unlikely that an important population is present. For further information, refer to the SIA in Appendix E.
Swift Parrot	Loss of 11.339 ha of VTWBC which may be used as an occasional foraging resource by these species.	The loss of 11.339 ha of VTWBC was not considered to constitute a significant impact because: • Use of habitat is likely to be limited to occasional foraging and dispersal. • Impacts are unlikely to result in long-term decline of the species, as they are localised impacts and occurring in areas that are not considered to be important for the species foraging and breeding. For further information, refer to the SIA in Appendix E.
Regent Honeyeater		
Painted Honeyeater		The loss of 11.339 ha of VTWBC was not considered to constitute a significant impact because:

Common Name	Residual impact	Significant impact likely?
		• Woodland provides occasional foraging and dispersal habitat for the species. • The loss of woodland habitat is localised, and it is unlikely to support an important population. For further information, refer to the SIA in Appendix E.
Growling Grass Frog	Impacts to aquatic habitat avoided or mitigated. A small extent (approximately 0.13 ha) of potential terrestrial foraging habitat may be impacted at overhead powerline project areas 1001, 1002, and 1003. This impact may affect individuals but will not threaten a population of the species.	Impacts to a small extent (approximately 0.13 ha) of potential terrestrial foraging habitat were not considered to constitute a significant impact because: • Potential aquatic habitat is avoided by project area and controls will be employed to mitigate potential indirect impacts on aquatic habitat (e.g. sedimentation). • Impacts will not threaten an important population of the species. • Hygiene controls will be employed to mitigate the potential introduction of predatory fish and/or disease agents. For further information, refer to the SIA in Appendix E.
Sloane's Froglet	No residual impact. Impacts to aquatic habitat has been avoided or mitigated.	No, as impacts to aquatic habitat has been avoided or mitigated and no residual impacts.
Striped Legless Lizard	Impact to potential habitat at overheard powerline project area 1088.	Impacts to potential habitat was not considered to constitute a significant impact because: • Habitat present in the powerline 1088 project area is small, less than 0.5 ha • An important population is unlikely to be present. For further information, refer to the SIA in Appendix E.

Common Name	Residual impact	Significant impact likely?
Golden Sun Moth	No residual impact. Impacts to potential habitat at Track Slew 1 – Wallan Loop and overhead powerline project area 1013 have been avoided.	No, as impacts to potential habitat have been avoided and there are no residual impacts.

8.2 State significant values

8.2.1 Native vegetation loss

Following application of measures to avoid, minimise, and restore, the residual impacts of the Project on native vegetation is outlined in Table 35.

Table 35 Summary of residual impacts on native vegetation

Native vegetation attribute	Residual impacts		
	Reference Design area	Buffer area	Total
Patches of native vegetation	13.793 ha	10.496 ha	24.289 ha
Endangered EVC extent[1]	8.810 ha	5.533 ha	14.343 ha
High quality patches of native vegetation[1]	2.976 ha	2.645 ha	5.621
Large Trees in a Patch	29	53	82
Large Scattered Trees	44	4	48
Small Scattered Trees	64	19	83
DELWP Mapped Wetlands[2]	0 ha	0 ha	0 ha

[1] *Subset of patches of native vegetation*

[2] *Included within extent of patches of native vegetation*

For the full analysis of native vegetation loss based on the Project Reference Design, refer to Technical Report A (Attachment B) and Technical Report B (Attachment C).

8.2.2 Threatened ecological communities

Land clearance associated with construction will result in the loss of areas of native vegetation synonymous with the VTWBC (Table 36), while areas of WBPGC have been avoided. Measures to protect aquatic habitat during construction, including NGZs and best practice spill and sedimentation controls, have mitigated the risk of potential impacts on LRFCSMDB.

Table 36 FFG Act-listed TECs to be impacted by works

TEC	Residual impact		
	Reference Design area	Buffer area	Total
Victorian Temperate Woodland Bird Community	4.44 ha	6.899 ha	11.339
Western (Basalt) Plains Grassland Community[1]	0	0	0
Lowland Riverine Fish Community of the Southern Murray Darling Basin[2]	0	0	0

[1] *WBPGC is synonymous with NTGVVP. ARTC have advised that impacts to WBPGC will be avoided during works*

[2] *LRFCSMDB was not mapped within the investigation area but may occur in the Goulburn River*

The Project may directly remove 4.387 ha of VTWBC. A further 6.899 ha occurs within 15 m of the Reference Design area and could also be indirectly impacted by construction as a result of tree decline.

In line with the losses predicted for the GBGW community, the greatest potential loss will occur at impact areas associated with the Seymour-Avenel Road, Seymour and Hume Highway, Seymour enhancement sites.

There is currently no indication of the extent of VTWBC across Victoria to assess what percentage of the community will be lost; however, the loss of up to 11.339 ha is considerable in the context of the surrounding landscape.

8.2.3 Threatened species

Flora species

Measures to avoid and minimise impacts on ecological values outlined in Chapter 7.0 have reduced the risk of the Project impacting on FFG Act listed flora species (in addition to those also listed under the EPBC Act). The Project will still impact on threatened flora species through loss of habitat and clearance.

Table 37 FFG Act-listed flora species

Common name	Conservation Status			Residual impacts
	EPBC Act	FFG Act	VROT	
Buloke	-	L	en	Two immature individuals at Seymour-Avenel Road, Seymour and 14 individuals at overheard powerline 1042.
Cottony Cassinia	-	-	vu	Approximately 50 plants at overhead powerline 1041 were identified, loss some individuals may occur during works.
Glaucous Flax-lily	-	-	vu	Approximately 249 plants were identified at Seymour-Avenel Road, Seymour, Hume Highway, Seymour, and Tallarook enhancement sites, and Signal Gantry 14. Loss of some individuals may occur during works. Loss of one plant at overhead powerline 1042.
Late-flower Flax-lily	-	-	vu	Loss of up to 2 plants at overhead powerline 1012.
Purple Diuris	-	L	vu	No individuals identified during KBR (2020a) or current assessment; however, up to 3.824 ha of potential habitat may be impacted at the Seymour-Avenel Road, Seymour, and Signal Gantry 19, and Hume Highway, Seymour enhancement sites, and overhead powerline 1088.
Golden Cowslips	-	-	vu	KBR (2020e) recorded Golden Cowslips at overhead powerline 1088; however, total number of individuals was not recorded. Works are likely to result in the loss of some individuals (0.124 ha of patches of native vegetation impacted).

Common name	Conservation Status			Residual impacts
	EPBC Act	FFG Act	VROT	
Basalt Podolepis	-	-	en	KBR (2020e) recorded Basalt Podolepis at overhead powerline 1078; however, total number of individuals was not recorded. Works are likely to result in the loss of some individuals (0.532 ha of patches of native vegetation impacted).

Fauna species

Measures to avoid and minimise impacts on ecological values outlined in Chapter 7.0 reduce the risk of the Project impacting on FFG Act listed fauna species. The Project will still impact on threatened fauna species through loss of woodland habitat (VTWBC) and hollow-bearing trees and the associated risks to fauna occupying habitat as it is cleared (injury, death, or displacement).

Table 38 FFG Act-listed threatened fauna species

Common name	Conservation Status			Residual impacts
	EPBC Act	FFG Act	VROT*	
Apostlebird	-	L#		Loss of 11.339 ha woodland habitat. Loss of up to 103 known and estimated hollow-bearing trees. Injury, death, or displacement of fauna. Increase in habitat fragmentation, primarily at Tallarook and Seymour-Avenel Road, Seymour enhancement sites.
Bush Stone-curlew	-	L#	en	
Diamond Firetail	-	L#	nt	
Grey-crowned Babbler	-	L#	en	
Ground Cuckoo-shrike	-	L#		
Hooded Robin	-	L#	nt	
Powerful Owl	-	L#	vu	
Speckled Warbler	-	L#	vu	
Turquoise Parrot	-	L#	nt	
Barking Owl	-	L#	en	Loss of 11.339 ha woodland habitat. Loss of up to 103 known and estimated hollow-bearing trees. Injury, death, or displacement of fauna. Increase in habitat fragmentation, primarily at Tallarook and Seymour-Avenel Road, Seymour enhancement sites.
Brush-tailed Phascogale	-	L	vu	
Squirrel Glider	-	L	en	
Sugar Glider##	-			
Brown Toadlet	-	L	en	Impacts potential habitat (terrestrial areas that become flooded by seasonal rains) will need to be determined following detailed design of overhead powerlines.

** Victorian advisory lists for rare and threatened species – DSE (2009), DSE (2013) and DEPI (2014).*

 # member of the FFG Act-listed Victorian Temperate Woodland Bird Community

although not currently listed as a VROT or under the FFG Act, the Sugar Glider is a species of note

Protected Flora species

Thirty-six protected flora species were identified within the investigation area during field assessments. Their exact locations and the total numbers of plants of each species were not collected during field assessments. Whilst it is anticipated that project works will result in the removal of some or all of these species, exact numbers of plants are to be determined following the finalisation of the design. An application for a 'Permit to Take Protected Flora' will then need to be made to the relevant DELWP region.

8.2.4 Hollow-bearing trees

Three known hollow-bearing trees may be removed as per the Reference Design and a further 48 trees may be indirectly impacted within 15 m of the Reference Design area (Table 39) of the enhancement sites. While the canopy cover (shelter) of those 48 trees could be lost through a decline in tree health or death of the tree, the hollows themselves will not be removed. The Reference Design area represents a substantial reduction from the potential impact of 172 hollow-bearing trees.

Table 39 Hollow-bearing trees to be impacted by enhancement site works

Enhancement site	Residual impact		
	Reference Design area	Buffer area	Total
Hume Highway, Seymour	0	7	7
Tallarook	1	18	19
Marchbanks Road, Broadford	2	1	3
Seymour-Avenel Road, Seymour	0	21	21
Short Street, Broadford	0	1	1
Total	3	48	51

Large Trees in Patches and large Scattered Trees at Glenrowan and Wangaratta Precinct enhancement sites may also contain hollows. Two may be directly impacted (within the Reference Design area) and seven may be indirectly impacted within 15 m of the Reference Design area. Additionally, an estimated 43 impacted large trees within the overheard powerline project area are likely to contain hollows based on the ratio of 0.65 hollow-bearing trees for each large tree (Attachment B).

Therefore, works across the entire Project may result in the loss of approximately 103 hollow-bearing trees within the impact area (Table 40). The loss of up to 103 known and estimated hollow-bearing trees is considered to exacerbate a threatening process listed under the FFG Act.

Table 40 Hollow-bearing trees to be impacted by Project works

Project component	Residual impact
Enhancement Sites where hollow-bearing tree targeted survey was conducted	51
Glenrowan and Wangaratta Precinct	9
Overhead powerlines	43
Total	103

8.2.5 Habitat connectivity

Potential disruption to habitat connectivity has been reduced but not entirely avoided by the Reference Design.

The Reference Design for the Project will increase existing gaps in habitat linkages in the local landscape at Marchbanks Road, Broadford, Seymour-Avenel Road, Seymour, and Tallarook. Gaps in the canopy will result from removal of trees within the Reference Design area and loss of canopy cover

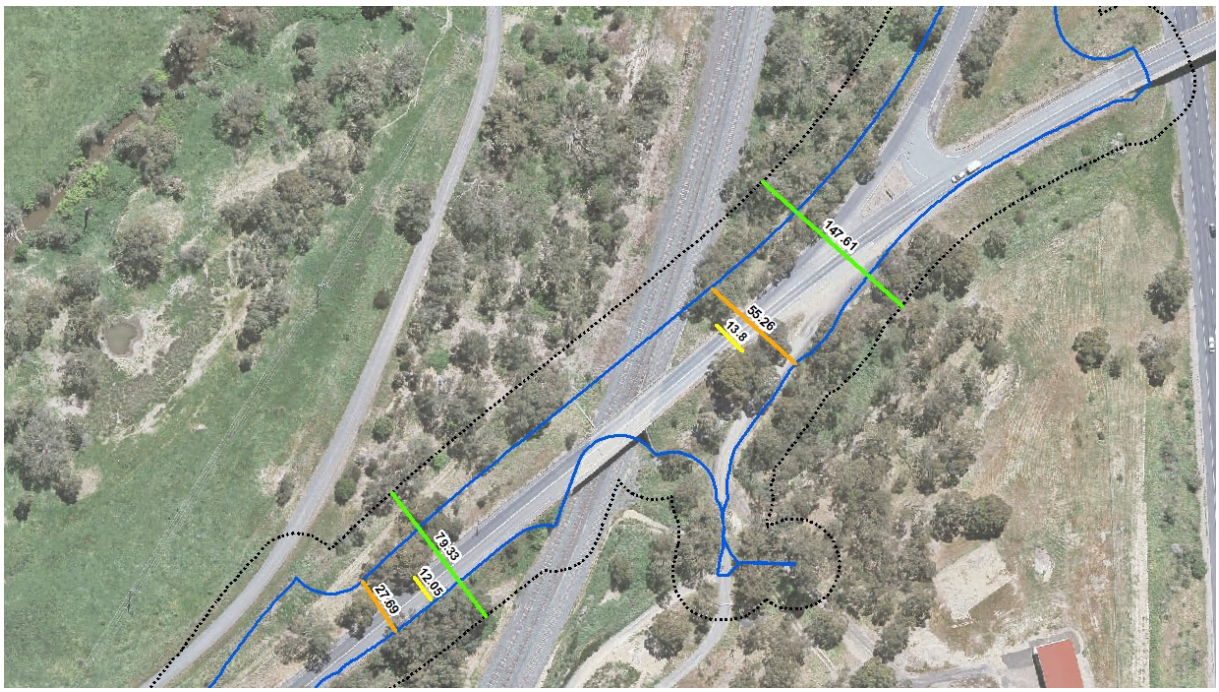
of trees within the 15 m buffer which may be impacted by encroachment on the TPZs resulting in the death of the tree. While the trees themselves would not be removed and would therefore remain as potential launching points for gliders, the loss of canopy represents a loss of cover for other arboreal mammals and woodland birds. An arborist assessment will be undertaken to determine whether trees will be lost and whether the implementation of tree protection measures will be sufficient to protect the trees. In the interim, the potential loss of canopy linkages is included in the discussion of impacts on connectivity.

Aerial photography overlaid with the impact area at the Tallarook and Seymour-Avenel Road, Seymour enhancement sites (the two enhancement sites with greatest landscape connectivity values associated with the Project) to identify to what extent the proposed works will result in an increase in existing gaps and functional connectivity.

Marchbanks Road, Broadford

At Marchbanks Road, Broadford, existing gaps in canopy across the roadway could be widened from < 15 m to > 25 m on the west side of the rail and 55 m on the east side by works within the Reference Design area (Figure 8). Although unlikely, if the entire tree canopy cover is lost within the buffer area then the gap would be up to 150 m on the east side of the rail and up to 80 m of the west side.

Figure 8 Potential connectivity impacts at Marchbanks Road, Broadford



Key: yellow = existing gap in canopy, orange = future gap Reference Design, green = future gap if canopy compromised (buffer area)

Tallarook

At Tallarook, the Reference Design is largely contained within the existing 35 – 40 m gap in canopy formed by the rail line. If the tree canopy was lost within the buffer area then the existing gap across the rail line may be widened to 45 – 65 m (Figure 9). This wider gap in canopy cover is likely to impact on the capacity of fauna to move from east to west through the landscape, particularly arboreal mammals, and smaller woodland birds.

Given the North - South habitat corridor along Gairns Lane at Tallarook is separated from the woodland reserves to the north by the Hume Highway, an additional gap located close to the Hume Highway is unlikely to significantly exacerbate the existing barrier for gliders. It may; however, constrain home range or alter the boundaries of home ranges of resident arboreal mammals.

Figure 9 Potential connectivity impacts at Tallarook

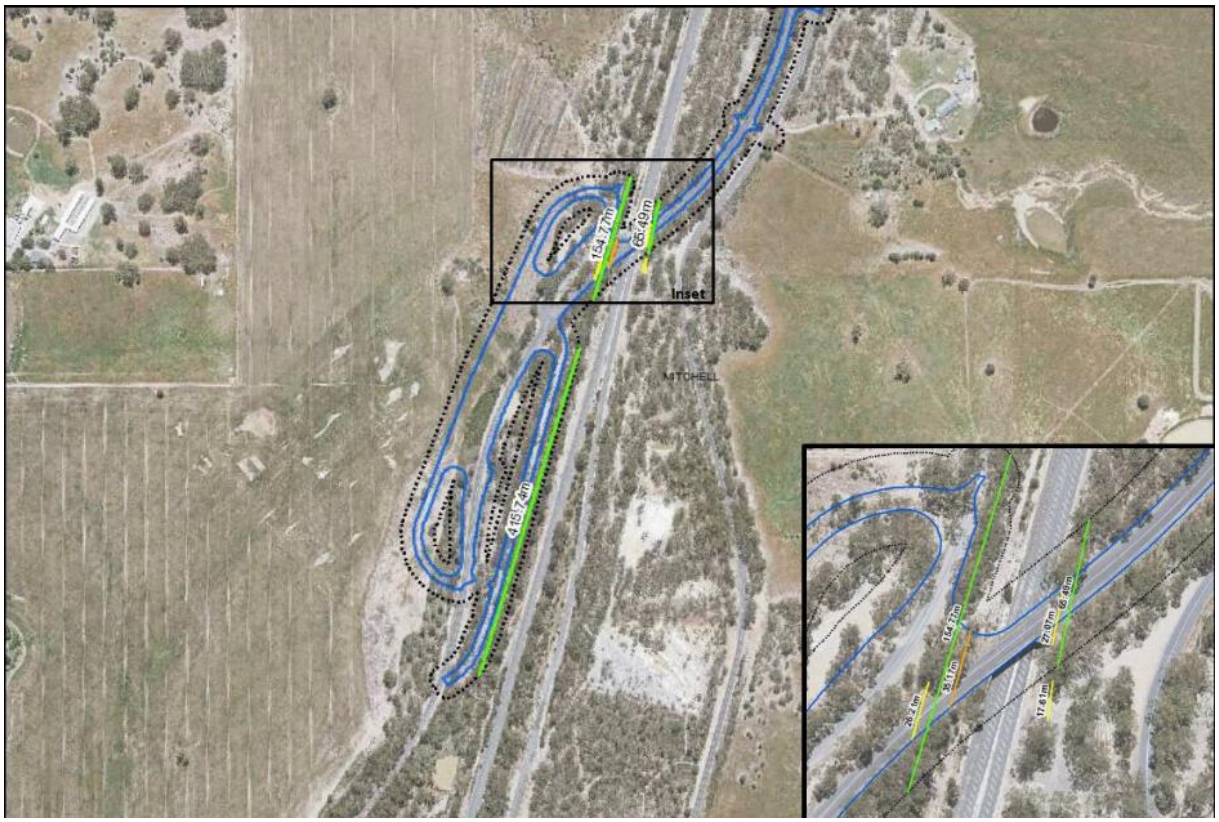
Key: yellow = existing gap in canopy, green = future gap if canopy compromised (buffer area)

Seymour-Avenel Road, Seymour

The Seymour-Avenel Road, Seymour enhancement site Reference Design area may increase an existing 25 – 30 m gap to approximately 30 m on the west side of the rail line. If tree canopy within the buffer area is impacted by the proposed works, then two gaps (415 m and 155 m separated by 50 m of tree canopy) would be formed in the woodland habitat corridor on the west side of the rail line. The existing gap across Seymour-Avenel Road on the east side of the rail line would be widened to approximately 65 m (Figure 10).

While Seymour Avenel Road is likely to be an existing barrier to the movement of more sedentary, ground-dwelling fauna, the increase in gap in canopy may impact arboreal mammals and smaller woodland birds. Functional connectivity on the west side of the rail corridor may be lost.

Figure 10 Potential connectivity impacts at Seymour-Avenel Road, Seymour



Key: yellow = existing gap in canopy, orange = future gap Reference Design, green = future gap if canopy compromised (buffer area)

Wider gaps in habitat at these locations are unlikely to significantly disrupt functional connectivity for more mobile woodland birds (which include the threatened Swift Parrot and Barking Owl).

8.2.6 Environmental overlays

The investigation area was contained within seven LGAs including Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, Indigo, and Wodonga. Environmental overlays were present within the investigation area within four LGAs including:

- Mitchell – ESO3, SMO, VPO1, and VPO2
- Wangaratta – VPO1, VPO2
- Indigo – ESO3
- Benalla – VPO3

Table 41 summarises the applicable overlays for each LGA, their specific requirements, and identifies impacts to relevant ecological values. A detailed discussion and response to the objectives and decision guidelines of the environmental overlays is included at Section 12.3. Figure 19 shows the location of the overlays and ecological values, relative to the impact area.

Table 41 Residual impacts to vegetation within environmental overlays

LGA	Overlay	Permit requirement	Required biodiversity information	Residual impacts			
				Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
Mitchell	Environmental Significance Overlay – Schedule 3 (Watercourse Conservation)	In accordance with the ESO3, a permit is required to: • Remove, destroy, or lop any vegetation, including dead vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non-native) Extent of impact to fauna habitat areas (if any) Extent of impact to watercourses (if any)	0.562 ha 13 trees	0.954 ha	All native vegetation to be impacted within the overlay is considered to be fauna habitat, and as such any impacts to native vegetation are also considered impacts to fauna habitat.	Works extent does not extend into watercourses, and, with mitigation measures, indirect impacts to watercourses are not anticipated.
	Salinity Management Overlay	In accordance with the SMO, a permit is required to: • Remove, destroy, or lop any vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non-native)	0.004 ha	0.099 ha	N/A	N/A
	Vegetation Protection Overlay – Schedule 1 (Roadside and Corridor Protection)	In accordance with the VPO1, a permit is required to: • Remove, destroy, or lop native vegetation. • A permit is not required for the removal of exotic vegetation.	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	7.648 ha 25 trees	N/A	N/A	N/A

LGA	Overlay	Permit requirement	Required biodiversity information	Residual impacts			
				Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
	Vegetation Protection Overlay – Schedule 2 (Freeway Environs Protection)	In accordance with the VPO2, a permit is required to: • Remove, destroy, or lop native vegetation. • A permit is not required for the removal of exotic or dead vegetation.	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	3.150 ha 13 trees	N/A	N/A	N/A
Benalla	Vegetation Protection Overlay Schedule 3 – (Regent Honeyeater Habitat / Lurg Ironbark Vegetation Protection Area)	In accordance with the VPO3, a permit is required to: • Remove, destroy, or lop native vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non-native) Number of Mugga Ironbark, White Box, Yellow Box, Blakeley's Red Gum impacted by the works (if any)	0.636 ha No Mugga Ironbark, White Box or Blakely's Red Gum. Of the tree species specified in VPO3, the project may impact on Yellow Box. The number of Yellow Box which may be impacted include an estimated 20 small trees within patches of native vegetation.	1.142 ha	N/A	N/A

LGA	Overlay	Permit requirement	Required biodiversity information	Residual impacts			
				Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
Wangaratta	Vegetation Protection Overlay – Schedule 1 (Glenrowan Township Vegetation Protection Area)	In accordance with the VPO1, a permit is required to: • Remove, destroy, or lop native vegetation with a height of more than 1 metre or a distance of more than 5 metres from a dwelling or outbuilding (permit required)	Extent of native vegetation to be removed / destroyed / lopped	0.312 ha 13 trees	N/A	N/A	N/A
	Vegetation Protection Overlay – Schedule 2 (Roadside vegetation of conservation significance)	In accordance with the VPO2, a permit is required to: • Remove, destroy, or lop native vegetation. • A permit is not required for the removal of exotic or dead vegetation.	Extent of native vegetation to be removed / destroyed / lopped	0.571 ha Two trees	N/A	N/A	N/A

LGA	Overlay	Permit requirement	Required biodiversity information	Residual impacts			
				Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
Indigo	Environmental Significance Overlay – Schedule 3 (Watercourse Conservation)	In accordance with the ESO3, a permit is required to: • Remove, destroy, or lop native vegetation including dead vegetation with the exception of land zoned for 'RDZ2 on Map1 and PAO1 on Map 1 PAO'.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non-native) Extent of impact to watercourses (if any)	0.514 ha 14 trees	0.839 ha	N/A	Works extent does not extend into watercourses, and, with mitigation measures, indirect impacts to watercourses are not anticipated.

Chapter 9.0 Proposed Environmental Offsets

9.0 Proposed Environmental Offsets

Offsets are any works or actions that compensate for biodiversity losses arising from the impacts to protected ecological matters.

What are environmental offsets?

A native vegetation offset consists of a site that protects existing patches of native vegetation, large trees and/or involves planting of new native vegetation. Offset owners secure and manage offset sites to improve native vegetation condition. There are two types of offsets:

- **General offsets:** required when the removal of native vegetation does not have a significant impact on habitat for rare or threatened species.
- **Species offsets:** required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species. This offset must compensate for the removal of that species' habitat.

The gains that these offsets deliver are measured in habitat units and the relative size of an offset is graded according to its conservation significance.

This section outlines the offsets required to compensate for Project impacts to native vegetation, threatened species and habitat for threatened species.

Previous sections of the report have outlined how the Project will avoid and minimise impacts (Chapter 7.0). There will be unavoidable losses (Chapter 8.0) that will require compensation through offsets.

9.1 State offsets

Removal of native vegetation will be offset through general and species offsets in accordance with Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a) which is an Incorporated Document within the Victoria Planning Provisions under Clause 52.17 (Native Vegetation). Under the Guidelines, state offsets are a requirement of the removal of native vegetation, and thus habitat for threatened flora and fauna and is informed by DELWP advisory lists for threatened flora and fauna.

The EnSym Native Vegetation Regulations Tool produced by DELWP has been used to test offset requirements for the full extent of native vegetation loss (direct and indirect impacts) identified for the Project, as per Appendix 2E of the Assessor's Handbook (DELWP, 2018a). The Project triggers general offsets owing to the removal of 29.203 ha (includes patches of native vegetation and Scattered Trees) of native vegetation during construction. It should be noted that the level of impact and offset requirements discussed in this section relate to the current Project Reference Design. As outlined elsewhere in this report, it is expected that the magnitude of impacts will be reduced by a considerable extent through the detailed design process and through adoption of construction methodologies on a site by site basis aimed at reducing impacts.

A total of 15.821 General Habitat Units (**GHU**), with a minimum strategic biodiversity score of 0.487, will need to be offset in the Goulburn Broken, North East, Port Phillip and Westernport CMA or Benalla Rural City, Indigo Shire, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, Wodonga City Council areas. No Species Habitat Units (**SHU**) are required to be offset based on the Reference Design assessment (Table 42).

Offsets must also include protection of large trees must be compensated for as part of the general offset. A total of 130 large trees are required to be offset.

A copy of the EnSym report is provided in Appendix F. Following the finalisation of the detailed design of the project, a Native Vegetation Removal (**NVR**) Report will be required from DELWP which will detail the specific offsets necessary to compensate for the proposed loss of native vegetation.

Table 42 General and Species Habitat Units to be offset by the Project.

Unit type	Amount	Minimum strategic biodiversity value score	Large trees	Credit location
General offset amount	15.821 GHU	0.487	130	Goulburn Broken, North East, Port Phillip and Westernport CMA or Benalla Rural City, Indigo Shire, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, Wodonga City Council.
Species offset amount	None			

Offset security and management

The biodiversity offset for the Project will be likely be achieved via a third party offset on land owned by another party (a native vegetation credit owner). Third party offset sites are established by the landowner via a security agreement registered on the land title that runs in perpetuity. Security agreements can be via a section 69 agreement under the *Conservation, Forests and Lands Acts 1987* with the Secretary to DELWP or an offset covenant agreement under the Victorian *Conservation Trust Act 1972* with Trust for Nature (DELWP, 2020c; 2020d).

Native vegetation credit owners are responsible for complying with their obligations under the security agreement, actively managing the site to generate gains, and reporting progress of this management to the relevant statutory body (DELWP or Trust for Nature [**TfN**]) (DELWP, 2020c).

Secured offset sites are registered on the DELWP Native Vegetation Credit Register (**NVCR**). The Project will therefore identify credit owners selling their native vegetation credits using the NVCR. The NVCR will list the relevant contact/s to discuss the third party offset arrangements.

The NVCR online tool was consulted on 4 June 2021 to confirm the sites which meet the Projects' offset requirements. The sites, offset units, and location identified by the NVCR are listed in Table 43 and a copy of the NVCR report is provided in Appendix G. A combination of sites may be required to achieve the offset requirement for the Project.

Table 43 Third party offset sites that meet Project requirements (based on current Reference Design).

Site ID	GHU available	LT available	CMA	LGA
BBA-0670	18.432	158	Port Phillip and Western Port	Cardinia Shire
BBA-0677	20.242	1527	Port Phillip and Western Port	Whittlesea City
BBA-0678	49.323	2665	Port Phillip and Western Port	Nillumbik Shire
BBA-2871	16.335	1668	Port Phillip and Western Port	Yarra Ranges Shire
VC_CFL-3074_01	24.038	2942	North East	Towong Shire

The NVCR will be consulted again and quotes requested from relevant brokers once the Project requests and obtains an official NVR report from DELWP.

9.2 EPBC Act offsets

Critical to the approval of an action under the EPBC Act, is an understanding of whether a suitable offset is available to compensate for any significant residual impacts to a matter of national environmental significance. The residual impacts of a project are those which remain (and are unavoidable) when all possible avoidance and mitigation measures have been enacted. It is noted that offsets do not reduce the likely impacts of a proposed action, but instead compensate for any residual significant impact. A proponent can employ a range of actions to achieve appropriate compensatory offsets for any residual impacts.

Compensatory offsets can be achieved through a range of actions that a proponent commits to in order to provide adequate compensation for the residual impacts of a project. These actions can comprise direct offsets, as well as alternative measures that do not directly offset impacts to the matter in question, but that may lead to eventual benefit for the matter. This may include the funding of research or educational programs.

Direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter. It is the expectation of the EPBC Act Environmental Offsets Policy (DSEWPAC, 2012b) that a minimum of 90% of the offsets proposed for an impact are comprised of direct offsets. Deviation from the 90% requirement is by exception only, and where it can be proven that a greater proportion of compensatory measures will benefit a matter more than direct offsets.

Offsets can be delivered by a range of mechanisms, including market-based mechanisms and contracting third party providers (DSEWPaC, 2012b).

EPBC Act offset requirements

The project is required to compensate for a significant residual impact to the GBGW community (Section 8.1.1), noting that quantum of offsets is likely to decrease as the design of the Project is finalised. Offsets are required for the project to compensate for the loss of 6.334 ha of GBGW.

EPBC Act offset strategy

A draft EPBC Offset Strategy (Attachment D) has been prepared outlining a proposed offset that meets the requirements of the Project and the EPBC Act Environmental Offset Policy. The offset will be achieved through a third-party provider which means the offset site will be established by the landowner via a security agreement registered on the land title that runs in perpetuity (DELWP, 2020d).

The proposed offset site is outlined in the EPBC Act Offset Strategy (Attachment D). The site supports patches of GBGW which meet the threshold for being representative of GBGW woodland (DSEWPaC, 2012a). The proposed offset is comprised of a total of 15.57 hectares of patches supporting a Grey Box overstorey. A further 5.83 hectares of derived native grassland (adjacent to these patches) is also available for offsets.

The owner of the proposed offset property has agreed to enter into a security agreement with the Secretary to DELWP under Section 69 of the *Conservation Forests and Lands Act 1987 (*a Section 69 agreement) to protect and improve the extent and quality of native vegetation on the site. The agreement will be recorded on the title of the subject land.

A memorandum of understanding has been drafted to be signed by ARTC and the offset provider to commit the offset provider to holding these offsets specifically for the Inland Rail project. This will ensure that these offsets remain reserved for the project until such time as they are ratified through a Section 69 agreement.

Meanwhile, the EPBC Act Offset Strategy will be finalised in consultation with DAWE and an Offset Management Plan has been prepared in consultation with the landowner, who has extensive experience in ecological restoration.

The Offset Management Plan (Attachment E) identifies management actions required to improve the ecological condition of the site such as weed control, revegetation, and fencing. The Offset Management Plan also includes responsibility, timing, and performance criteria to achieve specific environmental outcomes from the management measures. Preparation of the Offset Management Plan has been informed by the *Management standards for native vegetation offset sites* (DELWP, 2019d).

Subject to agreement from DAWE, the protection and management of approximately 15.57 ha of GBGW proposed in the draft EPBC Act Offset Strategy (Attachment D) and Offset Management Plan (Attachment E) exceeds the minimum requirement for direct offset under the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b) and demonstrates the capacity for the project to achieve offsets to compensate for the loss of GBGW.

Chapter 10.0 Environmental Management Framework

10.0 Environmental Management Framework

A detailed Environmental Management Framework will be prepared for the Project.

As outlined in the Scoping Document provided in Attachment A, a condition of the Minister's no-EES decision on the referral (referral number 2020-07) requires the preparation of an EMF. A draft EMF prepared by ARTC is contained in Attachment F.

The EMF will ultimately be informed by the findings and conclusions of this Environment Report and be developed in consultation with DELWP to the satisfaction of the Minister for Planning prior to the commencement of works. The EMF will include a statement of all environmental commitments for the Project and provide an overarching framework to manage environmental and amenity impacts during construction.

Design and construction of the Project will be authorised and regulated by the Project's Incorporated Document that will be incorporated into the Planning Schemes and by the approval of the controlled action under the EPBC Act.

Pursuant to the Incorporated Document, the EMF must include:

- A set of EPRs to define the environmental outcomes that must be achieved during the design and construction of the Project.
- The process and timing for the preparation of a CEMP and any sub-plan that is required by Environmental Performance Requirements.
- Performance monitoring and reporting processes, including auditing to ensure environmental and amenity effects are reduced and managed during construction of the Project.
- A statement of all environmental commitments for the Project.

The EMF will outline clear accountabilities for the delivery and monitoring of the implementation of the Project and include a set of EPRs. The EPRs will determine the environmental outcomes that design, and construction of the Project must achieve.

The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Documents and any statutory approvals.

ARTC's draft EMF (Attachment F) will be finalised following approval of the PSA and will be informed by the findings and conclusions of the Environment Report.

10.1 Environmental Performance Requirements

Environmental Performance Requirements will be a set of performance based environmental outcomes to be achieved by the Project. Mitigation and management actions summarised in Table (Section 7.4) will form the basis of the EPRs developed under the EMF for the Project.

Additional commitments of the Project relate to:

- Implementation of NGZs and PAZs that reflect the detailed design provide appropriate controls during construction.
- Next Generation cabling. The design is not at a stage where impacts can be calculated. As such, proposes to apply the following approach for assessing impacts:
  - Determine in consultation with DELWP whether vegetation loss has been previously offset for the previous utility installation had offset requirements and whether those offsets have been achieved.
  - If not, then develop avoidance and mitigation measures on a section-by-section basis as site conditions and construction method appropriate to those conditions will vary.
  - Engage an arborist to assess impact on trees and develop a Tree Management Plan.

- Conducting field assessments for the 64 overhead powerline sites that have been subject to desktop assessment (63 partial desktop assessment and 1 full desktop assessment) to verify occurrence of values and associated impacts. Note that for the purpose of this ER, a conservative estimate of the extent of native vegetation within these 64 sites has been made and is included in the residual impact calculation. It is considered reasonable that follow-upfield assessments will reduce the actual impact quantum.
- Quantifying impacts to species and numbers of Protected Flora species and submit an application for a 'Permit to Take Protected Flora' to the relevant DELWP region.
- Securing the proposed offset site to satisfy the EPBC Act offset requirements, including the preparation and provision of an offset management plan to DAWE.
- Sourcing a Native Vegetation Removal Report from DELWP to quantify necessary offsets to be achieved under State legislation following the provision of detailed design.
- Identifying and securing offset sites to meet State native vegetation offset requirements for the Project.

10.2 Monitoring, Audits and Review Procedures

A variety of tools will be utilised to monitor, audit, and review environmental performance to ensure that the requirements of the EMF, and planning and environment approvals are achieved. Environment performance monitoring, audit and review procedures will include (but not limited to):

- Environmental monitoring as required by the CEMP (such as noise, water quality, etc).
- Utilising results from environmental monitoring to identify potential or actual issues arising from the construction phase and allow rectification measures are sufficient.
- Audits of the CEMP.
- Regular review of planning and environmental approvals, management plans and the EMF to ensure compliance.
- On-site inspections to ensure:
- environmental controls are in place and effectively managing identified risks
- personnel are implementing the measures outlined in the EMF.
- Monthly review and monitoring against objectives, targets, and KPIs of the Project.

Chapter 11.0 Cumulative Impacts

11.0 Cumulative Impacts

Cumulative impacts on the same ecological values resulting from multiple projects that are spatially and temporally proximal to the Project have been considered.

Cumulative impacts are 'those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.' (IFC, 2013, p19). Considered in isolation, the impacts incurred by an individual project on ecological values may be considered minor or insignificant. When considered in conjunction with impacts associated with other projects, adverse impacts may be significant or unacceptable.

This section outlines the approach to assessing potential cumulative impacts on ecological values arising from the Project and other projects that are spatially or temporally proximal to Inland Rail. Assessment of cumulative is a requirement of the Scoping Document (DELWP, 2020a).

11.1 Approach

The approach proposed to assess potential cumulative impacts associated with the Project has been developed in conjunction with advice from DELWP and with reference to the following industry guidelines for best practice:

- *Cumulative Effects Assessment Practitioner's Guide* (Hegmann et al., 1999).
- *Cumulative Environmental Impact Assessment Industry Guide* (Minerals Council of Australia, 2015).
- *Good Practice Handbook: Cumulative Impact Assessment and Management* (IFC, 2013).
- *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE, 2006)

The identification of cumulative impacts followed two stages:

- Scoping: where the spatial (geographic relationship) and temporal relationships to determine which projects are included in the Cumulative Impact Assessment (**CIA**) are defined, the projects to include in the CIA are selected and ecological values to be considered by the CIA are identified.
- Assessment: where the impacts on ecological values will be summarised for each project and the cumulative impact discussed.

While the scoping approach may identify several projects to consider, the ability for the assessment to adequately capture the impacts associated with those projects will be determined by the availability of reports, spatial data, quantified impacts, and compatibility of the approach to identify and quantify impacts resulting from by each project. The *Cumulative Environmental Impact Assessment Industry Guide* (Minerals Council of Australia, 2015) recognises that there are numerous technical issues and potential legal limits in setting scale (spatial, temporal) and scope (what other projects to consider) when undertaking cumulative impact assessments of multiple projects on multiple environmental values. These technical issues were apparent when developing the approach for this project.

11.1.1 Scoping

The first stage of scoping the assessment involves the identification of ecological values to be considered in the CIA. In order to identify ecological values in common with other projects, the projects first need to be identified (project screening) through the application of the temporal and spatial boundaries.

Temporal boundary

Temporal bounds are defined as '*project life cycle and past, present and reasonably foreseeable future developments in the project's region'* (Minerals Council of Australia, 2015).

Past and present projects are defined as those that are:

- Referred under the EPBC Act within the last 5 years.
- currently under construction.

Future projects are those that are:

- approved but not yet commenced or,
- in the planning stage.

The identification of future projects is fraught and can only be achieved through consultation with regulators who are aware of projects in early planning stages. For this CIA, the regulators were not aware of any future projects that would have a material impact.

Spatial boundary

Spatial bounds are defined as '*site specific, focused on direct on-site and offsite impacts'* (Minerals Council of Australia, 2015). The spatial boundary in the context of this assessment, however, relates to the distance from the Project within which other projects will or have been constructed. The definition of temporal bounds above suggests the spatial boundary for identifying other projects should be the project's region. However, the *Cumulative Environmental Impact Assessment Industry Guide* (Minerals Council of Australia, 2015) recognises that it can be very difficult to undertake a cumulative impact assessment on a broad regional scale (particularly if data is unavailable). This discussion is particularly relevant for the Project as it dissects the State and crosses seven LGAs.

On this basis, the spatial boundary for identifying projects to include in the assessment of cumulative impacts has been defined at 10 km from the rail line.

Project screening

DELWP and DAWE have identified three major infrastructure projects that might result in cumulative impact when considered in conjunction with the Project - North East Rail Line Upgrade (**NERL**), the Shepparton Line Upgrade Project (**SLU**), and the proposed Beveridge Intermodal Freight Terminal (**BIFT**). This was determined based on the scale, location, and timing of those projects relative to Inland Rail.

Additionally, the EPBC Act PMST search tool has been used to identify other projects within 10 km of the Project (rail line) from Beveridge to Albury that have been previously referred to the Commonwealth. A temporal extent of five years since referral was applied to the search and all projects identified were potentially considered under the CIA.

The most recent, relevant project identified by the PMST search tool was referred in 2015. As this is outside of the temporal extent of the CIA, no other projects besides NERL, SLU, and BIFT were considered.

Table 44provides a summary of both NERL and SLU and a summary of their location is provided in Figure 11.

Table 44 Projects identified for consideration of the cumulative impacts

Project and proponent	Project summary	Selection criteria	Associated references
Shepparton Line Upgrade (Rail Projects Victoria)	The Shepparton Line Upgrade (**SLU**) Project comprises of a series of rail and station upgrades to the existing Shepparton railway line between Donnybrook and Shepparton to improve transport services. These upgrades include platform extensions and minor station works, level crossing upgrades, a new crossing loop and associated works. The SLU Project also involves the construction of a stabling yard, driver facilities including amenities building, refuelling area, staff car parking and a bypass track connected to the Shepparton line, which will allow trains to access the facility. Preliminary stages of the Project are underway with works expected to be fully completed by late 2022. The Project is being delivered by Rail Projects Victoria (**RPV**) on behalf of the Victorian State Government.	Identified by DELWP/DAWE for inclusion	AJM (2019) DELWP (2019e)
North East Rail Line (ARTC)	The North East Rail Line (**NERL**) upgrade aims to deliver major programmed maintenance works to improve passenger service reliability, ride quality and comfort and causes of major delays. The upgrade involves track resurfacing, signalling works, drainage improvements, mud hole removal, installation of crossovers, turnout upgrades, replacement of existing under bridges, ballast depth improvement, level crossing upgrades, and recondition of existing bridges to improve and sustain track geometry between Melbourne and Albury. Early works began in 2019 and were completed in March 2021. Aerial replacement works are currently being undertaken and are anticipated to be finished by mid-2021. The NERL upgrade is being delivered by ARTC on behalf of the Commonwealth and Victorian governments.	Identified by DELWP/DAWE for inclusion	Habitat Management Services (2020) GHD (2019a) GHD (2019b) WSP (2019) WSP (2020a,b,c,d)

Project and proponent	Project summary	Selection criteria	Associated references
Proposed Intermodal Freight Terminal, Beveridge	Beveridge Property and Management Services Pty Ltd have proposed a location for the **BIFT** immediately adjacent to the rail corridor in Beveridge, Victoria. The proposed BIFT site is located approximately 40 km from the Melbourne CBD over an area of approximately 1,100 ha and forms part of Mitchell Shire's Big Build. The BIFT and associated precinct infrastructure will include: • Intermodal terminals for the processing of both import/export and interstate freight, including containers and bulk commodities • Hardstands and rail track, arrival/departure sidings for trains up to 1,800 m in length • Locomotive refuelling areas • Associated truck loading and circulation areas • Distribution centres and warehousing. The project was referred in May 2020, and a decision was made in July 2020 that a EES was not required subject to conditions. To date, AECOM is not aware of any construction/impacts as a result of this project. All potential impacts considered by this CIA assume the scenario of total loss applied by Ecology and Heritage Partners (2020) as this is the extent of information available.	Identified by DELWP/DAWE for inclusion	Ecology and Heritage Partners (2020) GTA Consultants (2020)

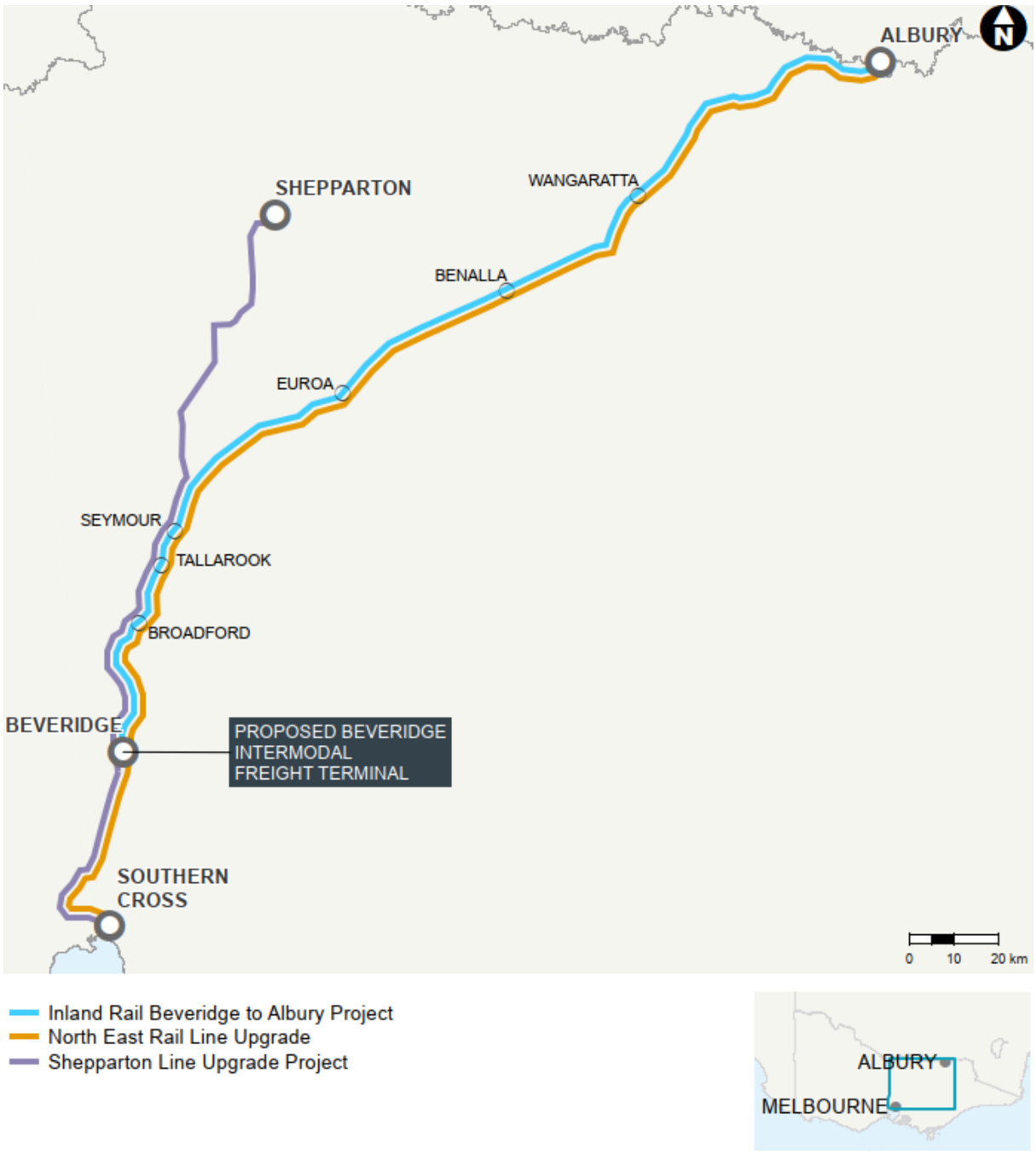


Figure 11 Location of projects assessed by the CIA

Identification of ecological values to be considered

DELWP (2020a) identifies values of primary concern as 'matters of state or national environmental significance, including listed threatened species and communities.' Traditionally in a CIA, values to be considered need to be those potentially impacted by more than one project (Hegmann et al., 1999; IFC, 2013). A summary of the values considered as part of this CIA is provided in Table 45.

11.1.2 Identification of cumulative impacts

Ecological values will be identified from the existing conditions information in the publicly available referral documentation of the projects identified in Table 45. Impacts on ecological values will be summarised for each project and then combined to present the cumulative impacts. It is noted that the ultimate impacts from each project may differ significantly from the impacts presented in the referral documents.

11.1.3 Assumptions and limitations

The findings of this CIA are subject to the following assumptions and limitations:

- The existing conditions and impact data for identified projects has been limited to publicly available data.
- The scope of projects assessed in the CIA have been limited to those identified through consultation with DELWP/DAWE and those identified during the EPBC and EE Act referral search.
- No new baseline data has been collected.
- The lack of specific impact data for each project has meant that a quantitative CIA was not possible.
- The determination of the significance of these impacts (given their qualitative nature) cannot be made without the contribution of regulatory stakeholders. This is particularly relevant in regional areas such as this where less information is readily available on the extent and value of remaining ecological assets.

11.2 Cumulative impacts

Cumulative impacts relate to native vegetation, reduction in extent of TECs, impacts on threatened flora and fauna, habitat fragmentation, and loss of Hollow-bearing trees.

This section summarises ecological values being considered and the cumulative impact. Information on impacts to each ecological value by the projects is tabulated in Table 45, noting that, where impacts to an ecological value was relevant to only one project, those impacts were not considered further in this CIA.

Those values where impacts occurred across more than one project include:

- TECs
  - GBGW
  - WBYBBRGGW
  - VTWBC
- Threatened fauna species
  - Swift Parrot
  - Regent Honeyeater
  - Brush-tailed Phascogale
  - Squirrel Glider
  - Barking Owl
  - Diamond Firetail
  - Woodland birds

- Threatened flora species
  - Late-flower Flax-lily
- Native vegetation
  - Patches of native vegetation
  - Large Trees in Patches
  - Scattered Trees
  - Endangered EVCs
  - High quality vegetation

11.2.1 Threatened ecological communities

Cumulative impacts will occur for one threatened ecological community, VTWBC (15.156 ha). Of this extent, 6.899 ha was considered impacted by the current Project. The subsequent arborist assessment being undertaken may result in a reduction in this value through implementation of protection measures and changes in detailed design.

Currently there is no indication of the extent of VTWBC across Victoria, so determining the significance and/or scale of this impact in the context of the wider landscape is difficult to gauge. However, impacts to VTWBC will result in loss of habitat, foraging resources, fragmentation of the landscape, and potential disruption of connectivity for some of the VTWBC species.

11.2.2 Threatened fauna species

Cumulative impacts to Growling Grass Frog or potential habitat may occur across all assessed projects. Impacts to potential habitat for the current project at Wallan Station will be avoided; however, without quantitative data for the other projects, it's difficult to determine the extent of cumulative impact to potential habitat. As potential Growling Grass Frog habitat has been identified as important for avoid and minimise measures across all three projects, it is considered that the cumulative impacts would not result in a significant impact to the species.

The loss of VTWBC and hollow-bearing trees may result in some minor impact to Swift Parrot, Regent Honeyeater, Barking Owl, Diamond Firetail, and Woodland Birds in general through loss of movement corridors, foraging resources, and fragmentation of intact patches of native vegetation. Additionally, Barking Owl may be impacted by the loss of hollow-bearing trees, particularly if they are regular roosts or breeding hollows.

Brush-tailed Phascogales may be impacted by the loss of hollow-bearing trees and fragmentation of habitat. While Squirrel Gliders were not identified by any project, they were assumed to be present for SLU and there is potential for them to occur for the current Project and NERL. This species may also be impacted by the loss of hollow-bearing trees and fragmentation of habitat.

11.2.3 Threatened flora species

Late-flower Flax-lily is listed as vulnerable under DELWPs Advisory list (VROTs). While a worst case scenario has been adopted with the assumption of loss of ecological values within the impact area, the eventual retention of the majority of these plants is likely as they directly under powerlines rather than being present within the potential disturbance footprint of the pole replacements.

Given that a small number of individuals are likely to be removed (12) and that impacts to VROT species are accounted for in the calculation of offsets, it is considered that the cumulative impact of the three projects is unlikely to be significant. A determination of significance is made here as the data availability was sufficient and the number of impacted individuals was relatively low.

11.2.4 Native vegetation

Potential cumulative loss of native vegetation (Table 45) as a result of the three projects includes:

- Patches of native vegetation – 66.272 ha
- Large Trees in Patches – 301

- Scattered Trees – 234
- Endangered EVCs – 50.692 ha (subset of patches of native vegetation)
- High quality vegetation – 19.052 ha (subset of patches of native vegetation)

To assume the complete loss of all vegetation within the project footprint of each of the four projects included in this CIA, 66.272 ha patches of native vegetation, 301 Large Trees in Patches, and 234 Scattered Trees will be removed. This is likely to have a material impact on the flora and fauna species that are dependent on remnant vegetation as habitat resource within the regional landscape. This extent of removal could realise a significant loss of habitat features such as nesting hollows, roosting and foraging resources, lead to an increase in fragmentation and edge effects on existing patches of vegetation, and reduce habitat connectivity across the landscape.

As discussed in Table 45, without the spatial data from SLU, NERL, and BIFT, it is difficult to ascertain exactly how much loss occurs within the spatial extent of this CIA (10 km from the project area) and what the significance of this loss means in the context of habitat loss (i.e. removal of hollow-bearing trees, proportion of vegetation impacted across the landscape), fragmentation, and impacts to connectivity.

Table 45 Summary of ecological values for projects and their cumulative impact

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
Matters of National Environmental Significance						
Threatened ecological communities (Section 8.1.1)	Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	6.333 ha will be impacted.	37.23 ha present. No impact or removal required through the implementation of NGZs.	Patches common between Mangalore Violet Town. No impact or removal required through the implementation of NGZs.	Not identified	No cumulative impact.
	Natural Temperate Grasslands of the Victorian Volcanic Plain	0.619 ha present Impacts to this TEC will be avoided (Section 7.1.1).	0.49 ha present. No impact or removal required through the implementation of NGZs.	Not identified.	Not identified	No cumulative impact.
	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	0.624 ha will be impacted.	0.83 ha present. No impact or removal required through the implementation of NGZs.	Not identified.	Not identified	No cumulative impact.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
Threatened flora species (Section 8.1.2)	Swamp Fireweed	No impacts.	Present within Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Low likelihood of a significant impact based on EPBC significant impact criterion and implementation of avoidance measures.	Not identified.	Potential habitat but considered unlikely to occur.	No cumulative impact.
	Swamp Everlasting	No impacts.	Important population present within Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Low likelihood of a significant impact based on EPBC significant impact criterion and implementation of avoidance measures.	Not identified	Potential habitat but considered unlikely to occur.	No cumulative impact.
Threatened fauna species (Section 8.1.2)	Grey-headed Flying-fox	Impacts unlikely to occur.	Targeted surveys undertaken; no permanent colonies present. Low likelihood of a significant impact (based on EPBC significant impact criterion).	No suitable habitat identified, no historical records within 10km.	Not identified.	No cumulative impact.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Swift Parrot	Loss of 11.339 ha of VTWBC - occasional foraging resource.	Targeted surveys undertaken; areas determined to be high quality habitat for this species designated as NGZs. Low likelihood of a significant impact (based on EPBC significant impact criterion).	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. This community may support several bird species including the Swift Parrot. No targeted surveys were undertaken. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not identified.	Loss of VTWBC may result in some minor impact to this species through loss of some foraging resources
	Regent Honeyeater	Loss of 11.339 ha of VTWBC - occasional foraging resource.	Targeted surveys undertaken; areas determined to be high quality habitat for this species designated as NGZs. Low likelihood of a significant impact (based on EPBC significant impact criterion).	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. This community may support several bird species including the Regent Honeyeater. No targeted surveys were undertaken. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not identified.	Loss of VTWBC may result in some minor impact to this species through loss of some foraging resources

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Painted Honeyeater	Impacts unlikely to occur.	Targeted surveys undertaken; areas determined to be high quality habitat for this species designated as NGZs. Low likelihood of a significant impact (based on EPBC significant impact criterion).	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. This community may support several bird species including the Regent Honeyeater. No targeted surveys were undertaken. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not identified.	No cumulative impact
	Growling Grass Frog	Significant impacts unlikely to occur but some individuals may be impacted by construction works.	Within the MSA Growling Grass frog Conservation Strategy Area (Donnybrook, Merri Creek, outside the Inland Rail project area). Low likelihood of a significant impact (based on EPBC significant impact criterion). During construction, 10 individuals were discovered in a	Within the MSA Growling Grass frog Conservation Strategy Area (Donnybrook, Merri Creek, outside the Inland Rail project area). Riparian Woodland EVC with Growling Grass Frog habitat identified.	Suitable habitat present but not identified by targeted survey. Within the Biodiversity Conservation Strategy Conservation Area 34 is contained within the project area.	The patch of vegetation at Track Slew 1 - Wallan Loop (HZ32 0.035 ha – see Figure 14) will be avoided (Section 7.1.1). The impacts to the MSA Growling Grass Frog Conservation Areas may result in the loss of some habitat and/or individuals. The translocated individuals from SLU were outside the

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
			recently excavated trench at Donnybrook Station and translocated to an adjacent dam within 100 m (Habitat Management Services, 2021).			Inland Rail project area. Without quantitative data, it is difficult to determine the extent of cumulative impact to Growling Grass Frog, but some cumulative impacts are possible
	Striped Legless Lizard	Impacts unlikely to occur.	Targeted surveys undertaken; areas determined to be high quality habitat for this species designated as NGZs. Low likelihood of a significant impact (based on EPBC significant impact criterion).	Not identified.	Not identified.	No cumulative impact.
	Golden Sun Moth	Impacts unlikely to occur.	Within the MSA Golden Sun Moth Biodiversity Conservation Strategy (outside Inland Rail project area). Habitat Compensation Obligations were paid to facilitate works.	Not identified.	Not identified.	No cumulative impact.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
State significant biodiversity values						
Native vegetation (Section 8.2.1)	Patches of native vegetation	24.289 ha of native vegetation patches identified for removal.	20.91 ha of native vegetation patches identified for removal.	An accurate account of the native vegetation loss for this project is not possible given the large number of reports that inform the impact of this project, and as such, determining the full extent of past and proposed vegetation removal is not possible. It is estimated that 1.768 ha of native vegetation was/will be removed under the *low impact works* exemption Procedure *to rely on the Railways Exemption in Planning Schemes* (DELWP, 2018d) and approximately 0.879 ha of additional native vegetation will be removed and offset.	21.073 ha of native vegetation patches identified for removal under the assumption of total loss.	Cumulative loss of 66.272 ha. Without spatial data, it is unclear how much would be removed from within the spatial extent of the CIA. Understanding this information is necessary for judgement of the significance of this impact to be made.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Large Trees in Patches	130 large trees identified for removal.	169 large trees identified for removal. Without spatial data, it is unclear how much would be removed from within the spatial extent of the CIA.	No large trees identified for removal.	Two large trees in patches.	Cumulative loss of 301 large trees. Without spatial data, it is unclear many trees would be removed from within the spatial extent of the CIA. Understanding this information is necessary for judgement of the significance of this impact to be made.
	Scattered Trees	436 Scattered Trees mapped (299 small and 137 large). 131 Scattered Trees identified for removal (83 small and 48 large).	91 Scattered Trees identified for removal	Six Scattered Trees identified for removal.	Six large Scattered Trees identified for removal.	Cumulative loss of 234 Scattered Trees. Without spatial data, it is unclear many trees would be removed from within the spatial extent of the CIA. Understanding this information is necessary for judgement of the significance of this impact to be made.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Endangered EVCs which are a subset of the total native vegetation mapped	14.343 ha identified for removal.	14.22 ha identified for removal.	0.22 ha was identified for removal by Habitat Management Services (2020) and 1.106 ha was identified for removal by WSP (2020c); however, detailed information relating to Endangered EVC extent and impact was not available in all NERL reports.	21.073 ha was identified for removal	Cumulative loss of 50.692 ha. Without spatial data, it is unclear the extent of endangered EVC's that would be removed from within the spatial extent of the CIA. Understanding this information is necessary for judgement of the significance of this impact to be made.
	High quality vegetation (Habitat Hectare score > 0.6) which is a subset of the total native vegetation mapped	5.621 ha identified for removal.	12.7 ha identified for removal.	0.731 ha was identified for removal by WSP (2020c); however, detailed information relating to the extent of and impacts to high quality vegetation, was not available.	Not identified.	Cumulative loss of 19.052 ha. Without spatial data, it is unclear how much high-quality vegetation would be removed from within the spatial extent of the CIA. Understanding this information is necessary for judgement of the significance of this impact to be made.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Mapped wetlands	Two wetlands were identified at Track Slew 2 – Tallarook Loop but impacts were avoided	Eight wetlands were identified.	No mapped wetlands were identified.	No mapped wetlands were identified.	No cumulative impact.
Threatened ecological communities (FFG Act) (Section 8.2.2)	Victorian Temperate Woodland Bird Community	11.339 ha required for removal.	3.87 ha required for removal.	Present between Donnybrook to Chiltern (considered unlikely to be impacted).	Not identified.	Cumulative loss of 15.156 ha. This loss may result in impacts to birds dependent on VTWBC for foraging resources, habitat, and fragmentation of intact patches of native vegetation.
	Western (Basalt) Plains Grassland Community	Impacts to this TEC will be avoided (Section 7.1.1).	0.06 ha required for removal.	Not present.	Not identified.	No cumulative impact.
Threatened flora (Section 8.2.3)	Late-flower Flax-lily	Impacts to up to 2 plants at overhead powerline investigation area 1012.	Present and considered common. Impacts not identified.	Potential to impact approximately ten individuals.	Not identified.	Approximately 12 individuals impacted.
Threatened fauna (Section 8.2.3)	Brush-tailed Phascogale	Impacted by works at Tallarook.	Assumed present, habitat linkage structures recommended.	High likelihood of occurrence between Tallarook and Chiltern.	Not identified.	Cumulative impacts to this species are likely to occur as a result of habitat fragmentation in the landscape but data is insufficient to determine the magnitude, location, and scale of impact.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Squirrel Glider	Not identified but potential impact at Tallarook.	Assumed present, habitat linkage structures recommended.	Moderate-high likelihood of occurrence between Tallarook and Chiltern.	Not identified.	Cumulative impacts to this species may occur as a result of habitat fragmentation in the landscape but data is insufficient to determine the magnitude, location, and scale of impact.
	Barking Owl	May be impacted through loss of hollow-bearing trees, particularly if a regular roost or breeding hollow is removed. Loss of 11.339 ha of VTWBC.	Assumed present.	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not identified.	Cumulative impacts to this species may potentially occur as a result of habitat loss through removal of hollow-bearing trees and clearance of VTWBC but data is insufficient to the determine magnitude, location, and scale of impact.
	Brown Toadlet	Low chance of impacts.	Present and observed in Seymour.	Not identified.	Potential habitat but not identified.	Cumulative impacts to this species may potentially occur as a result of habitat loss but data is insufficient to the determine magnitude of impact.

Ecological values		Inland Rail - Beveridge to Albury – Residual impacts	SLU Project	NERL Upgrade	BIFT	Total cumulative impact
	Diamond Firetail	Loss of 11.339 ha of VTWBC	Assumed to be present in timbered areas.	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. This community may support several bird species including the Diamond Firetail. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not identified.	Loss of VTWBC may result in some impacts to this species through loss of foraging resources, habitat, and fragmentation of intact patches of vegetation.
	Woodland birds	Several species listed in the VTWBC community description were identified by KBR (2020c) including Brown-headed honeyeater, Fuscous honeyeater, Jacky Winter, Little Lorikeet, and Western Gerygone. These species may potentially be impacted by loss of VTWBC.	Not assessed.	Victorian Temperate Woodland Bird Community (FFG Act, TEC) is present between Donnybrook to Chiltern. Unlikely significant impacts on this community, provided mitigation measures are implemented.	Not assessed.	Loss of VTWBC may result in some impacts to this species through loss of foraging resources, habitat, and fragmentation of intact patches of vegetation.

Chapter 12.0 Environmental Planning Considerations

12.0 Environmental Planning Considerations

This Chapter details the relevant sections of Victorian planning schemes and other statutory plans, policy, or strategy relevant to the Project.

12.1 Planning, legislative and policy context

12.1.1 Environmental Assessment

This sub-section discusses the environmental assessments and approvals required under the relevant Victorian planning schemes, plan, policy, and strategies.

- **Planning Scheme Amendment**

  An amendment to the Planning Schemes is currently being prepared for the Project. The Amendment introduces '*Inland Rail – Beveridge to Albury April 2021'* Incorporated Document into the Planning Schemes to facilitate the use and development of the project area for the purpose of the Project (excluding overhead powerline replacement works outside enhancement sites). The Incorporated Document is the key planning approval for the Project and will allow works to proceed alongside the approval of this Environment Report and the EMF and other necessary approvals. The Amendment introduces site specific controls via the Incorporated Document and applies a Specific Controls Overlay, allowing the Project to progress without the requirement for additional planning permits. However, the approval of the Amendment will be subject to conditions being met to the satisfaction of the Minister for Planning, in consultation with relevant stakeholders such as Councils where relevant.

- **Planning Permits**

  Overhead powerline replacement works that occur outside enhancement sites may require planning approval through a separate planning permit application lodged with the relevant Council. These works are largely exempt from planning approval under Clause 62.02-1 of the Planning Schemes, as the works are defined as a 'minor utility installation'. However, where native vegetation removal is required to facilitate the works a planning permit is required in accordance with Clause 52.17 of the Planning Schemes.

- **Plans, policies, and strategies** as discussed in Section 12.1.2.

12.1.2 Prevention, minimisation, and management

The following discusses the relevant scheme, plan, policy, and strategies that provide for the prevention, minimisation, and management of any relevant impacts as a result of the Project.

- **Environmental Planning Overlays**

  The environmental planning overlays contained within each Planning Scheme seek to protect vegetation or landscape features of an area. They are used to recognise areas of environmental or landscape significance. An assessment against the environmental planning overlays applicable to the Project are discussed in Section 12.3.

- **Urban Transport Strategy (Infrastructure Australia, 2013)**

  This report advocates for an urban transport infrastructure strategy that proposes a series of principles and criteria to assist planning for urban transport systems and the identification of infrastructure projects by providing clear signals about economic, social, and environmental criteria.

  The draft principles which are proposed to guide the development of this strategy includes an *environmental criterion*, which states:

  - *'Factor in the potential impacts of climate change and other environmental impacts when making decisions on urban transport planning, investment and management.'*

- **Victorian Freight Plan: Delivering the Goods (Department of Transport, 2018)**

  The Victorian Freight Plan builds on other previous Victorian freight plans and strategies however, the unprecedented growth in freight volumes and rapid change in the broader environment has required new approaches to be adopted. The Plan sets out short, medium and long-term priorities to support the freight and logistics system.

  The Plan is built on four key objectives, which comprise of:

  - *'Reducing the cost of doing business*
  - *Improving the efficiency of moving freight while minimising adverse impacts*
  - *Better connecting Victorian businesses with their local, interstate and export markets*
  - *Providing sufficient future capacity'*

  It identifies five priority areas to improve freight efficiency, capacity and amenity over the next five years including '*better use of our rail freight assets'.* This priority area identifies the importance of the management of the regional rail infrastructure and operating rules for the benefits of all users – freight and passenger. The Inland Rail project is identified under this priority area and supports the findings that investments in the regional (instar state) rail network would lead to improved running times and productivity and subsequently, contribute to the mode shift from road freight to rail freight. The Plan identifies the Inland Rail Project as nationally significant freight infrastructure and includes a long term (10+ years) priority to take advantage of opportunities presented by the Project.

- **Plan Melbourne 2017 – 2050 (DELWP, 2017d)**

  Plan Melbourne is a long-term strategy that seeks to accommodate Melbourne's future growth in population and employment. It includes nine principles that underpin the long-term vision for Melbourne and a series of outcomes, directions, and policies that aim to ensure Melbourne is a competitive, liveable, and sustainable city. The following policy is relevant with the objectives and outcomes of the Project:

  - Policy 3.4.3 (Avoid negative impacts of freight movements on urban amenity) commits the government to continue working with the industry to identify and prioritise key routes for protection and investment on the Principal Freight Network. In addition, it seeks to promote a more consistent and informed approach to land use planning in freight precincts and corridors including maintaining buffer zones to protect the community form unacceptable amenity impacts.

12.2 Clause 52.17 Requirements

Pursuant to Clause 52.17-1 of the Victorian Planning Provisions, a permit is required to destroy or lop native vegetation, including dead native vegetation. This does not apply:

- *If the table to Clause 52.17-7 specifically states that a permit is not required.*
- *If a native vegetation precinct plan corresponding to the land is incorporated into this scheme and listed in the schedule to Clause 52.16.*
- *To the removal, destruction or lopping of native vegetation specified in the schedule to this clause.*

An application to remove, destroy or lop native vegetation must comply with the application requirements specified within the Guidelines.

The PSA being prepared for this Project will seek approval for the removal of native vegetation and therefore, eliminate the requirement to seek a planning permit from the relevant Council. The Incorporated Document '*Inland Rail – Beveridge to Albury April 2021'* will specify the Project will comply with the Guidelines where native vegetation is proposed for removal (excluding overheard powerline replacement works outside enhancement sites).

Overhead powerline replacement works that occur outside enhancement sites are largely exempt from planning approval under Clause 62.02-1 of the Planning Schemes, as the works are defined as a 'minor

utility installation'. However, where native vegetation removal is required to facilitate the works, a planning permit is required in accordance with Clause 52.17 of the Planning Schemes.

In the instances where a planning permit is required for the removal of vegetation to facilitate overhead powerline replacement works outside enhancement sites, a separate planning permit application will be lodged with the relevant Council.

Native vegetation offsets will be provided in accordance with the Guidelines. Chapter 9.0 provides additional information regarding the proposed environmental offsets.

12.3 Environmental Planning Overlays

Environmental planning overlays are used to recognise areas of environmental or landscape significance. These overlays generally seek to protect vegetation or landscape features of an area. The environmental planning overlays that apply to the project area include the following:

Mitchell Planning Scheme

- Environmental Significance Overlay – Schedule 3 (ESO3) *(Watercourse Conservation).*
- Salinity Management Overlay (SMO).
- Vegetation Protection Overlay – Schedule 1 (VPO1) (*Roadside and Corridor Protection*).
- Vegetation Protection Overlay – Schedule 2 (VPO2) (*Freeway Environs Protection*).

Benalla Planning Scheme

- Vegetation Protection Overlay – Schedule 3 (VPO3) (*Regent Honeyeater Habitat / Lurg Ironbark Vegetation Protection Area*).

Wangaratta Planning Scheme

- Vegetation Protection Overlay – Schedule 1 (VPO1) (*Glenrowan Township Vegetation Protection Area*).
- Vegetation Protection Overlay – Schedule 2 (VPO2) (*Roadside vegetation of conservation significance*).

Indigo Planning Scheme

- Environmental Significance Overlay – Schedule 3 (ESO3) (*Black Dog Creek*).

Section 6.2.8 identifies the environmental overlays and summarises the extent of native vegetation that was recorded within the relevant environmental overlays present at the investigation area. Section 8.2.6 summarises the extent of native vegetation impacts in relation to relevant environmental overlays present within the investigation area.

The tables below identify the vegetation required to be removed in the environmental overlays listed above for the Mitchell, Benalla, Wangaratta, and Indigo planning schemes, and provides an assessment against the objectives and decision guidelines where a planning permit is triggered for the removal of the type of vegetation pursuant to the permit requirements of the overlay. It should be noted, impacts have been calculated based on a worst-case scenario. Planning permit exemptions will be considered at the detailed design phase.

12.3.1 Mitchell Planning Scheme

Table 46 Environmental Planning Overlays – Mitchell Planning Scheme

Environmental Objective / Decision Guideline	Response
Environmental Significance Overlay – Schedule 3 (ESO3) *(Watercourse Conservation)*	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop any vegetation, including dead vegetation.
Extent of Vegetation Impact	Up to 0.562 ha of native vegetation and 0.954 ha of non-native vegetation may be impacted within ESO3.
Overview of Works	• Five enhancement investigation areas and nine overhead powerline investigation areas are affected by the ESO3 within Mitchell Shire Council. • The enhancement sites include Wandong; Short Street, Broadford, Marchbanks Road, Broadford, Tallarook and Seymour-Avenel Road, Seymour. Each of the enhancement sites proposes a design solution to allow the necessary clearance required for the double-stacked freight trains through track lowering or a bridge replacement. • The proposed works associated with the overhead powerline investigation areas seek to lift or replace the overhead powerlines or towers with taller ones to allow for the required clearance for the double-stacked freight trains.
Environmental objective to be achieved *Conserve and improve the ecological vitality and health of watercourses.* *Maintain the quality and quantity of water within the watercourse and its ability to carry natural flows.* *Prevent erosion of banks, streambeds and adjoining land and the siltation of watercourses, drains and other features.* *Conserve and improve the visual and landscape values of watercourses.* *Minimise fill and the artificial modification of watercourses.* *Protect flora and fauna habitats and links along watercourses and encourage habitat regeneration.* *Prevent pollution and increased turbidity of water in natural watercourses.* *Prevent increased surface run-off or concentration of surface water run-off.* *Manage the intensity of development on and around watercourses.*	• The proposed works do not extend into any watercourses and will not have any direct impacts to the ecological vitality and health of watercourses. • The Surface Water Impact Assessment report prepared by AECOM to support this Project concluded that with the appropriate mitigation measures in place, such as flood protection and flood storage, waterway quality and function should be protected from any indirect adverse consequences caused by the construction or operation of the Project. • The visual and landscape value of watercourse in the Mitchell Shire will be conserved and no artificial modification of watercourses is proposed. • Flora and fauna habitats along watercourses will not be impacted by the works. • Any pollution or surface run-off will be managed through appropriate mitigation measures and no adverse impacts are anticipated to be caused by the construction or operation of the Project.

Environmental Objective / Decision Guideline	Response
Decision guidelines *The following decision guidelines apply to an application for a permit under Clause 42.01, in addition to those specified in Clause 42.01 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:* • *Any relevant State Environment Protection Policy.* • *The possible effect of the development on the quality and quantity of water.* • *The potential for flooding to occur as a result of the development.* • *The proper management of the land as a floodplain.* • *The need to conserve natural habitats and flora and fauna and retain and build biolinks, including significant plan and animal species or communities.* • *The need to retain vegetation and natural features which contribute to waterway health and water quality.* • *The protection and enhancement of the watercourse for its recreation, landscape, and visual values.* • *The preservation of and impact on soils and the need to prevent erosion.* • *The potential of chemical contamination of soil and water from the proposed development.* • *Whether the siting of buildings may cause demands in the future for tree lopping or removal.* • *The adequacy of reasons for removing vegetation, if required, and the practicality of alternative options which do not require the removal of vegetation.* • *The potential to prevent or reduce the need for earthwork removal and the extent of ground disturbance.* • The need for, or adequacy of, landscaping or vegetation screening.	• The Project is consistent with the decision guidelines of the ESO3 and is considered appropriate. • This report assesses the potential environmental effects of the Project and addresses the requirements of the EE Act and EPBC Act referral determinations. • The actions contained in Section 7.4 of this report will be used to inform the EPRs to be developed as part of the EMF for the Project. • Flood modelling conducted for the Project has determined that a very low risk of flooding is expected as a result of the development and there is largely no change to existing flood levels with the exception of minor changes to velocity levels. Mitigation measures proposed as part of the Project will appropriately manage any changes to the potential for flooding. • Preparation and implementation of a BMP to describe how the Project will manage and control impacts including pesticide and herbicide use, documentation, and limitations on use (i.e. not used in sensitive environmental areas, drainage lines that flow to waterways, and aquatic habitats; broadscale use does not result in an increased erosion and sediment risk). • Preparation and implementation of a CEMP which includes guidance on the best practice installation of sediment and erosion control measures to prevent erosion and impacts on soils, as well as minimising the potential and extent of ground disturbance. • Implement measures to address the management, handling, and storage of hazardous chemicals to minimize the potential of chemical contamination of soil and water from the Project. • The extent of vegetation impact will be refined during the detailed design stage and will seek to reduce the amount of native vegetation requiring removal and design the Project to impact on areas with the least biodiversity values in preference to areas of higher value to conserve the health and vitality of watercourses. • All native vegetation to be impacted by the works is considered to be fauna habitat and as such, up to 0.562 ha of fauna habitat may be impacted.

Environmental Objective / Decision Guideline	Response
	• The Incorporated Document includes a condition relating to the preparation of an Urban Design Framework (UDF) for the enhancement sites. This document requires high level commitment to the enhancement of the sites through landscaping.
Salinity Management Overlay (SMO)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop any vegetation.
Extent of Vegetation Impact	Up to 0.004 ha of native vegetation and 0.099 ha of non-native vegetation may be impacted within the SMO.
Overview of Works	One overhead powerline investigation area (Overhead powerline investigation area 1101) intersects with the SMO, and the amount of native vegetation present within this area totals 0.004 ha. The proposed works consist of lifting or replacing the overhead powerline with a taller pole to allow for the necessary clearance required for the double-stacked freight trains.
Salinity management objectives and statement of risk No objectives or statement of risk specified in the Clause 44.02 Salinity Management Overlay or schedule.	N/A
Decision guidelines *Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:* • *The Municipal Planning Strategy and the Planning Policy Framework.* • *The State Environmental Protection Policy, (Waters of Victoria).* • *The Regional Landcare Plan applicable to the catchment.* • *The Catchment Salinity Management Plan to the particular catchment.* • *A Local Government Planning Guide for Dry Land Salinity - Department Conservation and Natural Resources, 1995.* • *The need to remove, destroy or lop vegetation to a create defendable space to reduce the risk of bushfire to life and property.*	• The proposed works are consistent with Clause 13.04-1S (Salinity) of the Planning Policy Framework whereby the Project does not seek to introduce new structures within the SMO and impact an area affected by groundwater salinity. Rather, the works consist of an upgrade to an existing utility. • The proposed works are consistent with the *State Environmental Protection Policy (Waters of Victoria)* (SEPP) as the Project will seek to minimise the potential for adverse impacts on surface water quality to ensure that existing beneficial uses are protected. • The proposed works are consistent with the Goulburn Broken Catchment Management Authority Regional Catchment Strategy as the Project will not increase salinity levels of watercourses within the catchment. • Construction activities will utilise existing access tracks where possible to minimise disturbance to the existing environment.

Environmental Objective / Decision Guideline	Response
• *The need to augment tree planting and the establishment of deep-rooted, high water-use pasture species to reduce rainfall accessions to the water table in high recharge areas.* • *The need for planting of salt-tolerant species to stabilise and lower ground water levels in discharge areas.* • *The need for stock-proof fencing of discharge and high discharge areas to enable effective stock management for site stabilisation.* • *Any proposed landscaping and the need to preserve existing vegetation, particularly in high recharge and high discharge areas.* • *Any land management plan, works program, or farm plan applicable to the land.* • *The design, siting and servicing of the development and the extent of earthworks.* • *The appropriateness of the proposed use or development having regard to the sensitivity and constraints of the land and the capability of the land to accommodate the use or development.*	• During the detailed design phase, the Project will seek to reduce the amount of native vegetation impact and design the Project to impact areas with the least biodiversity values and retain areas of higher value. Additional vegetation impact to create defendable space and reduce bushfire risk is not considered applicable to this Project. • The proposed works are considered appropriate given they are an upgrade of an existing structure and will not introduce any additional constraints on the land nor impact high recharge areas. • An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction in line with the relevant plans and strategies outlined in the decision guidelines of the SMO. The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals.
Vegetation Protection Overlay – Schedule 1 (VPO1) (*Roadside and Corridor Protection*)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop native vegetation.
Extent of Vegetation Impact	Up to 7.648 ha of native vegetation may be impacted within VPO1.
Overview of Works	Two enhancement sites at Seymour-Avenel Road, Seymour and Hume Highway, Seymour, and four overhead powerline investigation areas
Vegetation protection objectives to be achieved *Protect and preserve indigenous vegetation and rare and endangered flora and fauna species on linear reserves.* *Achieve high landscape quality on roadsides.* *Maintain and enhance habitat and corridor requirements for indigenous fauna.*	• The extent of vegetation impact has been minimised as much as practicable to protect and preserve indigenous vegetation and rare and endangered flora and fauna species on linear reserves. • High landscape quality on roadsides will be retained through the retention and enhancement of comparable vegetation adjacent to sites of removal. • Habitat and corridor requirements for indigenous fauna will be maintained through various avoid and minimise strategies including the use of appropriate barriers and fencing, minimising night-time works, and associated light spill and timing the removal of trees to avoid fauna breeding season.

Environmental Objective / Decision Guideline	Response
Decision guidelines *The following decision guidelines apply to an application for a permit under Clause 42.02, in addition to those specified in Clause 42.02 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority*: • *The conservation and enhancement of the area.* • *The preservation of, and impact on, the natural environment or landscape values.* • *The role of native vegetation in conserving the flora and fauna and in providing food, shade, and shelter for native fauna.* • *The need to retain native vegetation if it is rare or supports rare species of flora or fauna and where it forms part of a wildlife corridor.* • *Whether provision is made or is to be made to establish and maintain native vegetation elsewhere on the land.* • *The sensitive location of driveways or crossings over roadside reserves.* • *The Mitchell Shire Roadside Conservation Surveys (1993-2002).*	• Vegetation impact at the two enhancement sites includes thin strips of native vegetation adjacent to the road/rail corridors. Comparable vegetation will be retained adjacent to the sites of removal, to minimise any impacts to the area. • Up to 25 native trees, 2 of which are scattered, may also be removed within the VPO1 extent. • Overall native vegetation impact has been minimised through avoidance and minimisation strategies including the prioritisation of rail corridor sites for use and the establishment of NGZs, TPZs and PAZs to protect ecologically significant areas. • Minor fragmentation of the landscape is anticipated as a result of the proposed native vegetation impact; however, this will be managed through the restoration and revegetation of disturbed areas at the conclusion of the works. • Native vegetation including hollow-bearing trees and scattered trees will be appropriately conserved through further avoidance of ecological communities in the detailed design phase. • Threatened ecological communities have been identified and these habitat links and flora and fauna species will be retained as much as practicable. • Construction activities will utilise existing access tracks where possible to minimise disturbance to the existing environment. As discussed in Chapter 6.0, vegetation impact at overhead powerline investigation areas is contained to existing gaps in the overstorey and are therefore unlikely to affect connectivity. • An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction. Vegetation surrounding the above listed sites within the VPO1 will be protected and managed through implementation of the Project's EMF. The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals. • During the detailed design phase, the Project will seek to reduce the amount of native vegetation requiring removal.

Environmental Objective / Decision Guideline	Response
	• Further discussions of habitat connectivity and potential ecological impacts of the Project are discussed in Chapter 6.0. - An in-depth discussion of mitigation measures for the required removal of native vegetation are outlined in Chapter 7.0.
Vegetation Protection Overlay – Schedule 2 (VPO2) (*Freeway Environs Protection*)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop native vegetation.
Extent of Vegetation Impact	Up to 3.15 ha of native vegetation may be impacted within VPO2.
Overview of Works	Three enhancement sites at Marchbanks Road, Broadford, Tallarook and Hume Highway, Seymour, and four overhead powerline investigation areas.
Vegetation protection objectives to be achieved *Maintain and enhance the safety and amenity of Hume Freeway and proposed Goulburn Valley Freeway including any adjoining main road.* *Preserve and enhance the tree lined character of the roadsides along the approaches to the urban townships and along main roads.* *Preserve and improve scenic views from Road Zones and to preserve and enhance the visual character of the areas adjacent to the Road Zones approaching and within the townships.* *Discourage the intensification of development in undesirable locations.* *Ensure that all existing trees and natural features which are within the overlay area are conserved within the limits of practicality and are not wantonly damaged, destroyed or removed.* *Require new buildings and their associated works, gardens, and landscape areas to be designed and maintained in a manner as to harmonise with the visual character of their surrounds.* *Preserve the amenity and service capability of the Road Zone and their environs.* *Protect and preserve indigenous vegetation and rare and endangered flora and fauna species on linear reserves.* *Maintain and enhance habitat and corridor requirements for indigenous fauna.*	• The proposed enhancement sites will allow adequate clearance for double-stacked freight trains and the overhead powerline areas will ensure the ongoing operation of the railway line remains safe. These will enhance the safety of the Hume Freeway and Goulburn Valley Freeway, particularly where the road and rail corridor are in proximity to one another. • The tree lined character of roadsides along the approaches to urban townships will be preserved where possible. • Any roadside trees within the proposed works area will be subject to further investigation in the detailed design phase to determine whether removal can be avoided or minimised. TPZs will be incorporated wherever possible. • Scenic views from Road Zones will be retained and the visual character of the areas adjacent to Road Zones approaching and within townships are not anticipated to be adversely impacted. • The intensification of development is limited to the enhancement sites and are considered to be located in appropriate locations, at the junctions between road and railway lines. • The extent of vegetation impact has been minimised as much as practicable to protect and preserve the natural features of the area. An avoid and minimise approach will be taken to all areas of potential vegetation removal.

Environmental Objective / Decision Guideline	Response
	• The service capability of the Road Zone and their environs may be temporarily affected during construction works. This is considered to be short term and the appropriate notification and traffic management measures will be in place to manage the service capability. • Any potential amenity impacts to the Road Zone as a result of the proposed works will be managed through the EMF. • Threatened ecological communities have been identified and these habitat links and flora and fauna species will be retained as much as practicable. • Construction activities will utilise existing access tracks where possible to minimise disturbance to the existing environment. Vegetation impact at overhead powerline investigation areas is contained to existing gaps in the overstorey and are therefore unlikely to affect connectivity.
Decision guidelines *The following decision guidelines apply to an application for a permit under Clause 42.02, in addition to those specified in Clause 42.02 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:* • *The effect of any development on the safety and operation of the road.* • *The prevention of ribbon development in the vicinity of the main road.* • *The objectives of the zone within which the land is situated.* • *The preservation of the amenity of the neighbourhood and the need to prevent unnecessary intrusive development from occurring in visually exposed areas.* • *The necessity or otherwise of retaining a buffer strip of vegetation in the vicinity of roads and property boundaries, or in visually prominent areas of the site.* • *The necessity to control the exterior colour and finishes of buildings, structures and works that directly affect the visual quality of the area, and to encourage where appropriate such buildings, structure and works to conform and reflect the character and atmosphere of the surrounding township.* • *The conservation and enhancement of the area.*	• The Project will improve the safety and operation of roads in proximity to the enhancement sites. • No ribbon development is proposed as part of the Project and no impact to the amenity of any neighbourhoods is anticipated. • The enhancement sites are not considered to be located in visually exposed areas and the overhead powerline works are an upgrade of existing infrastructure. • A buffer strip of vegetation will be retained in the vicinity of roads and the rail corridor. • The finishes of all proposed structures will be refined at the detail design phase and guided by the UDF prepared for the Project. This will ensure that the Project integrates well with the visual quality of the area, reflects the character of the township, and surrounds as well as improving overall amenity. • An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction. Vegetation to be retained within the VPO2 will be protected and managed through implementation of the Project's EMF. The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals.

Environmental Objective / Decision Guideline	Response
• *The preservation of, and impact on, the natural environment or landscape values.* • *The role of native vegetation in conserving the flora and fauna and in the providing food, shade, and shelter for native fauna.* • *The need to retain native vegetation if it is rare or supports rare species of flora or fauna and where it forms part of a wildlife corridor.* • *Whether provision is made or is to be made to establish and maintain native vegetation elsewhere on the land.* • *The sensitive location of driveways or crossings over roadside reserves.* • *The construction and use of signs or hoardings which are likely to cause drivers of vehicles to slow or stop their vehicles within the road reservation or constitute a hazard to pedestrian, bicycle, road, or rail traffic*. Referral of applications • Before deciding on an application, the responsible authority must refer the application in accordance with Section 55 of the Act to the referral authority specified in Clause 66.04 or a schedule to that clause.	• Mitigation measures such as the establishment of no-go zones, tree protection zones and prioritising the use of existing railway land will ensure that the maximum amount of native vegetation is retained. • The restoration and revegetation of areas that are disturbed as part of the construction phase of the Project will be completed at the conclusion of the works. This includes re-planting and re-seeding of disturbed areas with a mix of local native plant species. • Traffic management measures will be developed as part of the EMF and will be utilised in order to ensure the safe shared spaces and a safe interface between road users and construction sites. • The Department of Transport / VicRoads have been consulted on the Project and will continue to be consulted as the design progresses.

12.3.2 Benalla Planning Scheme

Table 47 Environmental Planning Overlays – Benalla Planning Scheme

Environmental Objective / Decision Guideline	Response
Vegetation Protection Overlay – Schedule 3 (VPO3) (Regent Honeyeater Habitat / Lurg Ironbark Vegetation Protection Area)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop any vegetation.
Extent of Vegetation Impact	Up to 0.636 ha of native vegetation and 1.142 ha of non-native vegetation may be impacted within VPO3.
Overview of Works	Three overhead powerline investigation areas.
Vegetation protection objectives to be achieved *To protect and stop the removal of native vegetation in areas that support Regent honeyeater.*	• The extent of vegetation impact has been minimised as much as practicable. An avoid and minimise approach will be taken to all areas of potential vegetation removal. • Any native vegetation within the proposed works area will be subject to further investigation in the detailed design phase to determine whether removal can be avoided or minimised. Ecological NGZs, TPZs and PAZs will be incorporated wherever possible.
Decision guidelines *The following decision guidelines apply to an application for a permit under Clause 42.02, in addition to those specified in Clause 42.02 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:* • *The recommendations of the "Regent Honeyeater Recovery Plan", Department of Natural Resources and Environment 1997, and the status of vegetation shown on the map series "Remnant Vegetation of the Lurg Hills", Sally Mann and Doug Robinson 1992.*	• The Regent Honeyeater Recovery Plan (1997) has been superseded by the National Recovery Plan for the Regent Honeyeater (DoE, 2016). • The VPO3 and National Recovery Plan for the Regent Honeyeater identifies the Mugga Ironbark, White Box, Yellow Box and Blakeley's Red Gum as the primary tree species for their habitat. No Mugga Ironbark, White Box or Blakeley's Red Gum trees are proposed to be impacted as part of the Project. • The Project may impact up to an estimated 20 small Yellow Box trees within patches of native vegetation. • Further investigation into the potential to avoid or minimise the impact to any Yellow Box trees within the project area will be conducted at the detailed design phase. Mitigation measures including TPZs, NGZs and PAZs will be implemented to protect and preserve as much native vegetation as practically possible. • The restoration and revegetation of areas that are disturbed as part of the construction phase of the Project will be completed at the conclusion of the works. This includes re-planting and re-seeding of disturbed areas with a mix of local native plant species.

Environmental Objective / Decision Guideline	Response
	• An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction. Vegetation to be retained within the VPO3 will be protected and managed through implementation of the Project's EMF. The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals. • The National Recovery Plan for the Regent Honeyeater states that mature, large individual trees tend to be more important for the habitat of the Regent Honeyeater. The patches of small Yellow Box trees are not considered to meet this criterion.

12.3.3 Wangaratta Planning Scheme

Table 48 Environmental Planning Overlays – Wangaratta Planning Scheme

Environmental Objective / Decision Guideline	Response
Vegetation Protection Overlay – Schedule 1 (VPO1) (*Glenrowan Township Vegetation Protection Area*)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop native vegetation of a height more than 1 m or a distance of more than 5 m from a dwelling or outbuilding.
Extent of Vegetation Impact	Up to 0.312 ha of native vegetation may be impacted within VPO1.
Overview of Works	One enhancement site at Glenrowan and overhead powerline investigation area 1080.
Vegetation protection objectives to be achieved *To conserve, protect, manage, and enhance trees, shrubs and vegetation communities of local landscape and botanical significance.* *To ensure that indigenous trees, shrubs, and vegetation communities are maintained and enhanced as a landscape feature of the Glenrowan township environment*.	• The extent of vegetation impact has been minimised as much as practicable, to conserve and protect trees, shrubs, and vegetation communities of local significance. Further refinement of the extent of vegetation impact will occur at the detailed design phase. • Adjacent patches of Grassy Woodland (Low Rises) and Plains Woodland will be retained to ensure the landscape feature of the Glenrowan township environment is maintained and preserved. • Native vegetation impact will be minimised through a number of avoidance and minimisation actions. This includes the establishment of ecological NGZs and TPZs in order to ensure that indigenous vegetation communities and established vegetation of a height more than 1 m are maintained and remain a key landscape feature of the Glenrowan township. • Overhead powerline investigation area 1080 is just out of the main town centre of Glenrowan, adjacent to the existing rail corridor. Removal of vegetation at this site is minimal and in an area that has undergone previous clearing associated with the rail corridor and adjacent road reserve.

Environmental Objective / Decision Guideline	Response
Decision guidelines *Before deciding on an application to remove, destroy or lop vegetation, the responsible authority must consider:* • *The conservation and enhancement of the area.* • *The benefit of a condition requiring planting, replanting or other treatment of any part of the land.* • The preservation of and the impact on the character of the township.	• Native vegetation in the area will be conserved through avoidance and minimisation actions including the establishment of NGZs, TPZs and PAZs • The restoration and revegetation of areas that are disturbed as part of the construction phase of the Project will be completed at the conclusion of the works. This includes re-planting and re-seeding of disturbed areas with a mix of local native plant species. • The surrounding landscape contains vegetation consistent with that which will be removed, therefore the removal of the required vegetation is unlikely to impact the conservation of the surrounding area or degrade the character of the township. • An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction. Vegetation surrounding the Glenrowan enhancement site and overhead powerline investigation area 1080 within the VPO1 will be protected and managed through implementation of the Project's EMF. • The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals.
Vegetation Protection Overlay – Schedule 2 (VPO2) (*Roadside vegetation of conservation significance*)	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop native vegetation.
Extent of Vegetation Impact	Up to 0.571 ha of native vegetation may be impacted within VPO2.
Overview of Works	Fourteen overhead powerline investigation areas.
Vegetation protection objectives to be achieved *To protect and preserve roadside native vegetation of 'high conservation' significance identified in the 'Rural City of Wangaratta Roadside Conservation Management Plan 2014'.* *Maintain and enhance flora and fauna habitat corridors.*	• Works at overhead powerline investigation areas are contained to existing gaps in the overstorey and are therefore unlikely to impact any roadside native vegetation of high conservation significance, high recreational or high amenity value. • Construction activities will utilise existing access tracks where possible to minimise disturbance to the existing flora and fauna habitat corridors.

Environmental Objective / Decision Guideline	Response
Decision guidelines *Before deciding on a permit application, Council must consider as appropriate:* • *The 'Rural City of Wangaratta Roadside Conservation Management Plan 2014'.* • *Any alternative ways of carrying out the proposed works that would nullify or reduce impacts.* • *The need for replacement compensatory planting and the most appropriate way of implementation.* • *The landscape, recreational and amenity values of the vegetation.* • *The need to protect vegetation from damage and disturbance by mowing, burning, grazing, droving, cultivation, spraying, grading, road formation and drainage works.* • *Pest plant and animal control.* • *Maintaining sight distance and clearance to fixed objects for road or rail safety.* • *Any relevant fire management plan.* • *Any comments of the Department of Environment, Land, Water, and Planning.*	• Works at overhead powerline investigation areas are contained to existing gaps in the overstorey and are therefore unlikely to affect the connectivity of habitat corridors in the area. • The impacted vegetation is largely contained to areas surrounding existing overhead powerlines. • No impacts are anticipated to vegetation that is of high recreational or amenity value, and ongoing maintenance of the area is unlikely to significantly change. • Sight distance and clearance to fixed objects for road and rail safety will not be impacted by the Project, as the proposed works in the VPO2 extent is considered an upgrade of existing infrastructure. • Detailed discussion of mitigation Impacts on existing flora and fauna habitat corridors will be minimised through avoidance and minimisation actions including the establishment of ecological NGZs and TPZs. • An EMF will be prepared for the Project, providing an overarching framework to manage environmental and amenity impacts during construction, including measures for pest plant and animal control. • The EMF will provide a structured approach for monitoring the implementation of a CEMP or equivalent, and other plans required to comply with the EPRs, the Incorporated Document and any statutory approvals. • ARTC is continuing to consult with relevant stakeholders including Wangaratta Council and DELWP, and relevant existing management plans are being considered.

12.3.4 Indigo Planning Scheme

Table 49 Environmental Planning Overlays – Indigo Planning Scheme

Environmental Objective / Decision Guideline	Response
Environmental Significance Overlay – Schedule 3 (ESO3) (*Black Dog Creek)*	
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop any vegetation, including dead vegetation.
Extent of Vegetation Impact	Up to 0.514 ha of native vegetation and 0.839 ha of non-native vegetation may be impacted within ESO3.
Overview of Works	Thirteen overhead powerline investigation areas.
Environmental objectives to be achieved *To maintain the quality of water within the catchment.* *To prevent buildings and works from impeding the flows of water within the Black Dog Creek catchment and maintain its ability to carry natural flows including floods.* *To provide a framework to assist in decisions regarding drainage works within the catchment.*	• The proposed works do not seek to introduce new structures within the overlay. The works include the replacement or modification of existing structures and therefore, the works are not anticipated to impact or impede water flows within the Black Dog Creek catchment. • An EMF will be prepared for the Project which will include EPRs that assist in decisions regarding drainage works within the catchment. • All appropriate catchment authorities have been engaged as part of the Project and ongoing consultation will occur with those organisations.
Decision guidelines *All applications must comply with the North East Catchment Management Authority Guidelines for Drainage Approval Within the Black Dog Creek Improvement District.* • *Before deciding on an application to develop land, the Responsible Authority must consider:* • *Comments of the North East Catchment Management Authority.* • *Specified flood level pursuant to the Australian Model Code for Building.* • *The need to design and construct buildings in accordance with the "Permissible works and structures" section of the report "Flood plain Management in Victoria" prepared by the Australian water Resources Council.* • *The existing drainage pattern of the land and its effectiveness and suitability to cope with any development.* • *The need to retain natural vegetation in the vicinity of streams and watercourses.* • *The need to minimise the effects of increased run-off, erosion, or siltation.*	• The proposed vegetation impact currently reports on the worst-case scenarios. During the detailed design phase, it is anticipated the impacts will be reduced and subsequently, minimise any impact to the quality of water within the catchment where possible. • Construction activities will utilise existing access tracks where possible to minimise disturbance to the existing environment. • The proposed works do not extend into any watercourses and will not have any direct impacts to the ecological vitality and health of watercourses. • The Surface Water Impact Assessment report prepared by AECOM to support this Project concluded that with the appropriate mitigation measures in place, such as flood protection and flood storage, waterway quality and function should be protected from any indirect adverse consequences caused by the construction or operation of the Project.

Environmental Objective / Decision Guideline	Response
• *Comments from the Department of Natural Resources and Environment where any proposed development abuts Crown Land.*	• No new structures are proposed, and the works are considered to be a replacement or modification of existing utilities. • Vegetation in the vicinity of streams and watercourses will not be impacted by the proposed works. • Flood modelling conducted for the Project has determined that no risk of flooding is expected as a result of the overhead powerline works. • Avoidance and minimisation actions such as the establishment of NGZs, TPZs and PAZs, will be used to inform the EPRs to be developed as part of the EMF for the Project. • A requirement to prepare and implement a CEMP will be included as part of the EMF which includes guidance on the best practice installation of sediment and erosion control measures to minimise the effects of increased run-off, erosion, or siltation. • ARTC is undertaking consultation for the entire Project with all relevant stakeholders. The North East CMA is involved in ongoing consultation and will continue to be consulted as the design progresses.

12.3.5 Heritage Overlays

Table 50 Heritage Overlays - Multiple Planning Scheme

Heritage Overlay	Response
Planning Permit Trigger Requirement	A permit is required to remove, destroy, or lop a tree if the schedule to the overlay specifies the heritage place as one where tree controls apply.
Extent of Vegetation Impact	Vegetation to be impacted will be confirmed during the detailed design phase of the Project.
Overview of Works	There are five Heritage Overlays (HOs) across three Councils where tree controls apply: • Benalla Planning Scheme (HO26 and HO60). • Wangaratta (HO8 and HO9). • Mitchell (HO308).
Purpose of the overlay *To implement the Municipal Planning Strategy and the Planning Policy Framework.* *To conserve and enhance heritage places of natural or cultural significance.* *To conserve and enhance those elements which contribute to the significance of heritage places.* *To ensure that development does not adversely affect the significance of heritage places.* *To conserve specified heritage places by allowing a use that would otherwise be prohibited if this will demonstrably assist with the conservation of the significance of the heritage place.*	• The Project seeks to protect, conserve, and enhance historic heritage places wherever works intersect with a heritage overlay, in accordance with Clause 15.03 of the Planning Policy Framework. • The Project has, and will continue to, take the heritage value and character of each site into consideration when progressing construction design and determining associated vegetation impacts. • Heritage assessments are being undertaken to support and inform this process, to minimise adverse impacts of the Project on the heritage character and significance of the Project sites. • Tree removal within heritage overlays will be confirmed during the detailed design phase and avoided wherever possible.
Decision guidelines *Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:* • *The Municipal Planning Strategy and the Planning Policy Framework.* • *The significance of the heritage place and whether the proposal will adversely affect the natural or cultural significance of the place.* • *Any applicable statement of significance (whether or not specified in the schedule to this overlay), heritage study and any applicable conservation policy.* • *Any applicable heritage design guideline specified in the schedule to this overlay.*	• The Project seeks to protect, conserve, and enhance historic heritage places wherever they intersect with the project area, in accordance with Clause 15.03 of the Planning Policy Framework. • Heritage assessments are being undertaken to support and inform the Project and minimise adverse impacts of the Project on the heritage character and significance of the Project sites. These assessments will include a description of the significance of the heritage places and any applicable statement of significance, heritage study or conservation policy. • Tree removal and the impact of works on heritage places within heritage overlays will be confirmed during the detailed design phase and avoided wherever possible.

Heritage Overlay	Response
• *Whether the location, bulk, form, or appearance of the proposed building will adversely affect the significance of the heritage place.* • *Whether the location, bulk, form, and appearance of the proposed building is in keeping with the character and appearance of adjacent buildings and the heritage place.* • *Whether the demolition, removal or external alteration will adversely affect the significance of the heritage place.* • *Whether the proposed works will adversely affect the significance, character, or appearance of the heritage place.* • *Whether the proposed subdivision will adversely affect the significance of the heritage place.* • *Whether the proposed subdivision may result in development which will adversely affect the significance, character, or appearance of the heritage place.* • *Whether the proposed sign will adversely affect the significance, character, or appearance of the heritage place.* • *Whether the lopping or development will adversely affect the health, appearance, or significance of the tree.* • Whether the location, style, size, colour, and materials of the proposed solar energy system will adversely affect the significance, character, or appearance of the heritage place.	• The Project's Incorporated Document includes a condition relating to the preparation of an UDF for the enhancement sites. This condition seeks the enhancement of sites and informs design so it can respond to the existing conditions and character of the site. These guidelines encourage and inform how design can respond to the character and heritage of the surrounding township and enhance the amenity and visual character of the area. • The Incorporated Document includes a specific condition requiring that where a planning permit would normally be required to remove, destroy or lop a tree within an HO where tree controls apply, a report or plan showing the trees to be removed, and measures taken to reduce tree removal must be prepared to the satisfaction of the Minister for Planning.

Chapter 13.0 Consultation

13.0 Consultation

Consultation with the community and key stakeholders has played an important role in developing and shaping the Inland Rail – Beveridge to Albury Project.

ARTC recognises that public participation is key to ensure a successful project outcome. As such, an extensive engagement program with the community and stakeholders with an interest in the Project has been undertaken.

The engagement approach focussed on two areas:

- Targeted engagement with key stakeholders to support the design process.
- Broader engagement to raise awareness of the Project.

This section of the Environment Report identifies key stakeholders and summarises the consultation activities undertaken to date. It also steps out the approach for ongoing engagement during the exhibition of the Environment Report, detailed design, and construction.

A detailed Consultation Report (Nation Partners, 2021) outlining all stakeholder communication activities is provided in Attachment G.

13.1 Consultation Overview

A community and stakeholder engagement strategy was developed to raise awareness, engage with land owners and occupiers whose land is required for the Project, seek feedback from the community and stakeholders regarding design and development of the project and inform the community about relevant approval processes.

Consultation regarding the design of the Project commenced in 2016 and was undertaken in a staged approach which aligned with stages of the design process:

- Stage 1: Concept Assessment: 2016 to 2017
- Stage 2: Reference Design: 2018 to 2022

To date, ARTC has engaged with stakeholders through media and news coverage, conducted 5,391 separate communications initiatives (from phone calls to pop-up information discussion events) and directly engaged with over 8,233 distinct stakeholders. ARTC's social media channels have engaged with over 753,768 people and 32 e-Newsletters have been sent to over 7,000 people with an average open rate of over 40 percent.

13.1.1 Stage 1

Consultation associated with Stage 1 took place from 2016 and continued to 2017. This stage focused on awareness building and introducing the Project to key stakeholders and the wider community. Key Project milestones and benefits were communicated, and ways of obtaining further information and ARTC contact information were promoted.

ARTC used a variety of methods to raise awareness and encourage feedback on the Project. Consultation methods adopted were tailored to the different demographics and communities at each of the enhancement sites.

A comprehensive report on consultation activities conducted in relation to this stage was published to support the Environmental Effects Statement Referral in March 2020. The report described engagement activity performed, and stakeholder feedback elicited during this stage.

13.1.2 Stage 2

Stage 2 of ARTC's consultation began in 2018 and will continue to 2022. Staged engagement activity across the reference design has occurred to enable an iterative approach to the design process and desire for genuine inclusion of collaboration across each step of the design.

Reference guides were tailor-made for individual communities and those communities were invited to have their say on the Project at the enhancement sites, to learn about the Project and its benefits,

promote ways of obtaining information and to understand local community and stakeholder requirements and future aspirations for the enhancement sites.

To support this process, ARTC conducted a large scale mail out, drop-in sessions, doorknocks, public displays, one-on-one phone calls and meetings with stakeholder and Urban Design Framework collaboration sessions. Information was disseminated online via direct emails, the ARTC website, social media channels and an online engagement portal.

13.1.3 Consultation engagement activities

ARTC's targeted engagement activities have focused on reaching key stakeholder groups using a variety of engagement methods. Consultation with the community is detailed in Table 51 and Table 52.

Table 51 Summary of outgoing engagement activities

Outgoing engagement activities
Conducting 126 community information sessions
Attendance to 19 community events to promote awareness of the Project.
A total of 370 meetings held, including meetings with directly impacted residents and business owners, the wider community and meetings with Working Groups (formally run groups made up of key community stakeholders to share project information and obtain local knowledge) (refer below for additional information on the working groups)
A dedicated project page located on the ARTC website providing updates, outlining the scope of the Project and stakeholder and community engagement activities or events. The site provides extensive information about the design in the form of an online social pinpoint interactive map tool.
Advertising in local and state newspapers and local radio to advertise Project and consultation opportunities
213 Doors knocked to provide timely notification to nearby residents of upcoming construction works, the installation of temporary bus stops, expected impacts, travel changes, and provide written information and Project team contact details
6 public displays held at local community venues located along the length of the corridor.
299 letters sent to stakeholders to inform them of the Project and invite public comment
7 SMS sent to provide notification of local area impacts during construction
629 phone calls made to stakeholders inviting discussion regarding the Project
1658 emails sent to stakeholders regarding the Project
Train station and community pop-ups held to provide information to the community regarding the Project
Issuing information and promoting engagement opportunities via the ARTC website and digital and social media campaigns
68 letter mail-outs to properties adjacent enhancement sites along the rail corridor
Advertising and communication materials including community updates and flyers.
7,253 letters sent to stakeholders inviting submissions and feedback on the Project's Planning Scheme Amendment

Table 52 Summary of incoming feedback received

Feedback received
Community information sessions attended by a minimum of 357 community members across the 12 enhancement sites.
146 distinct stakeholders providing feedback or registering their attendance at the community events.
In total, the Project's online consultation hub has received a total of 8,175 visits to the social pinpoint interactive map tool and received 21 comments.
34 letters received from stakeholders regarding the Project
7 SMS received from stakeholders regarding the Project
323 phone calls received from stakeholders for discussion regarding the Project
1054 emails received from stakeholders regarding the Project
216 submissions received from stakeholders during the Projects Planning Scheme Amendment consultation period

Working Groups

Two community working groups have been established, based in Euroa and Benalla following strong interest in the Project from these communities. The purpose of the working group is to:

- Facilitate broader community involvement in the Project.
- Capture local knowledge, issues, concerns, and opportunities.
- Increase project understanding and awareness.
- Coordinate response to community feedback.

The working groups are made up of 12 members, two representatives from local council, and a mixture of local residents and community group representatives. The working group members and their representation (i.e., individual, council, etc.) are listed publicly on the ARTC website.

Working group meetings are held regularly, as determined by the members. While the meetings are closed to the public, the meeting minutes and presentations are published on the ARTC website once finalised.

13.2 Council engagement and feedback

The Project traverses the municipalities of Whittlesea, Mitchell, Indigo, Strathbogie, Benalla, Wangaratta, and Wodonga. These local governments have been key stakeholder for the Project since inception.

ARTC has worked to understand local municipality priorities through workshops, council officer working groups, councillor, and council leadership briefings and meetings. Councils have provided feedback regarding the Project and specific design options, which are summarised by key themes in the Draft Consultation Report that is being prepared to support the PSA.

Council feedback regarding the Project has generally been focused around the following themes:

- Project benefits and extent of community benefit.
- Design matters including the high-level design options, extent of the Project boundary, impacts to heritage, road design and operational vehicle speeds, pedestrian access, cycling access, safety, visual amenity concerns, DDA compliance, and extent of land acquisition.
- Construction matters including environmental impacts, timing, noise, amenity, dust, and traffic management.

13.3 Key agency engagement and feedback

ARTC also consulted with the following agencies, regulatory and approval authorities regarding the Project and design development:

- DELWP
- DoT
- Department of Jobs, Precincts and Regions
- DAWE
- EPA Victoria
- Regional Development Victoria – Hume
- Victorian Planning Authority
- Transport for Victoria
- VicRoads
- Public Transport Victoria
- VicTrack
- Major Transport Infrastructure Authority
- Rail Projects Victoria
- Heritage Victoria
- Office of the Victorian Government Architect
- Aboriginal Victoria
- Yorta Yorta Nation Aboriginal Corporation
- Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation
- Taungurung Land and Water Aboriginal Corporation
- Goulburn Broken Catchment Management Authority
- North East Catchment Management Authority
- Country Fire Authority
- Victoria Police
- Ambulance Victoria
- Fire Rescue Victoria
- Goulburn Valley Water
- State Emergency Service (**SES**)
- Rail Freight Alliance
- Ovens Murray Regional Partnership
- Goulburn Regional Partnership
- V/Line
- Metro Trains Melbourne
- Dyson Bus Lines
- Benalla Bus Lines

- VOCUS
- Utility Services Authority

13.4 Consultation with Landowners and Occupiers affected by temporary occupation and land acquisition

Landowners and occupiers whose land is proposed to be temporarily occupied or permanently acquired as part of the Project have been contacted directly and consultation with them remains ongoing. Details of the Project and a thorough explanation of the relevant acquisition processes have been provided to all relevant landowners and occupiers.

13.5 Stakeholder feedback

The most common themes and sub themes that were identified when collecting community feedback are summarised in Table 53.

Table 53 Categories of themes and matters identified

Theme	Sub-theme
Engagement	• Career opportunities • Community consultative committees • Consultation process • General Inland Rail Programme • Project Approvals • Route Selection • Sponsorship • Supplier/contractor opportunities • Timing of Activities
Environment	• Air quality (dust, health concerns and odour) • Biodiversity / Flora and Fauna (offsets, endangered species, field surveys, pest control, rehabilitation and weed control) • Sustainability (use of coal, impacts on climate change) • Environmental management • Environmental and planning approvals • Land pollution, sediment, and erosion • Light • Noise and vibration • Impacts to Parks and public facilities • Waste, salvage, and recycling • Contamination • Water (discharge, ground water contamination, water licences, drainage, flooding, ground water and surface water quality)
Heritage / Native Title	• Indigenous heritage • Non-indigenous heritage

Theme	Sub-theme
Inland Rail Project Justification	• Alignment • Coal transport • Economic benefit to the region • Economic costs to the region • Program funding • Project approvals • Project justification • Project timeframe
Project components and design	• Project legacy • Access points • Access to waterways • Changes to loading zones • Connectivity • Construction staging • Construction compound / laydown areas • Construction lighting • Construction start • Construction / work hours • Design • Field investigations • Haulage routes • Out of hours works • Parking impacts • Pedestrian / cycling impacts • Tree trimming and removal • Workforce accommodation
Property impacts	• Easements • Fences/gates • Impacts to agricultural activities • Land acquisition • Lease requests • Livestock • Perceived impacts to property value • Property access • Property compensation • Property damage • Property rehabilitation • Rubbish and illegal dumping • Stock routes
Safety	• Construction safety • Crew behaviour • Reporting hazards • Signage

Theme	Sub-theme
Socio-economic	• Alternative accommodation • Change to social amenity • Employment opportunities • Impacts on businesses / trade loss • Initiatives supporting community • Social benefit • Social cost
Traffic and transport	• Level crossings • ARTC truck movements • Traffic impacts / damage to local roads during construction • Traffic impacts – operation • Traffic management • Traffic safety
Visual and urban amenity	• Visual amenity

13.6 Project Response to Consultation

Consultation with the community and key stakeholders for the Project remains ongoing. ARTC has considered all feedback and submissions received thus far throughout the consultation process for the Project.

- **If not relevant to the project** (e.g. query relating to a different project), the query is recorded, tagged to the relevant part of the Project, and forwarded via email to a representative of the relevant ARTC project (or external agency where relevant).
- **If relevant to existing operational or maintenance aspects of the project corridor** (e.g. grass cutting or operational noise) the query is recorded, tagged to Project operations, and forwarded via email to a representative of the operations / maintenance team for action (or external agency where relevant).
- **Where the feedback or query relates to project design** – the query is forwarded to the regional Stakeholder Engagement lead for handling.
    - The Stakeholder Engagement Lead is then required to contact the enquirer to record their feedback and / or resolve the query including providing any relevant information and the query is recorded in a project database.
    - Feedback records are then fed into the design development process via regular internal working groups which receive stakeholder queries and seek to incorporate them into the Project's design change management process.

At the commencement of each design and consultation stage, information materials such as newsletters and media releases provide summary information on how feedback to date has been incorporated into the current design and individual stakeholders are verbally advised on how their specific feedback has been considered and incorporated into the design by the regional Stakeholder Engagement Lead.

13.7 Planning Scheme Amendment Consultation Exhibition Period

As part of the PSA process the community and other interested parties were given an opportunity to provide feedback about the Project or the proposed PSA during a consultation exhibition period.

Consultation exhibition of the draft Incorporated Document, explanatory report, map book, and project reference guides occurred between 19 April to 17 May 2021. A total of 7,453 residents within 250 m of the project area were notified via mail on 9 April to ensure that the letters reached them before the exhibition period opened.

As a result of the consultation exhibition period ARTC received 216 submissions. These submissions are currently being reviewed and summarised into key themes. Following the collation of all submissions a submission response report will be prepared to support the PSA and will be provided to the Minister for Planning.

13.8 Environment Report Consultation

This Environment Report will be subject to an additional consultation process to ensure that the views and considerations of interested parties are received and responded to in a comprehensive and appropriate format. This will occur in the form of public exhibition and will provide key stakeholders and the community another opportunity to provide feedback to the Project and respond directly to the findings of this report.

The Environment Report for the Project will be on public exhibition for 14 calendar days. Written submissions on any matters described in the Environment Report can be made during this time.

The Environment Report document and instructions on how to provide submissions will be available online at www.inlandrail.com.au/T2A.

Making a submission

Submissions on the Inland Rail – Beveridge to Albury Environment Report must be made in writing and received by the last day of the exhibition period. Online submissions are preferred and can be lodged via www.inlandrail.com.au/T2A.

Post-exhibition process

After the two-week exhibition period, all public submissions received will be reviewed and an addendum report will be prepared to address submissions raised during the public exhibition period.

Following this, both the Environment Report, and Environment Report Addendum will be submitted to the Minister for Planning for assessment.

The Minister's Assessment must be considered by relevant Victorian statutory decision-makers responsible for determining key approvals for the Project.

The Commonwealth Minister for the Environment must also consider the Victorian Minister's assessment before deciding whether to grant approvals under the EPBC Act, and if so under what conditions.

13.9 Ongoing Engagement

Further to Stage 1 and 2 (described above), Stage 3 (Detailed Design) will involve engagement once the Project has transitioned into delivery. The community will continue to receive frequent updates about progress, disruptions, and milestones. The tool utilised for the predecessor stages will be applied to continue active engagement.

Where applicable, targeted engagement for specific aspects of the Project has occurred or is planned. For example, road access arrangements with emergency service providers.

Chapter 14.0 Social and Economic Impact Assessment

14.0 Social and Economic Impact Assessment

Social and economic impacts have been considered with a view to maximising the benefits to local communities and effectively managing potential impacts.

A Social Impact Baseline Assessment and Economic Impact Assessment have been prepared for the Project to assist in identification, analysis, assessment, management, and monitoring of both the positive and negative impacts. Impacts can affect individuals and their communities at all stages of the project lifecycle.

14.1 Social Impact Baseline Assessment

The Social Impact Baseline Assessment (Attachment H) undertaken for the Project used a risk-based approach to evaluate the likelihood and consequence of potential impacts of the Project on adjacent communities (AECOM, 2021e).

The findings of the socio-economic analysis indicate that the two LGAs at either end of the project area (Mitchell and Wodonga) contain a younger population, more families, more children, higher educational attainment, higher household incomes and lower socio-economic disadvantage compared to the central LGAs (although there are a few exceptions, such as Indigo LGA). The regions within the project area recorded higher employment levels than the Victorian average.

Potential social impacts during the construction phase include a loss of amenity, increase in demand for short term accommodation, impacts on heritage, changes in travel patterns and concern that the community will become disengaged from over-consultation. The Project is anticipated to generate employment opportunities with an expected 30 – 65 workers for each enhancement site (with a peak construction workforce potentially increasing to 110 during shutdowns). During the operational phase, the enhancement projects are anticipated to deliver improved access across the rail corridor through improved pedestrian access at Wangaratta Precinct and at the Hamilton Street, Broadford bridge in particular.

Continued stakeholder engagement will be essential to ensure communities and businesses are aware of the construction schedule with long lead times to plan for potential impacts and capture the benefits from the Project.

The Social Impact Management Plan (**SIMP**) provides a tailored approach to the future management and monitoring of social impacts as the Project moves from the approvals phase through construction and into operations.

The five action plans which form the SIMP have been developed to guide the mitigation and management actions to ensure a consistent approach to management and monitoring of social impacts and benefits. The five action plan categories are workforce management, housing and accommodation, local business and industry procurement, health and community wellbeing, and community and stakeholder engagement. Monitoring and reporting on the implementation of the SIMP by responsible parties will be essential over the life of the Project.

14.2 Economic Impact Assessment

A Review of Environmental Factors was undertaken by KPMG (KPMG, 2021b) to inform the economic impacts of the Project. This assessment focussed on both the potential impacts and benefits generated by the Project on adjacent communities in the eight LGAs the Project traverses across Victoria and NSW (Albury only). The below results include assessment of the Albury LGA; however, it should be noted no works are proposed to be undertaken within this LGA. Unless specified, all data was sourced from the 2016 Census of Population and Housing.

The findings of the assessment indicate that the unemployment rate across the eight LGAs in the December 2020 quarter was 6.1%, with Whittlesea representing the highest unemployment rate of 7.8% and Indigo the lowest at 2.1% (this average is broadly representative of Victoria (6.3%) and NSW (6.2%)). Labour market conditions declined over the 24 months to December 2020, as the unemployment rate increased to 6.1% in December 2020 from 5.4% in December 2018, after a minimum of 4.8% in December 2019. There was a significant increase in unemployment rate in the

LGAs closest to Melbourne over this 24-month period (Whittlesea [2.4% increase] and Mitchell [1.1% increase]). In contrast, the unemployment rate increased in Albury over the 24 months to December 2020, even though the LGA has the second highest unemployment rate in the study area. As Albury is in NSW, it was excluded from Victorian COVID-19 lockdown in late 2020, which contributed to worsening unemployment across the other LGAs. Unemployment rates peaked in June and August 2020 (Victoria, 7.1%) and July 2020 (NSW, 7.1%), reflective of the impact from the COVID-19 health crisis.

The youth (15 – 25 years old) unemployment rate (14.1%) is more than double the total average across the area (ABS, 2020). The eight LGAs have an above average Indigenous population (1.4% of residents identify as Aboriginal and/or Torres Strait Islander) compared to Victoria (0.8%), with the average Indigenous unemployment rate (15.2%) more than double that of the eight LGAs (6.5%). Indigenous Australians are inadequately represented in the workforce and the participation rate for Indigenous people in the eight LGAs is 56.7%, which is lower compared to 60.1% for the total population of the eight LGAs. Similarly, the Indigenous unemployment rate is 15.2%, which is more than double the unemployment rate across the eight LGAs (6.5%).

Despite the surrounding landscape being mainly open agricultural grassland, the majority of employment reflects urban industries (e.g. health care and social, retail trade and education assistance) rather than rural industries (e.g. agriculture, forestry, and fishing) driven by larger populations of the regional towns within the LGAs. The highest proportion of jobs is in service-based industries such as health care and social assistance (15.2%), retail trade (11.8%), and manufacturing (10.5%). Of the total workforce, 8% were employed in the construction industry, with the largest proportion in construction services, building construction and heavy and civil engineering construction, all occupations that can directly support the construction of the Project. There is a small representation of construction businesses across the eight LGAs, with a total of 2,893 employing businesses and a further 4,804 non-employing businesses (ABS, 2021). Local construction businesses and the nearby Lima South Quarry may have capacity to engage with the Project's construction.

The Australian Industry Group Construction Outlook (November 2018) found that, at a national level, businesses are reporting widespread and increasing difficulties in sourcing skilled labour, and that construction companies are forecasting strong growth in major project work. The results indicate 69.2% of respondents, up from 66.7% six months prior, reported either 'major' or 'moderate' difficulty in recruiting skilled labour in the six months to September 2018. With workforce demand expected to continue at high levels in line with major project activity, labour sourcing difficulties are expected to remain. According to the survey, labour supply constraints are being reflected in rising input costs which is exerting ongoing pressure on profit margins and increasing the total cost of project delivery. Shortages in labour availability is most likely for specific trades requiring specialist skills (AiGroup, 2018).

Generally, local traders and business may benefit from the Project's construction materials and services requirements, as ARTC intends to ensure that local, regional, and Indigenous businesses will have opportunity to supply the Project with materials and services. As the Project's land requirement is confined to the existing rail corridor, the Project is not expected to result in adverse or long-term impacts upon local business due to changes in land use, rural land viability, access, or amenity. Any temporary changes in amenity or access disruptions will be minimised as far as is practical through consultation and mitigation measures. Additionally, the broader Inland Rail program will have a strong contribution to regional economic development, improve freight network linkages, access to and from regional markets, reduce rail costs and increase certainty for fright travelling between Melbourne and Brisbane.

ARTC has established the Inland Rail Skills Academy to create opportunities for education, training, skills development, and employment for communities along the Inland Rail alignment. This program will result in an increase of skilled local workers and enhance local employment opportunities. ARTC have also prepared the Inland Rail – Australian Industry Participation Plan (**IR AIPP**), describing how ARTC and its contractors will provide fair employment opportunities, identifying local and Indigenous businesses to supply the Project and setting targets to ensure utilisation of local resources.

Mitigation and management measures for economic impacts include:

- Early identification of people with employment potential to ensure training requirements are up to date for their inclusion in the Project's delivery. This is supported and achieved through the implementation of the Inland Rail Skills Academy discussed above
- IR AIPP (discussed above) which describes how ARTC and its contractors will provide fair employment opportunities, identifying local and Indigenous businesses to supply the Project and setting targets within the Social Delivery Plan to ensure utilisation of local resources. This includes:
  - Preparation of a project specific industry participation plan which identifies how the contractor will comply with the IR AIPP, Australian Government Indigenous Procurement Policy, and Inland Rail Sustainable Procurement Policy, and proposes targets for procurement with local and Indigenous business
  - Reporting to ARTC on local and Indigenous business participation, including achievements against targets
  - Ongoing stakeholder and community engagement to support the proactive management of potential impacts and to maximise the socio-economic benefits of the Project

The Economic Benefits Assessment for the Project (KPMG, 2021a) (Attachment I) estimates that the majority of the economic benefit of the Project will be generated by improved freight availability, as well as freight time travel savings, operating cost savings, and improved reliability of the network.

14.3 Short term impacts

The potential short-term impacts of the Project are outlined in Table 54. It is important to note the impacts listed below can likely be effectively mitigated or managed to reduce negative impacts or enhance positive impacts as the detailed design and implementation phases of the Project progress.

Table 54 Potential short term social and economic impacts

Social	Economic
During the construction phase: • Negative amenity impacts due to construction disturbance (noise, dust vibration, etc) impacting the health and wellbeing of local communities (i.e. agitation, and mental health impacts). • Local businesses experience flow on benefits from the construction workforce (i.e. accommodation providers, cafes, etc.). • Local community experience restricted access to social infrastructure (i.e. recreation facilities) due to road closures during construction. • Local community experience restricted or delayed access to emergency services due to road closures during construction. • Impacts on travel patterns, vehicle access or behaviours relating to pedestrians or those using prams or mobility scooters due to traffic detours during construction.	During the construction phase: • Significant construction materials and services requirements which may provide local businesses with the opportunity to supply the proposal. • The following services may be sourced from within local or regional communities: • Fencing • Electrical installation (excluding rail systems) and instrumentation • Rehabilitation and landscaping • Trade services • Professional services (e.g. human resources) • Community adaptation to the rail corridor (e.g. community and economic development services) • Employment and upskilling opportunities for the general population, including youth and Indigenous community members

Social	Economic
• Change to the demographic profile of local townships during construction leading to an "us and them" feel within the community (peak construction workforce estimated to potentially increase to 110 people during enhancement site occupations). • Potential need to remove the community garden in Wandong for the duration of construction, impacting the activities of people who use the garden. • Experience of 'Consultation Fatigue' from the community due to extensive consultation on the Inland Rail – Beveridge to Albury Project and on the North East Rail Line Upgrade.	

14.4 Long term impacts

The potential long-term impacts are outlined in Table 55. It is important to note the impacts shown below can likely be effectively mitigated or managed to reduce negative impacts or enhance positive impacts as the detailed design and implementation phases of the Project progress.

Table 55 Potential long term social and economic impacts

Social	Economic
During the operation phase: • Increased pedestrian and cycling movements in locations where bridge replacement works result in additional walking and cycling infrastructure. • Upskilling opportunities for the general population, including youth and Indigenous community members, improving long-term employment opportunities for future projects in the area. • Positive visual amenity impacts due to new, modern bridges (that replaced the older bridges without adequate clearance) and station upgrades leading to revitalised public areas from an urban design perspective. • Increase in noise levels at Wangaratta Precinct above the assessment criteria (without mitigation), resulting in negative amenity impacts.	During the operation phase: • No adverse long-term impacts are expected on local businesses or industry due to changes in land use, the viability of rural land or access. • The proposal is part of the broader Inland Rail programme which will have a strong contribution to regional economic development. As detailed in the Inland Rail Programme Business Case (2015a,b), Inland Rail will: – Improve linkages and reduce distances travelled within the national freight network – Improve access to and from regional markets – Reduce rail costs, improve reliability, and provide greater certainty for freight travelling between Melbourne and Brisbane • Improved business efficiencies due to improvements in the supply of goods and services associated with a decrease in transit time between Melbourne and Brisbane. • The Project will be a catalyst for complementary supply chain investments, including fleet upgrades, new metropolitan and regional terminals and integrated freight precincts, as well as the potential for creation of new and expanded regional industries, including rail based warehousing and associated freight precincts.

Chapter 15.0 Conclusion

15.0 Conclusion

The following chapter provides the conclusion to the Inland Rail Beveridge to Albury Environment Report. The key risks and opportunities for the project are summarised, and an overview of how the assessments and the report have sought to satisfy the scoping requirements is provided.

The Inland Rail – Beveridge to Albury aims to enable the use of double-stacked freight trains between Melbourne and Brisbane including a critical pathway through regional Victoria. The Victorian portion of the Project is the focus of this assessment. Inland Rail will transform the way we move freight around the country, connect regional Australia to its markets more efficiently, drive substantial cost savings for producers and consumers, and deliver significant economic benefits.

Preparation of this Environment Report (ER) is a requirement of the Project under the Victorian *Environment Effects Act 1978* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* Assessment of the Project and this Environment Report is being undertaken by the Victorian State Government under the Bilateral (Assessment) Agreement 2014 to avoid process duplication and enable integrated and efficient consideration of relevant Commonwealth and Victorian government matters.

The purpose of this Environment Report is to clearly articulate the positive and negative impacts of the Project on the environment and on the communities through which this project will pass. In completing this ER, and in undertaking the technical assessments that underpin its findings, the Project has sought to satisfy the scoping requirements, and to provide appropriate mitigation measures that will inform the Environmental Performance Requirements (EPRs).

Reference Design

This ER assesses the impacts of the Reference Design that has been developed for the Project. Whilst this Reference Design provides evidence of a feasible approach to constructing and delivering the Project, it is subject to ongoing refinement. It is anticipated, particularly with respect to native vegetation clearance, that the overall ecological impacts will reduce considerably as the detailed design process progresses and construction methodologies are refined to incorporate avoidance measures.

The mitigation measures outline the particular ecological values that the construction of the Project should prioritise for avoidance and minimisation. These mitigation measures have been structured in such a way that they can be readily translated into tangible EPRs that will be a key feature of the Project's Environmental Management Framework (EMF). This application of the EMF and adherence to it will be a contractual requirement during the construction of the Project

Scoping requirements

This ER details the findings of the technical assessments that have been developed in response to the scoping requirements that were set out by the Victorian Minster for Planning in conjunction with the Commonwealth under the Bilateral (Assessment) Agreement 2014. Addressing the scoping requirements provides a basis by which the regulators can assess the acceptability of the environmental impact of the Project.

The findings of the technical assessments against the expectations of the scoping requirements are provided below. Note that the first four requirements for the scoping document detail the regulatory framework for the assessment, the expected formatting and style of the report, and the project description.

Description of the environment and potential impacts

Comprehensive ecological assessments have been undertaken for the Project. Detailed technical studies led to referral of the Project under the EE Act and EPBC Act, and further studies have provided an impact assessment against the Reference Design for the Project.

An investigation area for the Project was adopted and assessed, providing existing ecological conditions at each of the enhancement site, track slew, signal gantry, and overhead powerline locations. The investigation area allowed for the documentation of ecological values immediately adjacent to (but outside of) any areas proposed for disturbance, providing a comprehensive

assessment of all threatened species, communities and threatening processes that exist within the proximity to the works.

The Project generally occurs within a highly modified environment of cleared agricultural land; however, despite a longer-term disturbance history, remnant native vegetation and habitat values persist.

The ecological assessment revealed the presence of three MNES within the investigation area-

- Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands (GBGW) – listed as endangered under the EPBC Act.
- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived Native Grassland (WBYBBRGGW) – listed as critically endangered under the EPBC Act.
- Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP) – listed as Critically Endangered under the EPBC Act.

Fourteen species listed as threatened under the EPBC Act were identified as having the potential to occur within project area – six flora species and eight fauna species. Twelve of those species are also listed under State legislation. Detailed field assessment recorded only two threatened flora species.

A total of 411 patches of remnant vegetation, with a combined extent of 216.619 ha were recorded within the investigation area. 1,015 trees (both Scattered Trees and Large Trees in Patches) have been recorded, and it has been estimated that of these trees, approximately 716 of them are hollow bearing.

The FFG-Act listed Victorian Temperate Woodland Bird Community (VTWBC) and Western (Basalt) Plains Grassland Community (WBPGC) occur in the ecological assessment investigation area. Victorian Lowland Riverine Fish Community of the Southern Murray-Darling Basin (LRFCSMDB) may also be present. In addition to species listed as MNES under the EPBC Act, several flora and fauna species listed under the FFG Act or listed as a VROT in Victoria have a moderate to high likelihood of occurrence in the investigation area. Species that have been recorded, or that are highly likely to occur include Buloke, Glaucous Flax-lily, Late-flower Flax-lily, Cottony Cassinia, Basalt Podolepis, Golden Cowslips, Barking Owl, Brush-tailed Phascogale, and Squirrel Glider. In addition, suitable habitat is present within and adjacent to the investigation area for Purple Diuris, Brown Toadlet, and woodland birds

Details of proposed avoidance and mitigation measures and alternatives considered

The Project has sought to reduce potential impacts during development of the Reference Design and through commitments to be captured through EPRs and, as detailed in this report, will continue to seek opportunities to avoid or minimise impacts to areas of ecological value during detailed design.

The Project has applied the mitigation hierarchy outlined in the scoping document to avoid impacts where possible, to develop, prepare, and implement project-specific measures that reduce impacts to acceptable levels, to rehabilitate disturbed land during and after construction, and then offset any remaining residual impacts.

Implementation of these measures and preparing a Reference Design that is sensitive to the ecological values within the investigations area has meant that the Project has effectively reduced impacts to native vegetation. Detailed project design and the refinement of construction methodologies will result in further avoidance of impacts to native vegetation as the design is progressed.

The Project is committed to implementing additional measures to further mitigate ecological impacts beyond the consideration of ecological values during the design.

A key mitigation through which the avoid and minimise principals will be adopted for the project is through the delineation of Priority Avoidance Zones (PAZs) to inform detailed design and No-Go Zones (NGZs) to protect values during construction. The Project design will be subject to continuing refinement advised by the PAZs, and the determination of location and extent of the NGZs will be based on a final design. NGZs will be a key component of the EMF for the project and will be detailed in the Flora and Fauna Management Plan.

The works necessary for the track slews and signal gantry replacements have been designed so that they are conducted from the rail line and are able to utilise existing formed access tracks.

The Project will reinstate areas where temporary, minor disturbance occurs during construction. Opportunities for revegetation and to replace hollows will be developed in consultation with regulators to optimise the benefits for biodiversity in the region. ARTC have developed a Landscape and Rehabilitation Strategy (ARTC, 2021) for the Inland Rail Project that provides a commitment to employing landscape and rehabilitation treatment solutions for all stages of the Inland Rail program.

Actions the Project will implement to minimise and mitigate impacts will be used to inform the EPRs that will be developed as part of the EMF for the Project. The Project will engage a Design and Construction Contractor who will be responsible for ensuring compliance with the EPRs developed.

Social and economic

Social and Economic Impact Assessments have been prepared for the Project to assist in identification, analysis, assessment, management, and monitoring of both the positive and negative effects, which may manifest at all stages of the Project lifecycle.

Potential impacts during the construction phase include a loss of amenity, increase in demand for short term accommodation, impacts on heritage, changes in travel patterns, and concern the community will become disengaged from over-consultation. However, the Project is anticipated to generate employment opportunities, including jobs for 30 – 65 people respectively per enhancement site (with a peak construction workforce potentially increasing to 110 people during shutdowns). During the operational phase, the enhancement projects are anticipated to deliver improved access across the rail corridor through improved pedestrian access at Wangaratta Precinct and Hamilton Street, Broadford bridge in particular.

Continued stakeholder engagement will be essential to ensure communities and businesses are aware of the construction schedule with long lead times to plan for potential impacts and capture the benefits from the Project.

From an economic perspective, local traders and businesses may benefit from the Project's construction materials and services requirements, with ARTC intending to ensure the local provision of materials and services. As the Project's land requirement will be largely confined to the existing rail corridor, adverse or long-term impacts upon local business due to changes in land use is unlikely. By its very nature, the Inland Rail program will have a strong contribution to regional economic development, improve freight network linkages, access to and from regional markets, reduce rail costs, and increase certainty for freight travelling between Melbourne and Brisbane.

ARTC has established the Inland Rail Skills Academy to create opportunities for education, training, skills development, and employment for communities along the Inland Rail alignment. This program will result in an increase of skilled local workers and enhance local employment opportunities.

Residual impacts and offsets

Residual impacts

Avoidance and mitigation have materially decreased the potential impact of the Project. Impacts are referred to as residual (or actual) when mitigation measures cannot effectively avoid all disturbance.

Land clearance associated with construction will result in the loss of areas of native vegetation synonymous with TECs listed under the EPBC Act. The residual impacts to communities of national significance encompasses the removal of up to 6.334 ha of GBGW and 0.624 ha of WBYBBRGGW. Impacts to NTGVVP have been avoided. Impacts to GBGW were considered to be significant. Following advice from DAWE, impacts to WBYBBRGGW were not considered to be significant.

Avoidance and minimisation measures have meant that significant impacts to all EPBC Act listed threatened species that are considered to have the potential to occur (and for the two species that are known to occur) have been avoided.

The Project may directly remove 4.387 ha of VTWBC. A further 6.899 ha occurs within 15 m of the Reference Design area and has been included as a potential residual impact. The likelihood that all the community within the 15 m buffer of the Reference Design area is very low, and it is expected that a significant reduction in this area will be achieved following the finalisation of the detailed design. The remaining two FFG Act-listed communities (WBPGC and LRFCSMDB) will not be impacted.

Residual impacts to native vegetation include, but are not limited to, approximately 24 ha of native vegetation, 82 Large Trees in Patches, and 131 Scattered Trees (of which 48 are large).

The Project will also still impact on threatened flora and fauna species through vegetation clearance, loss of hollow-bearing trees and the associated risks to fauna occupying habitat as it is cleared (injury, death, or displacement). Potential disruption to habitat connectivity has been reduced but not entirely avoided by the Project.

Offsets

State

Removal of native vegetation will be offset through general habitat units in accordance with Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a) which is an Incorporated Document within the Victoria Planning Provisions under Clause 52.17 (Native Vegetation).

The Project triggers general offsets owing to the removal of 29.203 ha (includes patches of native vegetation and Scattered Trees) of native vegetation during construction of the Project. It is expected that the magnitude of impacts will be reduced by a considerable extent through the detailed design process and through adoption of construction methodologies on a site by site basis.

A total of 15.821 General Habitat Units, with a minimum strategic biodiversity score of 0.487, will need to be offset. No Species Habitat Units are required to be offset based on the Reference Design assessment. A total of 130 large trees are also required to be offset.

DELWP's Native Vegetation Credit Register has identified five sites which meet the Projects' State offset requirements.

EPBC Act offsets

The project will compensate for the 6.334 ha significant residual impact to the GBGW community.

A draft EPBC Act Offset Strategy has been prepared outlining a proposed offset that meets the requirements of the Project and the EPBC Act Environmental Offset Policy. The offset will be achieved through a third-party provider and a memorandum of understanding is currently being drafted to be signed by ARTC and the offset provider to commit the offset provider to holding these offsets specifically for the Inland Rail project. This will ensure that these offsets remain reserved for the project until such time as they are ratified through a security agreement with the Secretary to DELWP under Section 69 of the *Conservation Forests and Lands Act 1987* (a Section 69 agreement).

The EPBC Act Offset Strategy will be finalised in consultation with DAWE and an Offset Management Plan will be prepared in consultation with the landowner who has extensive experience in ecological restoration.

Cumulative impacts

The Cumulative Impact Assessment identified three projects that warranted inclusion in the assessment- the Shepparton Rail Line Upgrade, the North East Rail Line, and the proposed Beveridge Intermodal Freight Terminal. The lack of availability of reliable removal data meant that the CIA was undertaken using a qualitative assessment of impacts. The ecological values where impacts occurred across more than one project included three threatened ecological communities (GBGW, WBYBBGRGW, and VTWBC), one threatened flora species, six threatened fauna species, and woodland birds. It also may result in impacts to:

- 66.272 ha of patches of native vegetation
- 301 Large Trees in Patches
- 234 Scattered Trees

As a result of the projects there will be a material impact on the flora and fauna species that are dependent on native vegetation as habitat resource within the regional landscape. This may represent a large loss of habitat features such as nesting hollows, roosting and foraging resources, lead to an increase in fragmentation and edge effects on existing patches of vegetation, and the reduction in connectivity across the landscape. Without specific removal information however, it is difficult to ascertain exactly how much loss occurs within the spatial extent of the CIA (10 km from the project area) and what the significance of these impacts are.

Other approvals and conditions

Planning & Environment Act 1987

An amendment to the Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, and Wodonga Planning Schemes (the Planning Schemes) is currently being prepared for the Project (the Amendment). The Amendment proposes to introduce the '*Inland Rail – Beveridge to Albury April 2021'* Incorporated Document into the Planning Schemes to facilitate the use and development of the project area for the purpose of the Project (excluding overhead powerline replacement works outside enhancement sites). The Incorporated Document is the key planning approval for the Project and will allow works to proceed alongside the approval of this Environment Report and the EMF.

Aboriginal Heritage Act 2006

Sections of the project area are located within areas of Aboriginal cultural heritage sensitivity due to the presence of registered cultural heritage places and named waterways as defined in the *Aboriginal Heritage Regulations 2007* (Vic). Given the spatial extent of the Project, four CHMP's are currently being prepared in consultation with Aboriginal Victoria, the Yorta Yorta Nation Aboriginal Corporation, the Taungurung Land and Waters Council Aboriginal Corporation, and other Traditional Owner groups.

Given the spatial extent of the Project, four CHMP's are currently being prepared in consultation with Aboriginal Victoria, the Yorta Yorta Nation Aboriginal Corporation, the Taungurung Land and Waters Council Aboriginal Corporation, and other Traditional Owner groups.

Heritage Act 2017

Under the *Heritage Act 2017*, works within the registered extent of places listed on the Victorian Heritage Register or Victorian Heritage Inventory will require consultation with Heritage Victoria and permits or consents (or exemptions from permits or consents) under the *Heritage Act 2017* (Vic).

Two permit applications are currently being prepared in consultation with Heritage Victoria for Project works located within the Glenrowan Heritage Precinct (H2000) and the Wangaratta Railway Station Complex (H1597).

Other Relevant Legislation and Approvals

In addition, the following legislation is of relevance to the key and secondary approval requirements, and processes for the Project:

- *Transport Integration Act 2010* (Vic)
- *Major Transport Projects Facilitation Act 2009* (Vic)
- *Flora and Fauna Guarantee Act 1988* (Vic)
- *Wildlife Act 1975* (Vic)
- *Water Act 1989* (Vic)
- *Environment Protection Act 2017* (Vic)

Consultation

Following ARTCs announcement of the Project in 2014, a community and stakeholder engagement strategy was developed to raise awareness, engage with landowners and occupiers whose land is required for the Project, seek feedback from the community and stakeholders regarding design and development of the project and inform the community about relevant approval processes.

Consultation regarding the design of the Project commenced in April and was undertaken in a staged approach which aligned with stages of the design process:

- Stage 1: Concept Design: 27 April 2016 to 23 April 2018
- Stage 2: Reference Design: 24 April 2018 to 31 October 2021
- Stage 2A: Reference Designs at 30% development (early design)

- Stage 2B: Reference Designs at 70% development (progressed designs incorporating stakeholder feedback, including options)
- Stage 2C: Reference Designs at 100% development (refined designs considered to be preferred project solutions).

To date, ARTC has engaged with stakeholders through media and news coverage, conducted 5,057 separate communications initiatives (from phone calls to pop-up information discussion events) and directly engaged with over 4,696 distinct stakeholders. ARTC's social media channels have engaged with over 737,322 people and e-Newsletters have been sent to over 15,449 people with an average open rate of over 42%.

This Environment Report will be subject to an additional consultation process to ensure that the views and considerations of interested parties are received and responded to in a comprehensive and appropriate format. This will occur in the form of public exhibition and will provide key stakeholders and the community another opportunity to provide feedback to the Project and respond directly to the findings of this report.

Environmental record of organisation proposing to undertake the project

There have been no proceedings under a Commonwealth or Victorian law for the protection of the environment or the conservation and sustainable use of natural resources with regards to any of the 13 Inland Rail Projects.

ARTC have been subject to one Commonwealth proceeding, associated with the Western Victoria Track Upgrade Project. In 2011 the Department of Sustainability, Environment, Water, Population and Communities alleged that ARTC's engaged alliance partner was contracted to undertake re-sleepering and associated works, which resulted in the clearing of vegetation protected under the EPBC Act. By acknowledging the activities of the independent contractor engaged by ARTC may have resulted in loss of protected vegetation and complying with the actions outlined in the enforceable undertaking, no further action was taken against ARTC in relation to the incident.

There have been no other Commonwealth proceedings since 2011.

Conclusion

The Project presents a unique opportunity to establish a competitive freight system through the provision of rail infrastructure which supports a network of intermodal terminals and local sidings for the distribution of commodities at the national, regional, and local level.

Foreseeable benefits directly attributed to the broader Inland Rail Program include improved access to and from regional markets, reduced distances travelled and improved sustainability and amenity for the community

Without Inland Rail, the use of the road network will increasingly become the dominant freight transport mode, with rail becoming less relevant. A continued over-reliance on road transport to meet the future freight transportation needs will increase the vulnerabilities to demographic changes that are, even today, driving shortages of long-distance truck drivers and increasing costs.

For a project of the scale and economic significance of Inland Rail, residual environmental impacts are unavoidable. Significant effort has been invested during the preparation of the Reference Design to focus on the complete avoidance of significant ecological values where possible. This has been achieved in a very practical way by committing to protect all occurrences of a number of MNES, most notably Euroa Guinea-flower, Mountain Swainson-pea and Natural Temperate Grassland of the Victorian Volcanic Plain. A significant impact is likely on only one MNES- being Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

For ecological values of state significance, the application of measures to avoid and minimise impacts has avoided the trigger thresholds for impacts to species of state significance, leading to the need to offset only for general habitat units under state policy. Further, it is recognised that as the design is nuanced to respond to additional site constraints and community concerns, the principles of avoid and minimise will drive likely further reductions in the need for vegetation removal, and this is particularly true for the overhead powerline component of the works, where the current adoption of worst case scenarios has significantly over-estimated the potential residual impacts.

Throughout the duration of the construction of the project, the Environmental Management Framework will provide a clear and accountable process to ensure that the environmental effects are monitored and managed in accordance with the mitigation measures outlined in this ER. This EMF will include clear and achievable Environmental Performance Requirements, all of which have been informed by the comprehensive technical assessments that underpin this ER. The EPR's will be performance-based and driven by the fundamental principles of avoidance and minimisation of ecological impacts. The EPR's will also seek to resolve any current uncertainly that exists around the Reference Design by including outcomes that will ensure avoidance of any further impact to the most significant ecological values that exist within the investigation area regardless of the finalised design.

Ultimate compliance of both the EMF and the EPR's within it will be ensured by ARTC through the contractual arrangements with the party selected for delivery of the Beveridge to Albury component of the works. The EMF and EPR's will be a condition of the Projects Incorporated Document and will require subsequent endorsement by the Minister for Planning.

Chapter 16.0 Information Sources

16.0 Information Sources

The information which underpins the findings of this Environment Report is reliable.

The information sources used in preparing this Environment Report included consultant reports prepared by reputable organisations, guidelines and policy documents prepared by the Victorian and Commonwealth Governments, published papers, and books and databases maintained by DELWP and DAWE.

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