

Prepared for  
Australian Rail Track Corporation Ltd  
ABN: 75 081 455 754



# Environment Report

## Attachments

Inland Rail - Beveridge to Albury

# Attachment **B**

Enhancement Sites,  
Track Slews, and  
Signal Gantries -  
Ecology Existing  
Conditions & Impact  
Assessment





# Inland Rail - Beveridge to Albury: Enhancement Sites, Track Slews, and Signal Gantries

Ecology: Existing Conditions & Impact Assessment

12-Jul-2021

Commercial-in-Confidence

# Inland Rail - Beveridge to Albury: Enhancement Sites, Track Slews, and Signal Gantries

Ecology: Existing Conditions & Impact Assessment

Client: Australian Rail Track Corporation Ltd

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## Quality Information

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Signal Gantries

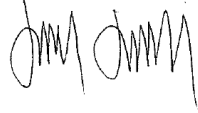


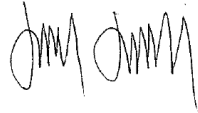
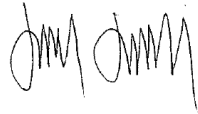
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## Acronyms

Acronym	Description
BCS	Bioregional Conservation Status
CaLP Act	<i>Catchment and Land Protection Act 1994</i>
CR; cr	Critically endangered
CVU	Central Victorian Uplands bioregion of Victoria
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)
DPCD	Department of Planning and Community Development
DSE	Department of Sustainability and Environment (now DELWP)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DAWE)
EE Act	<i>Environment Effects Act 1978</i>
EMP	Ecological Management Plan
En; en	Endangered
EnSym	Environmental Systems Modelling Platform Native Vegetation Regulations Tool managed by DELWP
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
FFMP	Flora and Fauna Management Plan
GBGW	Grey Box ( <i>Eucalyptus macrocarpa</i> ) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
GHU	General Habitat Unit
HHa	Habitat Hectare
HZ	Habitat Zone
IBA	Important Bird Area
IPAC	Invasive Plants and Animals Committee
LRFCSMDB	Lowland Riverine Fish Community of the Southern Murray-Darling Basin
MNES	Matters of National Environmental Significance
NERL	North East Rail Line
NIS	Northern Inland Slopes bioregion of Victoria
nt	Near-threatened

Acronym	Description
NTGVVP	Natural Temperate Grasslands of the Victorian Volcanic Plain
NVIM	Native Vegetation Information Management tool managed by DELWP
NVR	Native Vegetation Removal
P&E Act	<i>Planning and Environment Act 1987</i>
PMST	Protected Matters Search Tool managed by DAWE
SBV	Strategic Biodiversity Value
SHU	Species Habitat Unit
SuMP	Sustainability Management Plan
TEC	Threatened Ecological Community
TSSC	NSW Threatened Species Scientific Committee
r	Rare
VBA	Victorian Biodiversity Atlas
VQA	Vegetation Quality Assessment
VR	Victorian Riverina bioregion of Victoria
VROTS	Species listed as rare or threatened on a DEWLP 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
WoNS	Weeds of National Significance



## Glossary

Term	Explanation
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.
Bioregional Conservation Status (BCS)	An assessment of the conservation status of the native vegetation type (EVC) in the context of a particular bioregion, taking account of how commonly it originally occurred, the current level of depletion and the level of degradation of condition typical of remaining stands.
Bioregion	A landscape-based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology, and vegetation.
CVU	Central Victorian Uplands bioregion
Diameter at Breast Height (DBH)	Circumference of a tree in centimetres measured at 1.3 metres 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	Ecology is the study of the interrelationships between living organisms and their environments.
Exotic vegetation	Any vegetation that is not native to Australia or its States and Territories. This can sometimes include non-indigenous 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: <i>Habitat hectares of patch = extent in hectares x condition multiplier</i> For scattered trees: <i>Habitat hectares of scattered trees = (number of trees x standard extent) x condition multiplier</i> Where: Standard extent is a circle with a 15-metre radius
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.
High threat weed	Introduced species, including native species occurring outside their natural range ('non-indigenous'), with the ability to out-compete and substantially reduce one or more native life forms in the longer term assuming on-going current site characteristics and disturbance regime.
Impact area	Impact area is the term used to describe the area considered for potential impacts of the Project. The impact area is defined by the Reference Design (August 2020) for the Project plus a 15m buffer area for the purpose of identifying values adjacent to the reference design area that could also be impacted by the Project.
Indigenous vegetation	Indigenous vegetation includes vegetation that is native to Australia as well as being native to a specific geographic region.

Term	Explanation
Investigation area	Investigation area is the area assessed for existing ecological conditions at each of the 12 enhancement sites, signal gantries and track slew locations. The investigation area was defined by the project area boundary received in January 2021 plus a 15 m buffer for the purpose of documenting ecological values immediately adjacent to the project area.
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 (JAMBA, CAMBA, ROKAMBA), 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: <i>an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or any mapped wetland included in the Current wetlands map, available in DELWP systems and tools (DELWP, 2017a).</i>
Native vegetation – scattered tree	A scattered tree is defined as: <i>a native canopy tree that does not form part of a patch (DELWP, 2017a).</i> 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 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 metres in height (DELWP, 2018a).
Native vegetation – large tree in patch	A large tree in a patch is: <i>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).</i> 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	A native vegetation offset is 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.
NIS	Northern Inland Slopes bioregion
Non-indigenous vegetation	Vegetation that is native to Australia, but not to the geographic region to which a site is located.

Term	Explanation
Project area	Project area is the term used to collectively describe the package of the 12 enhancement sites, 21 signal gantries, and five track slew upgrades.
Threatened ecological community (TEC)	Threatened ecological communities are ecological communities listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> , the <i>Flora and Fauna Guarantee Act 1988</i> or those communities with a bioregional conservation status of 'endangered' in Victoria
Threatened species	Threatened species are flora and fauna species listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> , the <i>Flora and Fauna Guarantee Act 1988</i> or those species listed as a Victorian Rare or Threatened species (VROT) under the following lists: <ul style="list-style-type: none"> <li>Advisory List of Rare or Threatened Plants in Victoria – 2014 (DEPI, 2014)</li> <li>Advisory List of Threatened Vertebrate Fauna in Victoria – 2013 (DSE, 2013)</li> </ul>
Vegetation Quality Assessment (VQA)	An assessment of vegetation condition undertaken using the Habitat Hectares method as described in the <i>Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method</i> (DSE, 2004a). Individual patches are termed Habitat Zones (HZ) in accordance with DELWP terminology.
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 (DEWLP).
VicRiv	Victorian Riverina bioregion
VVP	Victorian Volcanic Plain bioregion
Weeds of National Significance (WoNS)	The most problematic invasive plant species in Australia as determined by the federal government.

## Executive Summary

Inland Rail is the largest freight rail project in Australia and spans 1,700 km across Victoria, New South Wales, and Queensland. It is divided into 13 individual projects and, once operational, Inland Rail will become part of ARTC's freight rail network which will support Australia's freight supply chain.

This report addresses Stage 1 of the Victorian portion of the Inland Rail project - Beveridge to Albury – which includes a number of discrete sites spread across approximately 230 kilometres from Beveridge (approximately 60 km north of Melbourne) through central and north east Victoria to Albury. This report describes the ecological values and impacts across the Victorian portion of the Inland Rail project. The Project is divided into two packages of works:

- enhancement sites, track slews, and signal gantries
- utility services (overhead powerlines).

The Project has been subject to several preliminary and detailed ecological studies that culminated in the Project being referred to the State Government under the *Environment Effects Act 1978* (EE Act) and to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In August 2020, the Victorian Minister for Planning determined that an Environment Effects Statement (EES) under the EE Act is not required for the Project, provided that the conditions set out in the Notice of Decision could be addressed. A delegate for the Commonwealth Minister for the Environment determined that the Project was a controlled action under the EPBC Act as it is likely to have a significant impact on listed threatened species and communities which are Matters of National Environmental Significance (MNES) and hence are protected under the EPBC Act.

An Environment Report is being prepared to meet assessment requirements set out by the Victorian Minister for Planning under the EE Act as well as matters identified by the Commonwealth for the controlled action determination under the EPBC Act.

In addition, an amendment to the Whittlesea, Mitchell, Strathbogrie, Benalla, Wangaratta, and Wodonga Planning Schemes is currently underway for the Project pursuant to the *Planning and Environment Act 1987*. The Project's Planning Scheme Amendment (PSA) is the key planning approval for the Project.

### Scope of report

This existing conditions and impact assessment report has been prepared to inform the preparation of the Environment Report required under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act. This technical report will also be used to support the Planning Scheme Amendment under the Planning and Environment Act 1987 (P&E Act). The assessment focuses on the biodiversity values and impacts of the enhancement sites, track slews, and signal gantries. The biodiversity assessment for overhead powerlines is the subject of a separate assessment.

### Methods

Existing ecological conditions are described based on the findings of ecological surveys that were completed by KBR for the Reference Design Phase (2017 – 2019) and detailed ecological assessments conducted between October 2020 and March 2021 for the expanded investigation area. Native vegetation was mapped, and a Vegetation Quality Assessment completed, and these assessments incorporated a buffer of 15 m to allow for potential impacts to small and large trees on the margins of the project area.

The presence and extent of threatened ecological communities was assessed against the relevant Victorian and Commonwealth criteria and existing extent mapped by KBR. Threatened species habitat assessments targeted Brush-tailed Phascogale, Squirrel Glider, and Barking Owl, and potential habitat for Striped Legless Lizard.

No flora targeted surveys were conducted as part of the current assessment, but the findings of targeted flora surveys conducted by KBR informed the findings of the assessment.

Targeted fauna survey was undertaken for Brush-tailed Phascogale, Squirrel Glider, and Barking Owl was undertaken in October – December 2021 and the findings of those surveys and targeted woodland



bird assessments conducted by KBR are incorporated into the existing conditions and impact assessment.

### Existing conditions and impacts

The investigation area generally occurs within a highly modified environment, dominated by road and rail infrastructure, in addition to land cleared for agricultural purposes or rural town centres. Interspersed amongst this are areas of remnant native vegetation and habitat that occur on both public and private land. Within the investigation area, the ecological assessments identified a number of important values particularly native vegetation along rail and road corridors that is relatively intact and contains higher numbers of large trees. A subset of the native vegetation within the investigation area was synonymous with threatened ecological communities listed under the EPBC Act and/or FFG Act and habitat for threatened species.

Construction works proposed for the Project will have direct and indirect impacts on biodiversity contained within and adjacent to the project area. Impacts to native vegetation and other ecological values are unavoidable; however, as the Project is still in the design phase, avoid and minimise principles will inform the continued design.

A summary of ecological values and potential impacts of the Project on those values is outlined below.

### Ecological values and potential impacts

Ecological value		Existing conditions	Impacts
<b>Matters of National Environmental Significance</b>			
Threatened ecological communities	Grey Box <i>Eucalyptus microcarpa</i> Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	25 patches, 69.834 ha mapped within the investigation area	Reference Design: 0.998 ha Buffer area: 3.958 ha Total: 4.956 ha
	Natural Temperate Grasslands of the Victorian Volcanic Plain	Two patches, 0.619 ha mapped within the investigation area	ARTC have advised that impacts to NTGVVP will be avoided
	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Not identified within the investigation area	No impact is anticipated in the impact area
Threatened flora species	No threatened flora identified	N/A	N/A
Threatened fauna species	Grey-headed Flying-fox overfly and occasionally forage within the investigation area	Not observed during assessment, potential habitat identified	Unlikely
	Swift Parrot may use parts of the investigation area as a movement and dispersal corridor rather than as core habitat	Not observed during assessment, potential habitat identified	Unlikely; possible habitat fragmentation
	Growling Grass Frog terrestrial habitat occurs at SG2 & TS1 at Wallan.	Not observed during assessment, potential habitat identified	Unlikely

Ecological value		Existing conditions	Impacts
	Striped Legless Lizard	Not observed during assessment, potential habitat identified	Unlikely
	Golden Sun Moth	Not observed during assessment, potential habitat identified	Unlikely, impacts to potential habitat has been avoided
<b>State significant biodiversity values</b>			
<i>Planning and Environment Act 1987</i>			
Native vegetation	Patches of native vegetation	205 patches, 172.374 ha mapped within the investigation area	Reference Design: 4.267 ha Buffer area: 10.495 ha Total: 14.764 ha
	Large Trees in Patches	452 Large Trees in Patches mapped within the investigation area	Reference Design: 4 Large Trees in Patches Buffer area: 53 Large Trees in Patches Total: 57 Large Trees in Patches
	Scattered Trees	248 Scattered Trees (205 small and 43 large) mapped within the investigation area	Reference Design: 16 Scattered Trees (12 small and 4 large) Buffer area: 23 Scattered Trees (19 small and 4 large) Total: 39 Scattered Trees (31 small and 8 large)
	Mapped wetlands	Two mapped wetlands mapped within the investigation area	Two mapped wetlands not likely to be impacted
	Endangered EVCs (subset of patches of native vegetation)	81.831 ha mapped within the investigation area	Reference Design: 1.793 ha Buffer area: 5.534 ha Total: 7.327 ha
	High quality vegetation (subset of patches of native vegetation)	97.377 ha mapped within the investigation area	Reference Design: 0.714 ha Buffer area: 2.645 ha Total: 3.359 ha
	Strategic Biodiversity Values	SBV ranges from 1 – 15 to 90 – 100 in investigation area. Areas $\geq 0.80$ are considered to be of high value.	Areas $\geq 0.80$ are considered to be of high value. This information may be used to inform decision-making during the design process when prioritising areas of greater or lesser importance.

Ecological value		Existing conditions	Impacts
Environmental overlays	Mitchell - ESO3	13 patches at five investigation areas	No impact is anticipated in the impact area
	Mitchell – SMO	Two patches at one investigation area	No impact is anticipated in the impact area
	Mitchell – VPO1	33 patches at three investigation areas	Reference Design: 2.260 ha Buffer area: 4.656 ha Total: 6.916 ha
	Mitchell – VPO2	39 patches at five investigation areas	Reference Design: 0.848 ha Buffer area: 2.283 ha Total: 3.130 ha
	Wangaratta – VPO 1	5 patches at one investigation area	Reference Design: 0.013 ha Buffer area: 0.176 ha Total: 0.189 ha
<i>Flora and Fauna Guarantee Act 1988</i>			
Threatened ecological communities	Victorian Temperate Woodland Bird Community	63 patches, 105.507 ha mapped within the investigation area	Reference Design: 1.519 ha Buffer area: 6.899 ha Total: 8.418 ha
	Western (Basalt) Plains Grassland Community	2 patches, 0.619 ha mapped within the investigation area	ARTC have advised that impacts to WBPGC will be avoided
	Lowland Riverine Fish Community of the Southern Murray-Darling Basin	Not mapped within the investigation area; however, Goulburn River and tributaries are adjacent to investigation area	Potential indirect impacts on Goulburn River and tributaries adjacent to project area
Threatened flora (FFG Act & VROT)	Buloke	Two immature individuals identified	Loss of two immature individuals
	Glaucous Flax-lily (VROT)	Approximately 239 individuals were identified during the assessment	No impact is anticipated in the impact area
	Protected flora	16 Protected flora species were identified	Impacts to protected flora species are anticipated however total numbers of plants will be determined following detailed design.

Ecological value		Existing conditions	Impacts
Threatened fauna (FFG Act & VROT)	Woodland birds	5 species included in the VTWBC description were observed	Loss of woodland habitat
	Barking Owl	Potentially heard but presence not confirmed, potential habitat identified	Loss of hollow-bearing trees, particularly if a regular roost or breeding hollow is removed by the Project
	Brush-tailed Phascogale	Potential woodland habitat identified. Recorded at Hume Highway (Tallarook) [ES05] & TS5	Loss of woodland habitat Loss of hollow-bearing trees at Tallarook. Disruption to habitat connectivity. Loss of individuals during habitat clearance. Habitat fragmentation (see connectivity below) Displacement of individuals resulting in injury or death.
	Squirrel Glider	Potential woodland habitat identified. Not detected during assessment; however, Sugar Glider observed at Hume Highway (Tallarook) [ES05] & TS5.	Loss of woodland habitat Loss of hollow-bearing trees. Disruption to habitat connectivity. Loss of individuals during vegetation removal, potentially a whole social group. Displacement of individuals resulting in injury or death.
	Brown Toadlet	Not detected during assessment; however, some recent records identified in proximity to investigation area	Potential loss of habitat (terrestrial areas that become flooded by seasonal rains).
Hollow-bearing trees	Hollows support a wide range of fauna species, including threatened species. Loss of hollow-bearing trees is a threatening process listed under the FFG Act.	172 hollow-bearing trees (40 of high value) mapped within the investigation area	Loss of up to 51 known hollow-bearing trees, including 11 of high value. Loss of up to 65 Large Trees estimated to contain hollows.



Ecological value		Existing conditions	Impacts
Connectivity	Loss of landscape connectivity (habitat fragmentation) is a threatening process listed under the FFG Act.	Several linkages identified around Seymour and Tallarook. SBV categories in the investigation area ranged from 1 - 15 to 90 – 100.	The Project will increase existing gaps in habitat linkages in the local landscape which is likely to sever functional connectivity for arboreal mammals and smaller woodland birds in particular.
<i>Catchment and Land Protection Act 1994</i>			
Weeds	Invasive plants (weeds) can compete with and displace native flora which alters vegetation communities and affects habitat suitability for native fauna. Invasion of native vegetation by 'environmental weeds' is threatening process listed under the FFG Act	Twenty noxious weed species listed under the CaLP Act recorded, including six that are listed as Weeds of National Significance (WoNS)	Control of weeds will form part of the EMP for the project and it is not expected the Project will encourage the introduction or spread of weeds.
Pest animals	Introduced Red Fox <i>Vulpes vulpes</i> and feral cats <i>Felis catus</i> directly threaten native fauna via predation. Other introduced species such as European Rabbit <i>Oryctolagus cuniculus</i> and European Hare <i>Lepus europaeus</i> cause land degradation that can affect native vegetation and habitat. Predation of native wildlife by foxes and cats, and grazing by rabbits are listed as threatening processes under the FFG Act.		The proposed works are unlikely to encourage the occurrence or increase the population of Red Fox in the local area. The Project is unlikely to encourage the occurrence of cats above current levels in the environment. The Project is unlikely to encourage the occurrence of rabbits.
<i>Wildlife Act 1987</i>			
Non-threatened fauna	All wildlife protected under the Wildlife Act	A diversity of species occurs, many of which are often absent or rare within urban and peri-urban areas.	Loss of habitat and connectivity. Loss of individuals during vegetation removal, potentially a whole social group. Potential to kill, injure, disturb, displace fauna. Species most at risk are those that are more sedentary such as possums, frogs, and lizards (less likely to

Ecological value		Existing conditions	Impacts
			move away from construction works), or species that breed and shelter in hollows

### Threatening processes

The Project has the potential to exacerbate threatening processes listed under the EPBC Act and FFG Act was also considered in this assessment. The processes are listed below.

EPBC Act listed threatening process	FFG Act listed threatening process
Land clearance	-
-	Habitat fragmentation as a threatening process for fauna in Victoria.
-	Loss of hollow-bearing trees from Victorian native forests and woodlands
Dieback caused by the root-rot fungus <i>Phytophthora cinnamomi</i>	The spread of <i>Phytophthora cinnamomi</i> from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority
	Use of <i>Phytophthora</i> -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.
-	Increase in sediment input into Victorian rivers and streams due to human activities
-	Invasion of native vegetation by Blackberry <i>Rubus polyanthemus</i>
-	Invasion of native vegetation by 'environmental weeds.

### Management and mitigation

The primary impacts associated with the Project are land clearance resulting in a loss of native vegetation (including loss of hollow-bearing trees), habitat fragmentation, loss of TECs, and habitat for threatened species.

Management and mitigation measures should focus primarily on the design process to avoid and minimise impacts to important ecological values such as patches of native vegetation, large trees, hollow-bearing trees, threatened ecological communities, vegetation protected under overlays, habitat for fauna and habitat linkages.

Opportunities to reinstate or enhance connectivity within the impact area are limited due to the linear nature of the rail and road corridor in the impact area. The Project could instead contribute to the enhancement of other areas of habitats that facilitate movement of fauna through the local landscape, particularly for the woodland birds and arboreal mammals which may be impacted by the project.

Revegetation does not provide a short-term mitigation for loss of hollow-bearing trees due to the time taken for suitable hollows to develop. Artificial measures may be utilised in conjunction with the other measures; however, consideration must be given to their feasibility as an effective mitigation measure.

Potential impacts on native fauna should be discussed with DELWP to ascertain their expectations with regard to the Wildlife Act.

A Flora and Fauna Management Plan (or equivalent) should be prepared and implemented to provide a strategy for the protection and management of ecological values during construction of the enhancement sites, track slews, and signal gantries. It should define the objectives and targets, roles and responsibilities and outline control measures to protect ecological values and reduce ecological impacts.

### Offsets

Offsets for the loss of native vegetation and TECs will be required in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b), Victorian vegetation assessment guidelines (DELWP, 2017a), or in agreement with DELWP and DAWE.

The Environmental Systems Modelling Platform (EnSym) Native Vegetation Regulations Tool produced by DELWP has been used to test offset requirements for the total extent of native vegetation mapped for the Project. This identified the following impacts based on the impact area (reference design area and buffer area):

- 15.818 ha of native vegetation (includes patches of native vegetation and trees as calculated by EnSym)
- 65 large trees.

Offsets required for this worst-case scenario are detailed in the offset section of the report and are comprised of General Habitat Units only.

The offset obligations are 9.083 GHU and 65 large trees. These require a minimum strategic biodiversity value score of 0.476 and must be sourced within the Goulburn Broken, and/or North East CMA or Benalla Rural City, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City Council, and/or Wodonga City Council.

Offsets under the EPBC Act have not yet been determined as the quantum of residual impacts (and therefore potential offsets) on EPBC Act-listed threatened ecological communities is not yet known as the Project is still in the planning stage. Consultation with DAWE and DELWP will be critical for resolving offset options for threatened ecological communities and native vegetation and developing an offset package amenable to both regulators.

### Next Steps

Once detailed design of the enhancement sites, track slews, and signal gantries has been finalised:

- Calculate the total extent of native vegetation clearance and native vegetation offset obligations. To do this, the Project should:
  - Complete an arborist assessment to determine if trees in the buffer area will be impacted through TPZ encroachment, provide advice whether they can be retained and if site-based control measures are required.
  - Validate Large Trees in Patches mapping for all KBR (2020a) patches of native vegetation at enhancement sites to determine accurate large tree impacts for the Project.
  - Submit the habitat hectare data for vegetation clearance to DELWP to generate an NVR report to calculate offset requirements for the Project.
  - Prepare an Offset Statement to provide evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured.
  - Submit an application to obtain approval to remove, lop or destroy native vegetation through the Incorporated Document of the PSA. The Incorporated Document acts as the permit to remove native vegetation and will include standard conditions that removal of native vegetation must be in accordance with application requirements 1, 5 and 9 of the Guidelines. Those requirements comprise information on the native vegetation to be removed, a statement that identifies the process undertaken to avoid and minimise vegetation loss, and

the offset statement that confirms that biodiversity offsets required for the Project are available.

- Consult with DELWP/DAWE regarding potential increase in impacts to GBGW TEC.
- Consult with DELWP and DAWE to develop an Offset Strategy that meets the requirements of the Victorian and Commonwealth offset obligations.
- Develop an EPBC Act Offset Strategy and Management Plan if required.
- Undertake survey for Brown Toadlet if impacts to seasonally inundated habitat is unavoidable.
- Identify potential opportunities to reinstate or enhance landscape connectivity in consultation with DELWP and other relevant stakeholders such as local Landcare groups.
- Consult with DELWP and Council on their expectations in relation to salvage and relocation of fauna from the construction area to adjacent habitat. If salvage is required, then a suitably qualified wildlife handler holding a relevant and current management authorisation under the Wildlife Act would need to be engaged prior to construction to salvage any wildlife encountered during the construction program.
- Prepare a Flora and Fauna Management Plan incorporating measures to reduce potential impacts on retained vegetation and wildlife during construction and operation (see Section 8.3).
- Develop Environmental Performance Requirements as part of Environmental Management Framework for the Project which reflect / draw upon the recommendations made in Section 6, Section 7, and 8 in relation to management, mitigation and offsets.



## 1.0 Introduction

AECOM Australia (AECOM) was engaged by Australian Rail Track Corporation Ltd (ARTC) to undertake an ecological impact assessment for the Victorian portion of the Inland Rail - Beveridge to Albury Stage 1 project (the 'Project'). This report outlines the results of ecological assessments completed for enhancement sites, track slews and signal gantries between Beveridge and Wodonga, (the 'project area') and details the implications of the proposed works from a legislation and policy context.

### 1.1 Project background

Inland Rail is the largest freight rail project in Australia which spans 1,700 km across Victoria, New South Wales, and Queensland. It is divided into 13 individual projects and, once operational, Inland Rail will become part of ARTC's freight rail network which will support Australia's freight supply chain.

The Project involves works to individual assets which will provide horizontal and vertical clearance for double stacked freight trains on the existing North East Rail Line (NERL). The Project will utilise the existing corridor and modify or replace existing infrastructure at discrete locations where there is not adequate clearance for double-stacked freight trains.

The Inland Rail project area includes a number of discrete sites spread across approximately 230 kilometres from Beveridge (approximately 60 km north of Melbourne) through central and north east Victoria to Wodonga (Figure 6 – Appendix A). The project area generally runs parallel to the Hume Highway and passes through the townships of Wallan, Wandong, Kilmore East, Broadford, Tallarook, Seymour, Euroa, Benalla, Glenrowan, Wangaratta, and Barnawartha North.

The Project passes through the jurisdictions of:

- Six Local Government Areas (LGAs) - Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, and Wodonga shires.
- Three Catchment Management Authority (CMA) areas - Port Phillip and Westernport, Goulburn Broken, and Northeast.
- Four Victorian Bioregions - Central Victorian Uplands (CVU), Northern Inland Slopes (NIS), Victorian Volcanic Plains (VVP), and Victoria Riverina (VR).
- Hume region of the Department of Environment, Land, Water and Planning (DELWP).

The Project is divided into two packages of works:

- enhancement sites, track slews, and signal gantries; and
- utility services (overhead powerlines).

The two packages of works are subject to different planning approval pathways and, as such, separate ecological assessments have been undertaken and reports prepared for each package.

#### **Enhancement sites, track slews and signal gantries**

Enhancement sites, track slews, and signal gantries (the 'enhancement sites') are the primary component of the Project and include areas where road and rail interfaces do not provide the required horizontal and vertical clearance for double-stacked freight trains. The enhancement sites comprise:

- Twelve enhancement sites where overbridges will be replaced and/or tracks lowered and realigned.
- Five track slews which will be upgraded to achieve the required clearances between tracks.
- Twenty signal gantries which will be decommissioned and new signal gantries and supporting infrastructure installed.

The approval process for enhancement site, track slew and signal gantries are set out in Section 1.2. Details of the works associated with these enhancement sites are provided in Section 1.4.

## Overhead powerlines

High and low voltage overhead powerlines cross the rail corridor at numerous discrete locations along the alignment. Powerline assets are owned and managed by AusNet (distribution powerlines), VicTrack (lines for lighting and signalling), and local Council (low voltage lines for lighting). The vertical clearances of the overhead powerlines do not allow for the passage of double-stacked freight trains and as such, the vertical clearances between the tracks and the overhead powerlines will be increased as part of the Project scope of works. The upgrade works will involve:

- Replacement of power poles or towers for additional height
- Lifting, replacement of cables or tensioning of existing cables
- Undergrounding of cables (where required)
- Decommissioning and removal of redundant assets.

The overhead powerlines are classified as ancillary works requiring upgrade prior to enhancement site, track slew, and signal gantry works commencing. As such, they are subject to a separate planning approvals pathway. The detailed ecological investigation and results associated with the overhead powerline package of works are provided in AECOM (2021a).

## 1.2 Project approvals

The Project has been subject to several preliminary and detailed technical studies that culminated in the Project being referred to the State Government under the *Environment Effects Act 1978* (EE Act) and to the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In August 2020, the Victorian Minister for Planning determined that an Environment Effects Statement (EES) under the EE Act is not required for the Project, provided that the conditions set out in the Notice of Decision could be addressed. A delegate for the Commonwealth Minister for the Environment determined that the Project was a controlled action under the EPBC Act as it is likely to have a significant impact on listed threatened species and communities which are Matters of National Environmental Significance (MNES) and hence are protected under the EPBC Act.

Assessment of the Project is therefore being undertaken via an Environment Report which is an accredited state assessment process under the Bilateral Agreement made under the EPBC Act between the Commonwealth of Australia and The State of Victoria in 2014 relating to environmental assessment.

An Environment Report is being prepared to meet assessment requirements set out by the Victorian Minister for Planning under the EE Act as well as matters identified by the Commonwealth for the controlled action determination under the EPBC Act. A scope for the Environment Report under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act was issued by the Department of Environment, Land, Water and Planning (DELWP) to guide the 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* (FFG Act) and/or Victorian threatened species advisory lists.

To address the requirements of the Environment Report, ARTC has separated the Project into two main packages of works:

- Enhancement sites, track slews and signal gantries (the subject of this report); and
- Overhead Powerlines (AECOM, 2021a).

In addition, an amendment to the Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta and Wodonga Planning Schemes is currently underway for the Project pursuant to the *Planning and Environment Act 1987* (P&E Act). The Amendment introduces '*Inland Rail-Beveridge to Albury April 2021*' (Incorporated Document) into the abovementioned Planning Schemes to facilitate the use and development of the Project (enhancement sites, track slews, and signal gantries only). The Project's Planning Scheme Amendment (PSA) is the key planning approval for the Project.

## 1.3 Project area definitions

### 1.3.1 Project area

Project area is the term used to collectively describe the package of the 12 enhancement sites, 21 signal gantries, and five track slew upgrades. The project area boundary associated with each of these sites is shown in (Figure 6 – Appendix A).

### 1.3.2 Investigation area

Investigation area is the area assessed for existing ecological conditions at each of the enhancement site, track slew, and signal gantry locations. The investigation area was defined by the project area boundary received in January 2021 plus a 15 m buffer. The purpose of the buffer was to document ecological values immediately adjacent to the project area as a conservative measure of values which may be affected by the Project, particularly remnant trees with Tree Protection Zones (TPZs) that may be impacted by works in the project area. The investigation areas are listed in Table 1 and their locations are shown in Figure 6 (Appendix A). Overlap between multiple investigation areas is noted in Table 1.

### 1.3.3 Impact area

Impact area is the term used to describe the area considered for potential impacts of the Project. The impact area is defined by the Reference Design (dated August 2020) for the Project plus a 15m buffer on the reference design for the purpose of identifying adjacent values that could also be affected impacted by the Project. The impact area is shown in Figure 11 (Appendix A).

The project area, investigation area, and impact area form a hierarchy as depicted in Figure 1.



Figure 1 Project area definition hierarchy

**Table 1 Investigation areas from south to north**

Investigation area (AECOM reference)	Corresponding ARTC site name (as per Functional Project Description)	Site name at time of KBR (2020a) assessment	Site type	Location	Chainage	Bioregion/s	LGA	CMA
SG16	Signal Gantry No.1	Not assessed by KBR	Signal gantry	Beveridge	~41.44 to ~43.8	VVP <sup>1</sup>	Whittlesea	PPWCMA <sup>2</sup>
SG1	Signal Gantry No. 2	N/A	Signal gantry	Wallan	~46.6 to ~47.3	VVP	Mitchell	PPWCMA
SG17	Signal Gantry No. 5	Track Slew Investigation Area C (Track Slew 4)	Signal gantry	Wallan	~48.4 to ~49.12	VVP	Mitchell	PPWCMA
SG2 & TS1	Track Slew No.1 Wallan Loop Signal Gantry No. 3	Track Slew Investigation Area C (Track Slew 5)	Track slew Signal gantry	Wallan	~47.3 to ~48.8	VVP	Mitchell	PPWCMA
Broadford-Wandong Road (Wandong) [ES01]	Broadford-Wandong Road (Wandong)	Broadford Road Overbridge (Wandong)	Enhancement site Signal gantry	Wandong	~55.2 to 55.7	CVU <sup>3</sup>	Mitchell	GBCMA <sup>4</sup>
SG3	Signal Gantry No. 6 Signal Gantry No. 7	Signal Gantry 15 (SG15)	Signal gantry	Kilmore East	~65.89 to ~66.22	CVU	Mitchell	GBCMA
SG4	Signal Gantry No. 8	Signal Gantry 16 (SG16)	Signal gantry	Broadford	~69.75 to ~70.96	CVU	Mitchell	GBCMA
SG5	Signal Gantry No. 9	Signal Gantry 17 (SG17)	Signal gantry	Broadford	~73.63 to ~73.66	CVU	Mitchell	GBCMA



Investigation area (AECOM reference)	Corresponding ARTC site name (as per Functional Project Description)	Site name at time of KBR (2020a) assessment	Site type	Location	Chainage	Bioregion/s	LGA	CMA
Hamilton Street (Broadford) [ES02] & SG18	Hamilton Street (Broadford) Signal Gantry No. 10	Hamilton Street Overbridge (Broadford)	Enhancement site Signal gantry	Broadford	~75.19 to ~75.83	CVU	Mitchell	GBCMA
Short Street (Broadford) [ES03] & SG6	Short Street (Broadford) Signal Gantry No. 11	Short Street Overbridge (Broadford)	Enhancement site Signal gantry	Broadford	~76.08 to ~77.21	CVU	Mitchell	GBCMA
Marchbanks Road (Broadford) [ES04]	Marchbanks Road (Broadford)	Marchbanks Road Overbridge (Broadford)	Enhancement site	Broadford	~77.58 to ~78.23	CVU	Mitchell	GBCMA
SG7 & SG8	Signal Gantry No. 12 Signal Gantry No. 13	Signal Gantry 18 (SG18)	Signal gantry	Broadford	~77.96 to ~83.18	CVU	Mitchell	GBCMA
SG9	Signal Gantry No. 14	Signal Gantry 19 (SG19)	Signal gantry	Tallarook	~86.25 to ~86.26	CVU	Mitchell	GBCMA
Hume Highway (Tallarook) [ES05] & TS5	Hume Highway (Tallarook) Track Slew No. 2 Tallarook Loop	Hume Highway Tallarook Precinct (Tallarook)	Enhancement site	Tallarook	~85.64 to ~89.5	CVU	Mitchell	GBCMA
SG10	Signal Gantry No. 15	N/A	Signal gantry	Tallarook to Seymour	~93.49 to ~94.43	VR <sup>5</sup> and CVU	Mitchell	GBCMA

Investigation area (AECOM reference)	Corresponding ARTC site name (as per Functional Project Description)	Site name at time of KBR (2020a) assessment	Site type	Location	Chainage	Bioregion/s	LGA	CMA
SG11 & TS2	Track Slew No. 3 Seymour Goulburn River Signal Gantry No. 16	Track Slew Investigation Area E	Track slew Signal gantry	Tallarook to Seymour	~94.45 to ~96.9	VR	Mitchell	GBCMA
SG12	Signal Gantry No. 17	N/A	Signal gantry	Seymour	~97.3 to ~98.06	VR	Mitchell	GBCMA
SG13 & TS3	Track Slew No. 4 Seymour Station Area Signal Gantry No. 18	Track Slew Investigation Area F	Track slew Signal gantry	Seymour Railway Station	~98.8 to ~99.28	VR and CVU	Mitchell	GBCMA
SG19 & TS4	Track Slew No. 5 Seymour – Mangalore Signal Gantry No. 20	Track Slew Investigation Area D Track Slew Investigation Area E Track Slew Investigation Area H Track Slew Investigation Area I	Track slew Signal gantry	Between Seymour and Mangalore	~99.78 to ~109.6	VR and CVU	Mitchell	GBCMA

Investigation area (AECOM reference)	Corresponding ARTC site name (as per Functional Project Description)	Site name at time of KBR (2020a) assessment	Site type	Location	Chainage	Bioregion/s	LGA	CMA
Seymour Avenel Road (Seymour) [ES06] & SG14	Seymour Avenel Road (Seymour) Signal Gantry No. 19	Seymour Avenel Road Overbridge (Seymour) (Includes Track Slew Investigation Area G)	Enhancement site Signal gantry	Seymour	~101.93 to ~102.91	CVU	Mitchell	GBCMA
Hume Highway (Seymour) [ES07]	Hume Highway (Seymour)	Hume Highway Seymour Precinct (Seymour) Track Slew Investigation Area H	Enhancement site	Seymour	~103.49 to ~104.24	CVU	Mitchell	GBCMA
Anderson Street (Euroa) [ES08]	Anderson Street (Euroa)	Anderson Street Overbridge (Euroa)	Enhancement site	Euroa	~149.7 to ~151.3	VR	Strathbogie	GBCMA
Benalla Station Access Road (Benalla) [ES09]	Benalla Station Access Road (Benalla)	Benalla Station Approach Road Overbridge (Benalla)	Enhancement site	Benalla	~195.11 to ~195.85	VR	Benalla Rural City	GBCMA

Investigation area (AECOM reference)	Corresponding ARTC site name (as per Functional Project Description)	Site name at time of KBR (2020a) assessment	Site type	Location	Chainage	Bioregion/s	LGA	CMA
Beaconsfield Parade (Glenrowan) [ES10]	Beaconsfield Parade (Glenrowan)	Beaconsfield Parade Overbridge (Glenrowan)	Enhancement site	Glenrowan	~218.52 to ~218.80	NIS <sup>6</sup>	Wangaratta Rural City	GBCMA
Wangaratta Precinct (Wangaratta) [ES11] & SG15	Wangaratta Precinct (Wangaratta) Signal Gantry No. 21	Wangaratta Precinct (Wangaratta)	Enhancement site	Wangaratta	~233.43 to ~234.428	VR	Wangaratta Rural City	NECMA <sup>7</sup>
Murray Valley Highway (Barnawartha North) [ES12]	Murray Valley Highway (Barnawartha North)	Murray Valley Highway Overbridge (Barnawartha North)	Enhancement site	Barnawartha North	~284.71 to ~285.44	NIS and VR	Wodonga City	NECMA

<sup>1</sup>VVP – Victorian Volcanic Plain<sup>2</sup>PPWCMA – Port Phillip and Westernport Catchment Management Authority<sup>3</sup>CVU – Central Victorian Uplands<sup>4</sup>GBCMA – Goulburn Broken Catchment Management Authority<sup>5</sup>VR – Victorian Riverina<sup>6</sup>NIS – Northern Inland Slopes<sup>7</sup>NECMA – North East Catchment Management Authority

## 1.4 Proposed works

The following provides an outline of the proposed activities associated with the enhancement sites, track slews and signal gantry works as well as works that relate to all components based on the Functional Project Description (dated 15 January 2021). These might be subject to change to adapt to alternative construction methods and practices, however, will still comply with the relevant statutory approvals and standards.

### 1.4.1 Enhancement sites

The major civil construction works associated with the Project are the track lowering and bridge replacement at enhancement sites.

The Project will require the following key works at enhancement sites:

- Bridge replacement over the rail line at Broadford-Wandong Road, Wandong
- Bridge replacement over the rail line at Hamilton Street, Broadford
- Track lowering and/or bridge replacement at Short Street, Broadford
- Bridge replacement over the rail line at Marchbanks Road, Broadford
- Track lowering under the road at Hume Highway, Tallarook
- Bridge replacement over the rail line at Seymour-Avenel Road, Seymour
- Track lowering under the road at Hume Highway, Seymour
- Bridge replacement or vehicle underpass at Anderson Street, Euroa
- New platform, track realignment and upgraded pedestrian access at Euroa Station
- Bridge replacement over the rail line at Benalla Station or new platform, track realignment and upgraded pedestrian access at Benalla Station
- Bridge replacement over the rail line at Beaconsfield Parade, Glenrowan
- Bridge upgrade over the rail line at Green Street, Wangaratta
- Track lowering, new platform and upgraded pedestrian access at Wangaratta Station
- Track lowering under the road at Murray Valley Highway, Barnawartha North

The general functional requirements for the track lowering and bridge replacement construction works are summarised below:

#### Bridge replacement

Works will include establishment of laydown and site compound areas, bulk earthworks for bridge approaches, structural piling operations, construction of the bridge structure and road pavement, relocation and/or protection of existing utility services, removal of existing fence and gates and installation of new boundary fencing (as required), replacement of track signals. The existing bridge structure will be removed on completion of the new bridge. Landscaping will be reinstated, or new landscaping will be undertaken as part of construction.

#### Track lowering

Works will include establishment of laydown and site compound areas, removal of existing rail infrastructure (track, sleepers, ballast), excavations to lower the track and grading to achieve rail design speed and drainage, construction of piled retaining walls to support differences in ground level between the existing and proposed level, and track drainage to divert surface and subsurface water to a pit and drainage system that runs parallel to the tracks. Existing utilities and services will be modified or protected. The existing fence and gates will be removed, and new boundary fencing will be installed as required. Replacement or reinstatement of track signals, capping, railway tracks and landscaping will also be undertaken.

### 1.4.2 Track slews

Track slew works are works to shift the railway track horizontally to provide clearance for double-stacked containers to be transported on freight trains. The function and performance requirements are:

- Track clearance between standard gauge and broad gauge (V/Line) tracks must be a minimum of 4m track centres for straight (tangent) track.
- Track clearances between adjacent standard gauge tracks must be a minimum of 4.5 m track centres for straight (tangent) track.
- All track slews must provide a 200mm air gap as a minimum between kinematic envelopes.

There are five track slews that do not achieve the necessary clearance between tracks.

Track slew construction works are minor in nature and range from a slew width of 30mm to 370mm. The magnitude of each track slew will determine the construction method required, occurring in the following general manner:

- Track slews less than 100 mm will be constructed within the existing formation by placing new track utilising hi-rail machinery with no disturbance outside the existing formation of the rail track.
- Track slews greater than 100 mm and less than 300 mm, will mostly be completed on track, by widening the existing formation through grading and proof-rolling and placing new ballast and track utilising hi-rail machinery.
- Track slews greater than 300mm, will be undertaken by constructing new formation and placing new ballast and track.

Where track slew works are required, one or both tracks may need to be moved to meet the required clearances.

### 1.4.3 Signal gantries

Signal gantry works comprise two components:

- Works at 20 locations where the existing signals do not satisfy the clearance requirements. These works will include decommissioning and removal of all redundant signalling equipment, installation of signal gantry structures, and associated equipment and access tracks.
- Signalling works at enhancement sites which include provision of new signalling cables where existing cables are being relocated, relocation of signalling assets where necessary, replacement of existing pole line with underground cabling, decommissioning and removal of all redundant signalling assets, provision of maintenance access to relocated signal assets.

Where construction of a new or relocated signal gantry is proposed, the works are anticipated to involve:

- Excavation and construction of piling foundations, footings and ladder foundations.
- Construction of two-way cable route.
- Installation of small part steelwork.
- Erection of portal legs and brace and signal gantry structure (main sections of the gantries would be prefabricated off site).
- Installation of new cabling for signals.
- Decommissioning of existing signals and gantries.



#### 1.4.4 Other associated works

Other works associated with the enhancement sites, track slew and signal gantry works include:

##### **Site establishment and utilities**

- Installation of site fencing and temporary signage for restricted access and temporary vehicle traffic diversion around site entry/exit points (if required).
- Installation of erosion and sediment controls.
- Establish site access locations, compound and stockpile sites.
- Vegetation clearing or grubbing.

##### **Utilities and services relocations**

This work will occur in consultation with the service asset owner and will generally occur in the following sequence:

- Excavation of new route.
- Installation of new conduit (Next Generation cabling).
- Temporary isolation of existing service and cutover to new route.
- Commissioning of relocated service.
- Isolation and cutover of new service (to occur during times that service outage will have the least impact to services).

##### **Site decommissioning**

- Removal of compound, stockpile and ancillary sites.
- Removal of site environmental and erosion and sedimentation controls.
- 'Making good' the site as appropriate.

##### **Demolition works**

- Demolition works are limited to removal of road and rail infrastructure.
- Bridges will be demolished after replacement bridges are tied into connecting roads.
- Some removal of redundant infrastructure is also proposed, including two footbridges in the Wangaratta Station precinct (Dockers Street and Cusack Street footbridges).

## 2.0 Purpose

This technical report has been prepared to inform the preparation of the Environment Report required under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act. This report will also be used to support the Planning Scheme Amendment under the P&E Act.

The ecological existing conditions and impact assessment report aims to:

- Describe ecological values within the project area and associated buffers focussing on values with biodiversity legislation and policy implications nominated during the EPBC Act and EE Act referral process and scoping document as being of concern for the Project. Those values are primarily native vegetation and habitat for threatened species and communities listed under the EPBC Act and/or FFG Act.
- Evaluate the potential impacts (direct and indirect) of the proposed works on biodiversity values, particularly those associated with:
  - Matters of National Environmental Significance (MNES) listed under the EPBC Act (threatened species and communities) including:
    - Euroa Guinea-Flower *Hibbertia humifusa* subsp. *erigens*
    - Mountain Swainson-pea *Swainsona recta*
    - Swift Parrot *Lathamus discolor*
    - Regent Honeyeater *Anthochaera phrygia*
    - Painted Honeyeater *Grantiella picta*
    - Striped Legless Lizard *Delma impar*
    - Sloane's Froglet *Crinia sloanei*
    - Growling Grass Frog *Litoria raniformis*
    - Golden Sun Moth *Synemon plana*
    - Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
  - State significant biodiversity values including:
    - Species and communities listed as threatened under the FFG Act including:
      - Purple Diuris *Diuris punctata* var. *punctata*
      - Buloke *Allocasuarina luehmannii*
      - Brush-tailed Phascogale *Phascogale tapoatafa*
      - Squirrel Glider *Anthochaera phrygia*
      - Barking Owl *Ninox connivens*
      - Victorian Temperate Woodland Bird Community.
    - Species listed on an advisory list of rare or threatened species in Victoria (flora, vertebrate fauna or invertebrates) prepared by DELWP (DSE, 2009, DSE, 2013, DEPI, 2014). Although these lists do not afford the species contained within statutory protection, unless those species are listed under the EPBC Act and/or FFG Act, advisory listed species are considered by DELWP when determining whether species-specific habitat is required to be offset as part of a native vegetation removal application under the P&E Act.
    - Native vegetation protected under the P&E Act including impacts to patches of native vegetation, Large Trees in Patches, and Scattered Trees. Native vegetation is defined by the *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP,

2017a) (the Guidelines) which are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria.

- Hollow-bearing trees, the loss of which is a threatening process under the FFG Act.
- Disruption to habitat connectivity for threatened fauna including Brush-tailed Phascogale, Squirrel Glider, Barking Owl, Swift Parrot, and Regent Honeyeater.
- Make recommendations on measures to mitigate or reduce potential impacts to native vegetation, flora and fauna species which may occur in the impact area.

Impacts to significant ecological values and the application of the legislation, frameworks and policies that relate to their protection are a key consideration for the Environment Report for the Project. Accordingly, an understanding of existing ecological values within the investigation area is critical in order to determine the likelihood and extent of project related impacts on significant ecological values.

This existing conditions and impact assessment report combines the findings of previous ecological assessments (KBR, 2020a,b,c) and recent field assessments.

## 3.0 Methods

### 3.1 Review of previous ecological assessments

A review of previous studies completed by KBR for the Beveridge to Albury section of the Inland Rail Project was completed to inform the current assessment (Appendix B). KBR reports reviewed 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 within and around the investigation areas 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 within the project area 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, Crimson Spider-orchid, and Purple Diuris. Targeted surveys were undertaken at three enhancement sites within the current project area. No EPBC Act listed or FFG Act listed species were identified.

The review considered threatened flora and fauna species and TECs of interest to the Project. The findings of this review informed the scope of the field assessment and targeted survey, and records of threatened flora, fauna, and ecological communities are presented in the relevant section.

### 3.2 Database searches

Database searches were completed as part of the desktop ecological assessment for the enhancement sites, track slews and signal gantries (KBR, 2020a). Databases reviewed included:

- EPBC Act Protected Matters Search Tool (PMST) administered by the Australian Government Department of Agriculture, Water and the Environment (DAWE) to identify MNES that may occur.
- Online tools administered by DELWP including:
  - Victorian Biodiversity Atlas (VBA) for records of Victoria's rare or threatened flora and fauna species (VROTS).
  - NatureKit and Native Vegetation Information Management (NVIM) for information on Ecological Vegetation Classes (EVCs), Bioregions, Local Government Areas (LGAs), Catchment Management Authority (CMA) boundaries, and the 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).
  - MapshareVic to identify mapped wetlands within DELWP's Current Wetlands Map.
  - EVC benchmarks to use in assessing native vegetation quality using the Vegetation Quality Assessment (VQA) method. (<https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks>).
  - Planning Maps Online (now VicPlan online) for information on planning zones and environmental overlays.
  - Environmental Systems Modelling Platform Native Vegetation Regulations Tool (EnSym) for native vegetation databases and offset requirements.

- Guidelines and other explanatory documents related to measuring value of native vegetation:
  - *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017a).
  - *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).

The database searches conducted by KBR (2020a) used a five kilometre radius (or buffer) on the investigation area. However, for key threatened mobile fauna species, a broader landscape assessment of habitat connectivity was conducted resulting in the use of a 10 km buffer. For PMST searches, a two kilometre buffer on the investigation area as a whole was used as the tool uses both known and predicted habitat based previous records and habitat requirements, and was informed by the findings of WSP (2016).

This current ecological impact assessment also relies on the findings of the desktop assessment and the findings of KBR (2020a). However, a contemporary review of the VBA was completed in February 2021 to identify any recent records for Commonwealth and State significant species within five kilometres of the investigation area. No new records and no additional values were identified.

MapshareVic was also searched for the presence of mapped wetlands on the Current Wetlands Map layer. Areas of mapped wetlands are regarded as native vegetation under the Guidelines (DELWP, 2017a).

### 3.3 Likelihood of occurrence assessment for threatened species

A likelihood of occurrence assessment was completed during the desktop assessment for threatened flora and fauna species (KBR, 2020a). This included species:

- Listed as threatened under the EPBC Act
- Listed as threatened in Victoria in the following:
  - FFG Act – Threatened List (DELWP, 2019a)
  - 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).

Species listed in these Victorian advisory lists are collectively referred to as Victorian Rare or Threatened Species (VROTS).

Three broad categories were used to assess likelihood of species within the investigation area by KBR:

- *High; the environment in the investigation area contains most of a species' habitat requirements as determined by previous surveys or with a modelled EVC present over a large portion of the investigation area. The modelled EVC may also correlate with a high modelled condition score [DELWP, 2017b]. There is good connectivity to other habitat areas and/or locations with known populations or recent records (less than 10 years old) of the species*
- *Moderate; there are previous records of the species (within the last 30 years) within 5 km of the investigation area, and potential linkages for the species in the surrounding landscape (generally for mobile fauna), with potential for one or two key habitat components (such trees identified on aerial photography, modelled EVC present) to be present with likely minimal disturbance from land use, including:*
  - *Evidence of agricultural activity, including cropping or slashing*
  - *Evidence of disturbance, from road or rail activities or adjacent land use changes (residential or industrial development)*

- *Low; few habitat components are present for a species (minimal vegetation apparent on aerial photography or no modelled EVC present) and the area appears to have been subject to previous disturbance, evidenced either through assessor knowledge or via aerial photography. No or few historic records are present for the species.*” (KBR, 2020a, pg. 13)

Only those species with a moderate and high likelihood of occurrence were considered to have the potential to occur within the investigation area (KBR, 2020a). Those species with a moderate or high likelihood of occurrence were the focus of the field assessments undertaken in 2020/2021 by AECOM.

### 3.4 Field assessment

Field assessments were undertaken to augment the findings of KBR (2020a) for values identified as requiring additional survey or for areas added to the investigation area since the KBR assessment and following two Early Contractor Involvement (ECI) updates received by AECOM on 9 December 2020 and 1 February 2021.

Field assessments undertaken in the investigation areas included:

- Vegetation assessments of areas added to the investigation area since the KBR assessment, and following the ECI process to:
  - Assess the biodiversity values (vegetation and habitat) for refined areas.
  - Complete a Vegetation Quality Assessment (VQA) by a DELWP- accredited Vegetation Quality Assessor if native vegetation was present in those new investigation areas.
  - Undertake a preliminary evaluation of remnant native trees which may require an arborist assessment for the purpose of calculating native vegetation losses.
- Habitat assessments to:
  - Identify potential den and/or nest trees at five enhancement sites for the three FFG Act-listed species that were recommended for survey in KBR (2020a):
    - Brush-tailed Phascogale
    - Squirrel Glider
    - Barking Owl
  - Identify potential habitat for Striped Legless Lizard in response to a request to ARTC from the regional DELWP officers to undertake a Striped Legless Lizard habitat assessment and survey. If a survey cannot be undertaken in the timeframe, then presence will be assumed where habitat is present and mitigation measures will need to be applied.
- Targeted survey for the three target fauna species Brush-tailed Phascogale, Squirrel Glider and Barking Owl. The findings of this targeted survey are provided in Appendix C.
- Incidental observations of threatened flora and fauna species, and flora species listed as Protected under the FFG Act were also recorded.

Further details of the approach to these surveys are provided in the subsections below.

#### 3.4.1 Native vegetation (Habitat Hectare assessment)

Field assessments were conducted between 23 October to 18 December 2020 and 15 February to 9 March 2021. The first field deployment (Oct – Dec 2020) assessed the portions of the investigation area received from ARTC on 27 July 2020 that had not previously been assessed by KBR. A second field deployment (Feb – Mar 2021) was conducted to assess additional areas that were incorporated into the investigation area as a result of the ECI updates.

##### 3.4.1.1 Native vegetation

Native vegetation present within the investigation area was mapped and assessed according to the prescriptions of the Guidelines (DEWLP, 2017a). Native vegetation is defined in the Victorian Planning Provisions as ‘plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses’. Under



the Guidelines, native vegetation is considered to be either a patch, scattered tree, or large tree in a patch (DELWP, 2017a), where:

A patch of native vegetation is:

- *an area of vegetation where at least 25 per cent 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 drop 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, pg. 6).

A Scattered Tree is:

- *a native canopy tree that does not form part of a patch* (DELWP, 2017a, pg. 6).

Scattered Trees are a native canopy tree defined as a 'mature tree' greater than 3 metres 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 Diameter at Breast Height (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 metres 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, pg. 9). If the large tree is located within the extent of a patch of native vegetation, it is a large tree in a patch.

The term 'indigenous' is used throughout this report to refer to native plant species that naturally occur within the relevant bioregion of Victoria.

A VQA was completed for any patches of native vegetation identified. The VQA was undertaken using the Habitat Hectares method as described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004a). Individual patches were termed Habitat Zones (HZ) in accordance with DELWP terminology.

The number, Diameter at Breast Height (DBH), and circumference (in centimetres measured at 1.3 metres above ground level) of large trees within patches was also documented. The total extent of native vegetation was calculated for patches (including mapped wetlands if relevant) in hectares. The 'extent' of Scattered Trees was expressed as the area of a circle with a 15 metre radius for large trees and 10 metre radius for small trees (DELWP, 2017a). The location of patches and trees was mapped using an iPhone 10 and Samsung Galaxy S8 which has a spatial accuracy of approximately  $\pm 5$  five meters depending on access to satellites.

Where existing vegetation had been mapped by KBR (2020a) and was contiguous with unmapped vegetation in the updated investigation area, the extent, quality, and threatened community criteria (where applicable) were reviewed in the field. Where mapped values were consistent with on-ground conditions, vegetation mapping was extended; however, if the values differed, information was updated by completing a separate VQA.

In some instances, patches of native vegetation and Scattered Trees could not be accurately assessed due to private land access restrictions. Where no access was granted to private land, a conservative approach was adopted as follows:

- Patches of vegetation were subject to desktop assessment only and the DELWP modelled condition score as provided in NVIM was applied.
- Scattered Trees were subject to a visual assessment only and the DBH was estimated to determine the Scattered Tree category (small or large). Where a tree could be identified to species level, the species was recorded, otherwise it was recorded as *Eucalyptus* sp. If a tree could not be observed clearly, aerial images were reviewed to mark the location of the tree and the tree was recorded as 'not assessed'. Where trees were assessed at a distance a conservative approach to estimating the DBH was applied due to the lack of certainty about

the tree size category. In these instances the tree was assigned the large tree DBH for the most relevant EVC in that location.

All native vegetation, including Scattered Trees and Large Trees in Patches, up to and including the 15 m buffer from the project area were mapped to inform potential impacts to TPZs. Where a patch of native vegetation extended beyond the 15 m buffer, the patch mapping was extended to provide greater context for native vegetation present outside the 15m buffer, but detailed ecological assessment were not typically undertaken within these areas.

#### 3.4.1.2 Preliminary arborist assessment

A preliminary evaluation of remnant native trees was undertaken to identify Scattered Trees or native vegetation patches containing trees that may require an arborist assessment to inform the calculation of native vegetation losses. The reference design for the investigation area was used to broadly identify:

- Trees that may suffer from a 10% or more encroachment into their TPZ's, but that could be retained subject to advice and guidance from an arborist.
- Trees located adjacent to an investigation area for which the investigation area encroaches at least 10% into their TPZ which will require guidance from an arborist on whether the tree will be deemed lost or retained.
- Trees for which there is no possibility of retention, and hence do not need further survey.

This information will be provided to ARTC in future to inform an arborist assessment following refinement to the project design that may outline mitigation measures to reduce overall loss of trees and/or identify areas where impacts to trees have already occurred such as hard stand areas.

#### 3.4.1.3 Mapped wetlands

Where DELWP's *Current wetlands map* identified Mapped Wetlands within the investigation area, these were assessed to confirm their presence and to check whether mapped wetlands had not been replaced by hardened, man-made surfaces.

### 3.4.2 Threatened ecological communities

The previous field assessments completed by KBR (2020a) identified the following EPBC Act-listed and FFG Act-listed TECs within their investigation area:

- EPBC Act
  - Grey Box *Eucalyptus macrocarpa* Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (GBGW).
  - White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and derived Native Grassland (WBYYBRGGW).
  - Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP).
- FFG Act
  - Victorian Temperate Woodland Bird Community (VTWBC)
  - Western (Basalt) Plains Grassland Community (WBPGC).

A precautionary approach was applied when considering whether a particular patch of native vegetation met the criteria listed for each TEC (Appendix D), and not all TECs contained clear criteria for inclusion (WBYYBRGGW and VTWBC). As an example, Box Ironbark Forest is not included in the list of synonymous EVCs for GBGW; however, when considering the characteristics of patches of this EVC in the field against the listing criteria, the thresholds were met. EVCs which were assessed against a particular TEC's criteria are summarised in Table 2.

Where patches of native vegetation within the updated investigation area were contiguous with TECs mapped by KBR (2020a, 2020b), the extent, quality, and species composition were compared against the listing criteria for the relevant EPBC Act and FFG Act-listed TECs (Appendix D) to determine whether the TEC was present.

**Table 2** TECs listed under the EPBC Act and FFG Act and synonymous EVCs

EVC Name	Bioregion*	EPBC Act-listed TEC	FFG Act-listed TEC
EVC 55_61 – Plains Grassy Woodland	CVU NIS VR	GBGW WBYBBRGGW	Grey Box – Buloke Woodland Community VTWBC
EVC 55 – Plains Grassy Woodland	VVP	Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Western Basalt Plains (River Red Gum) Grassy Woodland community
EVC 61 – Box Ironbark Forest	CVU NIS VR	GBGW WBYBBRGGW	Grey Box – Buloke Woodland Community VTWBC
EVC 132 - Plains Grassland	VVP	NTGVVP	WBPGC
EVC 175_61 –Grassy Woodland	CVU	GBGW WBYBBRGGW	Grey Box – Buloke Woodland Community VTWBC
EVC 175_61 – <i>Low rises</i> Grassy Woodland	NIS VR	GBGW WBYBBRGGW	Grey Box – Buloke Woodland Community VTWBC
EVC 803 – <i>Plains Woodland</i>	VR	GBGW WBYBBRGGW	Grey Box – Buloke Woodland Community VTWBC

\*CVU – Central Victorian Uplands, NIS – Northern Inland Slopes, VVP – Victorian Volcanic Plain, VR – Victorian Riverina

### 3.4.3 Targeted fauna survey

#### 3.4.3.1 Woodland bird survey

Targeted survey for listed threatened bird surveys and the VTWBC were completed by KBR in 2019 (KBR, 2020b). The survey was designed to detect the VTWBC suite of birds and EPBC Act listed Swift Parrot, Regent Honeyeater and Painted Honeyeater. Survey methodology was informed by the National Survey Guidelines for Australia's threatened birds (DEWHA, 2010) and consisted of 20 hours of diurnal survey (dawn and dusk) across an eight day period. Surveys were undertaken between 18 and 31 July 2019 at four investigation areas selected due to the extent of woodland habitat:

- Site 1: Short Street (Broadford) [ES03] & SG6
- Site 2: Marchbanks Road (Broadford) [ES04]
- Site 3: Hume Highway (Tallarook) [ES05] & TS5
- Site 4: Seymour Avenel Road (Seymour) [ES06] & SG14 and Hume Highway (Seymour) [ES07]; treated as one site given the contiguous nature of habitat between the sites.

At each site all woodland habitat was subject to survey as were surrounding public areas where habitat extended beyond the investigation area. Since the completion of those targeted woodland bird surveys some changes were made to the investigation area. Additional areas of VTWBC were therefore mapped during the native vegetation assessments (see Section 4.3.2.1). These areas were extensions of previous KBR mapping and as such VQA scores and FFG Act listed ecology determinations completed by KBR were utilised as they were directly comparable to the existing areas mapped by KBR.

### 3.4.3.2 Squirrel Glider, Brush-tailed Phascogale, Barking Owl survey

KBR (2020a) identified three FFG Act listed fauna species for survey:

- Brush-tailed Phascogale
- Squirrel Glider
- Barking Owl

Targeted surveys were undertaken to satisfy the Minister's Condition of Approval which states:

*'targeted surveys and ecological investigations undertaken by suitably qualified persons in accordance with relevant survey guidelines in consultation with DELWP, to inform the prediction of potential environmental impacts of the Project on native vegetation and biodiversity values'*

The targeted survey approach was therefore provided to DELWP for approval.

Surveys were undertaken by AECOM at five sites nominated by KBR (2020a) as having potential to support these species, or new investigation areas connected to those sites:

- Short Street (Broadford) [ES03] & SG6 – Barking Owl only,
- Marchbanks Road (Broadford) [ES04],
- Hume Highway (Tallarook) [ES05] & TS5,
- Seymour Avenel Road (Seymour) [ES06] & SG14,
- Hume Highway (Seymour) [ES07]; although KBR (2020a) did not recommend survey for Squirrel Glider or Brush-tailed Phascogale at this site, potential habitat was identified.

Surveys were undertaken in late-spring to early-summer and comprised:

- Hollow-bearing tree assessment to identify potential den and/or nest trees (high value assets) for the three species and inform targeted survey to maximise chance of detection. Daytime searches were undertaken for potential nest trees and signs of activity such as scratches on tree trunks or scats on the ground.
- Targeted survey using remote cameras, spotlighting and call playback (Barking Owl only).

A summary of the survey method, duration and effort provided to DELWP is outlined in Table 3.

**Table 3 Targeted survey method summary**

Species	Method	Duration	Effort per site
Brush-tailed Phascogale Squirrel Glider	Daytime survey to identify potential den / nest trees	Variable	1
	Spotlight survey	30 minutes per 500m; maximum 1km	2
	Remote cameras	Minimum 14 days	10
Barking Owl	Call playback	12 minutes	5
	Spotlight survey	Up to 15 minutes, 200 m	

A more detailed outline of the method and results of the targeted survey is provided in the targeted fauna survey report in Appendix C.

### 3.4.3.3 Striped Legless Lizard habitat assessment

Targeted habitat assessments were undertaken for Striped Legless Lizard (SLL) in those areas not assessed by KBR (2020). Potential habitat for SLL includes areas of treeless grassland or grassland with scattered eucalypts that support a complex structure of grass tussocks (native or introduced), cracking soils, or scattered surface rock. SLL are unlikely to persist in areas that have been

substantially modified (e.g. small areas in an otherwise developed landscape or areas subject to extensive soil disturbance such as intensive grazing or ploughing). The targeted Striped Legless Lizard habitat assessments focussed on the enhancement sites as track slews and signal gantry project areas were contained within the existing rail corridor and disturbed areas. SLL habitat within the buffered land will not be impacted and hence detailed habitat assessment were not undertaken in these areas.

Assessments were initially undertaken by the DELWP qualified VQA assessors and confirmed by experienced zoologists.

#### 3.4.4 Targeted flora survey

KBR (2020a) recommended three flora species for targeted survey north of Beveridge including Euroa Guinea-flower *Hibbertia humifusa* subsp. *erigens*, Crimson spider-orchid *Caladenia concolor*, and Purple Diuris *Diuris punctata* var. *punctata*. KBR (2020c) identified areas within the investigation area that may contain habitat for these species and undertook surveys in October 2019 at the following enhancement sites:

- Hume Highway (Tallaroak) [ES05] & TS5
- Seymour Avenel Road (Seymour) [ES06] & SG14
- Hume Highway (Seymour) [ES07]

During the targeted surveys, none of the three threatened flora species were identified and KBR (2020c) noted that the habitat was generally marginal as the investigation areas have poor, rocky soils, with a sparse and shrubby understorey. Based on KBR's (2020c) notes, targeted surveys for these flora species were not undertaken by the current Project; however, any incidental records of these, and other threatened species, were recorded during the field assessment.

#### 3.4.5 Private land access

Access was facilitated by ARTC to all private property requiring assessment except a single property associated with the Hume Highway (Tallaroak) [ES05] & TS5 enhancement site. This did not impact the overall assessment as the area of interest was surveyed within the Hume Highway road reserve (with relevant consent from Regional Roads Victoria).

#### 3.4.6 Field assessment assumptions and limitations

This section describes the assumptions and limitations associated with the field assessment. Discussion of assumptions underpinning the impact assessment are provided in Section 3.5.3. The field assessment was subject to the following assumptions and limitations:

- The spatial analysis of biodiversity attributes is complex and has significant limitations when it is driven by historical record data such as the VBA. The timing of surveys and incidental observations may not correspond with ideal sampling periods; there may be limited survey effort in the area if it is extensively private land; some species have naturally low detectability rates; Not all locations of records in the VBA are precise, with the actual accuracy of a record can range from +/- 1 m to +/- 500 m; and the validity of records accepted by the VBA was not assessed as part of KBR (2020a).
- Mapping was conducted using hand-held units (iPhone 10 and Samsung Galaxy S8) and aerial photo interpretation. The accuracy of the mapping is subject to the accuracy of the units and access to satellite information (generally  $\pm 5$  metres). As such, these points should not be relied on for detailed design purposes.
- Data from previous studies (KBR, 2020a, b, c) 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, potential discrepancies in the collection of field-based ecological data was noticed. Subject to the potential for future disturbance, some of these discrepancies may require resolution at the detailed design stage and prior to the finalisation of the offset obligations of the project.
- This assessment includes terrestrial vascular plant species (ferns, conifers and flowering plants) and terrestrial vertebrate fauna (mammals, birds, reptiles, and frogs). Non-vascular flora (e.g. mosses, liverworts, lichens), fungi and terrestrial invertebrates have not been considered as part of

this assessment, except where listed threatened species are known or suspected to occur, or where bryophytes comprise part of an EVC benchmark.

- The advice relating to biodiversity legislation and policy does not constitute legal advice. This technical study has been undertaken to identify the ecological features present with the investigation areas. The advice given in relation to legislative implications is general in nature and based on AECOM's understanding of the proposed works at the time of field assessments.
- A full list of all flora and fauna identified during the assessment is not provided; however, those species listed as threatened under the EPBC Act and FFG Act, and flora species listed as 'Protected' under the FFG Act have been summarised. This list is not considered to be exhaustive, as limitations such as survey timing or naturally low detectability rates may have resulted in some species remaining undetected.
- Individual native (i.e. FFG Act listed, Protected Flora species, and VROTS) and non-native plants were not mapped as part of this assessment but rather have been recorded as part of VQA assessments for each habitat zone. The exception to this are Scattered Trees and Large Trees in Patches which are required to be mapped in accordance with the Guidelines
- An full arborist assessment was not conducted as part of this field assessment.

## 3.5 Impact assessment

### 3.5.1 Impact analysis for native vegetation

Impacts to native vegetation were calculated using GIS tools. The calculation of impacts required a number of considerations based on the Assessors Handbook (DELWP, 2018b), advice from DELWP, the impact area (reference design plus 15 m buffer) provided by ARTC, and the assumptions and limitations outlined in Section 3.5.3.

#### 3.5.1.1 Determining impact extent

##### *The Guidelines and TPZs*

The total extent of native vegetation was calculated for patches (including mapped wetlands) in hectares. The 'extent' of Scattered Trees was expressed as the area of a circle with a 15 metre radius for large trees and 10 metre radius for small trees (DELWP, 2018a). All vegetation that fell within the impact area was considered lost, as detailed construction methods and specific refinements to proposed working locations were not available at the time of calculation.

As per DELWP guidance, the Project must consider impacts not only to the native vegetation that will be directly removed but also to Scattered Trees and small or Large Trees in Patches of native vegetation that may be indirectly lost as a result of encroachments into their TPZ. Appendix 2, Section B.1 of the Assessor's Handbook (DELWP, 2018a) states that '*unless an arborist report indicates otherwise, a tree, or trees will be deemed lost if the encroachment (of compaction and excavation) into the TPZ is greater than 10 per cent, or is inside the Structural Root Zone (SRZ)*'. An arborist assessment may result in the protection of trees and reduction of impacts; however, this has not been completed to date.

To address the potential for indirect impact on TPZs in accordance with DELWP (2018a), the current assessment took a conservative approach and considered an impact area which incorporated a 15 m buffer on the reference design area as the maximum TPZ for a large tree within any EVC is 15 m. If a patch of native vegetation extended outside of the 15 m buffer, the impact extent was clipped to the edge of the 15 m buffer. Scattered Trees and/or Large Trees in Patches were considered impacted if their trunk was located within the 15 m buffer.

##### *Access tracks*

The impact areas contain a number of existing access tracks that will be used to access the sites. ARTC have advised that these access tracks were originally constructed to allow for the movement of light and heavy vehicles such as cranes and excavators to allow for the safe and efficient function of the rail corridor.

Construction activities for the track slew and signal gantry works will be conducted from the hi-rail and existing access tracks. As works are contained to the rail corridor and existing access tracks, impacts to

access tracks and the margins of the impact area are not anticipated. Therefore, based on the proposed works and ARTC advice, impacts to vegetation associated with track slews and signal gantries have been excluded from the impact assessment.

At enhancement sites, existing access tracks may be moved or new access tracks constructed. These will be considered during the detailed design process and any unavoidable impacts accounted for at that time.

### 3.5.1.2 Overlaps in investigation areas

#### Overlaps between enhancement sites, track slews, and signal gantry investigation areas

Due to the overlap between the enhancement site, track slew, and signal gantry investigation areas, some locations are grouped as a single unit to avoid overstating the ecological values and native vegetation losses. These areas:

- SG13 & TS3
- SG19 & TS4
- Seymour Avenel Road (Seymour) [ES06] & SG14
- Hume Highway (Seymour) [ES07].

Where an overlap occurred between the enhancement site, track slew, and signal gantry investigation areas, native vegetation impacts were assigned to a site-based on the following hierarchy:

1. Enhancement sites
2. Track slews
3. Signal gantries

As an example, the SG19 & TS4, and Seymour Avenel Road (Seymour) [ES06] & SG14 investigation areas overlap. In this instance, impacted native vegetation that crosses multiple investigation areas is first assigned to the enhancement site (Seymour Avenel Road (Seymour) [ES06]). Where mapped native vegetation occurs within TS4 but is outside of the enhancement site, mapped native vegetation is assigned to TS4. As SG19 & SG14 fall completely within TS4 and Seymour Avenel Road (Seymour) [ES06] respectively, impacts are assigned completely to the enhancement site.

In instances where a signal gantry does not overlap any other investigation areas, such as SG3, all impacts are assigned solely to it.

#### Overlaps between overhead powerline investigation areas and enhancement site, track slew, and signal gantry investigation areas

Where overlap occurred between overhead powerline and enhancement sites investigation areas, the impact was assigned to the enhancement site. As impacts to track slews and signal gantries have been excluded, where overhead powerline, track slew, and signal gantry investigation areas overlapped, impacts were assigned to the overhead powerlines. Impacts to overhead powerlines are presented in AECOM (2021a).

### 3.5.1.3 Calculating landscape context scores

Due to the large extent of land that extends across the investigation area, and the large number of habitat zones assessed, an automated method for calculating the landscape context component of the VQA was utilised. The landscape context is the *'measure of the viability and functionality of a patch of vegetation in relation to its size and position in the landscape in relation to the surrounding vegetation'* (DSE, 2004a). Landscape context includes three components – Patch Size, Neighbourhood and Distance to Core Area. DSE (2004) allows for the landscape context to be calculated manually in the field or via GIS-based tools.



The automated GIS method calculated the landscape context score using a combination of publicly available data and GIS tools:

- DELWP Native Vegetation Removal (NVR) 2017 EXTENT dataset: This comprehensive dataset contains the extent of vegetation within Victoria including large intact areas of native vegetation such as state forest as well as fragmented native vegetation patches and scattered trees. The dataset has been developed from two separate modelling and remote sensing exercises involving a number of datasets from satellites and air-borne sensors. In addition to a variety of remote sensing techniques, the satellite sensor was 'trained' to distinguish woody vegetation from grasslands and native from non-native vegetation.
- Patch Size score was based on a review of the DELWP NVR2017 mapping in the wider landscape. In accordance with DSE (2004) vegetation linkages >50 m wide connected to and linking large areas of native vegetation are considered the same patch. Those patches <50 m wide are differentiated as a separate patch. For the purpose of this assessment all native vegetation is identified as 'significantly disturbed' due to past vegetation clearance and landscape modification.
- Neighbourhood Score was calculated using GIS and the DELWP NVR2017 Extent dataset. In accordance with DSE (2004) the configuration of native vegetation within three 'neighbourhood' radii (100 m, 1 km and 5 km) was calculated and rounded to the nearest 20%. Two was subtracted from the final score as the vegetation identified was 'significantly disturbed'.
- Distance to Core Area was calculated by locating the nearest core area defined as *any patch of native vegetation greater than 50 ha regardless of type, quality or tenure*. The nearest core area was based on the DELWP NVR2017 Extent dataset.

Whilst the mapped patches of native vegetation were often relatively small and clipped to the 15m buffers of the investigation areas, native vegetation values extended along the rail corridor and represented areas of long, linear remnant vegetation patches. Thus, their distance to core area as described by the VQA manual (DSE, 2004a) was considered 'continuous' and these patches received an appropriately high score.

### 3.5.2 Other factors

Based on the scale of the Project, the location in which the Project occurs (Location 1 and Location 2), the extent of native vegetation potentially impacted and the presence of large trees, native vegetation removal associated with the Project will be assessed under the detailed assessment pathway as per the Guidelines (KBR, 2020a). The impact assessment therefore addresses the requirements of the Guidelines as outlined in Appendix I. As the Project will be assessed under the detailed assessment pathway (DELWP, 2017a), additional consideration needs to be given to the biodiversity value of native vegetation to be removed including:

- the extent
- the condition score
- the strategic biodiversity value (SBV) score
- the number and circumference of any large trees
- whether it includes an endangered Ecological Vegetation Class
- whether it includes sensitive wetlands or coastal area.

In addition, consideration needs to be given to impacts on habitat for rare or threatened species (DELWP, 2017a).

Tables 7, 8 and Table 9 of the Assessors Handbook (DELWP, 2018a) outline the considerations for biodiversity value and the factors that determine whether not native vegetation should be considered as being of lower or higher value. To identify areas of higher value within the investigation area, additional factors have been included in the impact assessment:

- 'Endangered' EVCs
- Areas of 'high quality' native vegetation

- DELWP's Strategic Biodiversity Values (SBV)
- FFG Act-listed threatening processes.

### 3.5.2.1 'Endangered' EVCs

Bioregional Conservation Status (BCS) of an EVC is a reflection of 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).

### 3.5.2.2 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  $\geq 0.60 - 1$  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 Native Vegetation Information Management (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.

### 3.5.2.3 Strategic Biodiversity Values

DELWP's 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.

### 3.5.2.4 Threatening processes

The potential for the Project to exacerbate threatening processes forms part of the impact assessment. In addition to clearing of native vegetation (land clearing), other potential threatening processes included weeds, pest animals, loss of hollow-bearing trees and habitat fragmentation. Most of these threatening processes are recognised as threats under the EPBC Act and/or FFG Act.

#### *Weeds*

The presence of weed species was incidentally noted during the vegetation and habitat assessments. Invasive plants (weeds) can compete with and displace native flora which alters vegetation communities and affects habitat suitability for native fauna. Weeds are listed and categorised under the CaLP Act based on management requirements for those species (Table 4). The Australian Government has also listed 32 species as Weeds of National Significance (WoNS) under the National Weeds Strategy 2017 - 2027 (Invasive Plants and Animals Committee, 2017) as having high levels of invasiveness, potential for spread and negative social and economic impacts.

**Table 4 CaLP Act Declared Noxious Weed Management requirements**

Weed Category	Enforceable Management Requirement
State prohibited weeds (SP)	Either do not occur in Victoria but are a significant threat if they do invade, or are weeds that are present and pose a serious threat. SP weeds are expected to be eradicated, as infestations are generally small. The Victorian Government is responsible for the eradication of these weeds and may direct land owners to prevent growth and spread.
Regionally prohibited weeds (RP)	Are not widely distributed in a region but are capable of spreading further. Eradication from a region is a reasonable expectation and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate these weeds on their land.
Regionally controlled weeds (RC)	Usually widespread in a region and require ongoing control to prevent their spread. Land owners are responsible for taking all reasonable steps to prevent the growth and spread of these species on their land.
Restricted weeds (R)	Includes weeds that pose an unacceptable risk of spreading in Victoria and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules (plants, seeds or contaminants in other materials) is prohibited.

The presence of weeds was also noted because under both the CaLP Act and WoNS guidelines, proponents are required to take all reasonable steps to prevent the growth and spread of noxious weeds.

#### *Pest animals*

Introduced predators such as foxes and feral cats directly threaten native fauna via predation (DSE, 2003d; DSE, 2004b). Other introduced species such as rabbits and hares can cause indirect impacts through land degradation and can have significant impacts on native vegetation and fauna habitat

The presence of pest animals was incidentally noted during the field assessments.

#### *Hollow-bearing trees*

Hollow-bearing tree assessments were completed at five enhancement sites as a component of threatened fauna surveys the methodology of which is described in Targeted Fauna Survey Spring 2020 provided in Appendix C.

Whilst hollow bearing tree assessments were only completed at five enhancement sites all investigation areas mapped as containing large trees (Scattered Trees and Large Trees in Patches) are likely to contain hollows as hollows tend to form in older trees and dead trees (Mackowski, 1984). To determine an estimate of hollow bearing trees within investigation areas not subject to hollow tree mapping, the number of hollow bearing trees recorded at each of the enhancement sites where assessments were completed was compared to the number of large old trees (either scattered or within patches) as assessed during vegetation quality assessments. A summary of large trees per investigation area is provided in Section 4.3.1, Table 11. From this comparison an average ratio of 0.65 hollow bearing trees for each large tree was calculated. This ratio was then applied to each investigation area not subjected to targeted habitat assessment to provide a hollow bearing tree estimate. All calculations were rounded to the nearest whole number.

It is acknowledged that whilst hollows tend to form in older trees, during the targeted habitat assessment hollows were observed in trees that did not meet the definition of a large tree. Furthermore, the species of canopy tree also plays a role in the number of hollows present within trees, with some tree species more readily forming hollows than others (Gibbon and Lindenmayer, 1997). None the less, the calculation is considered to provide a good indicative measure of hollow bearing tree abundance and a basis on which potential impacts can be estimated.

### *Habitat connectivity*

KBR (2020b) completed a habitat connectivity analysis for woodland birds of the VTWBC. As part of this analysis, KBR produced landscape context maps that showed Parks and Conservation Reserves in the wider landscape in relation to the proposed VTWBC impact areas. Through this visual representation of habitat connectivity they were able to show locations where habitat and dispersal opportunities remained and areas in which the Project would result in habitat connectivity being interrupted.

Habitat connectivity was also considered during the field assessments in 2020/2021 and through a review of aerial photography to visually identify linkages in the landscape.

### **3.5.3 Impact assessment assumptions and limitations**

This report was prepared at a point in the Project where the initial Reference Design was being refined and progressively moving towards a final detailed design. As such, the impacts of the Project on vegetation and ecological values are assessed based on the Reference Design and may be refined further during detailed design or as methods of construction are resolved during the delivery phase of the Project. However, the extent to which detailed design and construction approach may further reduce vegetation clearance and associated impacts is unknown. Hence the impacts presented in this report are based on the impacts defined by the Enhancement Site Reference Design with a 15 m buffer.

A summary of the assumptions used to underpin the impact assessment includes:

- **Enhancement sites**

- Where overhead powerline investigation areas intersect enhancement site investigation areas, ecology impacts will be assessed under the enhancement sites.
- To account for potential indirect 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.
- Data from previous assessments were combined with the most recent assessments. It was assumed that all data from the previous assessments (KBR, 2020a, b, c) is accurate and correct.

- **Track slew and signal gantry sites**

- An assumption has been made that track slew and signal gantry works will have no indirect impacts to ecological values within the 15 m buffer as 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.

- **General**

- ARTC have advised that installation of 'Next Generation' cabling will be required as part of the Project works; however, due to the stage of the project design, impact quantum for these cables cannot currently be assessed. ARTC have provided indicative locations of the next generation cabling which have been included in Figure 6. A desktop review against current mapping suggests that between 2 – 2.5 ha of native vegetation may be impacted; however, ARTC must assess the impacts once detailed design and development of construction methodology has been determined. These impacts are not included as part of the overall impact to native vegetation contained in this assessment.

## 4.0 Existing conditions

The following sections summarise the findings of the recent AECOM field survey in addition to the findings of KBR's desktop and field surveys (KBR, 2020a, b, c).

Ecological values described below include MNES protected by the EPBC Act (threatened species and ecological communities) and state significant values listed under the FFG Act and/or advisory lists (DSE, 2013; DEPI, 2014).

Consideration of state significant values includes native vegetation, threatened ecological communities listed under the FFG Act, threatened flora and fauna species listed FFG Act and/or advisory lists (DSE, 2013; DEPI, 2014), flora listed as 'protected' under the FFG Act, the presence of hollow-bearing trees, and linkages in the landscape.

### 4.1 General description of the investigation area

The Project generally occurs within a highly modified environment, dominated by road and rail infrastructure, in addition to land cleared for agricultural purposes or rural centres. Interspersed amongst this are areas of remnant native vegetation and habitat that occur on public and private land.

Topographically, a large portion of the Project occurs north of the Great Dividing Range within north-east Victoria where patterns in vegetation communities are driven by soils depth, soil fertility and rainfall patterns. The result is the dominance of a select few EVCs comprised of Plains Grassy Woodland (EVC 55), Box-Ironbark Forest (EVC 61), and Grassy Woodland (EVC 175\_61). Beyond these dominant EVCs, a range of additional EVCs were also recorded but to a lesser extent. A description of the EVCs is presented in Table 9.

Native vegetation communities were characterised by mature Eucalypt canopy trees including, but not limited to, Grey Box, Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *Eucalyptus melliodora*, and River Red Gum *Eucalyptus camaldulensis*. The mid-storey shrub layer featured a suite of Acacia species including Lightwood *Acacia implexa*, Gold-dust Wattle *Acacia acinacea*, and Varnish wattle *Acacia verniciflua* as well as other species common to central Victoria such as Sifton Bush *Cassinia sifton*, and Gorse Bitter-pea *Daviesia ulicifolia*. The ground cover was sparse but generally comprised of species such as Spiny-headed Mat-rush *Lomandra longifolia*, Pale Flax-lily *Dianella longifolia s.l.*, Wallaby Grass *Rytidosperma* spp., and Kangaroo Grass *Themeda triandra*.

Enhancement Site investigation areas were located in rural centres such as Broadford, Seymour, and Wangaratta, and along road and rail corridors. The Track SLEWS and Signal Gantry investigation areas were located largely within the rail corridor and adjacent to road corridors or farmland.

Native vegetation within the rail corridors and road reserves was generally considered to be the highest quality due to its continuity, width (varying between 20 m and 80 m wide), presence of Large Trees in Patches, and relatively intact understorey supporting a variety of lifeforms (Plate 1). Where these investigation areas overlapped with larger extents of native vegetation within the rail corridor, the EVCs present were often consistent with a TEC; notably the endangered GBGW (Plate 2).

Outside of the rail corridor, EVCs varied in extent and quality. Where EVCs were present they were defined as areas supporting canopy trees atop a modified understorey or were mapped based on the presence and cover of native understorey species. A number of noxious weeds were also present, with a list provided in Section 4.5.1.

Vegetation around rural centres was generally a mix of planted non-native tree species such as Pin Oak *Quercus palustris* (Plate 3) and native tree and shrubs species such as Spiny-head Mat-rush *Lomandra longifolia*, Pale Flax-lily *Dianella longifolia s.l.*, and Kangaroo Grass *Themeda triandra* (Plate 4). There were also local parks and reserves such as Lions Park, Broadford which contained disturbed but intact remnant native vegetation and a mature, developed canopy of River Red Gums.

The rail corridor also contained a number of unmaintained drainage lines, culverts, and river/tributary crossings which contained native wetland species such as Cumbungi *Typha* spp., Common Spike-rush *Eleocharis acuta*, and Common Swamp Wallaby-grass *Amphibromus nervosus*, as well as exotic wetland species such as Toowoomba Canary-grass *Phalaris aquatica*, and Drain Flat-sedge *Cyperus eragrostis*. Blackberry *Rubus polyanthemus*. was also recorded across the investigation areas in association with disturbed and degraded areas of native vegetation.





**Plate 1** Large tree within the Seymour-Avenel Road roadside adjacent to SG19 & TS4



**Plate 2** TEC, Grey Box (*Eucalyptus macrocarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia, adjacent to SG19 & TS4.





**Plate 3** Planted Pin Oak within the Broadford-Wandong Road (Wandong) [ES01] investigation area.



**Plate 4** Planted native vegetation within the Beaconsfield Parade (Glenrowan) [ES10] investigation area.



## 4.2 Matters of National Environmental Significance

The findings of the EES decision dated 23 August 2020 identified TECs and threatened species as the MNES of relevance to the Project.

### 4.2.1 Threatened ecological communities

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

- GBGW – listed as endangered under the EPBC Act.
- NTGVVP – listed as Critically Endangered under the EPBC Act.

The location and extent of all TECs is provided in Figure 9 (Appendix A) and summarised in Table 5.

**Table 5** Locations of all EPBC Act-listed TECs mapped across the investigation areas.

EPBC Act TEC	Investigation area	Habitat Zones	Total number of Habitat Zones	Extent mapped (ha)
	Hume Highway (Tallarook) [ES05] & TS5	HZ 23 HZ 438	2	10.043
Grey Box ( <i>Eucalyptus macrocarpa</i> ) Grassy Woodlands and Derived Native Grasslands	SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	HZ 102 HZ 103 HZ 124 HZ 127 HZ 272 HZ 273 HZ 274 HZ 282 HZ 283 HZ 284 HZ 285 HZ 289 HZ 324 HZ 325 HZ 336 HZ 338 HZ 367 HZ 368 HZ 369 HZ 373 HZ 444 HZ 453	23	59.791
Natural Temperate Grassland of the Victorian Volcanic Plain	SG2 & TS1	HZ 401 HZ 421	2	0.619

Two patches of WBYBBRGGW (EVC 803 – Plains Woodland) previously identified at the Beaconsfield Parade (Glenrowan) [ES10] enhancement site by KBR (2020a) are no longer within the investigation area following revision to the boundary. These two patches are now located east of the current investigation area and potential loss of the TEC has been avoided. WBYBBRGGW is therefore not considered further in this report.

#### 4.2.1.1 Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and derived Native Grasslands

GBGW is listed as endangered under the EPBC Act. The fragmented remains of GBGW are often degraded and 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 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 can be naturally absent or purposefully cleared from this community, 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 (Department of Sustainability, Environment, Water, Planning and Community; DSEWPaC, 2012a).

A total of 25 patches, totalling 69.834 ha, of the GBGW TEC were identified during the field assessment (Table 5), based on occurrences of Plains Grassy Woodland (EVC 55), Box Ironbark Forest (EVC 61), and Grassy Woodland (EVC 175) which meet the criteria for GBGW. The location of these patches is shown in Figure 9 (Appendix A). GBGW was generally represented in the field by a mature Grey Box overstorey and a relatively undisturbed and diverse understorey with a variety of shrubs, grasses, and herbs (Plate 5). The majority of large trees were located in road reserve adjacent to the rail corridor.



Plate 5 TEC, Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands, adjacent to SG19 & TS4

#### 4.2.1.2 Natural Temperate Grasslands of the Victorian Volcanic Plain

NTGVVP is listed as critically endangered under the EPBC Act. NTGVVP is endemic to south-western Victoria within the Victorian Volcanic Plain bioregion. The community is dominated by Kangaroo grasses, wallaby grasses, spear grasses, and tussock grasses *Poa* spp. Plains Grassland (EVC 132) has been mapped within the investigation area and these EVCs are often synonymous with NTGVVP (DSEWPaC, 2011).

Two patches, totalling 0.619 ha, were identified at SG2 & TS1 by KBR (2020a) were identified (Table 5). The location of these patches is shown in Figure 9 (Appendix A). These two patches were deemed by KBR (2020a) to be large enough and contained at least 50 per cent cover of native grassland species to meet the thresholds for the TEC (Appendix D). The patches are located within the heavily disturbed rail corridor and are threatened by weeds such as perennial grasses, Toowoomba Canary-grass, Cocksfoot *Dactylis glomerata*, and thickets of Gorse *Ulex europaeus*. Both patches include areas that are occasionally inundated, with a small area of Cumbungi, surrounded by native grassland species such as Kangaroo Grass and Tussock Grass. Field assessment conducted in November 2020

also noted a number of Sun-orchids *Thelymitra* spp. (non-flowering) and Bulbine Lily *Bulbine bulbosa* within patch HZ401 (Plate 6). ARTC have noted that impacts to these patches will be avoided, therefore impacts to this TEC have not been considered.



Plate 6 Sun-orchids, Natural Temperate Grasslands of the Victorian Volcanic Plain TEC, adjacent to SG2 & TS1.

#### 4.2.2 Threatened flora species

Five flora species listed as threatened under the EPBC Act were identified to have a moderate or high likelihood of occurrence within the investigation area (Table 6) (KBR, 2020a). Four of those species are also listed as threatened under the Victorian FFG Act.

Targeted flora surveys were conducted in September – October 2019 for species identified with a moderate or high likelihood of occurrence (KBR, 2020c). The exception to this were species identified as having potential suitable habitat at SG2 & TS1 and SG17 which was avoided by the Project by reducing the investigation area. This included Matted Flax-lily *Dianella amoena*, Swamp Everlasting *Xerochrysum palustre*, or Swamp Fireweed *Senecio psilocarpus* (KBR, 2020a).

Three records of Matted Flax-lily were identified from the VBA database search (Figure 7) in close proximity to SG01 on the eastern side of the rail corridor. During field assessment, access was only available on the western side of the rail corridor so these records could not be re-visited; however, they are outside of the SG01 project area and impacts to vegetation adjacent to signal gantries have been avoided (Section 3.5.3).

Table 6 EPBC Act-listed threatened flora species identified by KBR (2020a) to have a moderate or high likelihood of occurrence within the investigation area

Scientific Name	Common Name	EPBC	FFG	VROT*
<i>Caladenia concolor</i>	Crimson spider-orchid	VU	L	en
<i>Hibbertia humifusa</i> subsp. <i>erigens</i>	Euroa Guinea-flower	VU	L	vu
<i>Dianella amoena</i>	Matted Flax-lily	EN	L	en
<i>Swainsona recta</i>	Mountain Swainson-pea	EN	L	en
<i>Senecio psilocarpus</i>	Swamp Fireweed	VU		vu
<i>Xerochrysum palustre</i>	Swamp Everlasting	VU	L	vu

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



The field assessments did not identify any of the threatened flora species listed in Table 6. KBR (2020c) noted that the habitat was generally marginal as the investigation areas have poor, rocky soils, with a sparse and shrubby understorey.

Populations of Euroa Guinea-flower and Mountain Swainson-pea were not recorded during targeted survey (KBR, 2020c) but were recorded as part of the overhead powerline investigation area assessments by KBR (2020d) and observed during the overhead powerline existing conditions assessment (AECOM, 2021a). These observations are outside the investigation area and are therefore not discussed further.

KBR (2020a) located a number of unidentified orchids (not flowering) between Broadford and Mangalore, including a potential Spider-orchid leaf *Caladenia* spp. It was noted that the EnSym results identified modelled habitat for the EPBC Act-listed Crimson Spider-orchid *Caladenia concolor*, and that the Seymour Avenel Road (Seymour) [ES06] & SG14 and Hume Highway (Seymour) [ES07] enhancement sites may meet the habitat requirements for this species. Targeted survey for this species by KBR (2020c) undertaken during its flowering period (August – October) in September and October 2019, and at the same time as flowering occurred at local reference sites, did not identify any individuals. The species is therefore not considered to occur within the investigation area.

#### 4.2.3 Threatened fauna species

Seven threatened fauna species listed under the EPBC Act were identified by KBR (2020a) to have a moderate or high likelihood of occurrence within the investigation area (Table 7). All species identified are also listed under the FFG Act.

**Table 7 EPBC Act-listed threatened fauna species likely to occur within the investigation area (KBR, 2020a).**

Common name	Scientific name	EPBC Act	FFG Act	DELWP advisory list
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	VU	L	vu
Swift Parrot	<i>Lathamus discolor</i>	EN	L	en
Painted Honeyeater	<i>Grantiella picta</i>	VU	L	vu
Regent Honeyeater	<i>Anthochaera phrygia</i>	CR	L	cr
Striped Legless Lizard	<i>Delma impar</i>	VU	L	en
Growling Grass Frog	<i>Litoria raniformis</i>	VU	L	en
Golden Sun Moth	<i>Synemon plana</i>	CR	L	cr

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

A discussion on each of these species is provided by subheading below. This discussion is informed by KBR (2020a, b) and observations made by AECOM during targeted fauna surveys and vegetation assessments in spring / summer of 2020 / 2021.

#### 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, however, is unlikely to make significant use of any of the vegetation or habitat present with the investigation area. The investigation area is not located in proximity to a known roost site (camp) for the species (DECCW, 2009). The species is considered to have a moderate likelihood of occurrence in the investigation area (KBR, 2020a).

#### Swift Parrot, Regent Honeyeater and Painted Honeyeater

Swift Parrot, Regent Honeyeater and Painted Honeyeaters were not observed during the winter 2019 surveys (KBR, 2020b).

A review of the landscape by KBR (2020b) identified the closest important or critical habitat for these threatened birds as being Puckapunyal Military Area, Mangalore Conservation Reserve and an area

south of Avenel (Mangalore Ammunition Depot). The 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, 2019), and the VTWBC.

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

- Seymour Avenel Road (Seymour) [ES06] & SG14
- Hume Highway (Seymour) [ES07]
- Hume Highway (Tallarook) [ES05] & TS5
- SG11 & TS2
- Beaconsfield Parade (Glenrowan) [ES10]

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 habitat within the investigation area as a corridor as they move through the landscape seeking foraging resources (D. Pendavingh, DELWP, pers. comm 2019 cited in KBR, 2020b). Priority foraging habitat for Swift Parrot in Victoria located closest to the investigation area is Rushworth State Forest, approximately 33km north of the Hume Highway Seymour Precinct (Seymour) (Saunders & Tzaros, 2011). Swift Parrot may sporadically occur within the investigation areas when moving between more extensive areas of foraging trees (KBR, 2020b).

Regent Honeyeater are highly mobile and move throughout Victoria in spring when eucalypts are flowering and are more likely to inhabit important foraging areas of box-ironbark forest in winter. 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 (KBR, 2020b).

Painted Honeyeater was initially considered by KBR (2020a) to have a moderate likelihood of occurrence at investigation areas contiguous with other woodland habitat and with areas likely to contain large trees and mistletoe, the species favoured food source, such as Beaconsfield Parade (Glenrowan) [ES10]. However, due to the low density of key feed resources, the habitat is unlikely to be important for the species (KBR, 2020b). The likelihood of Painted Honeyeater occurring in the investigation area has therefore been revised to low.

### **Striped Legless Lizard**

Striped Legless Lizard was initially considered by KBR (2020a) to have a moderate likelihood of occurrence at SG2 & TS1, Wallan and a low/moderate potential to occur in sparsely treed, grassy woodland areas including an area identified at Seymour Avenel Road (Seymour) [ES06] & SG14 which was to be avoided by the Project at the time of the assessment.

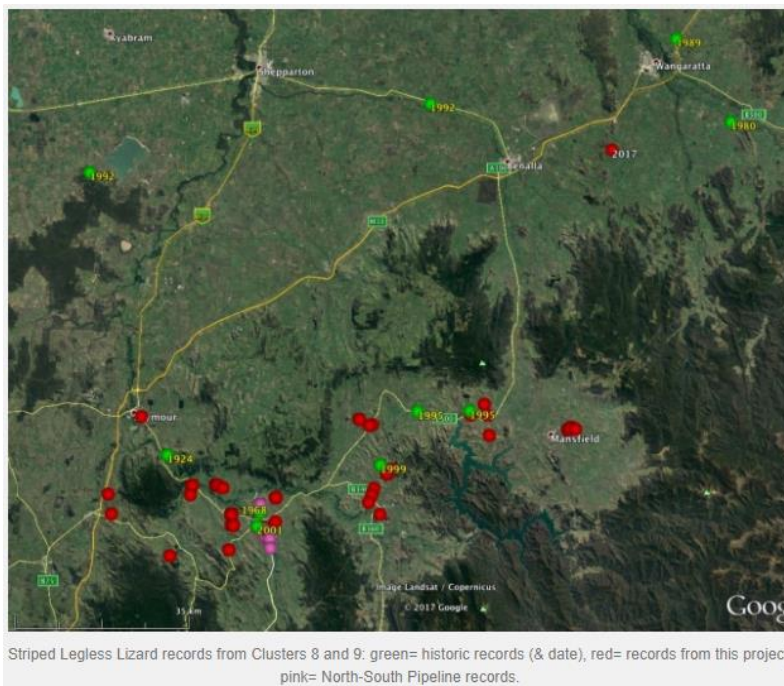
The distribution of Striped Legless Lizard in northeast Victoria is poorly known but its historic distribution included grasslands and grassy woodlands of northern and north-central Victoria. In 2002 the North East Striped Legless Lizard Project began to investigate the distribution and status of Striped Legless Lizard in the Goulburn Broken Catchment. The project is a collaboration of the Victorian Government, Goulburn Broken Catchment Management Authority, Upper Goulburn Landcare Network, Strathbogie Ranges Conservation Management Network and Trust for Nature.

According to the North East Striped Legless Lizard Project (Lobert, undated), the presence of the species in the north east catchment was only determined about 30 years ago with a few records around Wangaratta and Benalla. One of its Victorian strongholds is the upper Goulburn River catchment around Seymour, Yea, Alexandra and Mansfield. Prior to 2002, several specimens were found around Rushworth and Stewarton near Benalla in 1992, Bonnie Doon in 1995, Merton in 1995, Alexandra in 1999, and Yea in 2001. Since then there have been records 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).

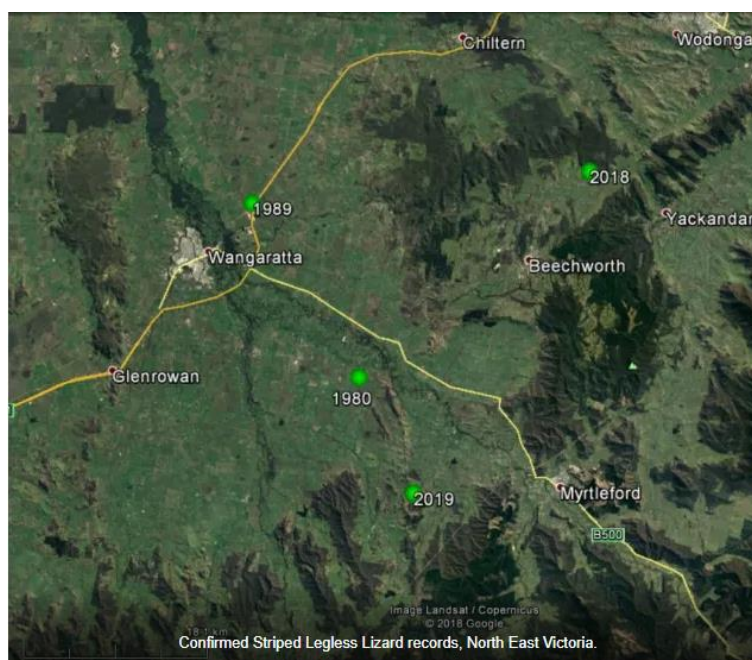
Based on recent records it appears the species is widely distributed in grassland and lightly wooded grassy woodland areas in north east Victoria, primarily on the lower slopes of mountain ranges in the

Central Victorian Uplands bioregion. Some of the more recent detections around Greta West and Oxley were from atypical grassy woodland habitat on a river floodplain which suggests the species could occur in a wider range of habitat types than previously thought.

The distribution of records from the Striped Legless Lizard project (Plate 7 and Plate 8) indicates that the species is more likely to be found between Broadford and Seymour and potentially around Benalla and Wangaratta than elsewhere in the investigation area.



**Plate 7** Records of Striped Legless Lizard northeast Victoria. Source: <https://goulburnbrokendelmaimpar.wordpress.com/>



**Plate 8** Records of Striped Legless Lizard (green points) east of Wangaratta. Source: <https://goulburnbrokendelmaimpar.wordpress.com/>



Around Broadford there are VBA records from 2010 (near Hamilton Street (Broadford) [ES02] & SG18) and 2012 (near Short Street (Broadford) [ES03] & SG6, Marchbanks Road (Broadford) [ES04], and Hamilton Street (Broadford) [ES02] & SG18) (KBR, 2020b).

As a semi-fossorial species, a key determinant of Striped Legless Lizard occurrence is the degree of soil disturbance and compaction that has occurred at a site. As such, areas disturbed by past rail construction in the rail corridor are unlikely to support the species. However, the potential for Striped Legless Lizard to occur in undisturbed grassland or grassy woodland areas offline of the rail but within the investigation area cannot be discounted.

Striped Legless Lizard has potential to occur in areas of Plains Grassland and non-native grassland plains grassland within the SG2 & TS1 investigation area at Wallan.

Striped Legless Lizard also has potential to occur in a grassy woodland patch adjacent to the investigation area at Short Street (Broadford) [ES03] & SG6 (Plate 9). Although this site may be more heavily treed than typical Striped Legless Lizard habitat, the species has been found in a variety of locations in the north east so its potential to occur at this site cannot be discounted.



**Plate 9 Potential Striped Legless Lizard habitat outside the Short Street (Broadford) [ES03] investigation area.**

Although other investigation areas support grassy and grassy woodland vegetation, the habitat in those locations is considered to be too densely treed, too disturbed or too isolated within regional towns or networks of road and rail lines to be able to support the species.

### **Growling Grass Frog**

Growling Grass Frog was assigned a moderate potential to occur at SG2 & TS1, Wallan which is located adjacent to the upper reaches of Merri Creek (KBR, 2020a). The Merri Creek catchment supports an important metapopulation of Growling Grass Frog (Clemann & Gillespie, 2012).

Survey for Growling Grass Frog was not undertaken because impacts to potential aquatic habitat had been avoided (KBR, 2020a). Individual Growling Grass Frogs could occur in the SG2 & TS1 investigation areas adjacent to Merri Creek as the species forages and overwinters in terrestrial environments within the catchment.

## Golden Sun Moth

Golden Sun Moth was initially considered to have a moderate likelihood of occurring in sparsely treed areas with native grassy understorey around Wallan and Broadford (KBR, 2020a). There are VBA records of the species within 5km of Wallan and Broadford and potential sites were SG1 & TS2 (Wallan), Short Street (Broadford) [ES03] & SG6, Marchbanks Road (Broadford) [ES04]. The species was not considered further as impacts to potential habitat had been avoided (KBR, 2020a). Golden Sun Moth may occur in the SG2 & TS1 investigation area.

## 4.3 State significant biodiversity values

### 4.3.1 Native vegetation

This section details the type, extent and quality of native vegetation associated with the enhancement site, track slew and signal gantry investigation areas.

#### 4.3.1.1 Ecological Vegetation Classes (EVCs)

Fifteen EVCs were recorded across four bioregions. Variations of certain EVCs such as Plains Grassy Woodland (EVC 55) and Grassy Woodland (EVC 175) are present depending on the bioregion in which they are found. The EVCs, their BCS, and total extent recorded across the investigation areas is provided in Table 8. Descriptions of each EVC and a representative photo is provided in Table 9.

**Table 8 Bioregional Conservation Significance of EVCs, including total extent (ha) across the investigation areas.**

EVC Number	EVC Name	Bioregional Conservation Significance				Extent (ha) within investigation areas			
		VVP	CVU	NIS	VR	VVP	CVU	NIS	VR
18	Riparian Forest	V				0.059			
47	Valley Grassy Forest		V				2.549		
55	Plains Grassy Woodland		E				44.538		
55_61	Plains Grassy Woodland				E				5.640
56	Floodplain Riparian Woodland		E		V		0.181		10.486
61	Box-Ironbark Forest		V		V		42.959		1.548
68	Creekline Grassy Woodland		E		E		0.015		2.275
83	Swampy Riparian Woodland	E				0.674			
132	Plains Grassland	E				0.669			
175	Grassy Woodland*		E				3.461		
175_61	Grassy Woodland		E				21.725		
175_61	Grassy Woodland (Low Rises)			E	E			0.480	0.096
803	Plains Woodland			E				2.077	

EVC Number	EVC Name	Bioregional Conservation Significance				Extent (ha) within investigation areas			
		VVP	CVU	NIS	VR	VVP	CVU	NIS	VR
819	Spike-sedge Wetland				V				0.108
821	Tall Marsh		D		D		0.079		0.261
N/A	DELWP Mapped Wetland				ND				32.493

\*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

Table 9 EVC description and location within the investigation area



EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
18	Riparian Forest	Victorian Volcanic Plain (V)	Riparian Forest is typically a forest to 30 m tall associated with river banks and alluvial terraces. Structurally, the EVC comprises tall eucalypts over a sparse tree layer. The ground layer supports a cover of shrubs, ferns, grasses and herbs. Within the VVP, the EVC comprises a canopy of Manna Gum <i>Eucalyptus viminalis</i> and within the CVU it contains both Manna Gum and Narrow-leaf Peppermint <i>Eucalyptus radiata</i> subsp. <i>radiata</i> . Examples of the EVC within the investigation area varied in quality from supporting large trees and a moderate-quality understorey to heavily disturbed patches of understorey species and weeds.	
47	Valley Grassy Forest	Central Victorian Uplands (V)	Valley Grassy Forest is an open forest to 25 m tall. The EVC generally occurs in association with undulating slopes and valley floors on colluvial or alluvial soil types. Within the CVU, the EVC was typically dominated by Yellow Box and to a lesser degree by Narrow-leaf Peppermint. Moving further north into the NIS the EVC included a mix of Blakely's Redgum and Red Box <i>Eucalyptus polyanthemos</i> . Understorey quality across the investigation area ranged between low to moderate and included species such as Spear Grasses, Wattle Mat-rush <i>Lomandra filiformis</i> , and Milkmaids <i>Burchardia umbellata</i> .	





EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
55	Plains Grassy Woodland	Central Victorian Uplands (E)	<p>Plains Grassy Woodland is an open woodland to 15 m tall and generally occurs on poorly drained fertile soils on flat or gently undulating plains at low elevations. In the CVU, the EVC description lists Manna Gum and Swamp Gum <i>Eucalyptus ovata</i> as the characteristic canopy species; however, patches of Plains Grassy Woodland within the investigation area generally contained River Red Gum, Grey Box, and Yellow Box canopies similar to the description for VicRiv.</p> <p>Within the investigation area, the EVC varied in condition from patches with only a canopy present to those with canopy and a developed understorey consisting of species such as Black-anther Flax-lily <i>Dianella revoluta s.l.</i>, Kangaroo Grass, and Common Rice-flower <i>Pimelea humilis</i>.</p>	
55_61	Plains Grassy Woodland	Victorian Riverina (E)	<p>Within the VicRiv bioregion, Plains Grassy Woodland generally exists as a canopy of River Red Gum and Yellow Box over a species-rich understorey of herbs and grasses. Within the investigation area both EVC 55_61 and EVC 55_62 were present. To differentiate, generally EVC 55_61 contained a greater proportion of River Red Gum and Yellow Box within the canopy, while EVC 55_62 contained a greater variety of canopy species including Grey Box, Red Box, Blakely's Red Gum, and Yellow Box.</p> <p>Patches of both varied in quality and contained native grass and herbaceous species such as Common Wheat-grass <i>Anthosachne scabra s.l.</i>, Climbing Saltbush <i>Einadia nutans</i>, and Common Everlasting <i>Chrysocephalum apiculatum s.l.</i></p>	



EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
55_62	Plains Grassy Woodland (Riverina)	Northern Inland Slopes (E)	Plains Grassy Woodland (Riverina) is synonymous with Plains Woodland (EVC 803) and as such all instances of EVC 55_62 have been recorded as EVC 803. See also EVC 55_61 for a description of the EVC within the investigation area.	
56	Floodplain Riparian Woodland	Central Victorian Uplands (E) Victorian Riverina (V)	Occurs in association with floodplains and banks of creeks and major rivers. Within the investigation area, the canopy consisted of River Red Gum and Yellow Box over a modified understorey often containing aquatic herbs and sedges such as Tall Sedge <i>Carex appressa</i> , Common Water-ribbon <i>Cychnogeton procerum</i> s.s, and Swamp Wallaby-grass <i>Amphibromus</i> spp.	






EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
61	Box-Ironbark Forest	Central Victorian Uplands (V) Victorian Riverina (V)	<p>Box Ironbark Forest occurs on undulating rises, low hills, and peneplains where soils are shallow and infertile. In the CVU, eucalypts typical of the EVC include Red Box, Red Stringybark <i>Eucalyptus macrorhyncha</i> and Red Ironbark <i>Eucalyptus tricarpa</i>.</p> <p>Within the VicRiv, the canopy species varies and can also include Grey Box and Mugga <i>Eucalyptus sideroxylon</i> s.s., and Yellow Gum <i>Eucalyptus leucoxylon</i>.</p> <p>Within the investigation area, vegetation varied from understorey only to very high quality vegetation, generally with an overstorey dominated by Grey Box and containing species such as Golden Everlasting <i>Xerochrysum viscosum</i>, Gold-dust Wattle <i>Acacia acinacea</i>, and Bristly Wallaby-grass <i>Rytidosperma setaceum</i>.</p>	
68	Creekline Grassy Woodland	Central Victorian Uplands (E) Victorian Riverina (E)	<p>Creekline Grassy Woodland occurs along ephemeral and intermittent drainage lines in areas of low relief. The EVC generally exists as a canopy of River Red Gum atop a sparse shrub layer with herbs and grasses tolerant to periods of waterlogging and inundation contributing to the ground layer.</p> <p>Within the investigation area, the community was species poor with remnant canopy trees present atop a modified and weed-dominated understorey including species such as Silver Wattle <i>Acacia dealbata</i>, Sheep's Burr <i>Acaena echinata</i>, and Tall Sedge.</p>	

EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
83	Swampy Riparian Woodland	Victorian Volcanic Plain (E)	<p>Swampy Riparian Woodland exists as a low woodland to 15 m and generally occurs in low relief areas on the low foothills and plains. Structurally, the EVC is generally comprised of a Swamp Gum overstorey atop a shrub layer of Acacias and a ground cover of tussock grasses and sedges.</p> <p>The presence of this community within the investigation area was characterised by low quality vegetation dominated by weeds with no canopy trees present and only the shrub layer remaining.</p>	
132	Plains Grassland	Victorian Volcanic Plain (E)	<p>A treeless EVC generally dominated by grasses and herbaceous species on basalt soils prone to seasonal waterlogging.</p> <p>Within the investigation area, all instances of this EVC were mapped by KBR (2020a) with details of this community contained in KBR (2020a). During field assessment a high concentration of Sun-orchids (not flowering) were noted.</p>	



EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
175_61	Grassy Woodland	Central Victorian Uplands (E)	<p>This EVC is described as a variable open Eucalypt woodland over a diverse ground layer of grasses and herbs, and a sparse shrub cover.</p> <p>Within the investigation area, the canopy contained a number of Eucalypt species including River Red Gum, Yellow Box, Grey Box, Red Box, Red Ironbark, and Red Stringybark. The understorey was generally disturbed and contained a higher cover of shrubs than other lifeforms.</p>	
175_61	Grassy Woodland (Low Rises)	Northern Inland Slopes (E) Victorian Riverina(E)	<p>Low Rises Grassy Woodland typically occurs on shallow soils on gentle slopes and undulating rises. Characteristic canopy species typically include Grey Box, White Box <i>Eucalyptus albens</i>, Yellow Box, Blakely's Red Gum, and Drooping Sheoak <i>Allocasuarina verticillata</i>. The understorey generally contains a sparse shrub layer and diverse ground layer of grasses and herbs.</p> <p>Across the investigation area, the canopy contained a variety of species including Blakely's Red Gum, Grey Box, Red Box, Red Stringybark, and Drooping Sheoak. The understorey also contained a diverse range of species including Milkmaids, Yellow Rush-lily <i>Tricoryne elatior</i>, and Sun-orchids.</p>	

EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
803	Plains Woodland	Northern Inland Slopes (E)	In both bioregions, Plains Woodland is listed as synonymous with Riverina Plains Grassy Woodland as described above.	
819	Spike-sedge Wetland	Victorian Riverina (V)	<p>Spike-sedge Wetland EVC is typically treeless and supports a variety of rhizomatous sedge species capable of surviving periods on inundation.</p> <p>Within the investigation area, this EVC was found in disturbed drainage channels and supported a range of aquatic species such as Knob Sedge <i>Carex inversa</i>, Tall Sedge, Common Spike-sedge, Water-plantain <i>Alisma plantago-aquatica</i>, Poong'ort, and Water Plantain.</p>	

EVC No.	EVC name	Bioregion/s <sup>1</sup>	Description	Representative photo
821	Tall Marsh	Central Victorian Uplands (D) Victorian Riverina (D)	<p>Tall Marsh exists as a wetland dominated by emergent graminoids (sedges, rushes and reeds) tolerant to inundation.</p> <p>Throughout the investigation area, Tall Marsh was found in disturbed areas such as drainage channels that divert water away from the rail sidings and contained species such as Narrow-leaf Cumbungi <i>Typha domingensis</i>, Common Rush <i>Phragmites australis</i>, and Water Milfoil <i>Myriophyllum</i> sp., along with common weeds such as Toowoomba Canary-Grass and Blackberry.</p>	

<sup>1</sup>D = Depleted; E = Endangered; V = Vulnerable



#### 4.3.1.2 Native vegetation extent and quality

Native vegetation identified during the VQA assessment comprised patches of native vegetation, Large Trees in Patches and large and small Scattered Trees.

##### Patches

A total of 205 habitat zones (patches of native vegetation) were mapped across the investigation areas (Figure 7 – Appendix A). These patches of native vegetation represent a total extent of 172.374 ha. Table 10 summarises the number of patches and extent for each investigation area. Detailed habitat hectare scoring for each of the patches is provided in Appendix F.

##### Trees

A total of 700 trees were mapped within the investigation areas including 452 Large Trees in Patches and 248 Scattered Trees (43 large and 205 small). Table 11 summarises the number of trees for each investigation area and their location is shown in Figure 7 (Appendix A).

**Table 10 Summary of EVCs that intersect a 15m buffer of the investigation areas**

Investigation Area	EVC Name	EVC Number	Number of Habitat Zones	Extent mapped (hectares)
SG16	No native vegetation patches			
SG1	Swampy Riparian Woodland	83	1	0.039
SG17	Riparian Forest	18	1	0.023
	Swampy Riparian Woodland	83	1	0.022
SG2 & TS1	Plains Grassland	132	4	0.669
	Riparian Forest	18	1	0.035
	Swampy Riparian Woodland	83	11	0.613
Broadford-Wandong Road (Wandong) [ES01]	Tall Marsh	821	1	0.079
	Valley Grassy Forest	47	3	0.067
SG3	Plains Grassy Woodland	55	2	0.259
	Valley Grassy Forest	47	1	0.032
SG4	Grassy Woodland	175_61	1	0.061
	Plains Grassy Woodland	55	1	1.240
	Valley Grassy Forest	47	5	2.450
SG5	Plains Grassy Woodland	55	2	0.235
Hamilton Street (Broadford) [ES02] & SG18	Grassy Woodland	175_61	5	0.369
	Plains Grassy Woodland	55	1	0.251
Short Street (Broadford) [ES03] & SG6	Grassy Woodland	175_61	1	0.087
	Plains Grassy Woodland	55	9	0.436
	Plains Grassy Woodland	55_61	6	4.344



Investigation Area	EVC Name	EVC Number	Number of Habitat Zones	Extent mapped (hectares)
Marchbanks Road (Broadford) [ES04]	Grassy Woodland	175_61	5	0.878
	Plains Grassy Woodland	55	11	3.188
SG7 & SG8	Grassy Woodland	175	1	3.461
	Grassy Woodland	175_61	3	0.698
	Plains Grassy Woodland	55	4	3.348
SG9	Grassy Woodland	175_61	2	0.693
Hume Highway (Tallarook) [ES05] and TS5	Grassy Woodland	175_61	19	19.025
	Plains Grassy Woodland	55	6	9.512
SG10	Floodplain Riparian Woodland	56	2	0.090
SG11 & TS2	Floodplain Riparian Woodland	56	19	10.465
	Spike-sedge Wetland	819	1	0.108
	Tall Marsh	821	1	0.261
	DELWP Mapped Wetland	ND	4	32.493
SG12	Floodplain Riparian Woodland	56	1	0.113
SG13 & TS3 SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	Box Ironbark Forest	61	31	44.507
	Creepline Grassy Woodland	68	2	0.353
	Plains Grassy Woodland	55	8	26.069
	Plains Grassy Woodland	55_61	1	0.614
Anderson Street (Euroa) [ES08]	Plains Grassy Woodland	55_61	1	0.134
Benalla Station Access Road (Benalla) [ES09]	Plains Grassy Woodland	55_61	3	0.523
Beaconsfield Parade (Glenrowan) [ES10]	Grassy Woodland (Low Rises)	175_61	3	0.489
	Plains Woodland	803	2	0.517
Wangaratta Station Precinct (Wangaratta) [ES11] & SG15	Creepline Grassy Woodland	68	5	1.937
	Plains Grassy Woodland	55_61	1	0.024
Murray Valley Highway (Barnawartha North) [ES12]	Plains Woodland	803	12	1.560

Investigation Area	EVC Name	EVC Number	Number of Habitat Zones	Extent mapped (hectares)
<b>All investigation areas</b>	Box Ironbark Forest	61	31	44.507
	Creekline Grassy Woodland	68	7	2.290
	Floodplain Riparian Woodland	56	22	10.667
	Grassy Woodland	175	1	3.461
	Grassy Woodland	175_61	35	21.725
	Grassy Woodland (Low Rises)	175_61	4	0.576
	Plains Grassland	132	4	0.669
	Plains Grassy Woodland	55	44	44.538
	Plains Grassy Woodland	55_61	12	5.640
	Plains Woodland	803	14	2.077
	Riparian Forest	18	2	0.0589
	Spike-sedge Wetland	819	1	0.108
	Swampy Riparian Woodland	83	13	0.674
	Tall Marsh	821	2	0.340
	Valley Grassy Forest	47	9	2.549
DELWP Mapped Wetland	N/A	4	32.493	
<b>Total</b>			<b>205</b>	<b>172.374</b>

**Table 11 Summary of trees within the investigation area**

Investigation areas	Tree category			
	Small Scattered Tree	Large Scattered Tree	Large Trees in Patch	Total
SG16	No native trees			
SG1	No native trees			
SG17	No native trees			
SG2 & TS1	15	1	1	17
Broadford-Wandong Road (Wandong) [ES01]	No native trees			
SG3	1	None	1	2
SG4	No native trees			
SG5	No native trees			
Hamilton Street (Broadford) [ES02] & SG18	4	2	1	7
Short Street (Broadford) [ES03] & SG6	12	7	14	33
Marchbanks Road (Broadford) [ES04]	19	7	18	44
SG7 & SG8	None	None	3	3
SG9	None	None	7	7
Hume Highway (Tallaroek) [ES05] & TS5	11	None	89	100
SG10	No native trees			
SG11 & TS2	19	2	11	32
SG12	1	None	None	1
SG13 & TS3 SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	14	1	279	294
Anderson Street (Euroa) [ES08]	9	4	2	15
Benalla Station Access Road (Benalla) [ES09]	75	5	4	84
Beaconsfield Parade (Glenrowan) [ES10]	16	5	9	30
Wangaratta Station Precinct (Wangaratta) [ES11] & SG15	7	4	12	23
Murray Valley Highway (Barnawartha North) [ES12]	2	5	1	8
<b>Total</b>	205	43	452	700

#### 4.3.1.3 Mapped wetlands

The Current Wetlands Map from MapshareVic identified two mapped wetlands across the investigation areas (Figure 7 - Appendix A); both related to the SG11 & TS2 investigation area:

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

Total extent of values listed above reflect the total area of each mapped wetland rather than the area contained within the investigation area.

#### 4.3.1.4 Endangered EVCs

EVCs with an endangered BCS are recognised as threatened within their respective bioregion and represent important patches of vegetation within a landscape context. Overall, 10 EVCs across four bioregions with a BCS of endangered were recorded, representing a total extent of 81.831 ha.

Table 12 summarises extents of endangered EVCs in the investigation areas where they are present. Impacts to these patches of vegetation may be an important factor when undergoing decision-making during the design process.

**Table 12 Summary of endangered EVCs that intersect a 15m buffer of the investigation areas**

Investigation area	EVC Name	Extent (ha) recorded
SG1	Swampy Riparian Woodland (EVC 83)	0.039
SG17	Swampy Riparian Woodland (EVC 83)	0.022
SG2 & TS1	Plains Grassland (EVC 132)	0.669
	Swampy Riparian Woodland (EVC 83)	0.613
SG3	Plains Grassy Woodland (EVC 55)	0.259
SG4	Grassy Woodland (EVC 175_61)	0.061
	Plains Grassy Woodland (EVC 55)	1.240
SG5	Plains Grassy Woodland (EVC 55)	0.235
Hamilton Street (Broadford) [ES02] & SG18	Grassy Woodland (EVC 175_61)	0.369
	Plains Grassy Woodland (EVC 55)	0.251
Short Street (Broadford) [ES03] & SG6	Grassy Woodland (Low Rises) (EVC 175_61)	0.087
	Plains Grassy Woodland (EVC 55)	0.436
	Plains Grassy Woodland (EVC 55_61)	4.344
Marchbanks Road (Broadford) [ES04]	Grassy Woodland (EVC 175_61)	0.878
	Plains Grassy Woodland (EVC 55)	3.189
SG7 & SG8	Grassy Woodland (EVC 175)*	3.461
	Grassy Woodland (EVC 175_61)	0.698
	Plains Grassy Woodland (EVC 55)	3.348
SG9	Grassy Woodland (EVC 175_61)	0.693

Investigation area	EVC Name	Extent (ha) recorded
Hume Highway (Tallaroek) [ES05] & TS5	Grassy Woodland (EVC 175_61)	19.025
	Plains Grassy Woodland (EVC 55)	9.512
SG11 & TS2	Floodplain Riparian Woodland (EVC 56)	0.181
SG13 & TS3 SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	Creekline Grassy Woodland (EVC 68)	0.353
	Plains Grassy Woodland (EVC 55)	26.069
	Plains Grassy Woodland (EVC 55_61)	0.614
Anderson Street (Euroa) [ES08]	Plains Grassy Woodland (EVC 55_61)	0.134
Benalla Station Access Road (Benalla) [ES09]	Plains Grassy Woodland (EVC 55_61)	0.523
Beaconsfield Parade (Glenrowan) [ES10]	Grassy Woodland (Low Rises) (EVC 175_61)	0.489
	Plains Woodland (EVC 803)	0.517
Wangaratta Precinct (Wangaratta) [ES11] & SG15	Creekline Grassy Woodland (EVC 68)	1.937
	Plains Grassy Woodland (EVC 55_61)	0.024
Murray Valley Highway (Barnawartha North) [ES12]	Plains Woodland (EVC 803)	1.560
<b>Total</b>		<b>81.831</b>

\*2005 modelled EVC used in desktop-based vegetation assessments where access was not available for field assessment

#### 4.3.1.5 High quality native vegetation

As discussed in Section 3.5.2, high quality native vegetation is identified as part of the impact assessment. The intent of including high quality vegetation in the impact assessment was to identify representative areas of high-quality vegetation within and adjacent to the investigation areas to inform decision-making during the design process. These areas are assessed as higher quality as they scored highly across all VQA scoring parameters and achieved an overall score of  $\geq 0.60$ .

Table 13 summarises the number of patches and extent of high-quality vegetation patches in the investigation areas where they are present.

**Table 13 Summary of high-quality vegetation that intersects a 15m buffer of the investigation areas**

Investigation area	Number of Habitat Zones	Extent (ha) recorded
SG4	2	2.404
SG7 & SG8	4	6.601
Hume Highway (Tallaroek) [ES05] & TS5	9	12.688
SG11 & TS2	4	32.493
Marchbanks Road Overbridge (Broadford) (ES04)	1	0.067



Investigation area	Number of Habitat Zones	Extent (ha) recorded
SG13 & TS3 SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	16	43.124
<b>Total</b>	<b>36</b>	<b>97.377</b>

#### 4.3.2 Threatened ecological communities

Three FFG Act-listed TECs occur or may occur in the investigation areas (Table 14):

- Victorian Temperate Woodland Bird Community (VTWBC) identified by KBR (2020a)
- Western (Basalt) Plains Grassland Community (WBPGC)
- Victorian Lowland Riverine Fish Community of the Southern Murray Darling Basin (LRFCSMDB).

**Table 14 FFG Act TECs across the investigation areas**

TEC	Investigation area
VTWBC	SG11 & TS2
	SG5
	Short Street (Broadford) [ES03] & SG6
	Marchbanks Road (Broadford) [ES04]
	Hume Highway (Tallarook) [ES05] & TS5
	SG7 & SG8
	SG9
	SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]
WBPGC	SG2 & TS1
LRFCSMDB	SG11 & TS2

##### 4.3.2.1 Victorian Temperate Woodland Bird Community

This section provides a description of the community and is informed by the *Flora and Fauna Advisory Committee Final Recommendation on a nomination for listing – Victorian Temperate-woodland Bird Community* and the *Flora and Fauna Guarantee Act 1988 – threatened list Characteristics of Threatened Communities* (DELWP n.d.).

The VTWBC is a group of 24 key avian species considered in decline and primarily associated with dry woodland environs located to the north of the Great Dividing Range. Suitable habitat for this community consists of primarily eucalypt woodland dominated by species such as River Red Gum, Yellow Gum, Stringybarks, Ironbark and box though the community can also exist in Buloke and cypress-pine woodlands (DEPI, 2014)

These 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 cat and Red Fox.

Bird species included in the VTWBC in the final nomination (SAC, n.d.) are listed in Table 15. The list includes the 24 nominated key species considered to be reliant on Temperate woodland habitats and another 21 species associated with temperate woodlands but also known to persist in other habitats.

Five nominated species and one associated species from the VTWBC were observed during targeted woodland bird survey in 2019 (KBR, 2020b). KBR (2020a) considered a further seven nominated species to have a moderate likelihood of occurring in the investigation area. One of the species (Barking Owl) was targeted in nocturnal surveys by AECOM in spring 2020 (Appendix C). Surveys did not detect the species; however, based on regional records for the species and the nature of habitat present, it is possible that the species may use habitat within the investigation area on an opportunistic basis. Further discussion in relation to this species is provided in Section 4.3.4.

**Table 15 Bird species included in the VTWBC description**

Common Name	Scientific Name	EPBC Act	FFG Act	VicAdv	KBR targeted survey
<b>Nominated species</b>					
Apostlebird	<i>Struthidea cinerea</i>		L		Moderate
Barking Owl	<i>Ninox connivens</i>		L	en	
Black-chinned Honeyeater	<i>Melithreptus gularis</i>			nt	
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>			nt	
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>				Present (BO, T, SP)
Bush Stone-curlew	<i>Burhinus grallarius</i>		L	en	Moderate
Diamond Firetail	<i>Stagonopleura guttata</i>		L	nt	Moderate
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>				Present (SP)
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>		L	en	Moderate
Ground Cuckoo-shrike	<i>Coracina maxima</i>		L	vu	Moderate
Hooded Robin	<i>Melanodryas cucullata</i>		L	nt	Moderate
Jacky Winter	<i>Microeca fascinans</i>				Present (BO)
Little Lorikeet	<i>Glossopsitta pusilla</i>				Present (SS, SP)
Painted Button-quail	<i>Turnix varia</i>				
Painted Honeyeater	<i>Grantiella picta</i>	VU	L	vu	
Red-capped Robin	<i>Petroica goodenovii</i>				
Red-tailed Black-Cockatoo	<i>Calyptorhynchus banksia graptogyne</i>	EN	L	en	

Common Name	Scientific Name	EPBC Act	FFG Act	VicAdv	KBR targeted survey
Speckled Warbler	<i>Chthonicola sagittata</i>		L	vu	
Superb Parrot	<i>Polytelis swainsonii</i>	VU	L	en	
Swift Parrot	<i>Lathamus discolor</i>	CR	L	en	
Turquoise Parrot	<i>Neophema pulchella</i>		L	nt	Moderate
Regent Honeyeater	<i>Xanthomyza phrygia</i>	EN	L	cr	
Western Gerygone	<i>Gerygone fusca</i>				Present (SS)
Yellow-tufted Honeyeater	<i>Lichenostomus melanops meltoni</i>				
<b>Associated species</b>					
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>				
Crested Bellbird	<i>Oreoica gutturalis</i>		L	nt	
Crested Shrike-tit	<i>Falcunculus frontatus</i>				
Dusky Woodswallow	<i>Artamus cyanopterus</i>				
Eastern Yellow Robin	<i>Eopsaltria australis</i>				
Emu	<i>Dromaius novaehollandiae</i>			nt	
Gilbert's Whistler	<i>Pachycephala inornata</i>				
Glossy Black-cockatoo	<i>Calyptorhynchus lathami</i>		L	vu	
Grey Falcon	<i>Falco hypoleucos</i>				
Major Mitchell's Cockatoo	<i>Cacatua leadbeateri</i>		L	vu	
Malleefowl	<i>Leipoa ocellate</i>	VU	L	en	
Masked Owl	<i>Tyto novaehollandiae</i>		L	en	
Powerful Owl	<i>Ninox strenua</i>		L	vu	Moderate
Regent Parrot	<i>Polytelis anthopeplus</i>	VU	L	vu	
Restless Flycatcher	<i>Myiagra inquieta</i>				
Rufous Whistler	<i>Pachycephala rufiventris</i>				
Southern Whiteface	<i>Aphelocephala leucopsis</i>				
Square-tailed Kite	<i>Lophoictinia isura</i>		L	vu	
Varied Sittella	<i>Daphoenositta chrysoptera</i>				Present

Common Name	Scientific Name	EPBC Act	FFG Act	VicAdv	KBR targeted survey
White-browed Babbler	<i>Pomatostomus superciliosus</i>				
White-browed Wood-swallow	<i>Artamus superciliosus</i>				

BO = Broadford Over-bridge, SS = Broadford Short Street Overbridge, T = Tallarook, SP = Seymour precinct

As there are no published guidelines detailing a threshold for presence of the VTWBC (D. Pendavingh, DELWP, pes comm, 2019 in KBR, 2020b), the threatened community is assumed to be present where woodland EVCs occur and one or more nominated species consistent with the community is recorded. On this basis all four locations (five enhancement sites) surveyed by KBR are considered to support the community. A summary of the number of nominated VTWBC species detected at each investigation area is presented in Table 16.

**Table 16** Number of nominated species across the investigation areas

Investigation area	Number of VTWBC species
Short Street (Broadford) [ES03] & SG6	2
Marchbanks Road (Broadford) [ES04]	2
Hume Highway (Tallarook) [ES05] & TS5	1
Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	3

Following the completion of targeted woodland bird surveys some changes were made to the investigation area at the location of the enhancement sites. During the most recent AECOM assessment additional areas of VTWBC were mapped and locations are presented in Figure 9 (Appendix A). These areas were extensions of previous KBR mapping and as such VQA scores and FFG Act listed ecology determinations completed by KBR were utilised as these extensions were directly comparable to the existing areas mapped by KBR.

In total 105.507 ha of woodland bird community was identified across the investigation areas. A breakdown of habitat by enhancement site is provided in Table 17.

**Table 17** Location and extent of VTWBC across the investigation areas

Investigation area	Habitat Zones	Number of Habitat Zones	Extent mapped (ha)
SG11 & TS2	HZ 376	11	7.995
	HZ 377		
	HZ 378		
	HZ 379		
	HZ 380		
	HZ 381		
	HZ 382		
	HZ 383		
	HZ 384		
	HZ 385		
	HZ 386		

Investigation area	Habitat Zones	Number of Habitat Zones	Extent mapped (ha)
SG5	HZ 200 HZ 210	2	0.235
Short Street (Broadford) [ES03] & SG6	HZ 236 HZ 260	2	4.197
Marchbanks Road (Broadford) [ES04]	HZ 299 HZ 300 HZ 302 HZ 341 HZ 343	5	3.380
Hume Highway (Tallaroek) [ES05] & TS5	HZ 221 HZ 23 HZ 291 HZ 293 HZ 294 HZ 322 HZ 335 HZ 387 HZ 438 HZ 449 HZ 77	11	24.296
SG7 & SG8	HZ 24 HZ 220 HZ 251	3	0.603
SG9	HZ 72 HZ 252	2	0.693
SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	HZ 102 HZ 103 HZ 124 HZ 127 HZ 129 HZ 272 HZ 273 HZ 274 HZ 282 HZ 283 HZ 284 HZ 285 HZ 289 HZ 323 HZ 324	27	64.108



Investigation area	Habitat Zones	Number of Habitat Zones	Extent mapped (ha)
	HZ 325		
	HZ 336		
	HZ 338		
	HZ 367		
	HZ 368		
	HZ 369		
	HZ 371		
	HZ 373		
	HZ 444		
	HZ 445		
	HZ 453		
	HZ 76		
<b>Total</b>		<b>63</b>	<b>105.507</b>

#### 4.3.2.2 Western (Basalt) Plains Grassland Community

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

Two patches of WBPGC were recorded in the investigation area (Table 18). This community was considered synonymous with the two patches of NTGVVP identified and described in Section 4.2.1.2.

**Table 18** Location and extent of WBPGC across the investigation areas

Investigation area	Habitat Zones	Number of Habitat Zones	Extent mapped (ha)
SG2 & TS1	HZ 401 HZ 421	2	0.619

#### 4.3.2.3 Lowland Riverine Fish Community of the Southern Murray-Darling Basin

The Victorian 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.).

Surveys for LRFCSMDB were not completed by KBR (2020a) as the investigation area did not intercept any rivers or major tributaries with the potential support the TEC. However, changes to the investigation area since those assessments have meant that SG11 & TS2 crosses an area of mapped wetland (Section 4.3.1.3) which is a tributary of the Goulburn River (Figure 7– Appendix A) and also reaches the bank of the Goulburn River. Fauna surveys completed by AECOM since changes to the investigation area have primarily focused on the 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 a potentially rare and intermittent basis when overland flows allow connectivity to the wetlands along tributaries of the Goulburn River. Works that impact habitats associated with the community are not proposed and/or considered minor and this community is not discussed further.

### 4.3.3 Threatened flora 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.

In addition to the species listed under the EPBC Act that are also listed under the FFG Act (see Section 4.2.2), two flora species listed as threatened under the FFG Act only were identified by KBR (2020a) to have a moderate or high likelihood of occurrence (Table 19).

**Table 19 FFG Act-listed threatened flora species identified by KBR to have a moderate or high likelihood of occurrence and potential to be impacted by the Project.**

Scientific Name	Common Name	FFG Act	VROT*	Likelihood of occurrence (KBR 2020a)
<i>Allocasuarina luehmannii</i>	Buloke	L	Endangered	High
<i>Diuris punctata</i>	Purple Diuris	L	Vulnerable	Moderate

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

Surveys for these species identified with potential to occur and be impacted by the Project were subsequently undertaken (KBR, 2020c). The findings of those surveys are summarised below and observations during the 2020 and 2021 field assessments by AECOM are included where relevant.

#### Buloke

Two immature individuals of Buloke were recorded at Seymour Avenel Road (Seymour) [ES06] & SG14 during targeted flora surveys (KBR, 2020a). The species was also recorded by AECOM during the 2020 - 2021 overhead powerline assessment at overhead powerline investigation area 1042 (AECOM, 2021a); however, no additional individuals were identified within any of the enhancement site, track slew, and signal gantry investigation areas.

#### Purple Diuris

Previous habitat assessments undertaken by KBR identified suitable grassy woodlands around Seymour Avenel Road (Seymour) [ES06] & SG14 and Hume Highway (Seymour) [ES07] investigation area. Consequently, targeted surveys were conducted in September – October 2019.

Purple Diuris was not identified during the 2019 targeted surveys (KBR, 2020c) and was not recorded by AECOM during the 2020-2021 field assessment, therefore its likelihood of occurrence within the investigation area is considered to be low.

#### Glaucous Flax-lily

Glaucous Flax-lily *Dianella longifolia* var. *grandis* s.l. was also recorded within the investigation area. This species is not listed under the FFG Act but is considered to be vulnerable in Victoria (DEPI, 2014). Approximately 230 individuals were identified during the 2020 / 2021 surveys (Figure 9 – Appendix A) at the following investigation areas:

- SG7 & SG8
- SG9
- Hume Highway (Tallarook) [ES05] & TS5
- Hume Highway (Seymour) [ES07]
- Seymour Avenel Road (Seymour) [ES06] & SG14
- SG19 & TS4.

#### Protected flora

A number of species declared as protected flora under the FFG Act were observed by KBR during their field assessment (Table 30 and Table 31 in KBR, 2020a). A total of 17 protected flora were recorded by

the AECOM and KBR (2020a) field assessments. Protected flora species, their listing status, and location within the investigation area are summarised in Appendix E.

**Table 20 Protected flora recorded in investigation area**

Scientific name	Common name
<i>Acacia acinacea</i>	Gold-dust Wattle
<i>Acacia genistifolia</i>	Spreading Wattle
<i>Acacia mearnsii</i>	Black Wattle
<i>Acacia pycnantha</i>	Golden Wattle
<i>Acacia verniciflua s.l.</i>	Varnish Wattle
<i>Acrotriche serrulata</i>	Honey-pots
<i>Allocasuarina luehmannii</i>	Buloke
<i>Cheilanthes</i> spp.	Rock Fern
<i>Cheiranthra linearis</i>	Blue Finger-flower
<i>Chrysocephalum apiculatum s.l.</i>	Common Everlasting
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Cotula australis</i>	Common Cotula
<i>Laphangium luteoalbum</i>	Jersey Cudweed
<i>Ozothamnus obcordatus</i>	Grey Everlasting
<i>Senecio quadridentatus</i>	Cotton Fireweed
<i>Vittadinia cuneata</i>	Fuzzy New Holland Daisy
<i>Xerochrysum viscosum</i>	Shiny Everlasting

#### 4.3.4 Threatened fauna species

Twenty fauna species listed under the FFG Act had a moderate or high likelihood of occurrence in the investigation area (KBR, 2020a). Seven of those species are also listed under the EPBC Act and are therefore discussed in Section 4.2.3. Fauna species listed under the FFG Act but not listed under the EPBC Act are listed in Table 21.

**Table 21 FFG Act-listed threatened fauna species identified by KBR to have a moderate likelihood of occurrence.**

Scientific Name	Common Name	EPBC	FFG	VROT*
<b>Birds</b>				
Apostlebird	<i>Struthidea cinerea</i>		L#	
Barking Owl	<i>Ninox connivens</i>		L#	Endangered
Bush Stone-curlew	<i>Burhinus grallarius</i>		L#	Endangered
Diamond Firetail	<i>Stagonopleura guttata</i>		L#	Near Threatened
Grey- crowned Babbler	<i>Pomatostomus temporalis</i>		L#	Endangered

Scientific Name	Common Name	EPBC	FFG	VROT*
Ground Cuckoo- shrike	<i>Coracina maxima</i>		L#	
Hooded Robin	<i>Melanodryas cucullata</i>		L#	Near Threatened
Powerful Owl	<i>Ninox strenua</i>		L#	Vulnerable
Speckled Warbler	<i>Chthonicola sagittata</i>		L#	Vulnerable
Turquoise Parrot	<i>Neophema pulchella</i>		L#	Near Threatened
<b>Mammals</b>				
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>		L	Vulnerable
Squirrel Glider	<i>Petaurus norfolcensis</i>		L	Endangered
<b>Frogs</b>				
Brown Toadlet	<i>Pseudophryne bibronii</i>		L	Endangered

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

# also a member of the FFG Act listed Victorian Temperate Woodland Bird Community (see Section 4.3.1.3)

Following the identification of the above listed species as having potential to occur at enhancement sites supporting woodland vegetation, subsequent targeted surveys were completed by KBR (2020b) for woodland birds and AECOM for arboreal mammals and Barking Owl (Appendix C). The findings of those surveys are outlined below.

### Woodland birds

Apostlebird, Bush Stone-curler, Diamond Firetail, Grey-crowned babbler, Hooded Robin, Powerful Owl, Speckled Warbler, Barking Owl and Turquoise Parrot were considered to have a moderate likelihood of occurrence across the investigation area by KBR (2020a). All of these species are also 'nominated species' under the definition of VTWBC and were thus subject to targeted assessments by KBR (2020b). Discussion on these surveys and their findings is provided in Section 4.3.2. Whilst the VTWBC was confirmed to be present, these particular species were not recorded by KBR (2020b).

KBR (2020b) states that local DELWP officers know of eight species of the VTWBC in addition to those identified by KBR that are likely to occur in the surrounding landscape. However, with the exception of the EPBC Act-listed Swift Parrot, these species are not specifically named by KBR (2020b).

Whilst these woodland bird species were not recorded during surveys completed for the Project (KBR, 2020b) they are still considered to have a moderate likelihood of occurrence.

### Barking Owl

Barking Owl was potentially heard in response to call playback at Seymour Avenel Road (Seymour) [ES06] & SG14 investigation area during targeted survey (AECOM, 2021b; Appendix C). A distant call was heard on two separate occasions and by both members of the survey team independently that was considered to be consistent with the species. Another potential call was heard at Marchbanks Road (Broadford) [ES06] however it may have also have been a dog barking in the nearby township.

Whilst surveys did not confirm the species' presence, Barking Owl is likely to utilise woodland areas of the investigation area and in particular those associated with the localities of Tallarook, Seymour, and Mangalore as part of their foraging range. The presence of hollows increases the potential that non-breeding birds may roost in habitat whilst moving through the landscape or that areas of more extensive vegetation, if left undisturbed, could become breeding territories in the future.

Barking Owl is a member of the FFG Act listed VTWBC which is further discussed in Section 4.3.2.

## Mammals

Brush-tailed Phascogale and Squirrel Glider have the potential to occur in habitat at sites contiguous with other woodland habitats and areas likely to contain large and hollow-bearing trees which include:

- Hume Highway (Tallaroek) [ES05] & TS5
- SG19 & TS4 (Seymour to Mangalore)
- Seymour Avenel Road (Seymour) [ES06] & SG14.

Brush-tailed Phascogale was recorded at Hume Highway (Tallaroek) [ES05] & TS5 investigation area (Plate 10) during targeted survey in spring 2020 (AECOM, 2021b; Appendix C).

Sugar Glider *Petaurus breviceps* s.l. (a similar species to Squirrel Glider) was also recorded at Hume Highway (Tallaroek) [ES05] during targeted survey (Plate 11). A recent review of the taxonomy of Sugar Glider has suggested there are now three distinct species – Sugar Glider, Krefft's Glider (*Petaurus notatus*) and the Savannah Glider (*Petaurus ariel*) – which may have implications for the conservation status of the species in the future (Cremona et al, 2021). Based on this new taxonomic distinction, the species recorded during survey will be Krefft's Glider.



Plate 10 Brush-tailed Phascogale at Tallaroek in December 2020





**Plate 11 Sugar Glider at Tallarook in December 2020**

### **Frogs**

Brown Toadlet is another species identified by KBR (2020a) as having potential to occur within the investigation area at sites near waterways that hold water intermittently. Drainage lines at SG11 & TS2 and at Wangaratta Precinct (Wangaratta) [ES11] & SG15 were considered most likely to support the species, however, as impacts to those habitats were not proposed KBR did not consider the species further (KBR, 2020a).

VBA records of Brown Toadlet were identified within five kilometres of most of the enhancement sites and many track slews (KBR, 2020a). Most of these records were notably dated and as old as 1958. The most recent record was from Broadford Road in 2005.

Brown Toadlet was heard calling within a drainage line, near Wenkes Road west of Chiltern at overhead powerline investigation area 1010 in 2019 (KBR, 2020d). There are no enhancement sites, track slews, or signal gentries in the vicinity of this overhead powerline investigation area but this record does indicate that the species may be present in areas where suitable waterbodies occur within the investigation area. AECOM is also aware of detections of the species around Seymour and Wodonga by contributors to the Field Naturalist Club of Victoria Facebook page. The species was observed breeding in a drainage line dominated by introduced grasses near Seymour and wheel ruts in roadside vegetation near Wodonga. These observations suggest that any areas subject to seasonal flooding could provide habitat for Brown Toadlet.

#### **4.3.5 Hollow-bearing trees**

Hollow-bearing trees occur at all five of the enhancement sites subject to targeted habitat assessment (Appendix C). Over 170 hollow-bearing trees were recorded within the investigation areas surveyed and their distribution is shown in Figure 3 of the Targeted Fauna Survey Report (Appendix C). The number of hollow-bearing trees recorded at each of the survey sites is provided in Table 22.

Most of the hollow-bearing trees occurred within the 15 m buffer area rather than within the project area at these five enhancement sites. A total of 40 high value trees were recorded within the investigation areas. High value trees are those which support a large number and variety of hollows and/or evidence of fauna usage.

**Table 22 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	Hume Highway (Seymour) [ES07]	25	3
2	Seymour Avenel Road (Seymour) [ES06] & SG14	75	18
3	Hume Highway (Tallaroek) [ES05] & TS5	61	19
4	Marchbanks Road (Broadford) [ES04]	6	0
5	Short Street (Broadford) [ES03] & SG6	5	0
<b>Total</b>		<b>172</b>	<b>40</b>

Note to table: high value refers to trees which support a large number and variety of hollows and/or evidence of fauna usage.

Investigation areas not subjected to targeted habitat survey are also likely to support hollow-bearing trees. For investigation areas not subject to a targeted habitat assessment, an estimate of hollow bearing trees as per the methodology stated in Section 3.5.2.4 is provided in Table 23. It is important to note that this estimate provides an indication of the potential abundance of hollow-bearing trees associated with each investigation area but is likely to be an underestimate of availability of hollow-bearing trees.

**Table 23 Estimate of hollow bearing trees in investigation areas not subject to targeted survey**

Investigation area	Large trees	Estimate of trees likely to contain hollows
SG16	0	0
SG1	0	0
SG17	0	0
SG2 & TS1	2	1
Broadford Road (Wandong) [ES01]	0	0
SG3	1	1
SG4	0	0
SG5	0	0
Hamilton Street (Broadford) [ES02] & SG18	3	2
SG7 & SG8	3	2
SG9	7	5
SG10	0	0
SG11 & TS2	15	10
SG12	0	0
SG13 & TS3	0	0
SG19 & TS4	218	142

Investigation area	Large trees	Estimate of trees likely to contain hollows
Anderson Street (Euroa) [ES08]	6	4
Benalla Station Access Road (Benalla) [ES09]	10	7
Beaconsfield Parade (Glenrowan) [ES010]	14	9
Wangaratta Station Precinct (Wangaratta) [ES011] & SG15	16	10
Murray Valley Highway (Barnawartha North) [ES012]	6	4
<b>All investigation areas (not subject to habitat assessment)</b>	<b>301</b>	<b>196</b>

An example of a hollow bearing tree recorded in the investigation area is provided in Plate 12.



**Plate 12** Example of a hollow bearing tree recorded in the investigation area

### 4.3.6 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). 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).

The Project occurs in a landscape which has been substantially cleared and already varies in habitat connectivity. Patches of habitat within the urban landscape of the regional towns have lower connectivity than patches in the agricultural sections of the investigation area because the intervening matrix is more inhospitable in urban areas and therefore resistance to movement is higher (Baum et al., 2004; Fischer & Lindenmayer, 2002; Hanspach et al., 2012).

The rail and road reserve network associated with the Project (and where they support indigenous vegetation) contribute significantly to the provision of local and regional habitat corridors and connectivity due to the linear nature and long length of those infrastructure assets. Riparian vegetation along creeklines also provide linkages to large patches of habitat in reserves to the east and west of the rail line.

At Broadford, there are habitat links through and around the township (Figure 10). Woodland links through the town are associated with Sunday Creek, Mia Mia Creek and an unnamed tributary through Catherine Court Reserve. Woodland links around the north of the town are associated with Dry Creek and Sunday Creek which in turn link 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. Woodland within the Marchbanks Road (Broadford) investigation area provides valuable overstorey connectivity; however, the poor-quality understorey is not considered to provide significant habitat connectivity for ground-dwelling species.

At Seymour, there is a linear corridor of habitat which extends along road reserves on either side of the rail from Seymour to Mangalore. Linkages to the east and west of the rail are primarily provided by riparian corridors, roadsides and scattered paddock trees which may function as stepping stones for gliders, birds, and bats. These linkages, including the corridor through Seymour Avenel Road (Seymour) [ES06] & SG14 and Hume Highway (Seymour) [ES07], potentially facilitate the movement of animals between larger areas of habitat at Puckapunyal Army Barracks, the Mangalore Conservation Reserve, and along the Goulburn River (KBR, 2020b). The location of the sites which form the Important Bird Area (Birdlife, 2019) relative to the investigation areas is shown in KBR (2020b; Appendix B). The Puckapunyal Military Area is located approximately 6.8 km from the Seymour investigation areas and the Mangalore Nature Conservation Reserve is located approximately 3.8 km away. Areas of suitable habitat and a dispersal corridor also occur 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.

At Tallarook, there are several linkages. Remnant vegetation along the Gairns Lane roadside and the government road reserve adjacent to the rail corridor between the Hume Highway and Sanctuary Road links to the Tallarook Recreation Reserve, Tallarook Wildflower Sanctuary, and Tallarook Bushland Reserve. However, the Hume Highway represents a gap of almost 90 metres in the canopy and the road is elevated in that location which reduces the line of sight to trees across the gap. Fauna attempting to cross this gap would need to cross the road or move along the rail under the overbridge.

Habitat on either side of the rail corridor provides a link between woodland patches to the west and east of the rail and Hume Highway including the riparian corridor of Dabyminga Creek which in turn links to the Goulburn River. The gap in canopy formed by the existing rail corridor from 35 – 45 m within the Hume Highway (Tallarook) [ES05] & TS5 enhancement site. There is a more substantial 150 m gap in habitat along the Sharps and Taylors Road roadside at the rail crossing south of the enhancement site. This larger gap may increase the likelihood of fauna crossing the rail within the enhancement site where the canopy gap is narrower when moving east to west in the landscape. Regardless of whether fauna cross through the enhancement site or along the Sharps and Taylors Road roadside, the dual carriageway of the Hume Highway at the end of Sharps and Taylors Road represents two gaps in the canopy of 25 – 30 m, with a narrow 30 m wide strip of woodland in the central median.

**Figure 2 Overview of landscape connectivity from Broadford to Seymour**

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### 4.3.7 Strategic Biodiversity Values

Figure 12 (Appendix A) 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. Table 24 presents the SBV range contained within at individual investigation area to summarise the modelled importance of the areas impacted by the Project. As outlined in Section 3.5.3, areas containing an SBV value of  $\geq 0.80$  are those considered to be of high value. This information may be used to inform decision-making during the design process when prioritising areas of greater or lesser importance.

**Table 24 Summary of SBV range at each investigation area.**

Investigation area	Lowest SBV category contained	Highest SBV category
SG16	25 - 40	65 - 80
SG1	25 - 40	25 - 40
SG17	40 - 50	65 - 80
SG2 & TS1	25 - 40	65 - 80
Broadford-Wandong Road (Wandong) [ES01]	15 - 25	50 - 65
SG3	40 - 50	50 - 65
SG4	25 - 40	80 - 90
SG5	40 - 50	50 - 65
Hamilton Street (Broadford) [ES02] & SG18	1 - 15	1 - 15
Short Street (Broadford) [ES03] & SG6	1 - 15	50 - 65
Marchbanks Road (Broadford) [ES04]	50 - 65	80 - 90
SG7 & SG8	25 - 40	80 - 90
SG9	50 - 65	50 - 65
Hume Highway (Tallaroek) [ES05] & TS5	15 - 25	65 - 80
SG10	50 - 65	80 - 90
SG11 & TS2	1 - 15	80 - 90
SG12	15 - 25	90 - 100
SG13 & TS3	1 - 15	25 - 40
SG19 & TS4	1 - 15	90 - 100
Seymour Avenel Road (Seymour) [ES06] & SG14	1 - 15	90 - 100
Hume Highway (Seymour) [ES07]	50 - 65	65 - 80
Anderson Street (Euroa) [ES08]	1 - 15	25 - 40
Benalla Station Access Road (Benalla) [ES09]	15 - 25	15 - 25
Beaconsfield Parade (Glenrowan) [ES10]	1 - 15	80 - 90
Wangaratta Precinct (Wangaratta) [ES11] & SG15	1 - 15	25 - 40
Murray Valley Highway (Barnawartha North) [ES12]	15 - 25	80 - 90

## 4.4 Local biodiversity planning protections

### 4.4.1 Environmental overlays

Planning overlays are part of municipal planning schemes and are applied over areas of land to control development. Overlays may be applied to protect areas from adverse impacts or to allow easy identification of constraints in developments on that area. For the purpose of this report, consideration of planning overlays is limited to those of particular relevance to flora and fauna values, which include:

- Environmental Significance Overlays (ESOs). The broad intent of an ESO is to identify areas where the development of land may be affected by environmental constraints, and to ensure that if development does happen, it is compatible with the values that are highlighted in any schedule to the identified ESO.
- Vegetation Protection Overlays (VPOs). A VPO is specific to the removal of vegetation that has been deemed to be significant and protects this vegetation against inappropriate development.
- Salinity Management Overlay (SMOs). A SMO identifies areas subject to saline ground water discharge or high ground water recharge and facilitates the stabilisation of areas affected by salinity.

A schedule to these overlays contains a statement of the significance of the environmental, vegetation or landscape value that is protected by the overlay, and the objective to be achieved. Approval is typically required to remove most vegetation within an ESO, VPO, or SLO, and the application for an approval for vegetation removal must show that the proponent has been cognisant of the intent of each overlay.

The investigation area is contained within six LGAs including Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, and Wodonga. Environmental overlays were present within the investigation area in two LGAs:

- Mitchell – ESO3, SMO, VPO1, and VPO2
- Wangaratta – VPO1



The field assessments mapped the location of all relevant ecological values listed which is considered sufficient to meet the requirements of the overlays (Figure 13). Table 25 summarises the relevant environmental overlays present within the investigation area; identifies the habitat zone, location, and extent of vegetation; and provides a general description of representative vegetation identified.

### 4.4.2 Local Laws and policies



Analysis of potential Local Laws relating to Significant Trees and/or vegetation for each of the seven LGAs highlighted only one Significant Tree which is located within the Wangaratta municipality (Rural City of Wangaratta, n.d.). The Significant Tree is a Norfolk Island Pine *Araucaria heterophylla*, which is listed on the Significant Tree register as the tree is the largest specimen of this variety in Wangaratta. The tree is located outside the North Eastern Hotel on Spearing Street, Wangaratta (Figure 11 – Appendix A). Impact to this value is not considered in this report as the tree is protected under Overlay HO9.

Clause 12.01-1L (*River Red Gum protection*) of the Whittlesea Planning Scheme seeks to retain and provide for the long-term viability of the River Red Gum within the municipal boundary. This policy requires all proposals to remove River Red Gum trees be reported to a Council meeting for a decision. During the field assessment completed on 9<sup>th</sup> March 2021, the assessment of SG17 (the only investigation area contained within the City of Whittlesea LGA) included determining the presence of River Red Gums. No River Red Gums were identified within the investigation area and therefore this policy is not considered further.


Table 25 Environmental overlays within the investigation area

Council	Overlay	Permit requirement	Investigation area and HZ where present (Figure 7 reference)	General vegetation description	General photo of vegetation
Mitchell	<b>Environmental Significance Overlay – Schedule 3 (Watercourse Conservation)</b>	In accordance with the ESO3, a permit is required to: <ul style="list-style-type: none"> <li>Remove, destroy or lop any vegetation, including dead vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>SG4                             <ul style="list-style-type: none"> <li>- HZ17, HZ430, HZ431</li> </ul> </li> <li>Short Street (Broadford) [ES03] &amp; SG6                             <ul style="list-style-type: none"> <li>- HZ5, HZ260, HZ393</li> </ul> </li> <li>Marchbanks Road (Broadford) [ES04]                             <ul style="list-style-type: none"> <li>- HZ6, HZ341, HZ348</li> </ul> </li> <li>SG11 &amp; TS2                             <ul style="list-style-type: none"> <li>- HZ382, HZ383</li> </ul> </li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14                             <ul style="list-style-type: none"> <li>- HZ436, HZ468</li> </ul> </li> </ul>	Vegetation within ESO3 occurs within rail reserves, public park reserves and private properties. Patches of vegetation occurring within this overlay range from small degraded patches of Wallaby grass and Kangaroo Grass, to larger more intact patches of River Red Gum and Grey Box over an understorey of Hedge Wattle <i>Acacia paradoxa</i> and Sifton Bush.	
	<b>Salinity Management Overlay</b>	In accordance with the SMO, a permit is required to: <ul style="list-style-type: none"> <li>Remove, destroy or lop any vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>SG4                             <ul style="list-style-type: none"> <li>- HZ223, HZ224</li> </ul> </li> </ul>	Vegetation contained within the SMO was confined to the rail corridor and was located immediately adjacent to the rail ballast and a gravel access track. It was reflective of the disturbed nature of the corridor and consisted largely of exotic vegetation such as Toowoomba Canary-Grass, <i>Paspalum dilatatum</i> , and Blackberry. Occasionally native species were present in concentrations that met the criteria for a patch of native vegetation and included Kangaroo Grass, Sifton Bush, and Black-anther Flax-lily.	



Council	Overlay	Permit requirement	Investigation area and HZ where present (Figure 7 reference)	General vegetation description	General photo of vegetation
	<p><b>Vegetation Protection Overlay – Schedule 1 (Roadside and Corridor Protection)</b></p>	<p>In accordance with the VPO1, a permit is required to:</p> <ul style="list-style-type: none"> <li>Remove, destroy or lop native vegetation.</li> <li>A permit is not required for the removal of exotic vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>SG19 &amp; TS4, Seymour Avenel Road (Seymour) [ES06] &amp; SG14 and Hume Highway (Seymour) [ES07]                             <ul style="list-style-type: none"> <li>HZ102, HZ103, HZ119, HZ123, HZ124, HZ126, HZ127, HZ129, HZ270, HZ271, HZ272, HZ273, HZ274, HZ275, HZ276, HZ282, HZ285, HZ289, HZ323, HZ324, HZ325, HZ336, HZ337, HZ338, HZ339, HZ346, HZ367, HZ368, HZ369, HZ371, HZ373, HZ444, HZ453</li> </ul> </li> </ul>	<p>Vegetation within the roadside corridor was relatively intact compared to vegetation in adjacent farmland. These patches of native vegetation contained a higher concentration of large trees, with species including Grey Box, Yellow Gum, and River Red Gum. The understorey contained a variety of species including Black-anther Flax-lily, Chocolate Lily, and Common Everlasting.</p>	
	<p><b>Vegetation Protection Overlay – Schedule 2 (Freeway Environs Protection)</b></p>	<p>In accordance with the VPO2, a permit is required to:</p> <ul style="list-style-type: none"> <li>Remove, destroy or lop native vegetation.</li> <li>A permit is not required for the removal of exotic or dead vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Marchbanks Road (Broadford) [ES04]                             <ul style="list-style-type: none"> <li>HZ10, HZ301, HZ302, HZ319, HZ331, HZ343, HZ7</li> </ul> </li> <li>SG7 &amp; SG8                             <ul style="list-style-type: none"> <li>HZ24, HZ31, HZ251</li> </ul> </li> <li>Hume Highway (Tallaroak) [ES05] &amp; TS5                             <ul style="list-style-type: none"> <li>HZ81, HZ82, HZ119, HZ221, HZ290, HZ291, HZ292, HZ293, HZ294, HZ296, HZ297, HZ298, HZ322, HZ438, HZ442, HZ449, HZ450, HZ451, HZ452.</li> </ul> </li> <li>Hume Highway (Seymour) [ES07] and SG19 &amp; TS4                             <ul style="list-style-type: none"> <li>HZ124, HZ281, HZ282, HZ283, HZ284, HZ285, HZ289, HZ336, HZ371, HZ445.</li> </ul> </li> </ul>	<p>Similar to the vegetation in VPO1, vegetation within VPO2 was relatively intact and contained a high concentration of large trees and a variety of understorey species such as Grey Box, River Red Gum, Spiny-headed Mat-rush, Milkmaids, and Wallaby grasses.</p>	



Council	Overlay	Permit requirement	Investigation area and HZ where present (Figure 7 reference)	General vegetation description	General photo of vegetation
Wangaratta	<b>Vegetation Protection Overlay – Schedule 1 (Glenrowan Township Vegetation Protection Area)</b>	In accordance with the VPO1, a permit is required to: <ul style="list-style-type: none"> <li>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 out building (permit required)</li> </ul>	<ul style="list-style-type: none"> <li>Beaconsfield Parade (Glenrowan) [ES10]                             <ul style="list-style-type: none"> <li>HZ171, HZ305, HZ361, HZ437, HZ441.</li> </ul> </li> </ul>	Native vegetation with a height of more than 1 m or a distance of more than 5 m from a dwelling or out building within the VPO consisted of both patches of remnant native vegetation, native Scattered Trees, and planted native vegetation. EVCs identified within the VPO include Grass Woodland (Low Rises) (175_61) and Plains Woodland (EVC 803). Canopy trees generally consisted of Blakely's Red Gum, River Red Gum, and Red Ironbark. Native understorey vegetation consists of established and planted species such as Lightwood, Sticky Hop-bush <i>Dodonaea viscosa</i> , and Kangaroo Grass.	



## **4.5 Weeds and pest animals**

### **4.5.1 Weeds**

Twenty-one species of noxious weeds were incidentally observed within the investigation area by AECOM and KBR (2020a). These species are listed in Table 26.

### **4.5.2 Pest animals**

Pest animals observed in the investigation area are listed in Table 27. Feral cats (not listed in Table 27) are also likely to occur but were not detected during remote camera surveys or spotlighting. Domestic cats may also occur at some of the investigation areas in proximity to residential areas.

Table 26 Noxious weeds recorded within the investigation area

Scientific Name	Common Name	CMA CaLP Act Status			WoNS	Investigation areas recorded
		Port Phillip and Westernport	Goulburn Broken	North East		
<i>Asparagus asparagoides</i>	Bridal Creeper	Restricted	Restricted	Restricted	Yes	<ul style="list-style-type: none"> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> <li>TS4 &amp; SG19</li> </ul>
<i>Cirsium vulgare</i>	Spear Thistle	Regionally Controlled	Restricted	Regionally Controlled		<ul style="list-style-type: none"> <li>Broadford-Wandong Road (Wandong) [ES01]</li> <li>Short Street (Broadford) [ES03]</li> <li>Marchbanks Road (Broadford) [ES04]</li> <li>SG9</li> <li>Hume Highway (Tallarook) [ES03] &amp; TS5</li> <li>TS4 &amp; SG19</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>Benalla Station Access Road (Benalla) [ES09]</li> <li>Murray Valley Highway (Barnawartha North) [ES12]</li> </ul>
<i>Crataegus monogyna</i> <sup>#</sup>	Hawthorn	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>
<i>Dittrichia graveolens</i> <sup>^</sup>	Stinkwort	Regionally Controlled	Restricted	Regionally Controlled		<ul style="list-style-type: none"> <li>Benalla Station Access Road (Benalla) [ES09]</li> </ul>
<i>Echium plantagineum</i>	Paterson's curse	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>SG2 &amp; TS1</li> <li>Benalla Station Access Road (Benalla) [ES09]</li> <li>Murray Valley Highway (Barnawartha North) [ES12]</li> </ul>

Scientific Name	Common Name	CMA CaLP Act Status			WoNS	Investigation areas recorded
		Port Phillip and Westernport	Goulburn Broken	North East		
<i>Eragrostis curvula</i> #	African Love-grass	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>Benalla Station Access Road (Benalla) [ES09]</li> <li>Murray Valley Highway (Barnawartha North) [ES12]</li> </ul>
<i>Foeniculum vulgare</i> #	Fennel	Restricted	Restricted	Restricted		<ul style="list-style-type: none"> <li>Marchbanks Road (Broadford) [ES04]</li> </ul>
<i>Genista linifolia</i> #	Flax-leaf Broom	Regionally Controlled	Restricted	Regionally Prohibited	Yes	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>
<i>Genista monspessulana</i>	Montpellier Broom / Cape Broom	Regionally Controlled	Regionally Controlled	Regionally Controlled	Yes	<ul style="list-style-type: none"> <li>Short Street (Broadford) [ES03] &amp; SG6</li> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> <li>SG3</li> </ul>
<i>Hypericum perforatum</i> subsp. <i>veronense</i>	St John's Wort	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>Short Street (Broadford) [ES03]</li> <li>SG7 &amp; SG8</li> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> <li>SG19 &amp; TS4</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>Hume Highway (Seymour) [ES07]</li> <li>Benalla Station Access Road (Benalla) [ES09]</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> <li>Murray Valley Highway (Barnawartha North) [ES12]</li> </ul>
<i>Juncus acutus</i> subsp. <i>acutus</i> ^	Spiny Rush	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>

Scientific Name	Common Name	CMA CaLP Act Status			WoNS	Investigation areas recorded
		Port Phillip and Westernport	Goulburn Broken	North East		
<i>Lycium ferocissimum</i> <sup>#</sup>	African Box-thorn	Regionally Controlled	Regionally Controlled	Regionally Controlled	Yes	<ul style="list-style-type: none"> <li>Hume Highway (Seymour) [ES07]</li> </ul>
<i>Marrubium vulgare</i> <sup>^</sup>	Horehound	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>
<i>Nassella neesiana</i> <sup>#</sup>	Chilean Needle-grass	Regionally Controlled	Restricted	Restricted	Yes	<ul style="list-style-type: none"> <li>Murray Valley Highway (Barnawartha North) [ES12]</li> </ul>
<i>Opuntia stricta</i>	Prickly Pear	Regionally Controlled	Restricted	Regionally Controlled	Yes	<ul style="list-style-type: none"> <li>SG19 &amp; TS4</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> </ul>
<i>Rosa rubiginosa</i>	Sweet Briar	Regionally Controlled	Regionally Controlled	Regionally Controlled		<ul style="list-style-type: none"> <li>SG3</li> <li>Hamilton Street (Broadford) [ES02] &amp; SG18</li> <li>Marchbanks Road (Broadford) [ES04]</li> <li>Hume Highway (Tallaroek) [ES05] &amp; TS5</li> <li>SG19 &amp; TS4</li> </ul>
<i>Rubus polyanthemus</i> .	Blackberry	Regionally Controlled	Regionally Controlled	Regionally Controlled	Yes	<ul style="list-style-type: none"> <li>SG2 &amp; TS1</li> <li>Broadford-Wandong Road (Wandong) [ES01]</li> <li>SG3</li> <li>Hamilton Street (Broadford) [ES02] &amp; SG18</li> <li>Short Street (Broadford) [ES03]</li> <li>Marchbanks Road (Broadford) [ES04]</li> <li>SG7 &amp; SG8</li> <li>Hume Highway (Tallaroek) [ES05] &amp; TS5</li> <li>SG11 &amp; TS2</li> <li>SG12</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> </ul>

Scientific Name	Common Name	CMA CaLP Act Status			WoNS	Investigation areas recorded
		Port Phillip and Westernport	Goulburn Broken	North East		
<i>Salix sp.</i> <sup>^</sup>	Willow	Restricted	Restricted	Restricted	Yes	• Broadford-Wandong Road (Wandong) [ES01]
<i>Senecio jacobaea</i> <sup>^</sup>	Ragwort	Regionally Controlled	Regionally Prohibited	Restricted		• Hume Highway (Tallarook) [ES05] & TS5
<i>Ulex europaeus</i> <sup>^</sup>	Gorse	Regionally Controlled	Regionally Controlled	Regionally Controlled	Yes	• Broadford-Wandong Road (Wandong) [ES01]
<i>Verbascum thapsus</i> subsp. <i>thapsus</i> <sup>#</sup>	Great Mullein	Restricted	Regionally Controlled	Regionally Controlled		• Beaconsfield Parade (Glenrowan) [ES10]

\*No legislative requirements under the CaLP Act

# Identified within investigation area by KBR (2020a) assessment only

^ Identified within investigation area by AECOM assessment only



**Table 27** Pest animals recorded within the investigation area

Scientific Name	Common Name	CaLP Act Status	EPBC Act / FFG Act
<i>Apis Mellifera</i>	European Honeybee	-	Threatening process under the FFG Act (hollow competition)
<i>Felis catus</i>	Feral Cat	Established Pest	Threatening process under the EPBC Act and FFG Act
<i>Lepus europaeus</i>	European Hare	Established Pest	-
<i>Oryctolagus cuniculus</i>	European Rabbit	Established Pest	Threatening process under the EPBC Act and FFG Act
<i>Vulpes vulpes</i>	Red Fox	Established Pest	Threatening process under the EPBC Act and FFG Act

## 5.0 Summary of ecological values

Table 28 summarises the ecological values identified at each investigation area.

**Table 28 Summary of ecological values found at each investigation area**

Investigation area	EPBC Act (MNES)	P&E Act	FFG Act	Other values
SG16		No native vegetation		
SG1	<ul style="list-style-type: none"> <li>Growling Grass Frog potential habitat (terrestrial, non-breeding)</li> </ul>	<ul style="list-style-type: none"> <li>0.039 ha Swampy Riparian Woodland (EVC 83)</li> </ul>		<ul style="list-style-type: none"> <li>0.039 ha Endangered EVC</li> </ul>
SG17		<ul style="list-style-type: none"> <li>0.023 ha Riparian Forest (18)</li> <li>0.022 ha Swampy Riparian Woodland (EVC 83)</li> </ul>		<ul style="list-style-type: none"> <li>0.022 ha Endangered EVC</li> </ul>
SG2 & TS1	<ul style="list-style-type: none"> <li>0.619 ha NTGVVP</li> <li>Golden Sun Moth potential habitat</li> <li>Striped Legless Lizard potential habitat</li> <li>Growling Grass Frog potential habitat (terrestrial, non-breeding)</li> </ul>	<ul style="list-style-type: none"> <li>0.669 ha Plains Grassland (EVC 132)</li> <li>0.035 ha Riparian Forest (18)</li> <li>0.613 ha Swampy Riparian Woodland (EVC 83)</li> <li>15 Small Scattered Trees</li> <li>One Large Scattered Tree</li> <li>One Large Tree in Patch</li> </ul>	<ul style="list-style-type: none"> <li>0.619 WBPGC</li> </ul>	<ul style="list-style-type: none"> <li>1.282 ha Endangered EVC</li> <li>1 hollow bearing tree (estimated*)</li> </ul>
Broadford-Wandong Road (Wandong) [ES01]		<ul style="list-style-type: none"> <li>0.079 ha Tall Marsh (EVC 821)</li> <li>0.067 ha Valley Grassy Forest (47)</li> </ul>	<ul style="list-style-type: none"> <li>Black Wattle</li> </ul>	
SG3		<ul style="list-style-type: none"> <li>0.259 ha Plains Grassy Woodland (EVC 55)</li> <li>0.032 ha Valley Grassy Forest (47)</li> <li>One Small Scattered Tree</li> <li>One Large Tree in Patch</li> </ul>	<ul style="list-style-type: none"> <li>Jersey Cudweed</li> <li>Cotton Fireweed</li> </ul>	<ul style="list-style-type: none"> <li>0.259 ha Endangered EVC</li> <li>1 hollow bearing tree (estimated*)</li> </ul>
SG4		<ul style="list-style-type: none"> <li>0.061 ha Grassy Woodland (EVC 175_61)</li> <li>1.240 ha Plains Grassy Woodland (EVC 55)</li> <li>2.450 ha Valley Grassy Forest (47)</li> <li>ESO3 (Watercourse Conservation)</li> <li>SMO</li> </ul>	<ul style="list-style-type: none"> <li>Jersey Cudweed</li> </ul>	<ul style="list-style-type: none"> <li>1.301 ha Endangered EVC</li> <li>2.404 ha High Quality EVC</li> </ul>
SG5		<ul style="list-style-type: none"> <li>0.235 ha Plains Grassy Woodland (EVC 55)</li> </ul>	<ul style="list-style-type: none"> <li>0.235 ha VTWBC</li> </ul>	<ul style="list-style-type: none"> <li>0.235 ha Endangered EVC</li> </ul>
Hamilton Street (Broadford) [ES02] & SG18		<ul style="list-style-type: none"> <li>0.369 ha Grassy Woodland (EVC 175_61)</li> <li>0.251 ha Plains Grassy Woodland (EVC 55)</li> <li>Four Small Scattered Trees</li> <li>Two Large Scattered Trees</li> <li>One Large Tree in Patch</li> </ul>	<ul style="list-style-type: none"> <li>Jersey Cudweed</li> </ul>	<ul style="list-style-type: none"> <li>0.621 ha Endangered EVC</li> <li>2 hollow bearing trees (estimated)</li> </ul>
Short Street (Broadford) [ES03] & SG6	<ul style="list-style-type: none"> <li>Striped Legless Lizard potential habitat (outside project area)</li> </ul>	<ul style="list-style-type: none"> <li>0.087 ha Grassy Woodland (EVC 175_61)</li> <li>0.436 ha Plains Grassy Woodland (EVC 55)</li> <li>4.344 ha Plains Grassy Woodland (EVC 55_61)</li> <li>12 Small Scattered Trees</li> <li>Seven Large Scattered Trees</li> <li>14 Large Trees in Patch</li> <li>ESO3 (Watercourse Conservation)</li> </ul>	<ul style="list-style-type: none"> <li>4.197 ha VTWBC</li> <li>Golden Wattle</li> <li>Cotton Fireweed</li> <li>Fuzzy New Holland Daisy</li> </ul>	<ul style="list-style-type: none"> <li>4.866 ha Endangered EVC</li> <li>5 hollow-bearing trees (known)</li> <li>'Stepping stone' for fauna movement</li> </ul>

Investigation area	EPBC Act (MNES)	P&E Act	FFG Act	Other values
Marchbanks Road (Broadford) [ES04]		<ul style="list-style-type: none"> <li>0.878 ha Grassy Woodland (EVC 175_61)</li> <li>3.188 ha Plains Grassy Woodland (EVC 55)</li> <li>19 Small Scattered Trees</li> <li>Seven Large Scattered Trees</li> <li>18 Large Trees in Patch</li> <li>ESO3 (Watercourse Conservation)</li> <li>VPO2 (Freeway Environs Protection)</li> </ul>	<ul style="list-style-type: none"> <li>3.380 ha VTWBC</li> <li>Cotton Fireweed</li> </ul>	<ul style="list-style-type: none"> <li>4.067 ha Endangered EVC</li> <li>0.067 ha High Quality EVC</li> <li>6 hollow-bearing trees (known)</li> <li>'Stepping stone' for fauna movement</li> </ul>
SG7 & SG8		<ul style="list-style-type: none"> <li>3.461 ha Grassy Woodland (EVC 175)</li> <li>0.698 ha Grassy Woodland (EVC 175_61)</li> <li>3.348 ha Plains Grassy Woodland (EVC 55)</li> <li>Three Large Trees in Patch</li> <li>VPO2 (Freeway Environs Protection)</li> </ul>	<ul style="list-style-type: none"> <li>0.603 ha VTWBC</li> <li>Common Everlasting</li> <li>Glaucous Flax-lily</li> <li>Cotton Fireweed</li> </ul>	<ul style="list-style-type: none"> <li>7.507 ha Endangered EVC</li> <li>6.601 ha High Quality EVC</li> <li>2 hollow bearing trees (estimated*)</li> </ul>
SG9		<ul style="list-style-type: none"> <li>0.693 ha Grassy Woodland (EVC 175_61)</li> <li>Seven Large Trees in Patch</li> </ul>	<ul style="list-style-type: none"> <li>0.693 ha VTWBC</li> <li>Blue Finger-flower</li> <li>Glaucous Flax-lily</li> </ul>	<ul style="list-style-type: none"> <li>0.693 ha Endangered EVC</li> <li>5 hollow bearing trees (estimated*)</li> </ul>
Hume Highway (Tallaroak) [ES05] & TS5	<ul style="list-style-type: none"> <li>10.043 ha GBGW</li> <li>Swift Parrot habitat (linkages)</li> </ul>	<ul style="list-style-type: none"> <li>19.025 ha Grassy Woodland (EVC 175_61)</li> <li>9.512 ha Plains Grassy Woodland (EVC 55)</li> <li>11 Small Scattered Trees</li> <li>89 Large Trees in Patch</li> <li>VPO2 (Freeway Environs Protection)</li> </ul>	<ul style="list-style-type: none"> <li>24.296 ha VTWBC</li> <li>Gold-dust Wattle</li> <li>Black Wattle</li> <li>Clustered Everlasting</li> <li>Glaucous Flax-lily</li> <li>Cotton Fireweed</li> <li>Fuzzy New Holland Daisy</li> <li>Shiny Everlasting</li> <li>Brush-tailed Phascogale</li> <li>Squirrel Glider potential habitat</li> </ul>	<ul style="list-style-type: none"> <li>28.537 ha Endangered EVC</li> <li>12.688 ha High Quality EVC</li> <li>61 hollow-bearing trees (known)</li> <li>Sugar Glider population</li> <li>Habitat corridor</li> </ul>
SG10		<ul style="list-style-type: none"> <li>0.090 ha Floodplain Riparian Woodland (EVC 56)</li> </ul>		
SG11 & TS2		<ul style="list-style-type: none"> <li>10.465 ha Floodplain Riparian Woodland (EVC 56)</li> <li>0.108 ha Spike-sedge Wetland (EVC 819)</li> <li>0.261 ha Tall Marsh (EVC 821)</li> <li>32.493 ha DELWP Mapped Wetland</li> <li>19 Small Scattered Trees</li> <li>Two Large Scattered Tree</li> <li>11 Large Trees in Patch</li> <li>ESO3 (Watercourse Conservation)</li> </ul>	<ul style="list-style-type: none"> <li>7.995 ha VTWBC</li> <li>Gold-dust Wattle</li> <li>Squirrel Glider potential habitat</li> <li>Brown Toadlet potential habitat</li> </ul>	<ul style="list-style-type: none"> <li>0.181 ha Endangered EVC</li> <li>32.493 ha High Quality EVC</li> <li>10 hollow bearing trees (estimated*)</li> </ul>
SG12		<ul style="list-style-type: none"> <li>0.113 ha Floodplain Riparian Woodland (EVC 56)</li> <li>One Small Scattered Tree</li> </ul>		

Investigation area	EPBC Act (MNES)	P&E Act	FFG Act	Other values
SG13 & TS3 SG19 & TS4 Seymour Avenel Road (Seymour) [ES06] & SG14 Hume Highway (Seymour) [ES07]	<ul style="list-style-type: none"> <li>59.791 ha GBGW</li> <li>Swift Parrot habitat (linkages)</li> </ul>	<ul style="list-style-type: none"> <li>44.507 ha Box Ironbark Forest (61)</li> <li>0.353 ha Creepline Grassy Woodland (EVC 68)</li> <li>26.069 ha Plains Grassy Woodland (EVC 55)</li> <li>0.614 ha Plains Grassy Woodland (EVC 55_61)</li> <li>14 Small Scattered Trees</li> <li>One Large Scattered Tree</li> <li>279 Large Trees in Patch</li> <li>ESO3 (Watercourse Conservation)</li> <li>VPO1 (Roadside and Corridor Protection)</li> <li>VPO2 (Freeway Environs Protection)</li> </ul>	<ul style="list-style-type: none"> <li>64.108 ha VTWBC</li> <li>Buloke</li> <li>Glaucous Flax-lily</li> <li>Gold-dust Wattle (<i>Acacia acinacea</i>)</li> <li>Black Wattle (<i>Acacia mearnsii</i>)</li> <li>Honey-pots (<i>Acrotriche serrulata</i>)</li> <li>Rock Fern (<i>Cheilanthes</i> spp.)</li> <li>Blue Finger-flower (<i>Cheiranthra linearis</i>)</li> <li>Common Everlasting (<i>Chrysocephalum apiculatum</i> s.l.)</li> <li>Clustered Everlasting (<i>Chrysocephalum semipapposum</i>)</li> <li>Common Cotula (<i>Cotula australis</i>)</li> <li>Grey Everlasting (<i>Ozothamnus obcordatus</i>)</li> <li>Fuzzy New Holland Daisy (<i>Vittadinia cuneata</i>)</li> <li>Barking Owl habitat</li> <li>Brush-tailed Phascogale potential habitat</li> <li>Squirrel Glider potential habitat</li> </ul>	<ul style="list-style-type: none"> <li>27.037 ha Endangered EVC</li> <li>43.124 ha High Quality EVC</li> <li>100 hollow-bearing trees (known)</li> <li>142 hollow bearing trees (estimated*)</li> <li>Habitat corridor</li> </ul>
Anderson Street (Euroa) [ES08]		<ul style="list-style-type: none"> <li>0.134 ha Plains Grassy Woodland (EVC 55_61)</li> <li>Nine Small Scattered Trees</li> <li>Four Large Scattered Trees</li> <li>Two Large Trees in Patch</li> </ul>		<ul style="list-style-type: none"> <li>0.134 ha Endangered EVC</li> <li>4 hollow bearing trees (estimated*)</li> </ul>
Benalla Station Access Road (Benalla) [ES09]		<ul style="list-style-type: none"> <li>0.523 ha Plains Grassy Woodland (EVC 55_61)</li> <li>75 Small Scattered Trees</li> <li>Five Large Scattered Trees</li> <li>Four Large Trees in Patch</li> </ul>		<ul style="list-style-type: none"> <li>0.523 ha Endangered EVC</li> <li>7 hollow bearing trees (estimated*)</li> </ul>
Beaconsfield Parade (Glenrowan) [ES10]		<ul style="list-style-type: none"> <li>0.489 ha Grassy Woodland (EVC 175_61)</li> <li>0.517 ha Plains Woodland (EVC 803)</li> <li>16 Small Scattered Trees</li> <li>Five Large Scattered Trees</li> <li>Nine Large Trees in Patch</li> <li>VPO1 (Glenrowan Township Vegetation Protection Area)</li> </ul>	<ul style="list-style-type: none"> <li>Varnish Wattle (<i>Acacia verniciflua</i> s.l.)</li> <li>Fuzzy New Holland Daisy (<i>Vittadinia cuneata</i>)</li> <li>Shiny Everlasting (<i>Xerochrysum viscosum</i>)</li> </ul>	<ul style="list-style-type: none"> <li>1.006 ha Endangered EVC</li> <li>9 hollow bearing trees (estimated*)</li> </ul>
Wangaratta Precinct (Wangaratta) [ES11] & SG15		<ul style="list-style-type: none"> <li>1.937 ha Creepline Grassy Woodland (EVC 68)</li> <li>0.024 ha Plains Grassy Woodland (EVC 55_61)</li> <li>Seven Small Scattered Trees</li> <li>Four Large Scattered Trees</li> <li>12 Large Trees in Patch</li> </ul>	<ul style="list-style-type: none"> <li>Brown Toadlet potential habitat</li> </ul>	<ul style="list-style-type: none"> <li>1.961 ha Endangered EVC</li> <li>9 hollow bearing trees (estimated*)</li> </ul>
Murray Valley Highway (Barnawartha North) [ES12]		<ul style="list-style-type: none"> <li>1.560 ha Plains Woodland (EVC 803)</li> <li>Two Small Scattered Trees</li> <li>Five Large Scattered Trees</li> <li>One Large Tree in Patch</li> </ul>		<ul style="list-style-type: none"> <li>1.560 ha Endangered EVC</li> <li>4 hollow bearing trees (estimated*)</li> </ul>

Notes to table: \*estimated refers to number of large trees (scattered and/or in patches) likely to contain hollows as outlined in Section 4.3.5.

## 6.0 Impact assessment

Construction works proposed for the Project will have direct and indirect impacts on ecological values.

Direct impacts relate primarily to the loss of native vegetation and habitat that will occur as a result of construction activities within the reference design area. Removal of native vegetation in turn will result in a loss of other values the native vegetation supports including TECs, hollow-bearing trees, landscape connectivity, habitat for threatened species, and resident wildlife (threatened and non-threatened species).

Construction activities may also indirectly impact on retained values adjacent to the reference design area (i.e. within the buffer of the reference design). Indirect impacts relate primarily 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, root damage, sedimentation, weed infestation, and smothering by dust.

These impacts are primarily associated with the removal of vegetation during construction (land clearance) rather than the ongoing operation of the rail line and are discussed below in relation to the enhancement sites. As discussed in Section 3.5.1 impacts to track slews and signal gantries have been excluded as construction activities will be contained within existing rail and along existing access tracks, and are therefore no longer considered in this section.

Potential impacts are described for the enhancement site reference design (direct impacts) and buffer area (indirect impacts) where relevant. The potential impacts are based on the method outlined in Section 3.5.1.

### 6.1 Native vegetation loss

Native vegetation is protected under the P&E Act and its removal usually requires a permit in Victoria. 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 was generally heavily modified as a result of land clearing for agriculture, rural centres, for the construction of infrastructure like rail and road corridors, and from other pressures such as noxious weeds, pest animals, and habitat fragmentation. Urban areas often contained areas of planted native and non-native vegetation as well as areas of remnant but disturbed native vegetation. Agricultural land within and adjacent to the investigation area typically lacked an understorey but contained small and large Scattered Trees and/or Large Trees in Patches that have been retained for shade or other purposes. Higher quality vegetation tended to occur along road reserves such as Seymour Avenel Road which contained values such as large trees in patches and a relatively intact and variable understorey.

#### 6.1.1 Potential impacts

Loss of native vegetation is a direct and unavoidable consequence of construction and it is conservatively assumed that all vegetation and habitat would be removed within the impact area to facilitate construction works. This includes patches of native vegetation, large trees (in patches and Scattered Trees), areas of endangered EVC, and patches of high-quality native vegetation. Some of the native vegetation removal will also occur in areas covered by environmental overlays (Section 4.4.1).

##### 6.1.1.1 Patches of native vegetation

Table 29 summarises the total amount of patches of native vegetation mapped within each investigation area and how much is anticipated to be impacted.

Eight of the 12 investigation areas contained greater than one ha of native vegetation, and of those, four are anticipated to result in the clearing of more than one ha of native vegetation within their impact area.



Enhancement sites varied in the amount of native vegetation present. Some, such as Broadford-Wandong Road (Wandong) [ES01], Anderson Street (Euroa) [ES08], and Benalla Station Access Road (Benalla) [ES09], contained relatively little vegetation as they were mostly surrounded by planted and naturally established non-native vegetation or have experienced high levels of clearance from urban expansion. Other enhancement sites, such as Short Street (Broadford) [ES03], Hume Highway (Tallarook) [ES05], Seymour Avenel Road (Seymour) [ES06], and Hume Highway (Seymour) [ES07], contained larger areas of remnant vegetation along their margins such as the road/rail reserve along Seymour Avenel Road, Seymour.

The total mapped extent of native vegetation contained across the investigation areas is 172.374 ha (Section 4.3.1.2), compared to a total impact extent of 14.764 ha (Table 29). Management and mitigation measures that can potentially be implemented to reduce the extent of loss of patches of native vegetation are discussed in Sections 6.1.2 and 8.0.

**Table 29 Summary of impact to patches of native vegetation at each investigation area**

Investigation area	Extent mapped for each investigation area (ha)	Extent of potential impact (ha)		
		Reference design area	Buffer area	Total
Broadford-Wandong Road (Wandong) [ES01]	0.147	0.047	0.062	0.109
Hamilton Street (Broadford) [ES02]	0.621	0.008	0.029	0.038
Short Street (Broadford) [ES03]	4.866	0.107	0.634	0.741
Marchbanks Road (Broadford) [ES04]	4.066	0.540	1.205	1.745
Hume Highway (Tallarook) [ES05]	28.537	0.615	1.812	2.428
Seymour Avenel Road (Seymour) [ES06] & Hume Highway (Seymour) [ES07]	71.544	2.568	5.634	8.202
Anderson Street (Euroa) [ES08]	0.134	0.00	0.00	0.00
Benalla Station Access Road (Benalla) [ES09]	0.523	0.00	0.017	0.017
Beaconsfield Parade (Glenrowan) [ES10]	1.006	0.013	0.176	0.189
Wangaratta Precinct (Wangaratta) [ES11]	1.961	0.041	0.243	0.284
Murray Valley Highway (Barnawartha North) [ES12]	1.560	0.328	0.683	1.011
<b>Total</b>	<b>114.965</b>	<b>4.267</b>	<b>10.495</b>	<b>14.764</b>

### 6.1.1.2 Trees

Across the impact areas of the enhancement sites, a total of 20 trees (12 small Scattered Trees, 4 large Scattered Trees, 4 Large Trees in Patches) will potentially be directly removed by the Project. Indirect losses include 79 trees (19 small Scattered Trees, 4 large Scattered Trees and 53 Large Trees in Patches). These impacts are summarised in Table 30.

While some investigation areas do not contain any native trees, several contain a large number, particularly Hume Highway (Tallarook) [ES05] and Seymour Avenel Road (Seymour) [ES06]. These investigation areas were bounded by the relatively intact road and rail reserves which contained higher concentrations of Large Trees in Patches.

Importantly, the proposed direct and indirect loss of trees, particularly large trees, provide habitat (hollow-bearing trees) and foraging resources for native fauna species, and may take many years to establish in the environment. They also provide ecosystem benefits such as facilitating habitat connectivity across a heavily modified landscape. Efforts should be made to retain these trees wherever possible.

Table 30 Summary of impacts to trees at each investigation area

Investigation area	Number of trees mapped at each investigation area (existing conditions)				Number of trees impacted at each impact area							
					Reference design area				Buffer area			
	Small Scattered Tree	Large Scattered Tree	Large Trees in Patches	Total	Small Scattered Tree	Large Scattered Tree	Large Trees in Patches	Total	Small Scattered Tree	Large Scattered Tree	Large Trees in Patches	Total
Broadford-Wandong Road (Wandong) [ES01]	No native trees											
Hamilton Street (Broadford) [ES02]	4	2	1	7	None	None	None	None	None	None	None	None
Short Street (Broadford) [ES03]	11	8	16	35	None	None	None	None	None	None	4	4
Marchbanks Road (Broadford) [ES04]	19	6	18	43	6	3	None	9	4	3	10	17
Hume Highway (Tallaroak) [ES05]	11	None	99	110	1	None	None	1	3	None	9	15
Seymour Avenel Road (Seymour) [ES06] & Hume Highway (Seymour) [ES07]	14	1	328	343	None	None	3	3	2	None	24	26
Anderson Street (Euroa) [ES08]	9	4	2	15	1	None	None	1	1	None	None	1
Benalla Station Access Road (Benalla) [ES09]	15	5	5	25	None	None	None	None	1	None	None	1
Beaconsfield Parade (Glenrowan) [ES10]	16	5	9	30	3	1	None	4	4	None	3	7
Wangaratta Precinct (Wangaratta) [ES11]	7	4	12	23	1	None	1	2	4	1	3	8
Murray Valley Highway (Barnawartha North) [ES12]	2	5	1	8	None	None	None	None	None	None	None	None
<b>Total</b>	<b>108</b>	<b>40</b>	<b>491</b>	<b>639</b>	<b>12</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>19</b>	<b>4</b>	<b>53</b>	<b>79</b>

### 6.1.1.3 Endangered EVCs

The total mapped extent of endangered EVCs contained within the investigation areas is 81.831 ha (Section 4.3.1.4) compared to a total impact extent of 7.327 ha (Table 31). As endangered EVCs are a subset of the native vegetation information contained in Table 29, the locations and impacts to endangered EVCs reflect the overall trends seen in native vegetation. Management and mitigation measures that can potentially be implemented to reduce this loss of endangered EVCs are discussed in Sections 6.1.2 and 8.0.

**Table 31 Mapped and impacted extent of endangered EVCs at each investigation area where present.**

Investigation area	Endangered EVCs	Extent mapped for each investigation area (ha)	Extent of potential impact (ha)		
			Reference design area	Buffer area	Total
Hamilton Street (Broadford) [ES02]	Grassy Woodland (EVC 175_61)	0.369	0.008	0.029	0.037
	Plains Grassy Woodland (EVC 55)	0.251	0.00	0.00	0.00
Short Street (Broadford) [ES03]	Grassy Woodland (Low Rises) (EVC 175_61)	0.087	0.00	0.001	0.001
	Plains Grassy Woodland (EVC 55)	0.436	0.002	0.066	0.068
	Plains Grassy Woodland (EVC 55_61)	4.344	0.105	0.567	0.672
Marchbanks Road (Broadford) [ES04]	Grassy Woodland (EVC 175_61)	0.878	0.090	0.290	0.380
	Plains Grassy Woodland (EVC 55)	3.180	0.450	0.915	1.365
Hume Highway (Tallarook) [ES05]	Grassy Woodland (EVC 175_61)	19.025	0.598	1.513	2.111
	Plains Grassy Woodland (EVC 55)	9.512	0.017	0.300	0.317
Seymour Avenel Road (Seymour) [ES06] Hume Highway (Seymour) [ES07]	Creekline Grassy Woodland (EVC 68)	0.353	0.00	0.00	0.00
	Plains Grassy Woodland (EVC 55)	26.069	0.141	0.733	0.874
	Plains Grassy Woodland (EVC 55_61)	0.614	0.00	0.00	0.00
Anderson Street (Euroa) [ES08]	Plains Grassy Woodland (EVC 55_61)	0.134	0.00	0.00	0.00
Benalla Station Access Road (Benalla) [ES09]	Plains Grassy Woodland (EVC 55_61)	0.523	0.00	0.017	0.017

Investigation area	Endangered EVCs	Extent mapped for each investigation area (ha)	Extent of potential impact (ha)		
			Reference design area	Buffer area	Total
Beaconsfield Parade (Glenrowan) [ES10]	Grassy Woodland (Low Rises) (EVC 175_61)	0.489	0.002	0.099	0.101
	Plains Woodland (EVC 803)	0.517	0.011	0.078	0.089
Wangaratta Precinct (Wangaratta) [ES11]	Creekline Grassy Woodland (EVC 68)	1.937	0.041	0.224	0.265
	Plains Grassy Woodland (EVC 55_61)	0.024	0.00	0.019	0.019
Murray Valley Highway (Barnawartha North)	Plains Woodland (EVC 803)	1.560	0.328	0.683	1.011
<b>Total</b>		<b>70.302</b>	<b>1.793</b>	<b>5.534</b>	<b>7.327</b>

#### 6.1.1.4 High quality native vegetation

Patches of high-quality native vegetation have been identified from nine investigation areas (Section 4.3.1.5). The total mapped extent of high-quality patches contained across the investigation areas is 97.377 ha compared to a total impact extent of 3.359 ha. As high-quality patches are a subset of the native vegetation information contained in Table 29, the locations and impacts to high quality patches reflect the overall trends seen in native vegetation. Management and mitigation measures that can potentially be implemented to reduce this loss of high-quality patches are discussed in Sections 6.1.2 and 8.0.

**Table 32 Potential impacts on high quality native vegetation at each investigation area where it is present**

Investigation area	Extent mapped in investigation area (ha)	Extent of potential impact (ha)		
		Reference design area	Buffer area	Total
Hume Highway (Tallarook) [ES05]	12.688	0.240	1.391	1.631
Seymour Avenel Road (Seymour) [ES06] Hume Highway (Seymour) [ES07]	43.124	0.474	1.254	1.728
<b>Total</b>	<b>55.812</b>	<b>0.714</b>	<b>2.645</b>	<b>3.359</b>

#### 6.1.1.5 Environmental overlays

The Environmental Overlays outlined in Section 4.4.1, are planning tools applied by local council to identify vegetation of significance. Justification for inclusion in an environmental overlay may be that the vegetation is protected for its importance in providing habitat corridors (such as along roadways) or for the protection of watercourses, etc.

Table 33 summarises the applicable overlays for each LGA, their specific requirements, and identifies impacts to relevant ecological values. The relative location so the overlays and ecological values to the impact areas is provided in Figure 13.



**Table 33 Impacts to relevant ecological values within environmental overlays**

LGA	Overlay	Permit requirement	Required biodiversity information	Impacts to relevant ecological values			
				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: <ul style="list-style-type: none"> <li>Remove, destroy or lop any vegetation, including dead vegetation.</li> </ul>	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)	None identified	0.068 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: <ul style="list-style-type: none"> <li>Remove, destroy or lop any vegetation.</li> </ul>	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non-native)	None identified	None identified	N/A	N/A
	Vegetation Protection Overlay – Schedule 1 (Roadside and Corridor Protection)	In accordance with the VPO1, a permit is required to: <ul style="list-style-type: none"> <li>Remove, destroy or lop native vegetation.</li> <li>A permit is not required for the removal of exotic vegetation.</li> </ul>	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	6.916 ha 25 trees	N/A	N/A	N/A

LGA	Overlay	Permit requirement	Required biodiversity information	Impacts to relevant ecological values			
				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: <ul style="list-style-type: none"> <li>Remove, destroy or lop native vegetation.</li> <li>A permit is not required for the removal of exotic or dead vegetation.</li> </ul>	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	3.130 ha 12 trees	N/A	N/A	N/A
<b>Wangaratta</b>	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 out building (permit required)	Extent of native vegetation to be removed / destroyed / lopped	0.189 ha 11 trees	N/A	N/A	N/A

### 6.1.2 Management and mitigation recommendations

Currently the Project may impact 14.764 ha of native vegetation. Of this, 7.327 ha of endangered EVCS, 3.359 ha of high-quality patches of native vegetation, and 10.235 ha of native vegetation covered by relevant environmental overlays may potentially be impacted. Additionally, the Project may result in the loss of 96 trees, including 65 large trees (8 large Scattered Trees and 57 Large Trees in Patches) which provide important habitat resources for a number of fauna species in the landscape.

As the design process is ongoing, the Project should seek to reduce the footprint of the proposed works wherever possible, particularly for important ecological values such as endangered EVCS, high quality patches, TECs, and large trees. A number of management and mitigation measures that can be employed during the design process are identified in Section 8.0. Where vegetation loss is unavoidable, it should focus on lower quality vegetation and measures to protect retained vegetation from inadvertent damage should be implemented as part of a Flora and Fauna Management Plan (FFMP) or equivalent (see Section 8.3).

### 6.1.3 Summary

Removal of native vegetation and habitat will be unavoidable. The full extent of vegetation clearance will not be known until the detailed design of the Project has been finalised, the potential for retained vegetation to be indirectly lost is confirmed by an arborist assessment, and mitigation measures to be implemented by the Project are confirmed.

Offsets for native vegetation losses that cannot be avoided or mitigated will be required.

## 6.2 Habitat fragmentation

Removal of vegetation could increase habitat fragmentation by widening gaps within linear corridors of habitat which extend along the road and rail reserves associated with the impact area.

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 process of habitat fragmentation has several components: reduction in the amount of habitat (habitat loss), a decrease in the size of habitat patches (habitat reduction), and an increase in the isolation of patches (habitat isolation) (Bennett, 1999; Fahrig, 2003). Factors influencing the susceptibility of species to fragmentation include mobility of individual species, distance of gaps in the canopy or ground cover, width of corridors and presence of habitat to move to.

An increase in habitat fragmentation is a potential impact at all impact areas which contain woodland habitat, but is of particular relevance when assessing project related impacts to those enhancement sites that support significant areas of woodland habitat. Hume Highway (Tallarook) [ES05], Seymour Avenel Road (Seymour) [ES06], and Hume Highway (Seymour) [ES07] are all sites that contain extensive areas of woodland habitat and have connections to areas of remnant vegetation within parks, reserves and private land. These areas are also of moderate to high strategic biodiversity value (Section 4.3.7, Table 24).

Animals most likely to be affected by wider gaps in the vegetation at Tallarook and Seymour are arboreal mammals, the movement of which may be inhibited by wider gaps in the tree canopy. Species known to occur at the enhancement sites are primarily non-threatened possums (Common Brushtail Possum and Common Ringtail Possum). However, Brush-tailed Phascogale (FFG Act listed) and Sugar Glider (non-threatened but uncommon) have been confirmed to be present at Tallarook and the potential for Squirrel Glider (EPBC Act listed) cannot be discounted. Based on VBA records, these species may also occur around Seymour as Squirrel Glider are known to occur along the riparian corridor of the Goulburn River to the east of Seymour.

The susceptibility of arboreal mammals to widening of existing gaps at the enhancement sites varies between species (Bennett 1999; Gleeson and Gleeson, 2012). Gliders are rarely found on the ground and primarily move by gliding from tree to tree. Squirrel Gliders can glide up to 80 m but 20 – 40 m movements are more typical (van der Ree et al., 2003; Korodaj et al., 2014). Gaps of more than 70 m are considered to be 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.

Functional connectivity for woodland birds consists of trees no more than 200 m apart and large remnant patches no more than 2 km apart (Doerr et al., 2011). At least 10% tree cover is required to maintain connectivity (Bennett & Ford, 1997) and species diversity within a patch is strongly correlated to distance of patches in a landscape (Radford et al., 2005). The vegetation along the rail corridor and/or road reserves adjacent to the rail is likely to function as a dispersal corridor for woodland birds rather than as core areas of habitat, although many woodland bird species also reside in the vegetation of the impact areas (e.g. White-winged Chough were observed nesting at Seymour). Disruption to connectivity by road and rail infrastructure 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). Individual animals could have their home range destroyed through habitat removal, or the boundaries of home ranges could be reconfigured to accommodate the change in gap.

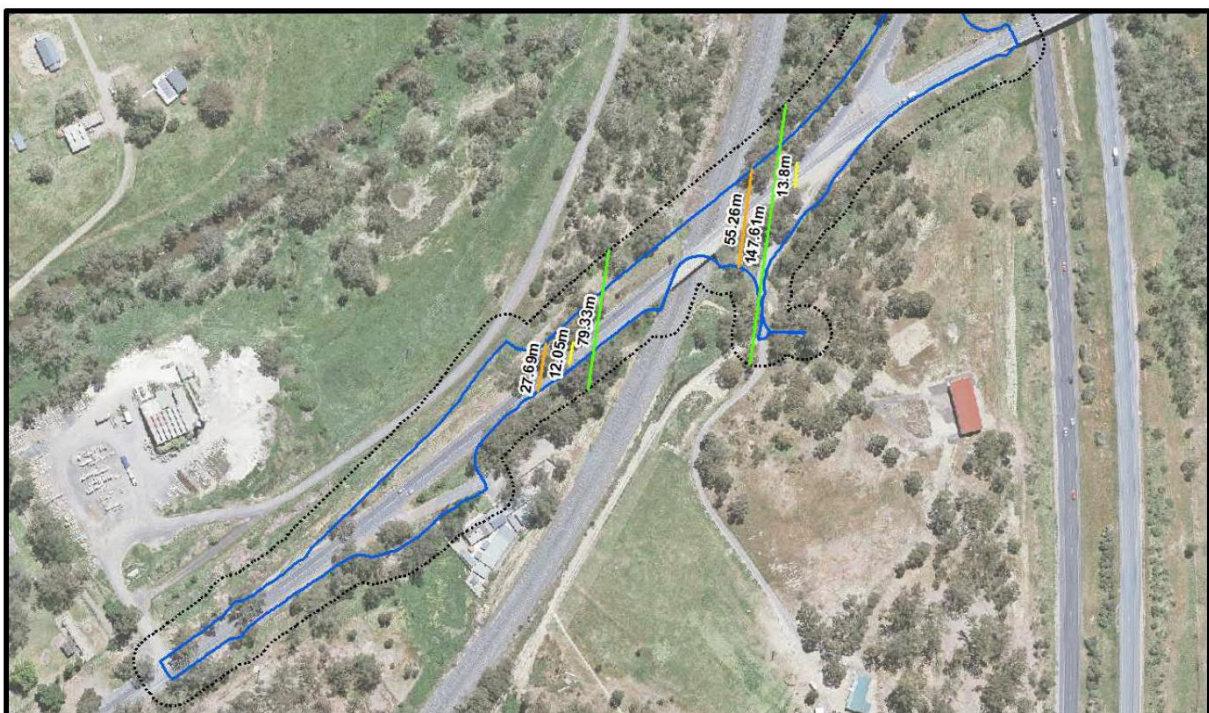
### 6.2.1 Potential impact

Track slews and signal gantry impact areas are largely contained within the rail corridor and utilise existing tracks, therefore impacts on connections in the landscape are unlikely.

The reference design for the Project will increase existing gaps in habitat linkages in the local landscape at Marchbanks Road (Broadford) [ES04], Seymour Avenel Road (Seymour) [ES06] and Hume Highway (Tallarook) [ES05]. Gaps in the canopy will result from removal of trees within the reference design area and potential loss (through major TPZ encroachment) of canopy cover of trees within the 15 m buffer.

At Marchbanks Road (Broadford) [ES04], existing gaps in canopy across the road would be widened from <15m to >25m on the west side of the rail and 55 m on the east side by works within the reference design area (Figure 3). If 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 80 m of the west side.

**Figure 3 Potential connectivity impacts at Marchbanks Road (Broadford) [ES04]**



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

At Hume Highway (Tallarook) [ES05], 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 4). 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 contribute to the existing barrier for gliders. It does have the potential however, to impact the home range or alter the boundaries of home ranges of resident arboreal mammals.

**Figure 4 Potential connectivity impacts at Hume Highway (Tallarook) [ES05]**

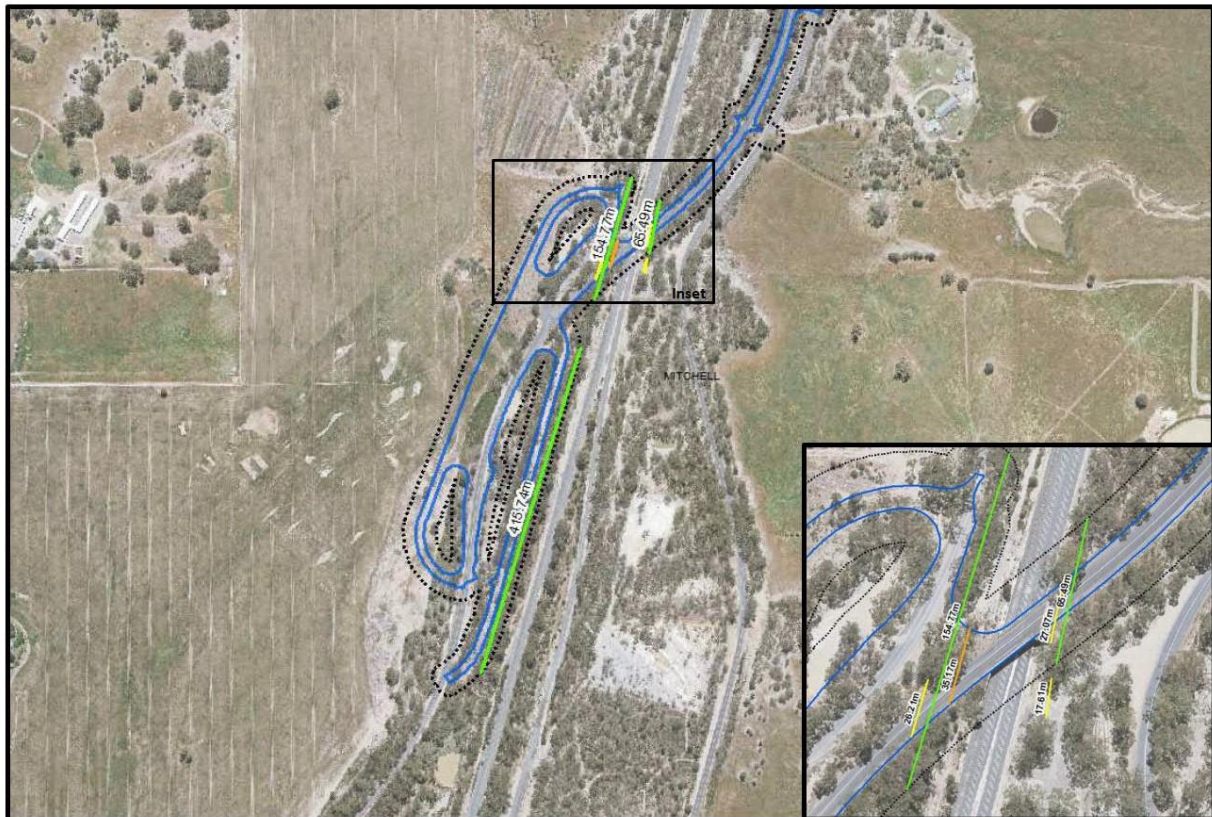


*Key: yellow = existing gap in canopy, green = future gap if canopy compromised (buffer area)*

At Seymour, the Seymour Avenel Road (Seymour) [ES06] enhancement site reference design area will 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 would be formed in the woodland habitat corridor on the west side of the rail line; one gap of 415 m long is separated from the second 155 m long gap by approximately 50 m of tree canopy. The existing gap across Seymour Avenel Road on the east side of the rail line would be widened to approximately 65 m (). 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 will impact arboreal mammals and smaller woodland birds. Functional connectivity on the west side of the rail corridor would be lost.



Figure 5 Potential connectivity impacts at Seymour Avenel Road (Seymour) [ES06]



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).

### 6.2.2 Management and mitigation recommendations

Opportunities to reinstate the habitat corridors through landscaping or restoration within the project area are limited due to the nature of the Project. However, the Project should seek to identify opportunities to improve habitat and connectivity elsewhere in the local landscape by enhancing species habitats that assist movement through an inhospitable environment (Bennett, 1999).

Revegetation activities can provide conservation benefits for wildlife directly through increasing the amount of suitable habitat in the landscape, improving the quality of existing habitats or promoting the connectivity of existing habitats by filling in 'gaps' in a link and establishing new habitat corridors or 'stepping stones' of habitat (Bennett et al., 2000). Increasing the amount of suitable habitat can be achieved by adding to existing vegetation to increase the size of a patch or width of a corridor. Improving the quality of habitat can be achieved through selective replanting or seeding to enhance the composition or structure of the vegetation.

The Project could contribute to the Regent Honeyeater Habitat Restoration Project which is a landscape scale restoration project being undertaken by landholders and community groups in the Lurg Hills district, 10 km east of Benalla. While the restoration project focuses on improving connectivity for Regent Honeyeater, many other co-occurring species will benefit from the project including the Swift Parrot, Brush-tailed Phascogale, Squirrel Glider and members of the VTWBC (Thomas, 2009; GBCMA, n.d). There are also several local Landcare groups in the north-east which may have other landscape restoration projects.

Protection, management, restoration, and expansion of habitat at a landscape scale are actions to improve the extent and quality of habitat identified in the national recovery plans for Swift Parrot and

Regent Honeyeater (Saunders & Tzaros, 2011; DoE, 2016). Measures implemented by the Project to protect, restore, or expand habitat will therefore align with those objectives.

Measures to promote safe movement of fauna around the impact areas should be considered within the FFMP. Use of structures such as land bridges, fauna underpasses, arboreal rope bridges, and glide poles have been increasingly used as an environmental management tool for developments (Gleeson & Gleeson, 2012; Soanes et al., 2015). The effectiveness and feasibility of using such structures at the enhancement sites, particularly at Tallarook and Seymour, should be at least considered.

Native vegetation clearance itself will be offset in accordance with the Guidelines (DELWP, 2017a) or in agreement with DELWP.

### 6.2.3 Summary

The Project has the potential to exacerbate fragmentation at a local scale. Disruption to connectivity by road and rail upgrades at Seymour and Tallarook is more likely to be exacerbated for smaller, less mobile species such as small woodland birds (robins, wrens, thornbills, honeyeaters), reptiles, and small mammals. Brush-tailed Phascogale, Sugar Glider, and potentially Squirrel Glider are likely to be affected by a reduction in connectivity, particularly at Tallarook. 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).

Opportunities to improve habitat and connectivity should be identified and implemented by the Project. This may include revegetation or contribution to the Regent Honeyeater Habitat Restoration Project.

## 6.3 Loss of hollow-bearing trees

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.

Hollows have been demonstrated to support a wide range of species. A study by Gibbons and Lindenmayer (1997) determined that 17% of bird, 42% of mammals, and 28% of reptiles are hollow dependent. DSE (2003) considered hollows to be essential for 16 species of mammal and 44 bird species in Victoria including many threatened species. Lace Monitor *Varanus varius* (listed as threatened under the FFG Act) is also dependent on hollows (DSE, 2003a). Roadside trees are a particularly important source of hollows in rural landscapes (DSE, 2003a) which is the setting for this Project.

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. Therefore, in order for a colony to survive, numerous trees with suitable hollows are essential (Bennett et al., 1998). Gliders and phascogales prefer hollows with a tight entrance hole (<50mm) and use multiple den sites within their home range (DSE, 2003b, 2003c; van der Ree et al., 2003; Sloanes and van der Ree, 2015). Owls tend to use larger, deeper hollows (Mackowski, 1984; Menkhorst, 1984; Scotts, 1991). It is therefore essential that not only a large number of hollows be available but also a variety of sizes and shapes as different species have their own, sometimes unique ecological niche (Recher, 1991).

Factors that contribute to hollow suitability include their location (height on the tree, spout, or trunk) entrance size, shape, depth, and degree of insulation (NPWS, 1999). Entrance size is particularly important in dictating what species utilise a hollow. Small mammals such as gliders and dasyurids for instance seem to prefer hollows with small entrances. The use of hollows with small entrances reduces the ability of predators to enter the hollow providing protection for the adult and having the added benefit of giving them the ability to leave young in order to forage (Dickman, 1991).

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. Hollows are generally found in old growth and dead trees and typically take 100 or more years to form (Mackowski, 1984). There is a strong relationship between hollow size and age of tree. Hollows often start off small and gradually increase in size through mechanisms such as exposure to the elements (wind, rain, extreme temperatures), insect attack, fungal or bacterial growth, and fire (Gibbon and Lindenmayer, 1997). As hollows expand and develop, they provide opportunities for different species over time. Small hollows such as those which support small mammals generally form after 100 years, medium hollows, such as

those that support parrots, often take in excess of 200 years, and hollows large enough to support larger forest owls take even longer (Mackowski, 1984; Menkhorst, 1984; Scotts, 1991). As such the presence of multiple age cohorts of trees is important. It is estimated that in order to support biodiversity, as many as 30 hollows (3 - 10 hollow-bearing trees) may be required per hectare (NPWS, 1999; DELWP 2018d).

### 6.3.1 Potential impact

Within the Short Street (Broadford) [ES03], Marchbanks Road (Broadford) [ES04], Hume Highway (Tallarook) [ES05], Seymour Avenel Road (Seymour) [ES06], and Hume Highway (Seymour) [ES07] enhancement site impact areas (Appendix C), 51 known hollow-bearing trees have the potential to be impacted. Three of these hollow-bearing trees will be removed and an additional 48 have the potential to be indirectly impacted through damage to TPZs. Of these, 11 were noted to be of particularly high value due to the presence of a large number and variety of hollow, and/or evidence of fauna usage.

At least another 196 trees are estimated to contain hollows at the other enhancement sites based on large tree mapping and there are likely to be other hollows in smaller trees (Section 4.3.5). Eight of those large trees which may contain hollows will be directly impacted. The health of approximately 60 trees within 15 m of the reference design area could be indirectly impacted (Table 30). While the canopy cover of those 60 trees could be lost, the hollows themselves will not be removed.

Removal of hollows has the potential to impact on a range of hollow-dependent fauna including Brush-tailed Phascogale, Sugar Glider, possums, bats, certain reptiles and amphibians (such as tree frogs) parrots, owls and other woodland birds. This includes members of the Victorian Temperate Woodland Bird Community.

### 6.3.2 Management and mitigation recommendations

No specific approvals are required under the FFG Act to remove hollow-bearing trees. However, as the loss of hollow-bearing trees is recognised as a threatening process under the FFG Act, consideration should be given to avoiding and minimising exacerbating the loss of hollow-bearing trees during the design phase. Avoiding and minimising loss of hollow-bearing trees is consistent with the requirements under the P&E Act in relation to loss of native vegetation (Section 6.1). Authorisation may also be required to wilfully damage, disturb or destroy wildlife habitat under the Wildlife Act.

Due to the time taken for hollows to develop, revegetation does not provide a short-term mitigation for their loss. Consideration therefore should be given to providing artificial hollow replacements for this critical habitat feature. Artificial hollow is a term used to describe a 'hollow structure that aims to mimic a natural tree hollow' (BCT, 2020, p3). Artificial hollows include:

- Nest boxes (manufactured hollows) which are pre-fabricated 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 with studies being undertaken to better understand their validity as a conservation tool (DSE, 2003a; TSRH, 2018). Nest boxes made of plywood or timber provide a short term solution if not maintained (BCT, 2020).

3D printed modular hollows recently developed by Habitech are made from more durable plastic-based materials (UV-stabilised), are double-walled for temperature and humidity control, and are modular which allows them to be adjusted to suit different sized species. 3D hollows is an emerging technique therefore effectiveness is unknown. 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.

- Chainsaw/drilled hollows which are cut into standing trees or cut into logs and attached to tree trunks (referred to as log hollows). This novel approach requires technical training and certification and may pose a risk to tree health (BCT, 2020). However, recent studies suggests that chainsaw hollows designed to replicate natural hollows could be effective (Griffiths et al. 2020; Terry et al. 2021). A 2.5 year monitoring program found that Sugar Gliders and Brush-tailed Phascogales rapidly occupied artificial hollows and both species were detected more often in carved hollows than in nest boxes (Terry et al. 2021). The monitoring also highlighted that, similar to nest boxes, periodic maintenance will be required. The studies recommended further studies and small-scale

experiments be undertaken before implementing this approach on a broad scale (Griffiths et al. 2020; Terry et al. 2021).

- Salvaged natural tree hollows which are hollow branches or trunks cut from felled hollow-bearing trees and refitted trees not currently containing hollows (BCT, 2020; Gleeson and Gleeson, 2012). Hollow branches or trunks should be cut into lengths of at least 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 after being cut to size (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.

Hollows carved directly into live trees can provide thermally similar habitat to natural hollows whereas plywood nest boxes are generally poorly insulated and produce lower-quality thermal environments (Griffiths et al. 2018). It is assumed that salvaged natural hollows would also provide habitat similar to in situ natural hollows.

If the Project considers the use of artificial hollows as a mitigation measure a number of factors need to be considered (DELWP, 2018d; BCT, 2020). These include:

- Target species. While threatened species impacted or potentially impacted by the Project such as Brush-tail Phascogale, Squirrel Glider and Barking Owl would be the primary targets for artificial hollows, a variety of hollows catering for a range of species should be considered.
- Consultation with an expert in the ecological requirements of the target species to determine the appropriate type, specification and installation location for artificial hollows. As described above different species have different preferences for hollow entrance and cavity sizes and different types of artificial hollows are more effective at replicating natural hollows.
- Presence and location of suitable enhancement sites to receive artificial hollows and if those enhancement sites adequately compensate for the habitat lost.
- Existing density of hollows within those enhancement sites.
- Spacing/density and diversity of hollows. As previously stated, resident phascogales and Sugar Gliders are known to utilise many hollows across their range and an abundance of hollows is needed to support biodiversity.
- Potential for artificial hollows to be utilised by non-target species such as ants, European Honey Bee *Apis mellifera*, Black Rat *Rattus rattus* and Common Starling *Sturnus vulgaris*.
- Retention of felled hollow-bearing trees as hollow logs to provide shelter and foraging resources and movement runways for a variety of native fauna including reptiles, antechinus, native rodents, possums and birds (Gleeson and Gleeson 2012).
- An ongoing monitoring and maintenance program as artificial hollows need to be monitored and repaired / replaced when damaged or exotic species evicted to make the hollow available again for native fauna.
- Metric for success as a mitigation measure, which should be occupancy by target species rather than number of artificial hollows installed. In recent times similar linear infrastructure projects have been accused of using the number of nest boxes installed as a metric for their success rather than actual occupancy by threatened species (TSRH, 2018).

### 6.3.3 Summary

Loss of hollow-bearing trees from impact areas is unavoidable and will occur as a result of native vegetation removal. 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. Removal of hollow-bearing trees will exacerbate a listed threatening process and reduce the availability of habitat for hollow-dwelling fauna in the impact area and surrounds.

The Project should seek to minimise loss of hollow-bearing trees. Where loss of hollows is unavoidable, the project should consider the use of artificial tree hollows in habitat to be retained as a means of mitigating impacts on fauna.

## 6.4 Impacts on threatened ecological communities

### 6.4.1 Potential impact

Land clearance associated with construction will result in the loss of areas of native vegetation synonymous with TECs listed under the EPBC Act and/or FFG Act. The Project may also indirectly impact on aquatic habitat for LRFCSMDB associated with the Goulburn River near Seymour.

#### 6.4.1.1 EPBC Act threatened ecological communities

The investigation areas that support the EPBC Act listed TECs and a conservative assessment of impacts associated with each impact area are presented in Table 34. The location of TECs is shown in Figure 9 (Appendix A).

**Table 34 MNES TECs to be impacted by works at investigation areas where the communities are present**

Investigation area	TEC	Extent mapped at each investigation area (ha)	Extent of potential impact (ha)		
			Reference design area	Buffer area	Total
SG2 & TS1	NTGVVP	0.619	0	0	0*
Hume Highway (Tallarook) [ES05]	GBGW	10.043	0.014	0.251	0.266
Seymour Avenel Road (Seymour) [ES06] Hume Highway (Seymour) [ES07]	GBGW	59.791	0.983	3.707	4.690
<b>Total</b>		<b>70.453</b>	<b>0.998</b>	<b>3.958</b>	<b>4.956</b>

\*ARTC have advised that impacts to NTGVVP will be avoided during works.

#### ***Grey Box Eucalyptus microcarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia***

Approximately 4.956 ha of GBGW will be impacted which is an increase from the previously predicted impact of 3.543 ha (KBR, 2020a) due to changes in impact areas resulting from the design process and the addition of the 15 m buffer. Potential impact to GWGW is therefore still considered to be significant as per KBR (2020a), due to:

- An increase in the potential loss of the GBGW community at the Seymour Avenel Road (Seymour) [ES06] and Hume Highway (Seymour) [ES07] impact areas which represents a considerable loss in the context of the surrounding landscape.
- Reduction in extent of the community; 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 by < 0.001%.
- Fragmentation of the community and disruption of continuous native vegetation in the rail corridor.
- Its potential as habitat for Swift Parrot, Euroa Guinea-flower and Crimson Spider-orchid.

#### ***Natural Temperate Grassland of the Victorian Volcanic Plain***

Two patches of NTGVVP (HZ401 and HZ421) occur in the SG2 & TS1 investigation area. However, ARTC has advised that those patches will not be impacted during the works and the patches have therefore been excluded from calculations of loss of TECs.

#### 6.4.1.2 FFG Act listed threatened ecological communities

The investigation areas that support the FFG Act listed TECs and a conservative assessment of impacts associated with each impact area are presented in Table 35. The location of these TECs is shown in Figure 9 (Appendix A).



**Table 35 Threatened FFG Act-listed ecological communities to be impacted by works within investigation areas where the communities are present**

Investigation area	TEC	Extent mapped in investigation area (ha)	Potential impact (ha)		
			Reference design area	Buffer area	Total
Short Street (Broadford) [ES03]	VTWBC	4.197	0.105	0.505	0.610
Marchbanks Road (Broadford) [ES04]	VTWBC	3.380	0.283	1.073	1.356
Hume Highway (Tallarook) [ES05]	VTWBC	24.296	0.135	1.599	1.734
Seymour Avenel Road (Seymour) [ES06] Hume Highway (Seymour) [ES07]	VTWBC	64.108	0.996	3.722	4.718
<b>Total</b>		<b>95.981</b>	<b>1.519</b>	<b>6.899</b>	<b>8.418</b>

\*ARTC have advised that impacts to WBP GC will be avoided during works

#### ***Western (Basalt) Plains Grassland Community***

WBP GC is synonymous with NTGVVP (which will not be impacted) and has also been excluded from calculations of potential impacts on TECs.

#### ***Victorian Temperate Woodland Bird Community***

The VTWBC could also be impacted through the mechanisms of direct loss, habitat fragmentation, loss of hollow-bearing trees, fauna mortality, and indirect impacts on retained vegetation and habitat.

The total mapped extent of VTWBC contained across the investigation areas is 105.507 ha compared to a total impact extent of 8.418 ha (Table 35).

In line with the losses predicted for the GBGW community, the greatest area of extent and potential loss occur at impact areas associated with Seymour Avenel Road (Seymour) [ES06] and Hume Highway (Seymour) [ES07].

There is currently no indication of the extent of VTWBC across Victoria; however, the loss of 8.418 ha is considerable in the context of the surrounding landscape. These losses would also fragment the community, disrupt connectivity within the rail corridor, and potentially result in the loss of hollow-bearing trees which fauna utilise (see Section 6.3). In addition, the community may be subject to indirect impacts during construction (see Section 6.8).

#### ***Lowland Riverine Fish Community of the Southern Murray Darling Basin***

The LRFCSMDB could occur in the Goulburn River and the oxbows on the floodplain associated with enhancement site SG11 & TS2. Impacts to this community relate to the potential for construction activities to indirectly damage aquatic habitat or pollute the water through spills and sedimentation.

Measures to protect aquatic habitat including No-Go Zones and best practice spill, sedimentation, and water runoff measures will reduce the risk of potential impacts on LRFCSMDB.

#### **6.4.2 Management and mitigation recommendations**

Removal of native vegetation that is considered a TEC will be unavoidable due to the nature of the proposed works. As the design process is ongoing, the Project should seek to reduce the footprint of the proposed works wherever possible. A number of management and mitigation measures that can be employed during the design process are identified in Section 8.0, and other measures to protect retained vegetation and habitat from inadvertent damage should be implemented as part of a FFMP or equivalent (see Section 8.3).

### 6.4.3 Summary

Areas of the EPBC Act-listed GBGW community and FFG Act-listed VTWBC are likely to be lost as a result of native vegetation clearance. The full extent of vegetation clearance and loss of TECs will not be known until the design of each enhancement site has been finalised, the potential for retained vegetation to be indirectly lost is confirmed by an arborist assessment, and mitigation measures to be implemented by the Project are confirmed.

Refinements will be made during detailed design; however, there may still be impacts to both TECs. There are no requirements for offsets under the FFG Act, but offsets for the removal of native vegetation under the P&E Act will be required. Under the EPBC Act, if residual impacts to the GBGW remain, Commonwealth offsets for areas of GBGW that cannot be avoided or mitigated will be required (see Section 9.0).

KBR (2020a) identified impact to approximately 3.693 ha of GBGW; however, the update to the impact area has resulted in an increase to a potential impact of 4.956 ha. As potential impacts have increased, it is recommended that ARTC consult with DELWP/DAWE regarding how to address this increase.

Measures to protect aquatic habitat including No-Go Zones and best practice spill, sedimentation, and water runoff measures will reduce the risk of potential impacts on LRFCSMDB which may occur in the Goulburn River and oxbows of the floodplain.

## 6.5 Impacts on threatened flora species

Protected flora controls under the FFG Act means it is an offence to take (kill, injure, disturb or collect), trade in, keep, move or process protected flora without a permit. Protected flora includes plants that are listed as threatened under the FFG Act, plants that belong to FFG Act-listed TECs, and plants that have been declared to be 'protected' under the FFG Act; the latter being referred to as 'protected flora'.

Protected flora controls do not apply on private land, unless the land is identified as critical habitat for the species. No critical habitat has been identified in Victoria to date. If works are proposed that could adversely impact on native flora on public land, then a permit may be required under the FFG Act.

### 6.5.1 Potential impact

Two immature Buloke (FFG Act listed) recorded by KBR (2020a) at Seymour Avenel Road (Seymour) [ES06] & SG14 may be impacted during vegetation clearance in the impact area.

KBR (2020a) identified approximately 3.7 ha of potential habitat for Purple Diuris (FFG Act listed) at the Seymour Avenel Road (Seymour) [ES06] & SG14 and Hume Highway (Seymour) [ES07] enhancement sites. Clearance relating to these works may result impacts to potential habitat; however, no individuals were identified during targeted survey (KBR 2020c) or the current assessment.

Sixteen flora species listed as protected under the FFG Act occur within the investigation area (Appendix E) and may be impacted by the proposed works.

### 6.5.2 Management and mitigation recommendations

The primary measure to prevent impacts to threatened and protected flora species is to minimise vegetation loss and avoid areas where individual plants have been located. Consideration should be given to avoiding threatened and protected flora at the sites listed above and shown on Figure 9 (Appendix A).

A 'permit to take protected flora' will be required to remove any species protected under the FFG Act – this includes listed threatened species, protected flora, and flora listed under the descriptions of the VTWBC.

### 6.5.3 Summary

Buloke and sixteen species listed as 'protected' under the FFG Act may be removed during construction at locations listed above and in Appendix E. Loss of individuals of protected flora would reduce the abundance of that species in the investigation area; however, it is likely that impacts to individuals can be further reduced as the detailed design progresses.

## 6.6 Impacts on threatened fauna species

Potential impacts on significant fauna species primarily relate to loss of habitat (including loss of hollow-bearing trees), loss of (or reduction in) home ranges, and fragmentation of habitat.

### 6.6.1 Potential impact

Potential impacts on the EPBC Act listed and FFG Act listed fauna species are summarised below.

#### ***EPBC Act listed species***

- Grey-headed Flying-fox is unlikely to be impacted by the proposed works as the species is not likely to make significant use of any of the vegetation or habitat present.
- Swift Parrot is unlikely to be impacted by the proposed works as they are likely to only sporadically use the woodland within the impact area as a corridor as they move through the landscape seeking foraging resources in more extensive areas of habitat.
- Regent Honeyeater is unlikely to be impacted as they are highly mobile and are more likely to inhabit larger important foraging areas away from the impact area; this understanding was confirmed by local DELWP officers at the time of the survey (KBR, 2020b).
- Growling Grass Frog may be impacted by works at sites associated with the Merri Creek catchment (SG2 & TS1 at Wallan). Impacts on Growling Grass Frog are likely to be minor as proposed works will not directly impact aquatic habitat but will remove some terrestrial habitat that may be used for foraging or overwintering. The footprint is small in those locations; and if impacts occur, they are likely to be to individuals rather than a population and are therefore unlikely to represent a significant impact on the species.
- Striped Legless Lizard and Golden Sun Moth are unlikely to be impacted as the proposed works are largely confined to the existing rail corridor and disturbed areas.

#### ***FFG Act listed species***

- Brush-tailed Phascogale will be impacted by the proposed works at Tallarook. This species generally occurs at low densities as individuals have large home ranges (DSE, 2003b; van der Ree et al., 2003). It is unknown whether the Hume Highway (Tallarook) [ES05] impact area supports a particularly important component of the home range for the individuals that were detected by remote cameras. It is therefore not possible to be definitive about the significance of the impact of habitat loss and fragmentation on this species that can be attributed to the Project.
- Squirrel Glider may be impacted through the loss of hollow-bearing trees and connectivity.
- Barking Owl may be impacted through the loss of hollow-bearing trees, particularly if a regular roost or breeding hollow is removed by the Project.
- Woodland birds, including members of the VTWBC TEC, are likely to occur in the habitats of the impact area and will therefore be impacted by the loss of native vegetation, loss of hollow-bearing trees and, to a lesser extent, habitat fragmentation for the smaller, less mobile species.
- Brown Toadlet may be impacted if terrestrial areas which become flooded by seasonal rains are impacted by the Project. Such lentic (non-flowing) habitats may occur in depressions on floodplains of rivers and creeks, drainage ditches and puddles.

### 6.6.2 Management and mitigation recommendations

The primary means of reducing impacts on threatened and uncommon non-threatened animals is minimising native vegetation and hollow-bearing tree removal, and mitigating the effects of widening gaps in vegetation linkages. Recommendations made in Section 6.1, Section 6.2, Section 6.3, and Section 8.0 therefore apply as a means of managing and mitigating impacts on threatened fauna.

Measures to protect retained vegetation and habitat including No-Go Zones and best practice spill, sedimentation, and water runoff measure adjacent to aquatic habitat will be also be important to mitigate potential impacts on threatened frogs.

If terrestrial areas which become flooded by seasonal rains will be impacted, then survey for Brown Toadlet may need to be undertaken.

No specific approvals are required under the FFG Act or Wildlife Act to remove habitat for threatened or non-threatened fauna. Loss of native vegetation and therefore habitat does require approval under the P&E Act. Authorisation may be required to wilfully damage, disturb, or destroy wildlife habitat under the Wildlife Act.

### 6.6.3 Summary

Brush-tailed Phascogale (FFG Act) will be impacted by the Project as the species has been confirmed to occur at Tallarook. Squirrel Glider may be impacted as its presence in the impact area, particularly at Tallarook, has not been discounted.

An area of potential foraging or overwintering habitat for Growling Grass Frog will be impacted adjacent to Merri Creek. Impacts on Growling Grass Frog are likely to be minor as proposed works will not directly impact aquatic habitat, the footprint is small, and impacts can be managed.

With the exception of arboreal mammals, potential impacts are likely to affect individuals only and are not expected to alter the conservation status of any of these species.

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 impacts on threatened and uncommon non-threatened fauna.

## 6.7 Fauna mortality and displacement

With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, all fauna species indigenous to Victoria are listed as protected under the Wildlife Act. The Wildlife Act makes it an offence to hunt, take, or destroy protected or threatened wildlife without authorisation.

Potential exists for vegetation within the impact area to provide habitat for threatened and non-threatened fauna, particularly arboreal mammals (possums) and birds. Construction would 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 identified by KBR (2020a) and AECOM include a diversity of species, many of which are often absent or rare within urban and peri-urban areas. Such species include Sugar Glider, Swamp Wallaby *Wallabia bicolor*, Short-beaked Echidna *Tachyglossus aculeatus* and Tawny Frogmouth *Podargus strigoides*. A large number of avifauna were also recorded. Many other non-threatened species are locally abundant (such as Common Ring-tail Possum) and therefore the risk of impact to the species as a whole is low. The displacement, injury, or death of non-threatened fauna is an animal welfare concern.

### 6.7.1 Potential impact

At Tallarook, a population of FFG Act listed Brush-tailed Phascogale has been confirmed to occur. A population of Sugar Gliders also occupies the site and the potential for Squirrel Glider to occur has not been fully discounted. Given the extent of habitat removal proposed at Tallarook (approximately 2.5 hectares, it is possible that as social group of Sugar Gliders could be impacted.

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

- Removal of occupied nests or hollows; birds, bats and arboreal mammals are most at risk of being killed or injured during vegetation removal.
- 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 disturb and displace fauna occupying habitat adjacent to the impact area. This could occur as a result of noise and vibration, and/or light and visual disturbance by human activity (vehicles and people) at levels not currently experienced in the environment of the impact 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.

### **6.7.2 Management and mitigation recommendations**

Potential impacts on native fauna should be discussed with DELWP to ascertain their expectations with regard to the Wildlife Act. Although translocation of non-threatened and threatened wildlife is generally not supported by DELWP, salvage and relocation of individuals from the construction area to adjacent habitat may be required by DELWP or Council. If so, a suitably qualified wildlife handler, holding a relevant and current management authorisation under the Wildlife Act, would need to be engaged prior to construction to salvage any wildlife encountered during the construction program.

Measures to reduce potential impacts on fauna should be included in a flora and fauna management plan (or equivalent). This may include measures such as enforcing a reduced speed limit on access roads to the site, limiting construction activity to daytime hours to reduce impacts of noise and light on nocturnal animals, using fauna-sensitive lighting design, and managing any open pits or trenches (if proposed) to reduce potential for fauna entrapment.

Opportunities to reinstate habitat for individual animals displaced by the Project are limited due to the constraints of the narrow rail corridor and impact area. Landscape design could utilise native species which provide foraging or shelter resources for wildlife likely to be impacted by the Project.

### **6.7.3 Summary**

Loss of fauna habitat is an unavoidable consequence of the Project. Minimising the area to be cleared or disturbed will reduce impacts but not avoid them.

The resident Brush-tailed Phascogale and Sugar Gliders may be injured, killed, or displaced during construction. Other non-threatened fauna may also be impacted, which is primarily an animal welfare concern.

## **6.8 Indirect impacts on vegetation and habitat**

### **6.8.1 Potential impact**

Without appropriate controls, construction works have the potential impact on vegetation and habitat adjacent to the impact area through means such as:

- Inappropriate placement of construction stockpiling resulting in smothering of native vegetation within, or adjacent to, the reference design area.
- Soil compaction or excavation causing structural root damage and vegetation loss within, or adjacent to, the reference design area.
- Dust generated during constructions settling on, and impacting the health of, vegetation.
- Introduction or spread of weeds resulting in a decline in the quality of adjacent native vegetation and habitat. Vegetation surveys recorded 21 CaLP Act listed weeds (Section 4.5). Soil disturbance associated with construction works would provide an opportunity for the establishment or spread of weeds.
- Surface water run off carrying pollution and/or sediment into waterways or areas subject to seasonal flooding.



## 6.8.2 Management and mitigation recommendations

Management and mitigation recommendations for indirect impacts include:

- Offset all vegetation losses under the requirements of the native vegetation removal regulations under Clause 52.17 of the P&E Act by submitting an application to the relevant planning authority for a permit to remove native vegetation.
- Restrict vegetation clearance to the minimum amount required.
- Develop a FFMP (or equivalent) which outlines mitigation measures including, but not limited to:
  - Install temporary fencing around retained vegetation to ensure surrounding vegetation and soil is not disturbed by construction activities.
  - Implement Tree Protection Zones and No-Go Zones to prevent inadvertent loss of vegetation.
  - Restrict soil disturbance to reduce opportunities for weed establishment and spread.
  - Weed controls and 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, and emerging weed issues are controlled.
  - Revegetation plan to ensure areas of native vegetation subject to minor clearance or disturbance are adequately revegetated at the conclusion of works. The revegetation plan should include locally indigenous species from the EVC being impacted and should consider the use of indigenous vegetation as recommended by the relevant DELWP branch, LGA, and CMA.

Under the CaLP Act, landowners have a responsibility to avoid causing, or contributing to land degradation. This includes taking all reasonable steps to conserve soil, protect water resources, eradicate regionally prohibited weeds, prevent the growth and spread of regionally controlled weeds and, where possible, eradicate established pest animals as declared under the CaLP Act.

## 6.8.3 Summary

Construction works in the impact area may unintentionally impact on vegetation and habitat adjacent to the impact area. Development and implementation of an FFMP (or equivalent) that includes measures to protect retained native vegetation and prevent establishment and spread of weeds and pathogens should be able to mitigate these potential impacts.

## 6.9 Threatening processes

### 6.9.1 Potential impact

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 is summarised in Table 36.

### 6.9.2 Management and mitigation recommendations

Develop an FFMP (or equivalent) which includes mitigation measures to:

- Manage and mitigate the impacts of land clearance (native vegetation loss), hollow-bearing tree removal, and widening gaps in habitat linkages (habitat fragmentation).
- Prevent and manage the introduction and spread of weeds or pathogens should be included in an FFMP (or equivalent).

### 6.9.3 Summary

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 should be included in an FFMP (or equivalent).

Table 36 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 6.1 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 6.1.
-	Habitat fragmentation as a threatening process for fauna in Victoria.	Yes	Project has potential to exacerbate this threatening process – see Section 6.2
-	Loss of hollow-bearing trees from Victorian native forests and woodlands	Yes	Project has potential to exacerbate this threatening process – see Section 6.3.
Predation by European Red Fox	Predation of native wildlife by the introduced Red Fox <i>Vulpes vulpes</i>	No	Red Fox was observed in the investigation 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, <i>Felis catus</i>	No	Feral cats were not observed in the investigation 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 <i>Oryctolagus cuniculus</i>	No	European Rabbit were detected during field assessments. The Project is unlikely to encourage the occurrence of rabbits.

EPBC Act listed threatening process	FFG Act listed threatening process	Potential for the Project to exacerbate the threatening process	Rationale
Dieback caused by the root-rot fungus <i>Phytophthora cinnamomi</i>	<p>The spread of <i>Phytophthora cinnamomi</i> from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority</p> <p>Use of Phytophthora-infected gravel in construction of roads, bridges and reservoirs.</p>	Yes	<p>Cinnamon Fungus is an introduced water mould that attacks the root systems of susceptible native plants including woody perennial plants from the Proteaceae (<i>Grevillea</i> spp., <i>Hakea</i> spp.), Fabaceae (peas), Dilleniaceae (<i>Hibbertia</i> 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).</p> <p>Little is known about the distribution and type of soil pathogens that may be present in the impact area or in surrounding areas.</p> <p>The Project therefore has the potential to exacerbate this threatening process.</p>
Infection of amphibians with chytrid fungus resulting in chytridiomycosis	Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.	Yes	<p>Chytrid Fungus <i>Batrachochytrium dendrobatidis</i> 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 per cent mortality in frog populations in eastern Australia populations and fewer deaths in other populations in western areas of Australia (DoEE, 2016).</p> <p>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.</p> <p>The Project therefore has the potential to exacerbate this threatening process.</p>

EPBC Act listed threatening process	FFG Act listed threatening process	Potential for the Project to exacerbate the threatening process	Rationale
-	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.
-	Invasion of native vegetation by Blackberry <i>Rubus fruticosus</i> L. agg (Blackberry has been reclassified as <i>Rubus polyanthemus</i> )	Yes	Blackberry was recorded at several investigation areas (see Section 4.5). The Project has potential to exacerbate this threatening process through spread of weed seed and propagule material during vegetation removal
-	Invasion of native vegetation by 'environmental weeds	Yes	Weeds recorded in the investigation area are listed in Section 4.5. Control of weeds will form part of the EMP 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 <i>Apis mellifera</i> of nesting hollows and floral resources	Unlikely	Honeybees were observed occupying some hollows within the impact area. The project is unlikely to encourage the establishment of hives in nesting hollows.



## 7.0 Summary of impacts and mitigation

Table 37 Summary of impacts and mitigation measures

#	Impact	Related impact	Recommended mitigation measure	Permits/approvals
1	Native vegetation loss	Habitat fragmentation (2) Loss of hollow-bearing trees (3) Impacts on threatened flora species (4) Impacts on threatened fauna species (5) Impacts on TECs (6)	Minimise loss of native vegetation during design stage (Section 6.1.2). Conduct arborist assessment to determine loss and identify protection measures for potentially impacted trees. Offset native vegetation clearance in accordance with the PSA and Incorporated Document	Follow the PSA and Incorporated Document for approval to remove native vegetation FFMP (or similar) for works.
2	Habitat fragmentation (exacerbation of threatening process listed under the FFG Act)	Loss of habitat for the FFG Act listed Victorian Temperate Woodland Bird Community (6)	Minimise loss of native vegetation during design stage (Section 6.1.2). Opportunities to improve habitat and connectivity should be identified and implemented by the Project. This may include revegetation or contribution to the Regent Honeyeater Habitat Restoration Project.	FFMP (or similar) for the works.
3	Loss of hollow-bearing trees (exacerbation of threatening process listed under the FFG Act)	Loss of habitat for the FFG Act listed Victorian Temperate Woodland Bird Community (6) Impacts on threatened fauna species (5) Impacts on non-threatened fauna species (protected under the Wildlife Act)	Minimise loss of native vegetation during design stage (Section 6.1.2). Conduct arborist assessment to determine loss and identify protection measures for potentially impacted trees. Fauna salvage of vegetation to be removed may be required by regulators. If required, this would include a search of hollows before felling. Install artificial hollows.	Authorisation may be required to wilfully damage, disturb or destroy wildlife habitat or protected wildlife under the Wildlife Act. FFMP (or similar) for the works.
4	Impacts on threatened flora species	Vegetation loss (1) Impacts on threatened flora species (4)	Minimise loss of vegetation during design stage Site works to avoid areas where threatened flora have been recorded	A 'permit to take protected flora' will be required to remove two immature Buloke at Seymour Avenel Road (Seymour) [ES06] & SG1 as well as any species considered to be Protected under the FFG Act (Table 30 KBR, 2020a). FFMP (or similar) for the works.
5	Impacts on threatened fauna species	Vegetation loss (1) Habitat fragmentation (2) Loss of hollow-bearing trees (3) Displacement injury or death of wildlife (7)	Minimise loss of vegetation during design stage, particularly in areas where threatened fauna have been recorded. Minimise impacts on areas subject to seasonal flooding, or undertake further survey for significant species (such as Brown Toadlet) if impacts are unavoidable. Fauna salvage of vegetation to be removed may be required by regulators. If required, this would include a search of hollows before felling.	Authorisation may be required to wilfully damage, disturb or destroy wildlife habitat or protected wildlife under the Wildlife Act. FFMP (or similar) for the works.
6	Impacts on TECs	Native vegetation loss (1) Habitat fragmentation (2)	Minimise loss of native vegetation during design stage. Offset native vegetation clearance in accordance with the PSA and Incorporated Document EPBC Act offset strategy required if significant residual impacts on community is likely	Approval will be required from the Australian Government to remove patches of GBGW as part of the Environment Report assessment process for the Project. A permit will be required under the FFG Act to remove patches of VTWBC and WBP GC.
7	Displacement, injury or death of wildlife	Vegetation loss (1)	Fauna salvage of vegetation to be removed may be required by regulators. If required, this would include a search of hollows before felling.	A management authorisation will be required under the Wildlife Act if the regulators require fauna salvage; the qualified wildlife handler engaged to undertaken salvage must hold the permit. FFMP (or similar) for the works.

#	Impact	Related impact	Recommended mitigation measure	Permits/approvals
		Impacts to threatened fauna species (5)	Fauna salvage of vegetation to be removed may be required by regulators. If required, this would include a search of hollows before felling.	A management authorisation will be required under the Wildlife Act if the regulators require fauna salvage; the qualified wildlife handler engaged to undertake salvage must hold the permit. Authorisation may be required to wilfully damage, disturb or destroy wildlife habitat or protected wildlife under the Wildlife Act. FFMP (or similar) for the works.
		Vehicle collision	Measures to reduce the risk of the Project resulting in the displacement, injury or death of wildlife.	FFMP (or similar) for the works.
		Noise and vibration		
		Light		
		Visual disturbance of human activity		
8	Indirect impacts on adjacent/retained vegetation and habitat	Inappropriate placement of construction stockpiling	Measures to protect retained vegetation and habitat including No-Go Zones, best practice spill, sedimentation, and water runoff measures.  Revegetation plan to ensure areas of native vegetation subject to minor clearance or disturbance are adequately revegetated at the conclusion of works.	FFMP (or similar) for the works.
		Soil compaction or excavation causing root damage and vegetation loss within (or adjacent to) the impact area.		
		Dust generation during construction impacting the health of vegetation.		
		Sedimentation and/or spills of chemicals resulting in pollution of native vegetation or habitat either through surface or groundwater flows.		
		Accidental plant / personnel access to designated 'No Go Areas' or areas outside of the defined and anticipated impact area.		
		Spread of weeds by construction plant, vehicles and personnel resulting in the decline in quality of native vegetation in the rail corridor adjacent to the impact area.	Procedures to prevent the introduction and spread of weeds (CaLP Act listed and WONS) and pathogens. Specific measures to manage this risk may include wash-down procedures to remove weed seeds and soil from plant and equipment and measures to contain runoff from spoil and prevent spread of soil into native vegetation adjacent to the impact area.	FFMP (or similar) for the works.
		Spread or introduction of pathogens / pest animals resulting in the exacerbation of a threatening process listed under the FFG Act and EPBC Act.		

## 8.0 Recommended management and mitigation measures

The primary impacts associated with the Project are land clearance resulting in a loss of native vegetation (including loss of hollow-bearing trees), habitat fragmentation, loss of TECs, and habitat for threatened species.

Recommendations are provided below to reduce impacts on ecological values and the implications associated with relevant legislation and policy requirements when developing the design and planning for the Project. The recommendations primarily relate to avoiding and minimising native vegetation and habitat loss and are a synthesis of the management and mitigation recommendations discussed in relation to specific impacts in Section 7. Avoidance should be the priority, but where this is not possible, then loss should be minimised where practicable.

### 8.1 Design to minimise loss

Vegetation clearance not only results in a loss of native vegetation but also a loss of TECs, loss of habitat for threatened species, loss of hollow-bearing trees, and disruption to habitat connectivity.

The Project should avoid impacts to native vegetation and habitat where possible. If avoidance is not possible then the Project should seek to minimise impacts on native vegetation and habitat.

During detailed design, the Project should:

- Seek to reduce the amount of native vegetation that has to be removed.
- Place laydown/site compounds in cleared areas at least 15 m from Scattered Trees and/or native vegetation patches, unless otherwise advised by arborist.
- Design the Project to impact on areas with the least biodiversity values in preference to areas of higher value. Areas of higher biodiversity values include:
  - Native vegetation:
    - Patches of TECs
    - Large Scattered Trees
    - Patches of native vegetation that contain Large Trees in Patches.
    - Patches of native vegetation that consist of an endangered EVCs.
    - Patches of native vegetation with a VQA score of > 0.60
    - Patches of native vegetation that have an SBV value of >0.80
    - Vegetation protected under an environmental overlay.
  - Landscape scale values:
    - Vegetation that is contiguous with larger woodland blocks or corridors and provide biodiversity corridor or 'stepping stone' link for habitat movement; investigation areas where this applies include:
      - Short Street (Broadford) [ES03] & SG6
      - Marchbanks Road (Broadford) [ES04]
      - Hume Highway (Tallarook) [ES05] & TS5
      - Seymour Avenel Road (Seymour) [ES06] & SG14
      - Hume Highway (Seymour) [ES07]
      - Wangaratta Precinct (Wangaratta) [ES11] & SG15
    - Areas that are located in an area of SBV greater than 0.8 (Figure 12)

- Hollow-bearing trees; trees have been mapped for five enhancement sites (Section 4.3.5), for the remaining sites large trees (large Scattered Trees and Large Trees in Patches) can be assumed to contain hollows and should be avoided where possible.
- Habitat for rare or threatened species such as a the long, relatively intact road corridors along Hume Highway (Tallaroak) [ES05] & TS5, SG19 & TS4, Seymour Avenel Road (Seymour) [ES06] & SG14, and Hume Highway (Seymour) [ES07].
- Aquatic habitats (rivers, creeks, wetlands, dams).
- Areas subject to seasonal flooding such as depressions on floodplains or drainage ditches (where practicable).
- Consider the use of alternate construction methods (where practicable) to limit impacts to native vegetation
- Implement management measures to minimise impacts on retained native vegetation or ecological values through a FFMP or equivalent (Section 8.3)
- Offset in accordance with the Guidelines (DELWP, 2017a) to compensate for the loss of native vegetation (see Section 9.0).

## 8.2 Enhancing landscape connectivity

Opportunities to reinstate or enhance connectivity within the impact area are limited due to the linear nature of the rail and road corridor in the impact area. The Project could instead contribute to the enhancement of other areas of habitats that facilitate movement of fauna through the local landscape, particularly for the woodland birds and arboreal mammals which may be impacted by the project.

Consultation with DELWP region and other stakeholders such as local Landcare groups is recommended to identify potential opportunities but these may include:

- Contributing to the Regent Honeyeater Habitat Restoration Project which is a landscape-scale restoration project in the Lurg Hills district, 10 km east of Benalla.
- Revegetating areas to:
  - increase the amount of suitable habitat in the landscape by adding to existing vegetation to increase the size of a patch or width of a corridor.
  - improve the quality of existing habitats through selective planting or seeding to enhance the composition or structure of the vegetation.
  - promote the connectivity of existing habitats by filling in 'gaps' between patches of native vegetation to link disconnected habitat and provide a more continuous native vegetation corridor.
- Incorporating measures to promote safe movement of fauna around the impact areas if feasible and likely to be effective.

## 8.3 Flora and Fauna Management Plan

An FFMP (or equivalent) should be prepared and implemented to provide a strategy for the protection and management of ecological values during construction of the enhancement sites, track slews and signal gantries. Retained values may be impacted by a range of construction activities including, but not limited to, minor 'maintenance' of access tracks and drainage lines, earthworks, vehicle parking and equipment and plant storage, and stockpiling of soils and construction materials, and surface water runoff.

The FFMP should define the objectives and targets, roles and responsibilities and outline control measures to protect ecological values and reduce ecological impacts. This should include measures such as:

- Native vegetation and tree protection measures developed in consultation with an arborist including establishment of No-Go Zones (for retained native vegetation patches) and Tree Protection Zones (for Large Trees in Patches and Scattered Trees) with fencing and signage.
- Fencing retained native vegetation to protect TECs during construction
- Best practice spill, sedimentation, and water runoff measures will reduce the risk of potential impacts on LRFCSMDB
- Weed and hygiene management to prevent the introduction and spread of weeds or pathogens.
- Rehabilitation of areas of native vegetation impacted during construction or subject to 'minor' disturbance at the conclusion of works. The revegetation plan should include locally indigenous species from the EVC being impacted and should consider the use of indigenous vegetation as recommended by the relevant DELWP branch, LGA, and CMA.
- Identification of strategic areas for habitat enhancement in the wider landscape and measures to enhance habitat connectivity.
- Measures to promote safe movement of fauna around the impact area.
- Measures to minimise disturbance to wildlife.
- Fauna salvage if the regulators require this to occur where habitat is to be removed.
- Installation of artificial hollows to replace hollow-bearing trees.
- Maintenance requirements and checklists to ensure proper functioning of No-Go Zones, Tree Protection Zones, and sediment barriers as well as compliance with environmental protection targets.

Other measures to reduce potential impacts on retained vegetation and habitat (including aquatic habitats) should be incorporated into a construction environmental management plan (or equivalent) for the Project. Measures including, but not limited to, soil compaction, dust, erosion and water run-off should be outlined.



## 9.0 Offsets

The Project will result in unavoidable losses of native vegetation. Unavoidable impacts are known as 'residual impacts' as they are the impacts that remain after avoidance and mitigation measures are applied. Offsets are measures that compensate for residual adverse impacts.

Offsets for the loss of native vegetation and TECs will be required in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b) and the PSA and Incorporated Document which follows the Victorian Guidelines (DELWP, 2017a). A combined offset approach may also be secured in agreement with DELWP and DAWE.

### 9.1 Victorian native vegetation offsets

In Victoria, there are two types of biodiversity offsets (DELWP, 2019c):

- Species offsets which are required when the removal of native vegetation has a significant impact on modelled habitat for rare or threatened species. These offsets are expressed as Species Habitat Units (SHU) when calculating offset obligations.
- General offsets which are required when the removal of native vegetation is not modelled to have a significant impact on a rare or threatened species. These offsets are expressed as General Habitat Units (GHU) when calculating offset obligations.

Offsets can be achieved as either first- or third-party offsets and must be protected in perpetuity (forever) with an on-title security agreement. First party offsets are on land owned by the party removing the native vegetation. Third party offset sites are on land owned by another party for which native vegetation credits can be bought to meet offset requirements (DELWP, 2019c).

#### 9.1.1 Offsets for enhancement sites, track slews and signal gantries

The final quantum of impacts on native vegetation (and therefore offset requirements) is not yet known as the Project is still in the planning stage and a detailed design has not been fully resolved to confirm the extent of loss that will be incurred by the Project.

In the interim, the Environmental Systems Modelling Platform (EnSym) Native Vegetation Regulations Tool produced by DELWP has been used to test offset requirements for the total extent of native vegetation mapped for the Project thus far. A scenario was tested through EnSym based on the current impact area for the enhancement sites, track slews, and signal gantries and identified the following impacts (Appendix H):

- 15.818 ha of native vegetation (includes patches of native vegetation and trees)
- 65 large trees.

Table 36 summarises the indicative offset obligations required as a result of the above losses. The EnSym report states that an offset obligation of 9.083 General Habitat Units (GHU) and 65 large trees will be required based on current clearance estimates. Offsets will need to be sourced within the Goulburn Broken, and/or North East CMA or Benalla Rural City, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City Council, and/or Wodonga City Council.

The availability of these offsets was checked against the DELWP Native Vegetation Credit Register on 22 June 2021, which indicated that several sites are available that meet these offset requirements.

**Table 38 Indicative offset requirements for the Project**

Unit type	Amount	Minimum strategic biodiversity value score	Large trees	Credit location
<b>General offset amount</b>	9.083 GHU	0.476	65	Goulburn Broken, North East Catchment Management Authority (CMA) or Benalla Rural City, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, Wodonga City Council.
<b>Species offset amount</b>	N/A			

Once the project design is completed and native vegetation clearance requirements are known, offsets can be formally determined via a Native Vegetation Removal (NVR) report. An NVR report is generated by DELWP following the submission of the relevant habitat hectare assessment field data.

Once offset requirements are known, an Offset Statement will also be required to provide evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured. Depending on the final offset requirements, an Offset Strategy may need to be developed to demonstrate how offsets, particularly Species Habitat Units (if required), will be achieved.

The NVR report, Offset Statement, and an Avoid and Minimise Statement, will be required to accompany an application for a permit to remove native vegetation if required.

### 9.1.2 Offsets for whole project (including overhead powerlines)

Impacts for the overhead powerlines component of the Project (AECOM, 2021a) have been considered separately to the impacts described here for the enhancement sites, track slews and signal gantries; however, when determining offset requirements for the wider Project, offsets for the overhead powerlines and enhancement sites, track slews, and signal gantries are required to be considered together (Appendix 2E, DELWP, 2018a). This is to correctly account for the biodiversity impacts for the total Project rather than for each individual stage.

Appendix 7B of DELWP's Assessor's Handbook (DELWP, 2018a) states that a species offset is required when 'the proportion of habitat value to be removed is greater than 0.005% of the habitat value in the *Habitat importance map* for that species'. If the impacts for the overhead powerlines and enhancement sites, track slews, and signal gantries were split, there is a risk that total impacts to habitat for rare or threatened species will not be fully accounted for and will not reach the 0.005% threshold required to generate a species-specific offset. The impacts for the whole Project (i.e. both works packages) will be considered in the Environment Report.

Appendix 8B of the Assessor's Handbook (DELWP, 2018a) details the process for securing offsets in stages. When a multi-staged project proposal is assessed, a single NVR report is required, but offset requirements can be split into stages of development. Offsets can then be secured by stage, prior to removal of native vegetation. Offsets can also be broken into separate council areas. This approach may add an element of risk as offsets for later stages of the Project may no longer be available and/or may change in price. As the current Project is in the design phase but is more progressed for the overhead powerlines (AECOM, 2021a), ARTC may wish to proceed with a staged approach in consultation with DELWP.

## 9.2 EPBC Act Offsets Policy

An offset package is a suite of actions undertaken to compensate for the residual impact. It can be a combination of two types of offsets:

- Direct offsets which are actions that provide a measurable conservation gain for the protected matter and are an essential component of a suitable offsets package. A minimum of 90% of the offset requirements must be met through direct offsets (DSEWPaC, 2012b). Although if it can be demonstrated that a greater benefit is likely to be achieved through increasing the proportion of other compensatory measures or scientific uncertainty makes it difficult to determine a direct offset that will benefit the protected matter, deviation from the 90% may be allowed.
- Other compensatory measures which are those actions that do not directly offset impacts but are anticipated to lead to benefits for the impacted protected matter; for example, funding for research or educational programs (DSEWPaC, 2012b).

Suitable offsets must improve or maintain the viability of the protect matter (DSEWPaC, 2012b). As such, it is possible that third party offsets for native vegetation removal (which also covers removal of areas of TECs) may not be accepted or may only be partly accepted in an EPBC Act offset package.

The quantum of residual impacts (and therefore potential offsets) on EPBC Act listed TECs must be considered in conjunction with the overhead powerlines impacts. Residual impacts for the whole Project (i.e. both packages of works) will be dealt with in the Environment Report. Consultation with DAWE and DELWP will be critical for resolving offset options for TECs and native vegetation and developing an offset package amenable to both regulators.

## 10.0 Next steps

Design refinements should continue to seek opportunities to avoid impacts to native vegetation and prioritise areas of higher biodiversity value for retention where possible (see Section 8.1).

Once detailed design of the enhancement sites, track slews, and signal gantries has been finalised:

- Calculate the total extent of native vegetation clearance and native vegetation offset obligations. To do this, the Project should:
  - Complete an arborist assessment to determine if trees in the buffer area will be impacted through TPZ encroachment, provide advice whether they can be retained and if site-based control measures are required.
  - Assess potential impacts as a result of the next generation cabling installation once detailed design and construction methodology have been finalised.
  - Validate KBR (2020a) Large Trees in Patches and TEC mapping during detailed design phase once impacts are known.
  - Submit the habitat hectare data for vegetation clearance to DELWP to generate an NVR report to calculate offset requirements for the Project.
  - Prepare an Offset Statement to provide evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured.
  - Submit an application to obtain approval to remove, lop or destroy native vegetation through the Incorporated Document of the PSA. The Incorporated Document acts as the permit to remove native vegetation and will include standard conditions that removal of native vegetation must be in accordance with application requirements 1, 5 and 9 of the Guidelines. Those requirements comprise information on the native vegetation to be removed, a statement that identifies the process undertaken to avoid and minimise vegetation loss, and the offset statement that confirms that biodiversity offsets required for the Project are available.
  - Consult with DELWP/DAWE regarding potential increase in impacts to GBGW TEC.
  - Consult with DELWP and DAWE to develop an Offset Strategy that meets the requirements of the Victorian and Commonwealth offset obligations.
  - Develop an EPBC Act Offset Strategy and Management Plan if required.
- Undertake survey for Brown Toadlet if impacts to seasonally inundated habitat is unavoidable.
- Identify potential opportunities to reinstate or enhance landscape connectivity in consultation with DELWP and other relevant stakeholders such as local Landcare groups.
- Consult with DELWP and Council on their expectations in relation to salvage and relocation of fauna from the construction area to adjacent habitat. If salvage is required, then a suitably qualified wildlife handler holding a relevant and current management authorisation under the Wildlife Act would need to be engaged prior to construction to salvage any wildlife encountered during the construction program.
- Prepare a Flora and Fauna Management Plan incorporating measures to reduce potential impacts on retained vegetation and wildlife during construction and operation (see Section 8.3).
- Develop Environmental Performance Requirements as part of Environmental Management Framework for the Project which reflect / draw upon the recommendations made in Section 6, Section 7, and 8 in relation to management, mitigation and offsets.

## 11.0 References

- AECOM (2021a). Inland Rail Beveridge to Albury – Powerlines Ecology: Existing Conditions & Impact Assessment. AECOM Australia Pty Ltd, Melbourne, Victoria.
- AECOM (2021b). Inland Rail Beveridge to Albury – Ecology: Targeted Fauna Survey Spring 2020. AECOM Australia Pty Ltd, Melbourne, Victoria.
- BCT (2020). Guidelines for artificial hollows for private land conservation agreements. August 2020. NSW Government Biodiversity Conservation Trust.
- Bennett, A.F. (1999). Linkages in the Landscape. The Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland and Cambridge, UK.
- Bennett, A.F. and Ford, L.A. (1997). Land use, habitat change and the conservation of birds in fragmented rural environments: a landscape perspective from the Northern Plains, Victoria, Australia. *Pacific Conservation Biology* (3): 244-261.
- Bennett, A.F., Kimber, S. L. and Ryan, P.A. (2000). Revegetation and wildlife: A guide to enhancing revegetated habitats for wildlife conservation in rural environments. Bushcare – National Projects Research and Development Program Environment Report 2/00.
- COAG Standing Council on Environment and Water 2012, Australia's Native Vegetation Framework, Australian Government, Department of Sustainability, Environment, Water, Population and Communities, Canberra
- Cremona, T., Baker, A.M., Cooper, S.J.B., Montague-Drake, R., Stoo-Wilson, M. and Carthew, S.M. (2021). Intergrative taxonomic investigation of *Petaurus breviceps* (Marsupialia: Petauridae) reveals three distinct species. *Zoological Journal of the Linnean Society*. 119: 503-527.
- DECCW. (2009). Draft National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus*. Department of Environment, Climate Change and Water NSW, Sydney.
- DECCW (2010). National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Department of Environment, Climate Change and Water NSW, Sydney.
- DELWP (2016). *Flora and Fauna Guarantee Act 1988* Processes List - December 2016. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>
- DELWP (2017a). Guidelines for the removal, destruction or lopping of native vegetation. Victorian Government Department of Environment, Land, Water and Planning Melbourne, 2017. Available at: [https://www.environment.vic.gov.au/\\_data/assets/pdf\\_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf](https://www.environment.vic.gov.au/_data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf)
- DELWP (2017b). Biodiversity information explanatory document: Measuring value when removing or offsetting native vegetation. December 2017. Victorian Government Department of the Environment, Land, Water and Planning, Melbourne.
- DELWP (2018a). Assessor's handbook: Applications to remove, destroy or lop native vegetation. Victorian Government Department of Environment, Land, Water and Planning. Melbourne, Victoria. Available at: [https://www.environment.vic.gov.au/\\_data/assets/pdf\\_file/0022/91255/Assessors-handbook-Applications-to-remove,-lop-or-destroy-native-vegetation-V1.1-October-2018.pdf](https://www.environment.vic.gov.au/_data/assets/pdf_file/0022/91255/Assessors-handbook-Applications-to-remove,-lop-or-destroy-native-vegetation-V1.1-October-2018.pdf)
- DELWP (2018b). Applicant's guide: Applications to remove, destroy or lop native vegetation. Victorian Government Department of Environment, Land, Water and Planning. Melbourne, Victoria. Available at: [https://www.environment.vic.gov.au/\\_data/assets/pdf\\_file/0024/90762/Applicants-guide-applications-to-remove,-destroy-or-lop-native-vegetation.pdf](https://www.environment.vic.gov.au/_data/assets/pdf_file/0024/90762/Applicants-guide-applications-to-remove,-destroy-or-lop-native-vegetation.pdf)
- DELWP (2018c). *Procedures to rely on the railways exemption in planning schemes*. Victorian Government Department of Environment, Land, Water and Planning, Melbourne.
- DELWP (2018d). Use of nest boxes – general guide. Fact sheet. Department of Environment, Land, Water and Planning, Melbourne.

DELWP (2019a). Flora and Fauna Guarantee Act 1988 Threatened List – November 2019. Victorian Government Department of Environment, Land, Water and Planning Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>.

DELWP (2019b). *Flora and Fauna Guarantee Act 1988 Protected Flora List* – November 2019. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/protected-flora-and-listed-fish>

DELWP (2019c). A quick comparison of first party and third party offset sites. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: [https://www.environment.vic.gov.au/data/assets/pdf\\_file/0023/329450/Info-sheet-A-quick-comparison-of-first-party-and-third-party-offset-sites.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0023/329450/Info-sheet-A-quick-comparison-of-first-party-and-third-party-offset-sites.pdf)

DELWP (2019c). Update on the implementation of the 2017 native vegetation removal regulations and Guidelines for the removal, destruction or lopping of native vegetation – November 2019. The Native Vegetation Newsletter p 4-5. Victorian Government Department of Environment, Land, Water and Planning, Melbourne.

DELWP (2020a). Bioregions and EVC benchmarks – 29 May 2020. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks>

DELWP (2020b). Translocation of wildlife. Webpage: <https://www.wildlife.vic.gov.au/managing-wildlife/translocation-of-wildlife> Page last updated 9 December 2020.

DELWP (n.d.). *Flora and Fauna Guarantee Act 1988 – Threatened List: Characteristics of Threatened Communities*. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>

DEPI (2014). Advisory list of rare or threatened plants in Victoria - 2014. Victorian Government Department of Environment and Primary Industries. Melbourne, Victoria. Available at: [https://www.environment.vic.gov.au/data/assets/pdf\\_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0021/50448/Advisory-List-of-Rare-or-Threatened-Plants-in-Victoria-2014.pdf)

DEWHA (2010). Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999. Australian Government Department of Environment, Water, Heritage and the Arts, Canberra.

Dickman, C. R. (1991). Use of trees by ground-dwelling mammals: implications for management, Conservation of Australia's Forest Fauna, Lunney, D. (ed.), The Royal Zoological Society of New South Wales, Sydney: 125- 136.

DoE (2016). National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*). Australian Government Department of Environment, Canberra.

DoEE (2016). Threat Abatement Plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (2016). Australian Government Department of Environment and Energy, Canberra. Available at: <http://www.environment.gov.au/system/files/resources/d7506904-8528-411e-a3f4-19d4379935f9/files/tap-chytrid-fungus-2016.pdf>

DoEE (2018). Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*. Australian Government Department of Environment and Energy, Canberra. Available at: <https://www.environment.gov.au/system/files/resources/ee1f3b9f-6e2e-4a01-86f3-6abb167fb443/files/tap-phytophthora-cinnamomi-2018.pdf>

DSE (2003a). Loss of hollow-bearing trees from Victorian native forests and woodlands. *Flora and Fauna Guarantee Act 1988* Action Statement No 192. Authors S.T. Garnett, R.H. Loyn and K.W. Low. Published by the Victorian Department of Sustainability and Environment, Melbourne.

DSE (2003b). *Flora and Fauna Guarantee Act 1988* Action Statement No. 79 – Brush-tailed Phascogale *Phascogale tapoatafa*. Prepared by Robert Humphries and John Seebeck, Department of Sustainability and Environment, Melbourne.



DSE (2003c). *Flora and Fauna Guarantee Act 1988* Action Statement No. 166 – Squirrel Glider *Petaurus norfolcensis*. Prepared by Leigh Ahern and Rodney van der Ree, Department of Sustainability and Environment, Melbourne.

DSE (2003d). *Flora and Fauna Guarantee Act 1988* Action Statement No. 44 (revised in 2002) – Predation of native wildlife by the introduced Red Fox *Vulpes vulpes*. Prepared by John Seebeck and Gordon Friend, Department of Sustainability and Environment, Melbourne.

DSE (2004a). Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3. Victorian Government Department Sustainability and Environment, State of Victoria. Available at:

[https://www.environment.vic.gov.au/data/assets/pdf\\_file/0014/50450/Advisory-List-of-Threatened-Vertebrate-Fauna\\_FINAL-2013.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0014/50450/Advisory-List-of-Threatened-Vertebrate-Fauna_FINAL-2013.pdf)

DSE (2004b). *Flora and Fauna Guarantee Act 1988* Action Statement No. 80 - Predation of Native Wildlife by the Cat *Felis catus*. Prepared by John Seebeck and Pam Clunie, Department of Sustainability and Environment, Melbourne.

DSE (2006). Ministerial guidelines for assessment of environmental effects under the *Environment Effects Act 1978*. Seventh edition. Victorian Government Department of Sustainability and Environment, Melbourne.

DSE (2008). Victoria's Public Land *Phytophthora cinnamomi* Management Strategy. Department of Sustainability and Environment, State Government, Victoria.

DSE (2009). Advisory list of threatened invertebrate fauna in Victoria – 2009. Victorian Government Department of Sustainability and Environment, East Melbourne. Available at:

[https://www.environment.vic.gov.au/data/assets/pdf\\_file/0016/50452/Advisory\\_List\\_of\\_Threatened\\_Invertebrate\\_Fauna\\_2009\\_FINAL\\_Sept\\_2009.pdf](https://www.environment.vic.gov.au/data/assets/pdf_file/0016/50452/Advisory_List_of_Threatened_Invertebrate_Fauna_2009_FINAL_Sept_2009.pdf)

DSE (2013). Advisory List of Threatened Vertebrate Fauna in Victoria – 2013. Victorian Government Department of Sustainability and Environment, Melbourne.

DSEWPaC (2011). 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*. Australian Government Department of Sustainability, Environment, Water, Population and Communities, Canberra.

DSEWPaC (2012a). Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and 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*. Australian Government Department of Sustainability, Environment, Water, Population and Communities, Canberra.

DSEWPaC (2012b). *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy – October 2012. Australian Government Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Fahrig (2003). Effects of Habitat Fragmentation on Biodiversity. *Annual Review of Ecology Evolution and Systematics* **23(1)**: 487-515

Gibbons, P. and Lindenmayer, D. B. 1997, Conserving Hollow-dependent Fauna in Timber-production Forests, Environmental Series Monograph Series No. 3, NSW National Parks and Wildlife Service, Sydney.

Gleeson, J. and Gleeson, D. (2012). Reducing the Impacts of Development on Wildlife. CSIRO Publishing, Collingwood.

Griffiths, S. R., Semmens, K., Watson, S.J. and Jones, C.S. (2020). Installing chainsaw-carved hollows in medium-sized live trees increases rates of visitation by hollow-dependent fauna. *Restoration Ecology* **28 (5)**: 1225 – 1236.

IPAC (2017). Australian Weeds Strategy 2017 – 2027. Invasive Plants and Animals Committee, Australian Government Department of Agriculture and Water Resources, Canberra.

Invasive Plants and Animals Committee (2017). Australian Weeds Strategy 2017 – 2027. Department of Agriculture and Water Resources, Canberra.

KBR (2020a). Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services, Tottenham to Albury Biodiversity Assessment. Prepared for Australian Rail Track Corporation (ARTC). Kellogg Brown & Root Pty Ltd, Victoria

KBR (2020b). Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services, Victorian Temperate woodland Bird Survey. Prepared for Australian Rail Track Corporation (ARTC). Kellogg Brown & Root Pty Ltd, Victoria

KBR (2020c). Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services, Threatened Flora Survey Report. Prepared for Australian Rail Track Corporation (ARTC). Kellogg Brown & Root Pty Ltd, Victoria.

KBR (2020d). Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services, Overhead Powerline Biodiversity Assessment Report. Prepared for Australian Rail Track Corporation (ARTC). Kellogg Brown & Root Pty Ltd, Victoria.

Korodaj, T., Winsemius, R. and Tack, E. (2014). Squirrel Glider Habitat Management Guide. A landholder guide for managing Squirrel Glider habitat in southern New South Wales. Local Lands Services, Deniliquin.

Lobert, B. (undated). Striped Legless Lizards in North East Victoria. Website of the Goulburn Broken Striped Legless Lizard Project; a collaborative project between the Victorian Government, Goulburn Broken Catchment Management Authority, Upper Goulburn Landcare Network, Strathbogie Ranges Conservation Management Network and Trust for Nature. Blog at <https://goulburnbrokendelmairpar.wordpress.com/introduction/> [Accessed 24 March 2021]

Mackowski, C.M., (1984). The ontogeny of hollows in Blackbutt (*Eucalyptus pilularis*) and its relevance to the management of forests for Possums, Gliders and Timber, Possums and Gliders, A.P. Smith and I.D. Hume (eds.), *Australian Mammal Society, Sydney*: 553-67.

Menkhorst, P. W. (1984), Use of Nest Boxes by Forest Vertebrates in Gippsland: Acceptance, Preference and Demand, *Australian Wildlife Research* (11): 255-264.

NPWS. (1999). Land for wildlife note 5. NSW National Parks and Wildlife Services

Recher, H. F. (1991), The Conservation and management of eucalypt forest birds: resource requirements for nesting and foraging, Conservation of Australia's Forest Fauna, Lunney, D. (ed.), *The Royal Zoological Society of New South Wales, Sydney*: 25-34

Rural City of Wangaratta (n.d.). *Significant Tree Register*, viewed 7 December 2020, <  
<https://wangeratta.vic.gov.au/community/trees-and-environment/significant-tree-register>>.

SAC (n.d.). Flora and Fauna Guarantee Act 1988 – Threatened List, Characterises of Threatened Communities. The FFG Scientific Advisory Committee. Available at:  
<https://www.environment.vic.gov.au/conserving-threatened-species?a=50418>

Saunders, D. and Tzaros, C. (2011). National recovery plan for the Swift Parrot *Lathamus discolor*. Birds Australia, Melbourne.

Sloanes, K., Vesk, P. A. and van der Ree, R. (2015). Monitoring use of road-crossing structures by arboreal marsupials: insights gained from motion-triggered cameras and passive integrated transponder (PIT) tags. *Wildlife Research* 42(3): 241-256.

Scotts, D. J. (1991), Old-growth forests: their ecological characteristics and value to forest-dependent vertebrate fauna of south-east Australia, Conservation of Australia's Forest Fauna, Lunney, D. (ed.), *The Royal Zoological Society of New South Wales, Sydney*: 147-159.

Terry, W., Goldingay, R.L. and van der Ree, R. (2021). Can chainsaw carved hollows provide an effective solution to the loss of natural tree cavities for arboreal mammals? *Forest Ecology and Management* 490: 119-122.

TSRH (2018). Testing the effectiveness of nest boxes for threatened species – project summary project 1.2.1.5. Threatened Species Recovery Hub, Australian Government.

TSSC (2020). NSW Threatened Species Scientific Committee. Available at:

<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/Determinations/2020/white-box-yellow-box-final-determination-ceec.pdf?la=en&hash=DD6076E55435D715E7E90B1A901EEB83D488563B>

van der Ree, R., Bennett, A.F. and Gilmore, D.C. (2003). Gap-crossing by gliding marsupials: thresholds for use of isolated woodland patches in an agricultural landscape. *Biological Conservation* (115): 241–249.

van der Ree, R. (1999). Barbed wire fencing as a hazard for wildlife. *Victorian Naturalist* (116): 210-217

WSP (2016). Vic and NSW Enhancement Works Phase 2 Preparatory Works, Ecological Assessment – Tottenham to Albury, prepared for the Australian Rail Track Corporation, WSP/Parsons Brinckerhoff, Southbank, Victoria.





# Inland Rail - Beveridge to Albury: Enhancement Sites, Track Slews, and Signal Gantries

Ecology: Existing Conditions & Impact Assessment

23-Aug-2021

Commercial-in-Confidence

# Appendix A

Figures



## Appendix A – Figures

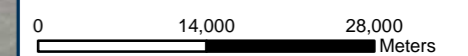
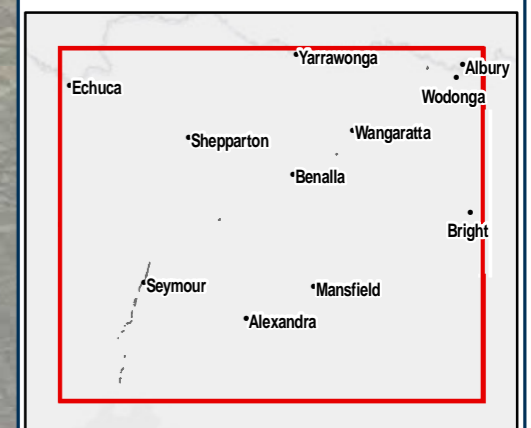
Figure 6 Project overview



**Project Area Overview**

MAP 1 OF 27

- Enhancement Sites
- Signal Gantry
- Track Slew
- Next Generation Cabling



Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:630,000  
 Data Sources: DELWP (2020) Figure 6



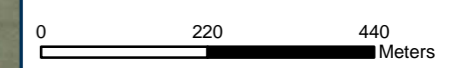


**Project Area Overview**

SG16

MAP 2 OF 27

- KM Posts
- ▭ Signal Gantry



Coordinate System: GDA 1994 MGA Zone 55

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 Data Sources: DELWP (2020)

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 Scale: 1:10,000  
 Figure 6



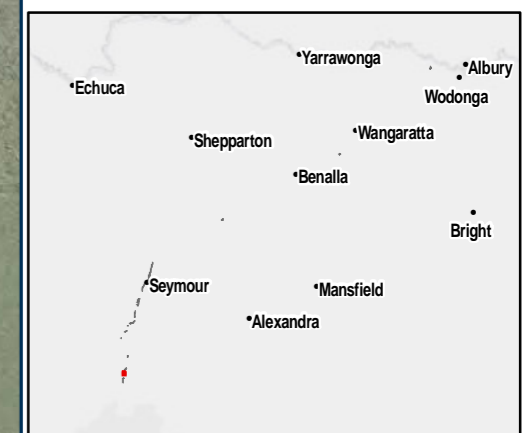
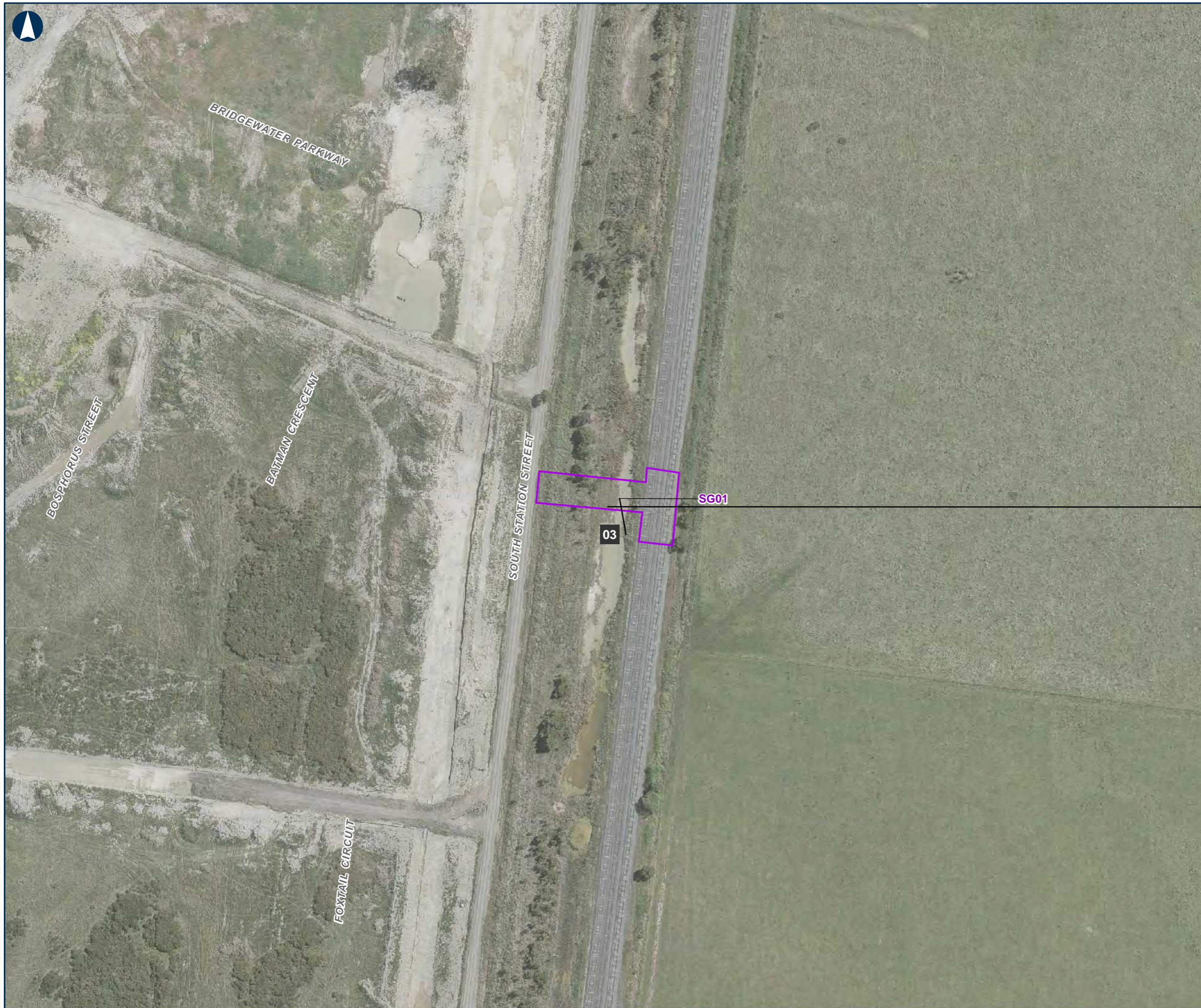


**Project Area Overview**

SG1

MAP 3 OF 27

Signal Gantry



0 30 60 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:1,500  
 Figure 6

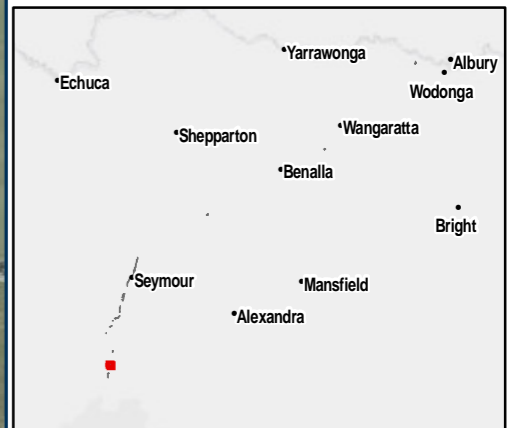


Project Area Overview

SG2 & TS1

MAP 4 OF 27

- KM Posts
- ▭ Signal Gantry
- ▭ Track Slew



0 160 320 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:7,500  
 Figure 6



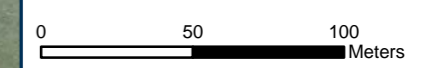
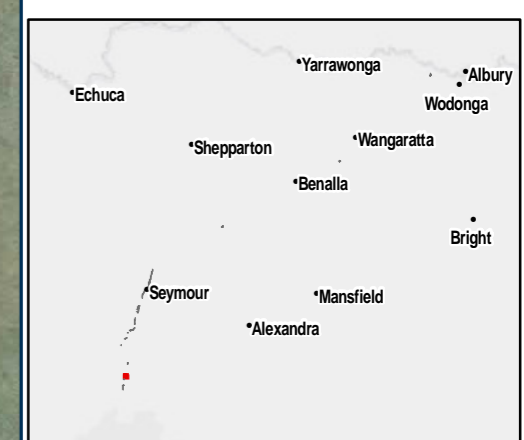


**Project Area Overview**

SG17

MAP 5 OF 27

- KM Posts
- ▭ Signal Gantry
- ▭ Track Slew



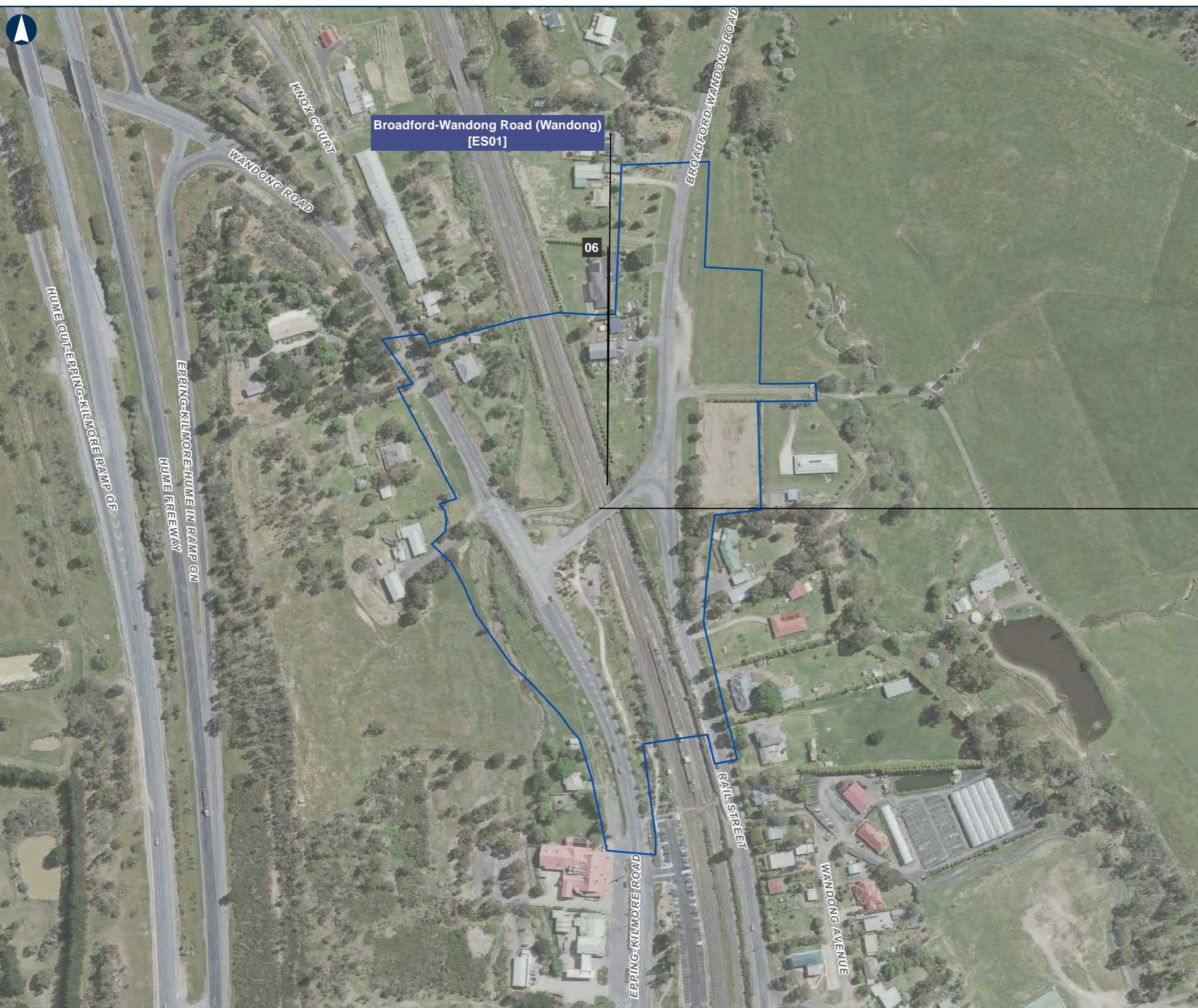
Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,500  
 Figure 6

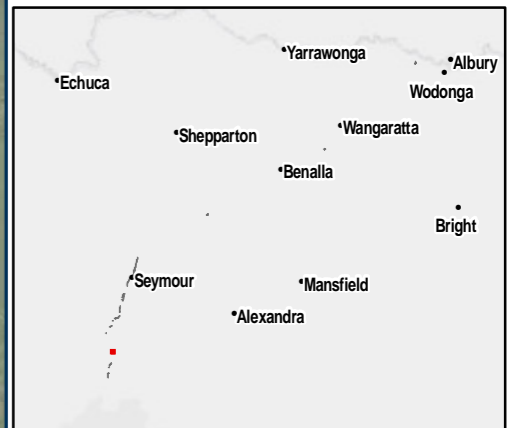




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**Project Area Overview**  
Broadford-Wandong Road (Wandong) [ES01]  
MAP 6 OF 27

Enhancement Sites



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,500  
Figure 6



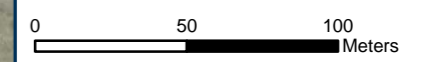
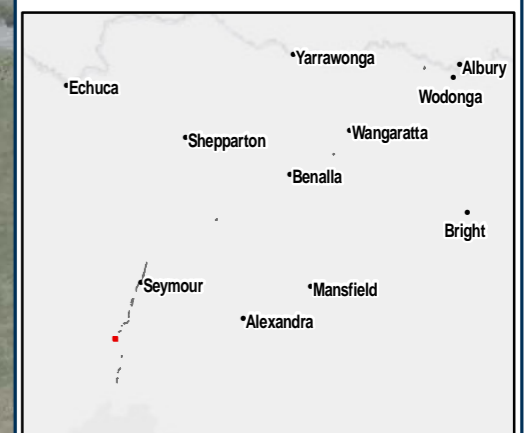


**Project Area Overview**

SG3

MAP 7 OF 27

- KM Posts
- ▭ Signal Gantry



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,500  
 Figure 6



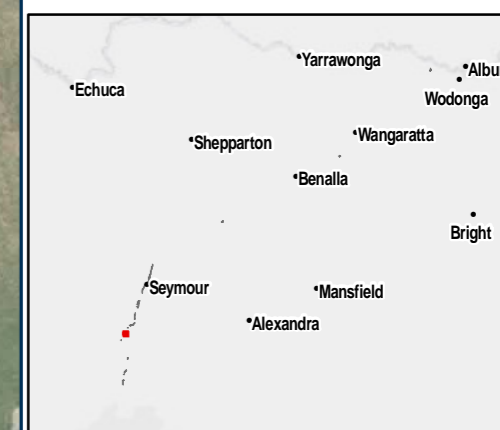


**Project Area Overview**

SG4

MAP 8 OF 27

- KM Posts
- ▭ Signal Gantry



0 100 200 Meters

Coordinate System: GDA 1994 MGA Zone 55

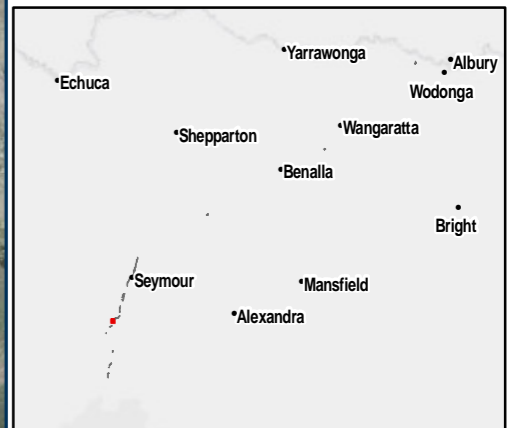
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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:4,500  
 Data Sources: DELWP (2020) Figure 6





Signal Gantry



0 30 60 Meters

Coordinate System: GDA 1994 MGA Zone 55

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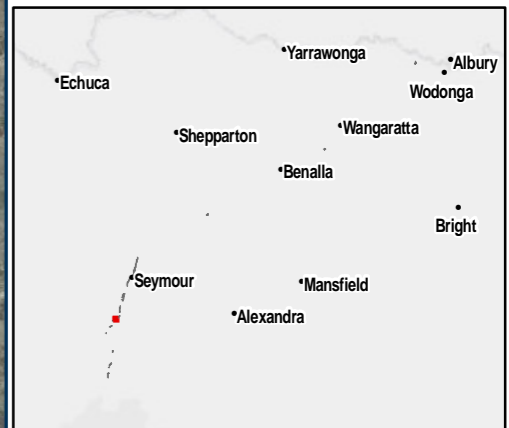




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**Project Area Overview**  
Hamilton Street (Broadford) [ES02] & SG18  
MAP 10 OF 27

- Enhancement Sites
- Signal Gantry



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,500  
Figure 6



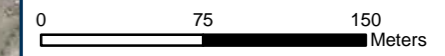
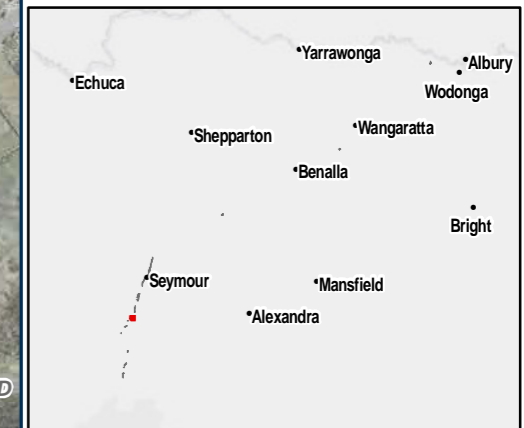
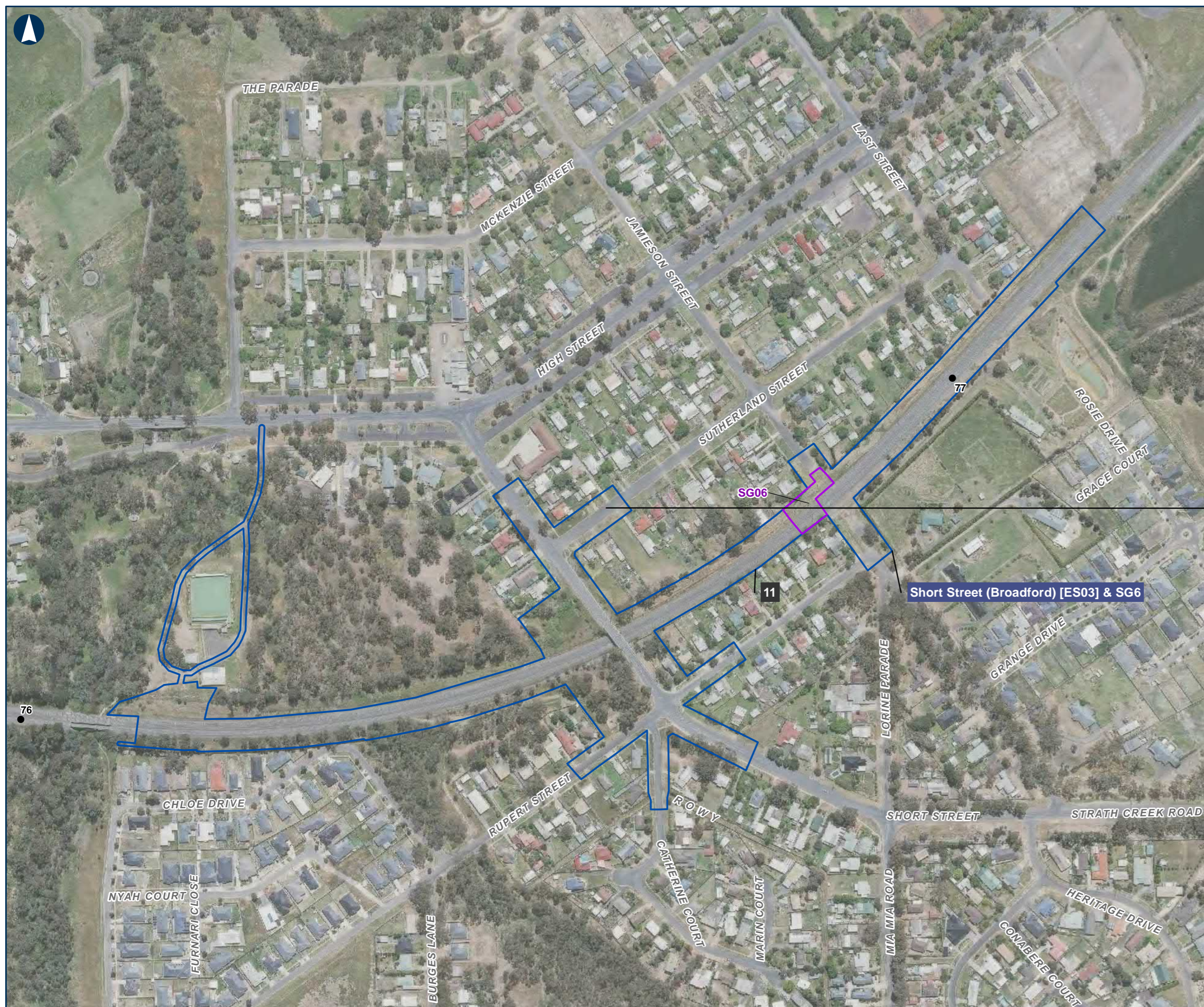


**Project Area Overview**

Short Street (Broadford) [ES03] & SG6

MAP 11 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Signal Gantry



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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:3,500  
 Data Sources: DELWP (2020) Figure 6





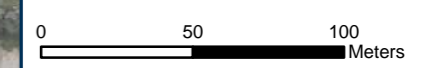
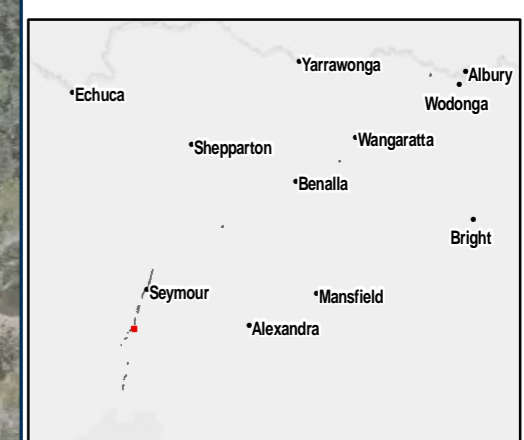
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**Project Area Overview**

Marchbanks Road (Broadford) [ES04]

MAP 12 OF 27

- KM Posts
- ▭ Enhancement Sites



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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,500  
 Figure 6



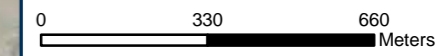
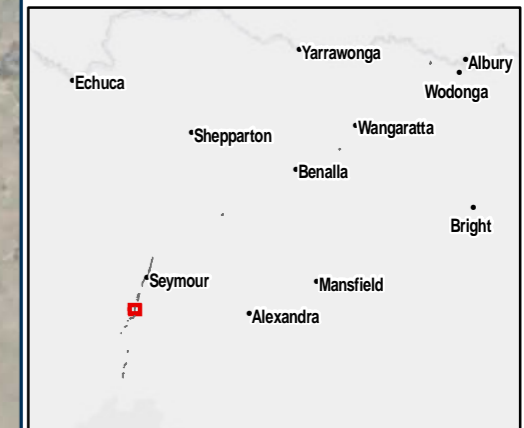
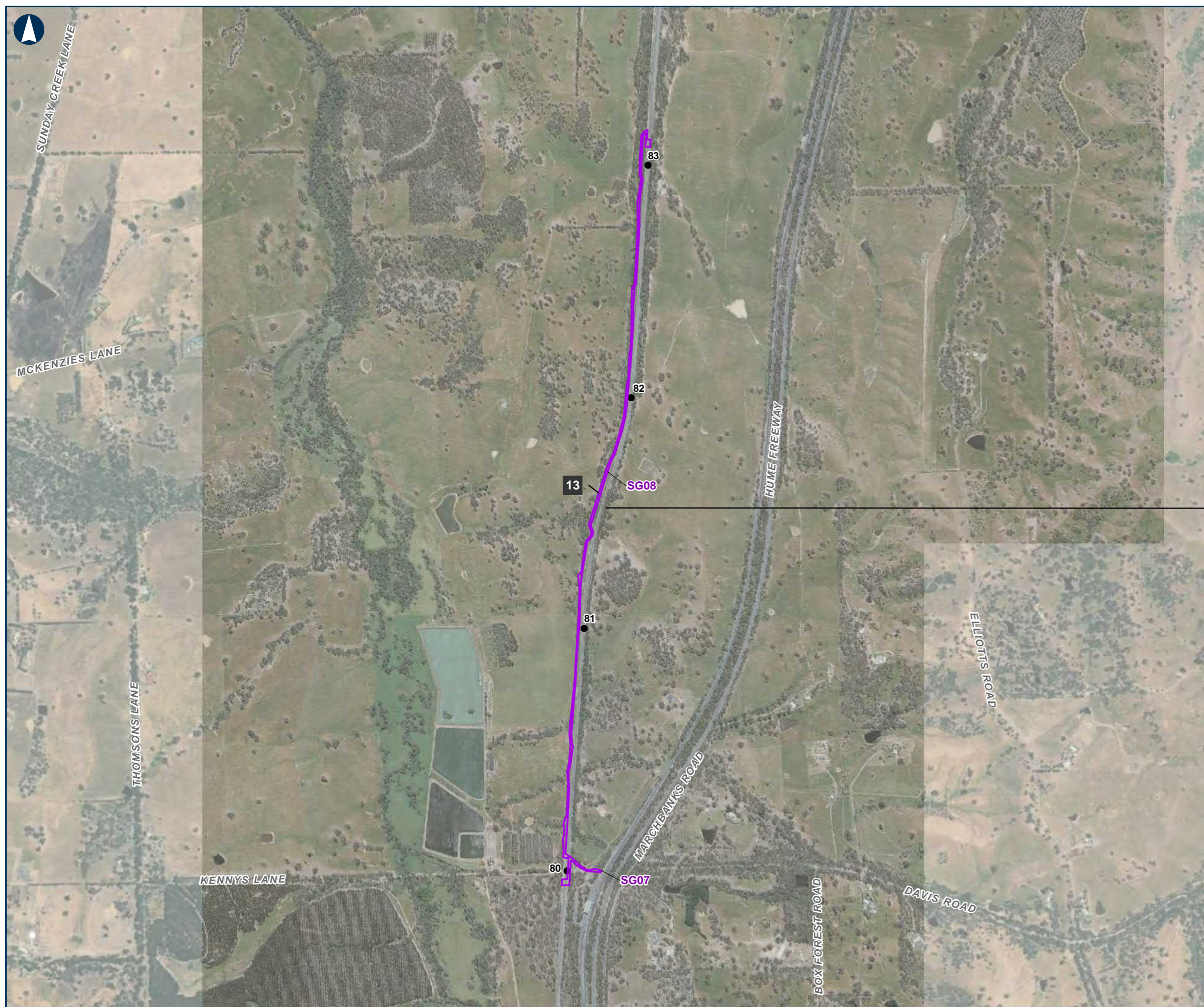


**Project Area Overview**

SG7 & SG8

MAP 13 OF 27

- KM Posts
- ▭ Signal Gantry



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:15,000  
 Figure 6



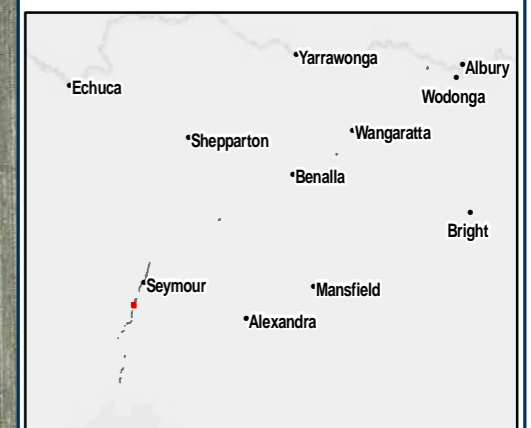
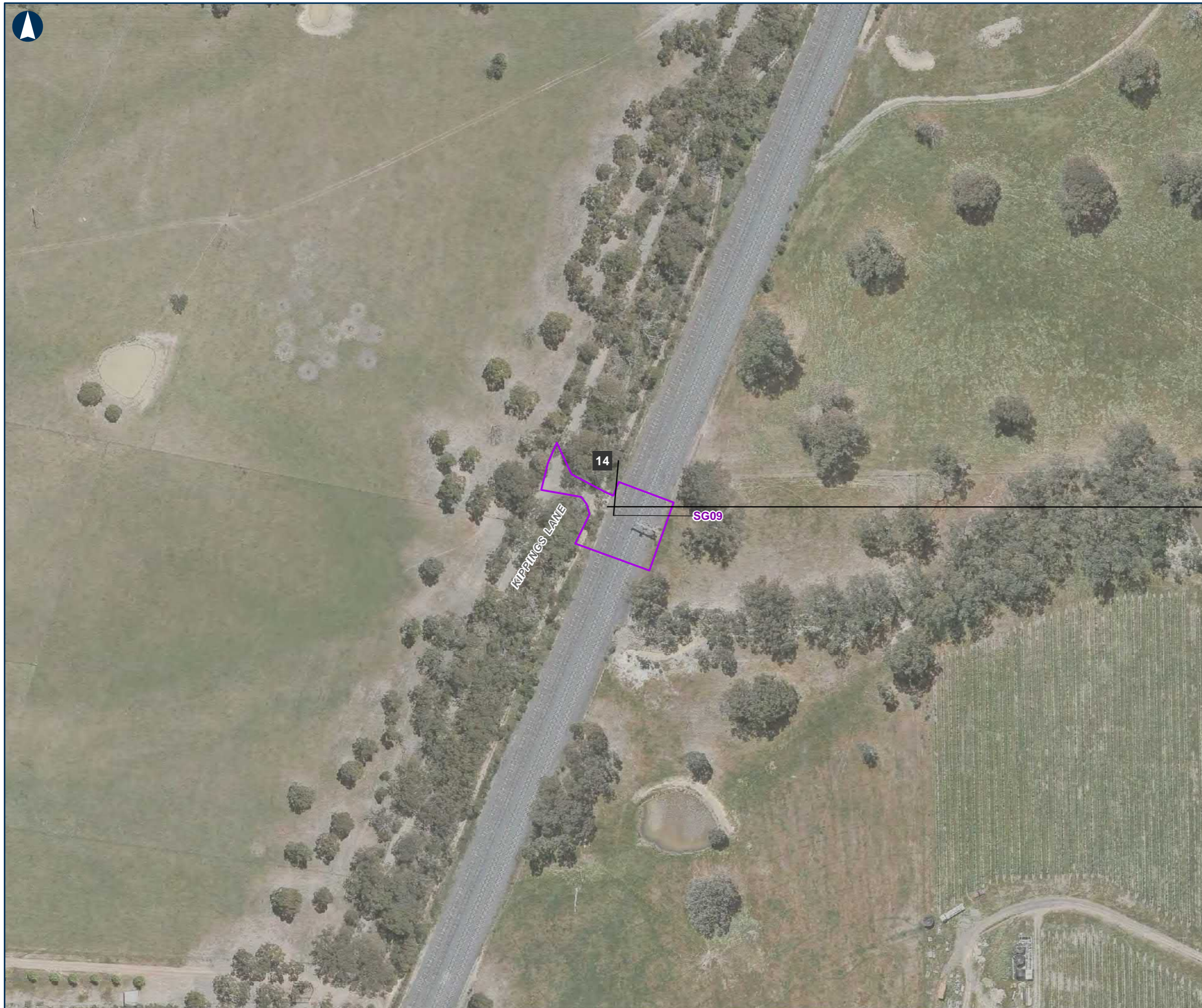


**Project Area Overview**

SG9

MAP 14 OF 27

 Signal Gantry



0 30 60 Meters

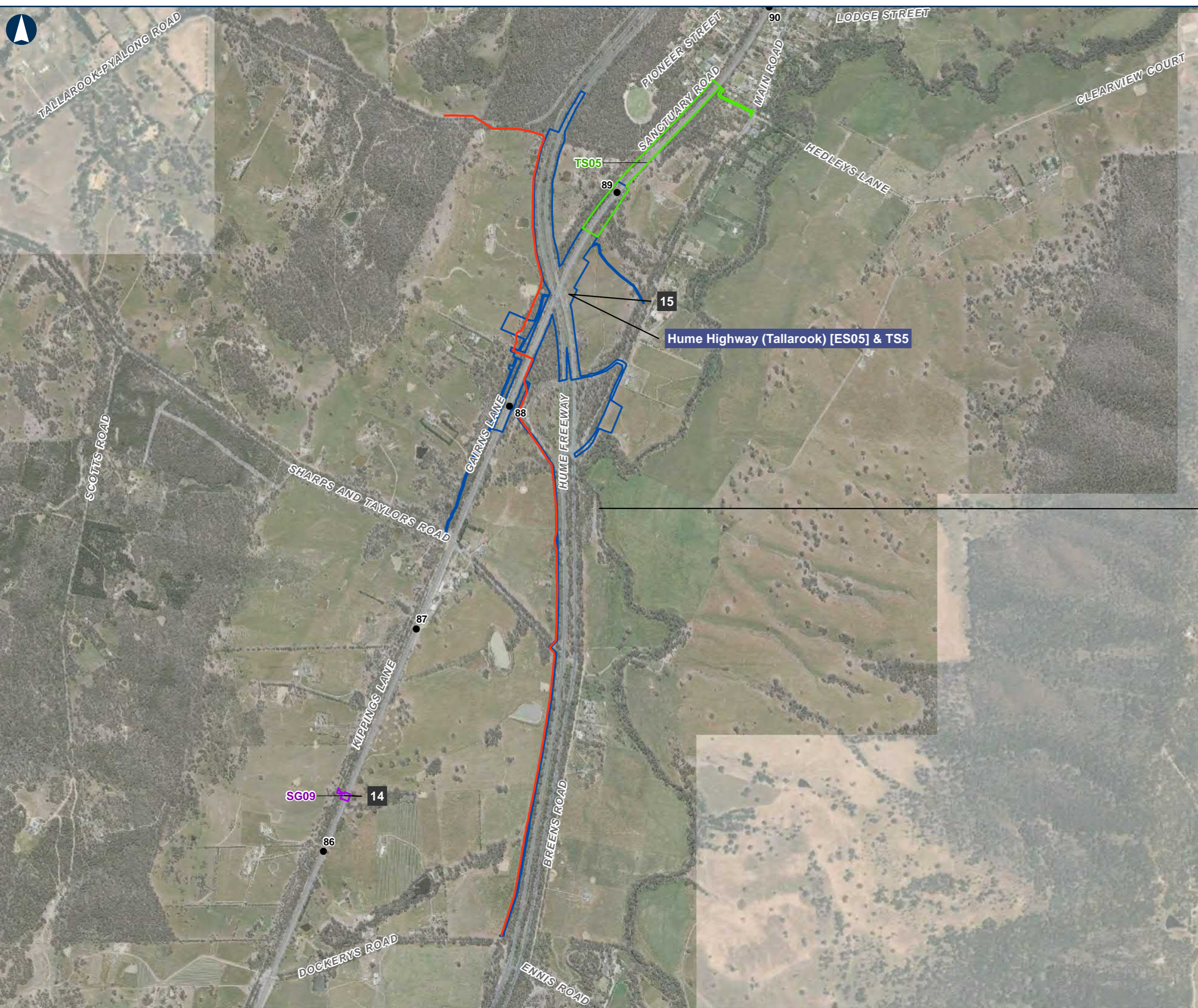
Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:1,500  
 Figure 6

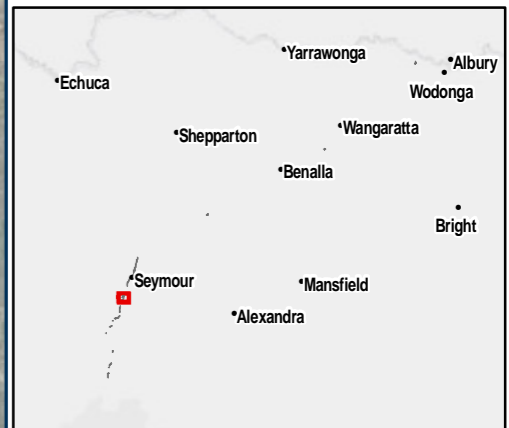




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**Project Area Overview**  
Hume Highway (Tallaroek) [ES05] & TS5  
MAP 15 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Signal Gantry
- ▭ Track Slew
- ▭ Next Generation Cabling

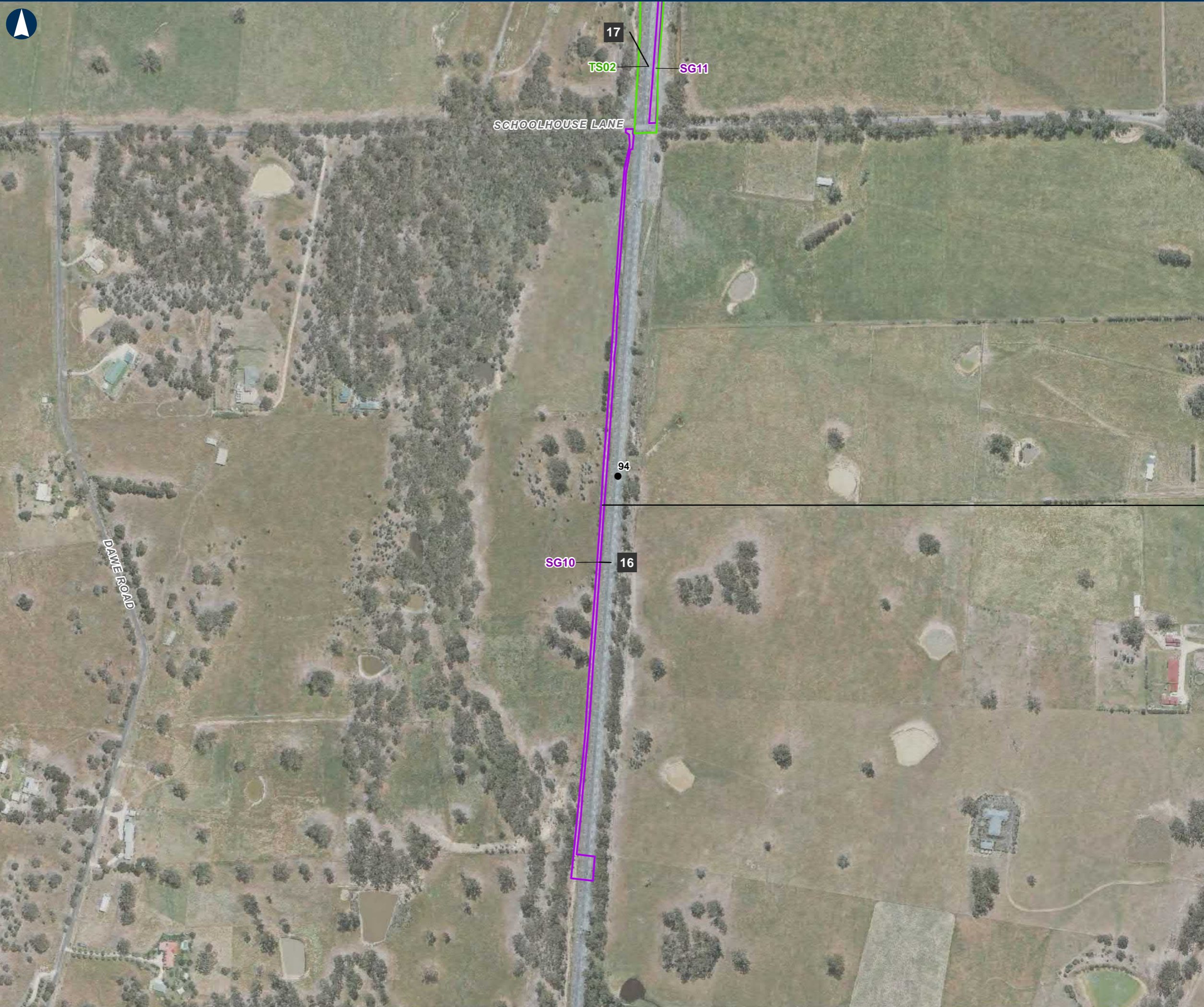


0 330 660 Meters

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Date: 2/07/2021 Paper: A3  
Author: JB Scale: 1:15,000  
Data Sources: DELWP (2020) Figure 6





**Project Area Overview**  
SG10  
MAP 16 OF 27

- KM Posts
- ▭ Signal Gantry
- ▭ Track Slew



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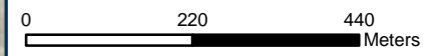
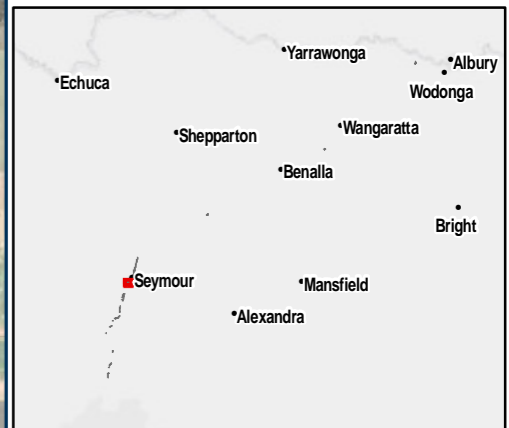
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**Project Area Overview**

SG11 & TS2

MAP 17 OF 27

- KM Posts
- ▭ Signal Gantry
- ▭ Track Slew



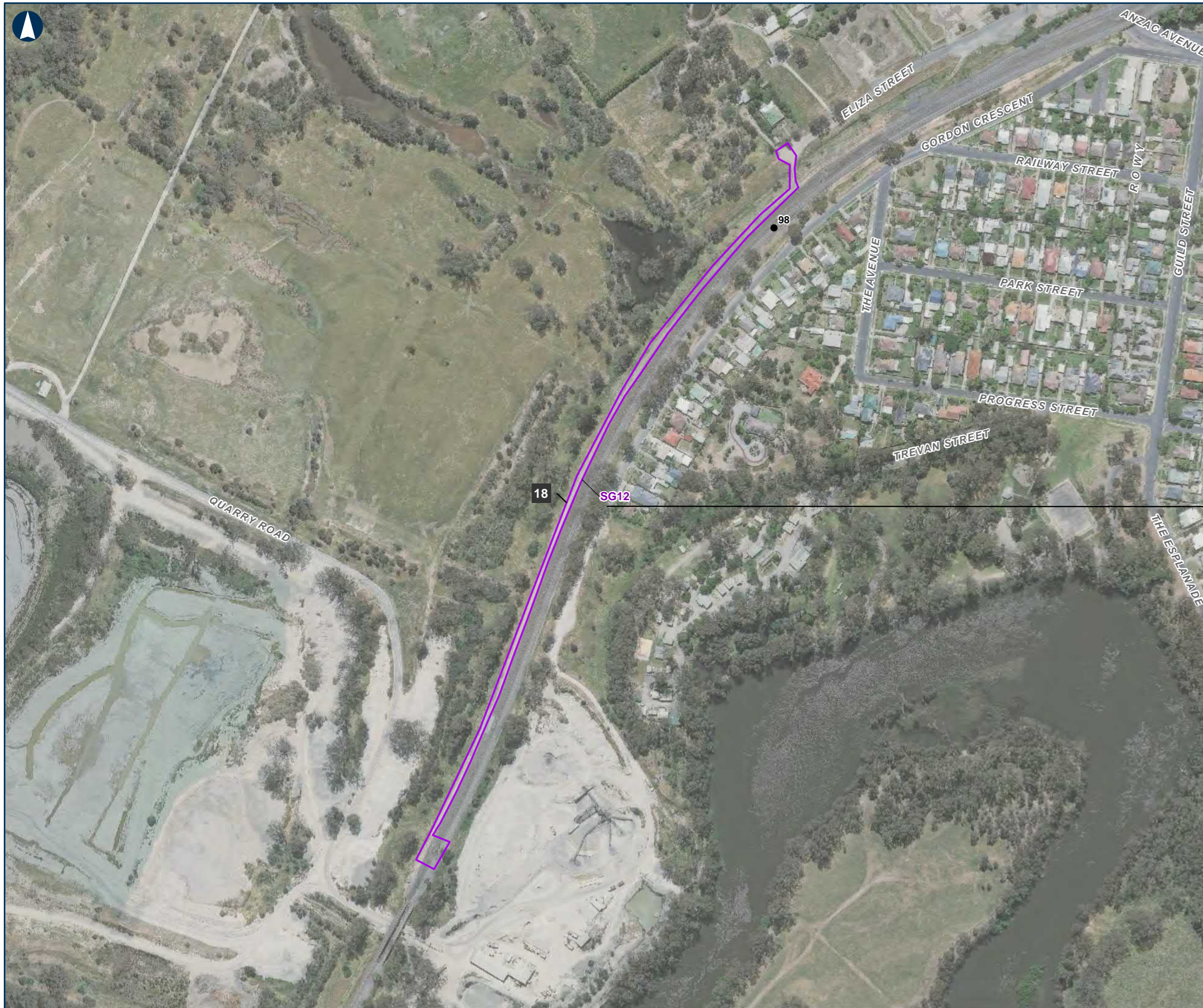
Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:10,000  
 Figure 6



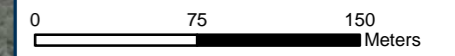
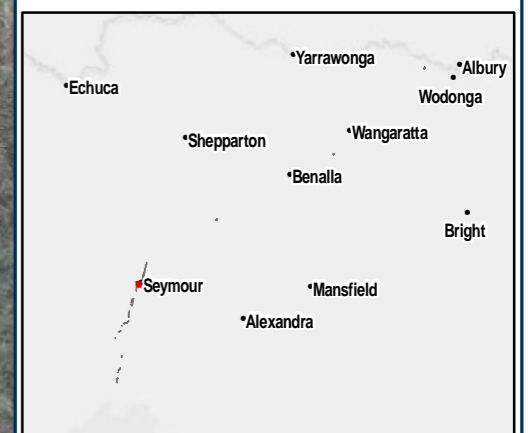


**Project Area Overview**

SG12

MAP 18 OF 27

- KM Posts
- ▭ Signal Gantry



Coordinate System: GDA 1994 MGA Zone 55

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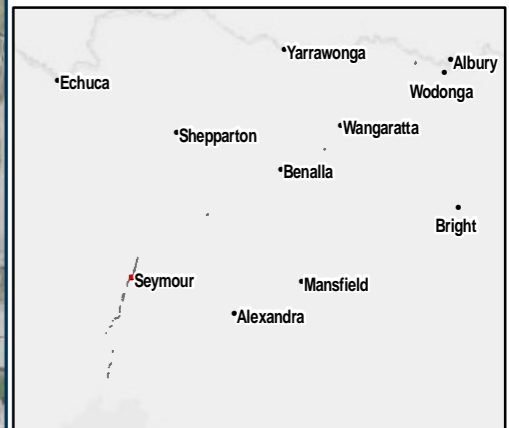




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**Project Area Overview**  
SG13 & TS3  
MAP 19 OF 27

- KM Posts
- Enhancement Sites
- Signal Gantry
- Track Slew
- Next Generation Cabling



0 40 80 Meters

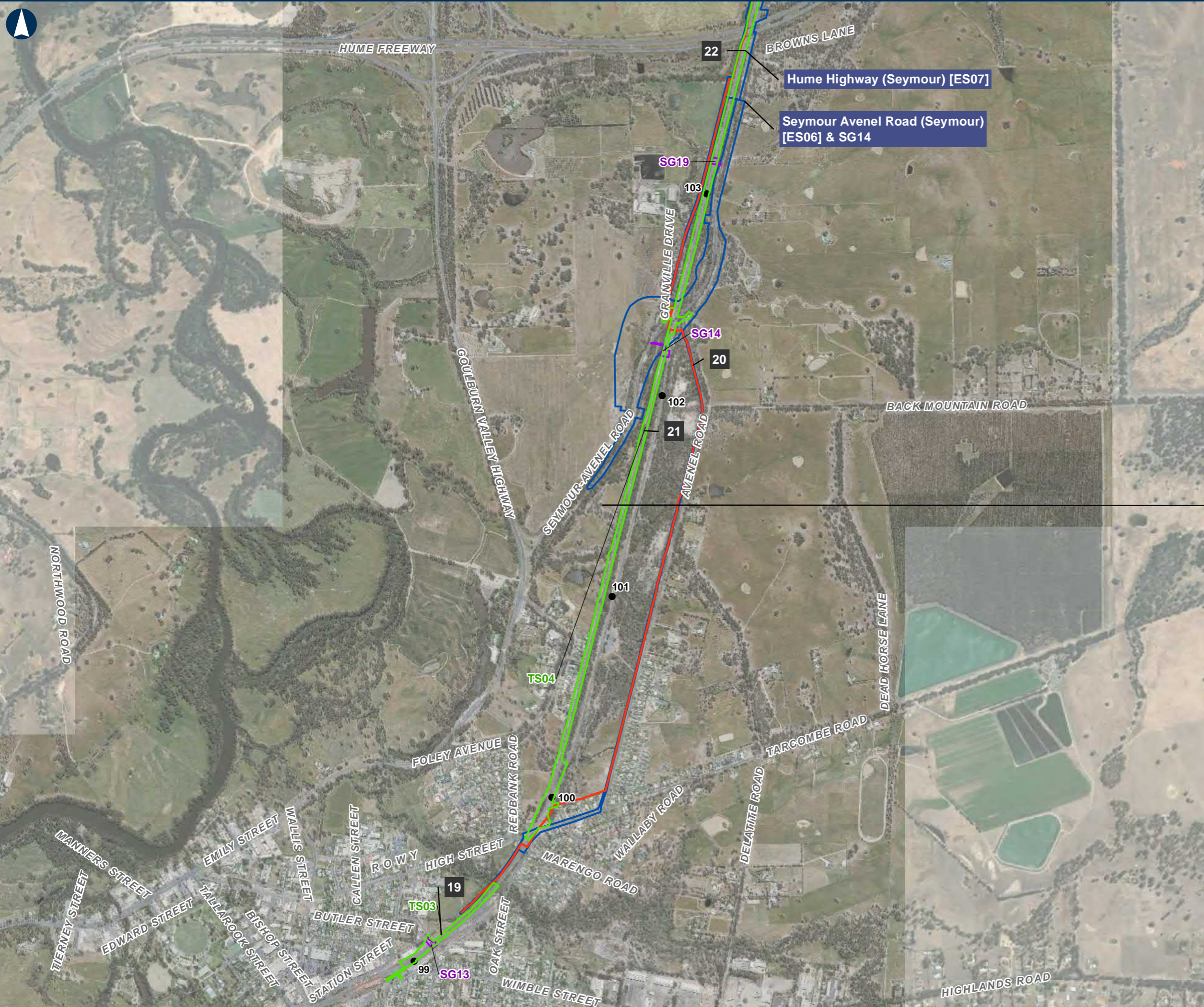
Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,000  
Figure 6

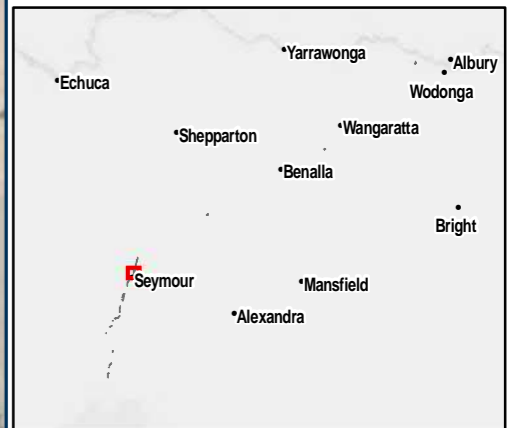




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**Project Area Overview**  
Seymour Avenel Road (Seymour) [ES06] & SG14  
MAP 20 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Signal Gantry
- ▭ Track Slew
- ▭ Next Generation Cabling



0 390 780 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
Author: JB Scale: 1:17,500  
Data Sources: DELWP (2020) Figure 6



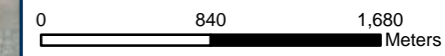
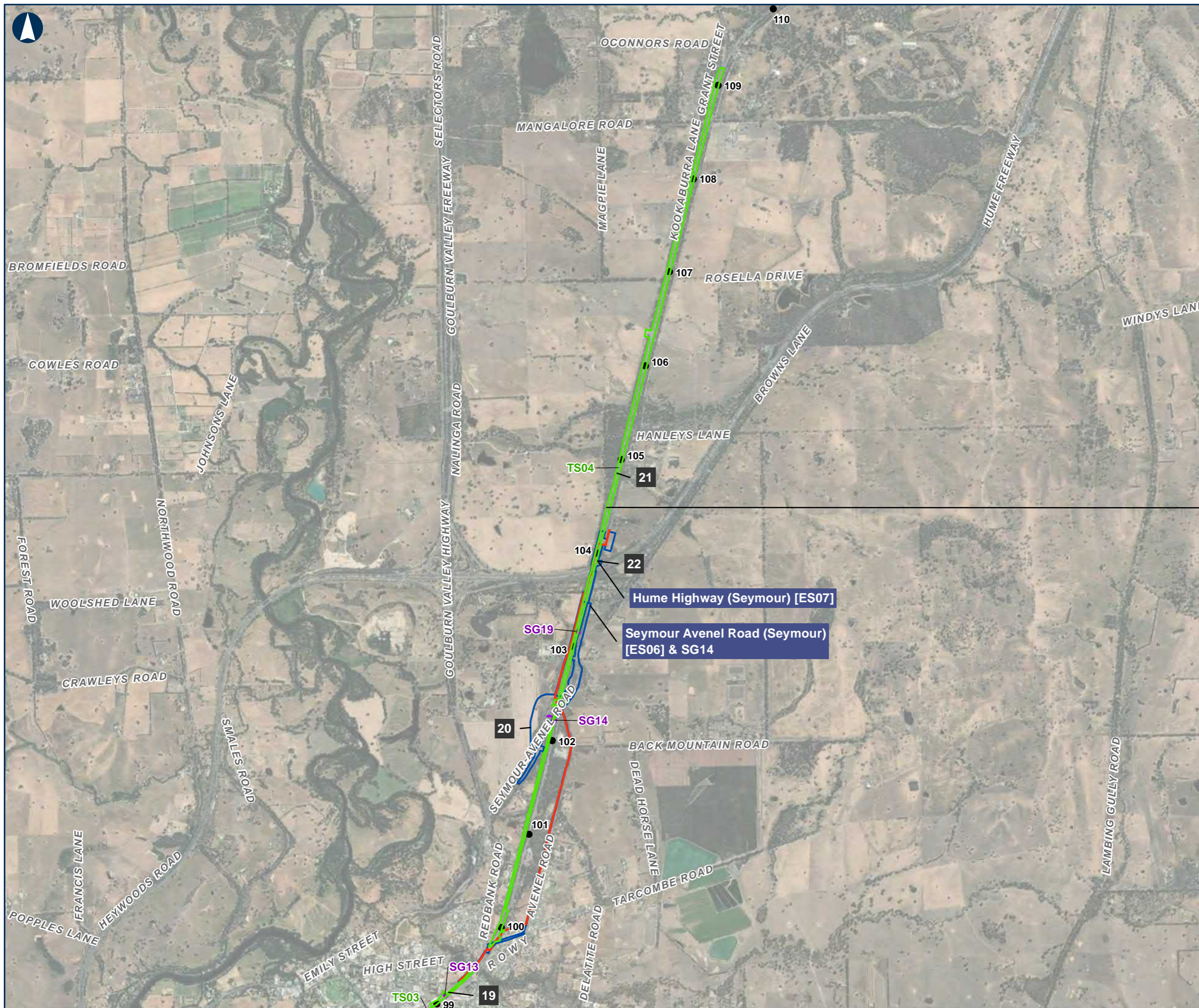


**Project Area Overview**

SG19 & TS4

MAP 21 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Signal Gantry
- ▭ Track Slew
- ▭ Next Generation Cabling



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:37,500  
 Figure 6



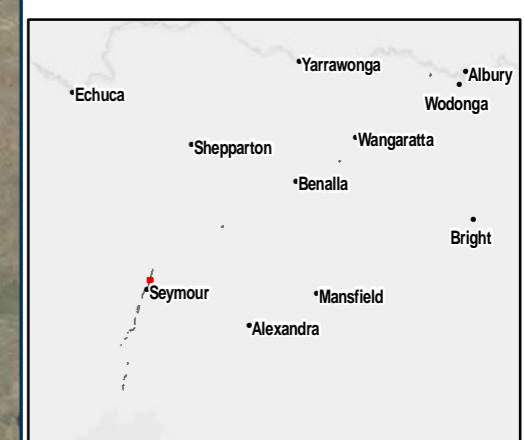
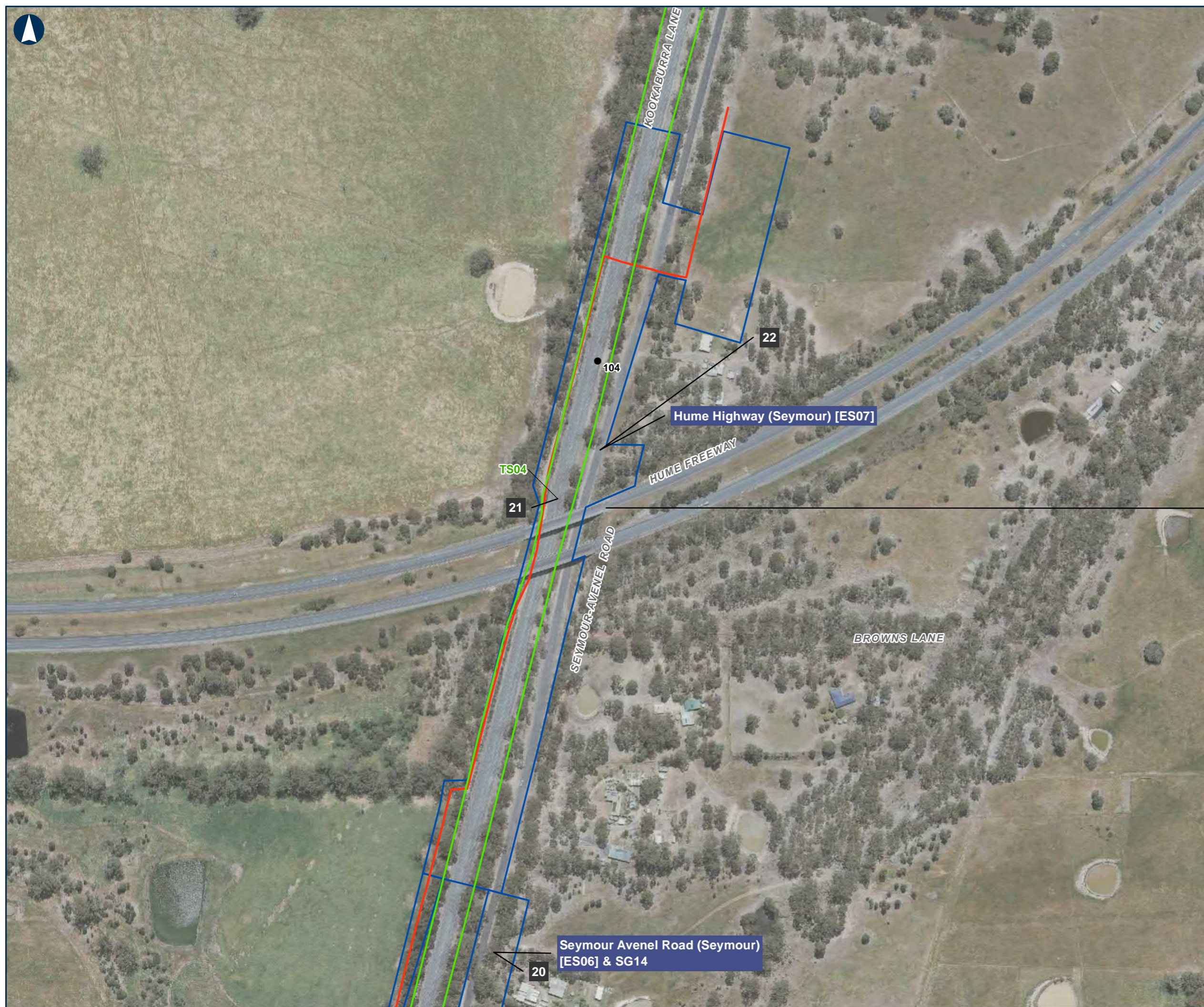


**Project Area Overview**

Hume Highway (Seymour) [ES07]

MAP 22 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Track Slew
- ▭ Next Generation Cabling



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:3,500  
 Figure 6



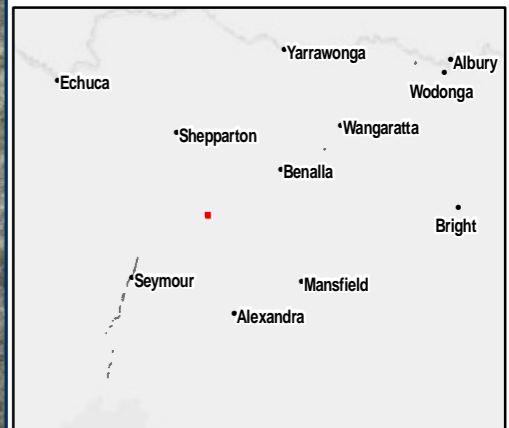


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**Project Area Overview**  
Anderson Street (Euroa) [ES08]

MAP 23 OF 27

- KM Posts
- ▭ Enhancement Sites



0 60 120 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:3,000  
Figure 6

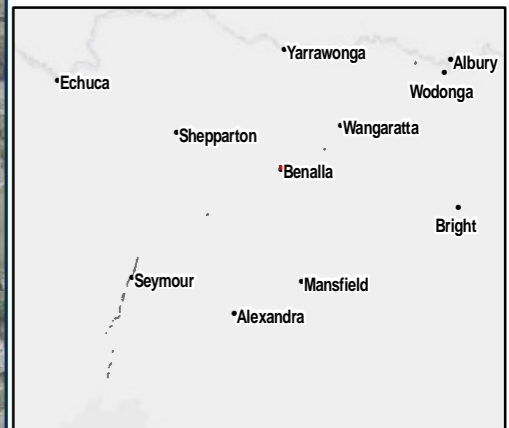




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**Project Area Overview**  
Benalla Station Access Road (Benalla) [ES09]  
MAP 24 OF 27

- KM Posts
- ▭ Enhancement Sites



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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,500  
Figure 6





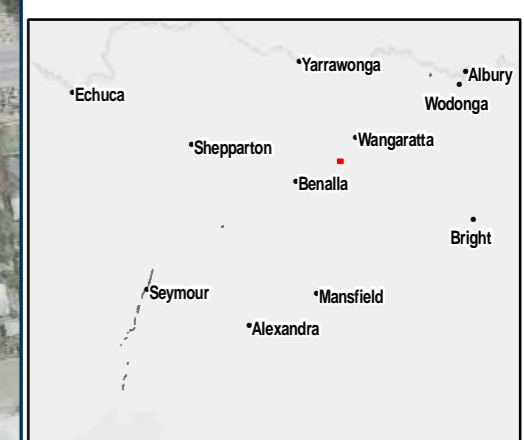
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

**Project Area Overview**

Beaconsfield Parade (Glenrowan) [ES10]

MAP 25 OF 27

Enhancement Sites



0 40 80 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:2,000  
 Data Sources: DELWP (2020) Figure 6





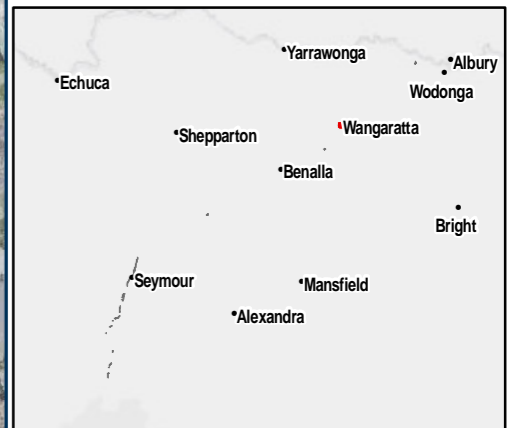
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**Project Area Overview**

Wangaratta Precinct (Wangaratta) [ES11] & SG15

MAP 26 OF 27

- KM Posts
- ▭ Enhancement Sites
- ▭ Signal Gantry



0 75 150 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:3,500  
 Figure 6

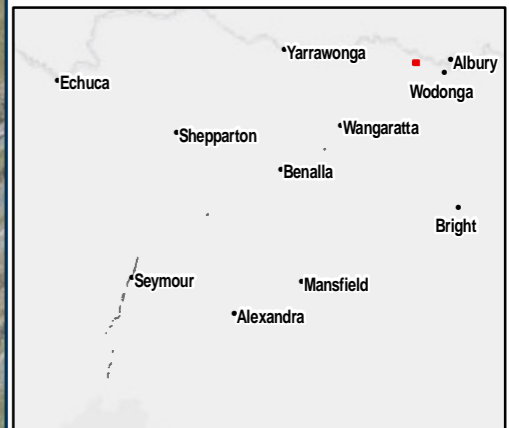




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**Project Area Overview**  
Murray Valley Highway (Barnawartha North) [ES12]  
MAP 27 OF 27

- KM Posts
- ▭ Enhancement Sites



Coordinate System: GDA 1994 MGA Zone 55

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Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:4,500  
Figure 6



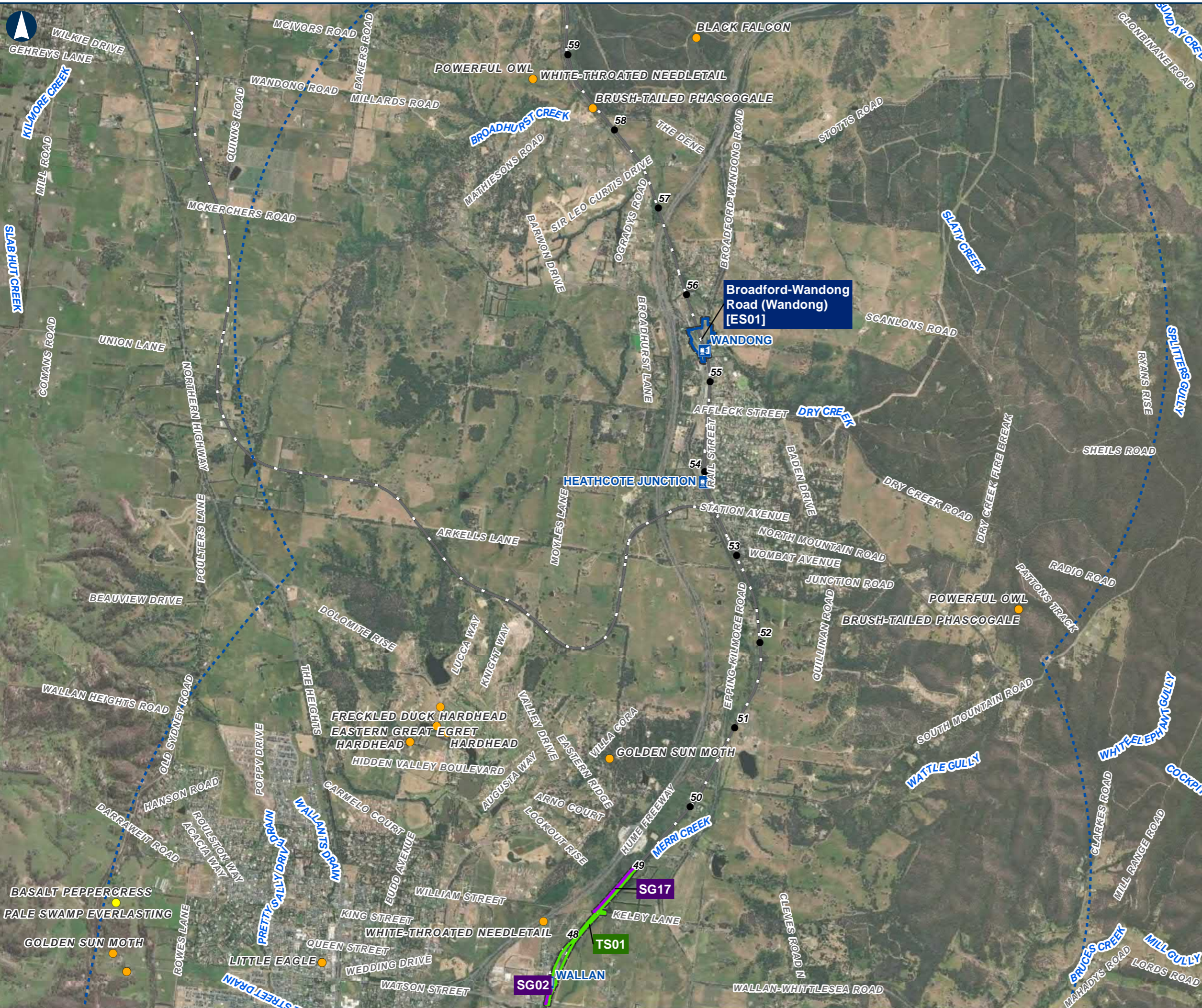
## Appendix A – Figures

Figure 7 VBA records





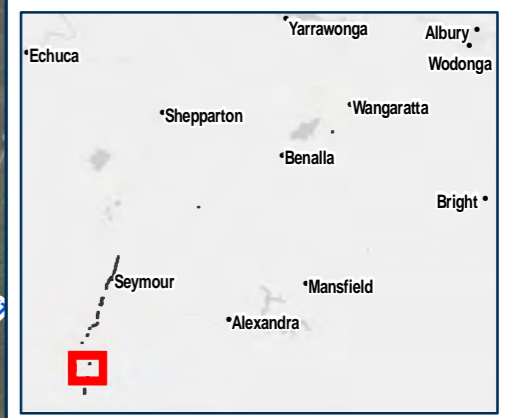




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**VBA Records**  
MAP 2 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- Signal Gantry
- Track Slew
- 15m buffer
- Train Station
- KM Posts
- Railway



0 910 1,820 Meters

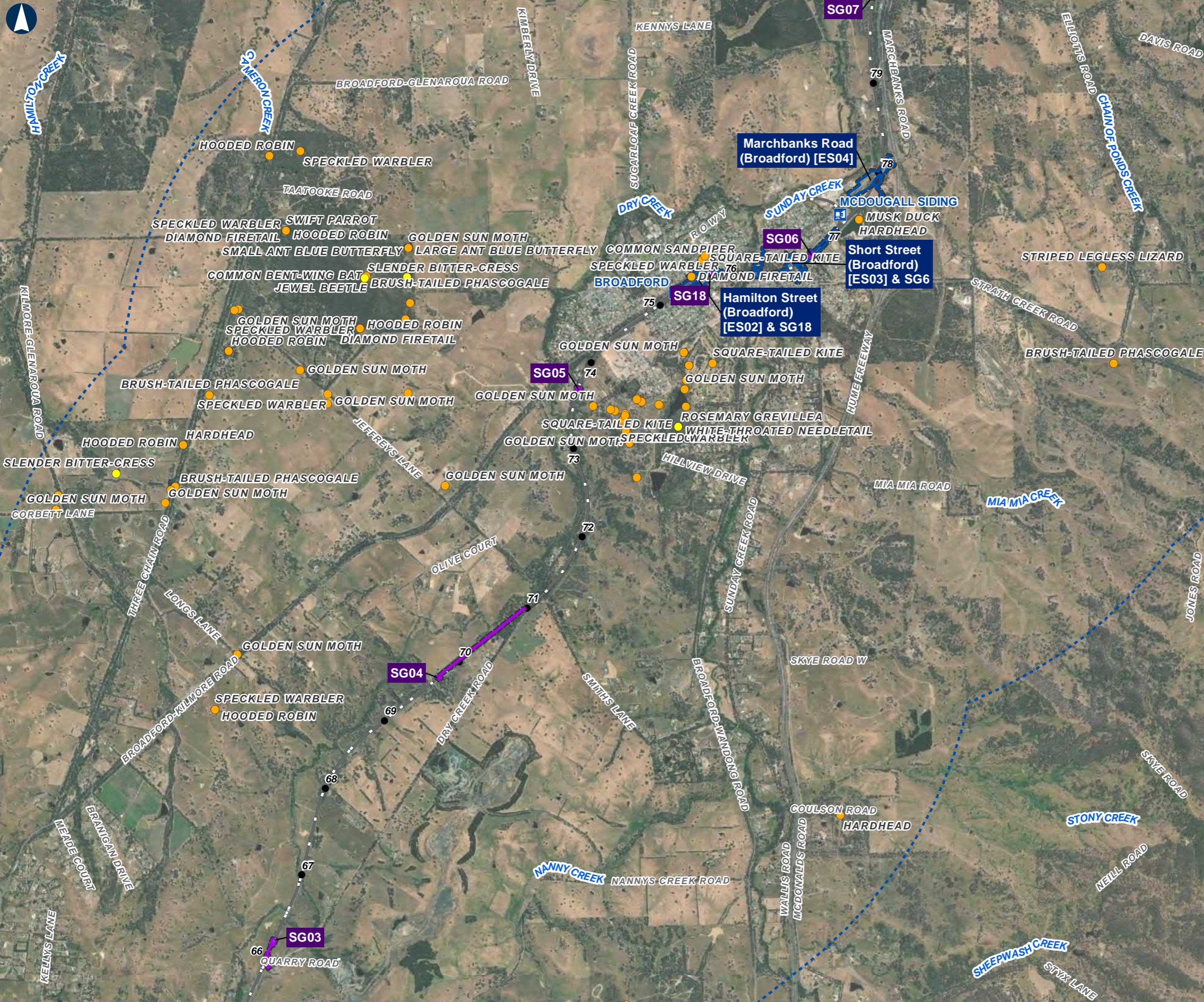
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 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:40,000  
 Figure 7





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**VBA Records**  
MAP 3 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- Signal Gantry
- 15m buffer
- +1 Train Station
- KM Posts
- Railway



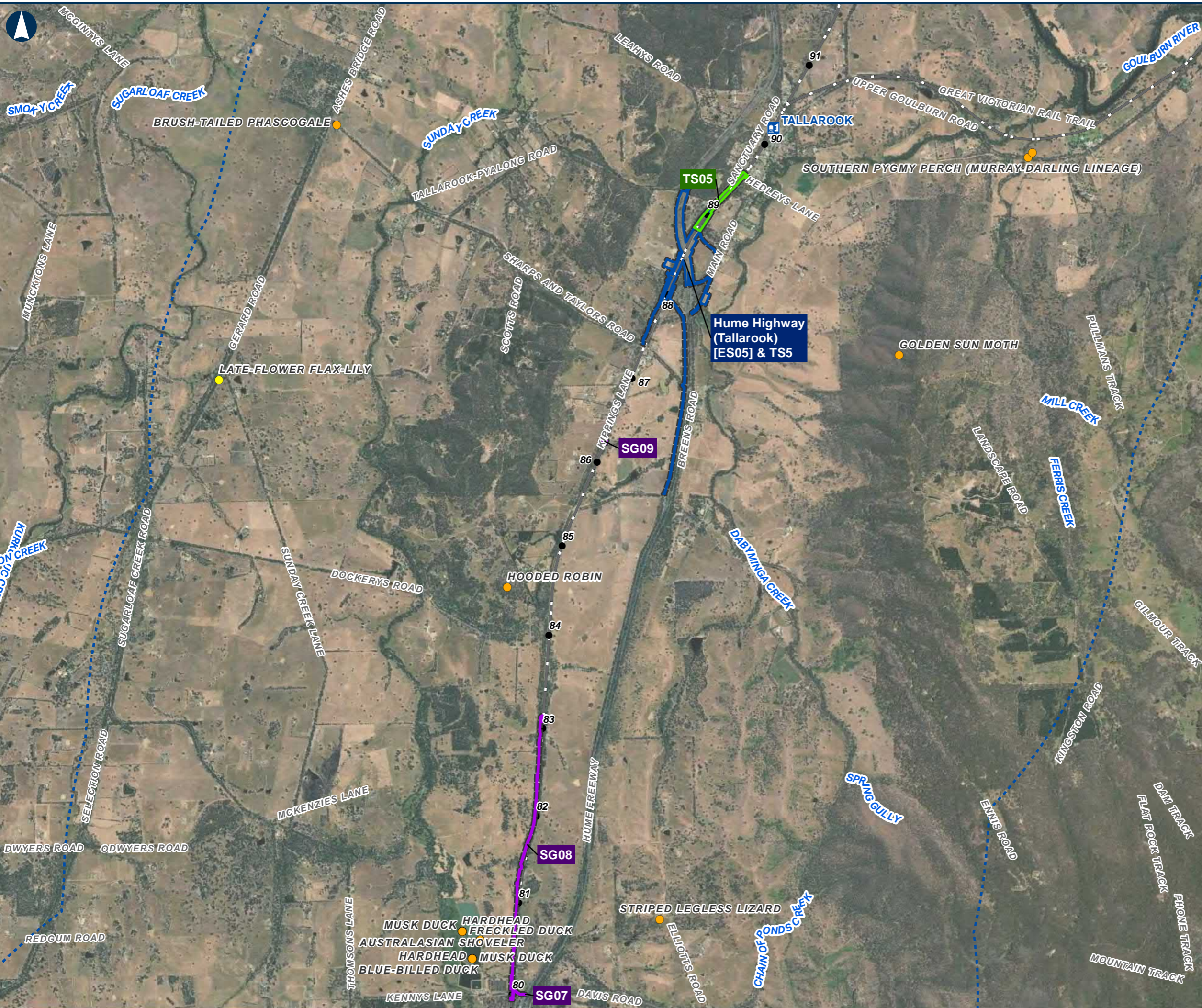
0 910 1,820 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:40,000  
 Data Sources: DELWP (2020) Figure 7





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**VBA Records**  
MAP 4 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- Signal Gantry
- Track Slew
- 15m buffer
- Train Station
- KM Posts
- Railway



0 910 1,820 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:40,000  
 Data Sources: DELWP (2020) Figure 7



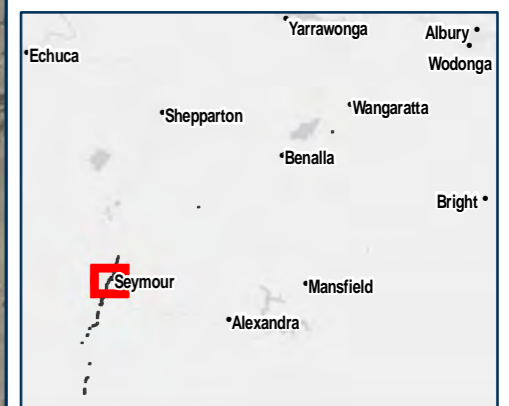
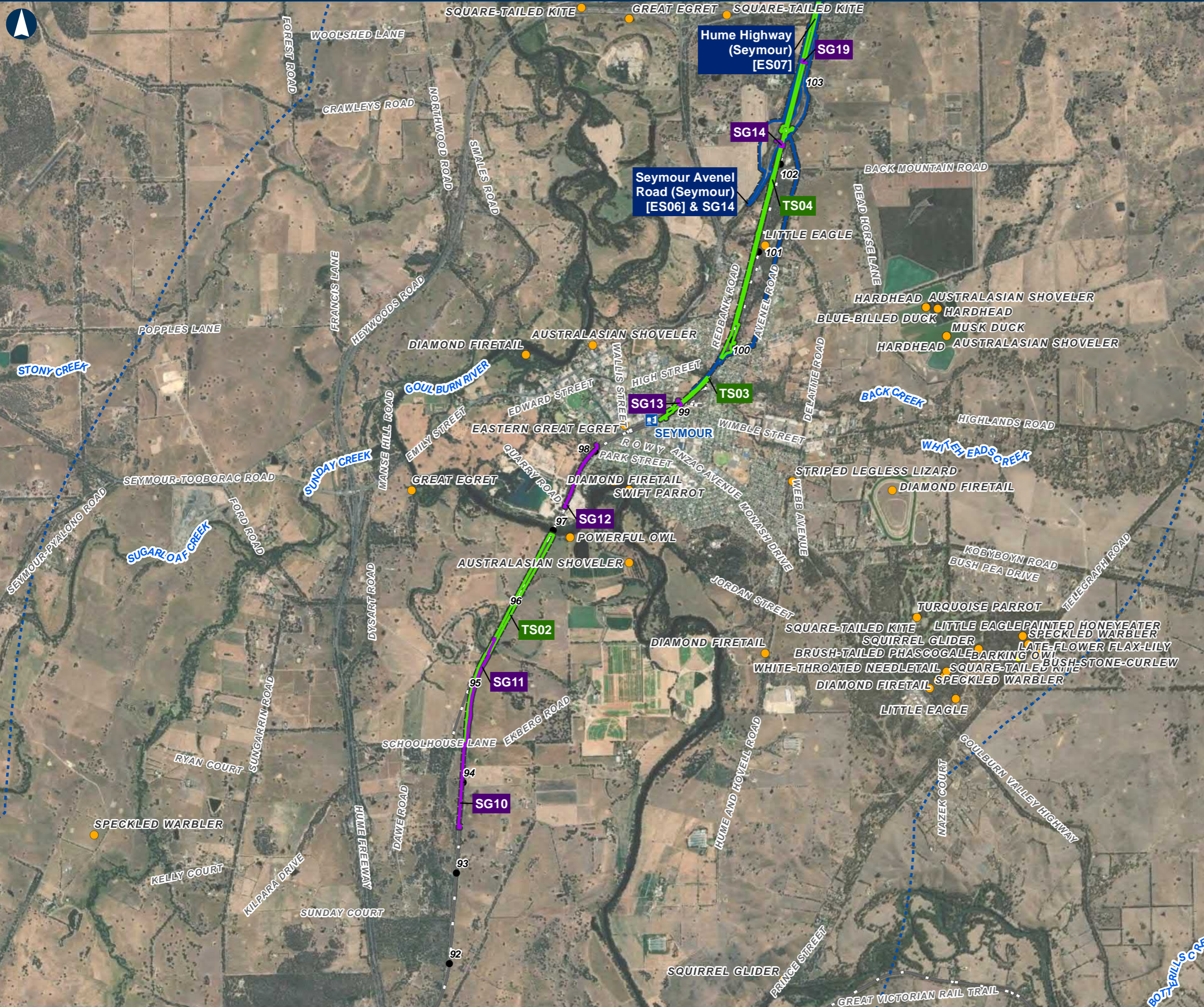


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**VBA Records**

MAP 5 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- Signal Gantry
- Track Slew
- 15m buffer
- + Train Station
- KM Posts
- Railway



0 910 1,820 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:40,000  
 Data Sources: DELWP (2020) Figure 7











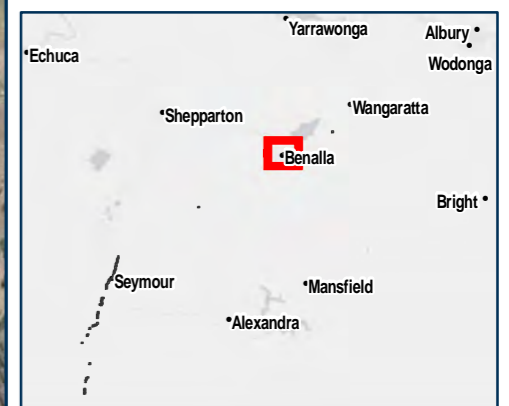
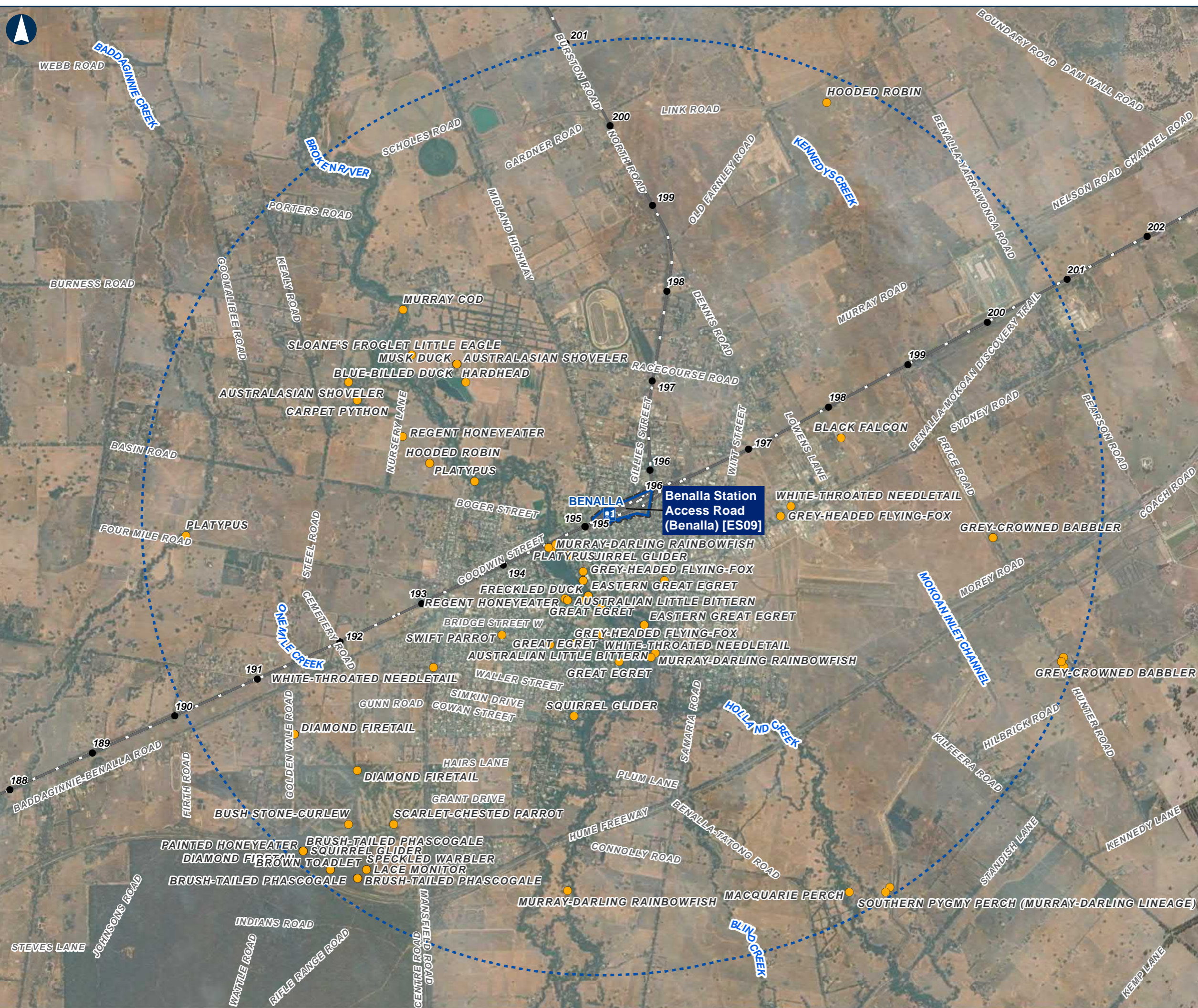


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**VBA Records**

MAP 8 OF 11

- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- 15m buffer
- 1 Train Station
- KM Posts
- Railway



Coordinate System: GDA 1994 MGA Zone 55

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 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:40,000  
 Figure 7



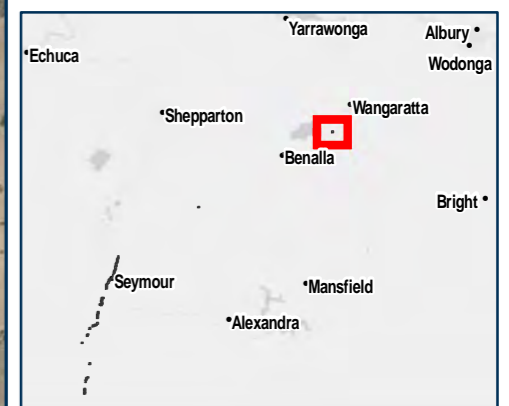
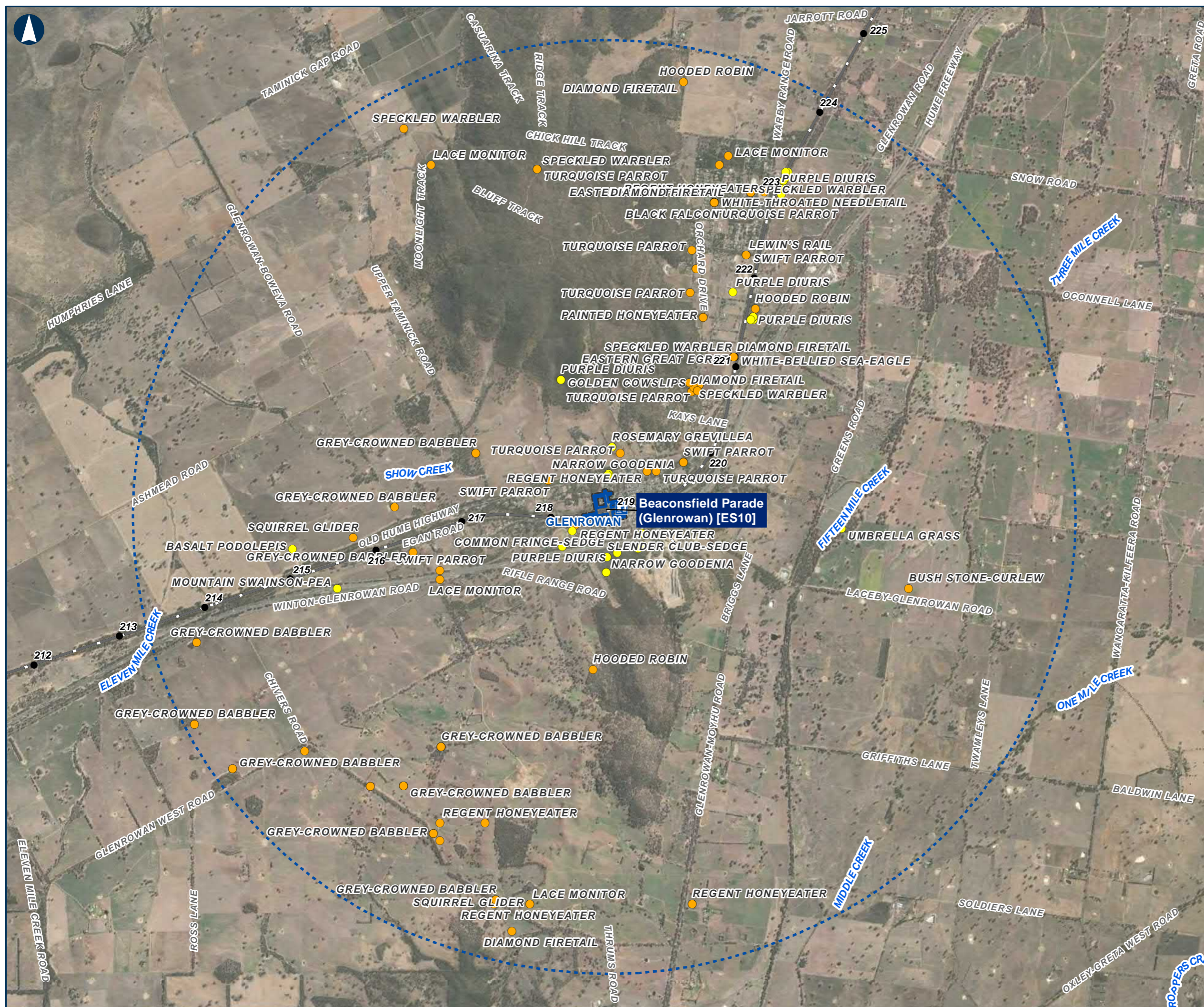


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**VBA Records**

MAP 9 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- 15m buffer
- 1 Train Station
- KM Posts
- Railway



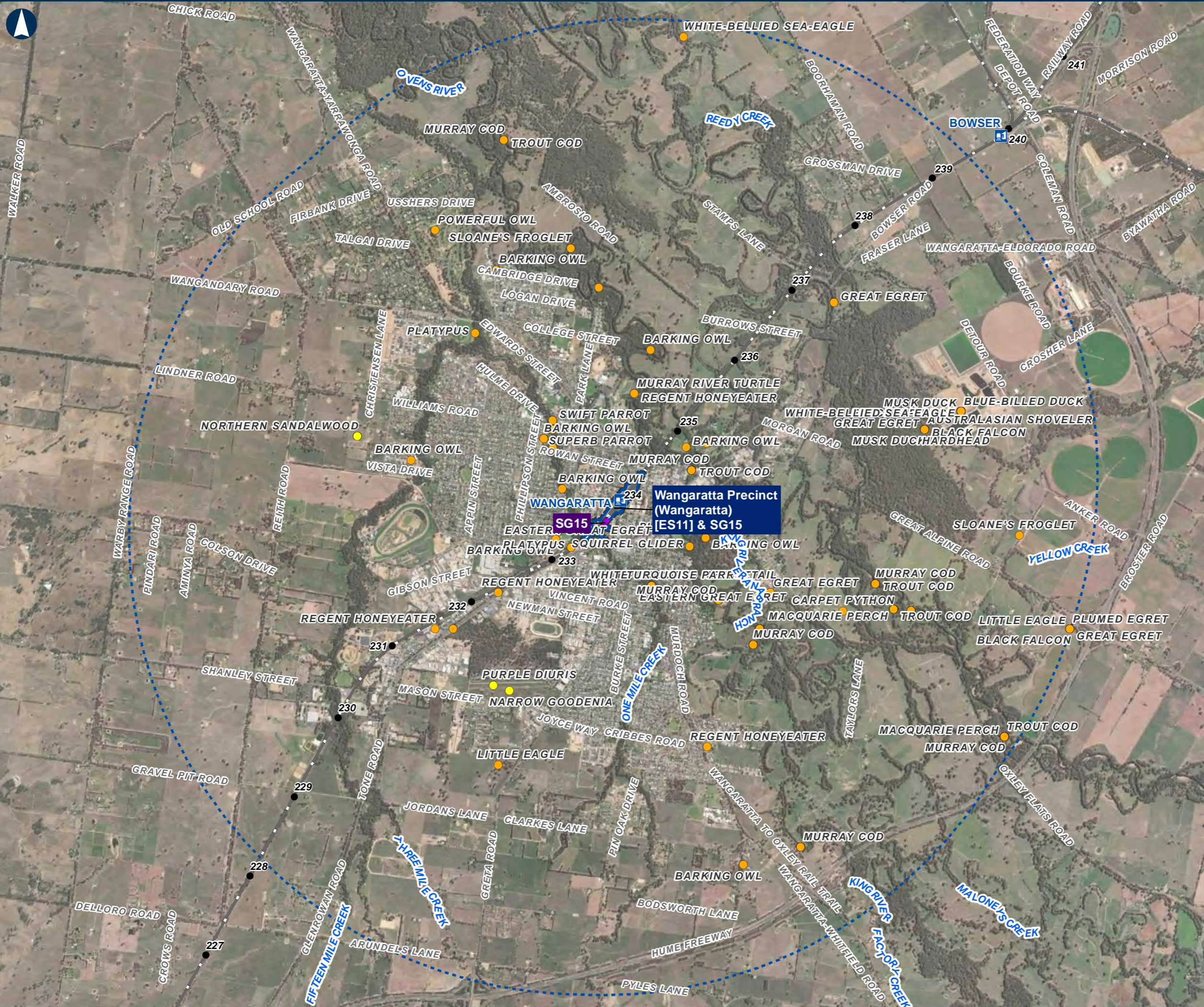
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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:40,000  
 Figure 7

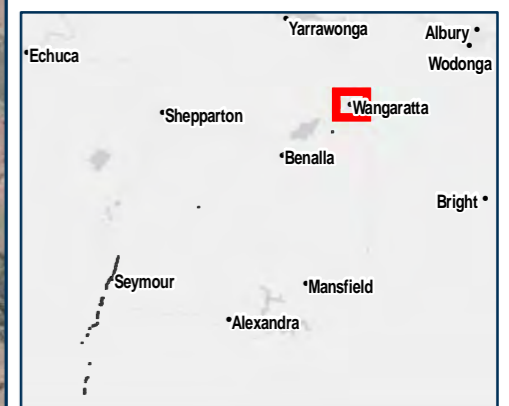




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**VBA Records**  
MAP 10 OF 11

- VBA Flora Records
- VBA Fauna Records
- 5km Buffer
- Enhancement Site
- Signal Gantry
- 15m buffer
- + Train Station
- KM Posts
- Railway



0 910 1,820 Meters

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Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:40,000  
Figure 7







## Appendix A – Figures

Figure 8 Native vegetation





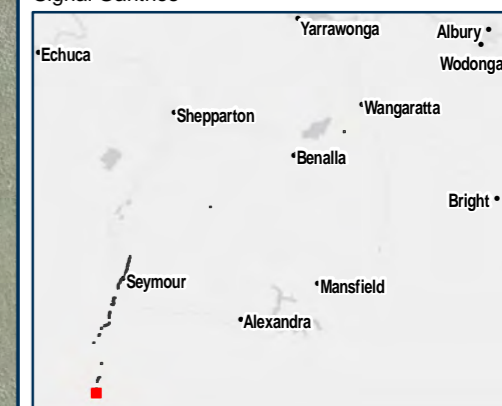
**Native Vegetation**

MAP 1 OF 58

- Signal Gantry
- 15m buffer
- Train Station
- KM Posts
- Railway
- Bioregion

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 13/08/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,500  
 Figure 8







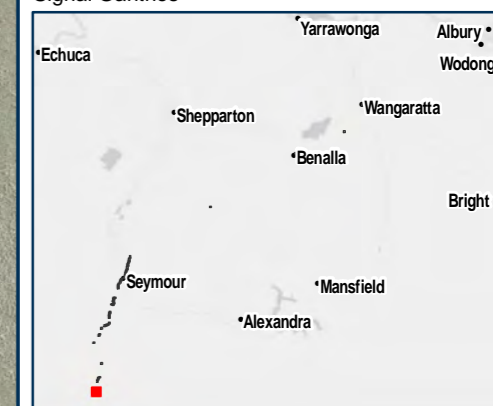
**Native Vegetation**

MAP 2 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Bioregion

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8












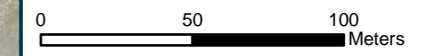
**Native Vegetation**

MAP 3 OF 58

-  Signal Gantry
-  15m buffer
-  KM Posts
-  Railway
-  Bioregion

- E=Endangered
- D=Depleted
- V=vulnerable
- ND= Not described

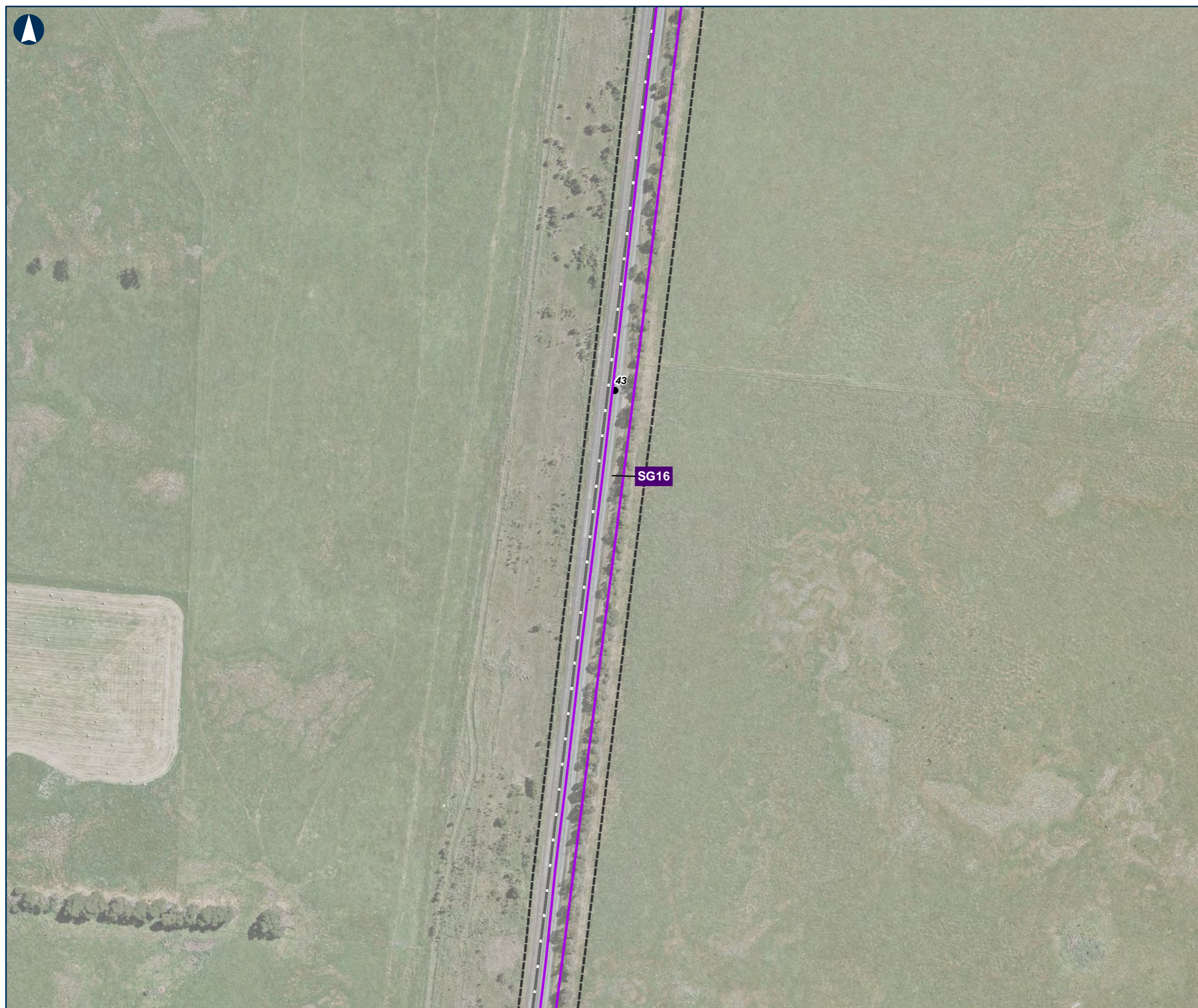
Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB      Scale: 1:2,500  
 Data Sources: DELWP (2020)      Figure 8











**Native Vegetation**

MAP 4 OF 58

-  Signal Gantry
-  15m buffer
-  Railway
-  Bioregion

- E=Endangered
- D=Depleted
- V=vulnerable
- ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

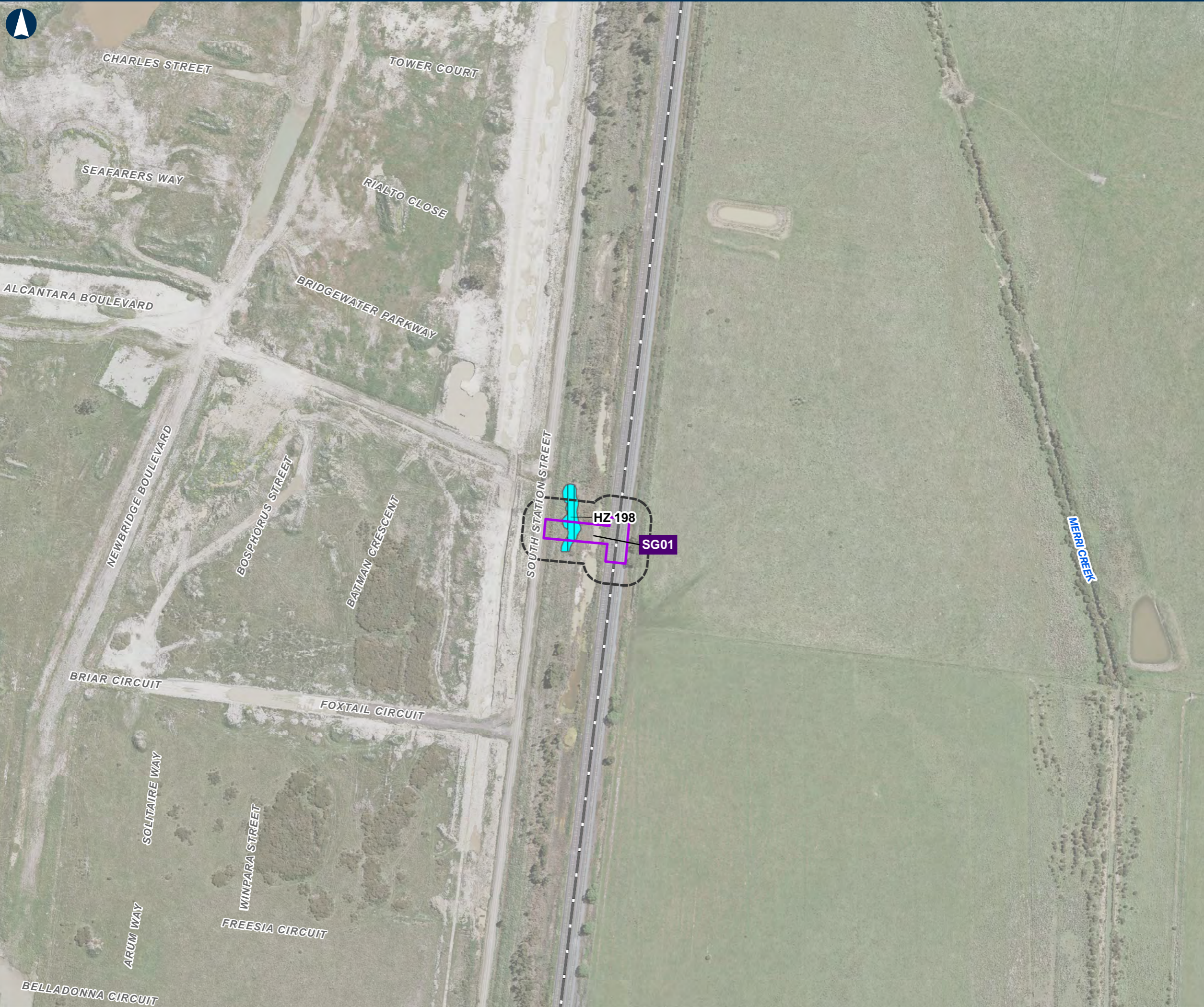
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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8












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### Native Vegetation

MAP 5 OF 58

-  Signal Gantry
-  15m buffer
-  Railway
-  Bioregion
- Ecological Vegetation Classes**
-  Swampy Riparian Woodland (83) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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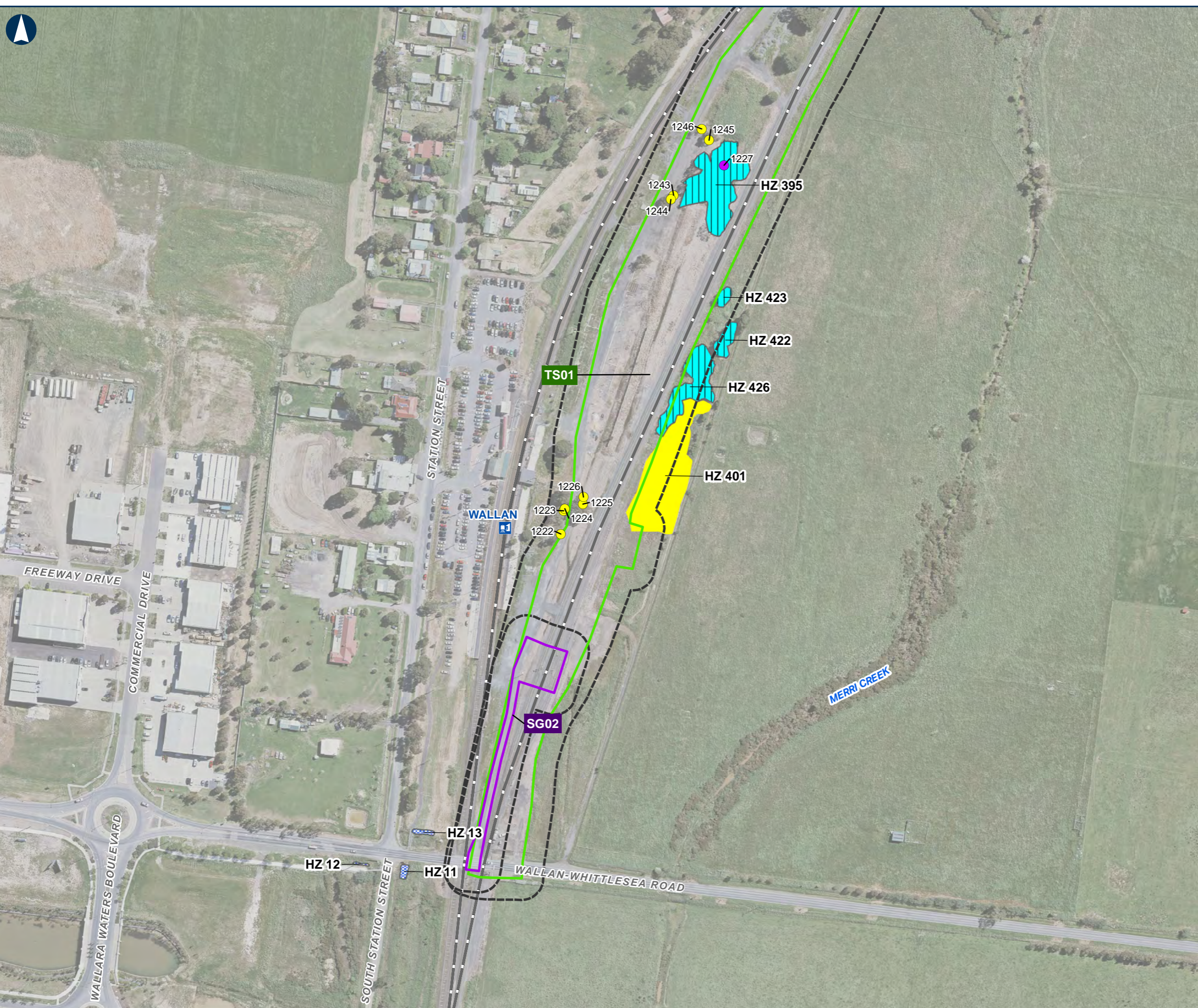
Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





**Native Vegetation**

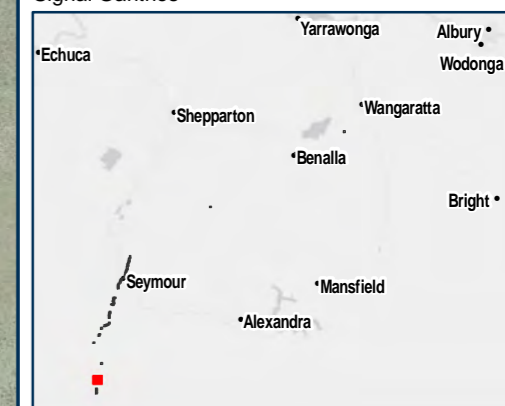
MAP 6 OF 58



- Signal Gantry
- Track Slew
- 15m buffer
- Train Station
- Railway
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Plains Grassland (132) (E)
- Swampy Riparian Woodland (83) (E)
- Tall Marsh (821) (D)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8

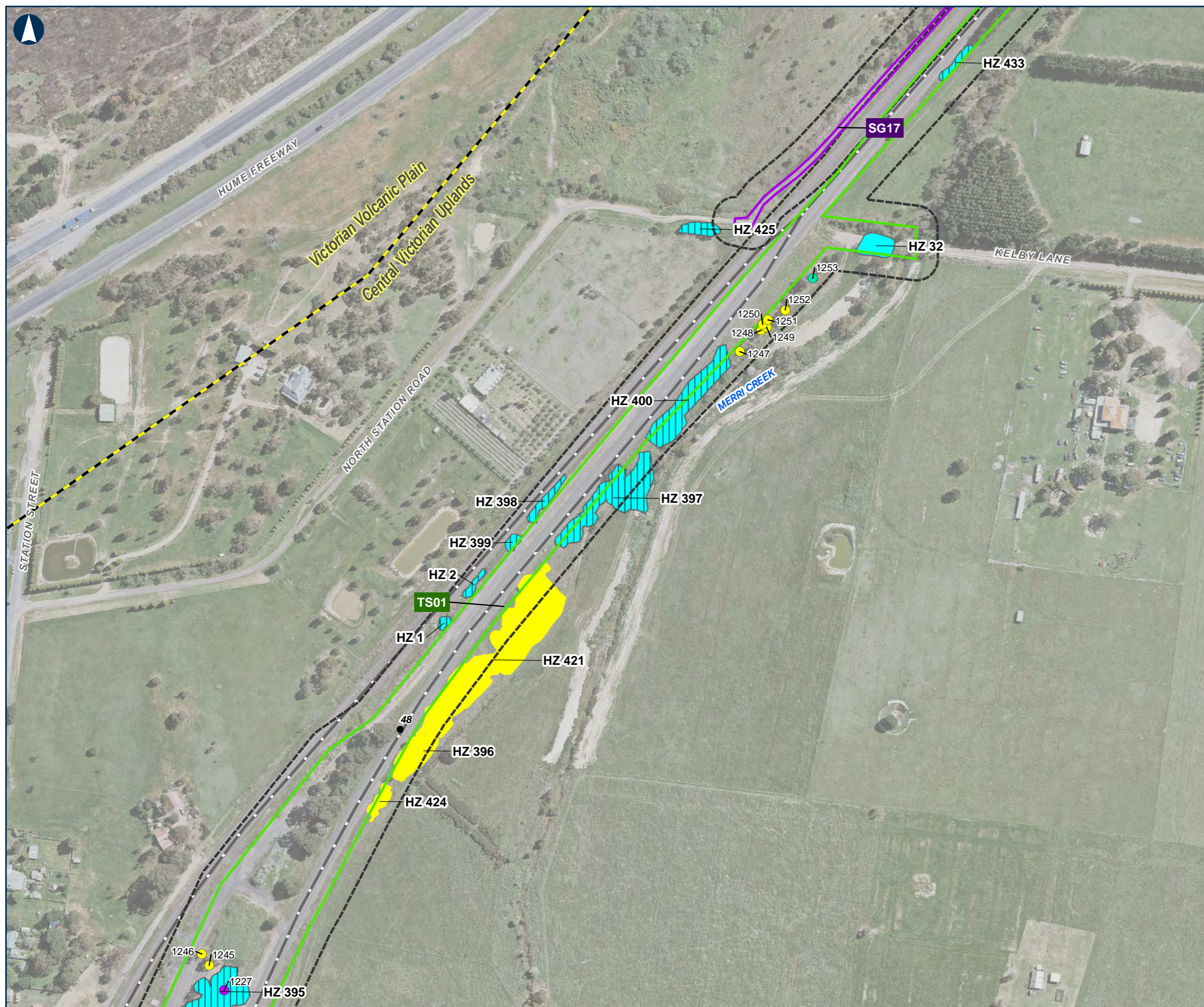




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**Native Vegetation**

MAP 7 OF 58



E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

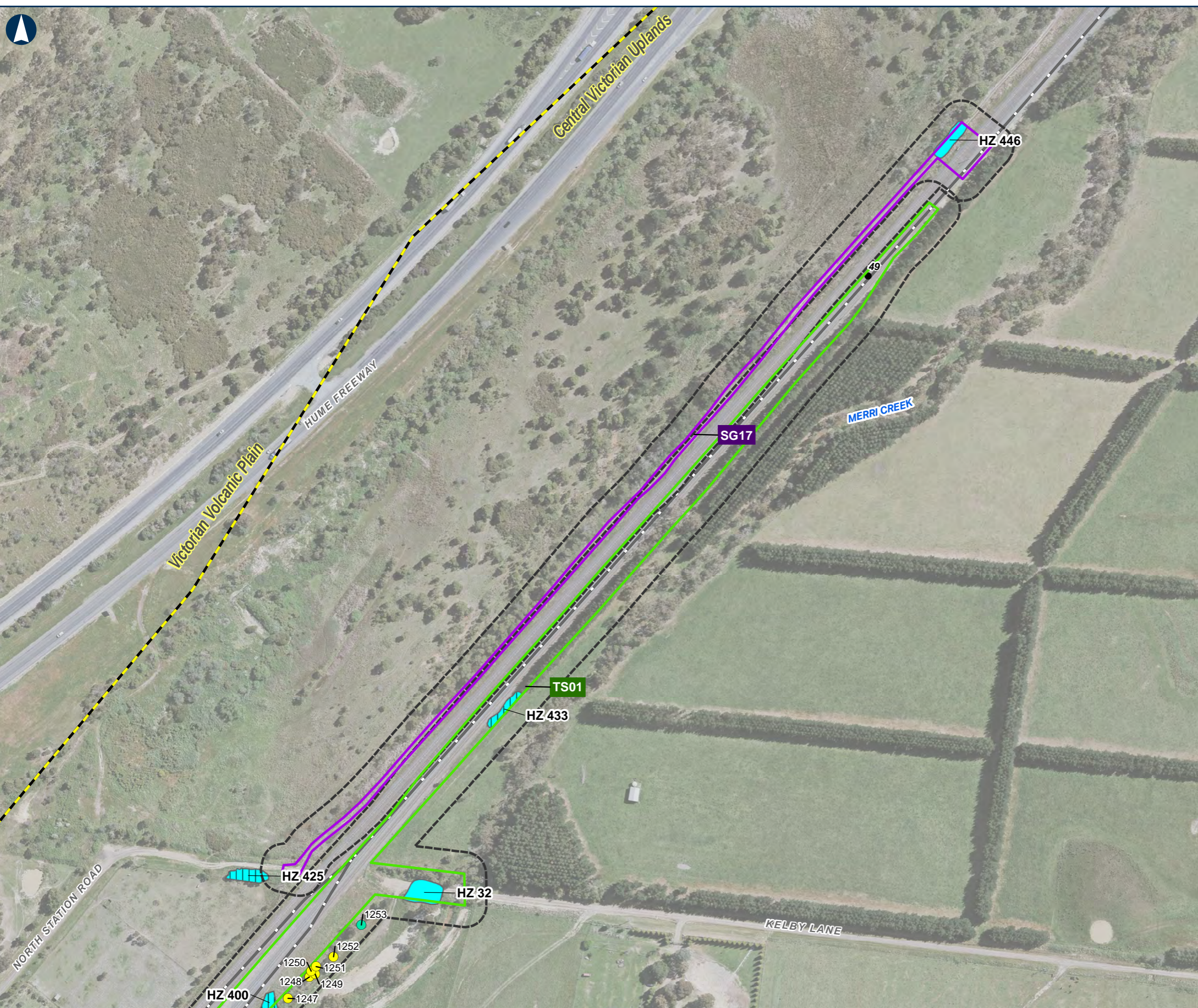
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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,500  
 Figure 8





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### Native Vegetation

MAP 8 OF 58

- Signal Gantry
- Track Slew
- 15m buffer
- KM Posts
- Railway
- Large Scattered Tree
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Riparian Forest (18) (V)
- Swampy Riparian Woodland (83) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

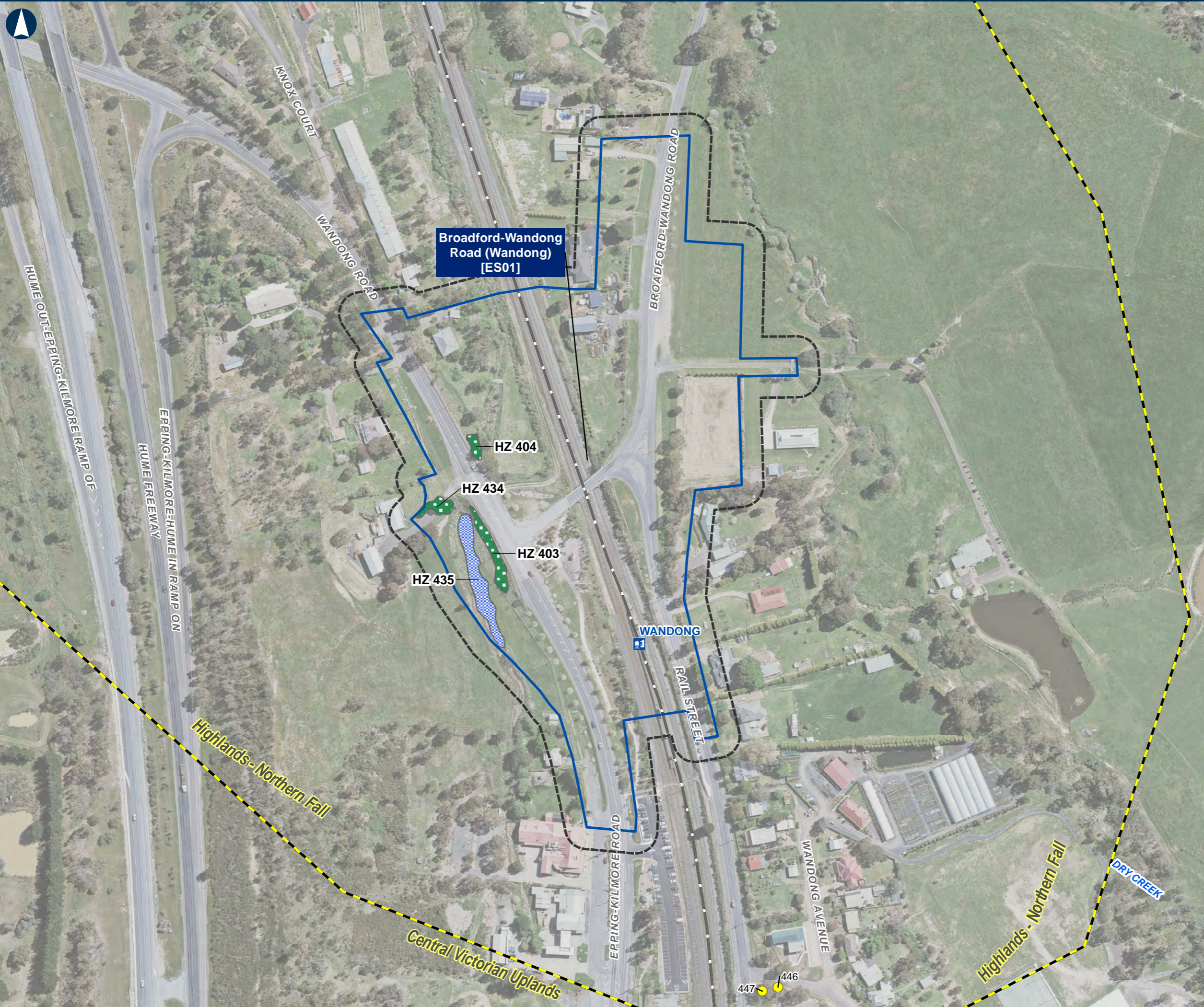
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Date: 13/08/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,500  
Figure 8





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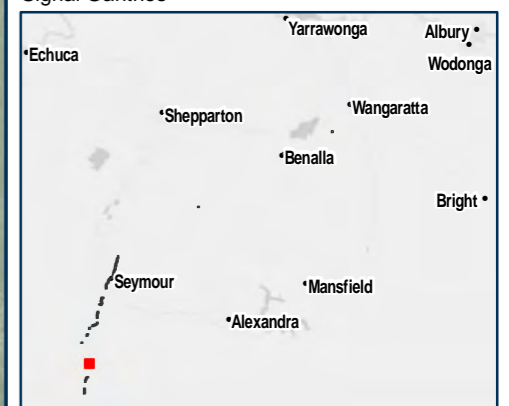
**Native Vegetation**

MAP 9 OF 58

- Enhancement Site
- 15m buffer
- Train Station
- Railway
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Tall Marsh (821) (D)
- Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





**Native Vegetation**

MAP 10 OF 58



- Signal Gantry
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
  - Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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DRY CREEK

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### Native Vegetation

MAP 11 OF 58

- Signal Gantry
  - 15m buffer
  - KM Posts
  - Railway
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)
  - Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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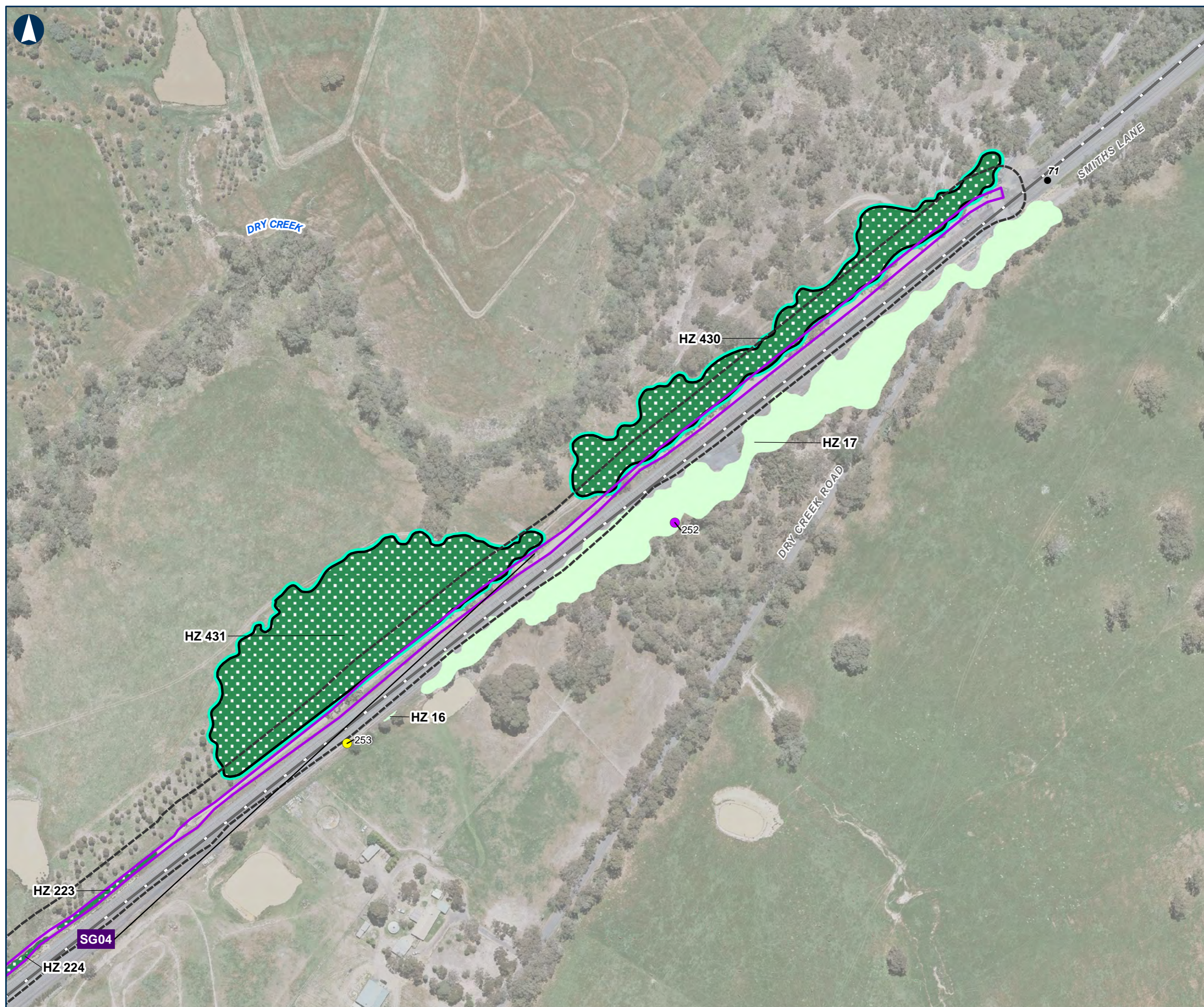




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**Native Vegetation**

MAP 12 OF 58



- Signal Gantry
  - 15m buffer
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
  - Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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 Author: JB  
 Data Sources: DELWP (2020)

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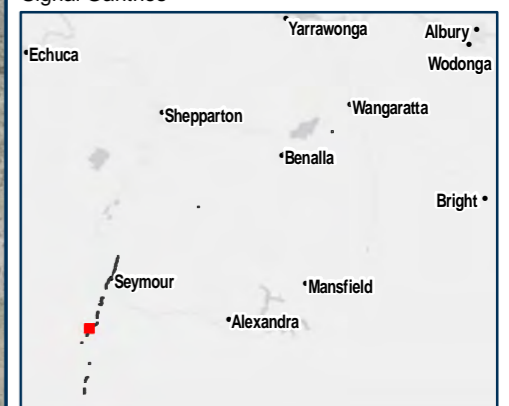
### Native Vegetation

MAP 13 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Large Tree in Patch
- Bioregion
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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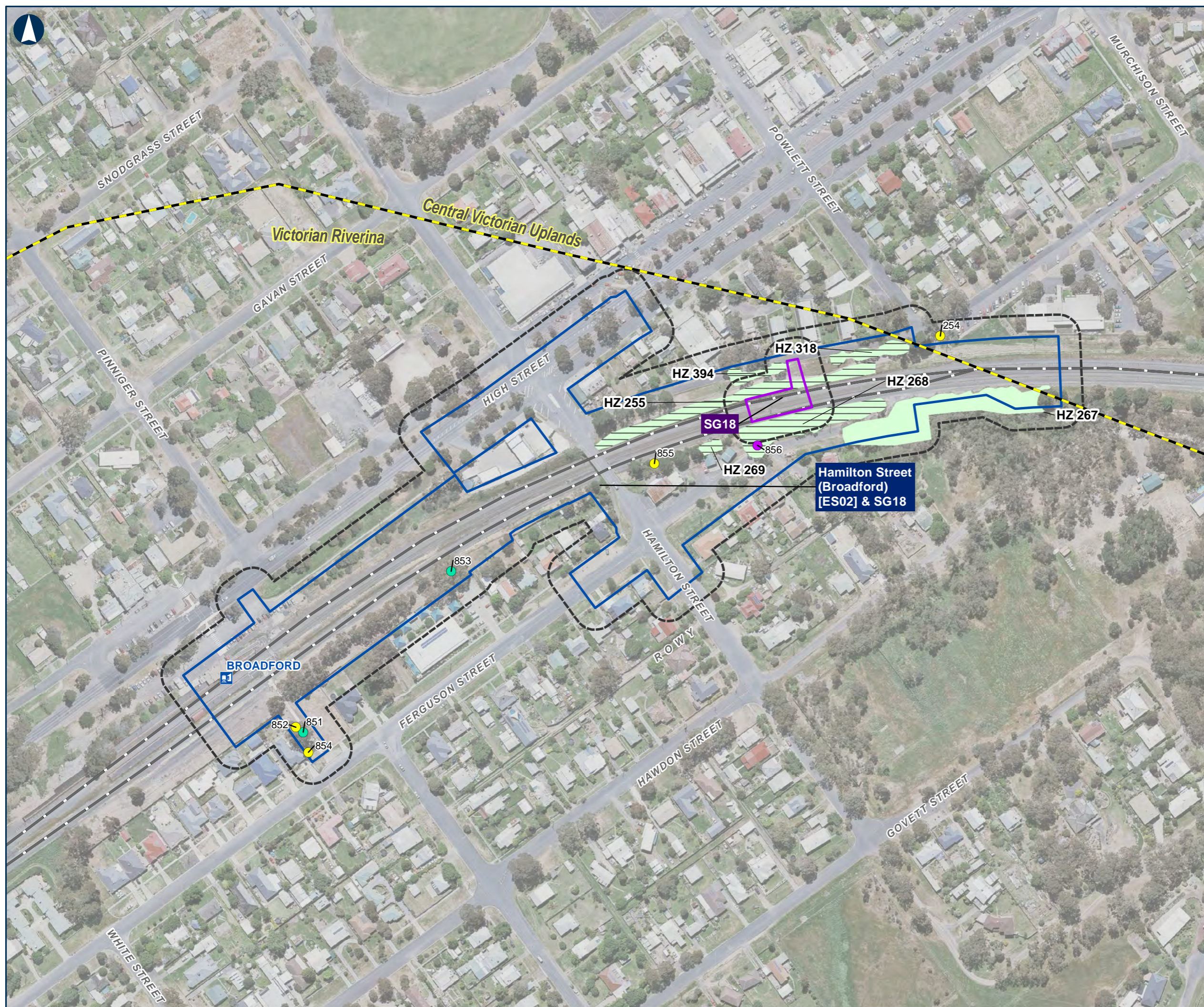
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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





**Native Vegetation**

MAP 14 OF 58



- Enhancement Site
- Signal Gantry
- 15m buffer
- Train Station
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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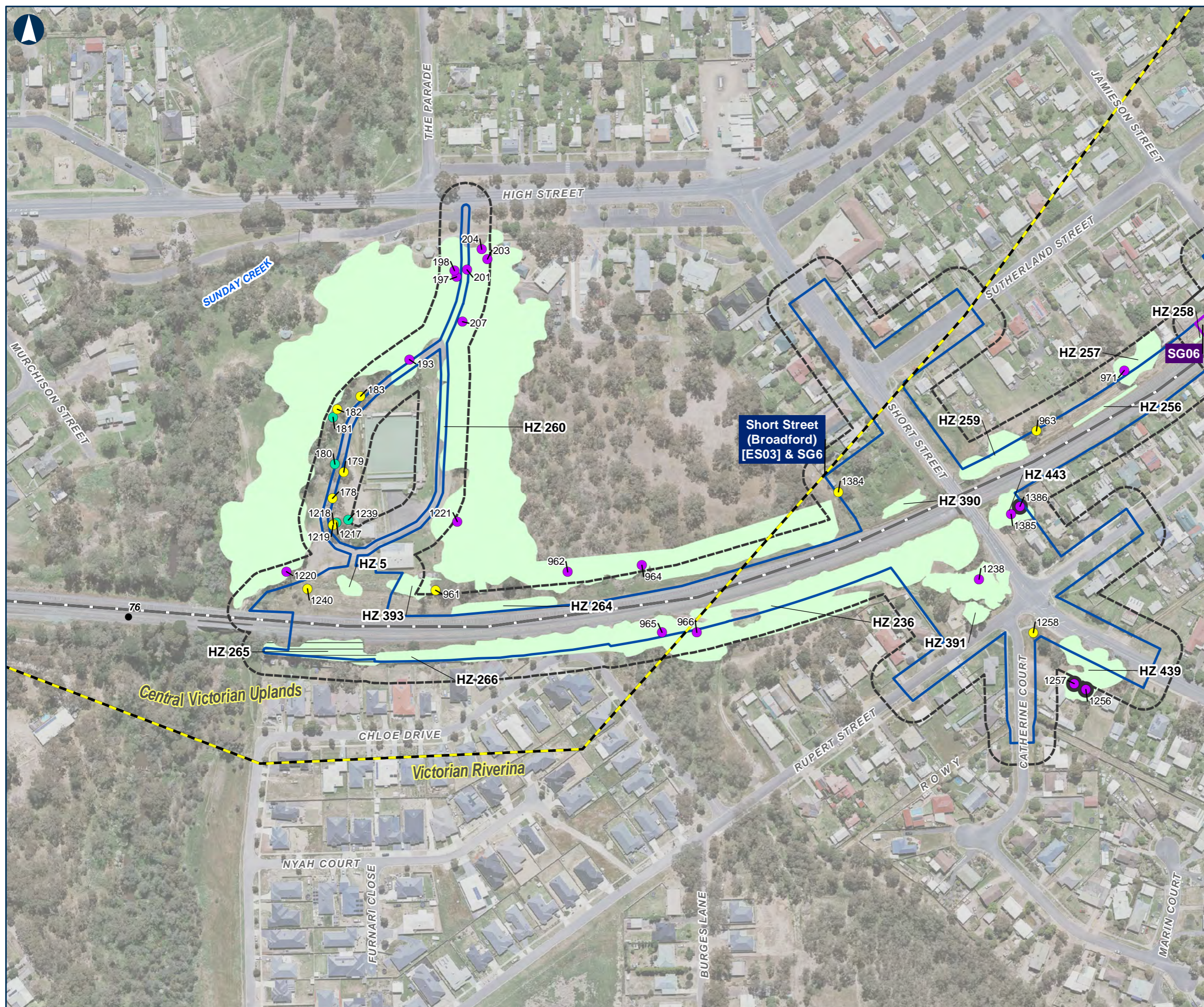




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**Native Vegetation**

MAP 15 OF 58



- Enhancement Site
  - Signal Gantry
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
  - Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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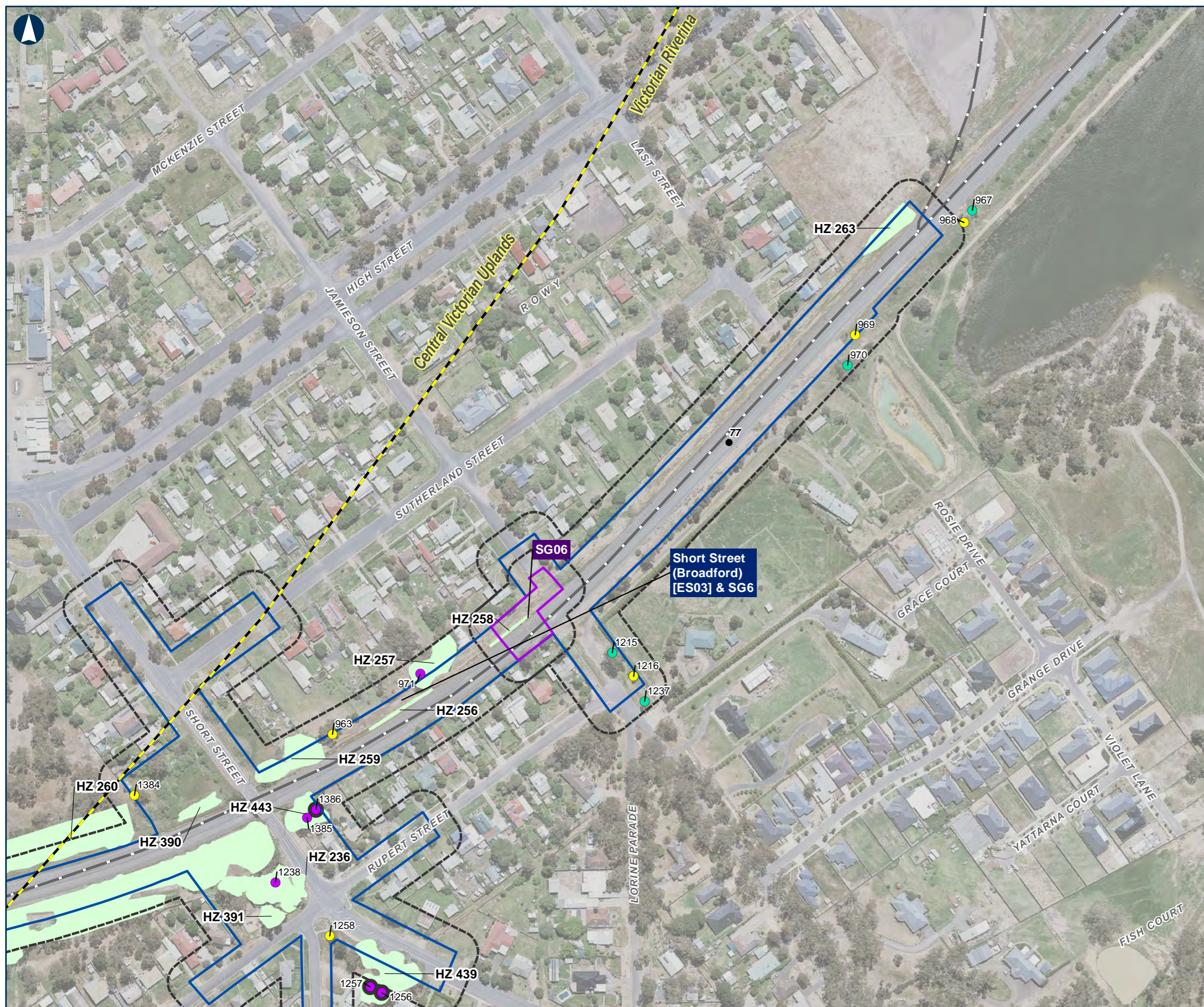




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**Native Vegetation**

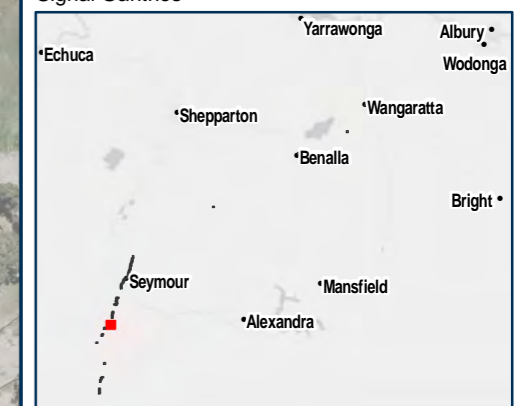
MAP 16 OF 58



- Enhancement Site
  - Signal Gantry
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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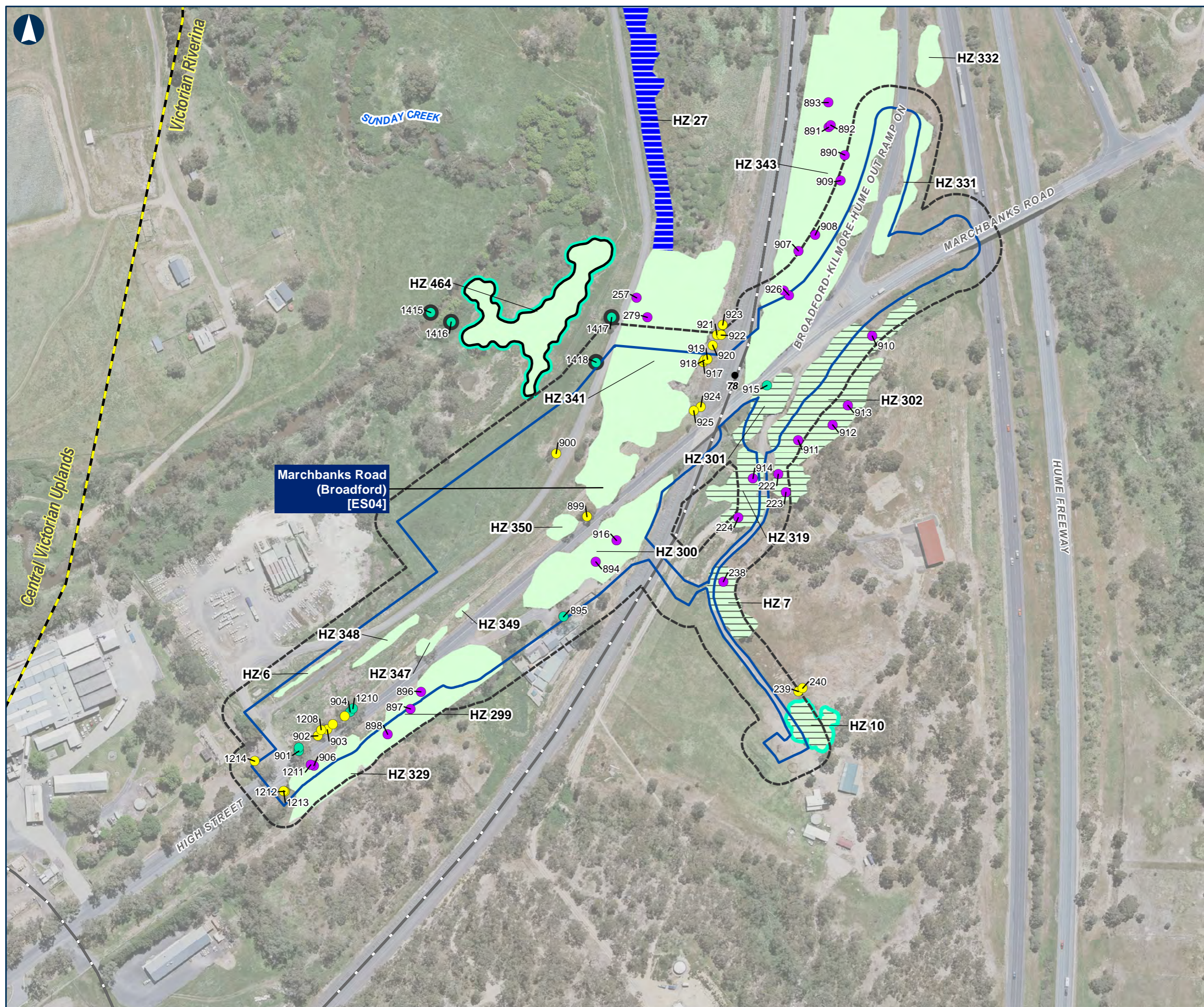




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**Native Vegetation**

MAP 17 OF 58



- Enhancement Site
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)
  - Red Gum Swamp (292) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



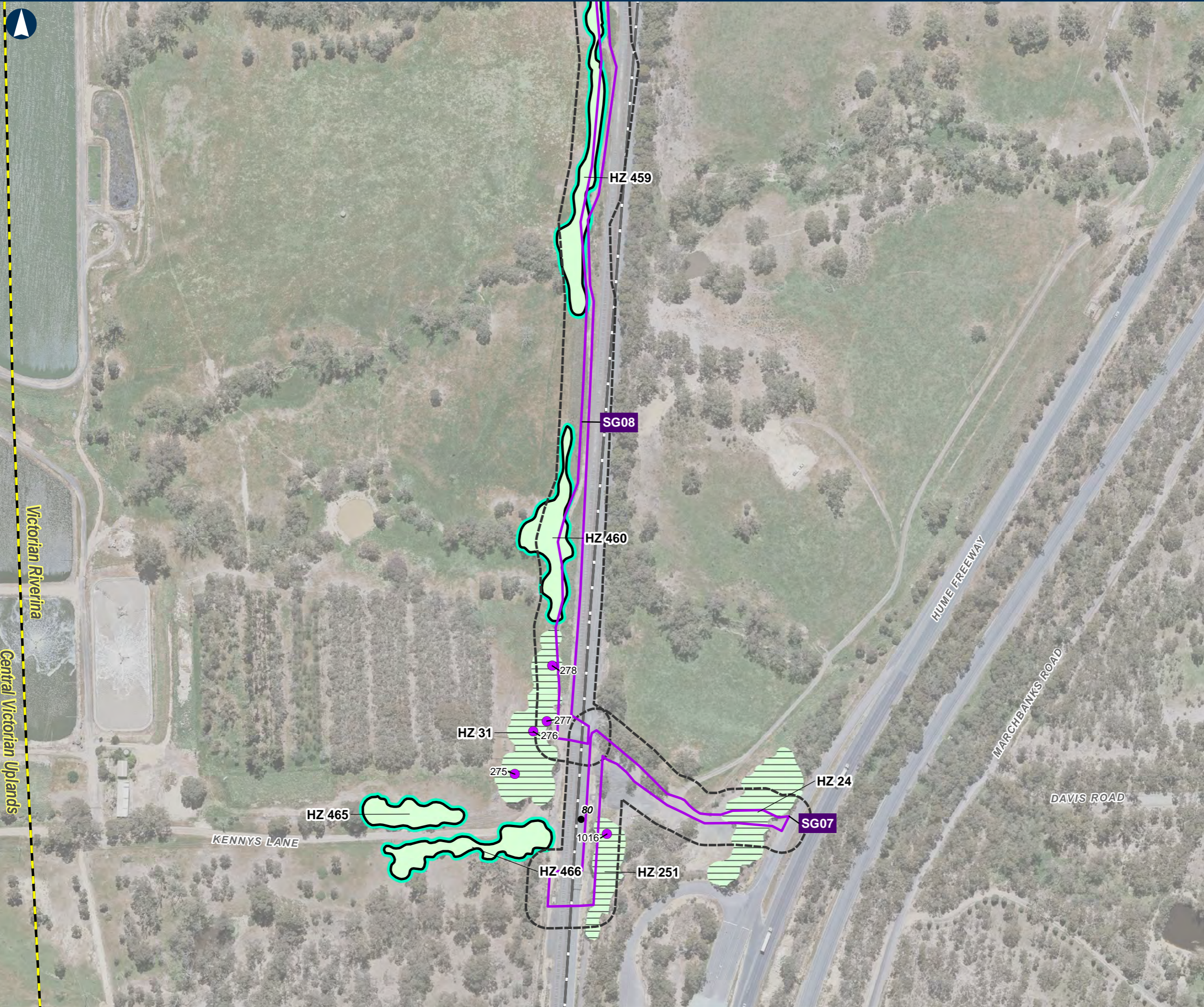
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Author: JB  
Data Sources: DELWP (2020)

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Scale: 1:2,500  
Figure 8





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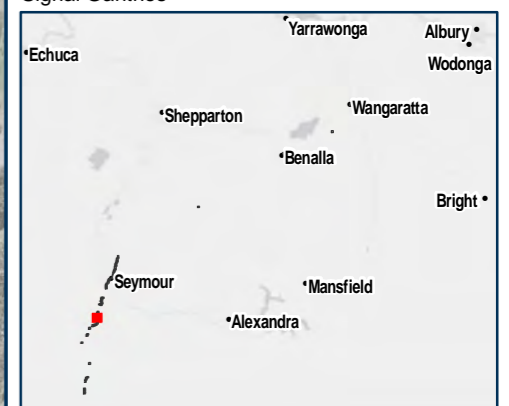
**Native Vegetation**

MAP 18 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Large Tree in Patch
- Bioregion
- Habitat Zones Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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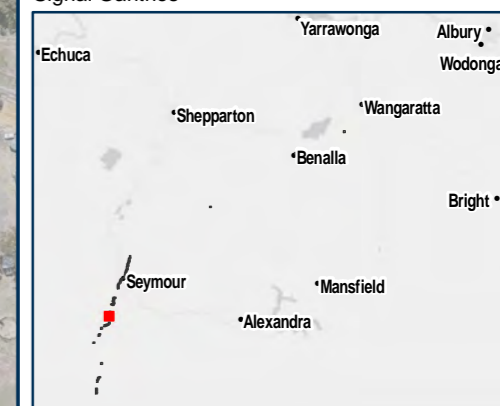
**Native Vegetation**

MAP 19 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Bioregion
- Habitat Zones Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

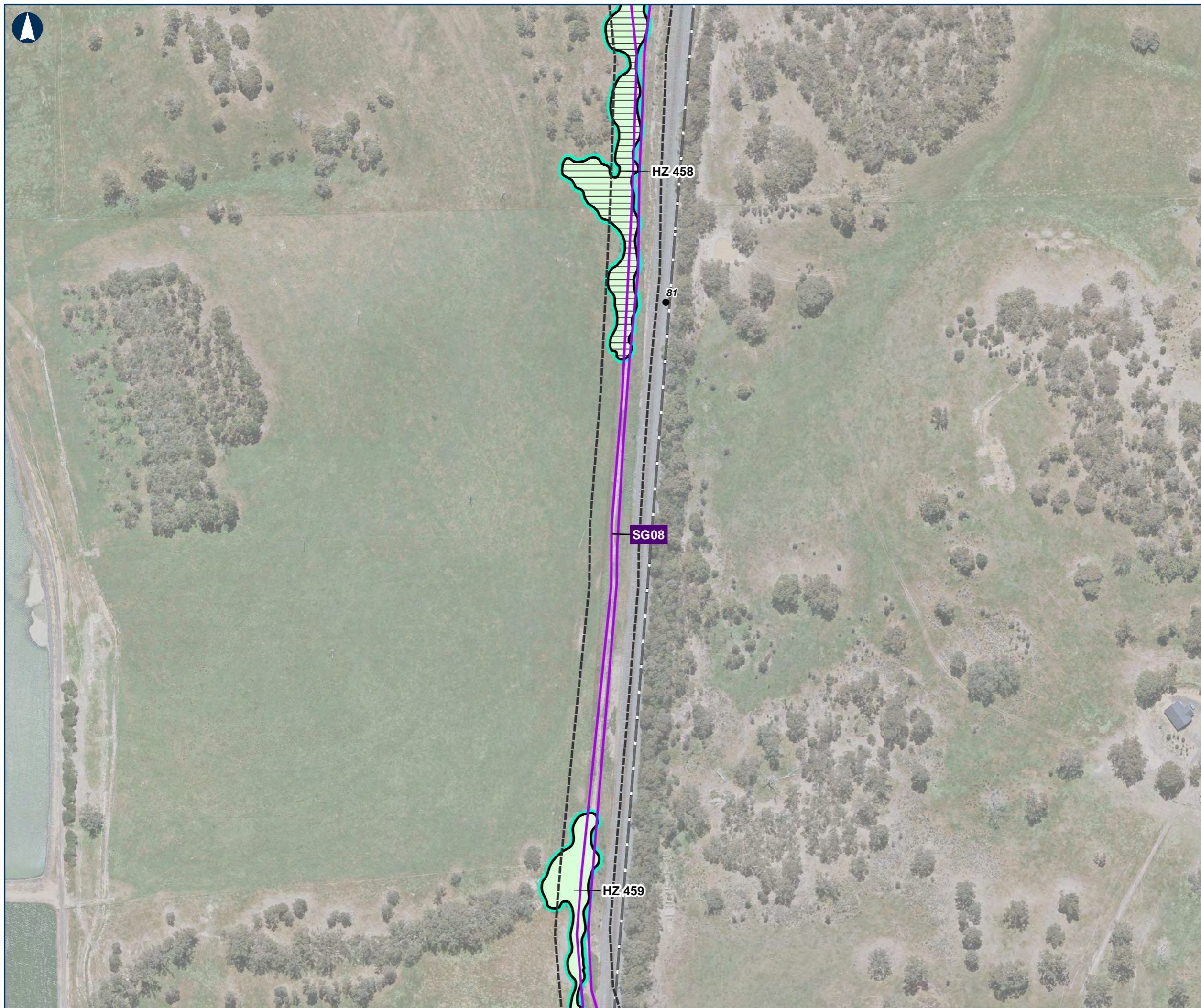


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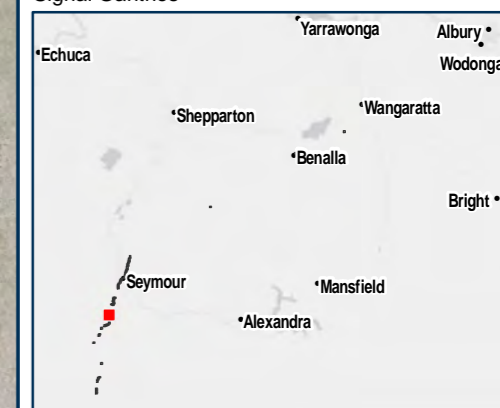
**Native Vegetation**

MAP 20 OF 58

-  Signal Gantry
-  15m buffer
-  Railway
-  Bioregion
-  Habitat Zones Desktop/No access
-  High Quality Native Vegetation
- Ecological Vegetation Classes**
-  Grassy Woodland (175) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

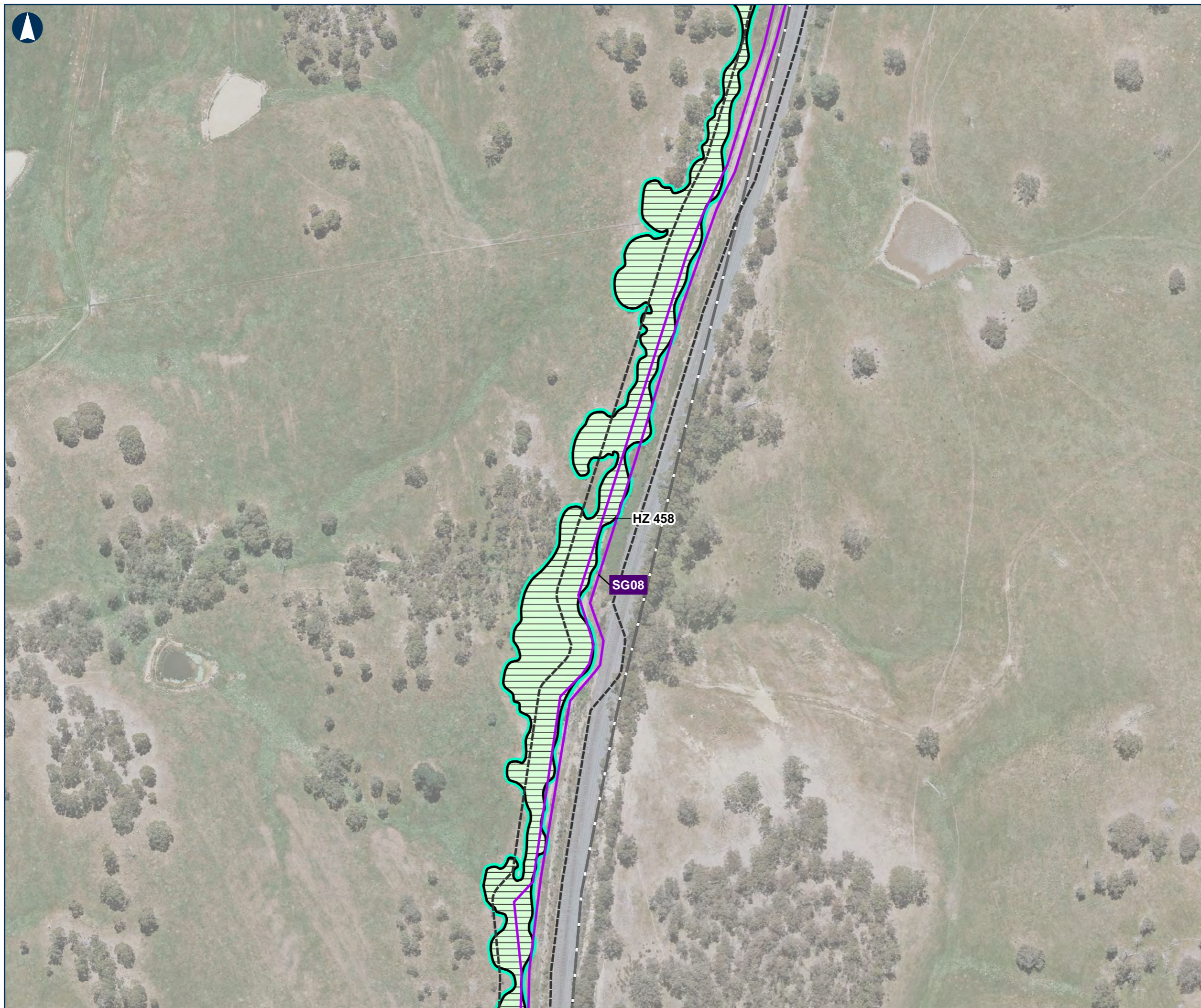


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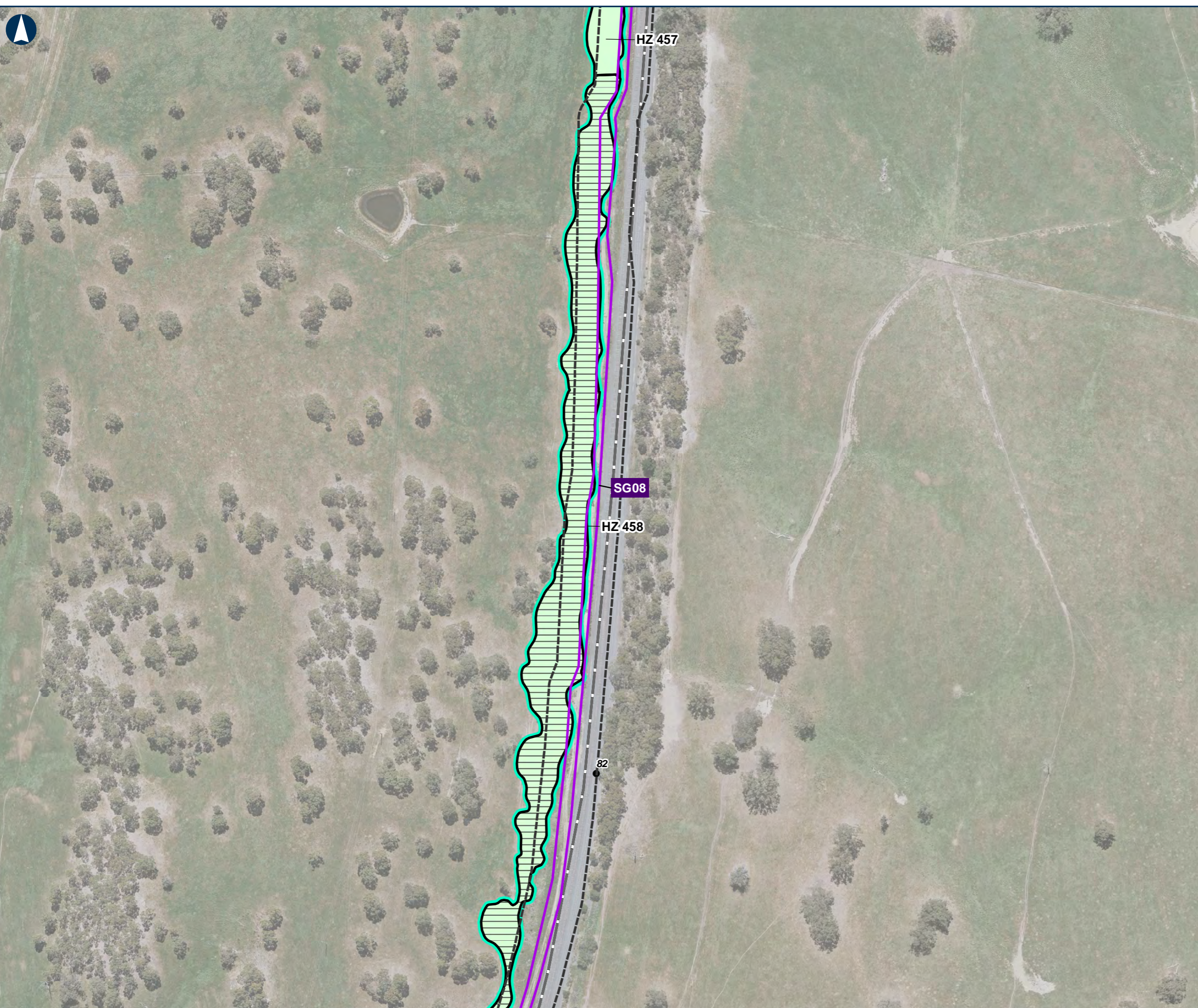
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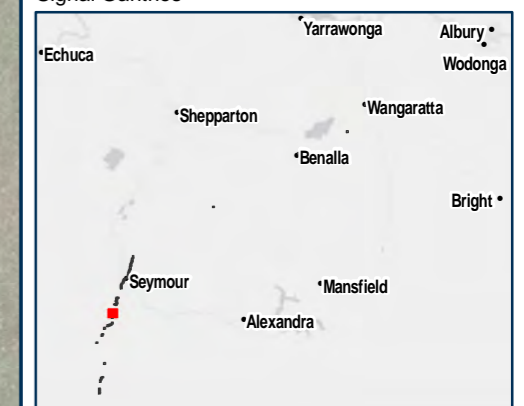
### Native Vegetation

MAP 21 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Bioregion
- Habitat Zones Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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

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Data Sources: DELWP (2020) Figure 8





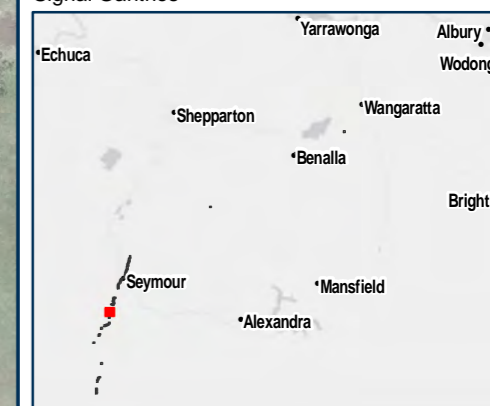
**Native Vegetation**

MAP 22 OF 58

-  Signal Gantry
-  15m buffer
-  KM Posts
-  Railway
-  Bioregion
-  Habitat Zones Desktop/No access
-  High Quality Native Vegetation
- Ecological Vegetation Classes**
-  Grassy Woodland (175) (E)
-  Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

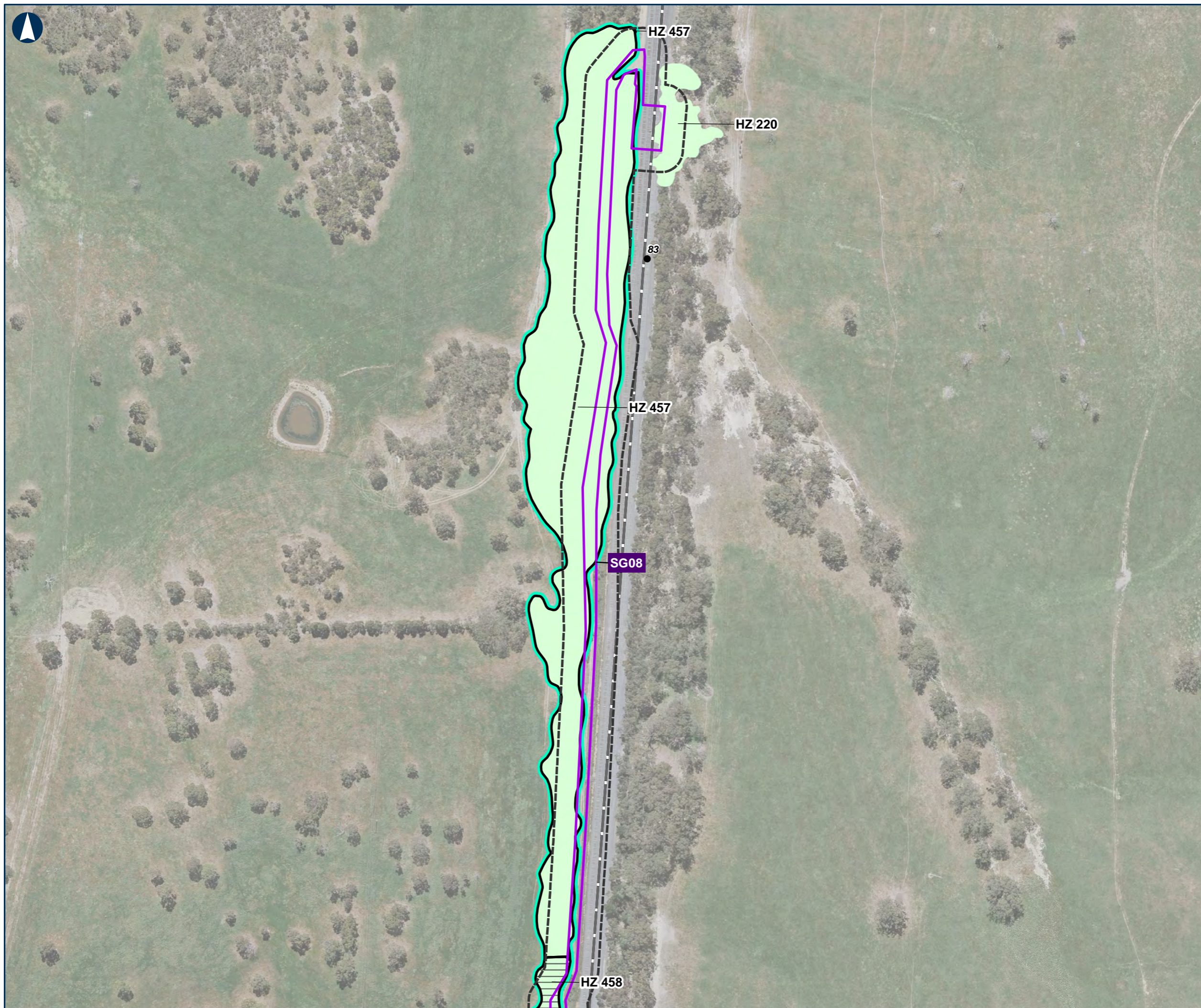


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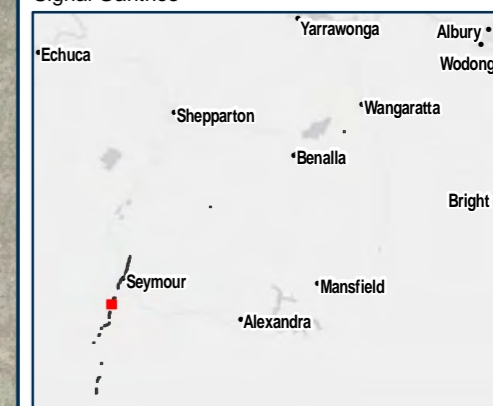
### Native Vegetation

MAP 23 OF 58

-  Signal Gantry
-  15m buffer
-  KM Posts
-  Railway
-  Large Scattered Tree
-  Large Tree in Patch
-  Bioregion
- Ecological Vegetation Classes**
-  Grassy Woodland (175\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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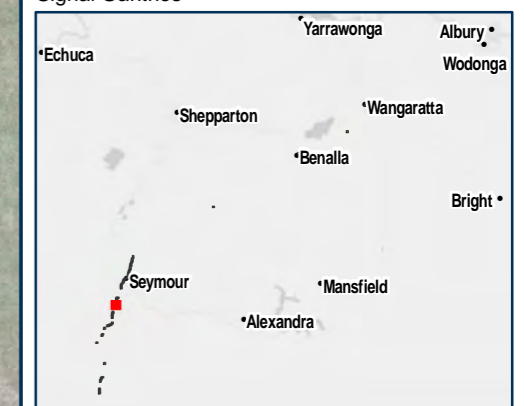
**Native Vegetation**

MAP 24 OF 58

- Enhancement Site
- 15m buffer
- Next Generation Cabling
- Bioregion
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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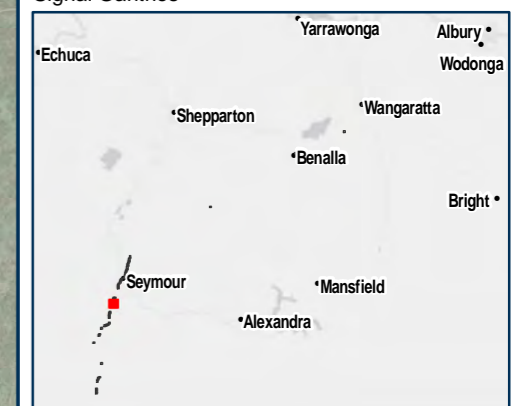
**Native Vegetation**

MAP 25 OF 58

- Enhancement Site
- 15m buffer
- Next Generation Cabling
- Bioregion
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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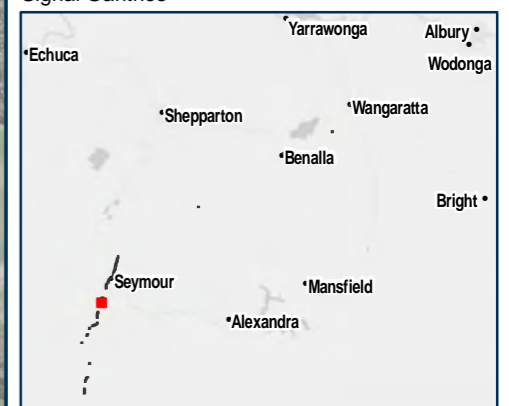
**Native Vegetation**

MAP 26 OF 58

- Enhancement Site
  - 15m buffer
  - Next Generation Cabling
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



Coordinate System: GDA 1994 MGA Zone 55

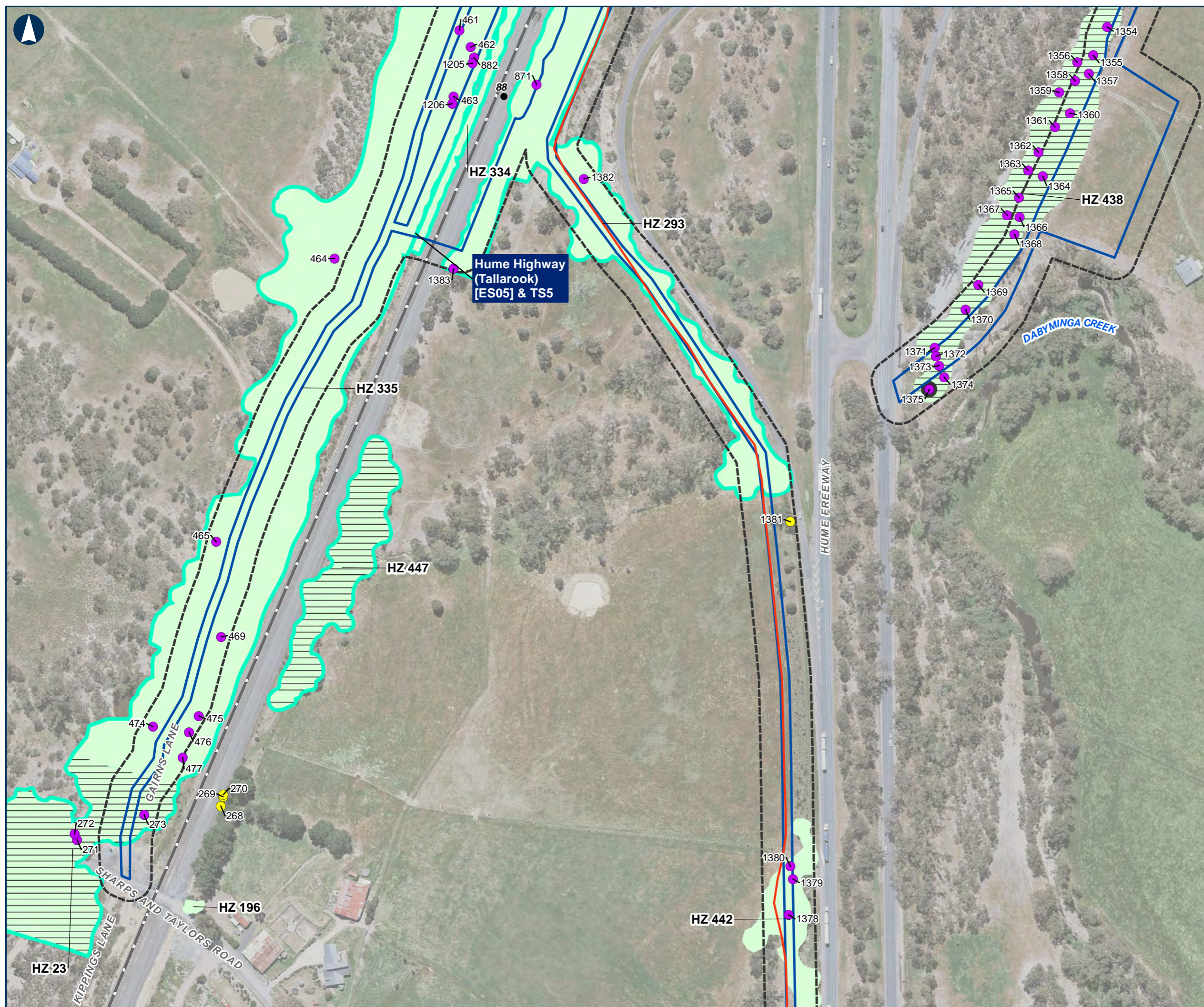
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**Native Vegetation**

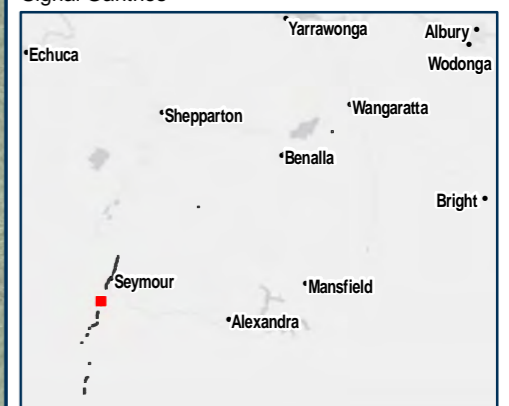
MAP 27 OF 58



- Enhancement Site
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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Coordinate System: GDA 1994 MGA Zone 55

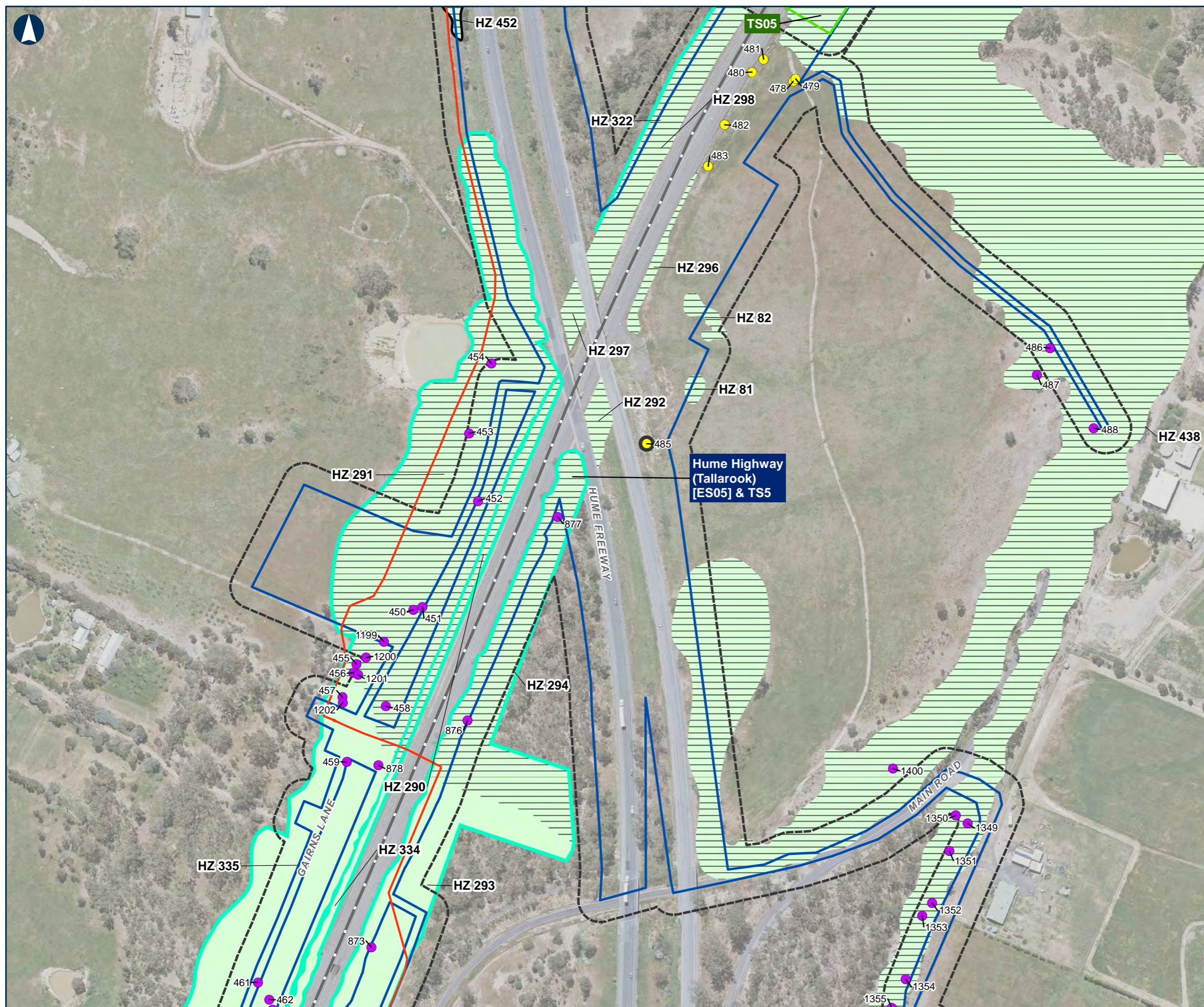
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**Native Vegetation**

MAP 28 OF 58



- Enhancement Site
  - Track Slew
  - 15m buffer
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Author: JB  
 Data Sources: DELWP (2020)

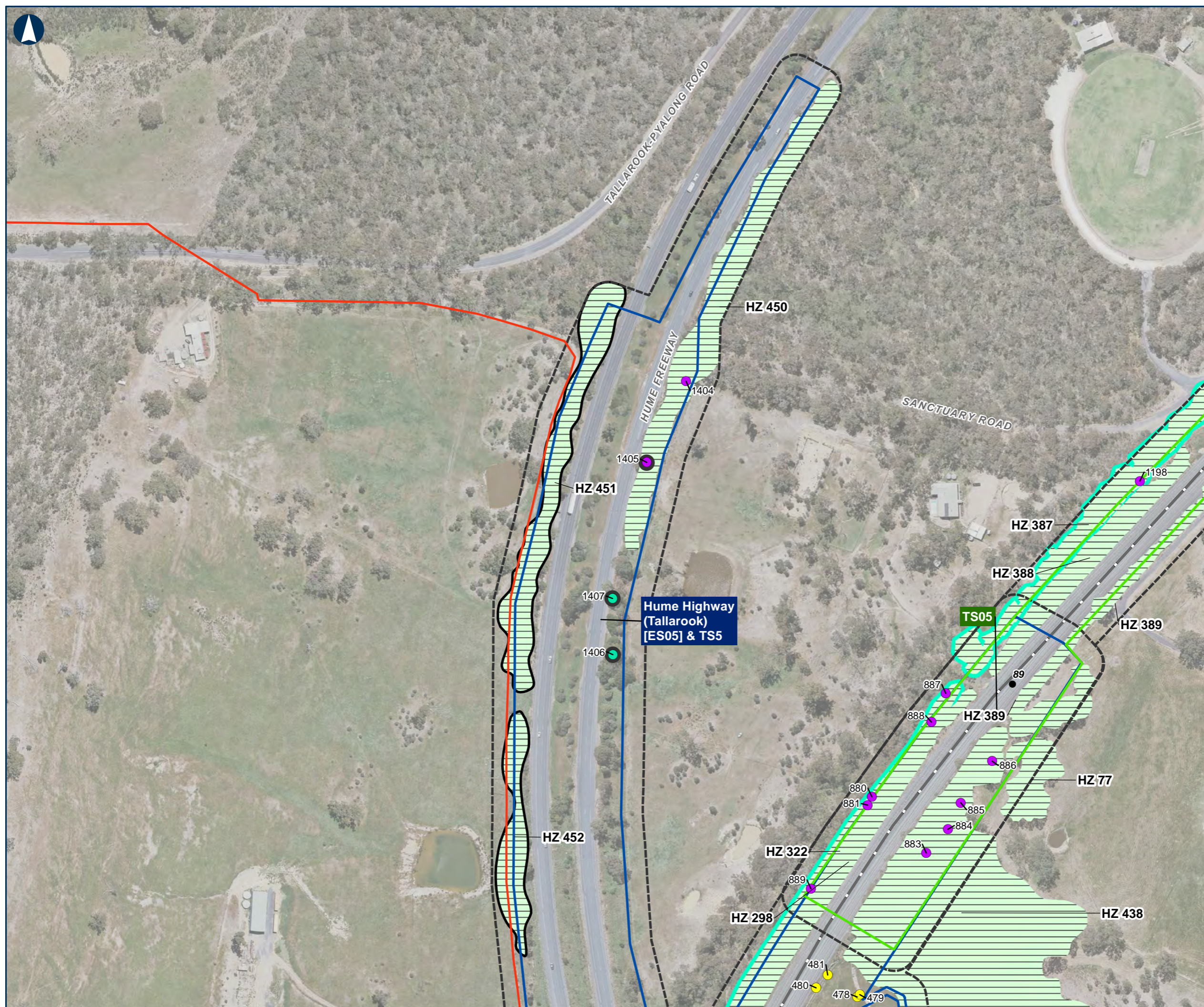
Paper: A3  
 Scale: 1:2,500  
 Figure 8





**Native Vegetation**

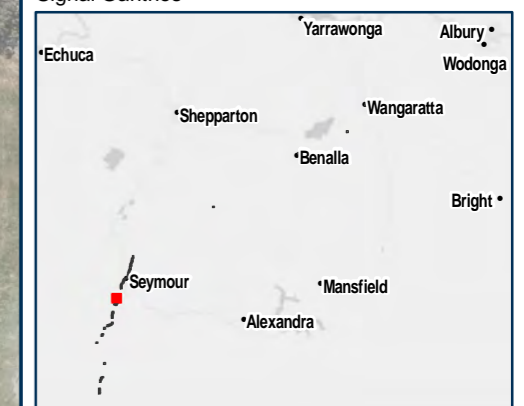
MAP 29 OF 58



- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





HUME FREEWAY

PIONEER STREET

SANCTUARY ROAD

GATEHOUSE LANE

MAIN ROAD

HEDLEYS LANE

DABYMINGA CREEK



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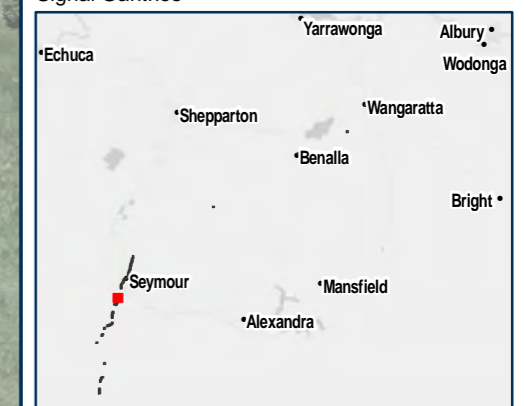
## Native Vegetation

MAP 30 OF 58

- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



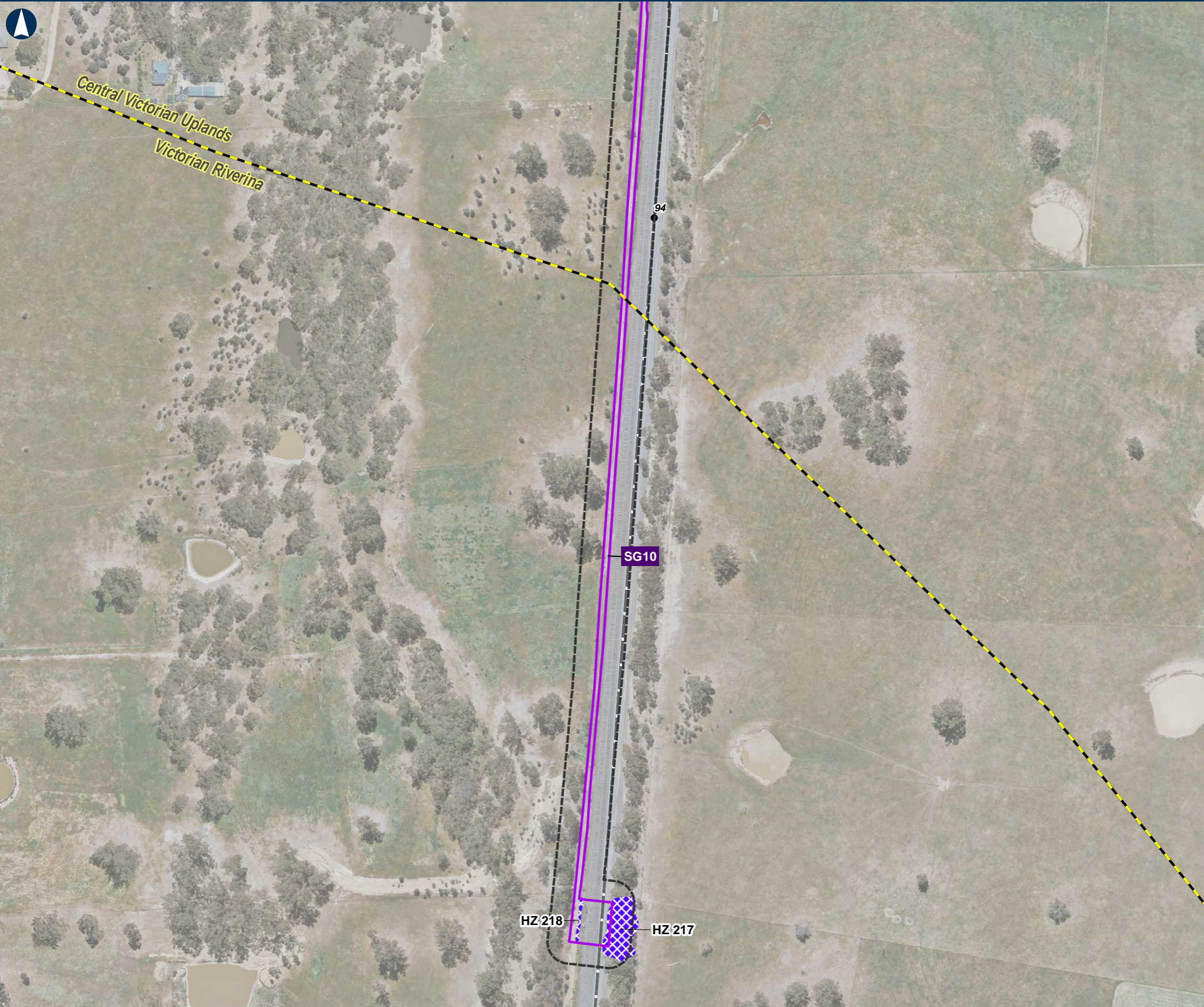
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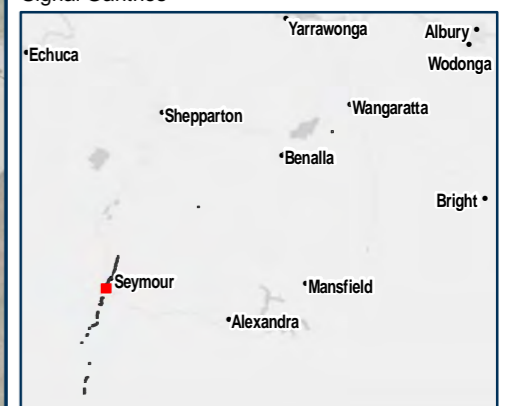
### Native Vegetation

MAP 31 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Bioregion
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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Coordinate System: GDA 1994 MGA Zone 55

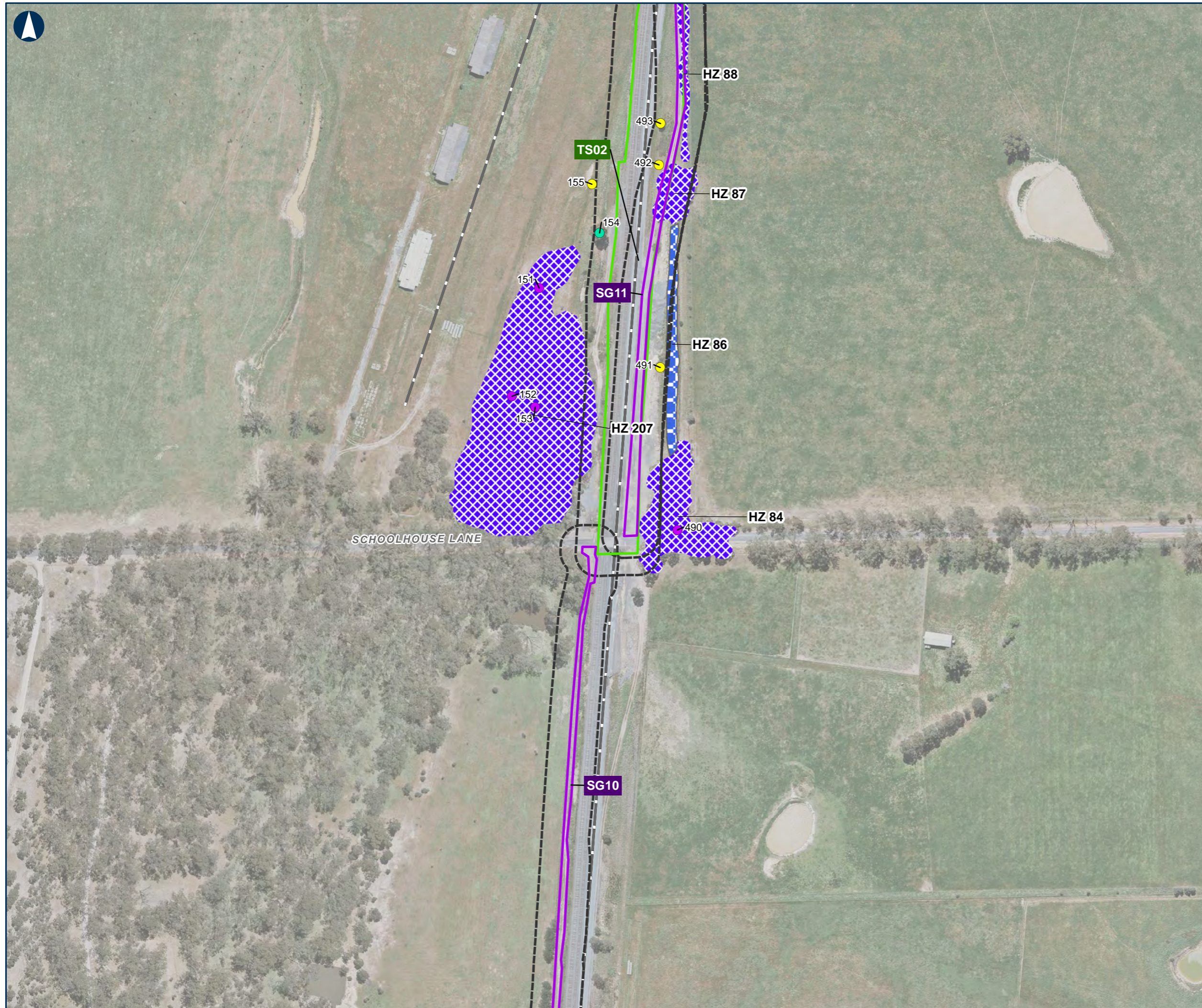
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**Native Vegetation**

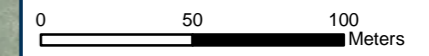
MAP 32 OF 58



- Signal Gantry
- Track Slew
- 15m buffer
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
- Spike-sedge Wetland (819) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

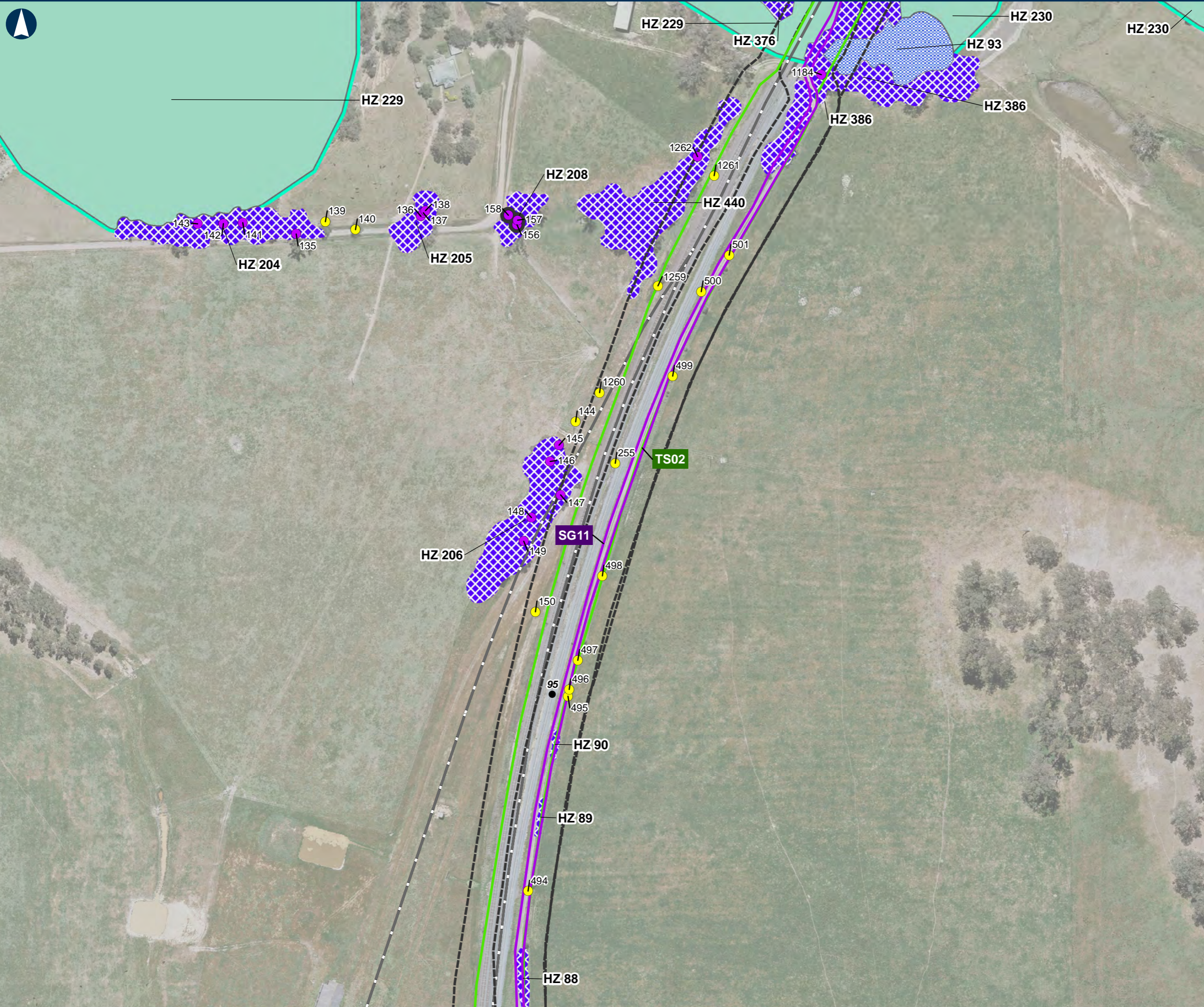
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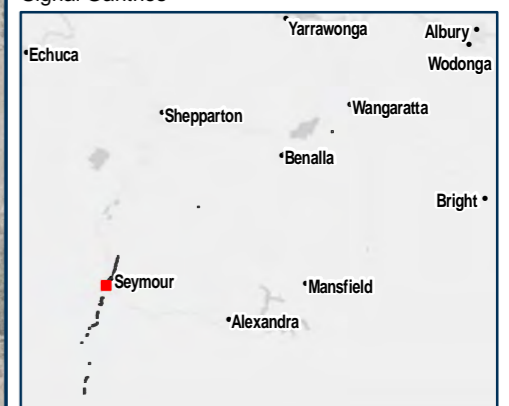
**Native Vegetation**

MAP 33 OF 58

- Signal Gantry
- Track Slew
- 15m buffer
- KM Posts
- Railway
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Trees Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
- Tall Marsh (821) (D)
- Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Ganties



0 50 100 Meters

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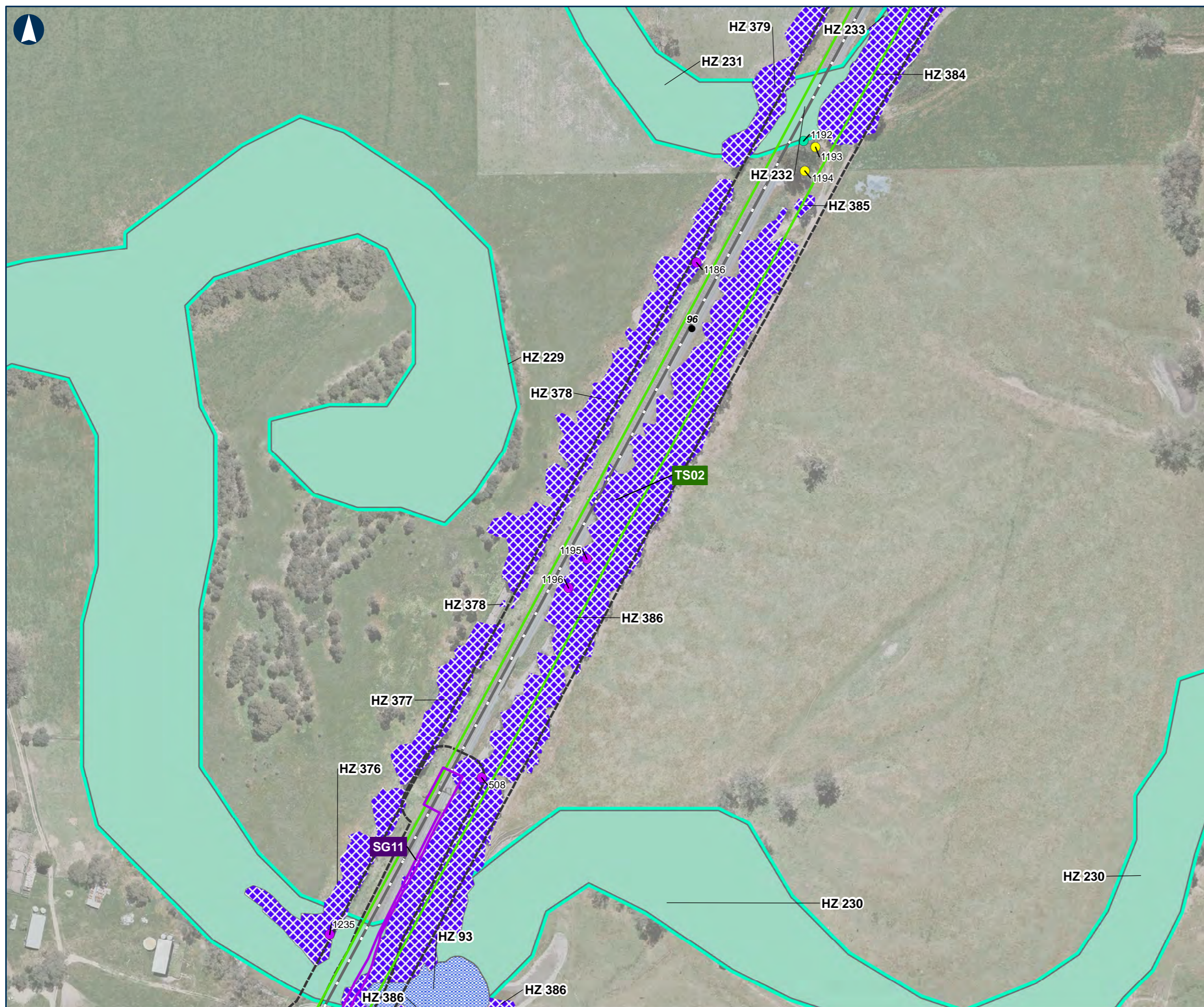
Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





**Native Vegetation**

MAP 34 OF 58



- Signal Gantry
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
  - Tall Marsh (821) (D)
  - Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

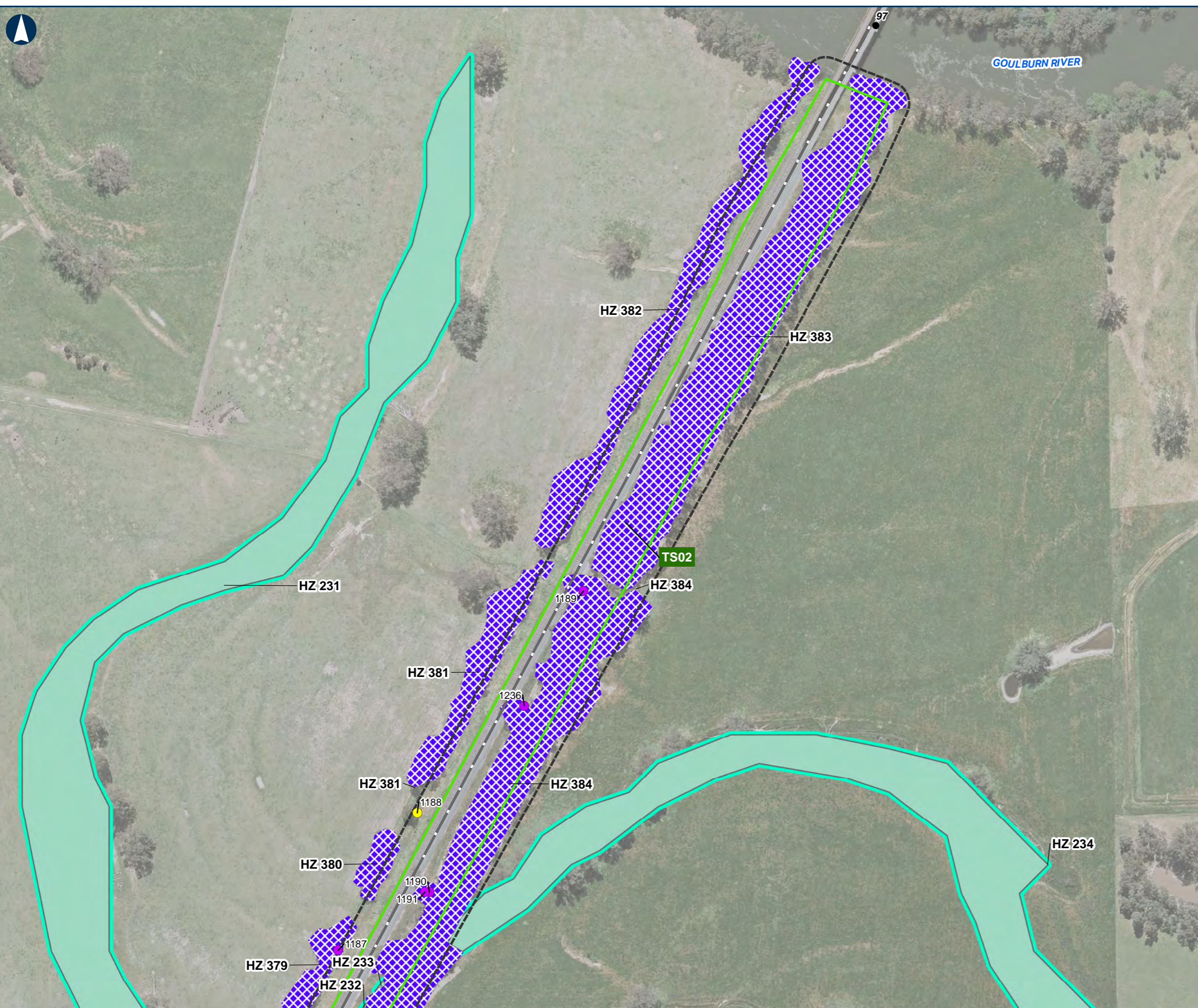


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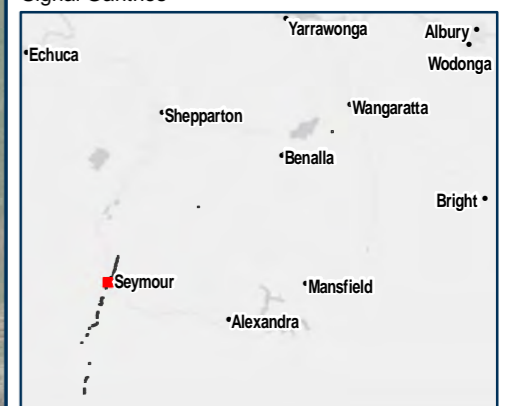
### Native Vegetation

MAP 35 OF 58

- Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
  - Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Author: JB Scale: 1:2,500  
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**Native Vegetation**

MAP 36 OF 58



- Signal Gantry
  - 15m buffer
  - Railway
  - Bioregion
  - Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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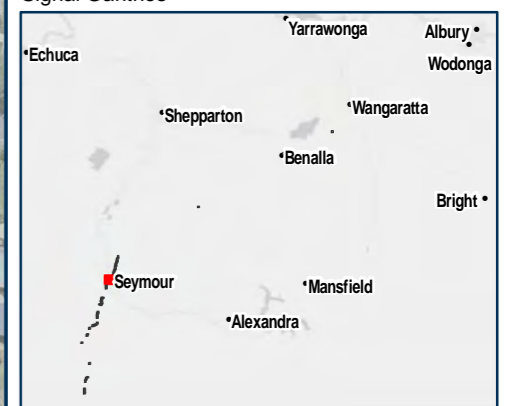
### Native Vegetation

MAP 37 OF 58

- Signal Gantry
- 15m buffer
- KM Posts
- Railway
- Small Scattered Tree
- Bioregion

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



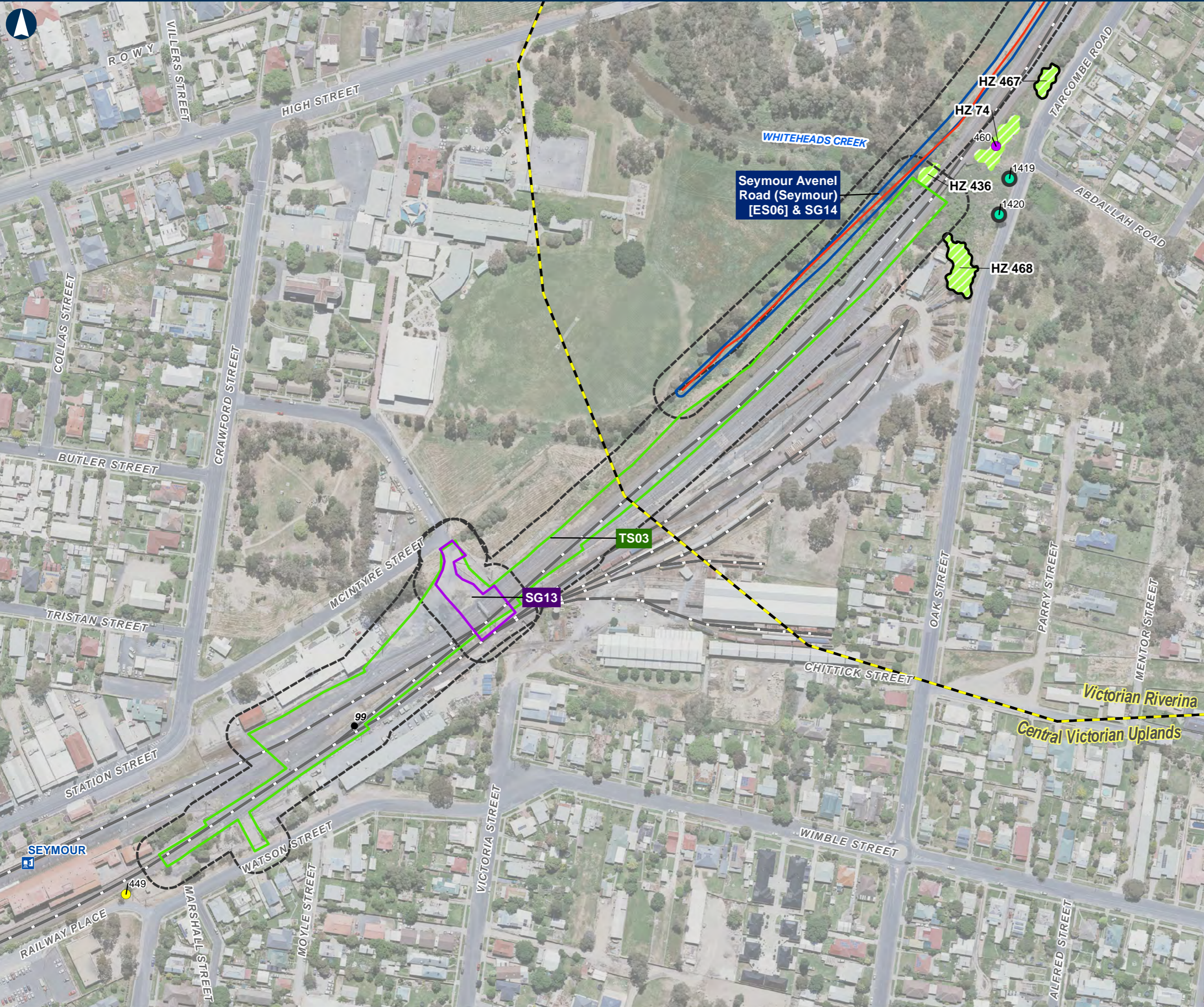
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**Native Vegetation**

MAP 38 OF 58

- Enhancement Site
  - Signal Gantry
  - Track Slew
  - 15m buffer
  - 1 Train Station
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Creekline Grassy Woodland (68) (E)
  - E=Endangered
  - D=Depleted
  - V=vulnerable
  - ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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 Data Sources: DELWP (2020)

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**Native Vegetation**

MAP 39 OF 58

- Enhancement Site
- Track Slew
- 15m buffer
- KM Posts
- Railway
- Next Generation Cabling
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Habitat Zones Desktop/No access
- Trees Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Creekline Grassy Woodland (68) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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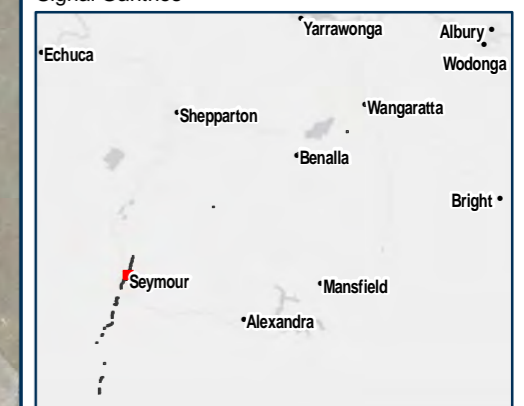
**Native Vegetation**

MAP 40 OF 58

- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Native Vegetation**

MAP 41 OF 58



- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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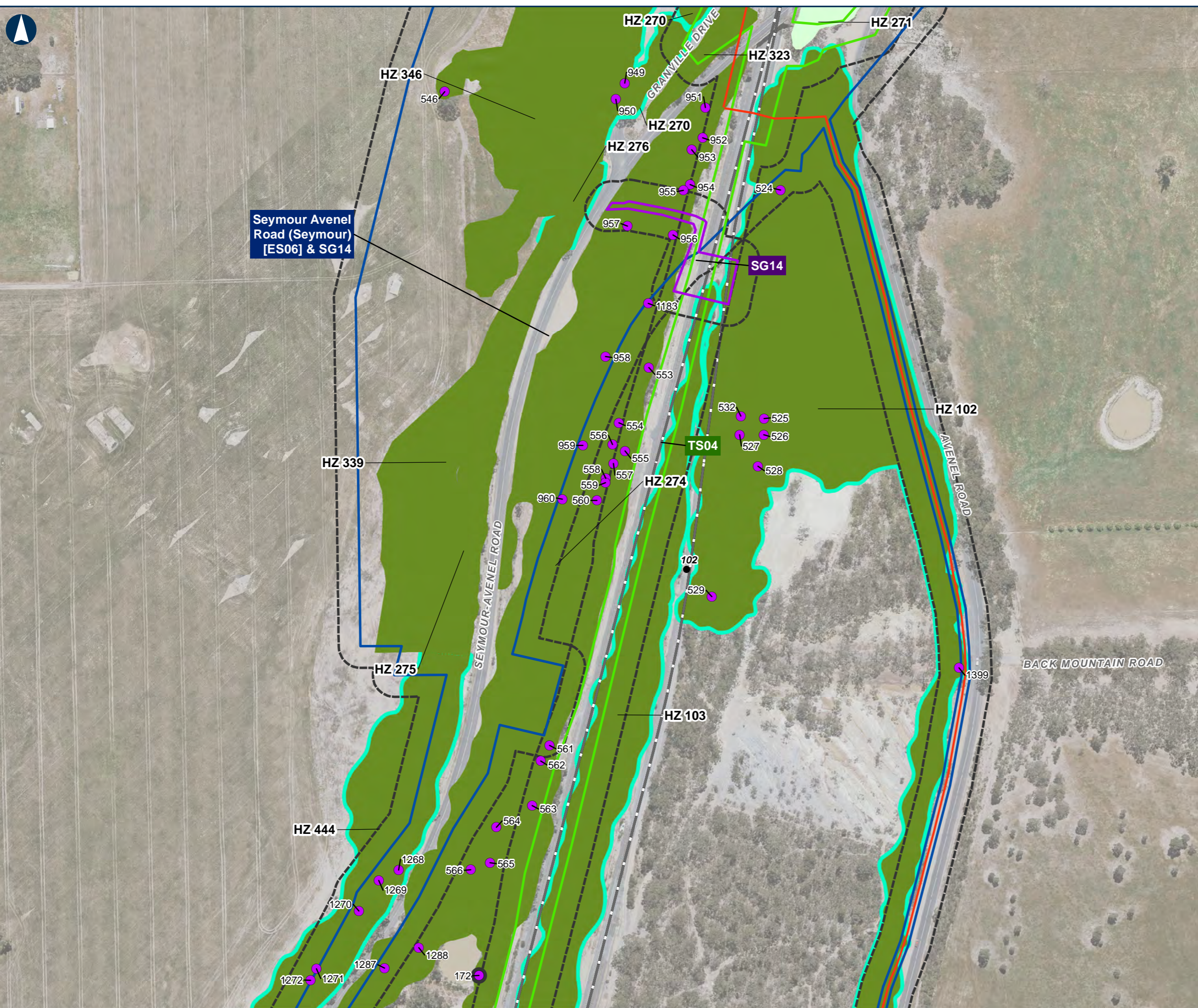
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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8





**Native Vegetation**

MAP 42 OF 58



**Seymour Avenel Road (Seymour) [ES06] & SG14**

- Enhancement Site
  - Signal Gantry
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Bioregion
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

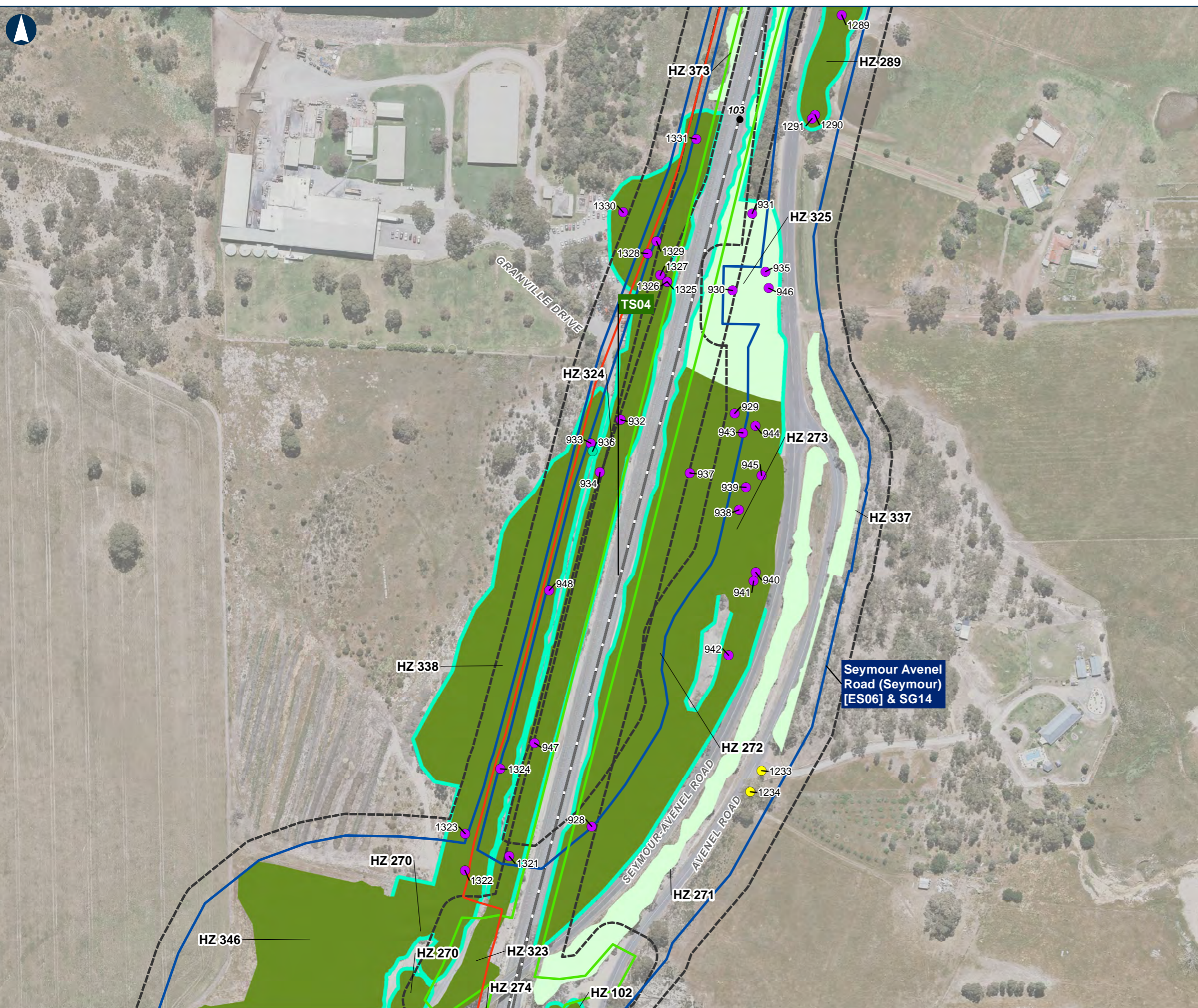
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**Native Vegetation**

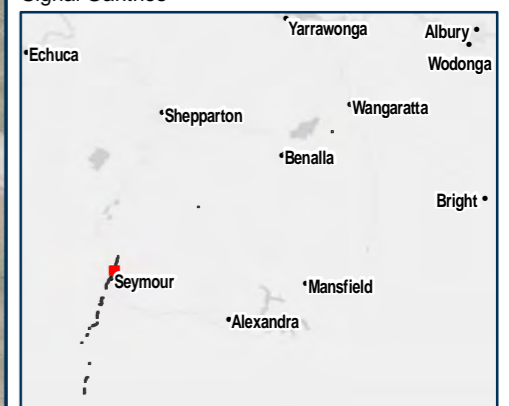
MAP 43 OF 58



- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

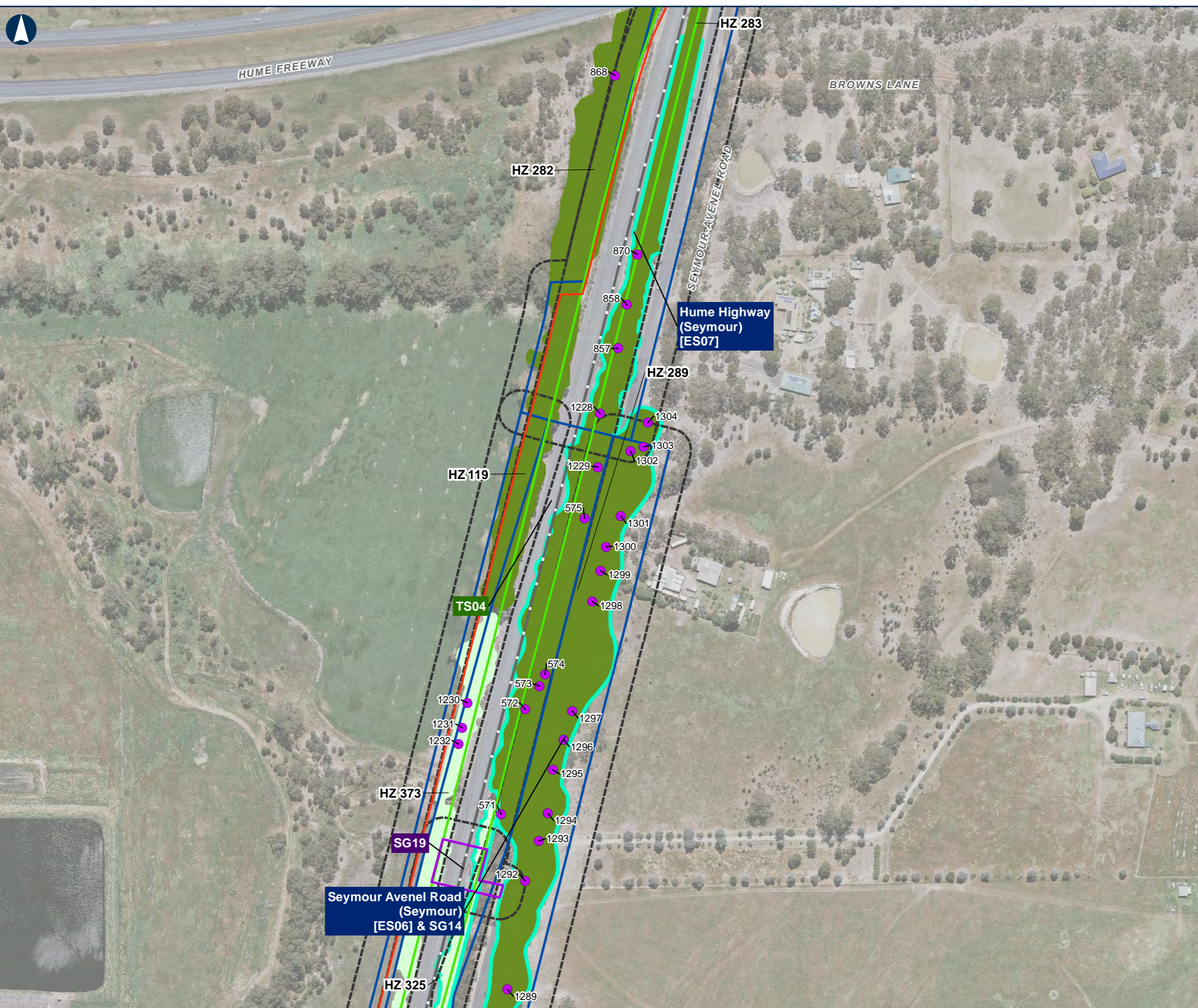
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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
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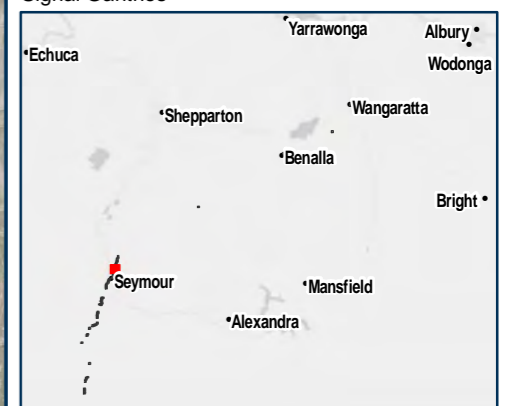
### Native Vegetation

MAP 44 OF 58

- Enhancement Site
  - Signal Gantry
  - Track Slew
  - 15m buffer
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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Author: JB      Scale: 1:2,500  
Data Sources: DELWP (2020)      Figure 8





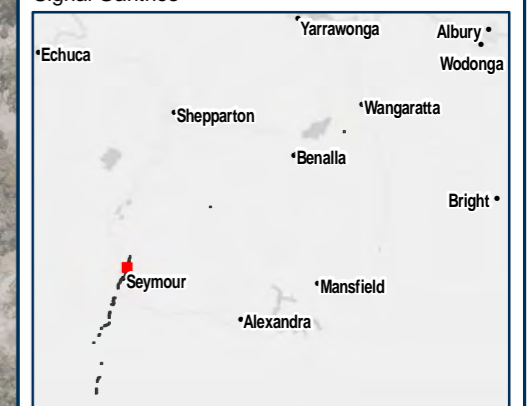
**Native Vegetation**

MAP 45 OF 58

- Enhancement Site
  - Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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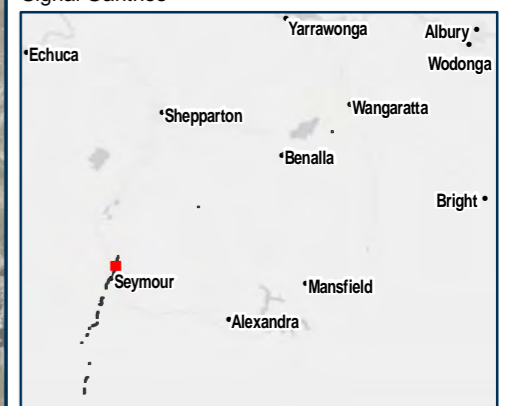
### Native Vegetation

MAP 46 OF 58

- Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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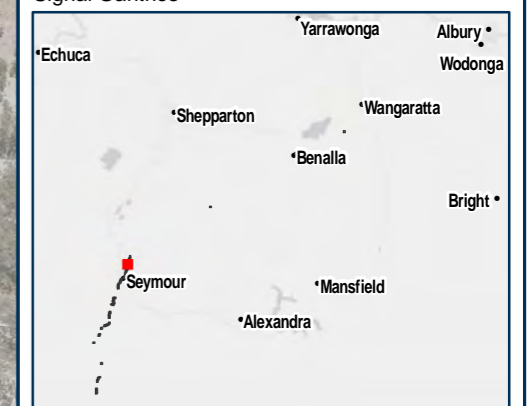
**Native Vegetation**

MAP 47 OF 58

- Track Slew
  - 15m buffer
  - Railway
  - Large Tree in Patch
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Creekline Grassy Woodland (68) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

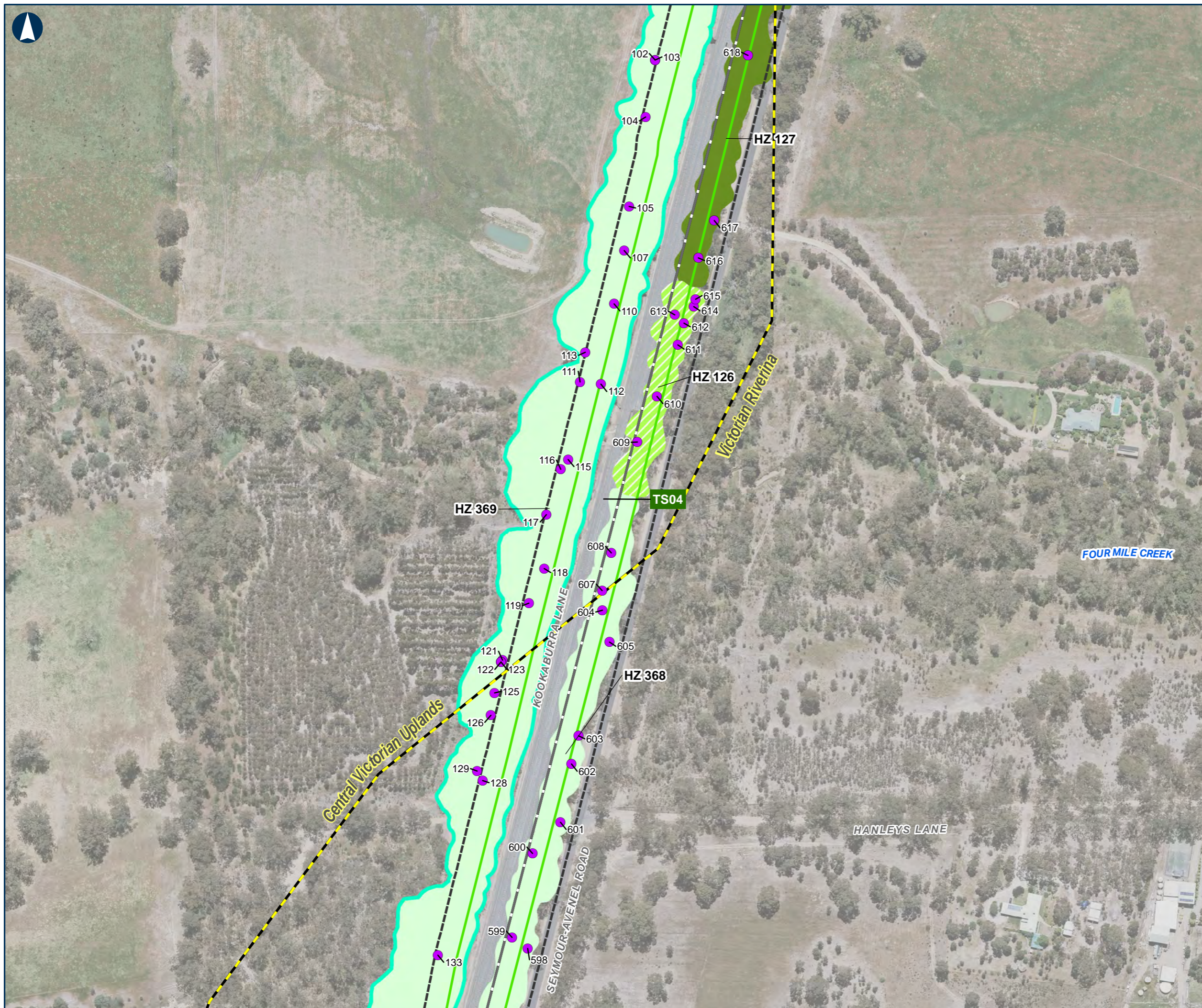


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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 8

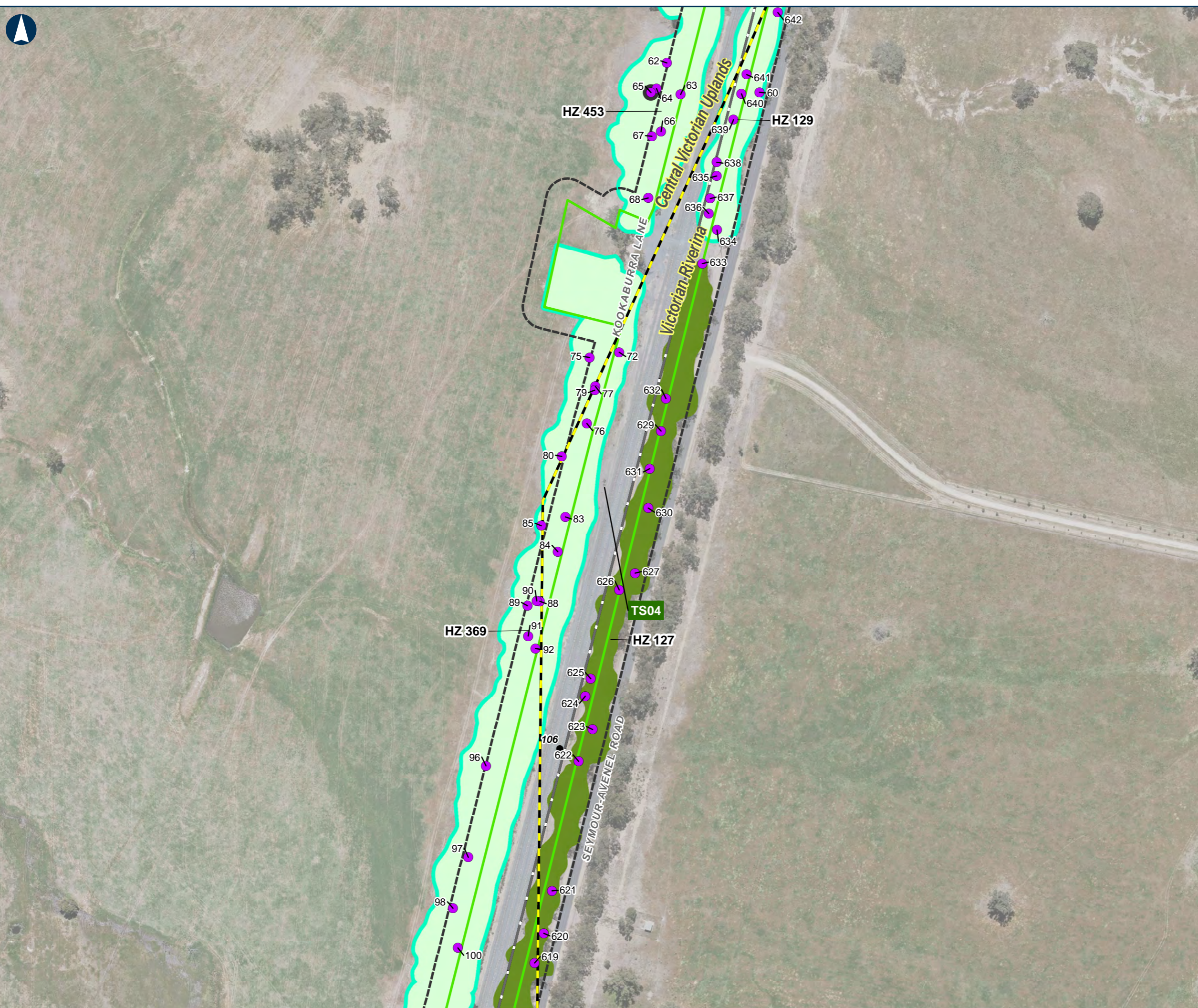






**Native Vegetation**

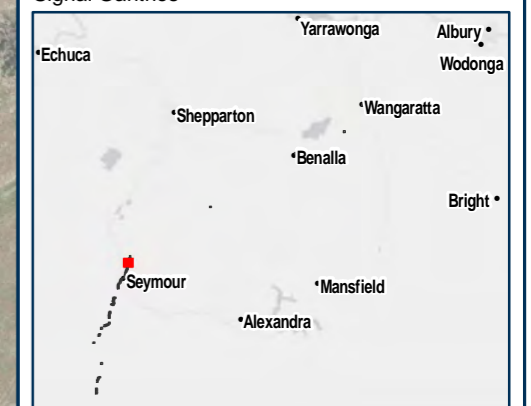
MAP 48 OF 58



- Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Bioregion
  - Trees Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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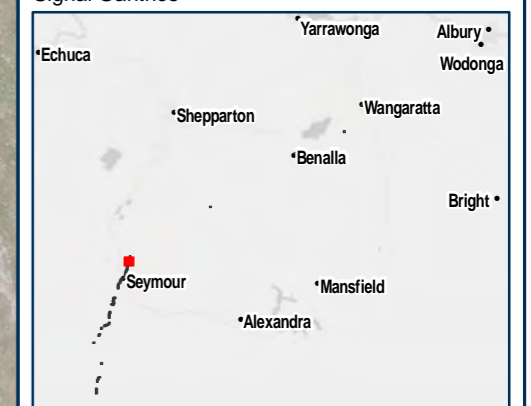
**Native Vegetation**

MAP 49 OF 58

- Track Slew
  - 15m buffer
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Bioregion
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 8







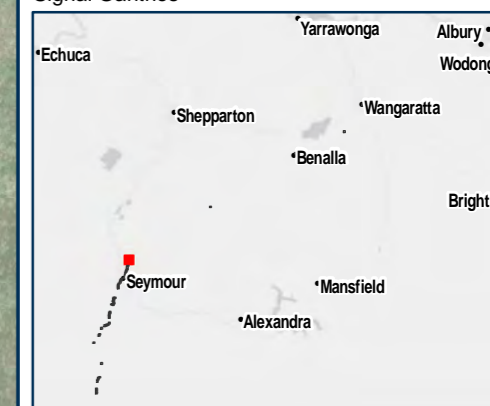
### Native Vegetation

MAP 50 OF 58

- Track Slew
- 15m buffer
- Railway
- Large Tree in Patch
- Bioregion
- Trees Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Data Sources: DELWP (2020) Figure 8







**Native Vegetation**

MAP 51 OF 58

- Track Slew
- 15m buffer
- KM Posts
- Railway
- Large Tree in Patch
- Bioregion
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

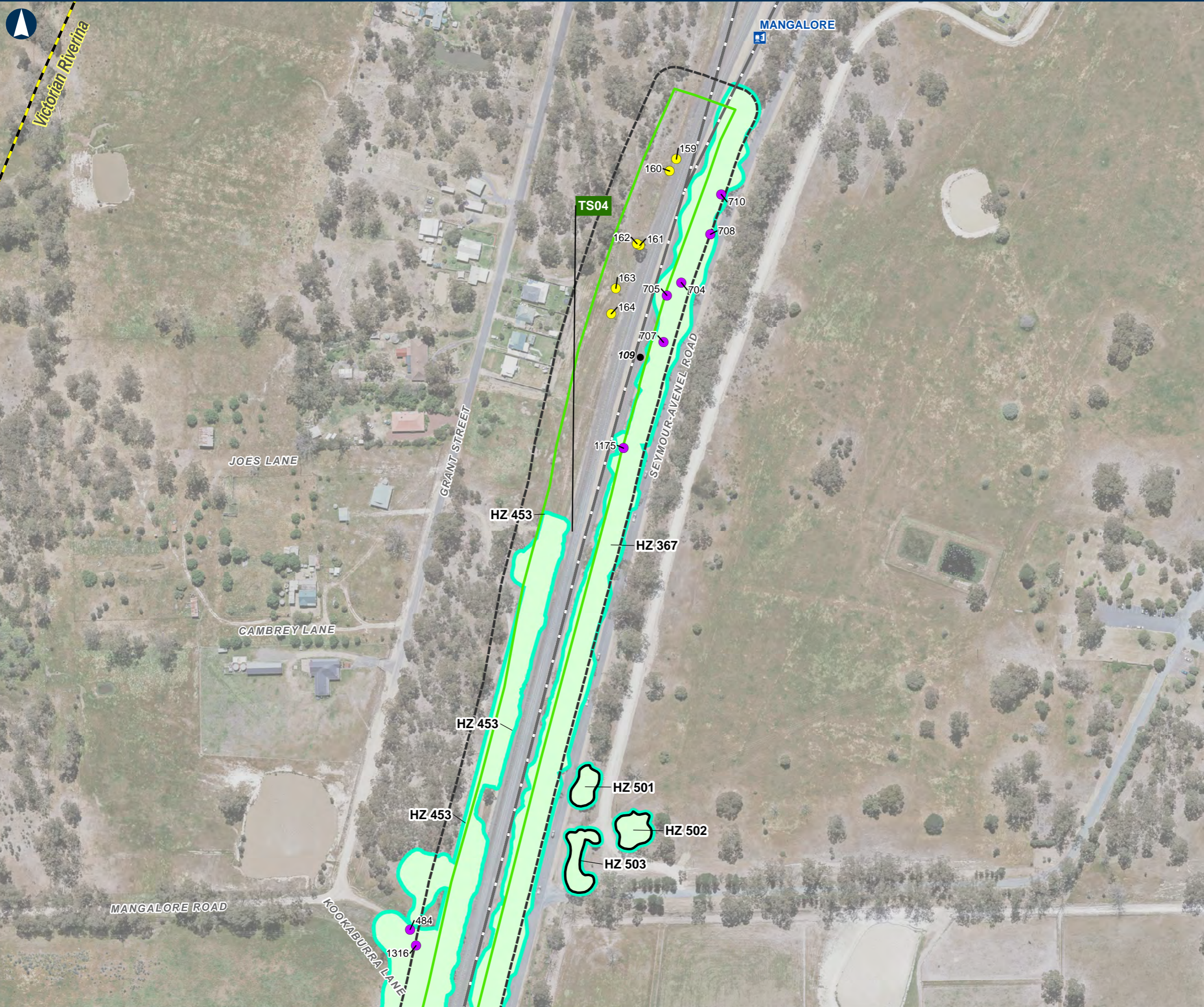
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Data Sources: DELWP (2020) Figure 8



Victorian Riverina  
Central Victorian Uplands





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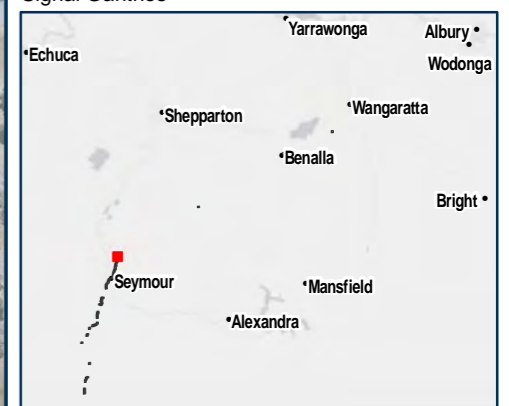
**Native Vegetation**

MAP 52 OF 58

- Track Slew
  - 15m buffer
  - S Train Station
  - KM Posts
  - Railway
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Habitat Zones Desktop/No access
  - High Quality Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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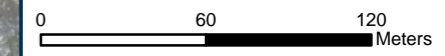
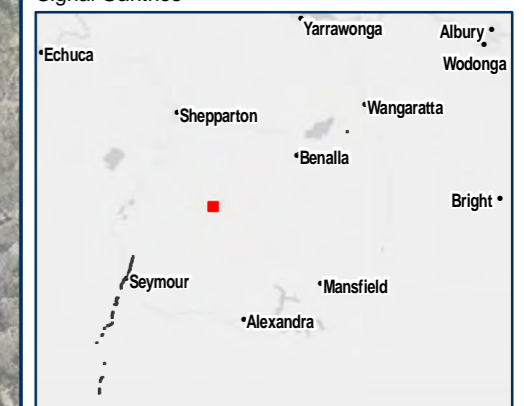
**Native Vegetation**

MAP 53 OF 58

- Enhancement Site
  - 15m buffer
  - Train Station
  - KM Posts
  - Railway
  - Large Scattered Tree
  - Large Tree in Patch
  - Small Scattered Tree
  - Bioregion
  - Trees Desktop/No access
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

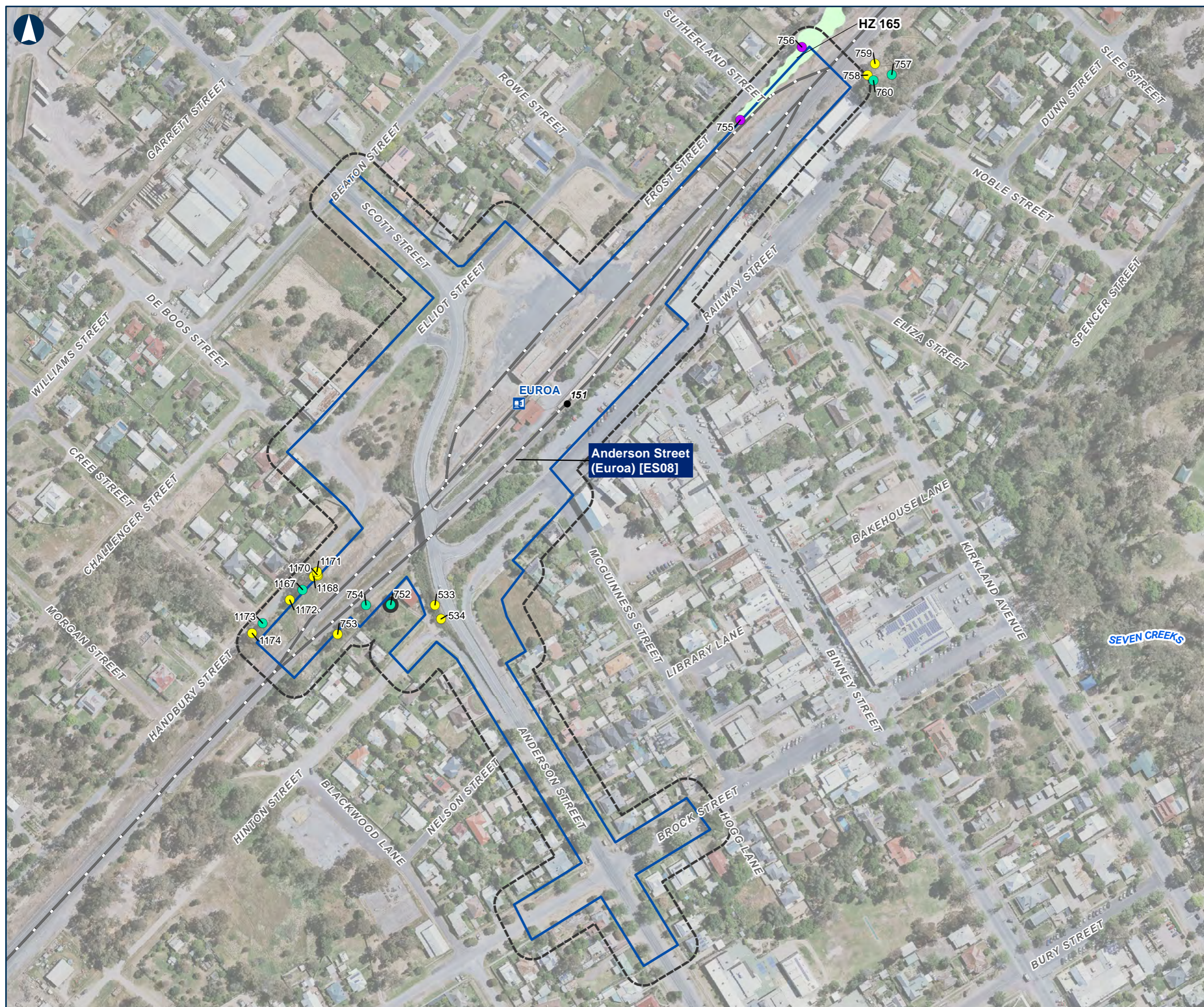


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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,750  
 Figure 8



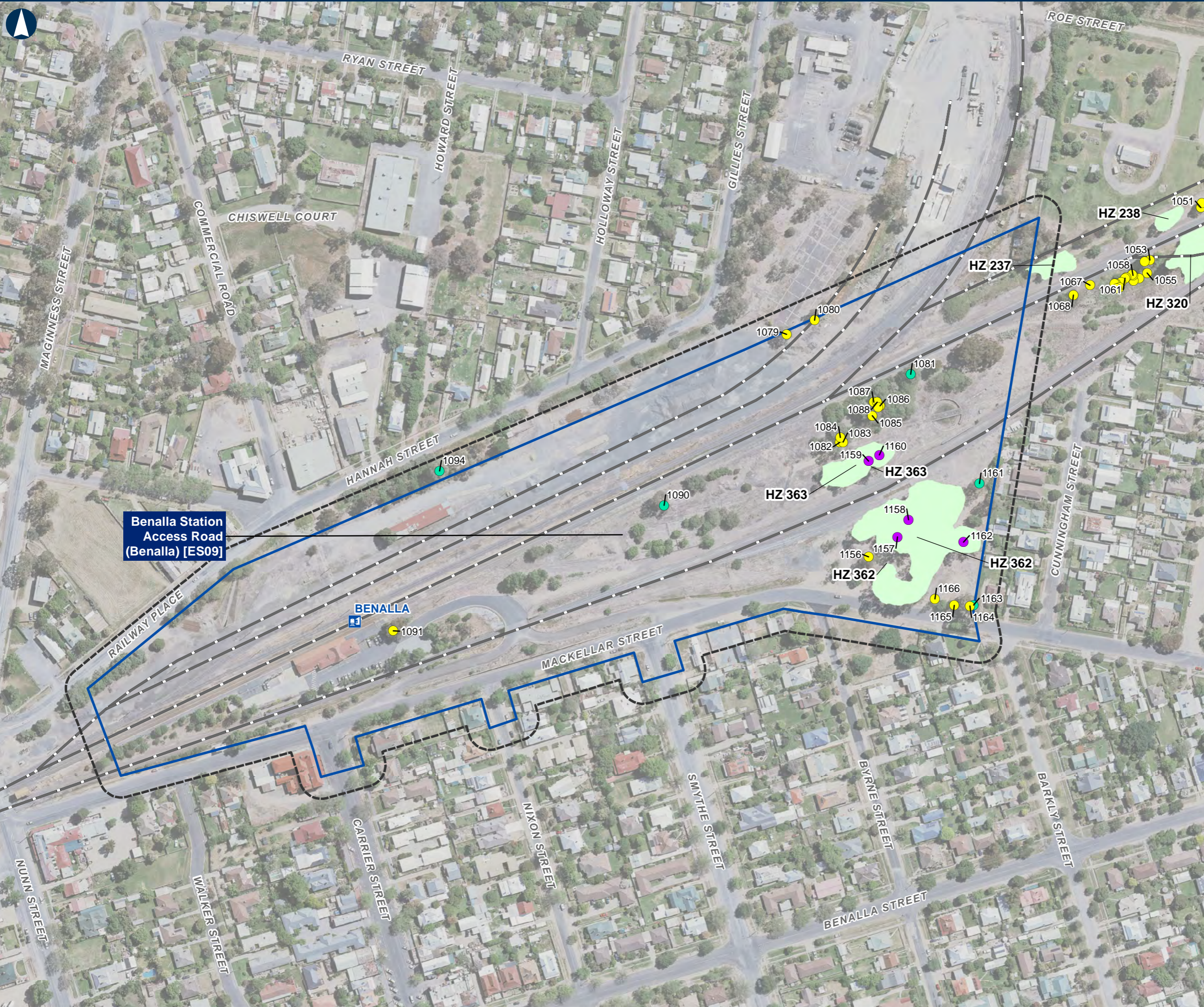




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**Native Vegetation**

MAP 54 OF 58

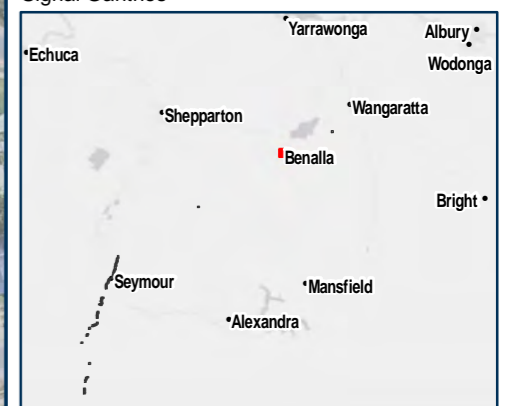


**Benalla Station Access Road (Benalla) [ES09]**

- Enhancement Site
- 15m buffer
- Train Station
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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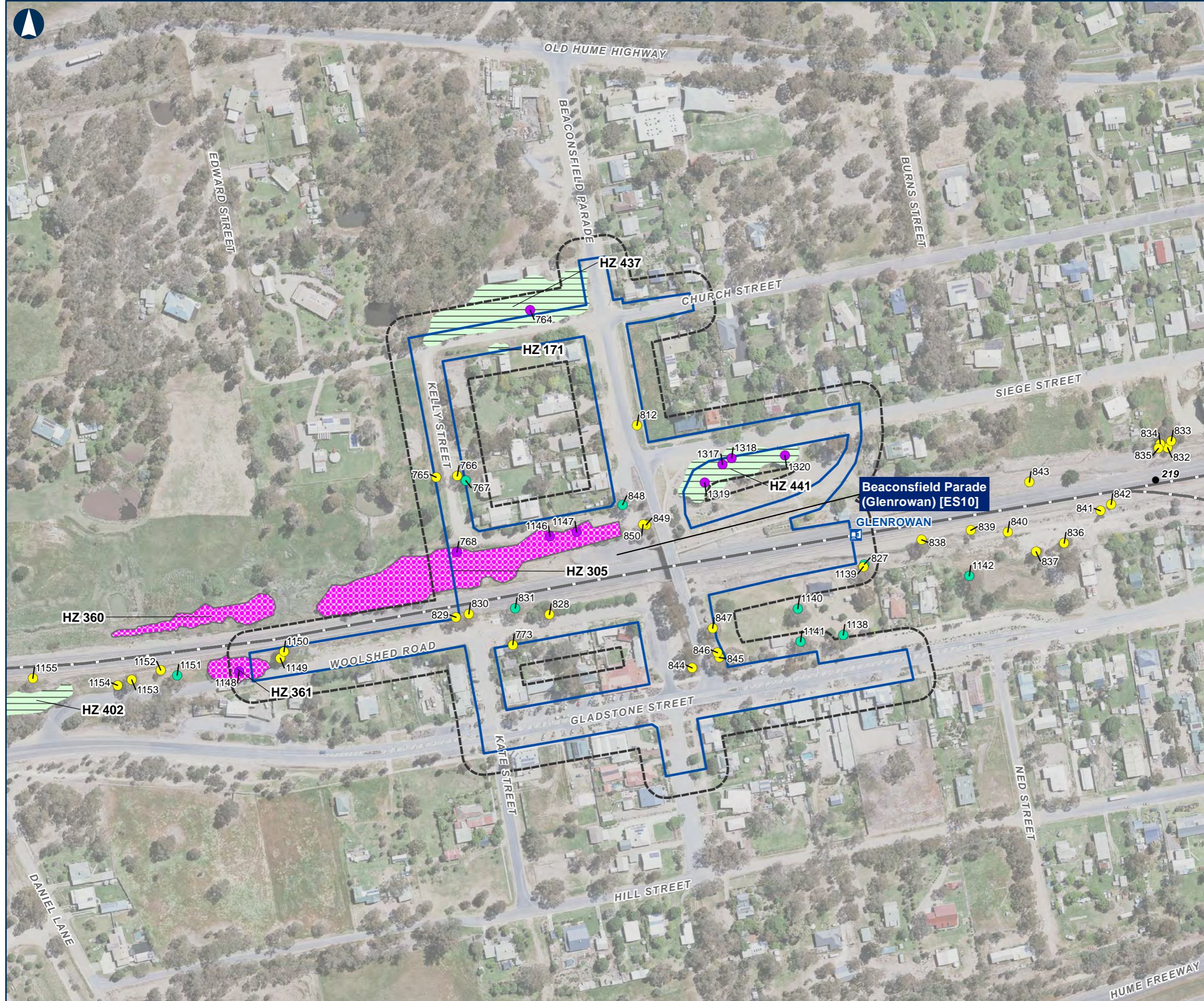




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**Native Vegetation**

MAP 55 OF 58



- Enhancement Site
- 15m buffer
- Train Station
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
- Plains Woodland (803) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gentries



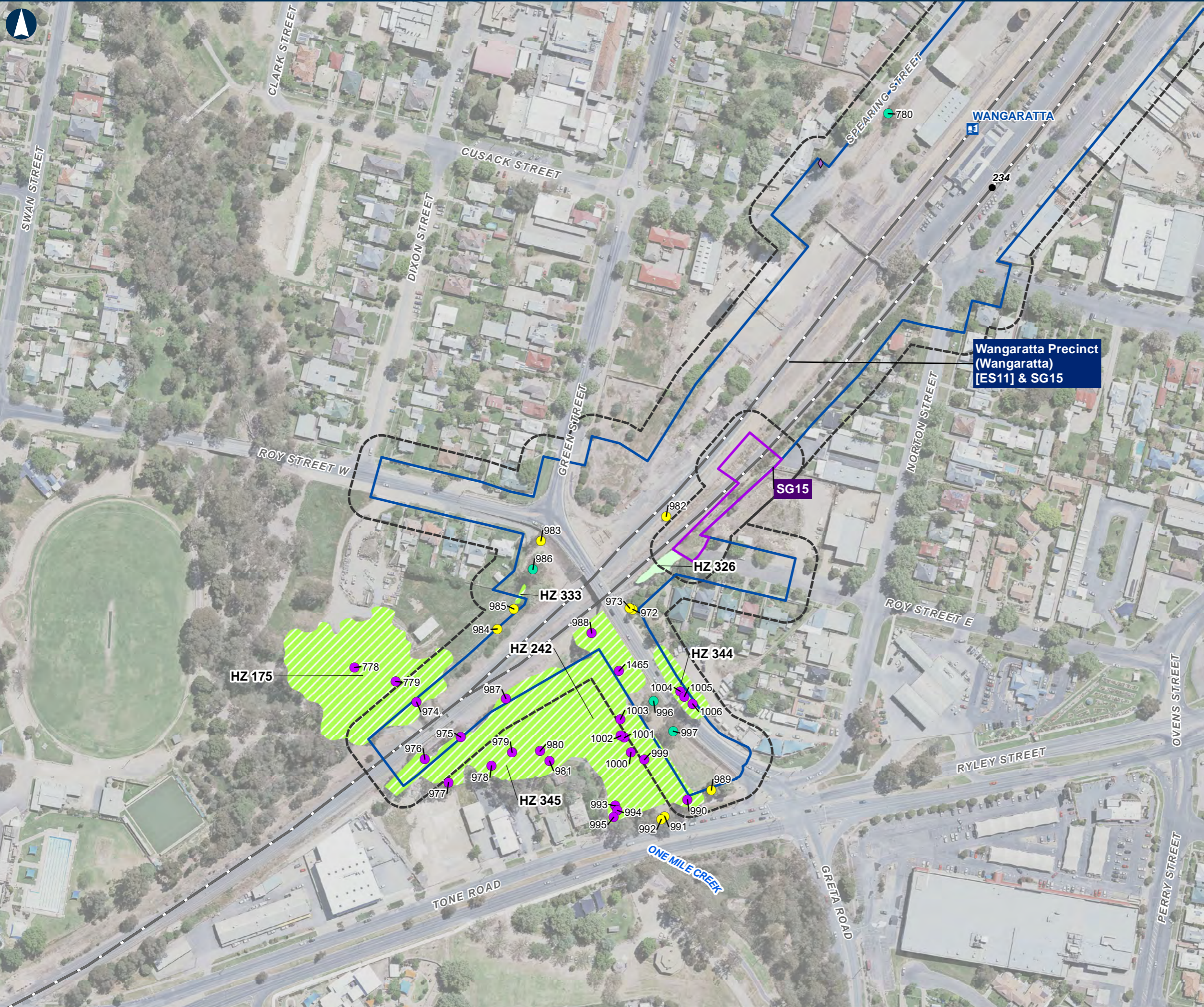
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 Data Sources: DELWP (2020) Figure 8





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**Native Vegetation**

MAP 56 OF 58

- Enhancement Site
- Signal Gantry
- 15m buffer
- Train Station
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Significant Tree – Wangaratta Rural City
- Bioregion
- Ecological Vegetation Classes**
- Creekline Grassy Woodland (68) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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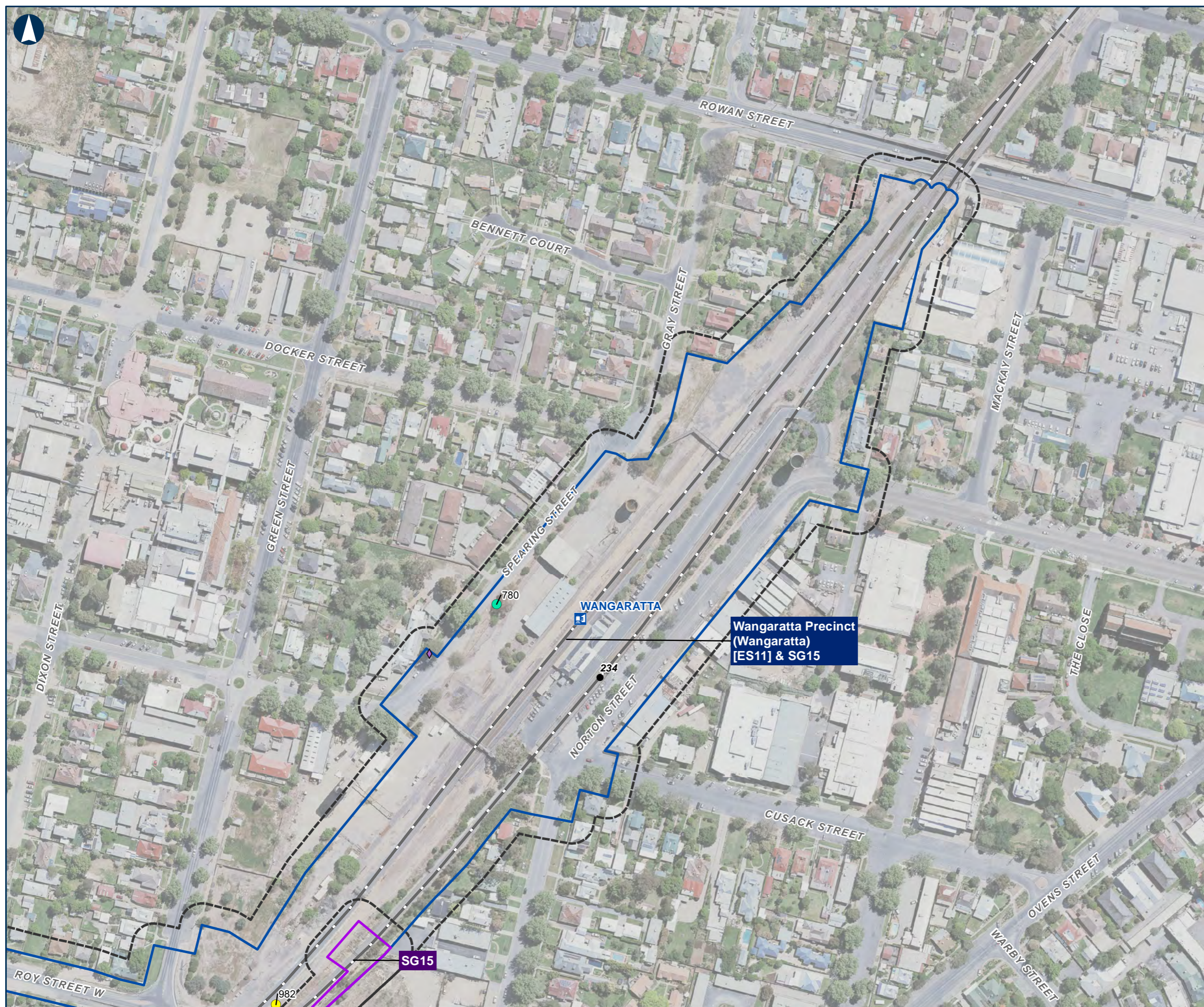




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**Native Vegetation**

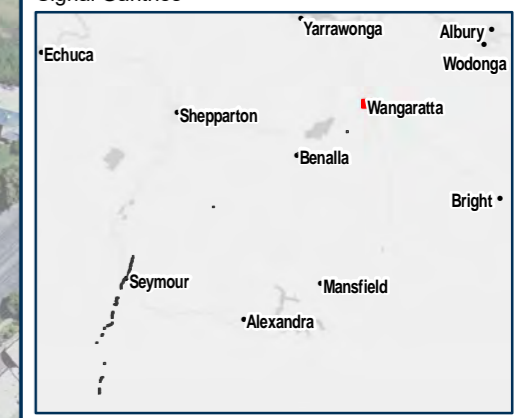
MAP 57 OF 58



- Enhancement Site
- Signal Gantry
- 15m buffer
- Train Station
- KM Posts
- Railway
- Large Scattered Tree
- Small Scattered Tree
- Significant Tree – Wangaratta Rural City
- Bioregion

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

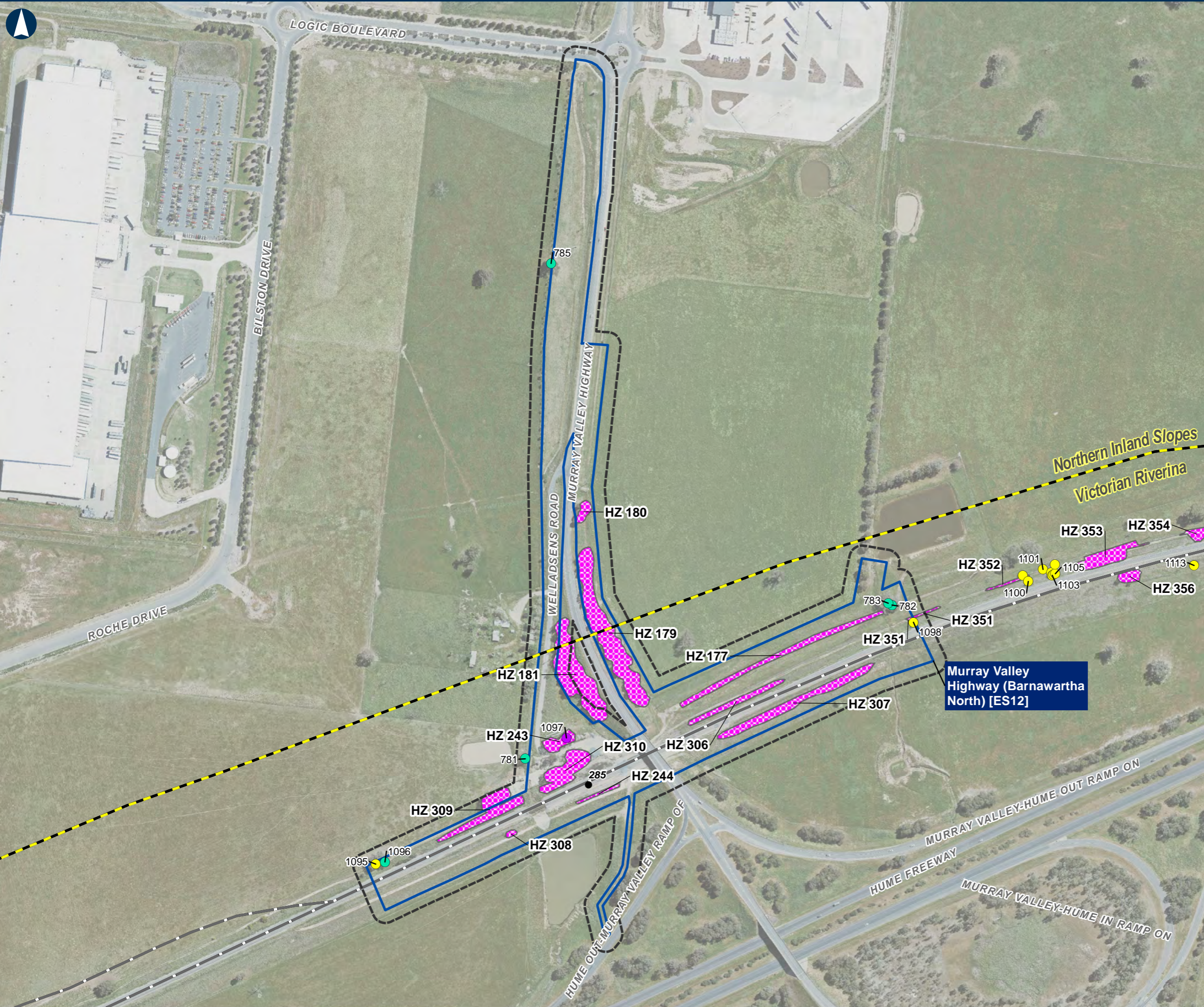
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**Native Vegetation**

MAP 58 OF 58

- Enhancement Site
- 15m buffer
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Ecological Vegetation Classes**
- Plains Woodland (803) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 90 180 Meters

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 Author: JB Scale: 1:4,250  
 Data Sources: DELWP (2020) Figure 8



## Appendix A – Figures

Figure 9 Threatened species and ecological communities





**Threatened species and ecological communities**

MAP 1 OF 58

- Signal Gantry
- Train Station
- KM Posts
- Railway
- Watercourses

- E=Endangered
- D=Depleted
- V=vulnerable
- ND= Not described

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0 50 100 Meters

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9







**Threatened species and ecological communities**

MAP 2 OF 58

- Signal Gantry
- KM Posts
- Railway
- Watercourses

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

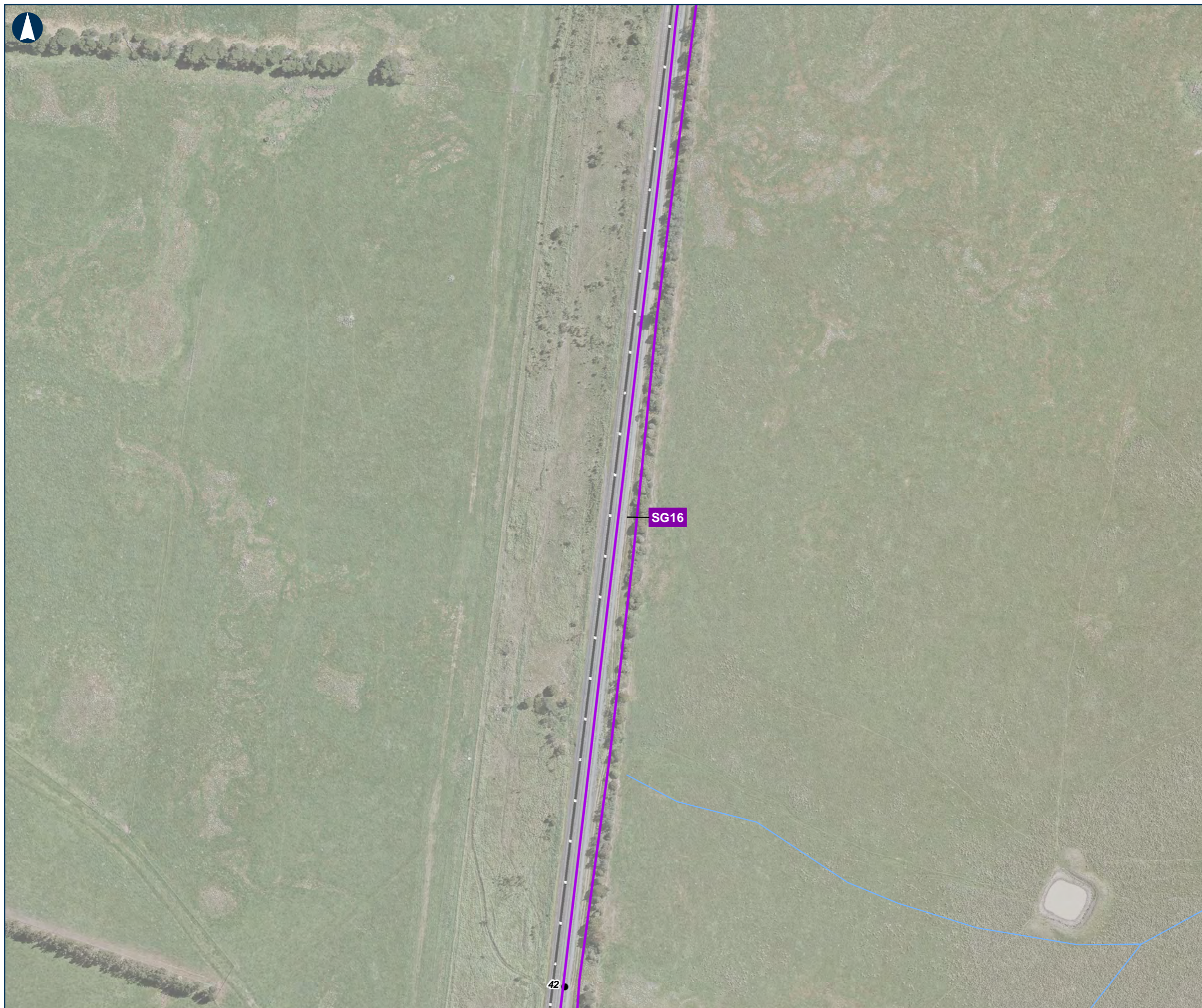


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 Data Sources: DELWP (2020) Figure 9











SWAMP FIREWEED

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### Threatened species and ecological communities

MAP 3 OF 58

-  Signal Gantry
-  VBA Flora Records
-  KM Posts
-  Railway

43

SG16

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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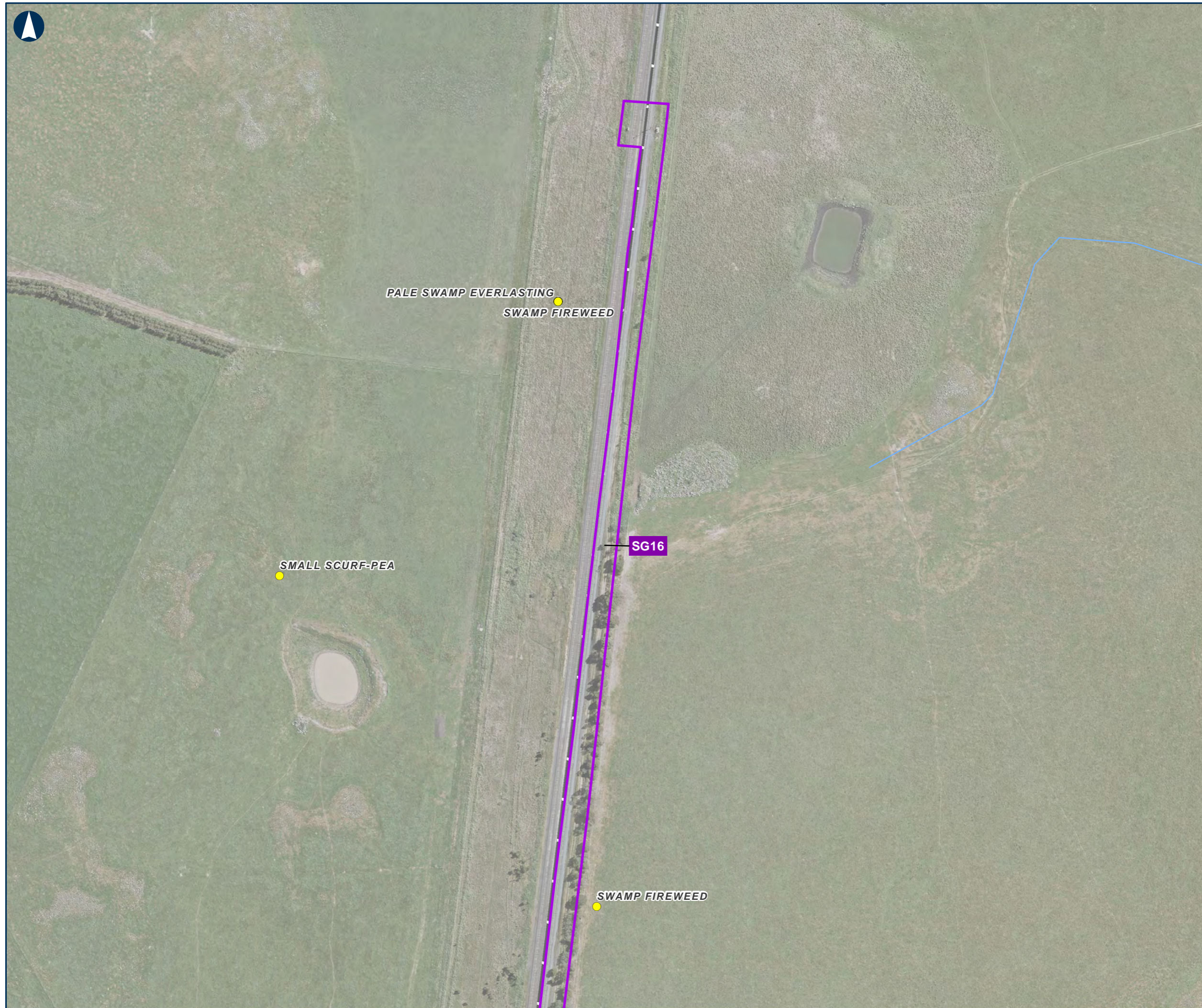
Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9





**Threatened species and ecological communities**

MAP 4 OF 58



- Signal Gantry
- VBA Flora Records
- Railway
- Watercourses

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



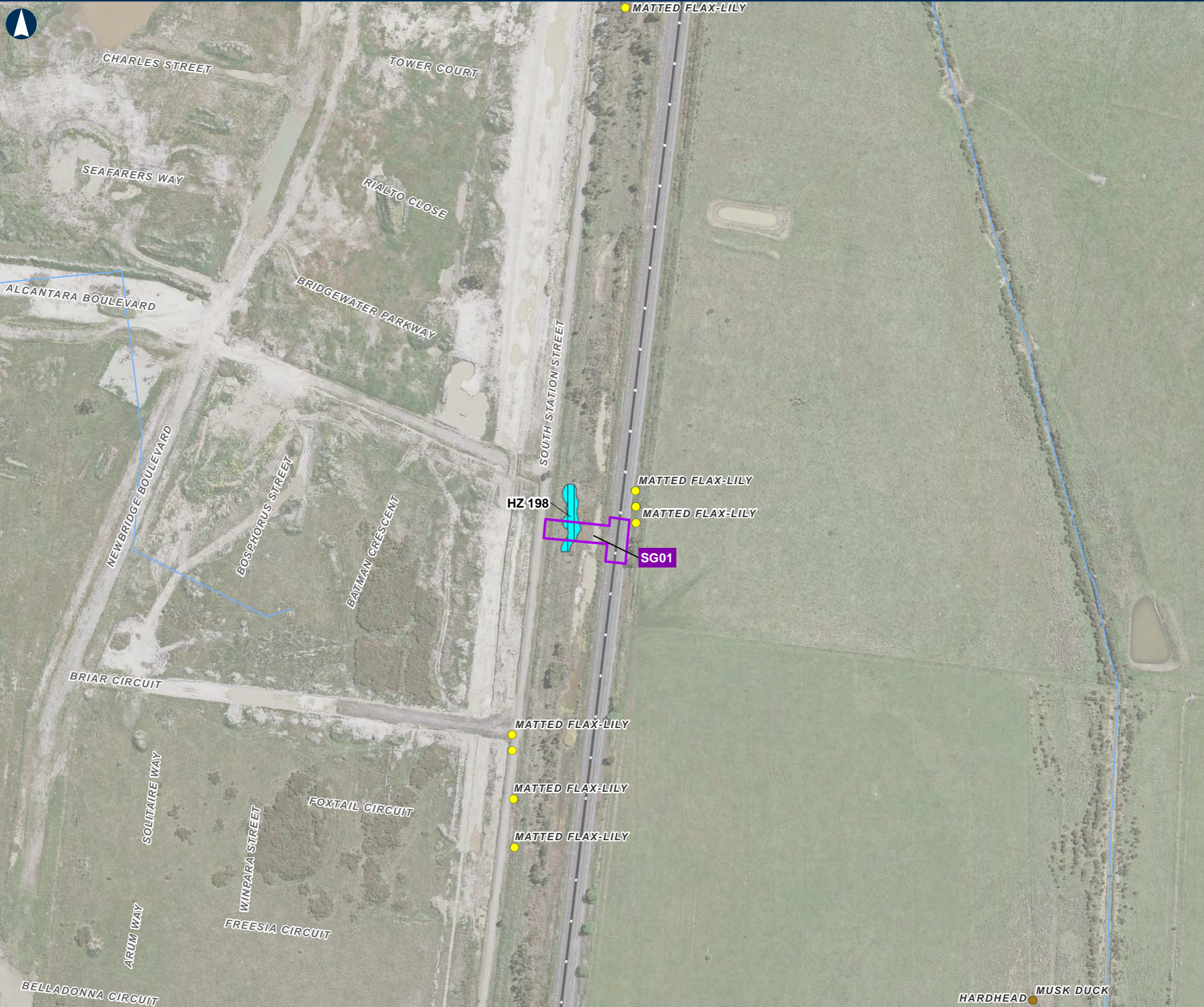
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Coordinate System: GDA 1994 MGA Zone 55

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Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9





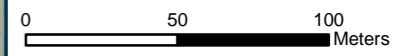
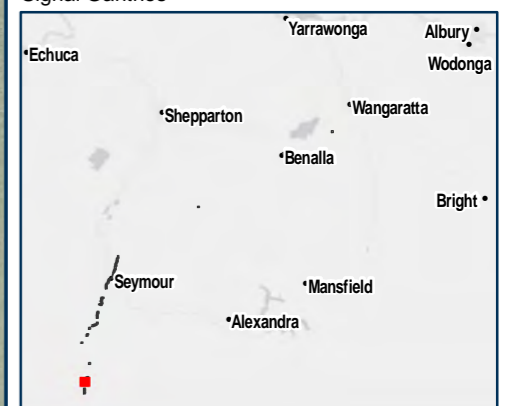
**Threatened species and ecological communities**

MAP 5 OF 58

- Signal Gantry
  - VBA Flora Records
  - VBA Fauna Records
  - Railway
  - Watercourses
- Ecological Vegetation Classes**
- Swampy Riparian Woodland (83) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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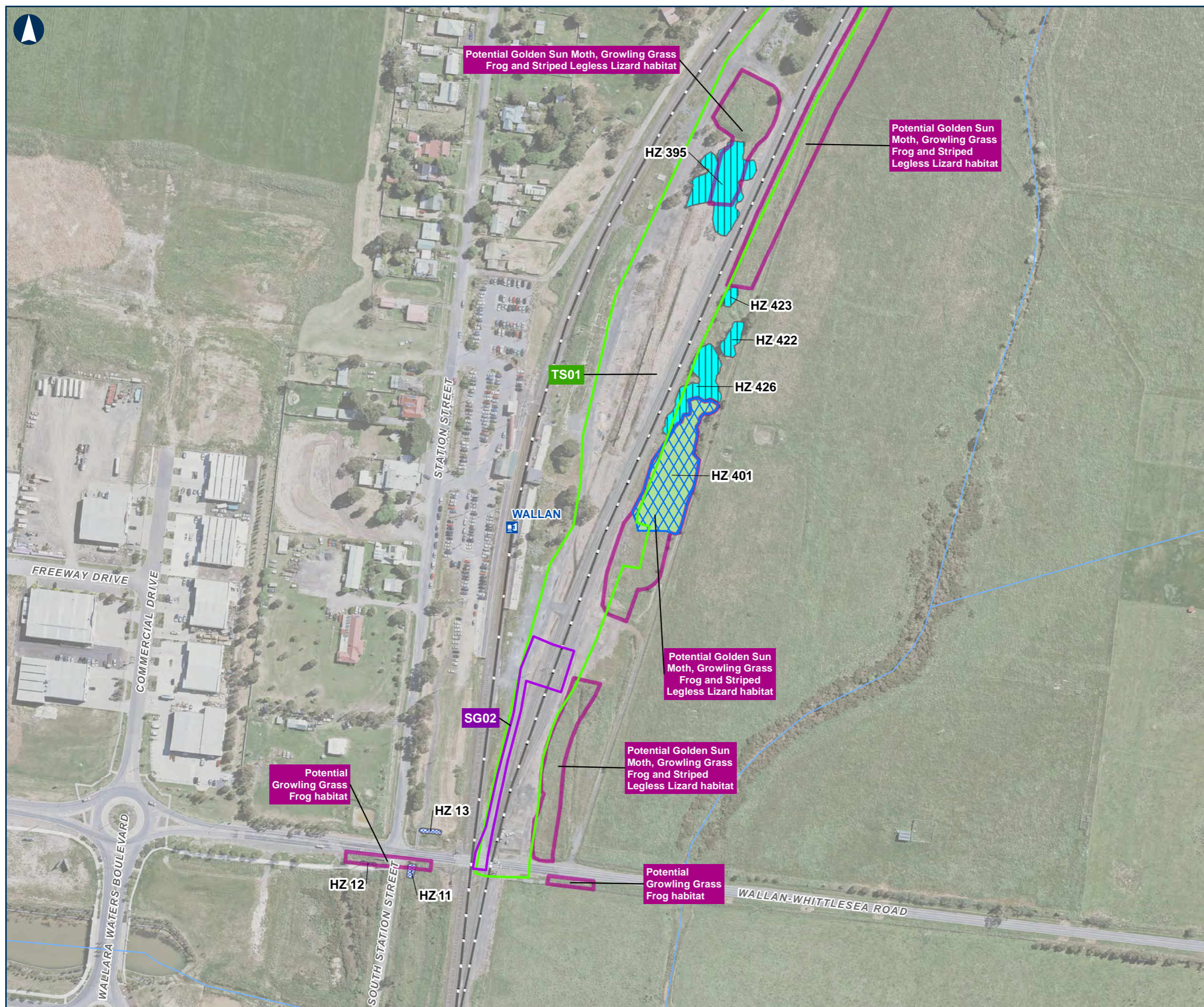




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**Threatened species and ecological communities**

MAP 6 OF 58



- Signal Gantry
- Track Slew
- Train Station
- Railway
- Watercourses
- Western (Basalt) Plains Grassland
- Threatened Fauna Habitat
- Threatened Ecological Communities**
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Ecological Vegetation Classes**
- Plains Grassland (132) (E)
- Swamy Riparian Woodland (83) (E)
- Tall Marsh (821) (D)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

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0 50 100 Meters

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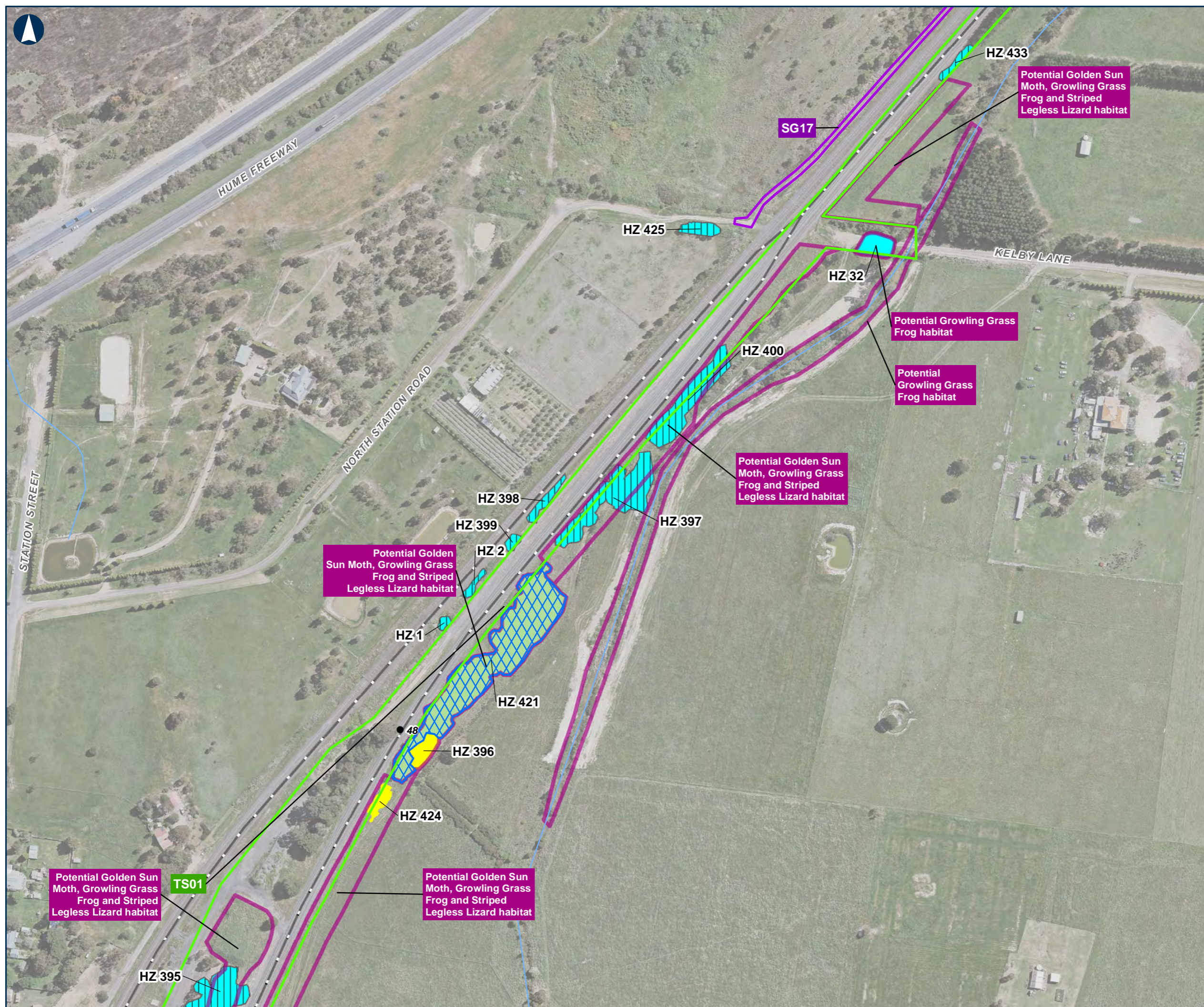




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**Threatened species and ecological communities**

MAP 7 OF 58



- Signal Gantry
  - Track Slew
  - KM Posts
  - Railway
  - Watercourses
  - Western (Basalt) Plains Grassland
  - Threatened Fauna Habitat
- Threatened Ecological Communities**
- Natural Temperate Grassland of the Victorian Volcanic Plain
- Ecological Vegetation Classes**
- Plains Grassland (132) (E)
  - Riparian Forest (18) (V)
  - Swampy Riparian Woodland (83) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Threatened species and ecological communities**

MAP 8 OF 58

- Signal Gantry
- Track Slew
- KM Posts
- Railway
- Watercourses
- Threatened Fauna Habitat
- Ecological Vegetation Classes**
- Riparian Forest (18) (V)
- Swampy Riparian Woodland (83) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Threatened species and ecological communities**

MAP 9 OF 58

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Train Station
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Tall Marsh (821) (D)
- Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



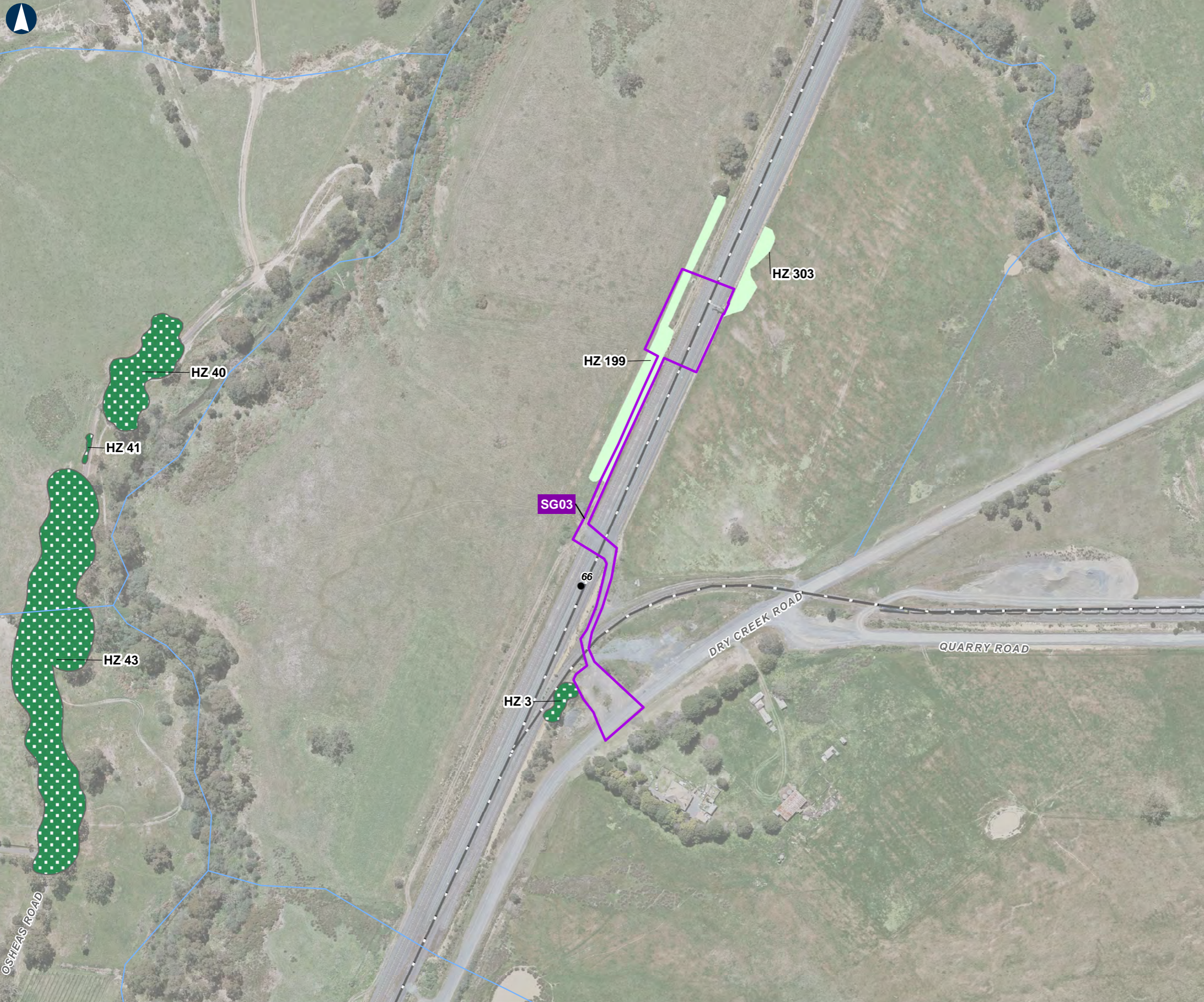
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**Threatened species and ecological communities**

MAP 10 OF 58

- Signal Gantry
- KM Posts
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
- Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Threatened species and ecological communities**

MAP 11 OF 58



- Signal Gantry
- KM Posts
- Railway
- Watercourses
- Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)
- Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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Coordinate System: GDA 1994 MGA Zone 55

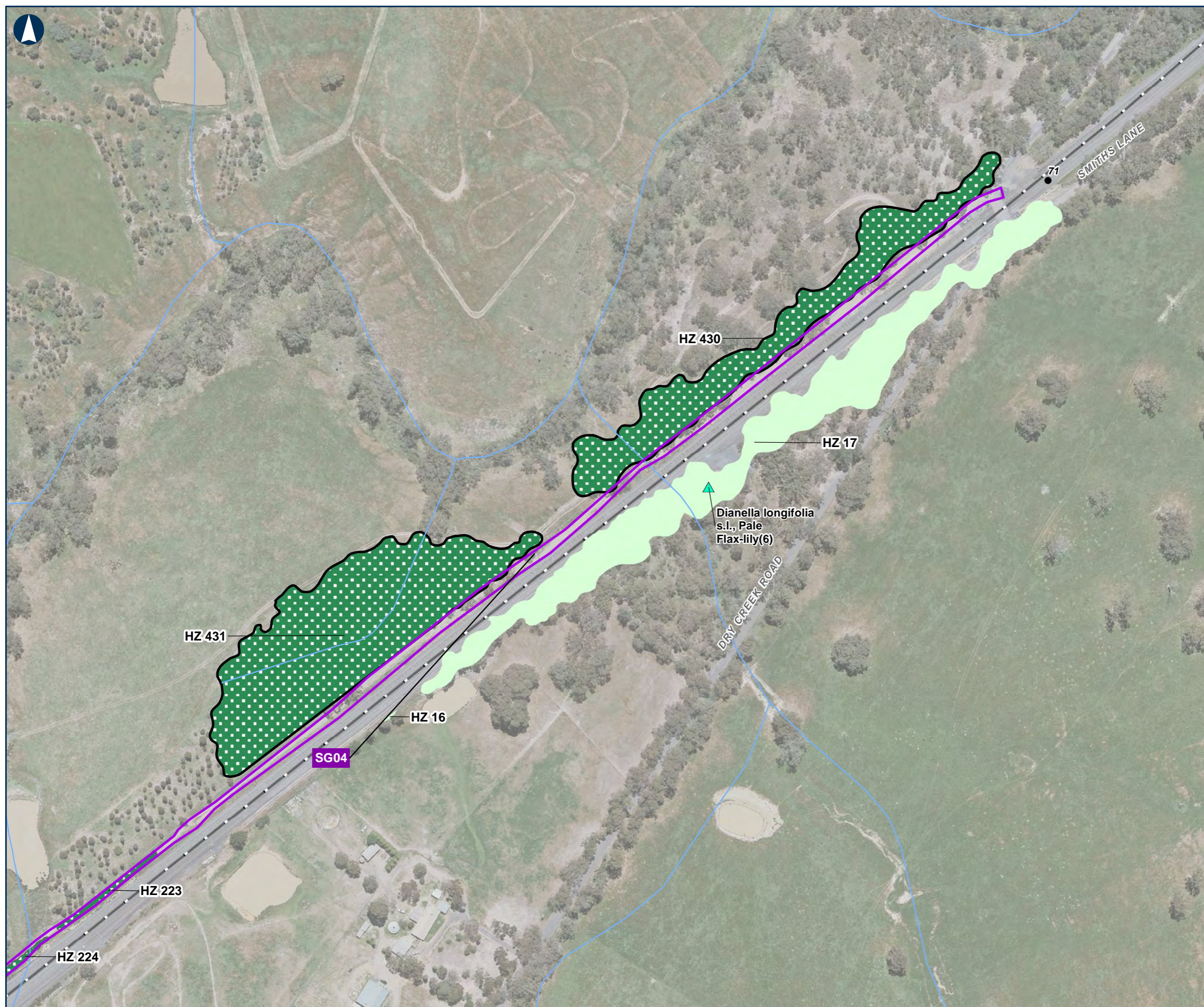
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**Threatened species and ecological communities**

MAP 12 OF 58



- Signal Gantry
- Threatened Flora (1)
- KM Posts
- Railway
- Watercourses
- Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
- Valley Grassy Forest (47) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

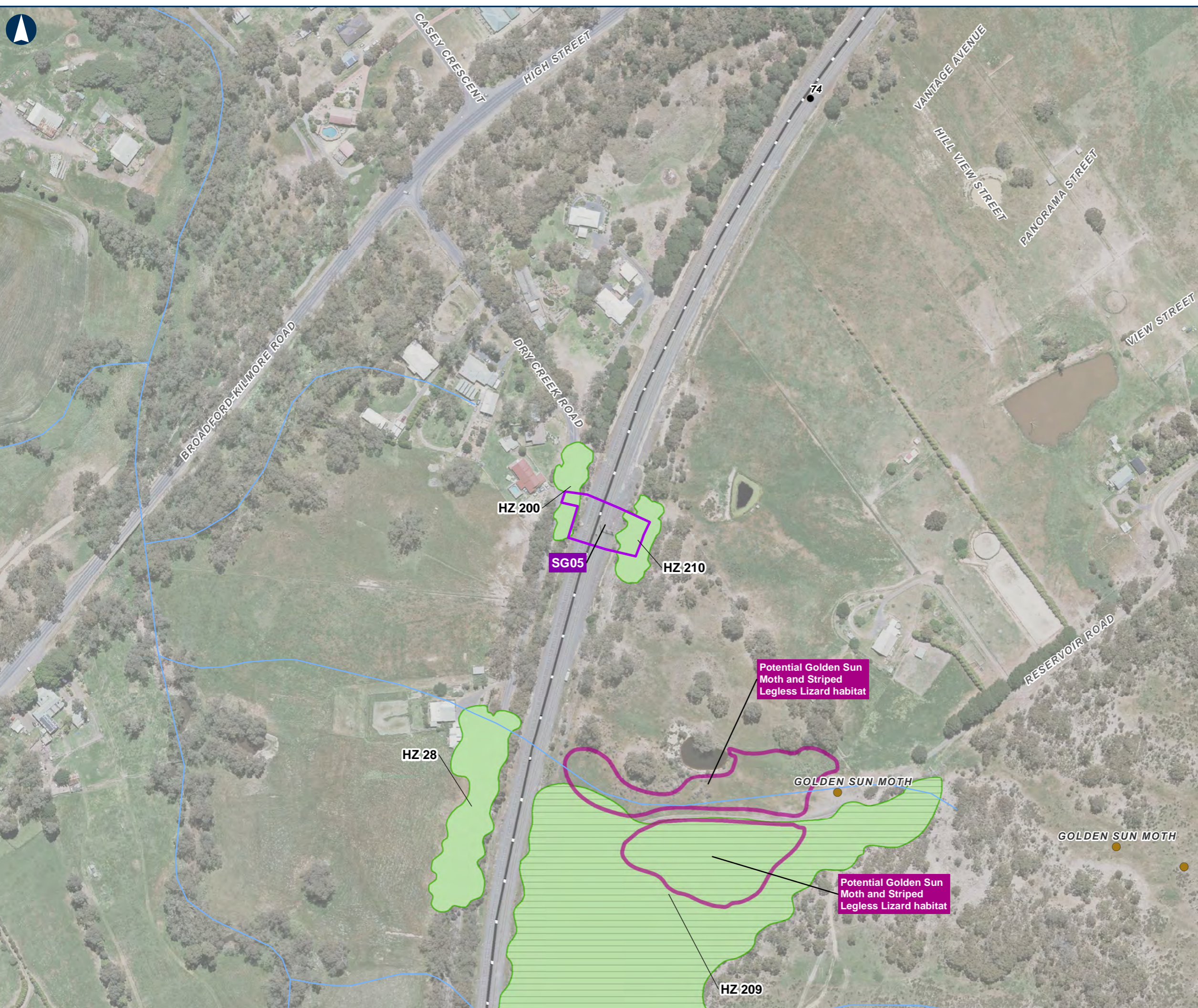


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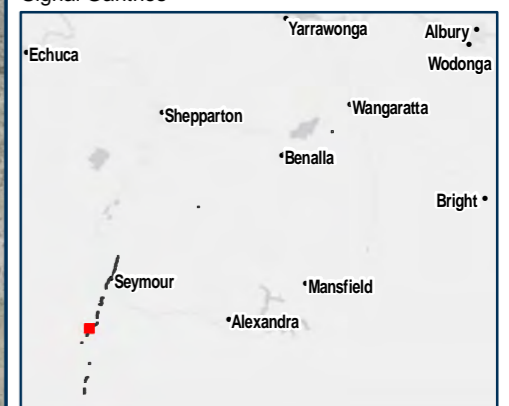
### Threatened species and ecological communities

MAP 13 OF 58

- Signal Gantry
  - VBA Fauna Records
  - KM Posts
  - Railway
  - Watercourses
  - Victorian Temperate Woodland Bird Community
  - Threatened Fauna Habitat
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Threatened species and ecological communities**

MAP 14 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Signal Gantry
- Train Station
- VBA Fauna Records
- Railway
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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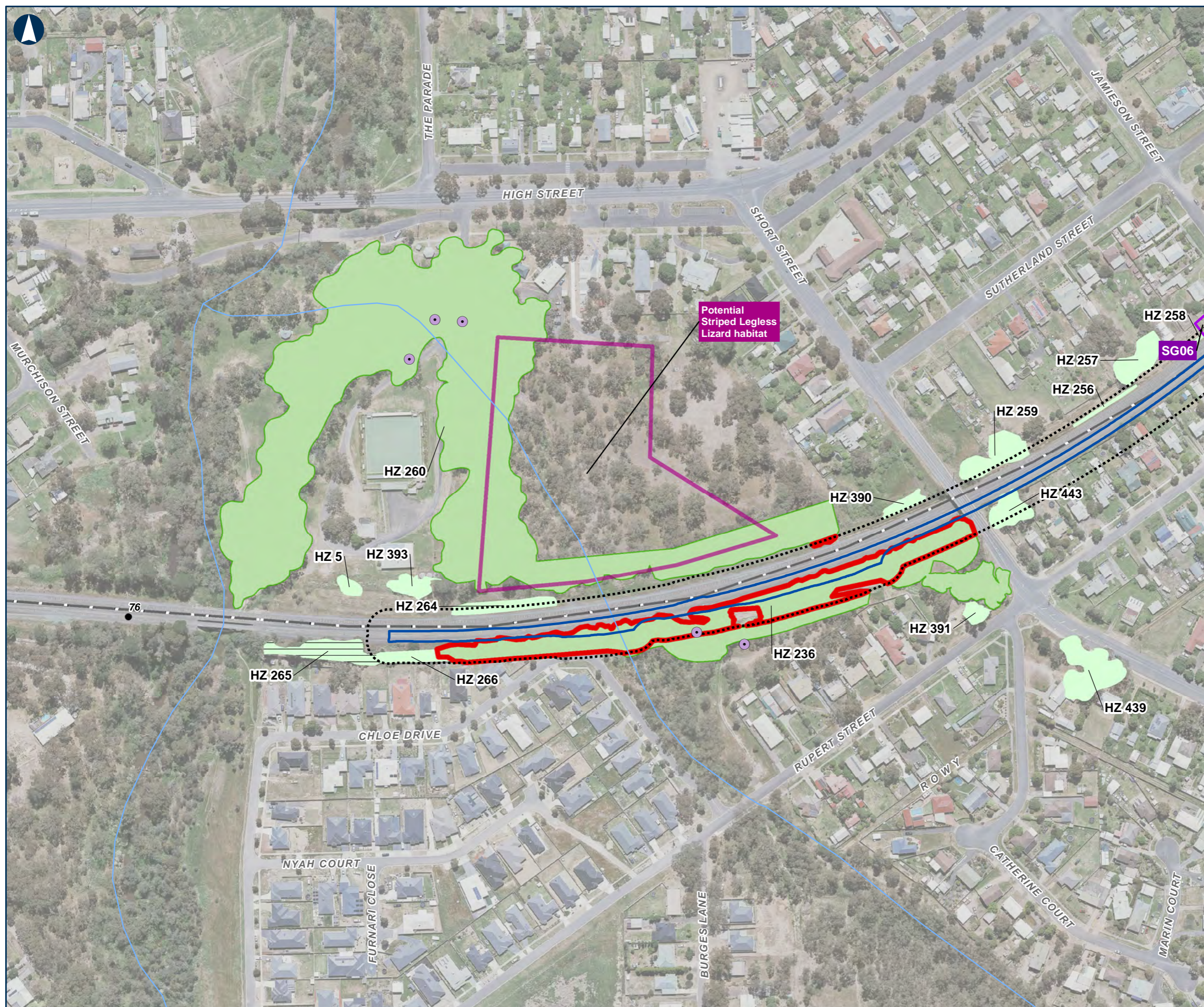




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### Threatened species and ecological communities

MAP 15 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Signal Gantry
  - Hollow Bearing Trees
  - KM Posts
  - Railway
  - Watercourses
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
  - Threatened Fauna Habitat
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
  - Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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**Threatened species and ecological communities**

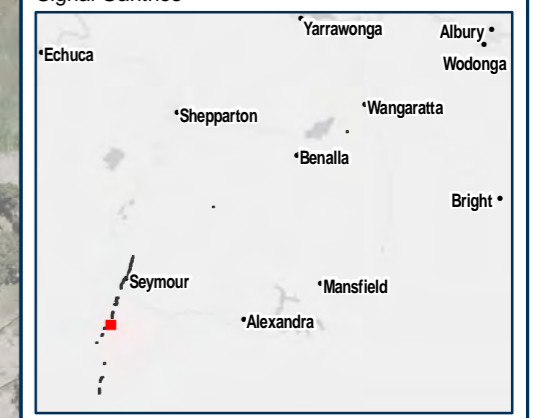
MAP 16 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Signal Gantry
  - Hollow Bearing Trees
  - KM Posts
  - Railway
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
  - Threatened Fauna Habitat
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
  - Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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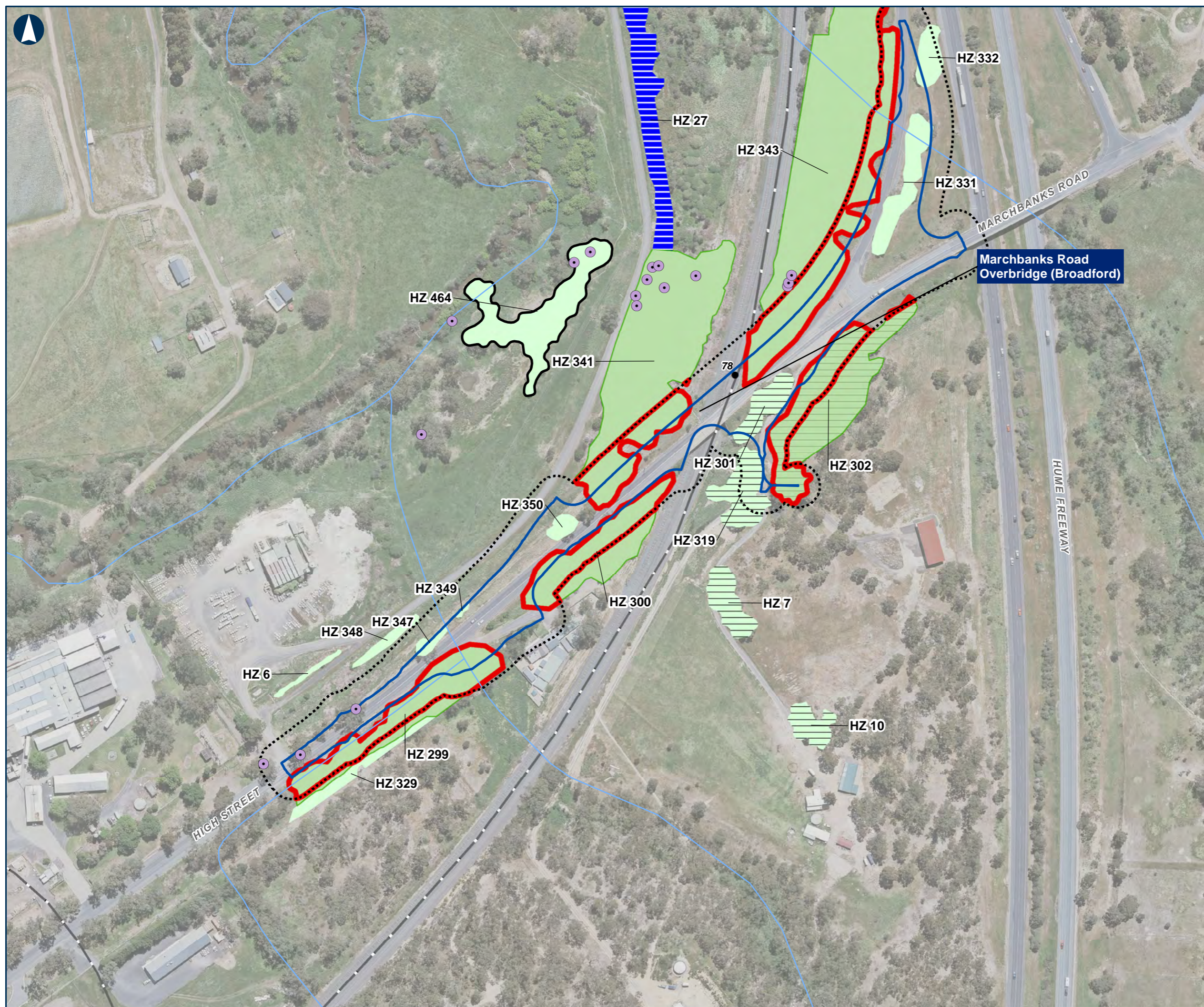




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**Threatened species and ecological communities**

MAP 17 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Hollow Bearing Trees
  - KM Posts
  - Railway
  - Watercourses
  - Habitat Zones Desktop/No access
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)
  - Red Gum Swamp (292) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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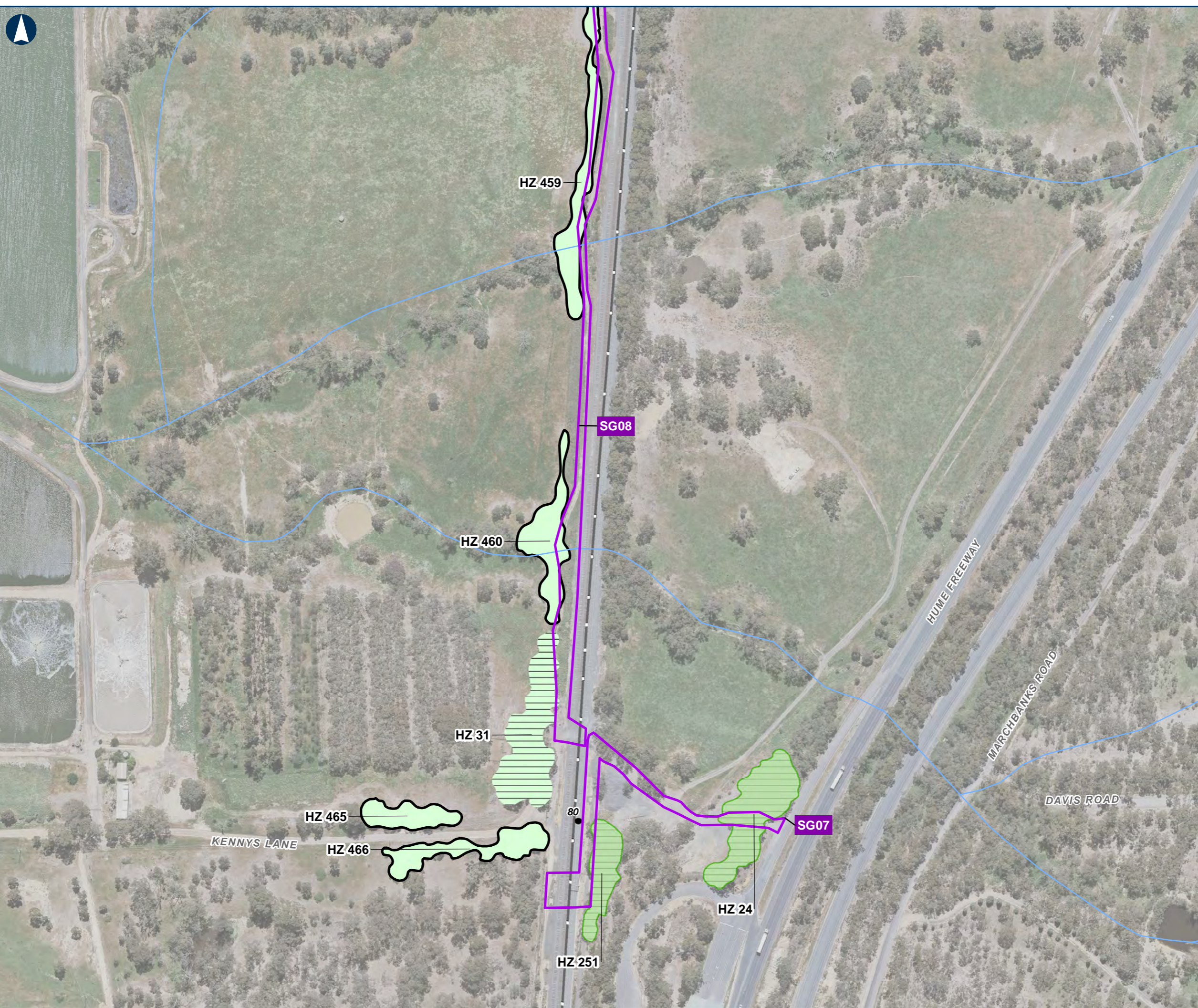
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 Data Sources: DELWP (2020) Figure 9





**Threatened species and ecological communities**

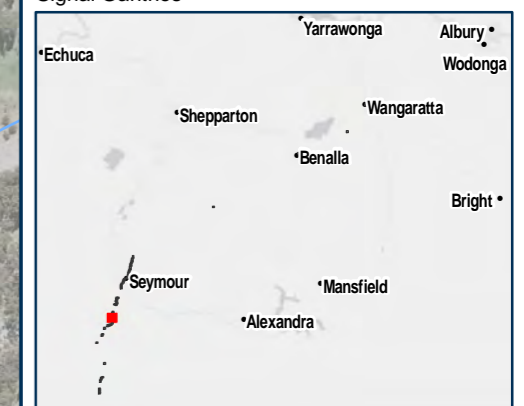
MAP 18 OF 58



- Signal Gantry
  - KM Posts
  - Railway
  - Watercourses
  - Habitat Zones Desktop/No access
  - Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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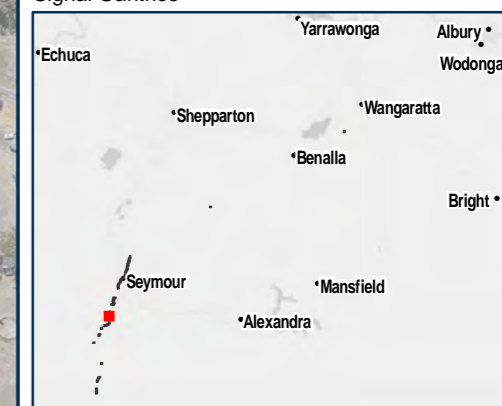
**Threatened species and ecological communities**

MAP 19 OF 58

- Signal Gantry
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses
- Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Grassy Woodland (175) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

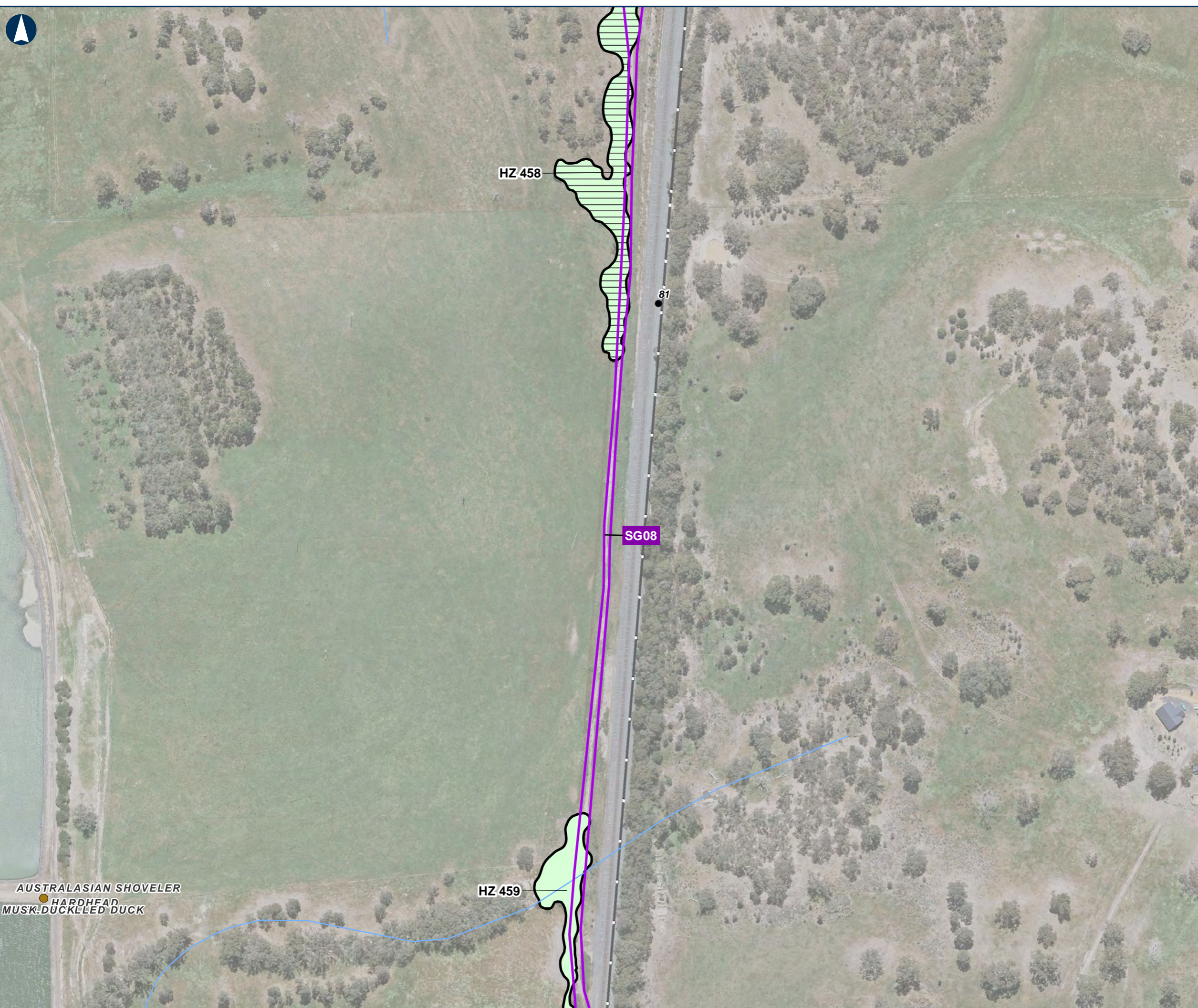


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
AUSTRALASIAN SHOVELER  
HARDHEAD  
MUSKY DUCK  
DUCKLED DUCK





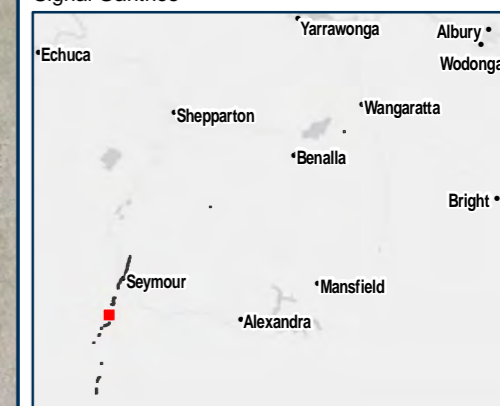
**Threatened species and ecological communities**

MAP 20 OF 58

-  Signal Gantry
-  Railway
-  Watercourses
-  Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
-  Grassy Woodland (175) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

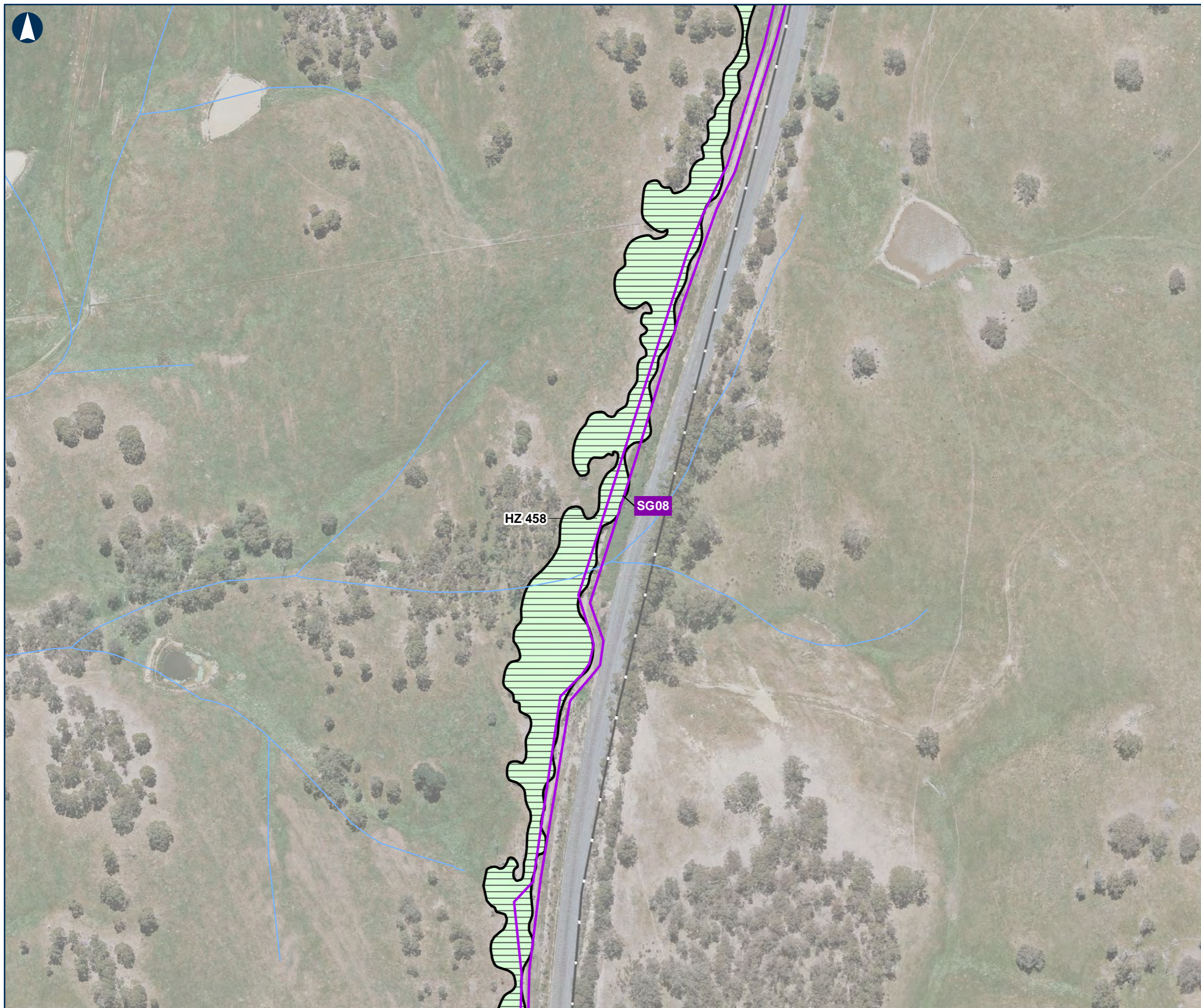


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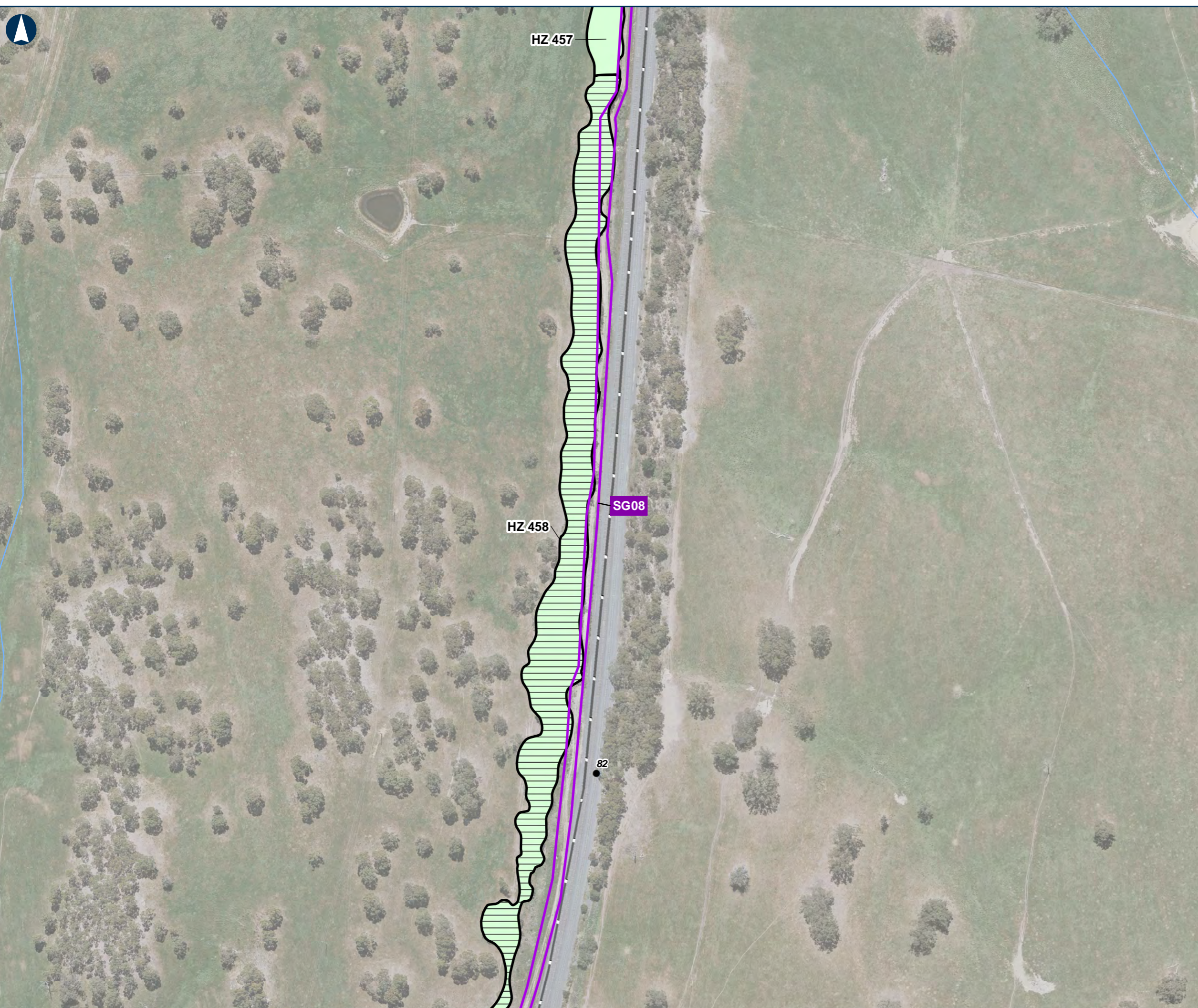
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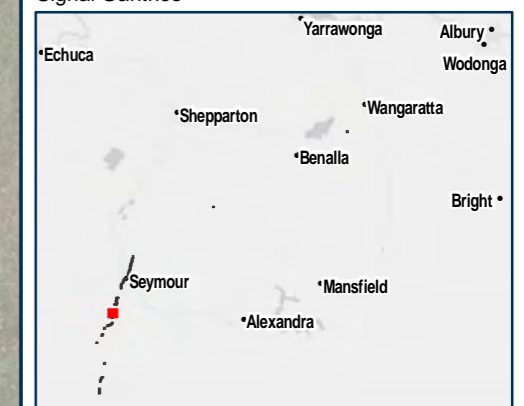
### Threatened species and ecological communities

MAP 21 OF 58

- Signal Gantry
- KM Posts
- Railway
- Watercourses
- Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Grassy Woodland (175) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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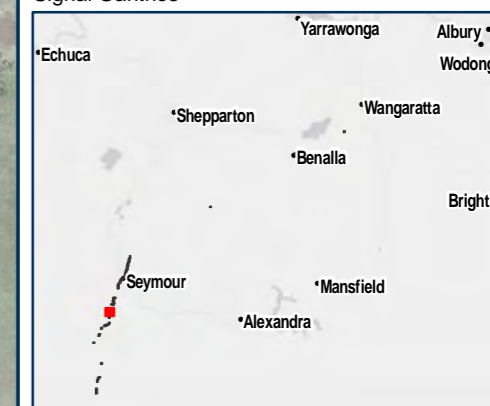
### Threatened species and ecological communities

MAP 22 OF 58

- Signal Gantry
- Threatened Flora (2)
- KM Posts
- Railway
- Watercourses
- Habitat Zones Desktop/No access
- Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Grassy Woodland (175) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

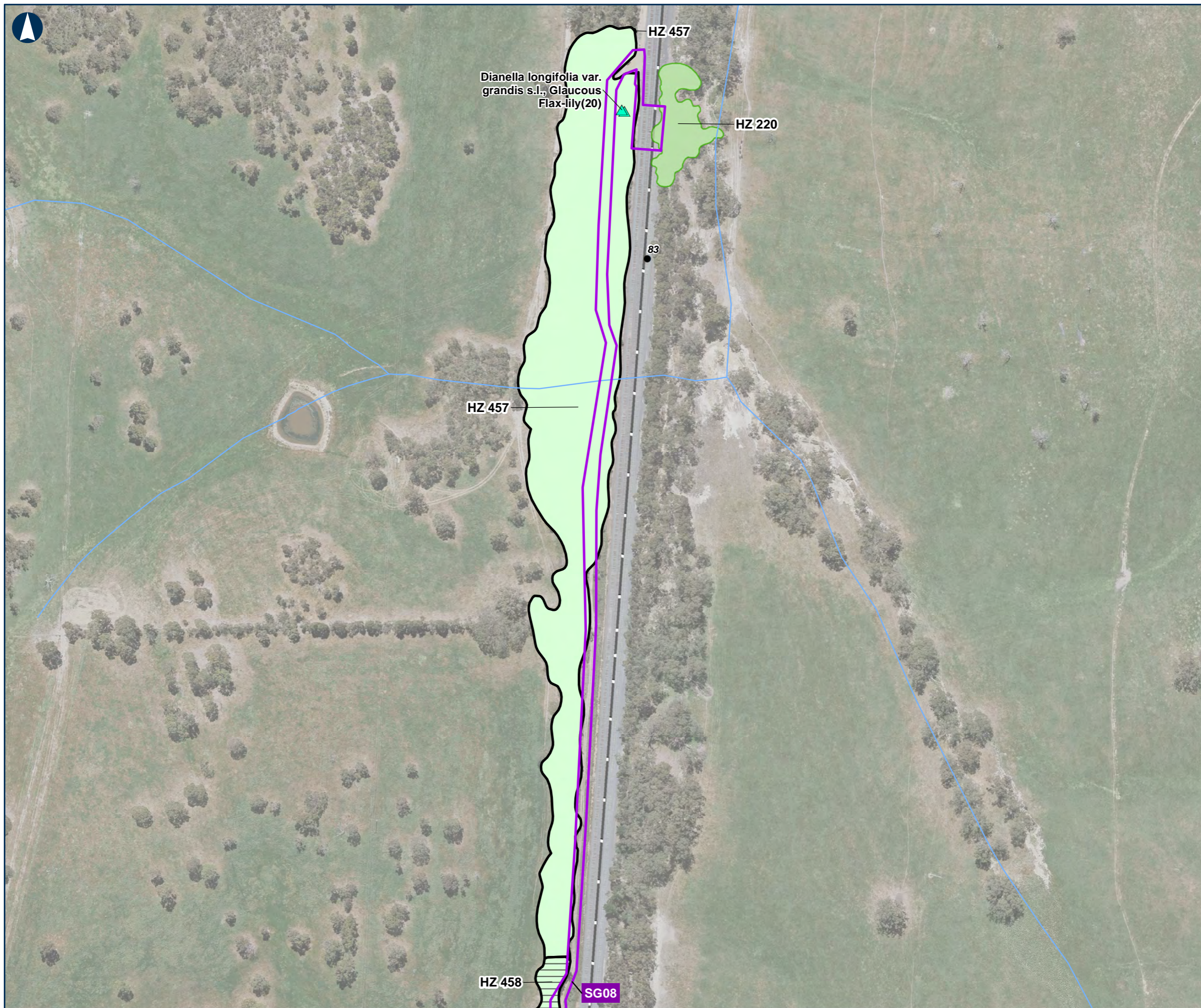


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






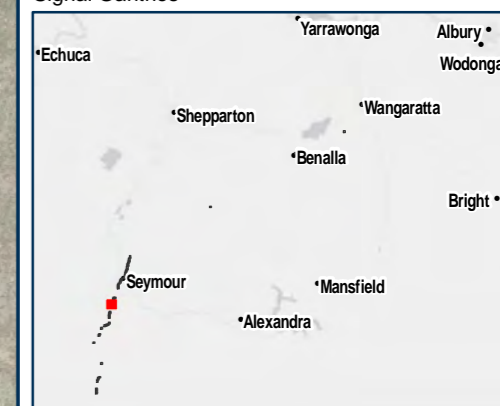
**Threatened species and ecological communities**

MAP 23 OF 58

-  Signal Gantry
-  Threatened Flora (1)
-  KM Posts
-  Railway
-  Watercourses
-  Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
-  Grassy Woodland (175\_61) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

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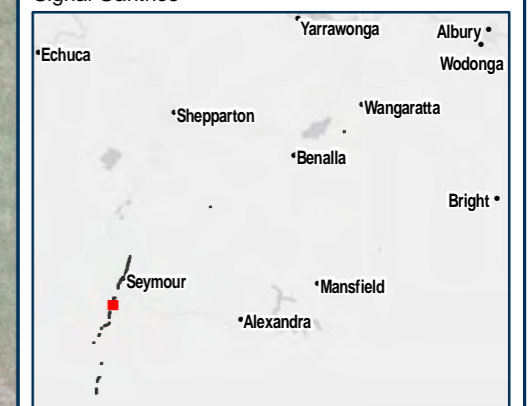
**Threatened species and ecological communities**

MAP 24 OF 58

-  Threatened Flora (1)
  -  Hollow Bearing Trees
  -  Next Generation Cabling
  -  Watercourses
  -  Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
-  Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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






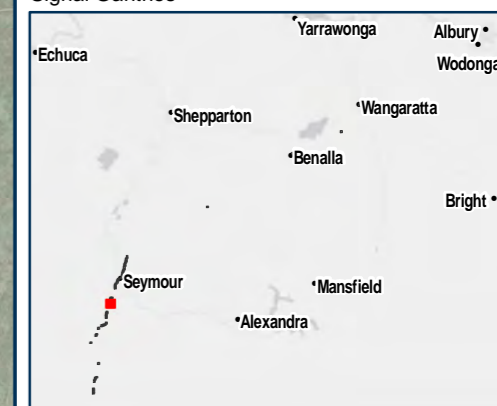
**Threatened species and ecological communities**

MAP 25 OF 58

-  Hollow Bearing Trees
-  Next Generation Cabling
-  Watercourses
-  Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
-  Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9







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**Threatened species and ecological communities**

MAP 26 OF 58

- Hollow Bearing Trees
- Next Generation Cabling
- Watercourses
- Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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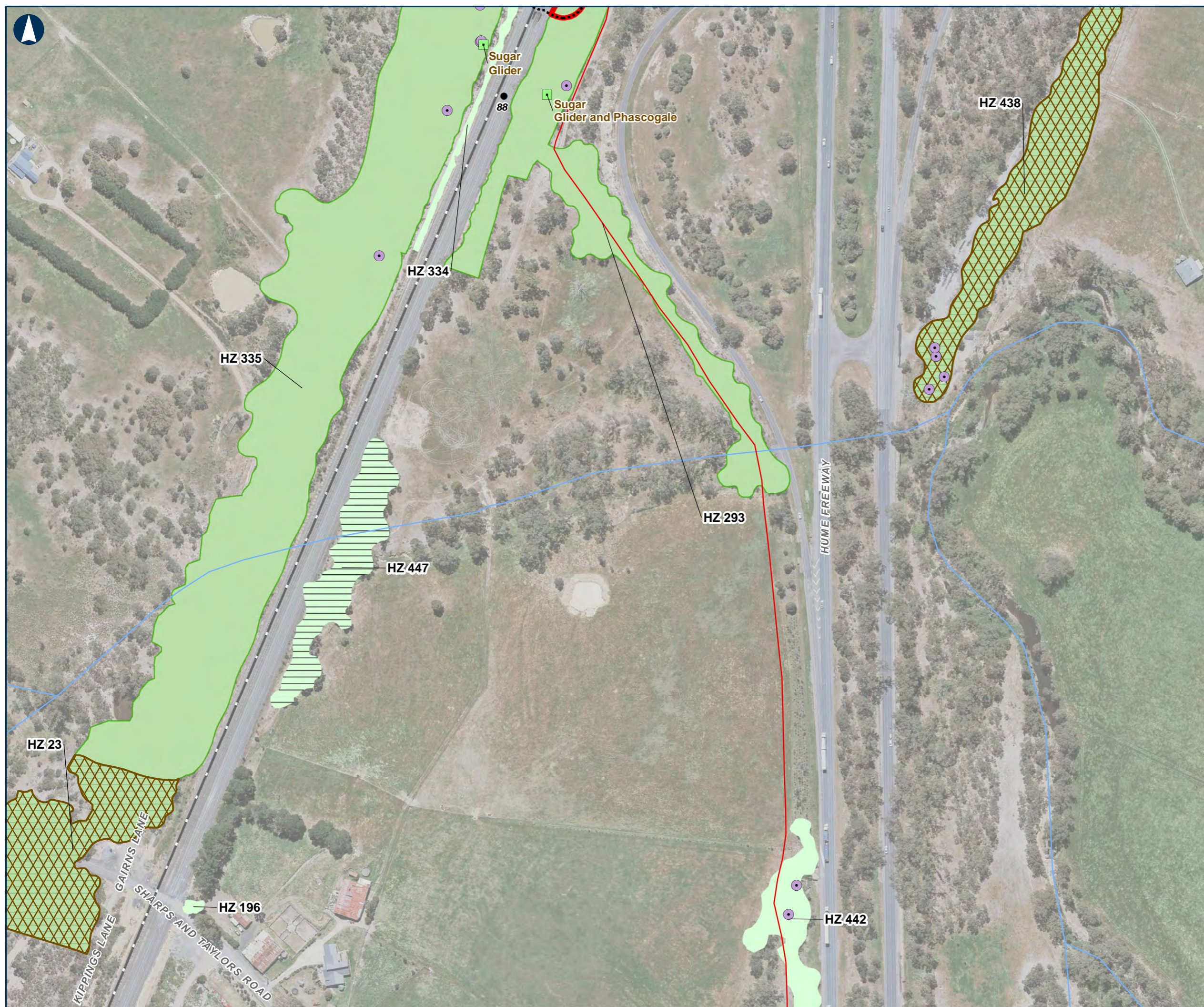
Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9





**Threatened species and ecological communities**

MAP 27 OF 58



- 15m Buffer
- Threatened Fauna Species
- Hollow Bearing Trees
- KM Posts
- Railway
- Next Generation Cabling
- Watercourses
- Victorian Temperate Woodland Bird Community
- Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

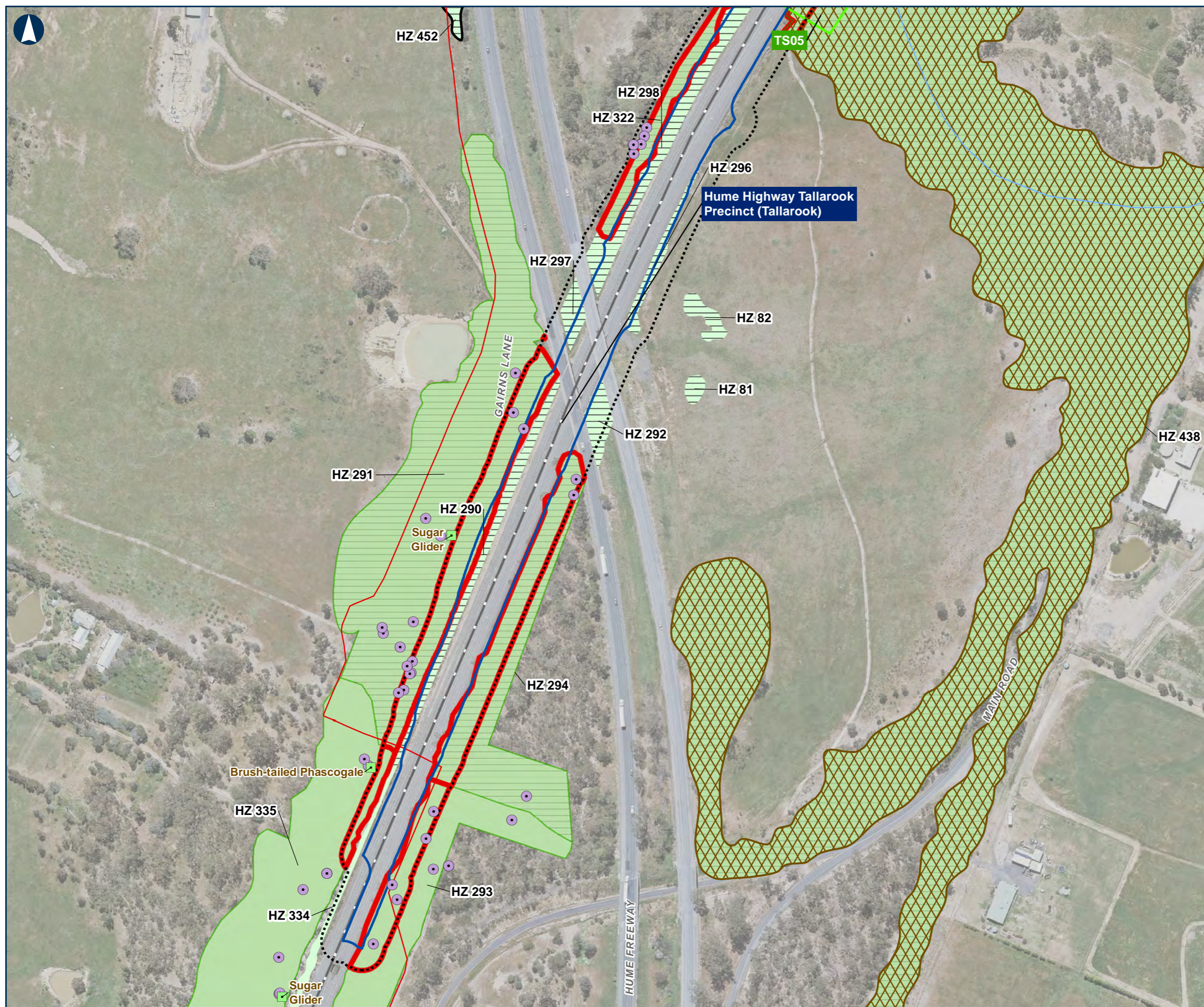
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**Threatened species and ecological communities**

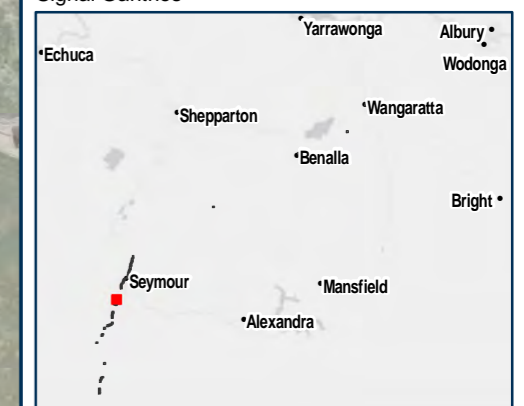
MAP 28 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Track Slew
  - Threatened Fauna Species
  - Hollow Bearing Trees
  - Railway
  - Next Generation Cabling
  - Watercourses
  - Habitat Zones Desktop/No access
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

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Date: 13/08/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,500  
Figure 9

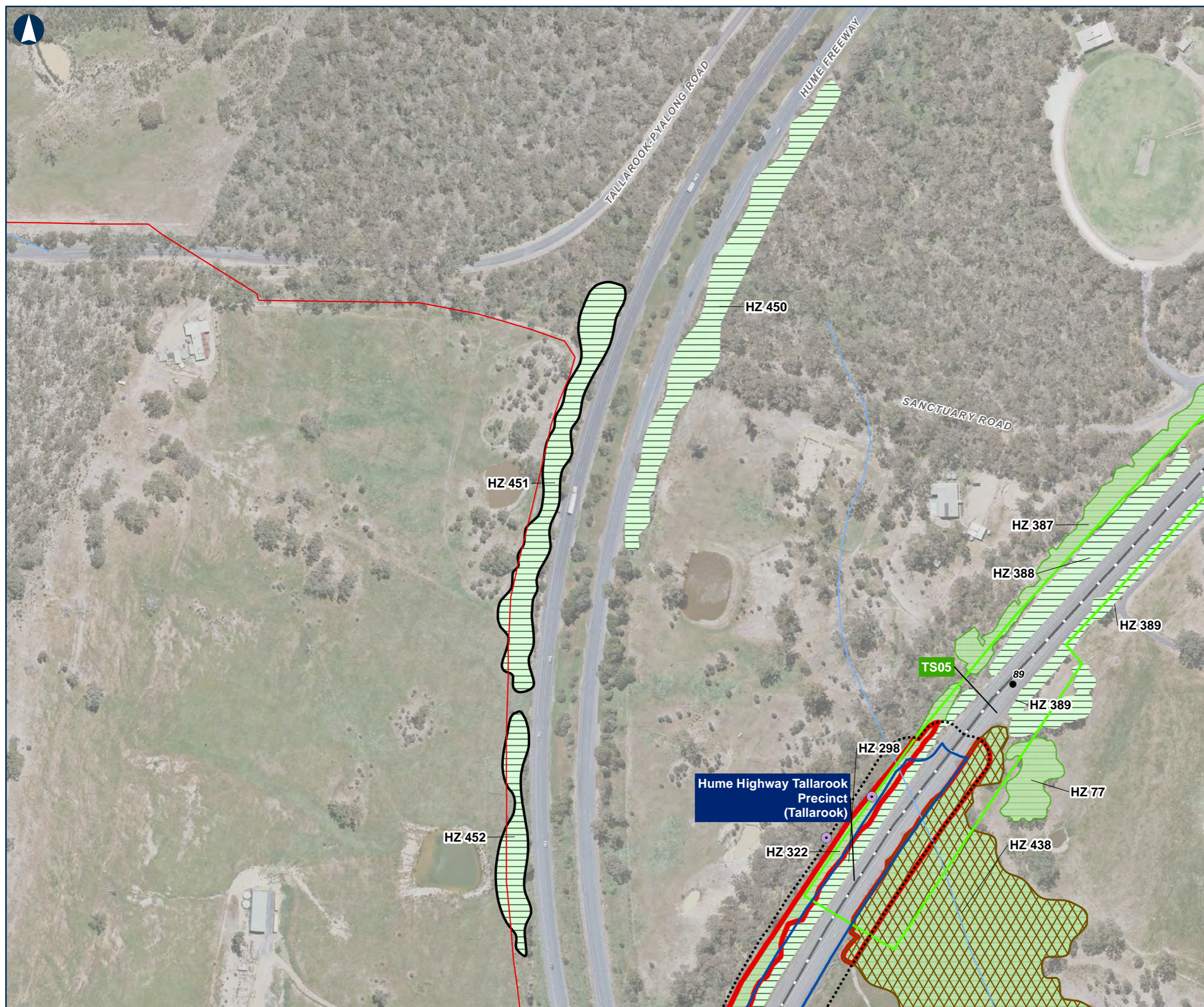




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**Threatened species and ecological communities**

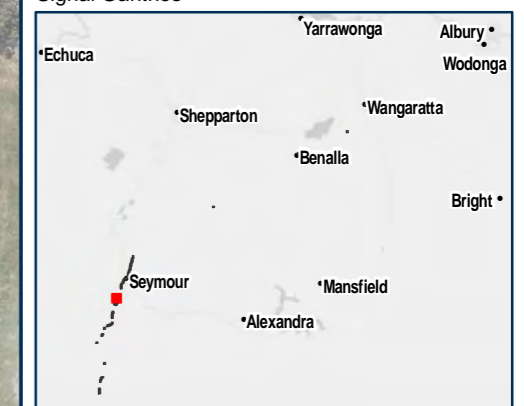
MAP 29 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Track Slew
  - Hollow Bearing Trees
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Watercourses
  - Habitat Zones Desktop/No access
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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 Figure 9





HUME FREEWAY

PIONEER STREET

SANCTUARY ROAD

GATEHOUSE LANE

MAIN ROAD

HEDLEYS LANE

HZ 30

HZ 29

HZ 387

HZ 389

TS05

HZ 388

HZ 389

HZ 298

HZ 322

Hume Highway Tallarook Precinct (Tallarook)

HZ 438

HZ 77

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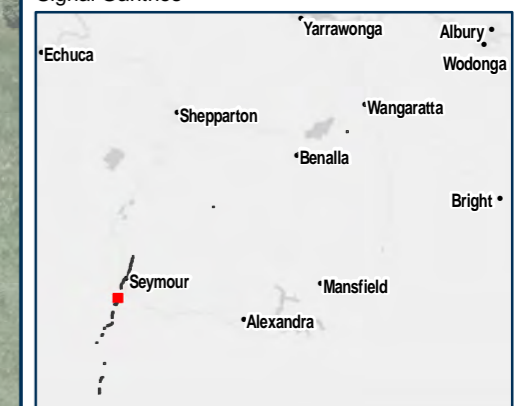
## Threatened species and ecological communities

MAP 30 OF 58

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Track Slew
  - KM Posts
  - Railway
  - Watercourses
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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 Data Sources: DELWP (2020) Figure 9





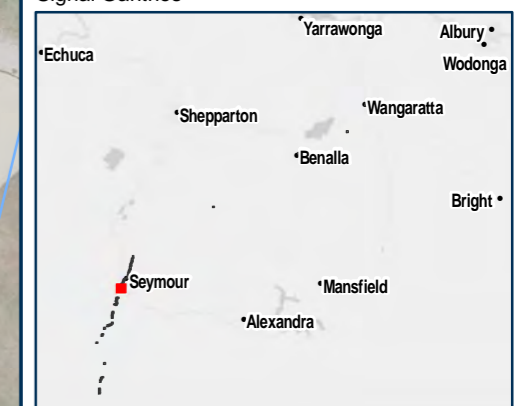
**Threatened species and ecological communities**

MAP 31 OF 58

-  Signal Gantry
-  KM Posts
-  Railway
-  Watercourses
- Ecological Vegetation Classes**
-  Floodplain Riparian Woodland (56) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9

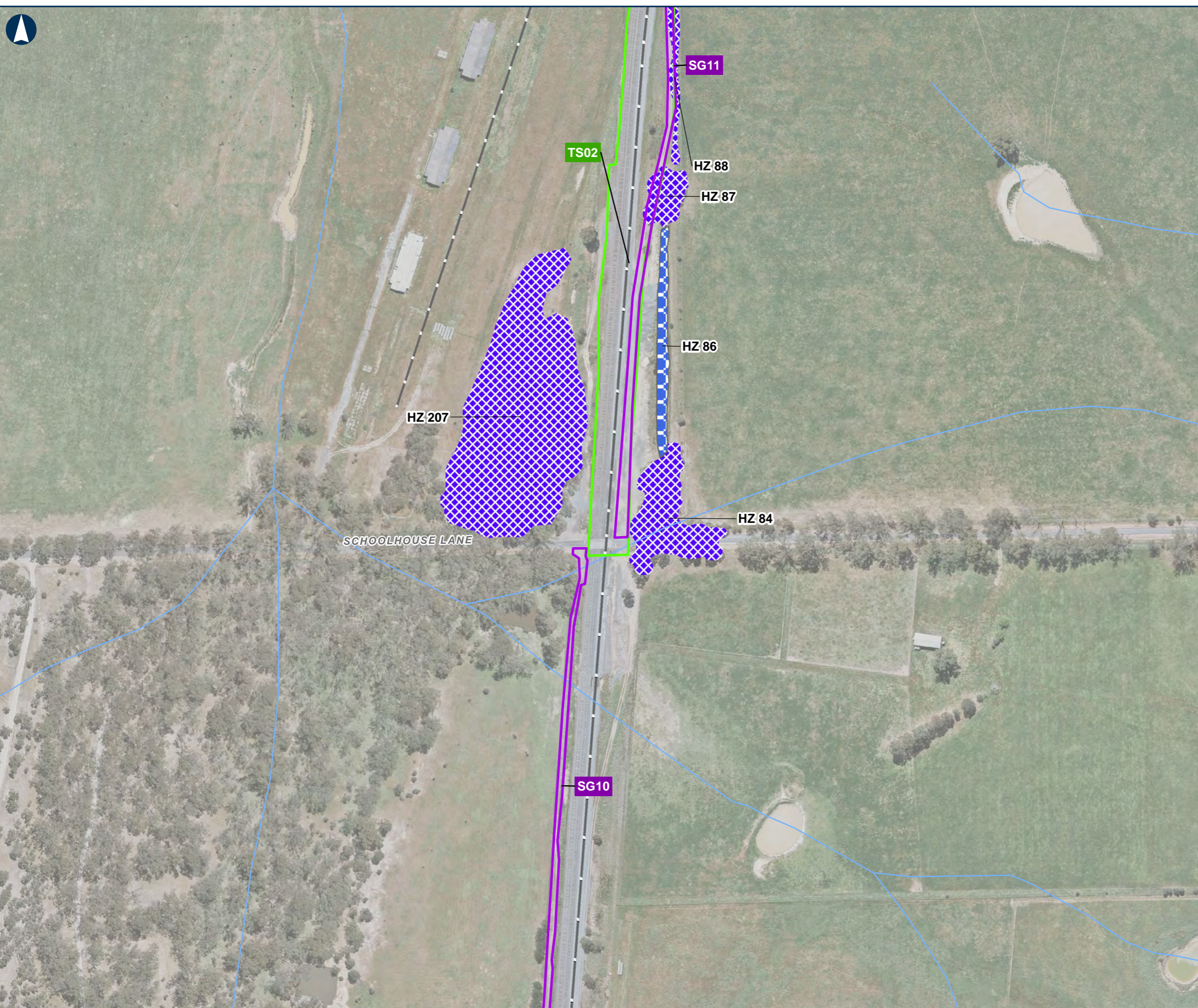






### Threatened species and ecological communities

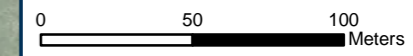
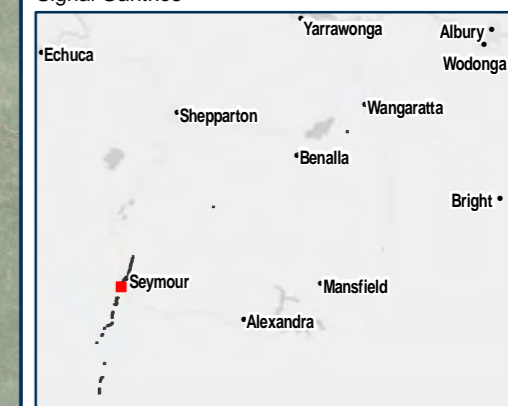
MAP 32 OF 58



- Signal Gantry
  - Track Slew
  - Railway
  - Watercourses
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
  - Spike-sedge Wetland (819) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

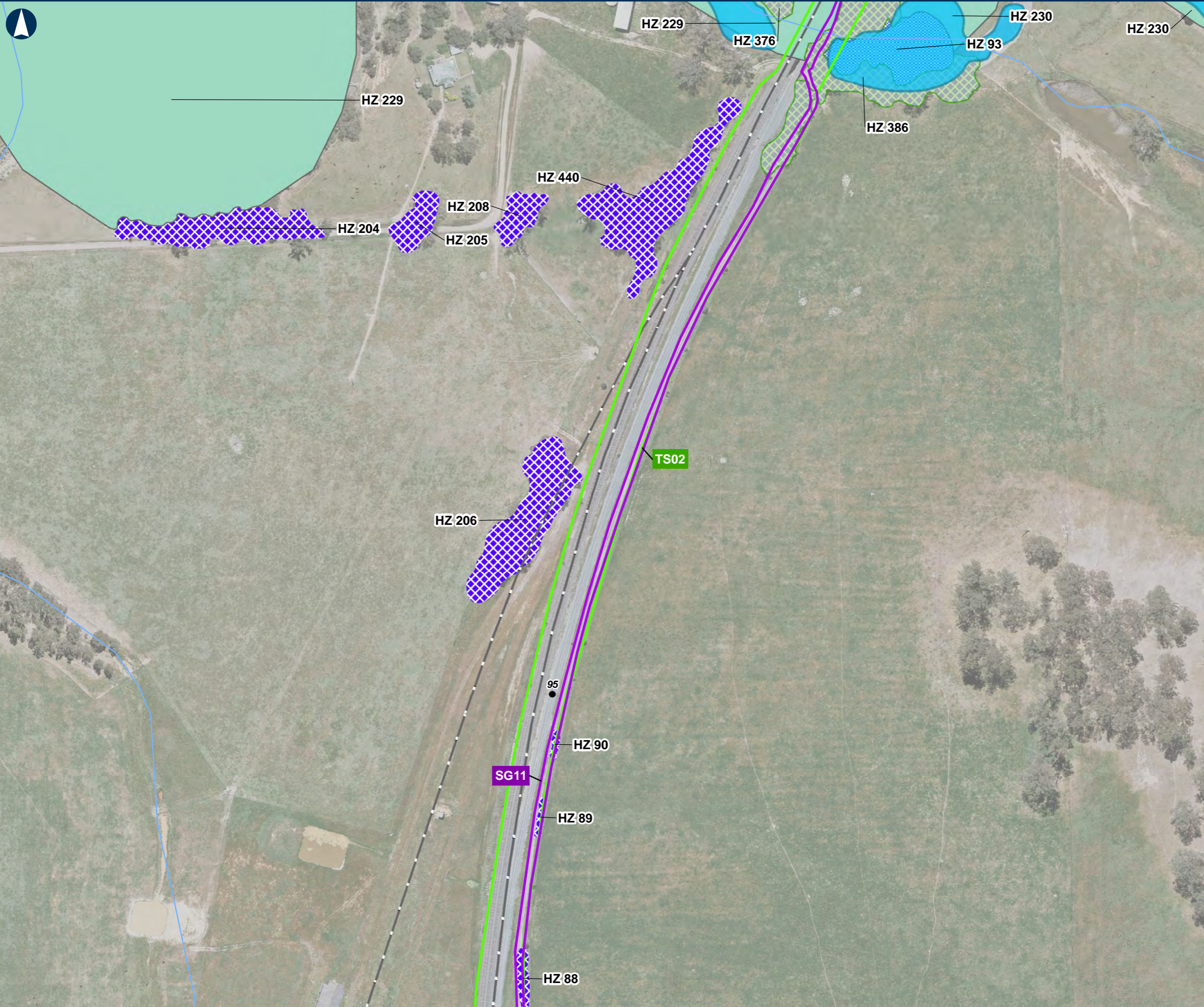
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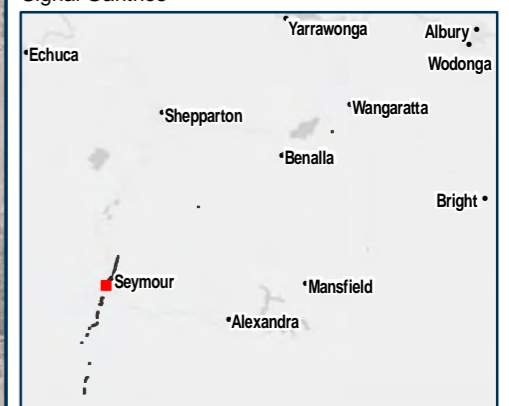
**Threatened species and ecological communities**

MAP 33 OF 58

- Signal Gantry
- Track Slew
- KM Posts
- Railway
- Watercourses
- Lowland Riverine Fish Community of the Southern Murray-Darling Basin
- Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
- Tall Marsh (821) (D)
- Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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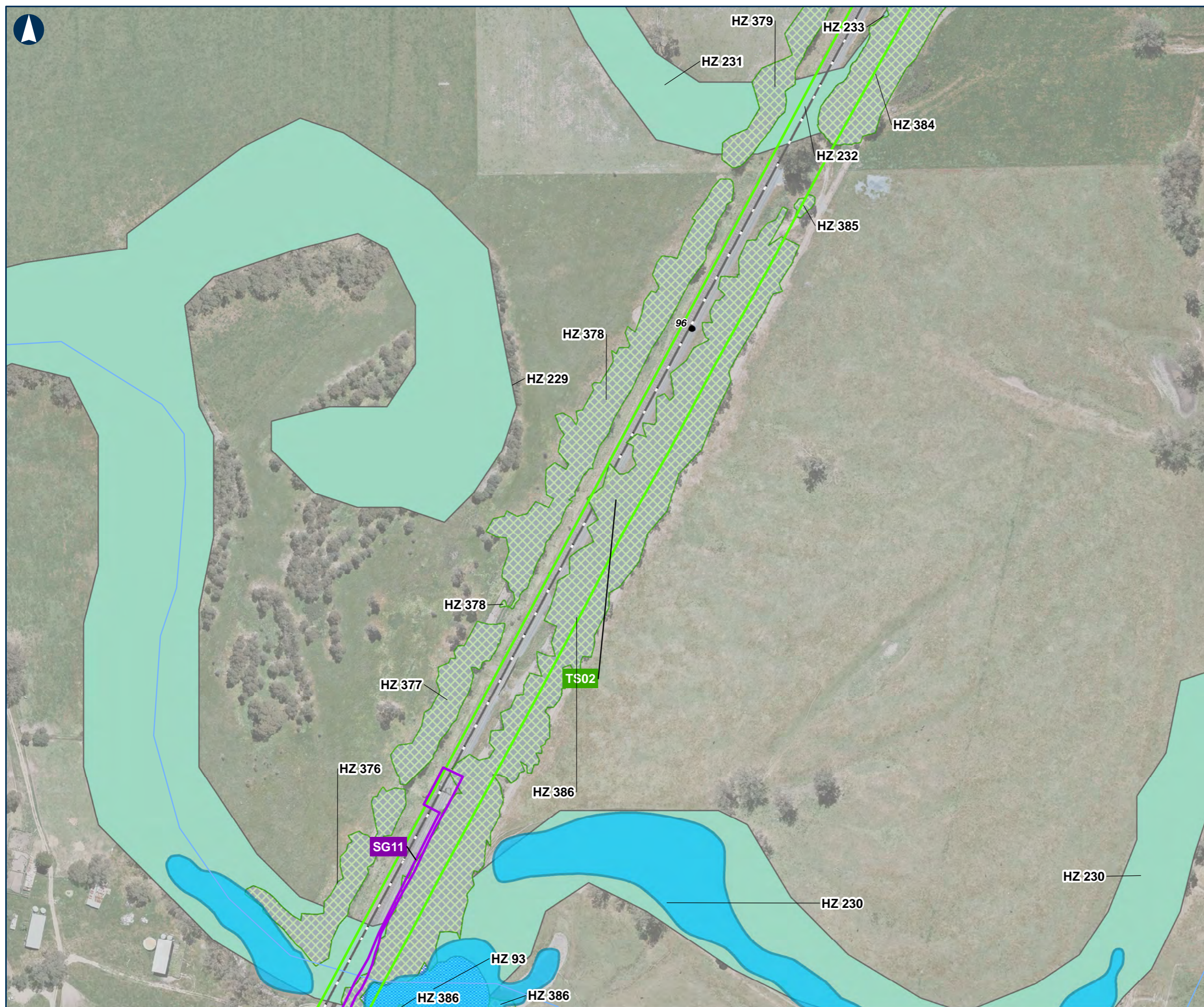




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**Threatened species and ecological communities**

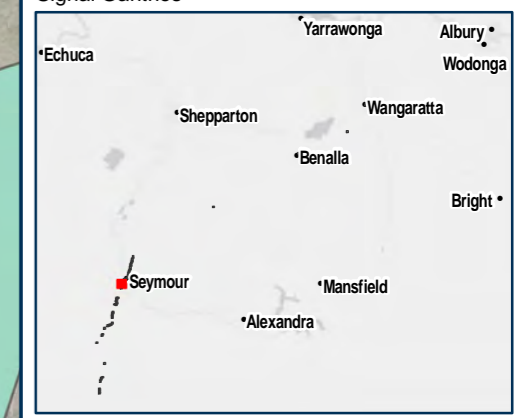
MAP 34 OF 58



- Signal Gantry
- Track Slew
- KM Posts
- Railway
- Watercourses
- Lowland Riverine Fish Community of the Southern Murray-Darling Basin
- Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
- Tall Marsh (821) (D)
- Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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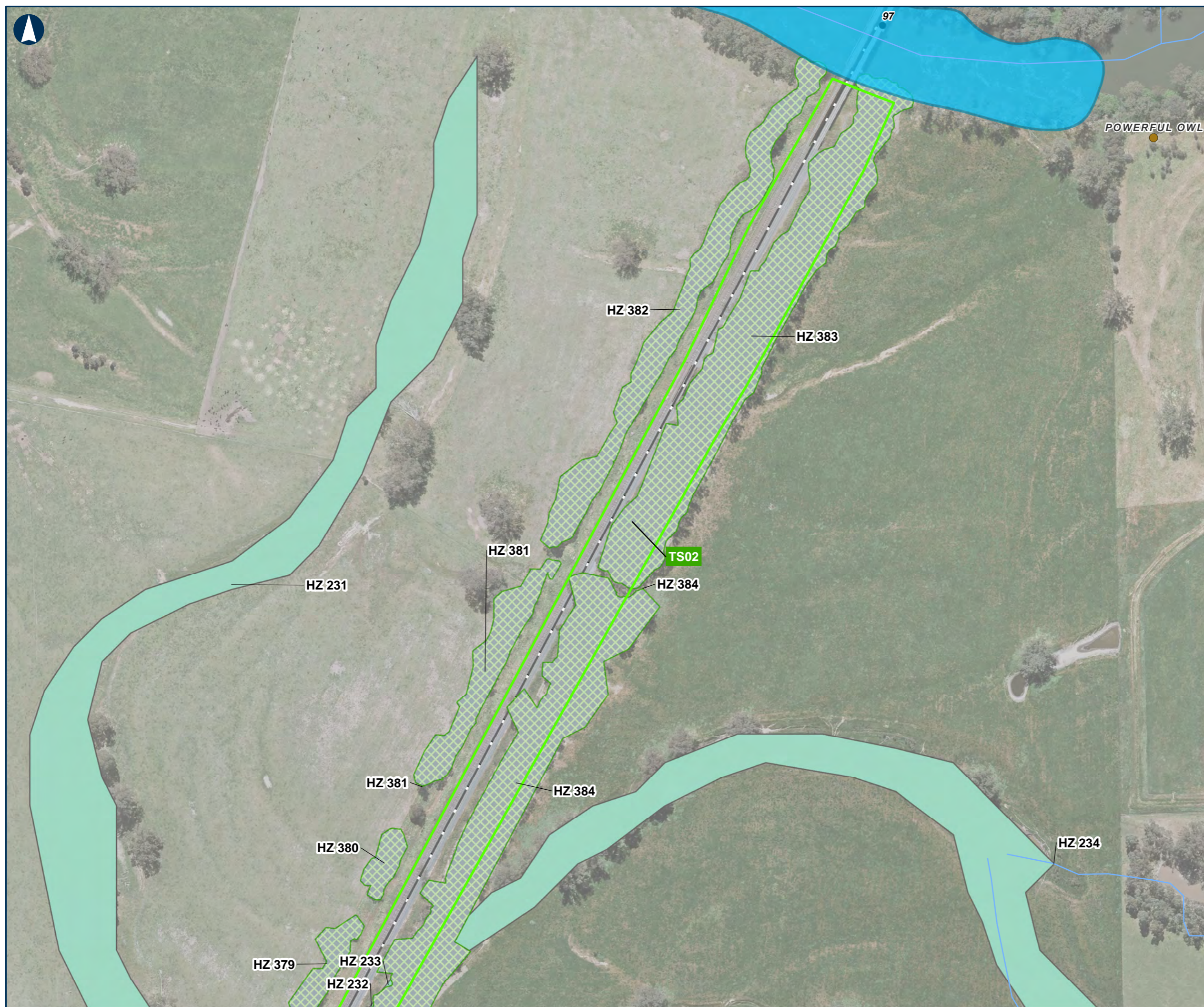
Paper: A3  
 Scale: 1:2,500  
 Figure 9





**Threatened species and ecological communities**

MAP 35 OF 58



- Track Slew
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses
- Lowland Riverine Fish Community of the Southern Murray-Darling Basin
- Victorian Temperate Woodland Bird Community
- Ecological Vegetation Classes**
- Floodplain Riparian Woodland (56) (V)
- Wetland (ND)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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**Threatened species and ecological communities**

MAP 36 OF 58

-  Signal Gantry
-  Railway
-  Watercourses
-  Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
-  Floodplain Riparian Woodland (56) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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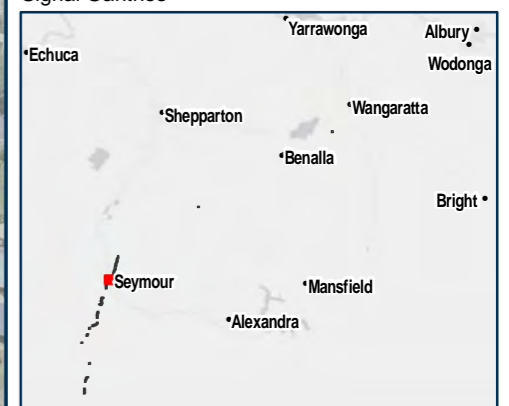
### Threatened species and ecological communities

MAP 37 OF 58

- Signal Gantry
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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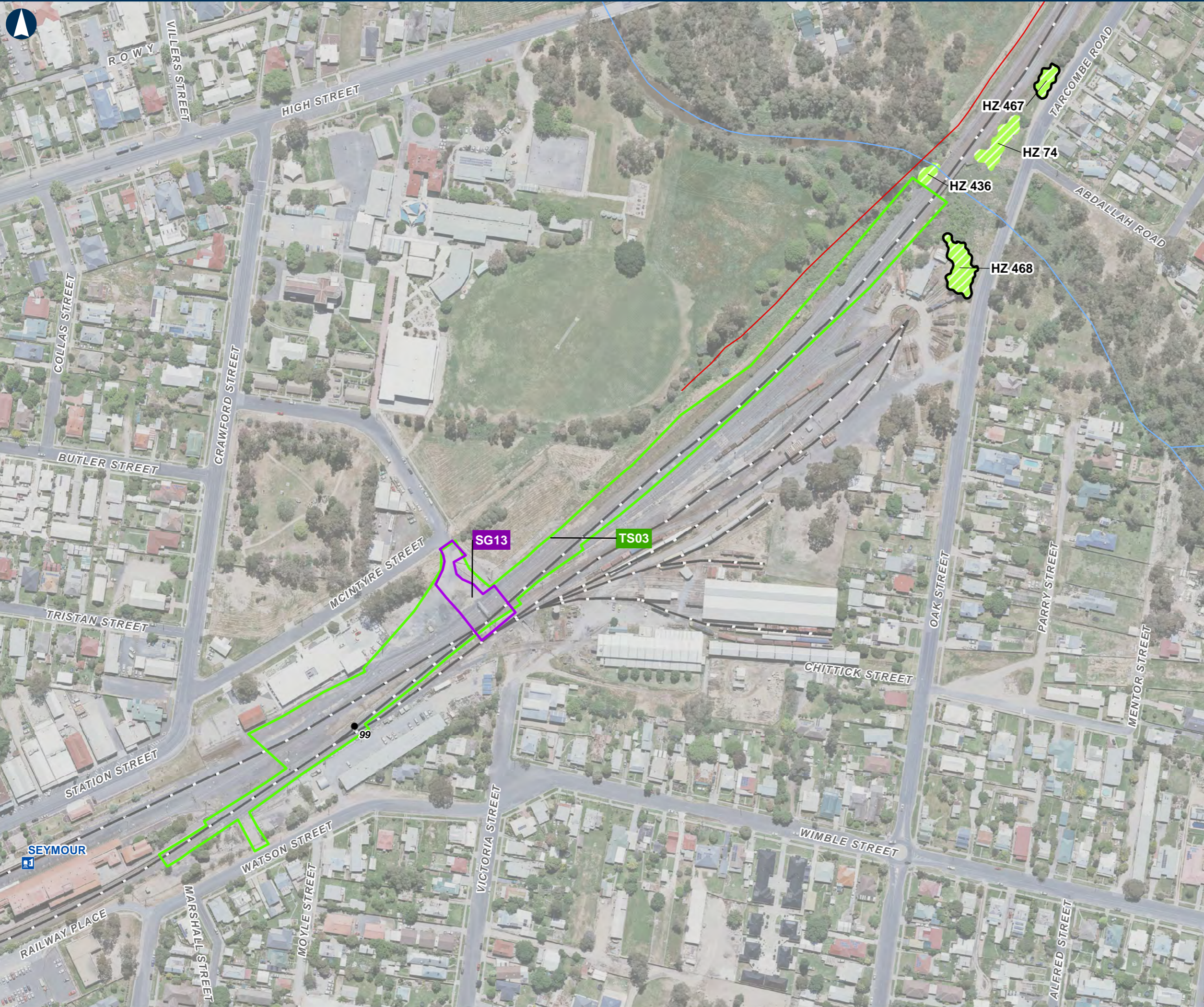
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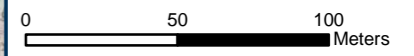
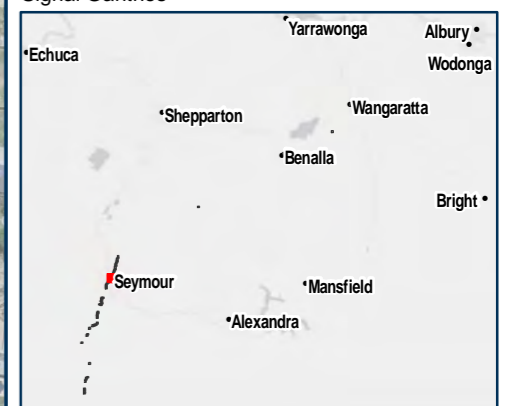
**Threatened species and ecological communities**

MAP 38 OF 58

- Signal Gantry
- Track Slew
- Train Station
- KM Posts
- Railway
- Next Generation Cabling
- Watercourses
- Habitat Zones Desktop/No access
- Ecological Vegetation Classes**
- Creepline Grassy Woodland (68) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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**Threatened species and ecological communities**

MAP 39 OF 58



- Track Slew
- KM Posts
- Railway
- Next Generation Cabling
- Watercourses
- Habitat Zones Desktop/No access
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes
- Box Ironbark Forest (61) (V)
- Creekline Grassy Woodland (68) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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**Threatened species and ecological communities**

MAP 40 OF 58



- Track Slew
- KM Posts
- Railway
- Next Generation Cabling
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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**Threatened species and ecological communities**

MAP 41 OF 58



- Track Slew
- Threatened Flora (1)
- VBA Fauna Records
- Hollow Bearing Trees
- KM Posts
- Railway
- Next Generation Cabling
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

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Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
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Figure 9

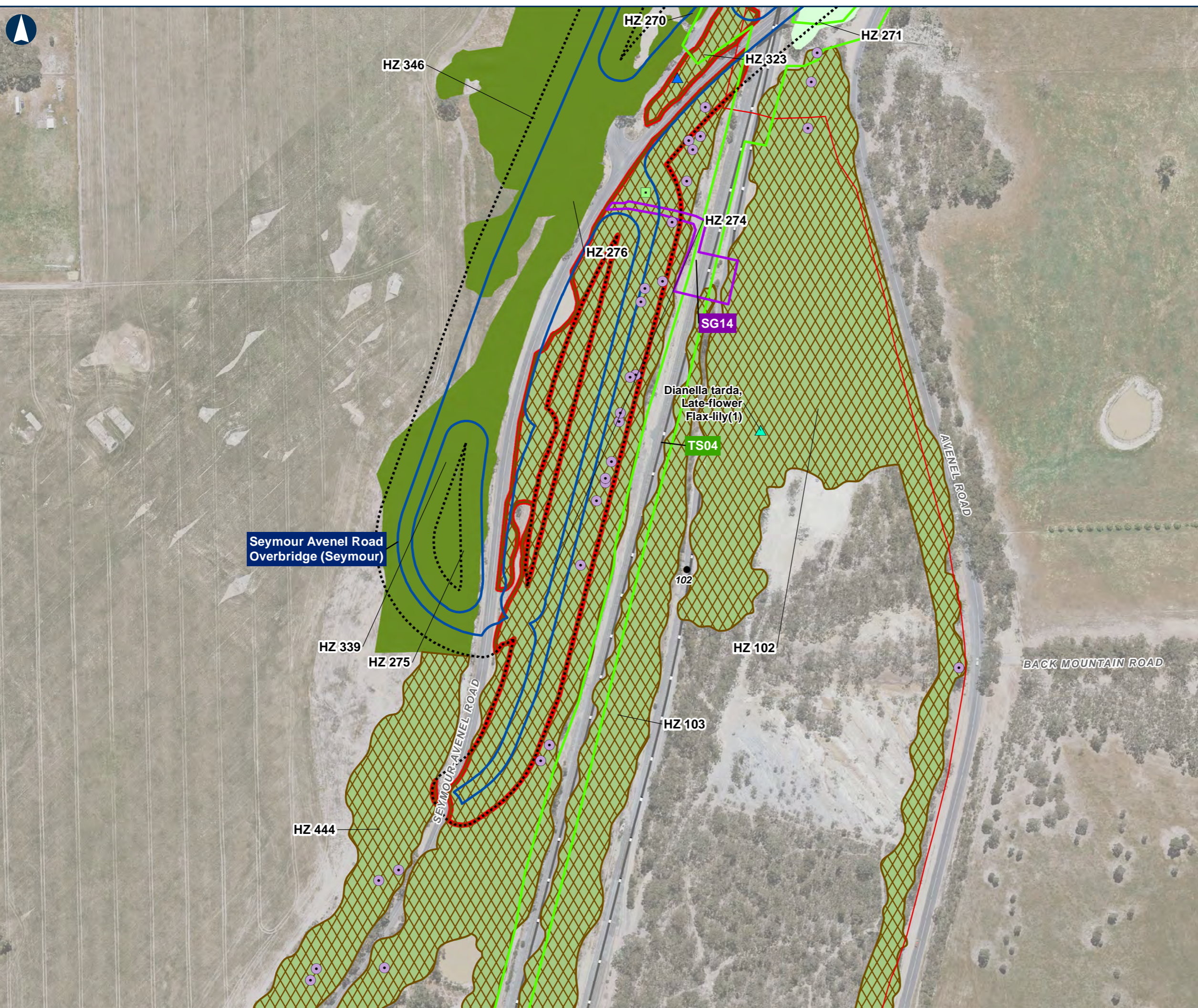




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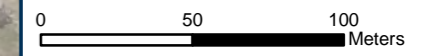
**Threatened species and ecological communities**

MAP 42 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Signal Gantry
- Track Slew
- Allocasuarina luehmannii, Buloke (1)
- Threatened Flora (1)
- Threatened Fauna Species
- Hollow Bearing Trees
- KM Posts
- Railway
- Next Generation Cabling
- Victorian Temperate Woodland Bird Community
- Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Plains Grassy Woodland (55) (E)
- E=Endangered**
- D=Depleted**
- V=vulnerable**
- ND= Not described**

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



Coordinate System: GDA 1994 MGA Zone 55

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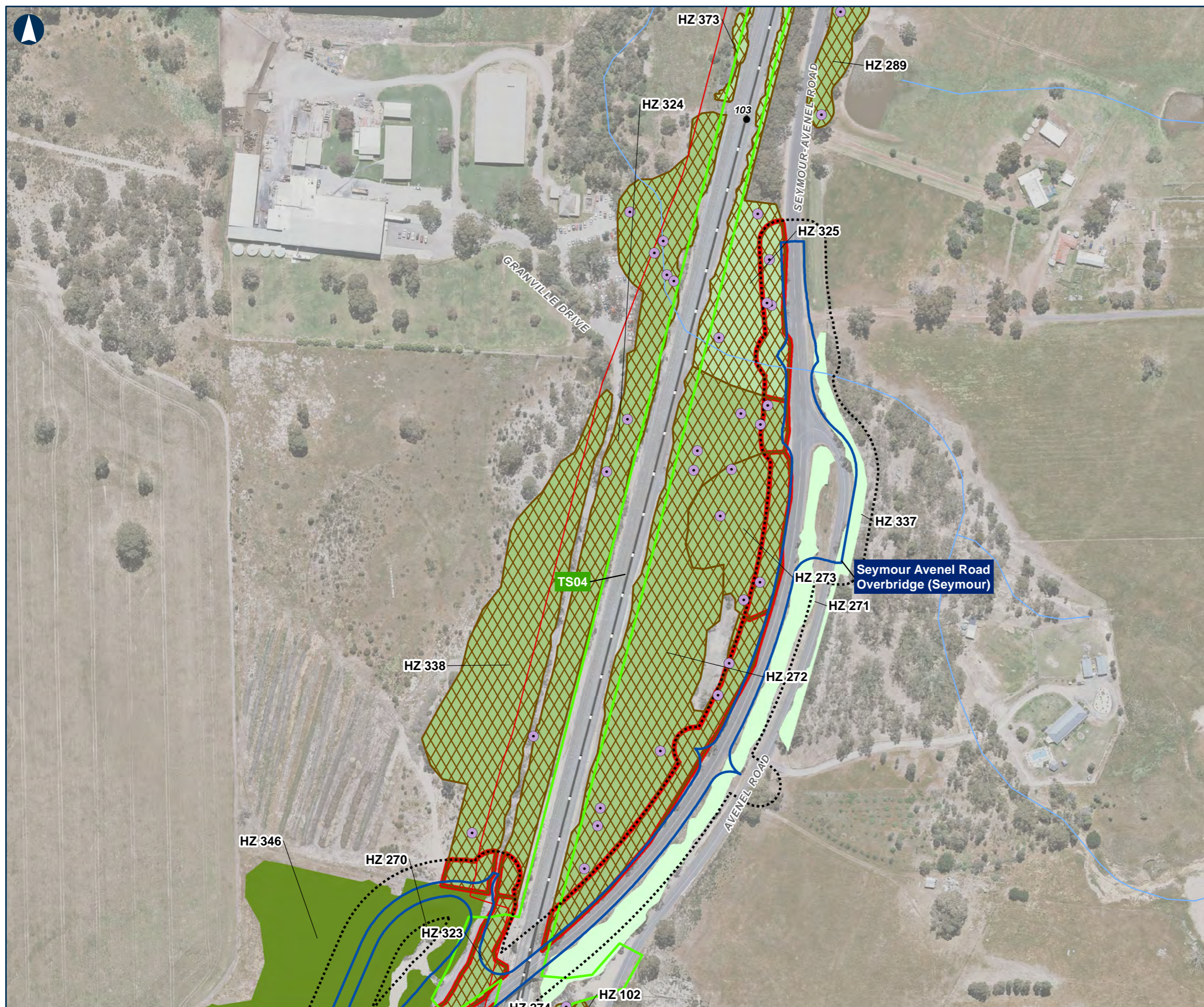




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**Threatened species and ecological communities**

MAP 43 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Track Slew
  - Hollow Bearing Trees
  - KM Posts
  - Railway
  - Next Generation Cabling
  - Watercourses
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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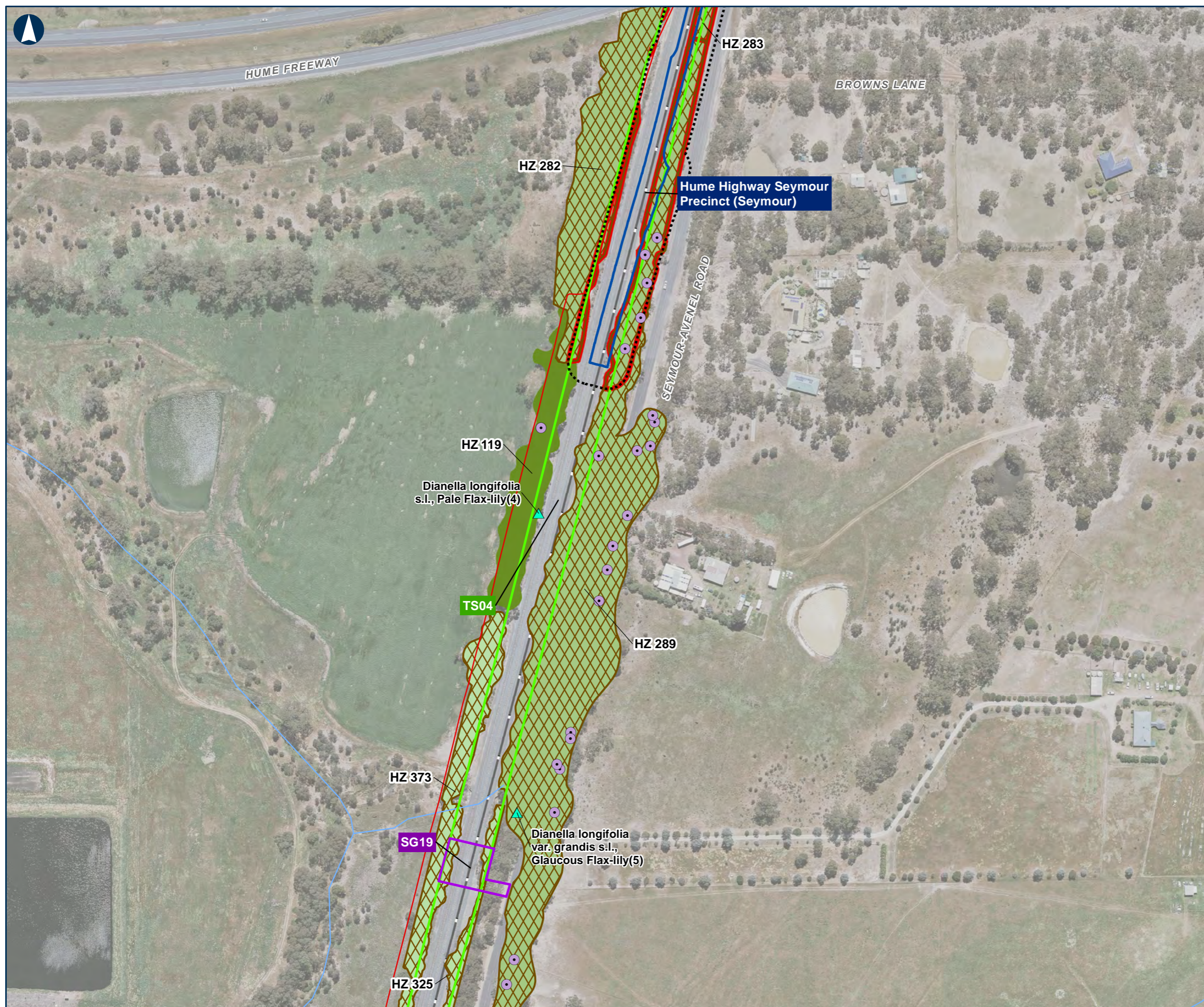
Date: 13/08/2021 Paper: A3  
 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9





**Threatened species and ecological communities**

MAP 44 OF 58



- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Signal Gantry
  - Track Slew
  - Threatened Flora (2)
  - Hollow Bearing Trees
  - Railway
  - Next Generation Cabling
  - Watercourses
  - Victorian Temperate Woodland Bird Community
  - Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
  - Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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**Threatened species and ecological communities**

MAP 45 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Track Slew
- Threatened Flora (1)
- Hollow Bearing Trees
- KM Posts
- Railway
- Next Generation Cabling
- Victorian Temperate Woodland Bird Community
- Impacted Threatened Ecological Community
- Threatened Ecological Communities**
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9





**Threatened species and ecological communities**

MAP 46 OF 58



- Track Slew
- Threatened Flora (1)
- KM Posts
- Railway
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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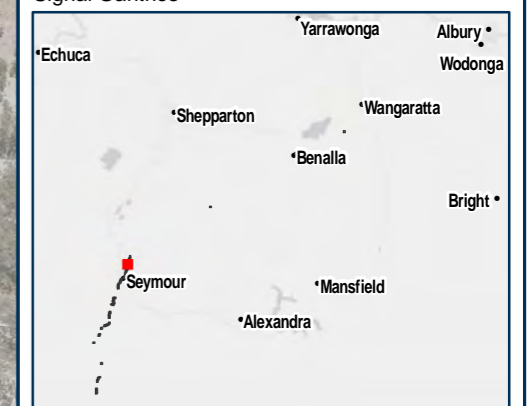
**Threatened species and ecological communities**

MAP 47 OF 58

- Track Slew
- Threatened Flora (3)
- Railway
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Creekline Grassy Woodland (68) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

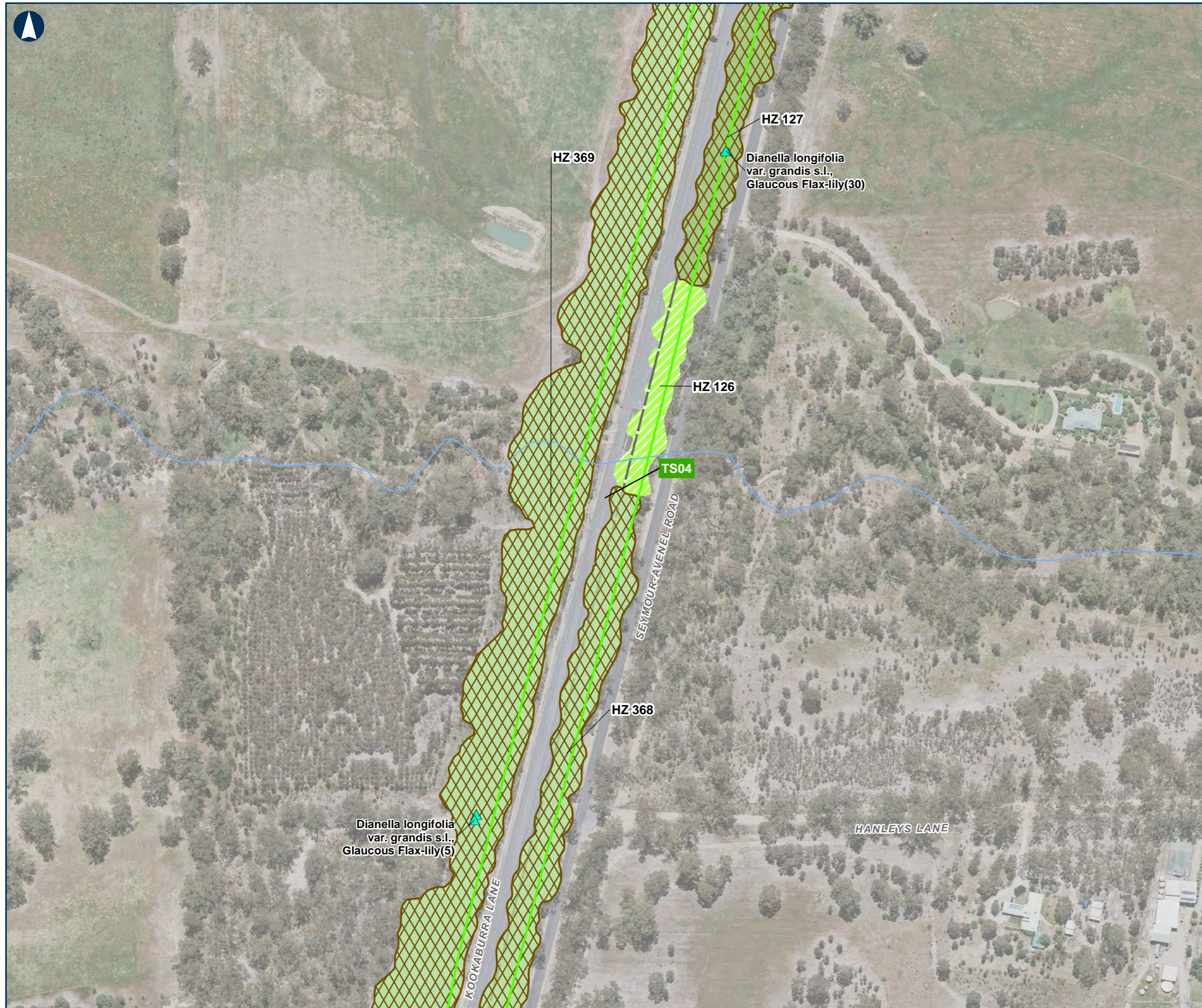


0 50 100 Meters

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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9







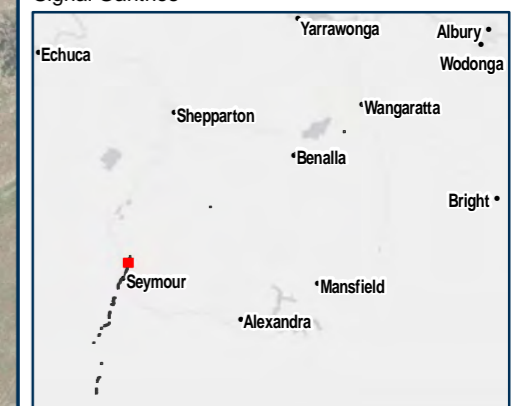
**Threatened species and ecological communities**

MAP 48 OF 58

- Track Slew
- Threatened Flora (1)
- KM Posts
- Railway
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Plains Grassy Woodland (55) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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Date: 13/08/2021 Paper: A3  
Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9







**Threatened species and ecological communities**

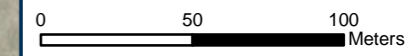
MAP 49 OF 58



- Track Slew
- Threatened Flora (2)
- KM Posts
- Railway
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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**Threatened species and ecological communities**

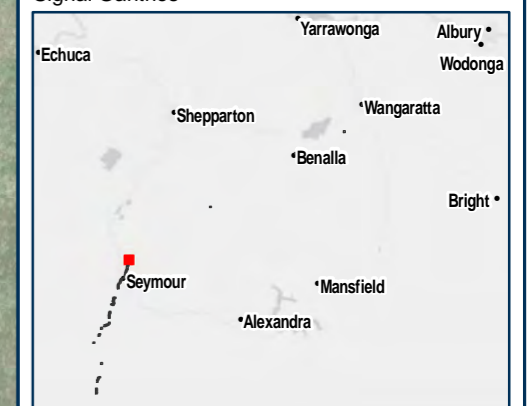
MAP 50 OF 58



- Track Slew
- Threatened Flora (1)
- Railway
- Watercourses
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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0 50 100 Meters

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
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**Threatened species and ecological communities**

MAP 51 OF 58

-  Track Slew
-  KM Posts
-  Railway
-  Watercourses
-  Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
-  Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
-  Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

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0 50 100 Meters

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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9







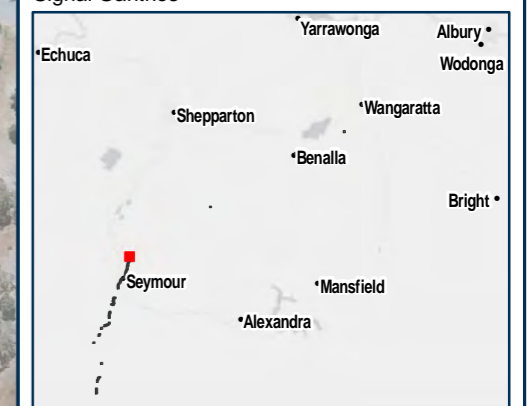
**Threatened species and ecological communities**

MAP 52 OF 58

- Track Slew
- Train Station
- VBA Fauna Records
- KM Posts
- Railway
- Habitat Zones Desktop/No access
- Victorian Temperate Woodland Bird Community
- Threatened Ecological Communities**
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

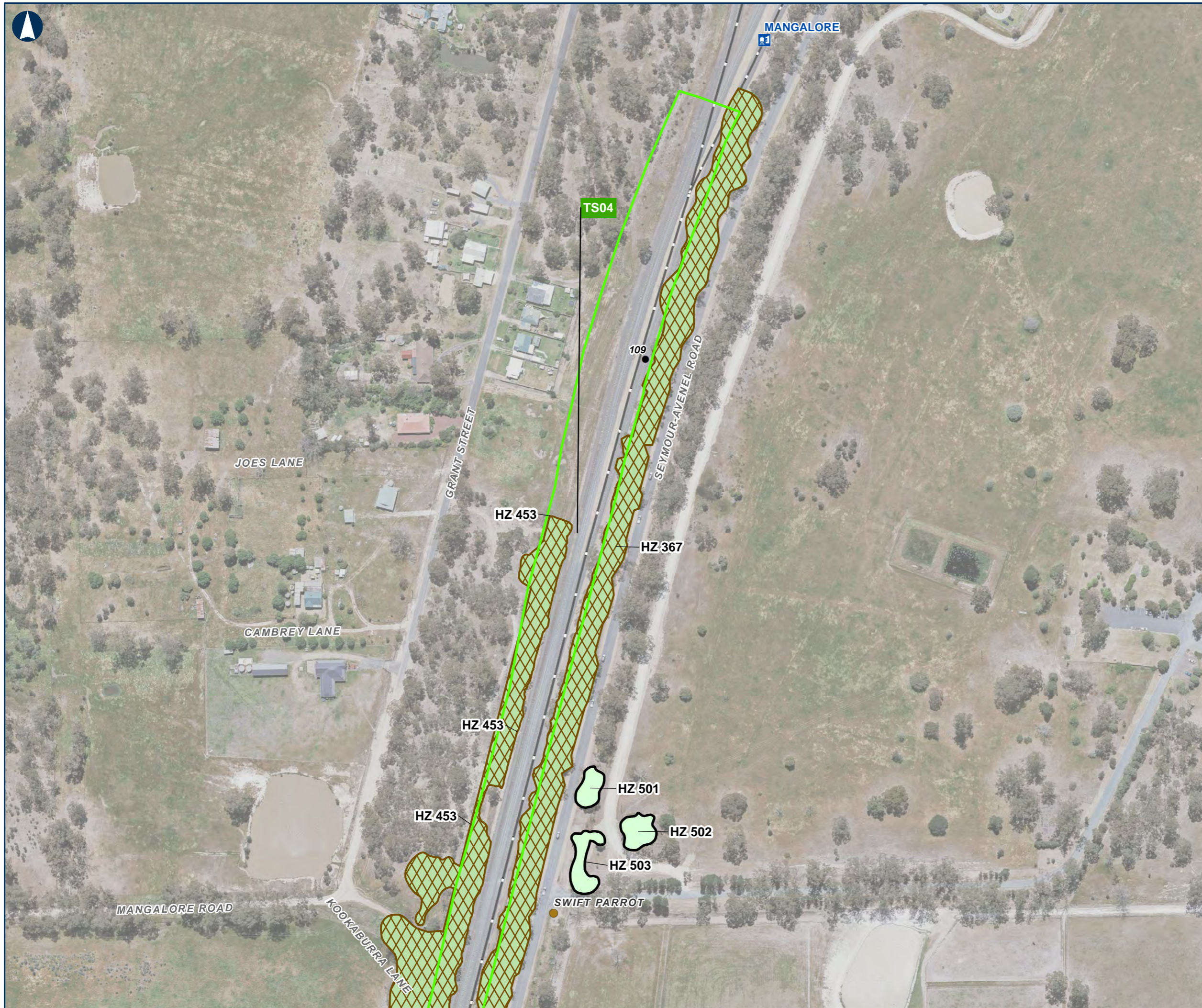


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Author: JB Scale: 1:2,500  
Data Sources: DELWP (2020) Figure 9



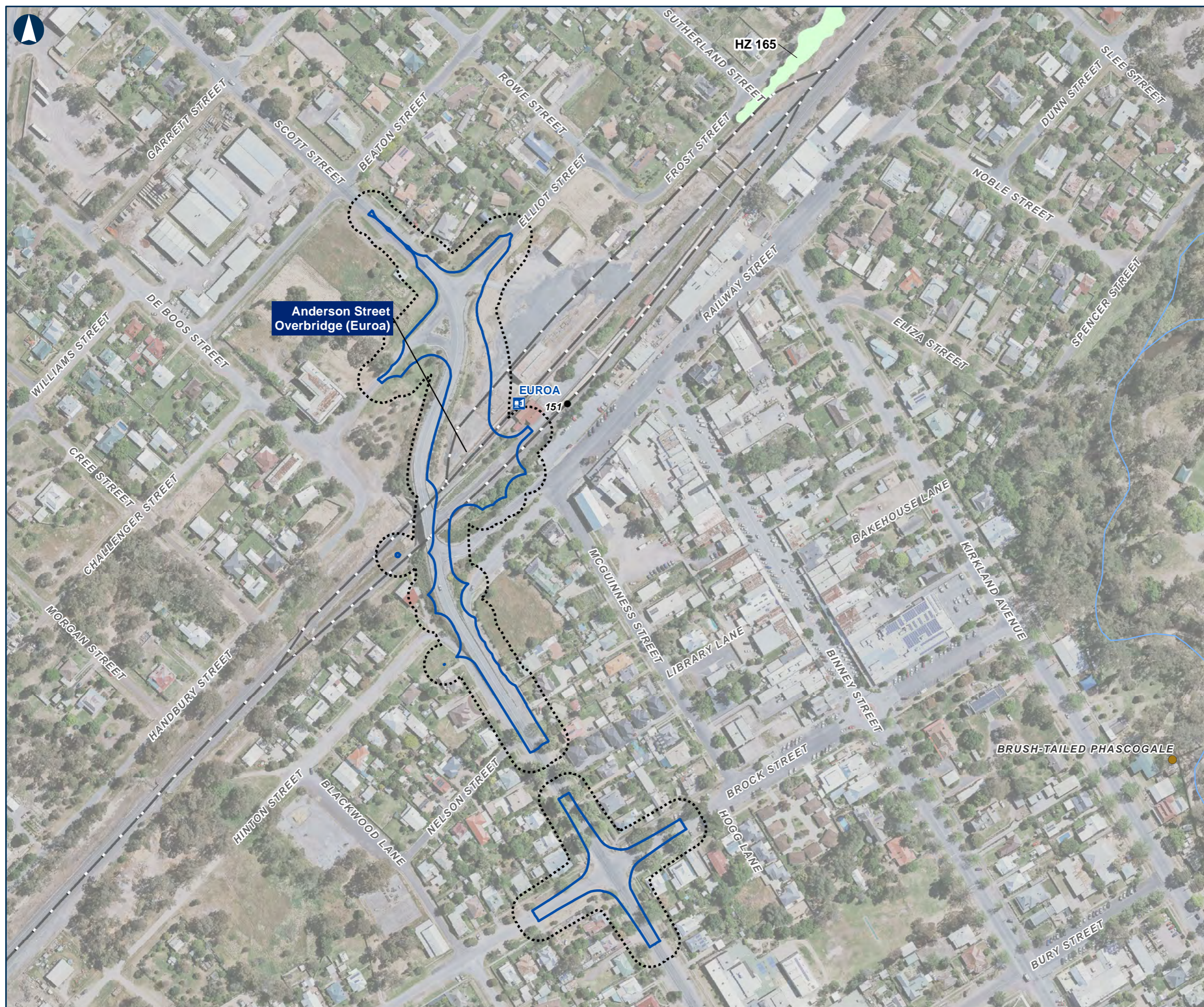




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**Threatened species and ecological communities**

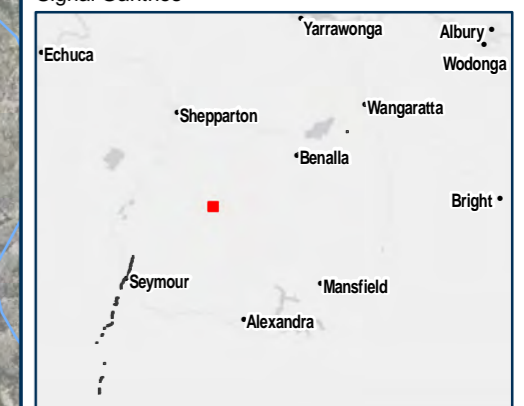
MAP 53 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Train Station
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

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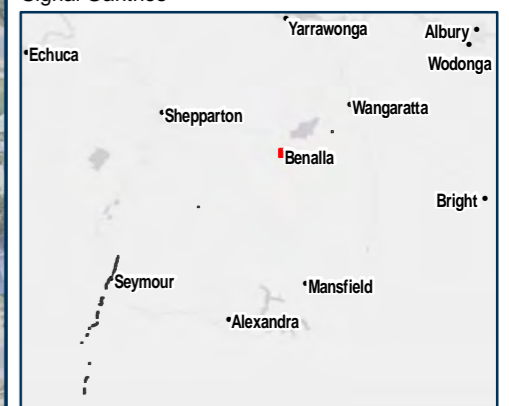
### Threatened species and ecological communities

MAP 54 OF 58

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Train Station
- Railway
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9

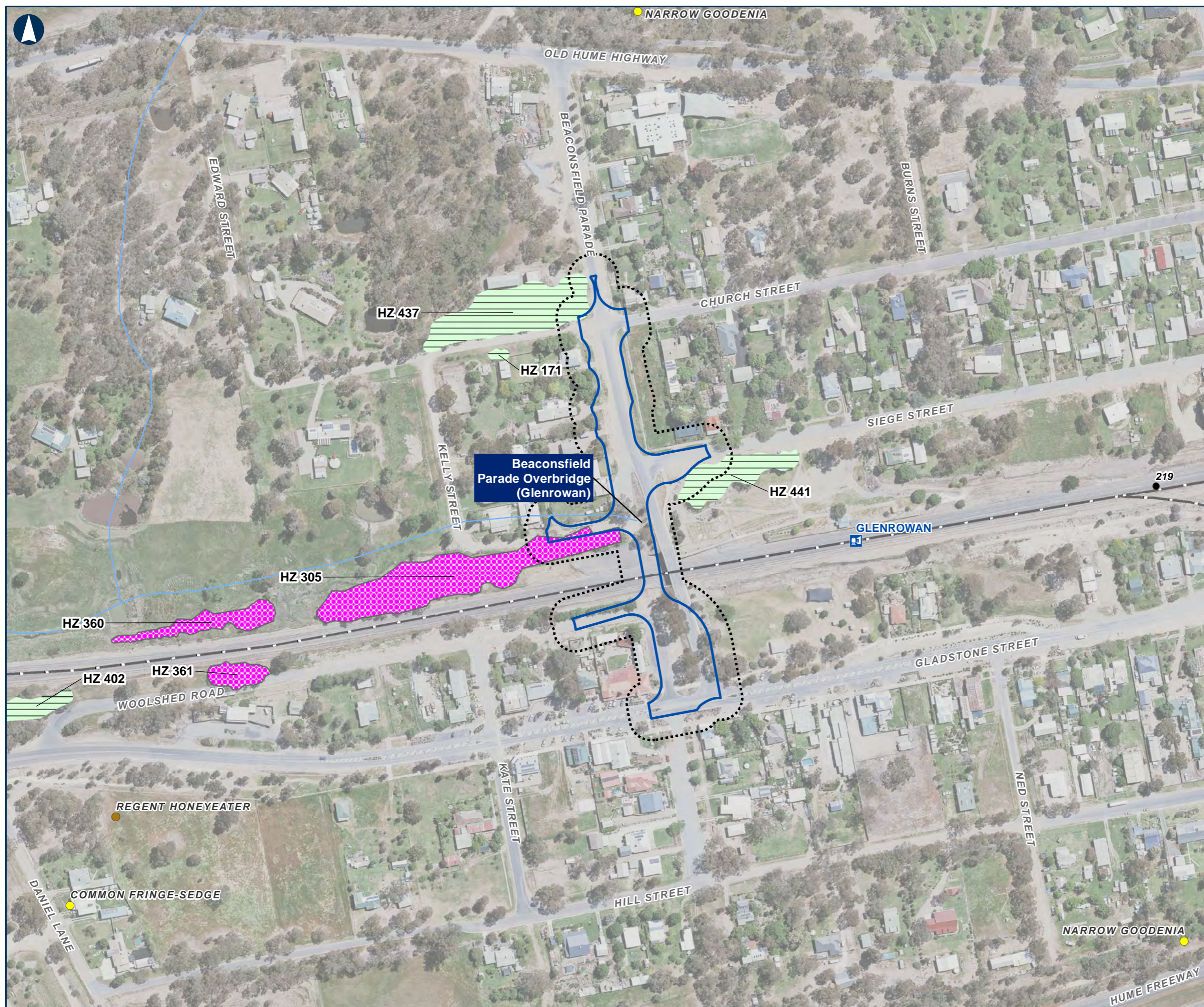




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**Threatened species and ecological communities**

MAP 55 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Train Station
- VBA Flora Records
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
- Plains Woodland (803) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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 Author: JB Scale: 1:2,500  
 Data Sources: DELWP (2020) Figure 9





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**Threatened species and ecological communities**

MAP 56 OF 58

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Signal Gantry
- Train Station
- VBA Fauna Records
- KM Posts
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Creeklane Grassy Woodland (68) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 50 100 Meters

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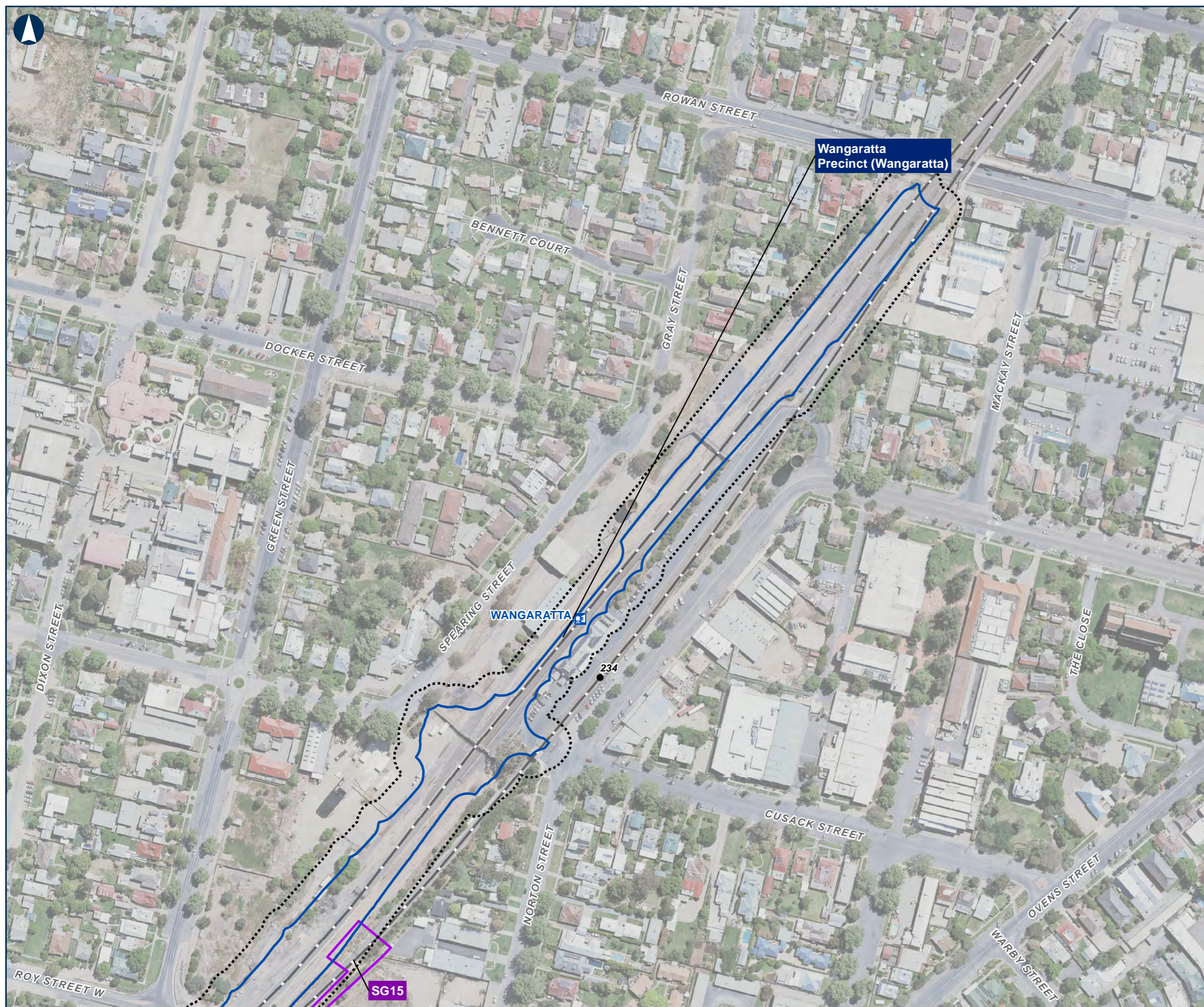




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**Threatened species and ecological communities**

MAP 57 OF 58



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Signal Gantry
- Train Station
- KM Posts
- Railway

E=Endangered  
 D=Depleted  
 V=vulnerable  
 ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



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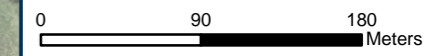
**Threatened species and ecological communities**

MAP 58 OF 58

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- KM Posts
- Railway
- Watercourses
- Ecological Vegetation Classes**
- Plains Woodland (803) (E)

E=Endangered  
D=Depleted  
V=vulnerable  
ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

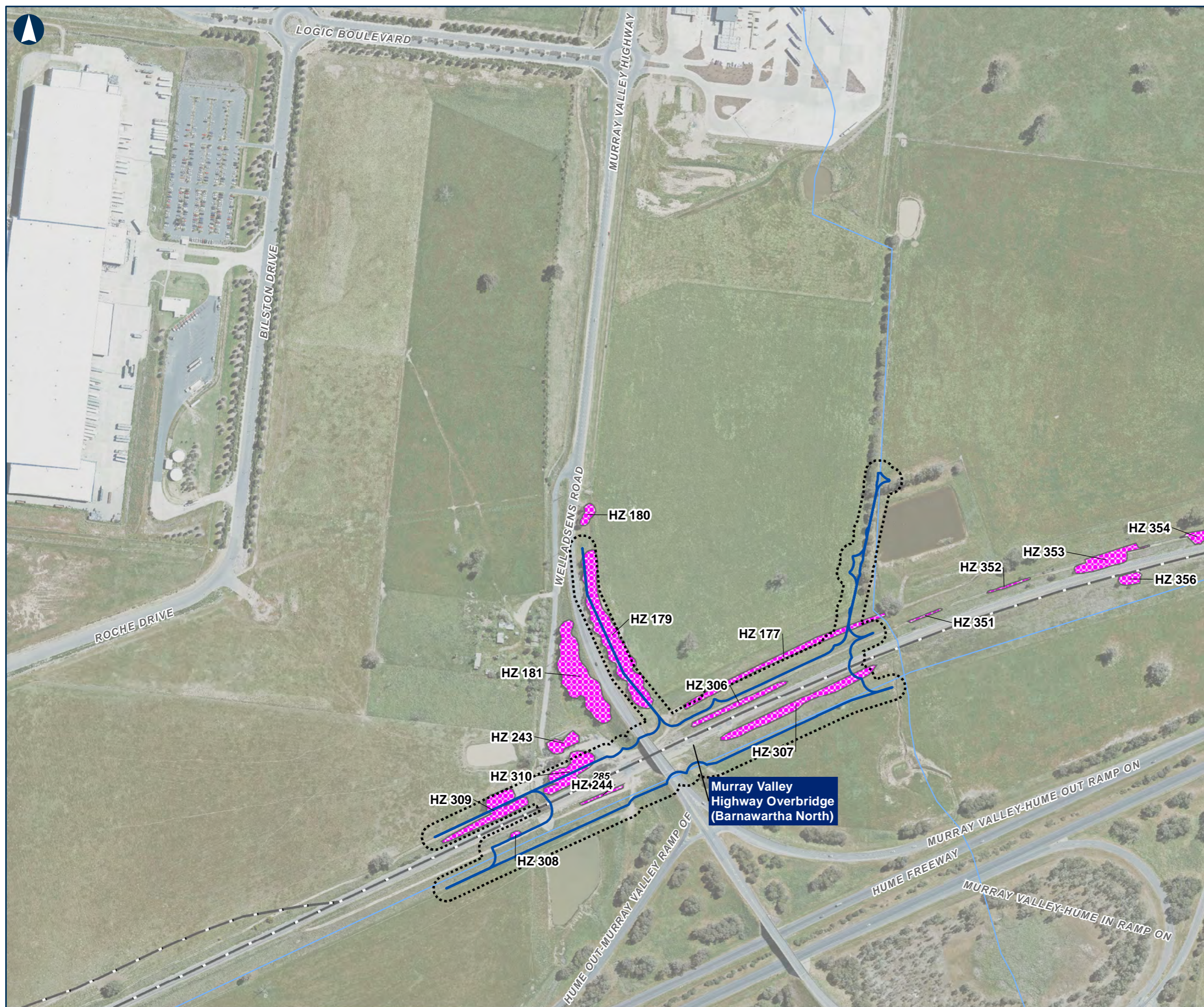


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Date: 13/08/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:4,250  
Figure 9





## Appendix A – Figures

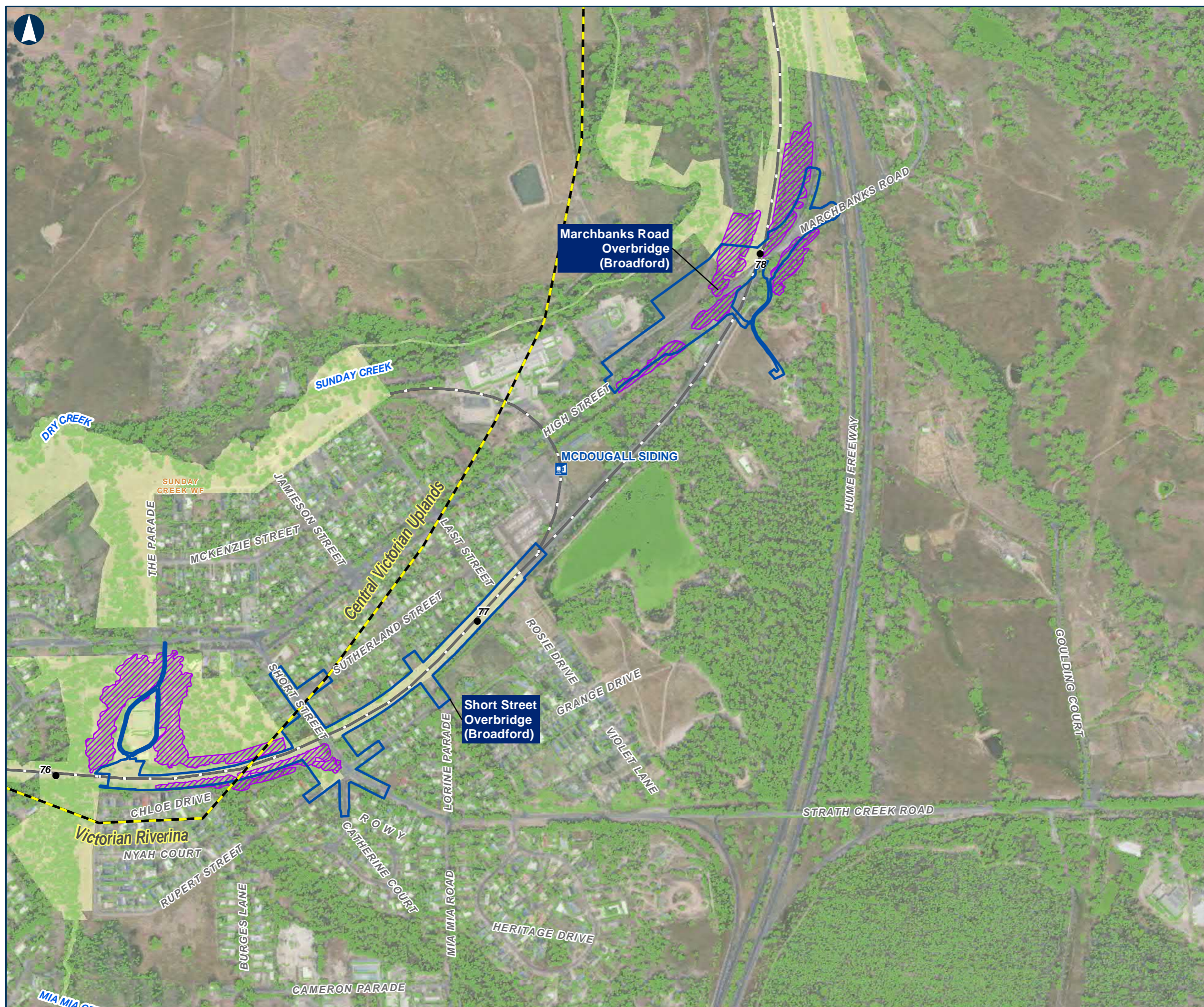
Figure 10 Habitat connectivity at Broadford, Tallarook and Seymour



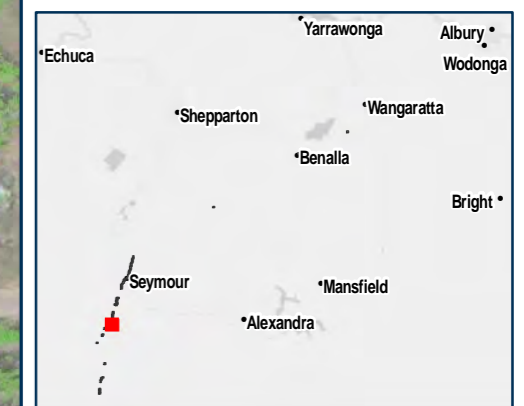


**Habitat Connectivity at Broadford, Tallarook and Seymour**

MAP 1 OF 3



- Enhancement Sites
- Victorian Temperate Woodland Bird Community
- Train Station
- KM Posts
- Railway
- Bioregion
- Vegetation Canopy
- Crown Land



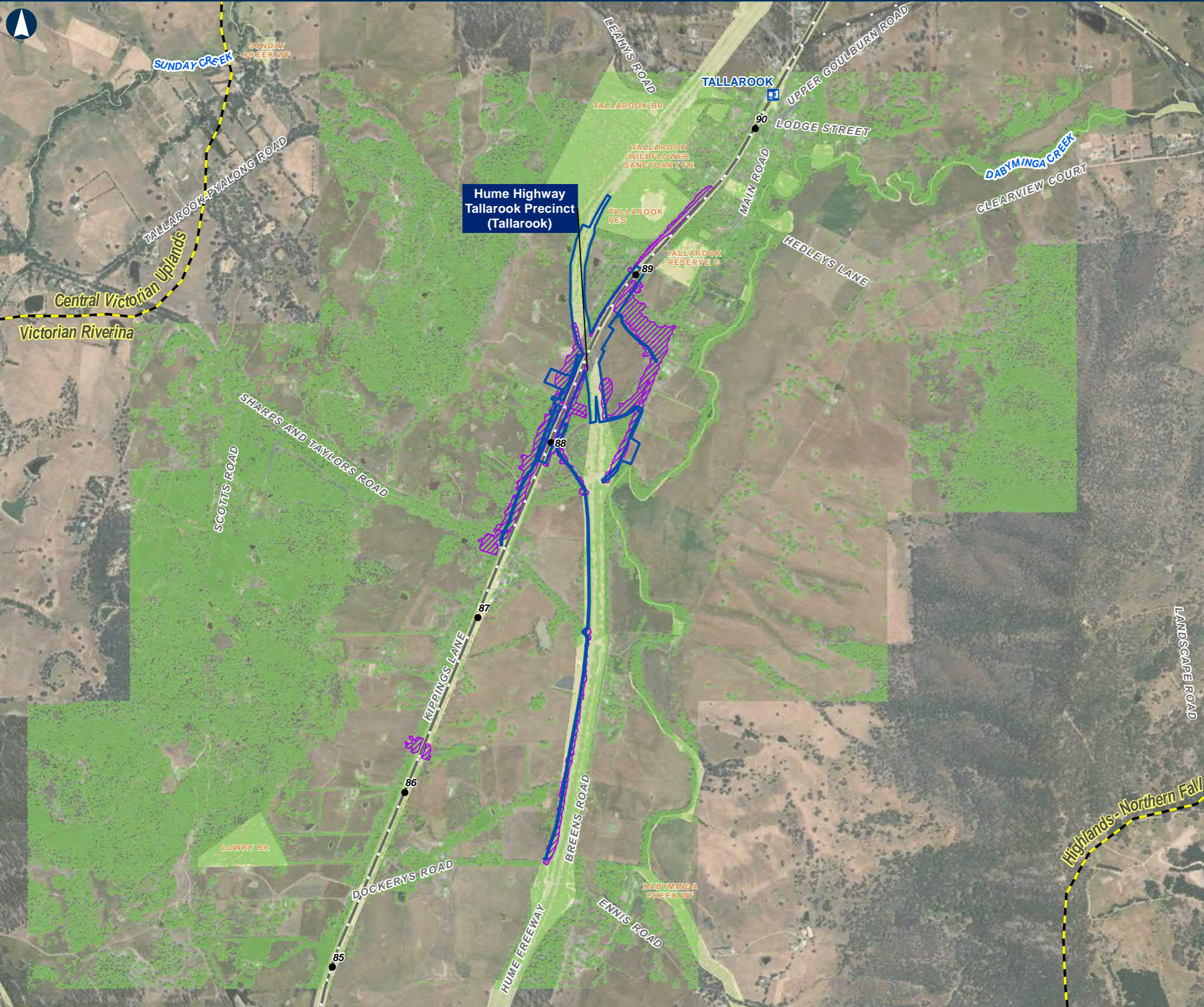
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 Author: JB Scale: 1:7,740  
 Data Sources: DELWP (2020) Figure 10



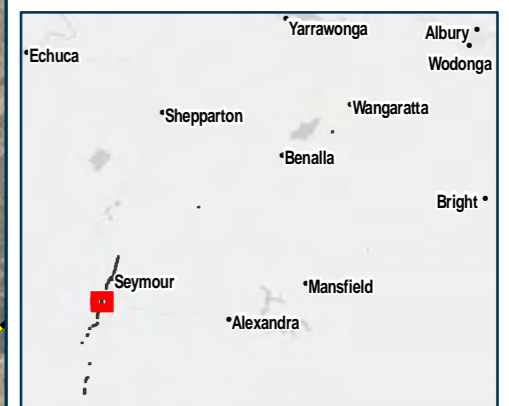


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**Habitat Connectivity at Broadford, Tallarook and Seymour**

MAP 2 OF 3

- Enhancement Sites
- Victorian Temperate Woodland Bird Community
- Train Station
- KM Posts
- Railway
- Bioregion
- Vegetation Canopy
- Crown Land



0 440 880 Meters

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 Author: JB Scale: 1:19,180  
 Data Sources: DELWP (2020) Figure 10



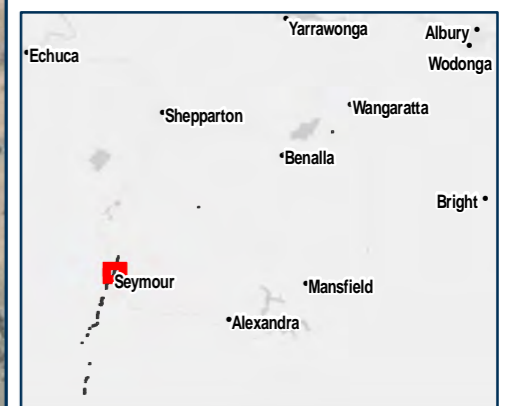
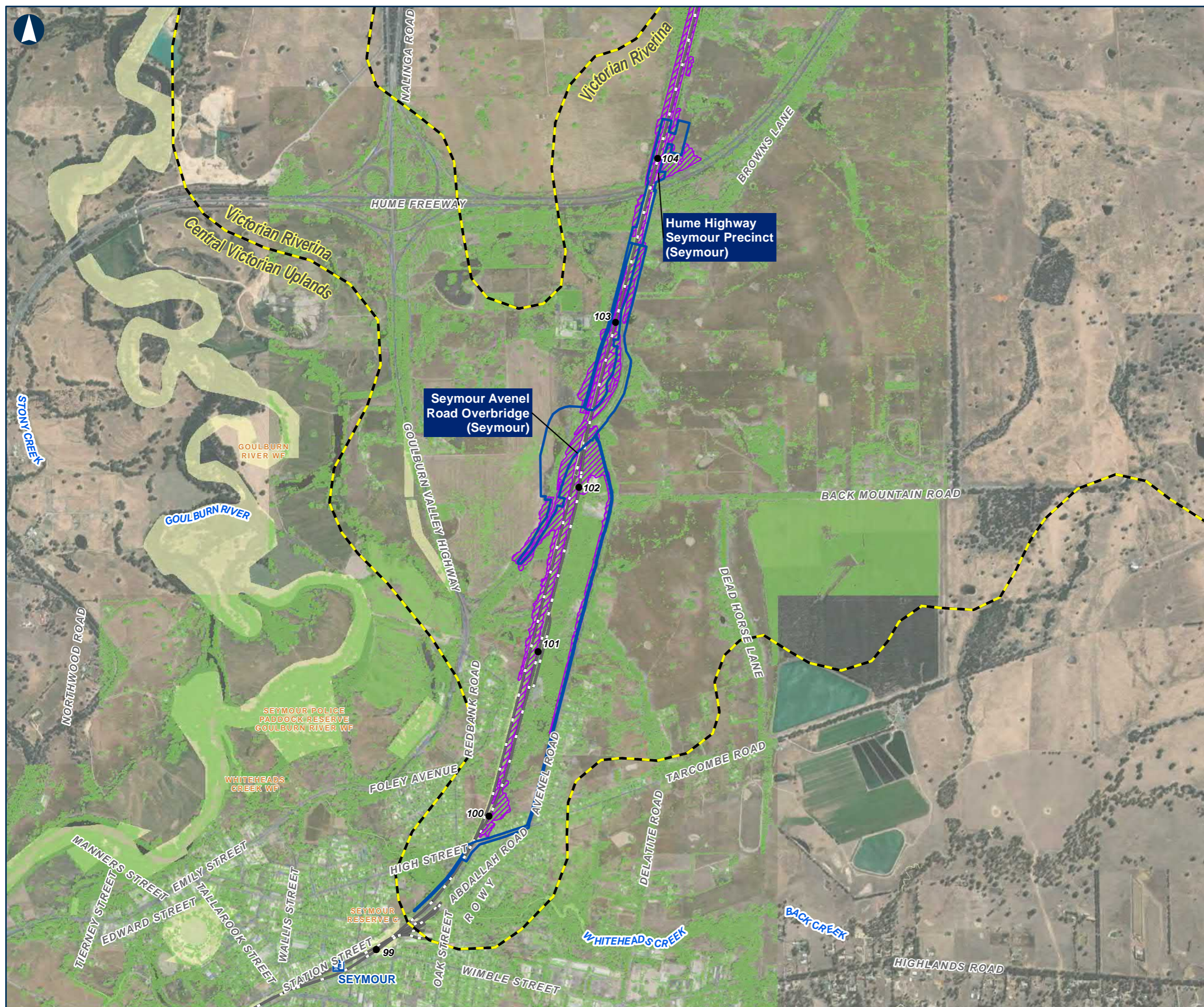


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### Habitat Connectivity at Broadford, Tallarook and Seymour

MAP 3 OF 3

- Enhancement Sites
- Victorian Temperate Woodland Bird Community
- Train Station
- KM Posts
- Railway
- Bioregion
- Vegetation Canopy
- Crown Land



0 480 960 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:21,280  
 Figure 10



## Appendix A – Figures

Figure 11 Native vegetation impacts





KNOX COURT  
WANDONG ROAD

HUME FREEWAY

WANDONG

RAIL STREET

WANDONG AVENUE

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

### Native Vegetation Impacts

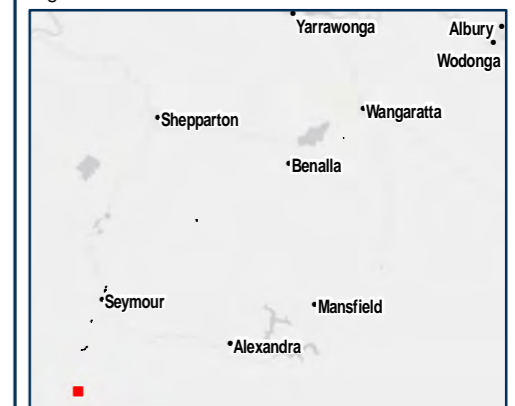
Broadford-Wandong Road (Wandong) [ES01]

MAP 1 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Train Station
- Railway
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Tall Marsh (821) (D)
- Valley Grassy Forest (47) (V)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 30 60 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:1,550  
 Data Sources: DELWP (2020) Figure 11





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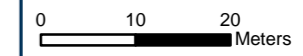
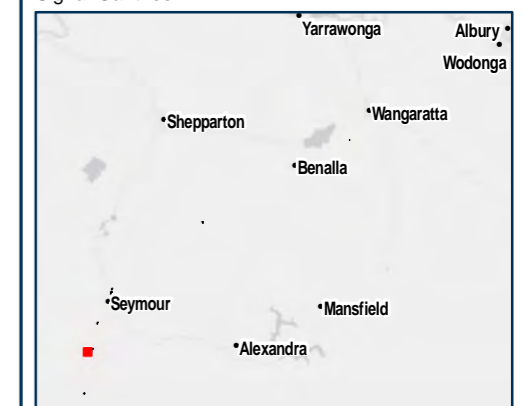
**Native Vegetation Impacts**

Hamilton Street (Broadford) [ES02] & SG18

MAP 2 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)

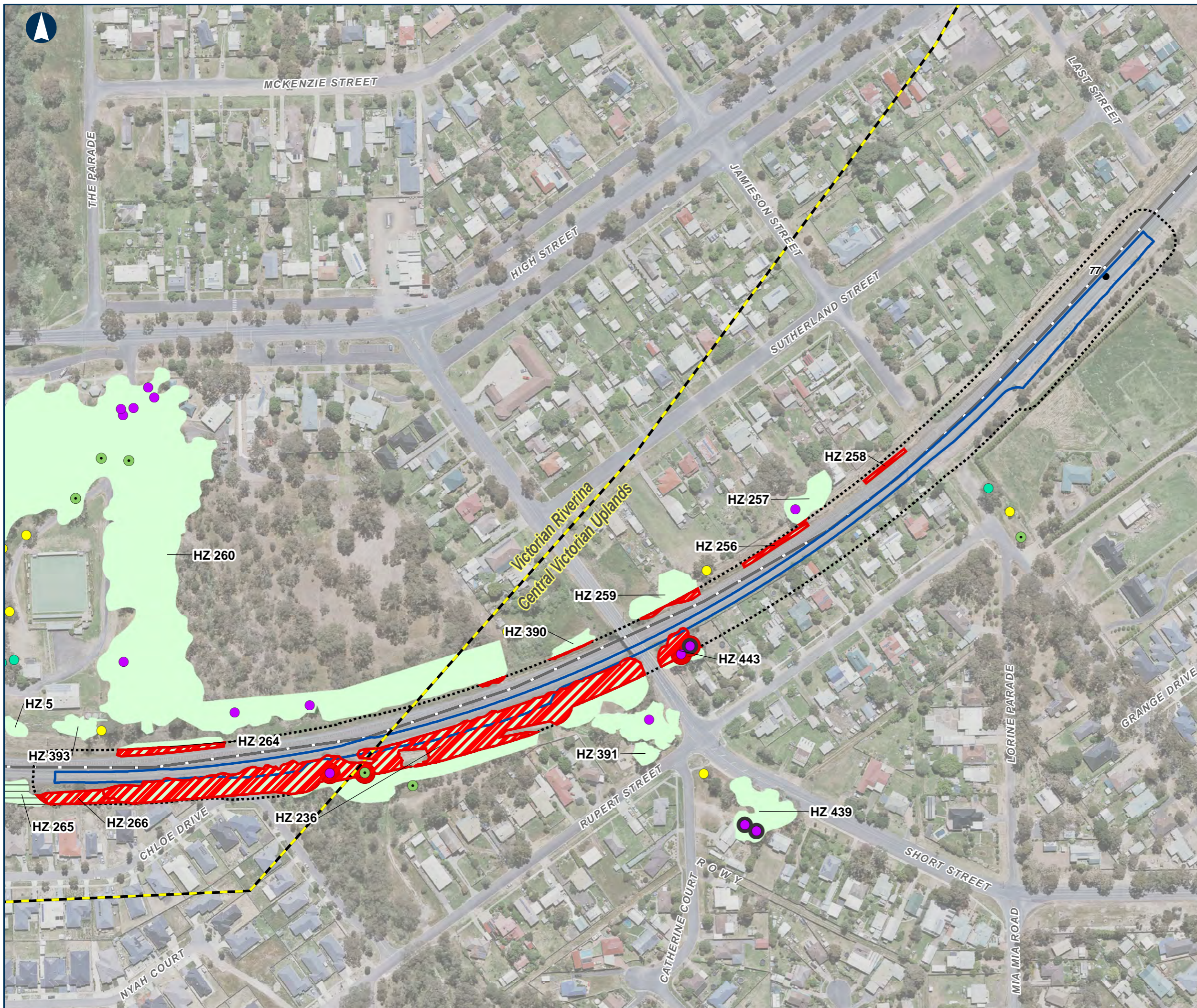
E=Endangered D=Depleted  
 V=vulnerable ND= Not described  
 Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEws, and Signal Gantries



Coordinate System: GDA 1994 MGA Zone 55

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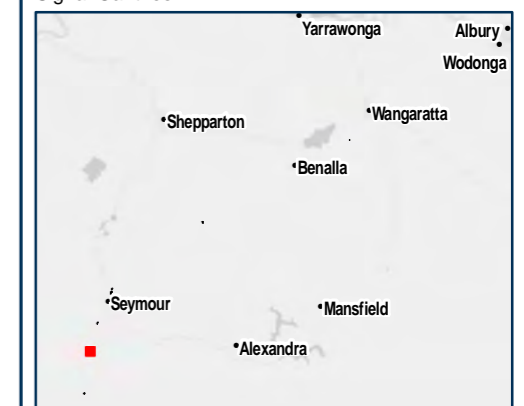
**Native Vegetation Impacts**

Short Street (Broadford) [ES03] & SG6

MAP 3 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Hollow Bearing Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- Trees Desktop/No access
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
- Plains Grassy Woodland (55) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered D=Depleted  
V=vulnerable ND= Not described  
Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



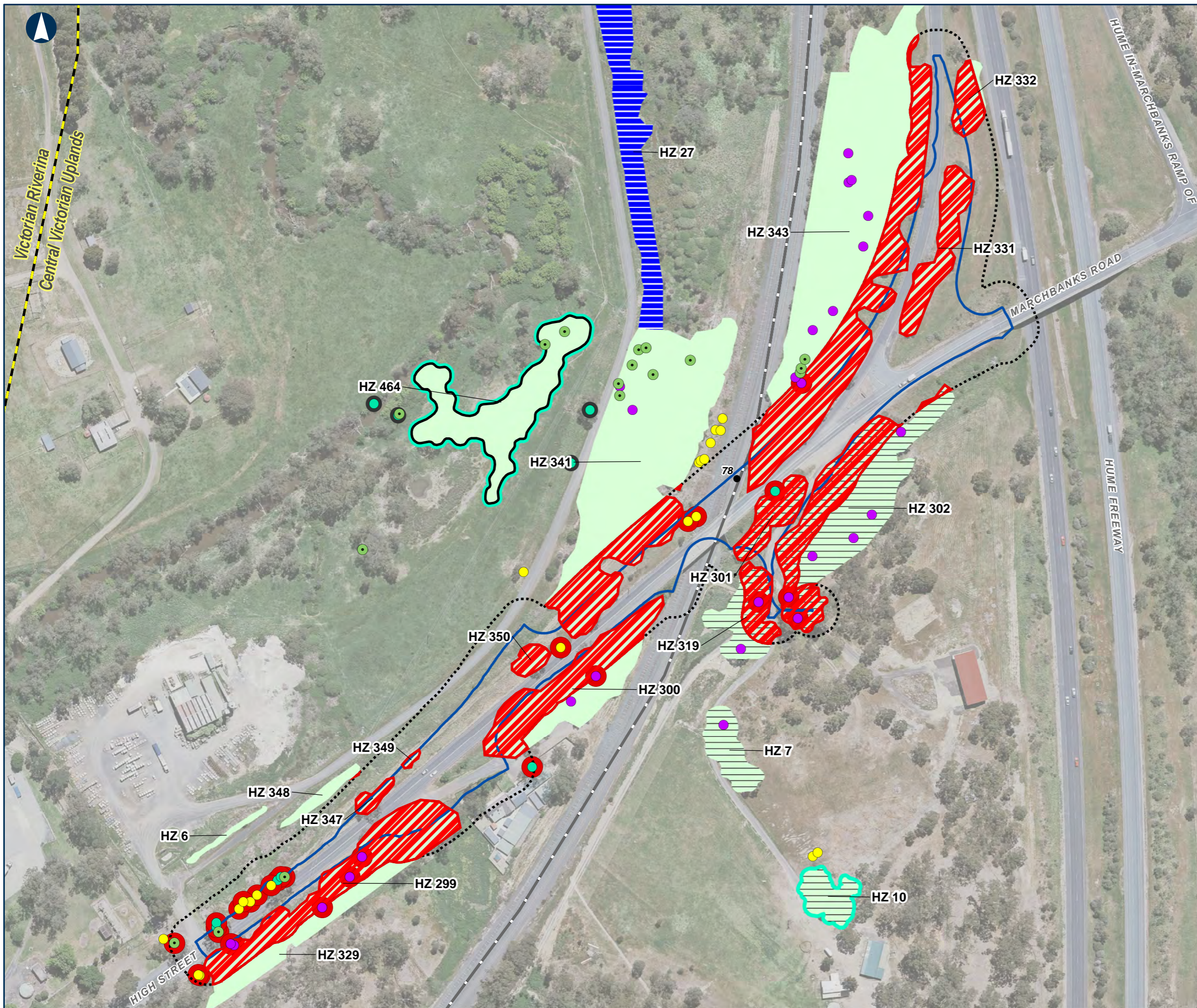
0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Author: JB Scale: 1:2,490  
Data Sources: DELWP (2020) Figure 11





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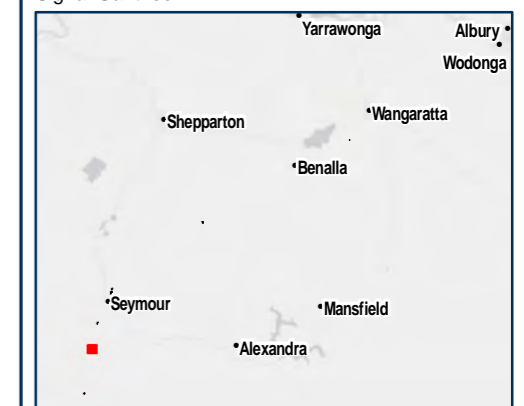
**Native Vegetation Impacts**

Marchbanks Road (Broadford) [ES04]

MAP 4 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Hollow Bearing Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- Habitat Zones Desktop/No access
- Trees Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)
- Red Gum Swamp (292) (E)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described  
 Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEWS, and Signal Gantries



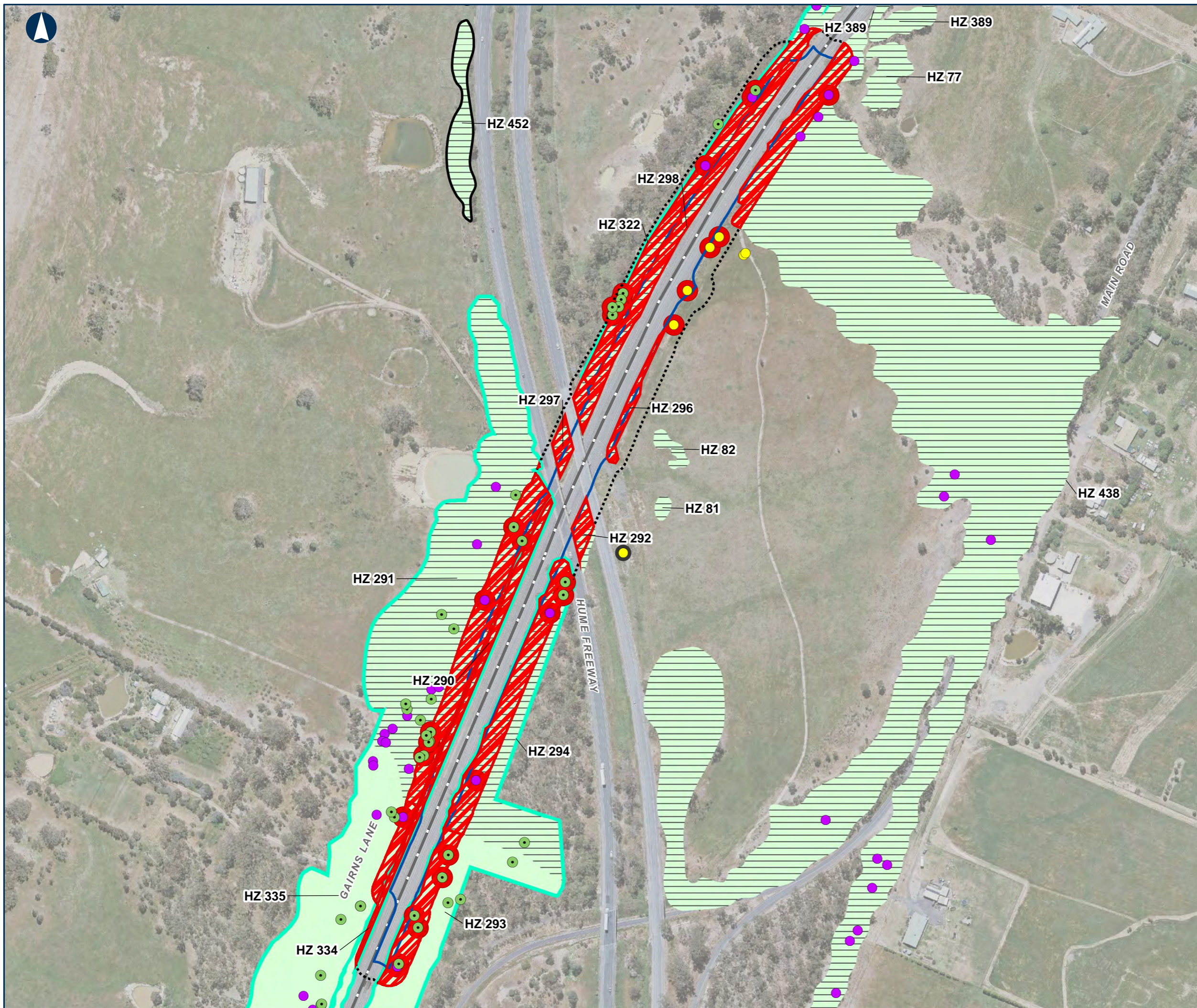
0 40 80 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:2,100  
 Data Sources: DELWP (2020) Figure 11





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### Native Vegetation Impacts

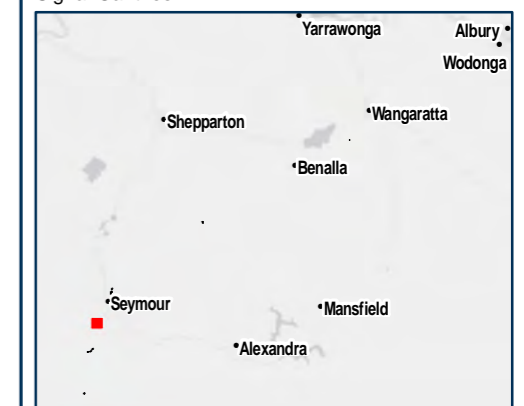
Hume Highway (Tallarook) [ES05] & TS5

MAP 5 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Railway
- Large Tree in Patch
- Small Scattered Tree
- Hollow Bearing Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- Habitat Zones Desktop/No access
- Trees Desktop/No access
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (175\_61) (E)
- Plains Grassy Woodland (55) (E)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEWS, and Signal Gantries



0 60 120 Meters

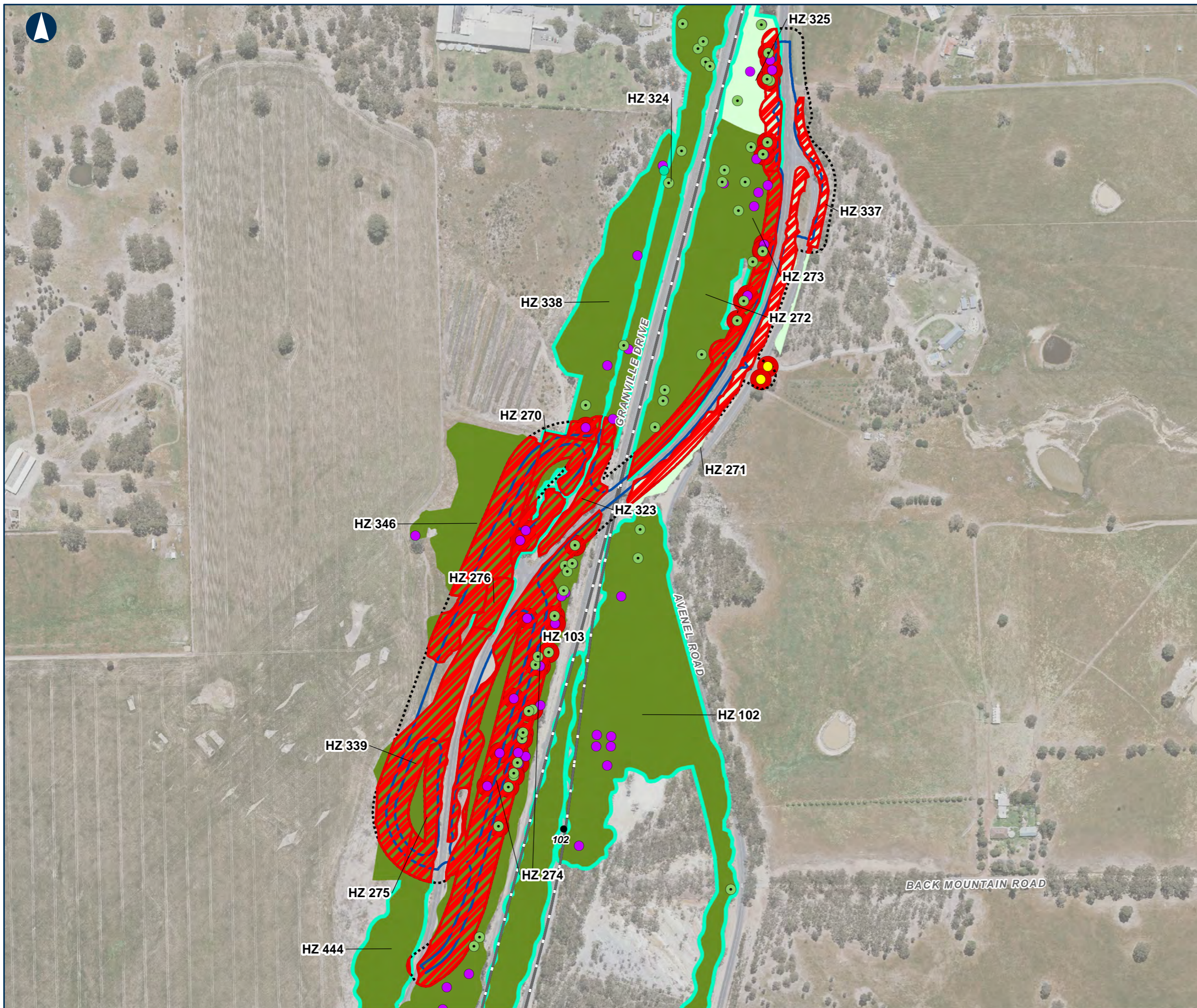
Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:3,050  
 Data Sources: DELWP (2020) Figure 11





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### Native Vegetation Impacts

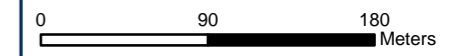
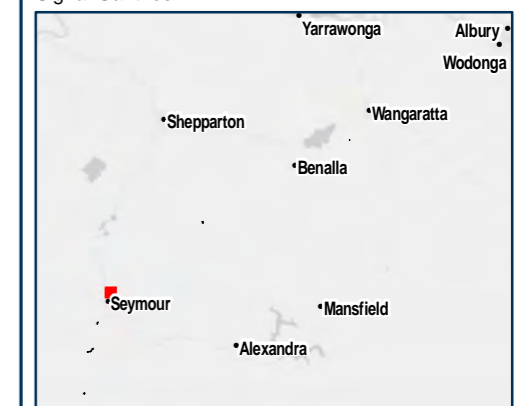
Seymour Avenel Road (Seymour) [ES06] & SG14

MAP 6 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Hollow Bearing Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)
- Plains Grassy Woodland (55) (E)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:4,080  
 Data Sources: DELWP (2020) Figure 11





### Native Vegetation Impacts

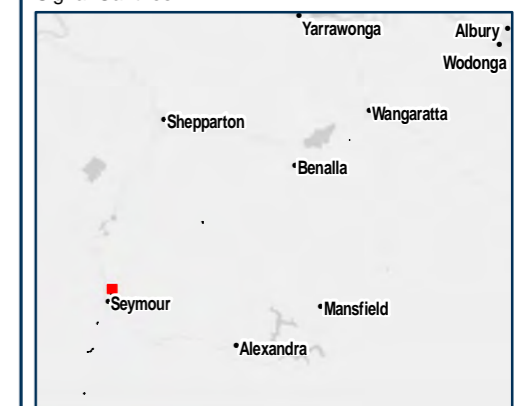
Hume Highway (Seymour) [ES07]

MAP 7 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- KM Posts
- Railway
- Large Tree in Patch
- Hollow Bearing Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- High Quality Native Vegetation
- Ecological Vegetation Classes**
- Box Ironbark Forest (61) (V)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described

Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEWS, and Signal Gantries



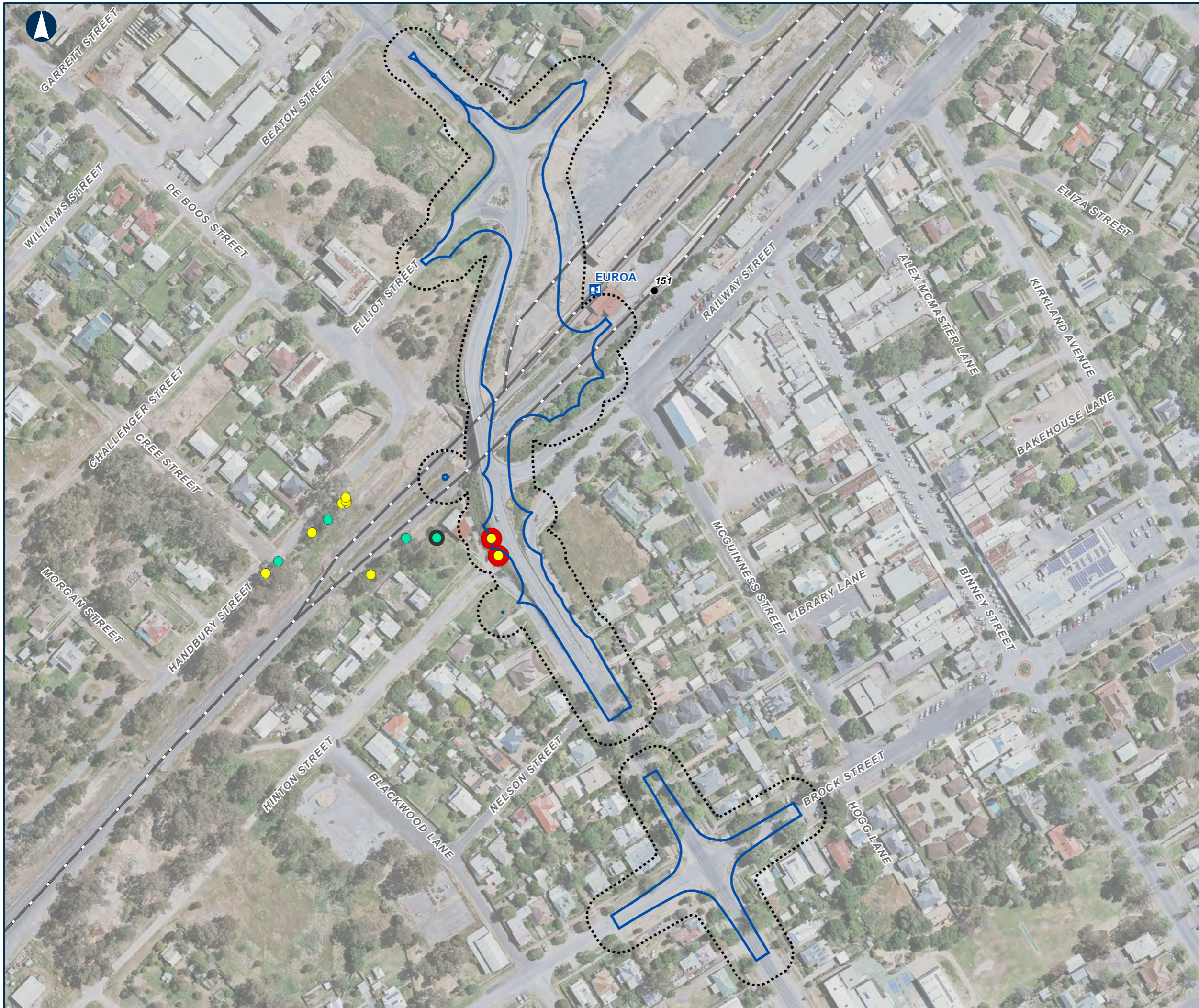
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Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB Scale: 1:2,280  
 Data Sources: DELWP (2020) Figure 11





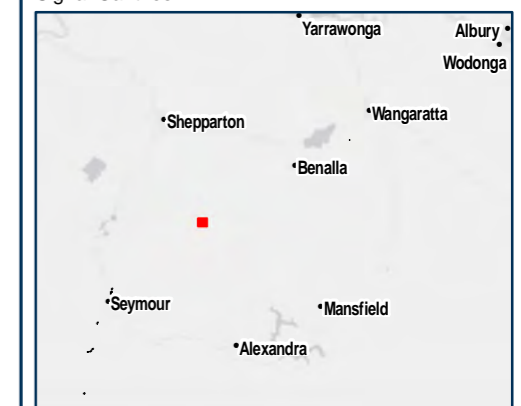
**Native Vegetation Impacts**

Anderson Street (Euroa) [ES08]

MAP 8 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Train Station
- KM Posts
- Railway
- Large Scattered Tree
- Small Scattered Tree
- Impacted Scattered Trees
- Trees Desktop/No access

E=Endangered D=Depleted  
 V=vulnerable ND= Not described  
 Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEws, and Signal Gantries



0 50 100 Meters

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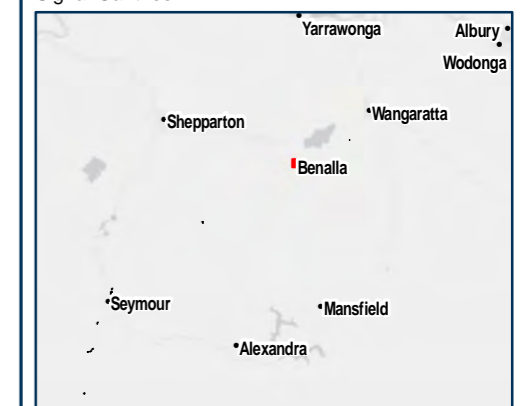
**Native Vegetation Impacts**

Benalla Station Access Road (Benalla) [ES09]

MAP 9 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Train Station
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Plains Grassy Woodland (55\_61) (E)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described  
 Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEWS, and Signal Gantries



0 25 50 Meters

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 Author: JB Scale: 1:1,300  
 Data Sources: DELWP (2020) Figure 11





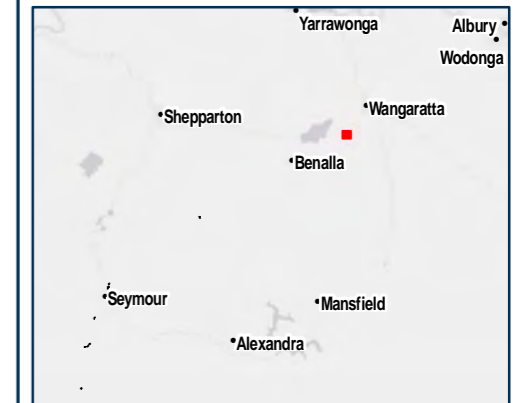
**Native Vegetation Impacts**

Beaconsfield Parade (Glenrowan) [ES10]

MAP 10 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Train Station
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Impacted Scattered Trees
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Grassy Woodland (Low Rises) (175\_61) (E)
- Plains Woodland (803) (E)

E=Endangered D=Depleted  
 V=vulnerable ND= Not described  
 Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track SLEws, and Signal Gantries

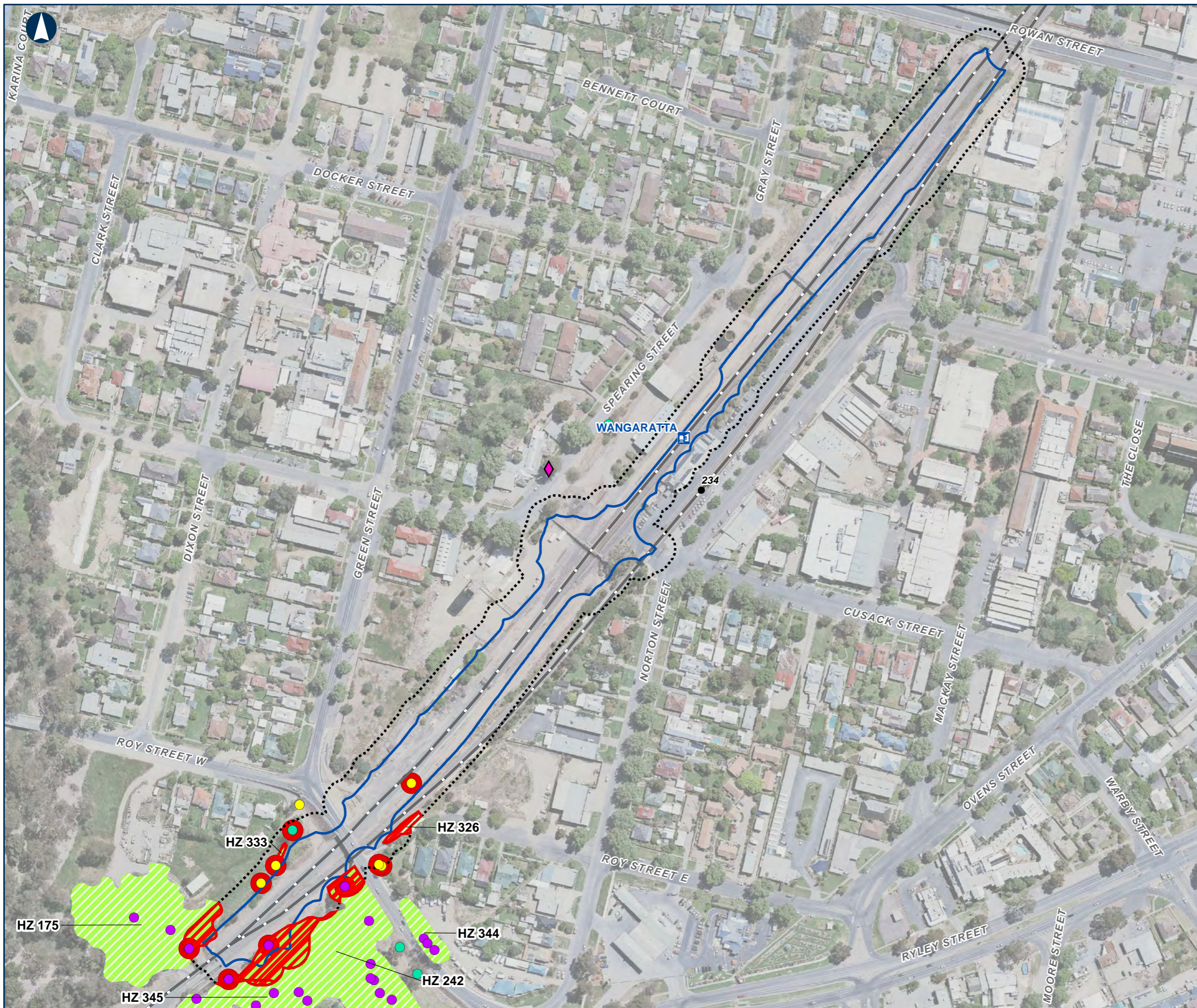


0 25 50 Meters

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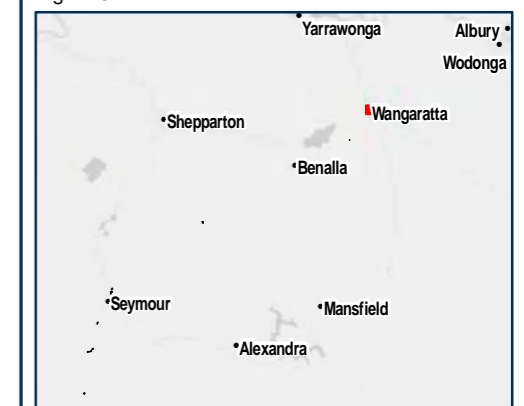
**Native Vegetation Impacts**

Wangaratta Precinct (Wangaratta) [ES11] & SG15

MAP 11 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- Train Station
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Significant Tree – Wangaratta Rural City
- Impacted Scattered Trees
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Creekline Grassy Woodland (68) (E)
- Plains Grassy Woodland (55\_61) (E)

E=Endangered D=Depleted  
V=vulnerable ND= Not described  
Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries



0 60 120 Meters

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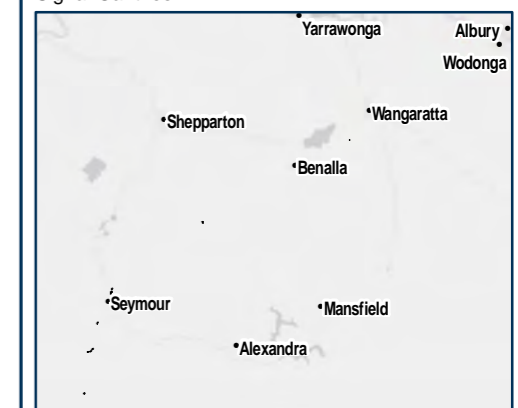
**Native Vegetation Impacts**

Murray Valley Highway (Barnawartha North) [ES12]

MAP 12 OF 12

- 15m Buffer
- Enhancement Site Reference Design
- Bioregion
- KM Posts
- Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Impacted Native Vegetation
- Ecological Vegetation Classes**
- Plains Woodland (803) (E)

E=Endangered D=Depleted  
V=vulnerable ND= Not described  
Vegetation mapping for the Overhead Powerlines has been included as these were assessed during the same field assessment as Enhancement Sites, Track Slews, and Signal Gantries

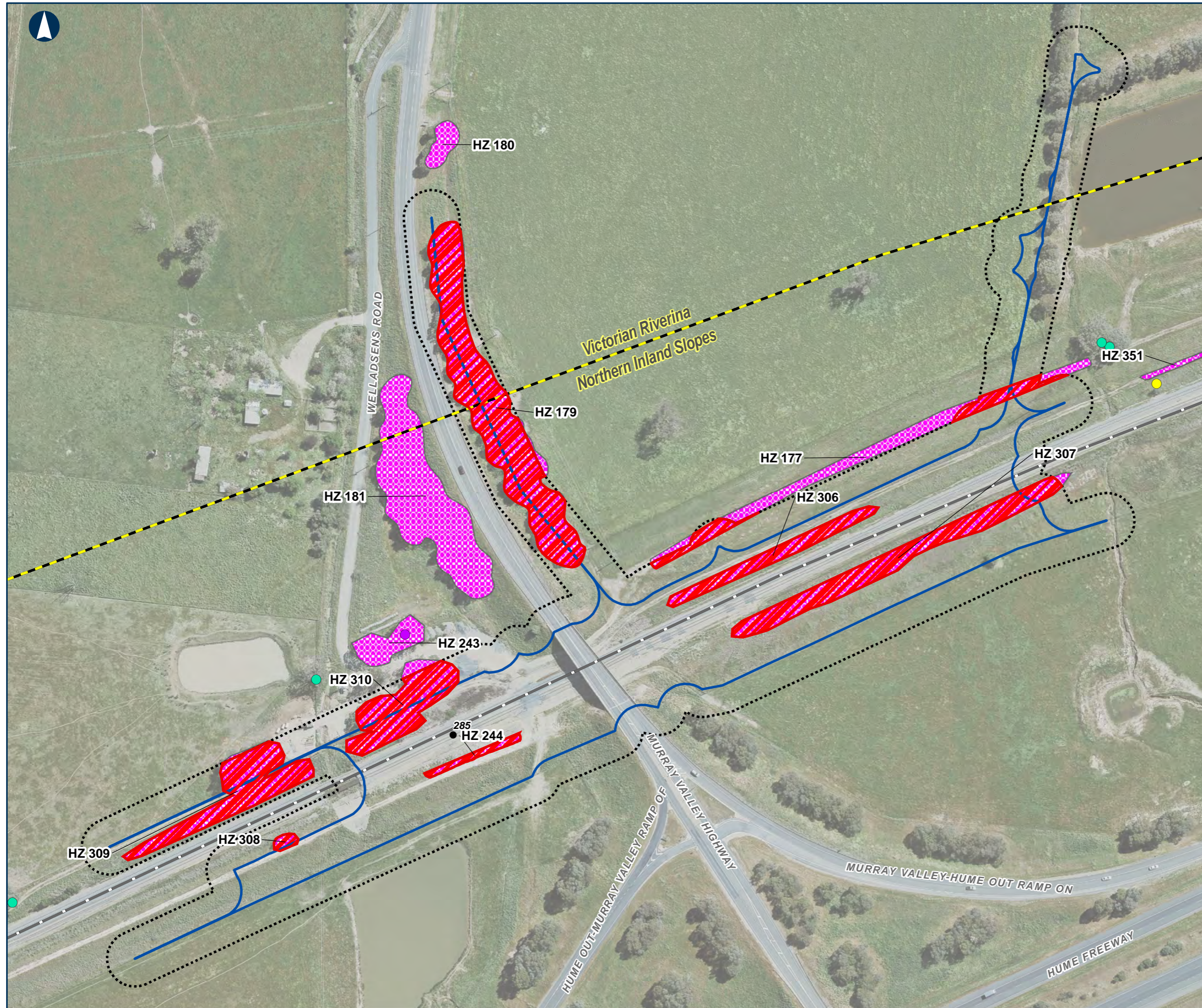


0 40 80 Meters

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Author: JB Scale: 1:1,960  
Data Sources: DELWP (2020) Figure 11

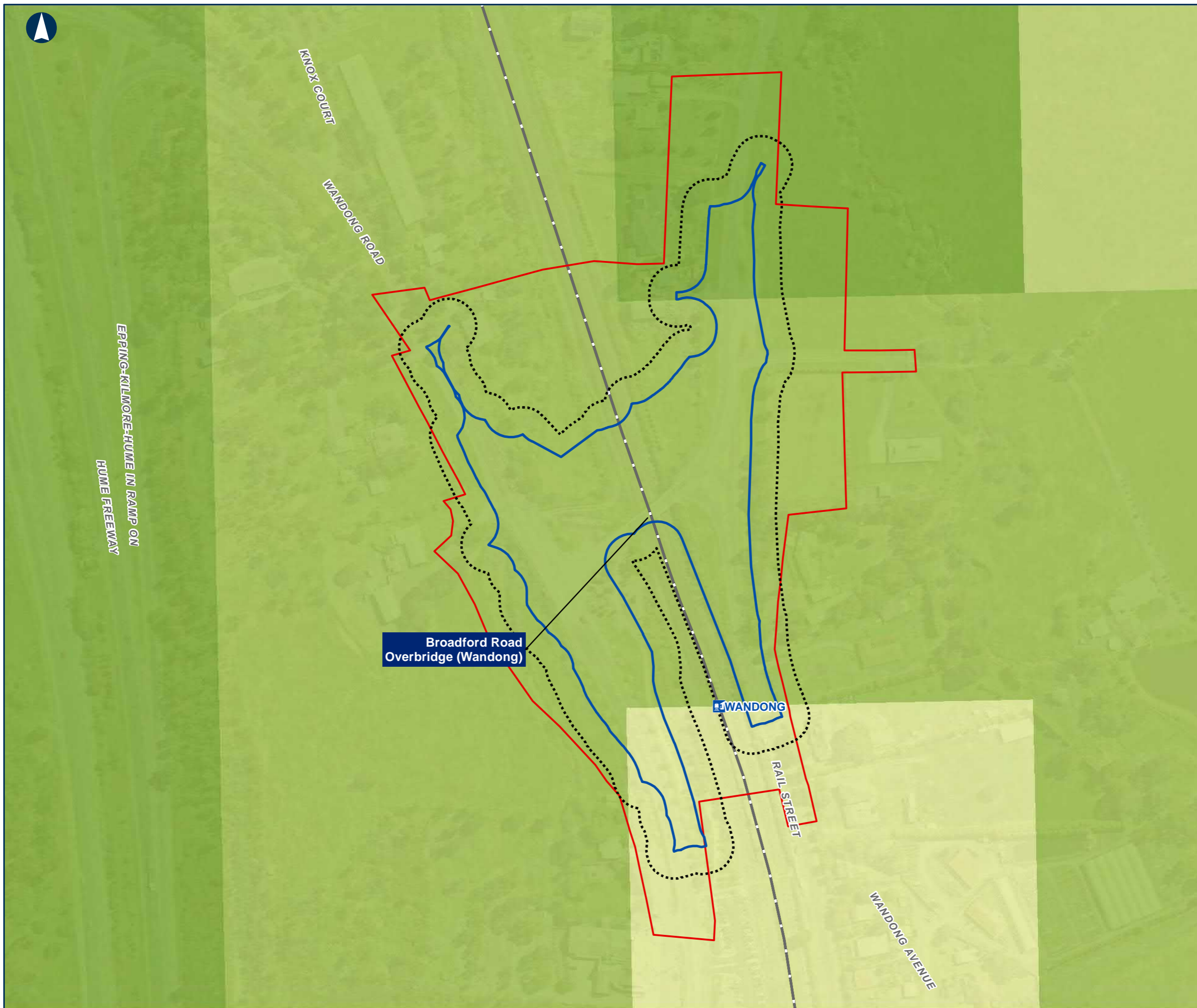




## Appendix A – Figures

Figure 12 Strategic biodiversity value



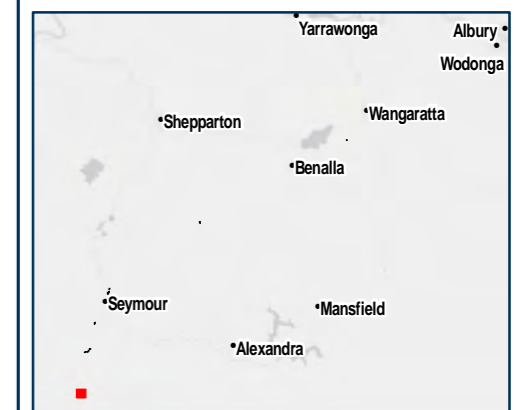


**Strategic Biodiversity Value**

Broadford Road Overbridge (Wandong)

MAP 1 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - Train Station
  - Railway
- Strategic biodiversity values**
- 50- 65
  - 40- 50
  - 25- 40
  - 15 - 25



0 40 80 Meters

Coordinate System: GDA 1994 MGA Zone 55

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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,000  
 Figure 12



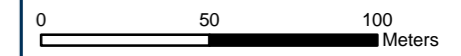
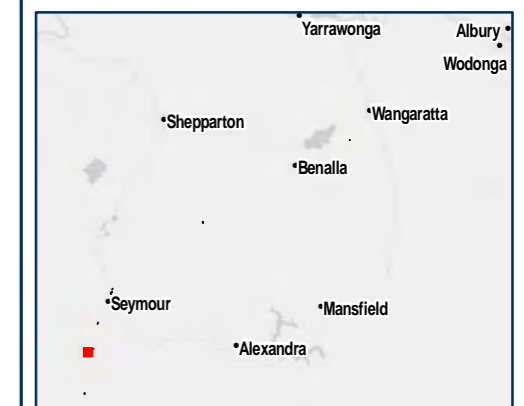
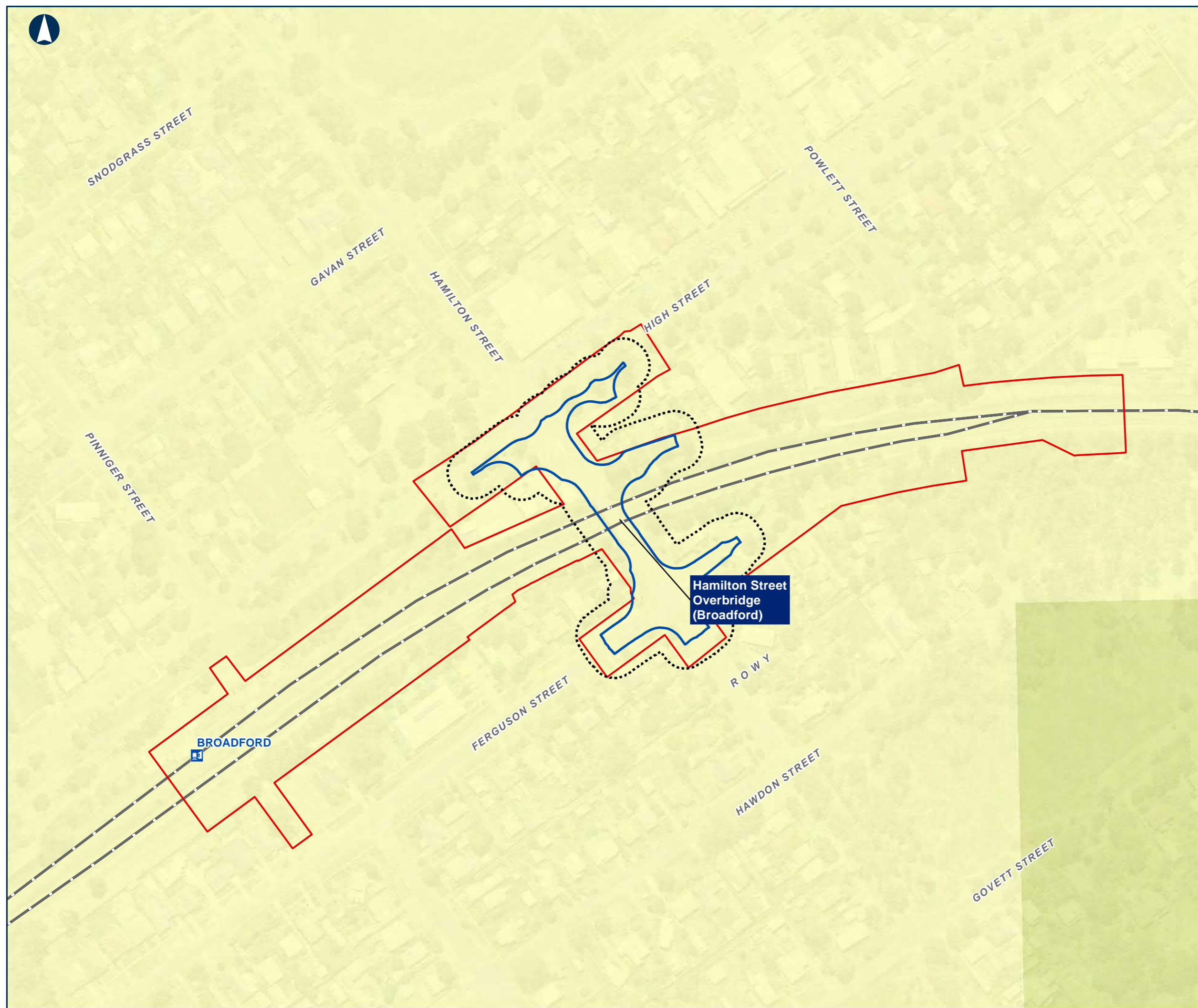


**Strategic Biodiversity Value**

Hamilton Street Overbridge (Broadford)

MAP 2 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - Train Station
  - Railway
- Strategic biodiversity values**
- 15 - 25
  - 1 - 15



Coordinate System: GDA 1994 MGA Zone 55

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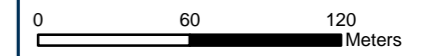
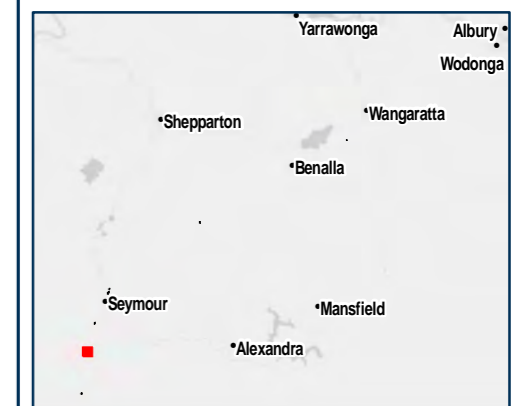


**Strategic Biodiversity Value**

Short Street Overbridge (Broadford)

MAP 3 OF 12

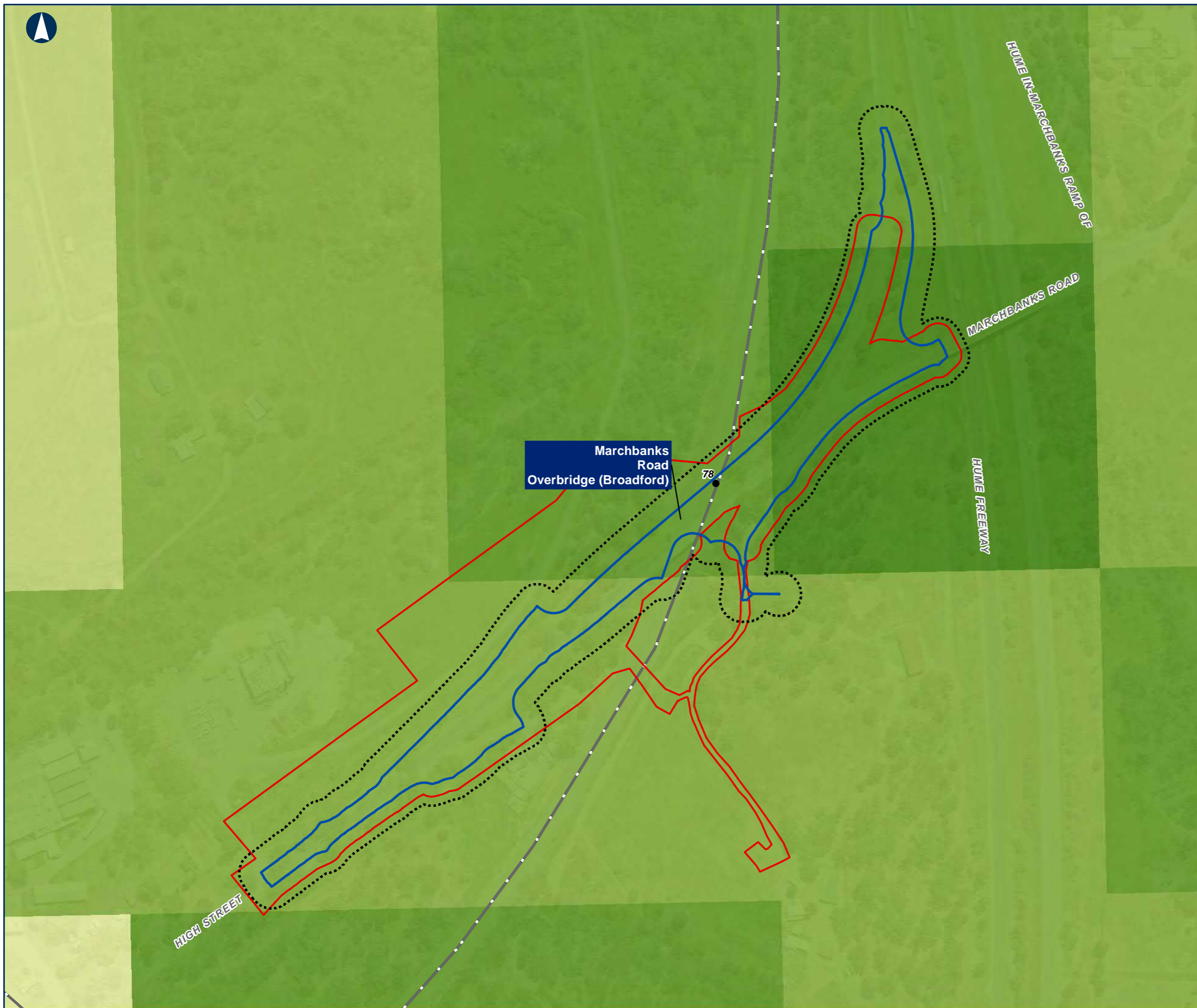
- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 50- 65
  - 25- 40
  - 15 - 25
  - 1 - 15



Coordinate System: GDA 1994 MGA Zone 55

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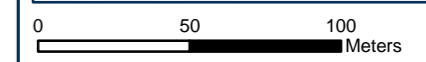
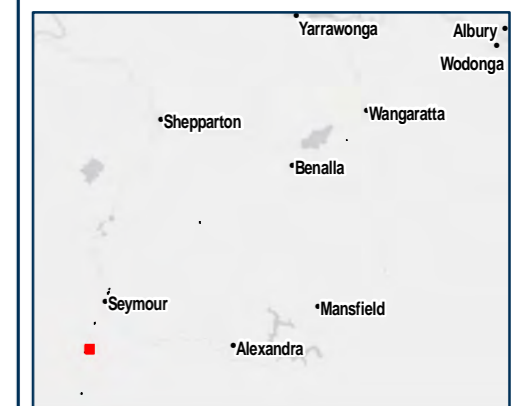


**Strategic Biodiversity Value**

Marchbanks Road Overbridge (Broadford)

MAP 4 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 80 - 90
  - 65 - 80
  - 50 - 65
  - 25 - 40
  - 15 - 25



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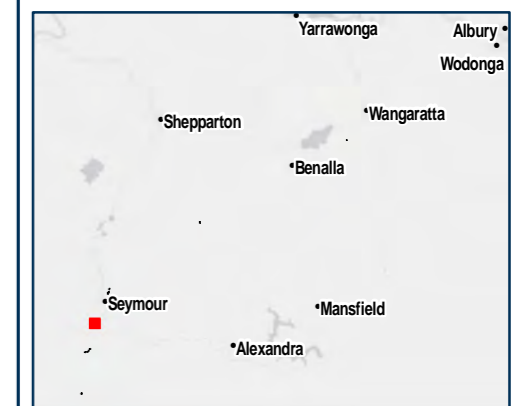


**Strategic Biodiversity Value**

Hume Highway Tallarook Precinct (Tallarook)

MAP 5 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 80 - 90
  - 65 - 80
  - 50 - 65
  - 40 - 50
  - 15 - 25



0 90 180 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:4,000  
 Data Sources: DELWP (2020) Figure 12



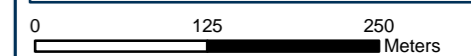
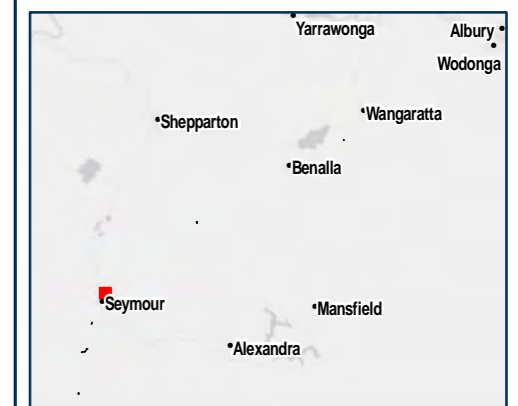


**Strategic Biodiversity Value**

Seymour Avenel Road Overbridge (Seymour)

MAP 6 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 90- 100
  - 80 - 90
  - 65- 80
  - 50- 65
  - 40- 50
  - 25- 40



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:5,500  
 Data Sources: DELWP (2020) Figure 12



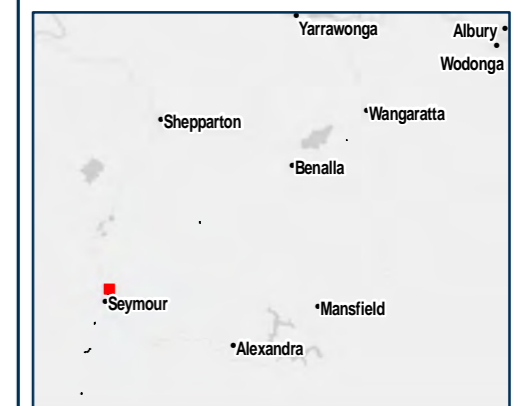


**Strategic Biodiversity Value**

Hume Highway Seymour Precinct (Seymour)

MAP 7 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 80 - 90
  - 65- 80
  - 50- 65
  - 40- 50
  - 15 - 25
  - 1 - 15



0 60 120 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:3,000  
 Data Sources: DELWP (2020) Figure 12



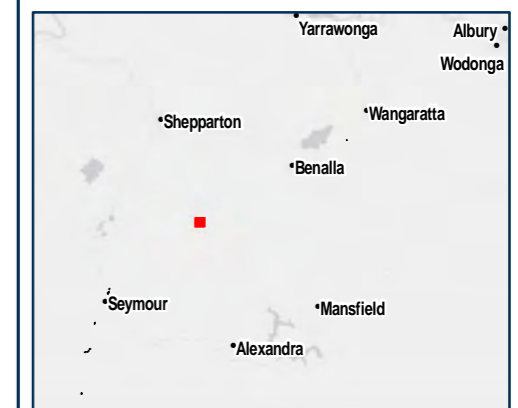


**Strategic Biodiversity Value**

Anderson Street Overbridge (Euroa)

MAP 8 OF 12

- 15m Buffer
  - Enhancement Site Reference Design
  - Impact Area
  - Project Area
  - Train Station
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 90- 100
  - 80 - 90
  - 40- 50
  - 25- 40
  - 15 - 25
  - 1 - 15



0 60 120 Meters

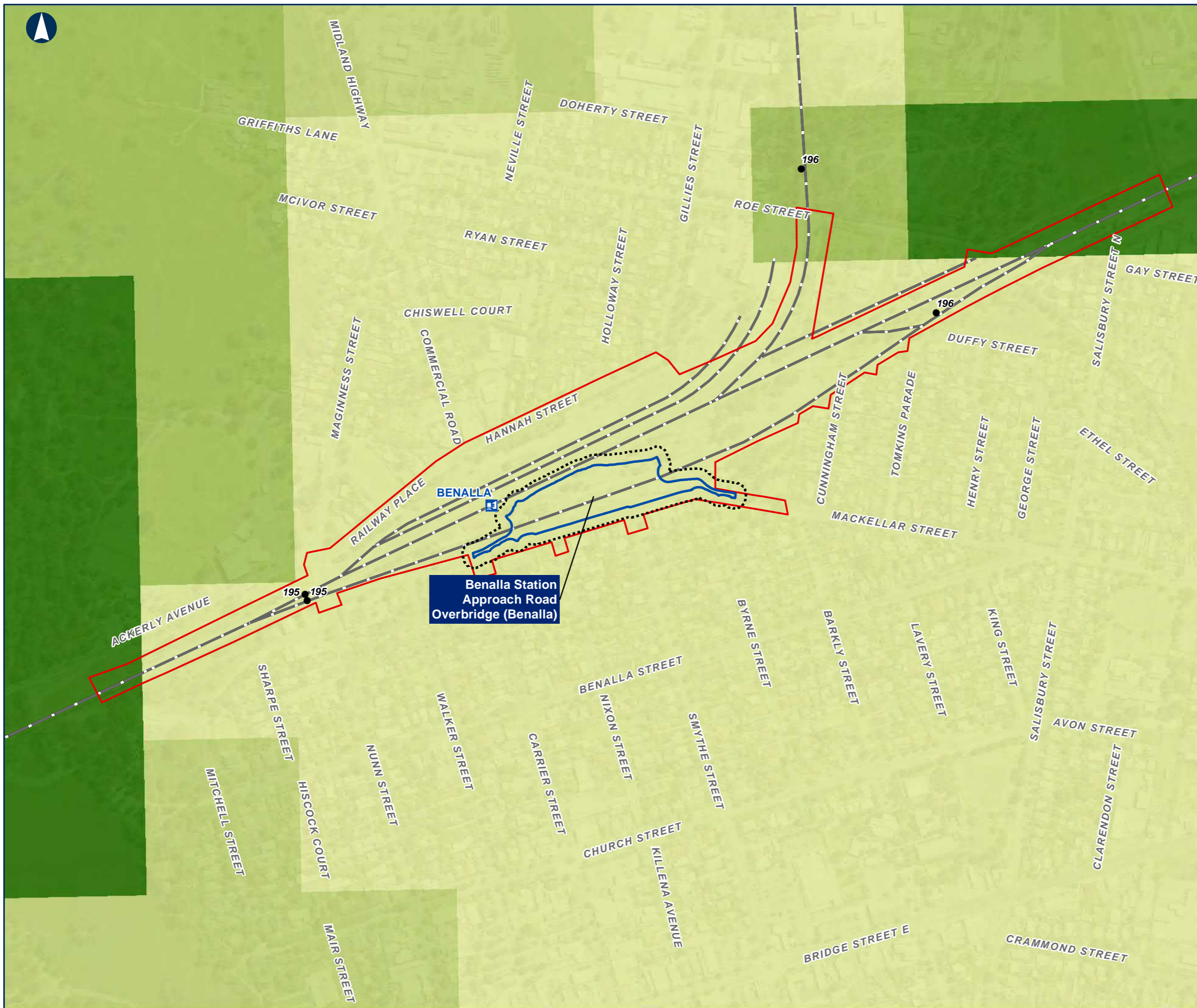
Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:3,000  
 Figure 12



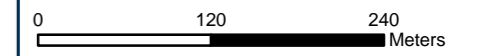
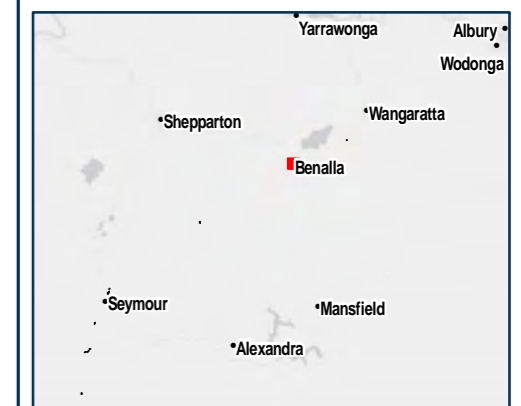


**Strategic Biodiversity Value**

Benalla Station Approach Road Overbridge (Benalla)

MAP 9 OF 12

- 15m Buffer
  - Enhancement Site Reference Design
  - Impact Area
  - Project Area
  - Train Station
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 90- 100
  - 40- 50
  - 25- 40
  - 15 - 25



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:5,250  
 Figure 12





EDWARD STREET

BEACONSFIELD PARADE

BURNS STREET

CHURCH STREET

KELLY STREET

SIEGE STREET

GLENROWAN

Beaconsfield Parade Overbridge (Glenrowan)

WOOLSHED ROAD

GLADSTONE STREET

KATE STREET

NED STREET

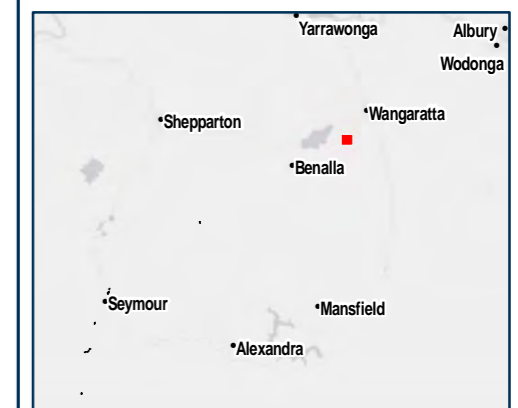
HILL STREET

Strategic Biodiversity Value

Beaconsfield Parade Overbridge (Glenrowan)

MAP 10 OF 12

- 15m Buffer
  - Enhancement Site Reference Design Impact Area
  - Project Area
  - Train Station
  - Railway
- Strategic biodiversity values**
- 80 - 90
  - 65 - 80
  - 50 - 65
  - 40 - 50
  - 25 - 40
  - 15 - 25
  - 1 - 15



0 40 80 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,000  
Figure 12





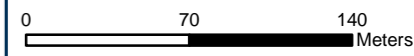
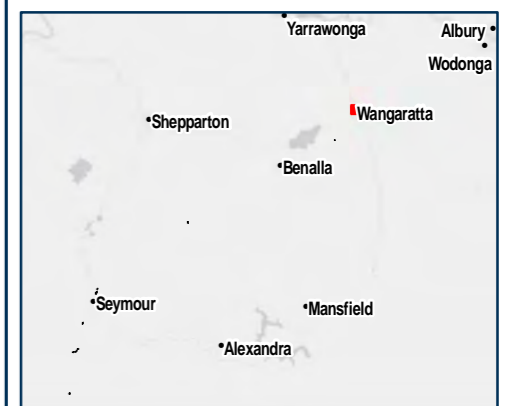
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

**Strategic Biodiversity Value**

Wangaratta Precinct (Wangaratta)

MAP 11 OF 12

- 15m Buffer
  - Enhancement Site Reference Design
  - Impact Area
  - Project Area
  - Train Station
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 80 - 90
  - 65- 80
  - 25- 40
  - 1 - 15



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\\aume11fp001.au.aecomnet.com/projects\606X\60637387\900\_CAD\_GIS\920\_GIS\02\_Maps\2021106\Ecology\ARTC\_EST\F12\_EST\_Project\_Area\_SBV.mxd



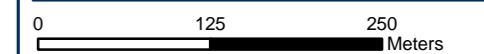
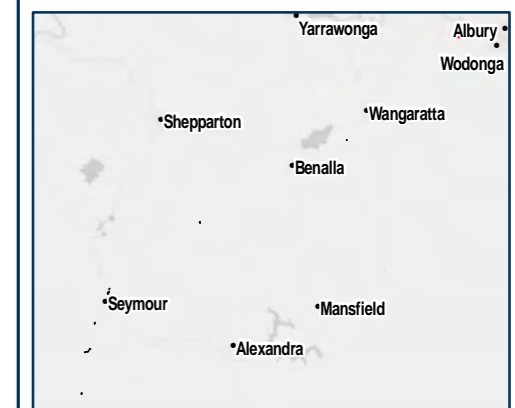


**Strategic Biodiversity Value**

Murray Valley Highway Overbridge (Barnawartha North)

MAP 12 OF 12

- 15m Buffer
  - Enhancement Site Reference Design
  - Impact Area
  - Project Area
  - KM Posts
  - Railway
- Strategic biodiversity values**
- 90- 100
  - 80 - 90
  - 65- 80
  - 50- 65
  - 40- 50
  - 25- 40
  - 15 - 25
  - 1 - 15



Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:5,500  
 Figure 12



## Appendix A – Figures

Figure 13 Environmental overlays

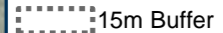










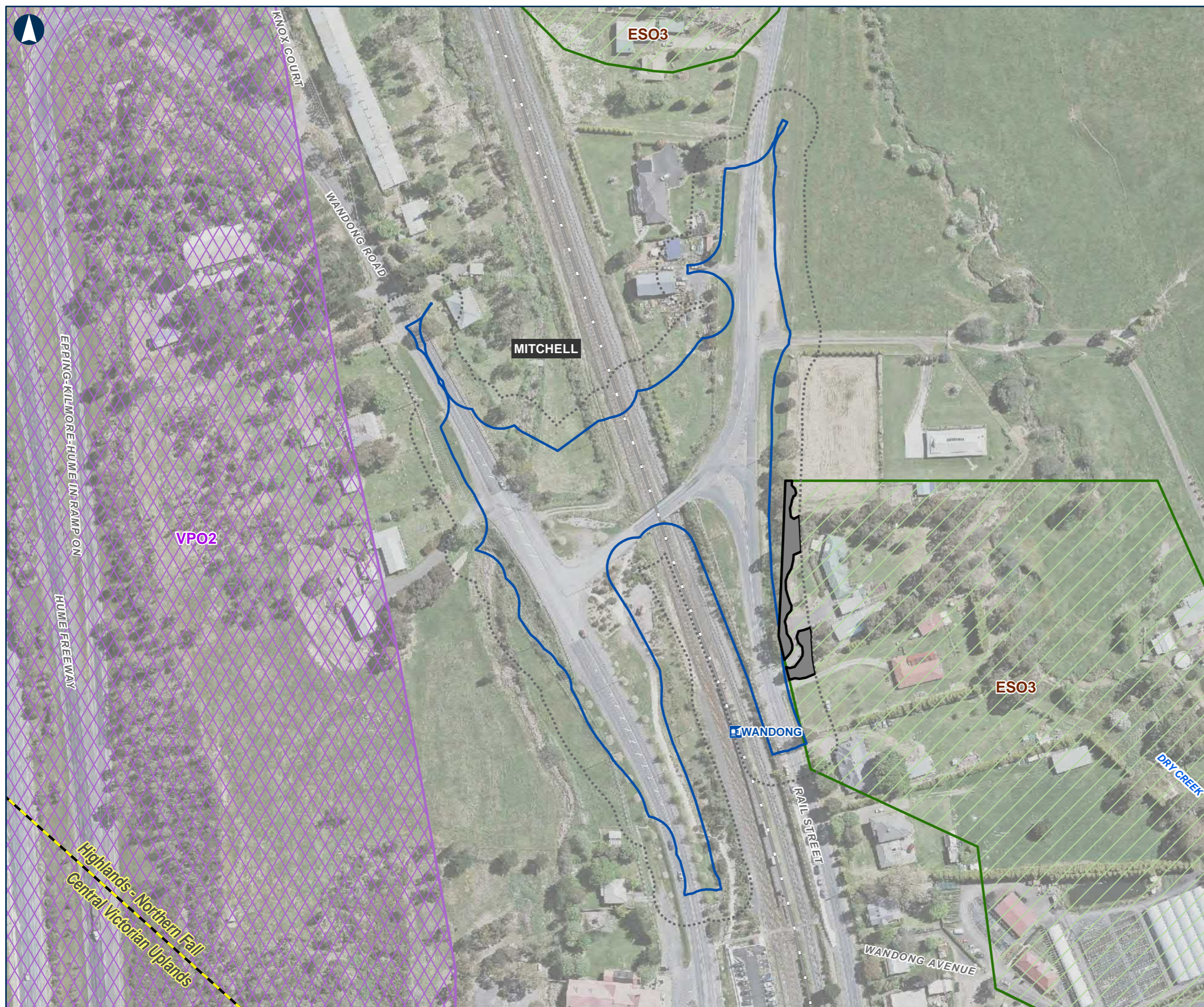


**Environmental Overlays**

Broadford Road Overbridge (Wandong)

MAP 1 OF 7

-  15m Buffer
-  Enhancement Site Reference Design Impact Area
-  Non-native Vegetation Impacted
-  Train Station
-  Railway
-  Bioregion
-  LGA Boundaries
- Planning Overlay**
-  ESO - Environmental Significance
-  VPO2 - Vegetation Protection



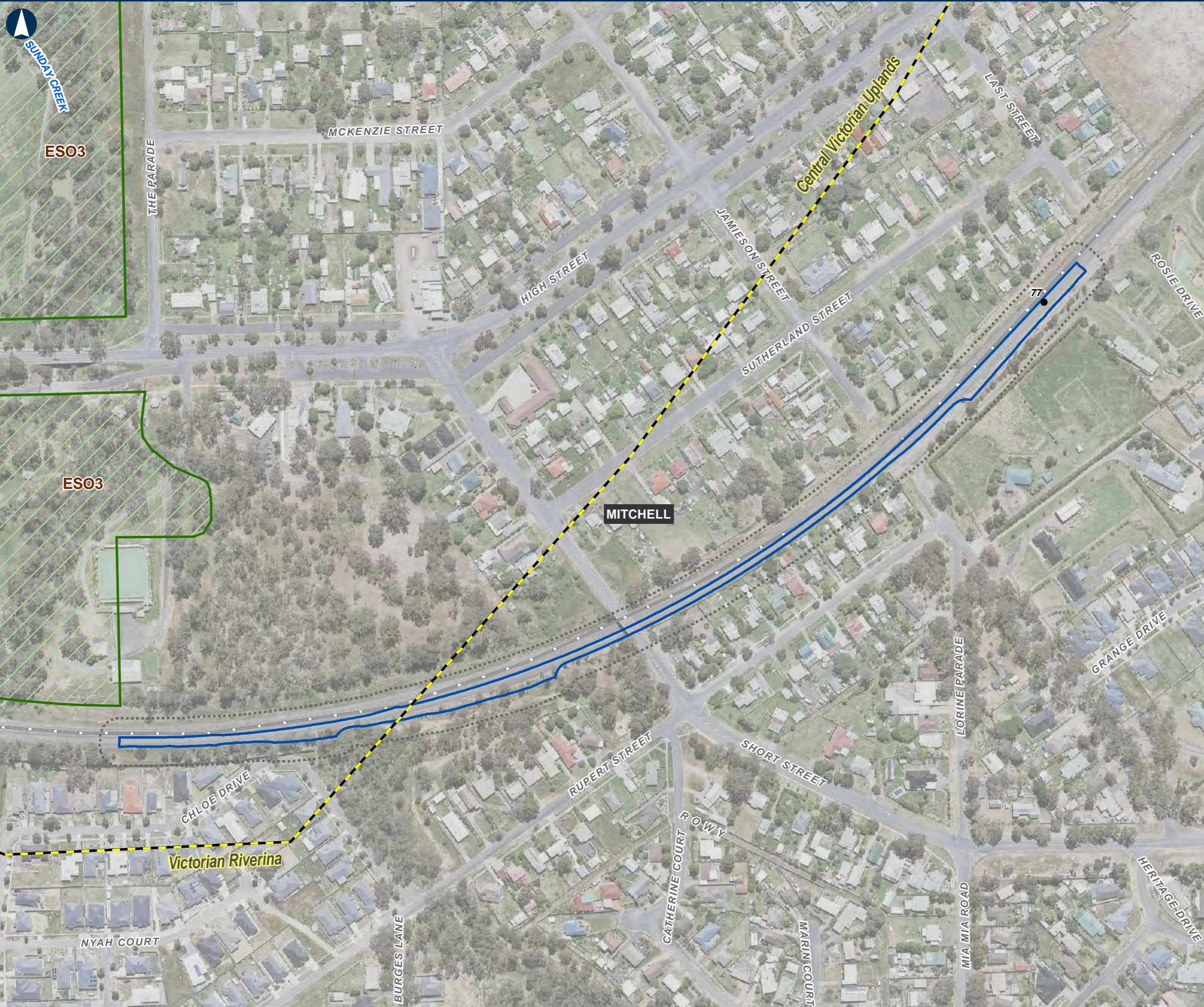
0 40 80 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:1,770  
 Data Sources: DELWP (2020) Figure 13





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**Environmental Overlays**

Short Street Overbridge (Broadford)

MAP 2 OF 7

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Native Vegetation Impacted
- KM Posts
- Railway
- Bioregion
- LGA Boundaries
- Planning Overlay**
- ESO - Environmental Significance



0 60 120 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021 Paper: A3  
 Author: JB Scale: 1:2,840  
 Data Sources: DELWP (2020) Figure 13

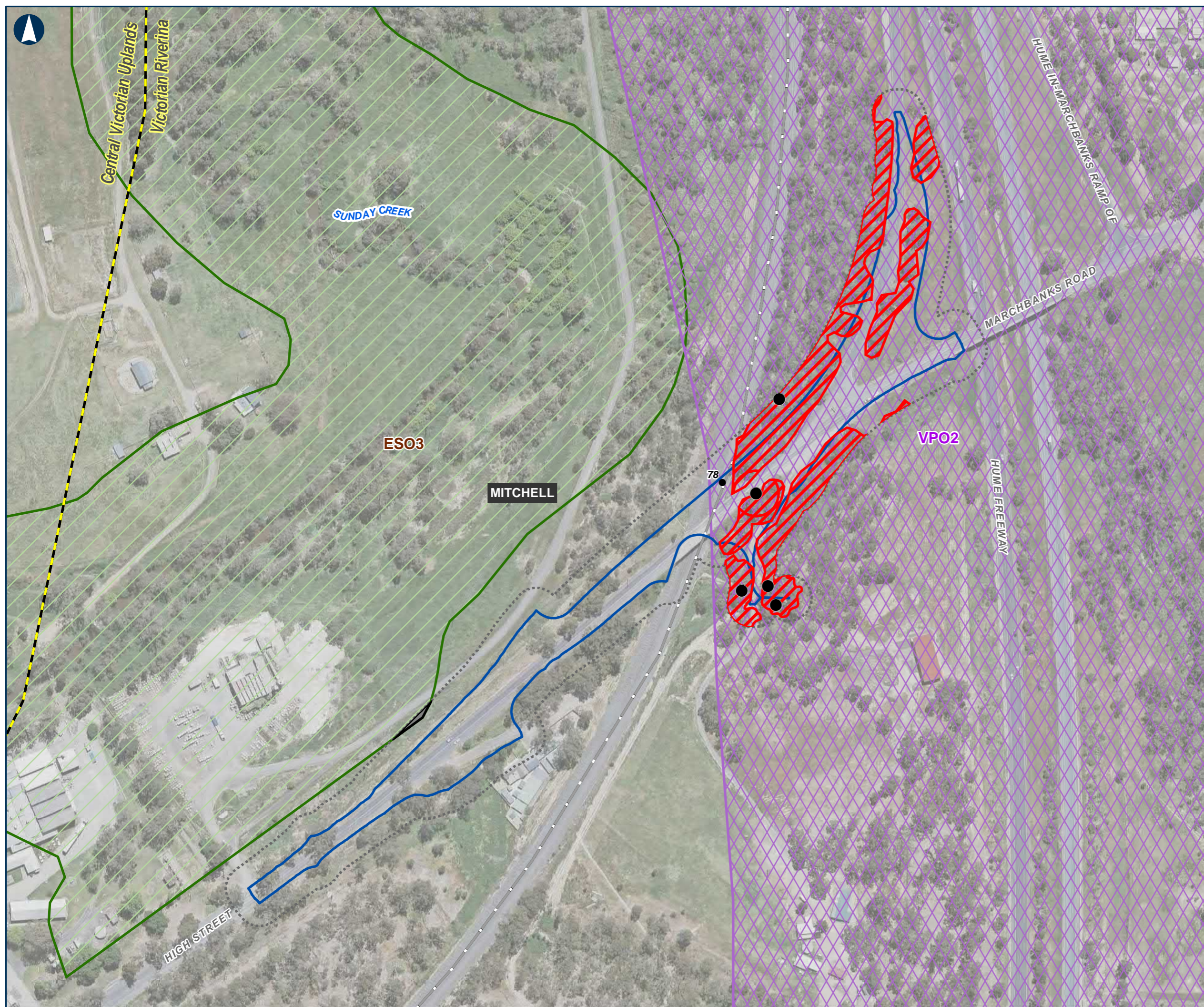




The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

**Environmental Overlays**

Marchbanks Road Overbridge (Broadford)  
MAP 3 OF 7



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Native Trees Impacted
- Native Vegetation Impacted
- Non-native Vegetation Impacted
- KM Posts
- Railway
- Bioregion
- LGA Boundaries
- Planning Overlay**
- ESO - Environmental Significance
- VPO2 - Vegetation Protection



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:2,390  
Figure 13





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**Environmental Overlays**

Hume Highway Tallarook Precinct (Tallarook)  
MAP 4 OF 7

- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Native Trees Impacted
- Native Vegetation Impacted
- KM Posts
- Railway
- Bioregion
- LGA Boundaries
- Planning Overlay**
- ESO - Environmental Significance
- VPO2 - Vegetation Protection



0 75 150 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
Author: JB  
Data Sources: DELWP (2020)

Paper: A3  
Scale: 1:3,480  
Figure 13

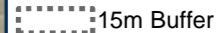










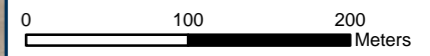
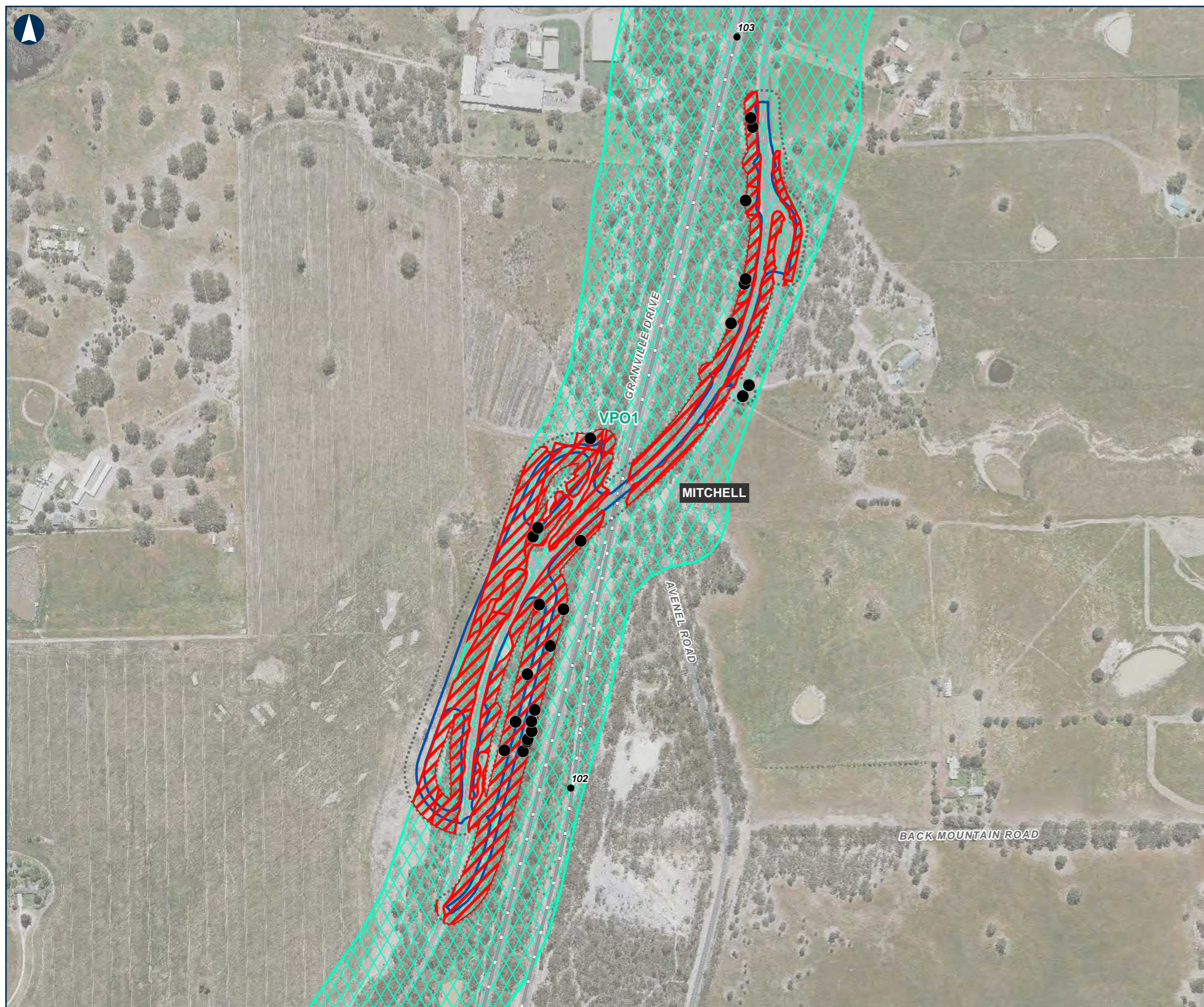


**Environmental Overlays**

Seymour Avenel Road Overbridge (Seymour)

MAP 5 OF 7

-  15m Buffer
-  Enhancement Site Reference Design Impact Area
-  Native Trees Impacted
-  Native Vegetation Impacted
-  KM Posts
-  Railway
-  Bioregion
-  LGA Boundaries
- Planning Overlay**
-  VPO1 - Vegetation Protection



Coordinate System: GDA 1994 MGA Zone 55

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**Environmental Overlays**

Hume Highway Seymour Precinct (Seymour)

MAP 6 OF 7



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Native Trees Impacted
- Native Vegetation Impacted
- KM Posts
- Railway
- Bioregion
- LGA Boundaries
- Planning Overlay**
- VPO1 - Vegetation Protection
- VPO2 - Vegetation Protection



0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 2/07/2021  
 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:2,610  
 Figure 13



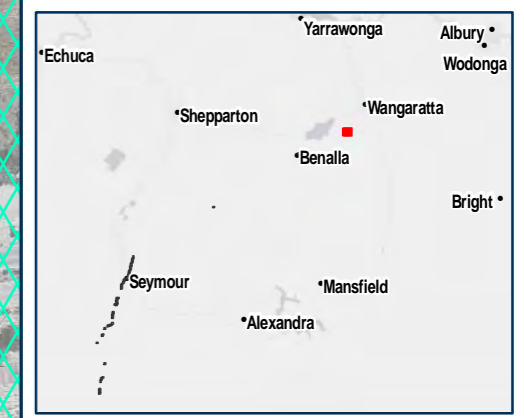


**Environmental Overlays**

Beaconsfield Parade Overbridge (Glenrowan)  
MAP 7 OF 7



- 15m Buffer
- Enhancement Site Reference Design Impact Area
- Native Trees Impacted
- Native Vegetation Impacted
- Train Station
- Railway
- Bioregion
- LGA Boundaries
- Planning Overlay**
- VPO1 - Vegetation Protection



0 30 60 Meters

Coordinate System: GDA 1994 MGA Zone 55

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# Appendix B

Literature review



## Appendix B – Literature review

A review of previous studies completed by KBR for the Beveridge to Albury section of the Inland Rail Project was completed to inform the current assessment. The review considered threatened flora and fauna species and TECs of interest to the Project. Data, including mapping and VQA assessments completed by KBR have been consolidated with the current AECOM assessment data.

The literature review only considered areas between Beveridge and Albury as this aligned with the current investigation area. KBR reports reviewed include:

### **Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services. Tottenham to Albury Biodiversity Assessment (KBR, 2020)**

This desktop and field assessment was conducted for areas north and south of Beveridge and the following biodiversity values were identified north of Beveridge:

- A total of 34.56 ha of native vegetation
- 426 scattered trees

Potential habitat for threatened fauna:

- Growling Grass Frog;
- Striped Legless Lizard;
- Golden Sun Moth;
- Painted honeyeater;
- Regent honeyeater;
- Swift parrot;
- Brush-tailed phascogale; and
- Squirrel glider.

Threatened flora:

- Large-flower crane's-bill (FFG Act); and
- Buloke (FFG Act).

Threatened ecological communities:

- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (GBGW);
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands (WBYBRGGW);
- Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP);
- Victorian Temperate Woodland Bird Community (VTWBC); and
- Western (Basalt) Plains Grassland Community (WBPGC).

Potential habitat for threatened flora:

- Matted flax-lily (EBPC Act);
- Euroa guinea-flower (EBPC Act);
- Swamp everlasting (EBPC Act);
- Swamp fireweed (EBPC Act);
- Crimson spider-orchid (EBPC Act);
- Purple diuris (FFG Act); and



The biodiversity values identified during the KBR assessment are to be consolidated within the current AECOM assessment.

**Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services. Threatened Flora Survey Report (KBR, 2020)**

This flora survey has been conducted in response to the recommendations made in the Tottenham to Albury Assessment report by KBR. The following targeted flora surveys were undertaken:

- Euroa guinea-flower (EPBC and FFG Act) - Hume Highway (Seymour) [ES07];
- Crimson spider-orchid (EPBC and FFG Act) – Hume Highway (Tallarook) [ES05] & TS5, Seymour Avenel Road (Seymour) [ES06] & SG14, and Hume Highway (Seymour) [ES07]
- Purple diuris (EPBC and FFG Act) – Hume Highway (Tallarook) [ES05] & TS5, Seymour Avenel Road (Seymour) [ES06] & SG14, and Hume Highway (Seymour) [ES07].

None of the targeted flora species or any additional EPBC or FFG Act listed species were identified during the field assessment or considered likely to occur within the investigation area.

**Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services. Ecology Report - Victorian Temperate Woodland Bird Survey (KBR, 2020)**

Targeted surveys for threatened bird species and the FFG Act listed Victorian Temperate Woodland Bird community (VTWBC) were conducted in woodland areas that had previously been identified in the overall Tottenham to Albury Biodiversity Assessment (KBR, 2020).

The following investigation areas were surveyed:

- Short Street Overbridge (Broadford) [ES03] & SG6
- Marchbanks Road Overbridge (Broadford) [ES04]
- Hume Highway (Tallarook) [ES05] & TS5
- Seymour Avenel Road (Seymour) [ES06] & SG14
- Hume Highway (Seymour) [ES07].

No EPBC Act-listed or FFG Act-listed bird species were identified during the assessment however small non-critical areas of potential habitat for Swift parrot, Regent honeyeater and painted honeyeater was noted to be present. Suitable habitat for VTWBC was identified at each investigation area surveyed.

The extent of impact to the VTWBC may be considered significant and as such KBR recommended a referral under the EE Act in response to the referral criteria for the 'potential loss of a significant area of a listed ecological community' and potential clearing of 10 ha or more of native vegetation.



# Appendix C

Targeted fauna survey  
report



# Inland Rail - Beveridge to Albury

Ecology: Targeted Fauna Survey Spring 2020





## Inland Rail - Beveridge to Albury

Ecology: Targeted Fauna Survey Spring 2020

Client: Australian Rail Track Corporation Ltd

ABN: 75 081 455 754

Prepared by

**AECOM Australia Pty Ltd**

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ABN 20 093 846 925

15-May-2021

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## Quality Information

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## 1.0 Introduction

AECOM Australia (AECOM) was engaged by Australian Rail Track Corporation (ARTC) to undertake an ecological impact assessment for the Victorian portion of the Inland Rail – Tottenham to Albury (T2A) Stage 1 project (the ‘project’). T2A is part of a broader national program to create a freight route from Brisbane to Melbourne which requires upgrades the existing rail corridor from Beveridge to Alby to provide passage for double-stacked freight trains.

The project was referred under the *Environment Effects Act 1978* (EE Act) and under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In August 2020, the Victorian Minister for Planning decided that an environment effects statement (EES) under the EE Act is not required for the project subject to conditions set out in the decision. A delegate for the Commonwealth Minister for the Environment determined that project to be a controlled action under the EPBC Act as it is likely to have a significant impact on listed threatened species and communities which is a matter of national environmental significance (MNES) protected under the EPBC Act.

Assessment of the project under the EPBC Act is being undertaken via the accredited state assessment process (environmental report) under the Bilateral (Assessment) Agreement between the Commonwealth and Victorian governments. The environment report needs to meet assessment requirements set out by the Victorian Minister for Planning under the EE Act as well as matters identified by the Commonwealth for the controlled action determination under the EPBC Act. A scope for the environment report under EPBC Act Bilateral (Assessment) Agreement 2014 and the EE Act was issued by the Department of Environment, Land, Water and Planning (DELWP) to guide the preparation of the reporting for the Inland Rail T2A 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* (FFG Act) and/or Victorian threatened species advisory lists.

The Victorian Minister’s Condition of Approval requires:

*‘targeted surveys and ecological investigations undertaken by suitably qualified persons in accordance with relevant survey guidelines in consultation with DELWP, to inform the prediction of potential environmental impacts of the project on native vegetation and biodiversity values’*

Previous ecological assessments completed for the T2A project considered the likelihood of threatened species and communities occurring within the project area. Threatened species habitat mapping and some targeted species surveys were undertaken (KBR 2020).

A summary of species recommended for further survey by KBR (2020) and status of completion of surveys is provided in Table 1. Surveys for three species were not completed:

- Brush-tailed Phascogale *Phascogale tapoatafa* which is listed as threatened under the FFG Act and classified as endangered in Victoria (DSE 2013).
- Squirrel Glider *Petaurus norfolcensis* which is listed as threatened under the FFG Act and classified as endangered in Victoria (DSE 2013).
- Barking Owl *Ninox connivens* which is listed as threatened under the FFG Act and classified as be endangered in Victoria (DSE 2013).

As such, targeted surveys for the three species were undertaken to inform the ecological impact assessment for the T2A project. A survey approach was developed in consultation with DELWP prior to undertaking the survey. The survey assumes that the surveys undertaken by KBR for other significant species outlined in the KBR (2020) report have been considered adequate by the regulator(s).

This report documents the findings of the surveys for the three target species.



**Table 1 Summary of survey status for species identified for targeted survey by KBR (2020)**

Species	Protection status	Targeted survey status (KBR 2020)
<b>Flora</b>		
Euroa Guinea-flower	EPBC Act FFG Act	Completed September - October 2019
Crimson Spider-orchid	EPBC Act FFG Act	Completed September - October 2019
Purple Diuris	FFG Act	Completed September - October 2019
Swamp Everlasting	FFG Act	No survey as no impact to habitat was proposed.
Swamp Fireweed	FFG Act	No survey as no impact to habitat was proposed.
Buloke	FFG Act	No survey as detected during vegetation surveys
<b>Fauna species</b>		
Brush-tailed Phascogale	FFG Act	Not completed
Squirrel Glider	FFG Act	Not completed
Barking Owl	FFG Act	Not completed
Woodland birds	FFG Act	Completed July 2019
Regent Honeyeater	EPBC Act FFG Act	Completed July 2019
Swift Parrot	EPBC Act FFG Act	Completed July 2019
Growling Grass Frog	EPBC Act FFG Act	No survey – impact assessment based on assumed presence of the species and impacts to potential habitat identified at Track Slew Investigation Area C, Wallan, had been avoided (no-go zone).



## 2.0 Target species

### 2.1 Brush-tailed Phascogale

The following Brush-tailed Phascogale (or Tuan) species profile has been prepared based on information contained in (DSE 2003a) and van der Ree et al. (2006):

Brush-tailed Phascogale in Victoria are subspecies *P. tapoatafa tapoatafa* which is also found in southern Queensland, coastal New South Wales, the Eyre Peninsula in South Australia (thought to be extinct) and south-west Western Australia. The other subspecies *P.t. piriata* occurs in northern Australia including the Cape York Peninsula (DSE 2003a).

In Victoria, the Brush-tailed Phascogale has a fragmented distribution, occurring in the foothills to the east and north-east of Melbourne, central Victoria around Ballarat, Heathcote and Bendigo, north-eastern Victoria from Broadford to Wodonga, the Brisbane Ranges north-east of Geelong and far western Victoria. The species is found in a variety of treed habitats, preferring open dry sclerophyll foothill forest with little ground cover. Typically occurs in areas that have a reliable annual rainfall between 500 to 2000mm.

Brush-tailed Phascogales are primarily arboreal, foraging on large insects, spiders and centipedes on the trunks and major branches of rough-barked trees and fallen logs. Eucalypt nectar may be eaten when ironbarks or boxes are flowering.

Brush-tailed Phascogales are cryptic and shy and occurs at low densities. Female home ranges can be 30-60 hectares and do not overlap while male home ranges are larger (over 100 hectares) and overlap with females and other males.

Tree hollows are critical for Brush-tailed Phascogales as they provide shelter, nesting and denning opportunities. Tree hollows that have small entrance holes are preferred. Brush-tailed Phascogales typically nest and shelter alone. The species nest in numerous sites each year (as many as 30), within hollows in dead or live trees, under flaking bark or in tree stumps. Breeding occurs from early winter and juveniles disperse in early summer. Most males die after the breeding season and females seldom survive a second year.

Habitat loss and fragmentation pose the greatest threats to the species. Other threats include inappropriate fire regimes affecting habitat quality and predation by introduced predators – Red Fox (*Canis vulpes*) and Cat (*Felis catus*).

### 2.2 Squirrel Glider

The following Squirrel Glider species profile has been prepared based on information contained in (DSE 2003b) and Sloanes and van der Ree (2016):

Squirrel Glider occurs in northern and central Victoria through to the southern Cape York Peninsula. In Victoria, the species has a patchy distribution north of the Great Dividing Range which extends from the northern tip of the Grampians National Park to near Wodonga with a major gap between western and eastern populations. The species typically occurs at sites below 250m in altitude, with an average annual rainfall of 345-920mm within its range. The range of the Squirrel Glider includes the box-ironbark region of the gentle inland slopes and the central and northern riverine plains where they are often found in remnant and roadside patches of *Eucalyptus* woodland.

Squirrel Gliders are arboreal and occur in River Red Gum *Eucalyptus camaldulensis* open forests (usually in association with major rivers or creeks) and mixed species dry forests and woodlands primarily with gum barked and box eucalypt species but occasionally with ironbark or stringybark species. These habitats typically contain numerous mature trees with an understorey dominated by Silver Wattle *Acacia dealbata* or Black Wattle *Acacia mearnsii*. Golden Wattle *Acacia pycnantha* and Lightwood *Acacia implexa* may also occur on mixed species sites.

Squirrel Gliders are nocturnal and feed mainly on insects. Their diet can also include nectar, pollen and sap. The presence of winter-flowering species such as Yellow Gum *Eucalyptus leucoxydon*, White Box *Eucalyptus albens*, Long-leaved Box *Eucalyptus goniocalyx* and Red Ironbark *Eucalyptus tricarpa* can be important as they provide alternative food sources when many other species are not flowering.



Tree hollows are essential for Squirrel Gliders as these provide den and breeding sites. Hollows with a tight entrance hole (<50mm) are preferred although gliders may shelter in sub-optimal hollows in areas where hollows are scarce. Squirrel Gliders use multiple den sites within their home range and may travel over 2.5 km to forage.

Squirrel Gliders primarily move by gliding from tree to tree with an average glide length of 30 – 40 m. They live in social groups of up to 8 individuals typically comprised of an adult male, an adult female and their offspring. Multiple family groups can inhabit a patch, depending on its size and availability of nesting and feeding resources. Squirrel Glider have been found to occur at average densities of 0.5-1.5 individuals per hectare and can occupy home ranges from 1.5-6 hectares depending on habitat quality and shape. Young are usually born between April and November.

Squirrel Gliders in Victoria are now largely confined to isolated habitat remnants. Habitat loss and fragmentation, particularly large gaps between trees, pose the greatest threats to the species. Other threats include timber and firewood harvesting altering habitats, grazing affecting habitat regeneration, predation by introduced predators and collisions with barbed-wire fencing becoming ensnared by its gliding membrane.

### 2.3 Barking Owl

The following Barking Owl species profile has been prepared based on information contained in (DSE 2003c) and Higgins (1999):

The Barking Owl is a medium-sized, robust-bodied owl with generally brownish plumage and large yellow eyes with an indistinct facial disk. The Australian subspecies (*Ninox connivans connivans*) occurs across much of south-eastern Australia northward to the base of Cape York Peninsula with scattered populations in south-western Australia. They are often recorded by their distinctive dog-like *wok-wok* calls at dusk and into the night. Calls are more frequently given at the start of the breeding season. They also give a shrill, loud screaming call which is typically given in autumn (Higgins, 1999).

In Victoria, Barking Owl occur in open woodlands and open forests, often near watercourses, including the edges of woodlands and wooded farmland, typically from 400–700 mm rainfall zone north of the Great Dividing Range (DSE, 2003c; Higgins, 1999). Barking Owl is largely absent from unforested areas such as the volcanic plains and the semi-arid north-west of Victoria. The species has been recorded more frequently in edge habitats than in forest interiors, which is likely to be due to foraging behaviour, the abundance of European Rabbits (a common prey item) and the availability of larger, hollow-bearing trees on freehold land compared to public forests (DSE 2003c). River and swamps are also common features of Barking Owl habitat.

Barking Owl typically roost in large trees with dense foliage, often along or near watercourses and wetlands. They are sedentary and the adult home ranges are said to be 100–1,000 ha. They are crepuscular or nocturnal and generally rest during the day. They typically feed on small to medium-sized arboreal mammals (e.g. Sugar Glider *Petaurus brevipes*, Squirrel Glider, Common Brushtail Possum *Trichosurus vulpeculus*, microbats), birds (e.g. various parrots) and sometimes ground-dwelling mammals (e.g. European Rabbit *Oryctolagus cuniculus*, Black Rat *Rattus rattus*, House Mouse *Mus musculus*). Unlike other forest owls in Victoria, the species often eats invertebrates (e.g. beetles, moths, spiders, grasshoppers), particularly outside the breeding season.

Barking Owl are monogamous and may form life-long pair bonds. The species typically breeds in live, hollow-bearing eucalypts (usually at least 150 years old), including River Red Gum *E. camaldulensis*, Red Box *E. polyanthemos*, Apple Box *E. bridgesiana*, Red Stringybark *E. macrorhyncha* and Grey Box *E. macrocarpa* (DSE 200c). In Victoria the species breeds from late winter to spring, and two or three eggs are laid in a tree hollow. Preferred hollows are usually large (entrance diameter 25–45 cm and internal depth 20–250 cm) and a pair may use the same hollow for many years.

Loss of habitat, including loss of large, hollow-bearing trees, is a key threat for Barking Owl. Hollows suitable for nesting do not form in eucalypts for 100-200 years. Mortalities have been recorded from collisions with wire fences, powerlines and vehicles and captures in rabbit traps.

Barking Owl is a member of the FFG Act listed threatened community – Victorian Temperate Woodland Bird Community.



## 3.0 Survey approach

The survey approach outlined below was developed in consultation with DELWP prior to undertaking the survey. Site selection was based on the findings of previous assessments for the project and methods were developed in accordance with available survey guidelines.

### 3.1 Sites

Targeted surveys were undertaken at the five enhancement sites nominated by KBR because they *'contain areas with intact woodland that is connected to other habitats and woodland corridors in the landscape, and also contain large and hollow-bearing trees, which may be used as den sites'* (p54, KBR 2020). Based on aerial photography prior to survey, AECOM agreed that the nominated sites represented the areas with the larger patches of woodland vegetation associated with the project area.

The five survey sites and their target species are shown in Figure 1 and listed in Table 2.

**Table 2 Targeted fauna survey sites**

Site number	Site name	Location	Target species
Site 1	Hume Highway Seymour Precinct	Seymour	Brush-tailed Phascogale Squirrel Glider Barking Owl
Site 2	Seymour Avenel Road Overbridge	Seymour	
Site 3	Hume Highway Tallarook Precinct	Tallarook	
Site 4	Marchbanks Road Overbridge	Broadford	Barking Owl
Site 5	Short Street Overbridge	Broadford	

Aerial photography interpretation and field assessments suggest most of the track slew, gantry and powerline project areas are either small in extent or confined to the rail corridor. It was therefore assumed those areas did not require specific survey for the three target species.

### 3.2 Methods

#### 3.2.1 Hollow-bearing tree assessment

Daytime searches were undertaken for potential nest trees and signs of activity such as scratches on tree trunks or scats on the ground. Hollow-bearing trees were identified within the sites to concentrate direct detection survey methods and maximise the chance of detection.

Trees were surveyed from the ground using Nikon Monarc 10 x 42 binoculars to assist in identifying the presence of hollows. Tree characteristics including number of hollows, whether the tree was alive or dead and presence of introduced European Honey Bee were recorded. The geographic location of hollow-bearing trees was recorded using Arc GIS Collector on a iPhone SE paired via Bluetooth to a BAD ELF GNSS surveyor. The accuracy of the mapping, is subject to the accuracy of the unit and access to satellite information (generally between 1 and < 5 metres).

#### 3.2.2 Brush-tailed Phascogale & Squirrel Glider survey

The following references were used to inform survey approach for these arboreal mammals:

- Pre-Harvest Surveys – Targeted Species Survey Procedure (VicForests 2015).
- Survey guidelines for Australia's threatened mammals - Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (DSEWPaC 2011) – noting that neither species is listed in under the EPBC Act or specifically addressed by the guidelines.
- Forest Protection Survey Program Survey Design Summary October 2018 (Malloy, 2018)



Due to similarity in species detection methods and habitat requirements the two target arboreal mammal species were surveyed for concurrently. Survey methods comprised remote cameras (also referred to as camera trapping) and spotlighting. These methods are described below.

### 3.2.2.1 Remote cameras

Use of remote cameras is becoming an increasingly common method of surveying and is the primary method used to determine occupancy and distribution of Squirrel Glider in particular as it reduces the reliance on time consuming methods of stag watching and spotlighting (Soanes and van der Ree, 2016). Many of the survey guidelines for mammals pre-date the more widespread use of this technique and therefore do not explicitly outline appropriate methods for target species.

Initially, the survey approach was proposed with up to 10 cameras deployed for a minimum of 14 days at each of the four target arboreal mammal survey sites (depending on availability of suitable and secure camera sites) or a total survey effort of 140 trap nights per site.

However, availability of suitable and secure camera sites precluded the deployment of 10 cameras simultaneously per site. As such, a decision was made to deploy 5 cameras for double (or greater) the time to achieve the target number of trap nights per site.

Priority was placed on deploying cameras in the vicinity of hollow-bearing trees and trees identified to show strong evidence of animal use (e.g. scratches).



### 3.2.2.2 Spotlighting

Spotlighting involved a slow, quiet walk (no slower than 500m per hour) along transects through areas containing hollow bearing trees or areas that represent connections through the landscape. Spotlight searches were undertaken for a length of up to 1 km (determined by project-area size) using a hand-held spotlight and binoculars.

Spotlight surveys were conducted on three occasions at each survey site (Plate 1).





Plate 1 Photo taken during spotlight survey undertaken for the project - Tawny Frogmouth in tree

### 3.2.3 Barking Owl survey

There are no formal survey guidelines specifically tailored to Barking Owl. In the absence of formal guidelines, the following resources were used to inform survey approach:

- Pre-Harvest Surveys – Targeted Species Survey Procedure (VicForests 2017).
- Approved Survey Standards: Powerful Owl *Ninox strenua*. (DSE 2011) – in the absence of DELWP-specific survey standards for the Barking Owl.

Vocalisations are the optimal means of detecting Barking Owl as visual appearance (size and plumage) is similar to the more common Southern Boobook *Ninox boobook*.

Surveys methods for Barking Owl comprised:

- Broadcast surveys (call playback). Broadcast surveys is an effective method for detecting nocturnal birds. Recording of the vocalisation of Barking Owl was played over a loudspeaker with periods of silence in between broadly following a sequence of 2 mins calls followed by 3 mins silent listening; repeat; 2 mins calls followed by spotlighting.
- Spotlighting was undertaken for approximately 15 minutes over approximately 200 metres at the completion of call playback to search for any owls that may have flown in to investigate.

In line with survey guidelines for threatened forest owls, five surveys were conducted on different nights under good conditions at each site.



### 3.3 Effort

A summary of the survey method, duration and effort is provided in the table below.

**Table 3 Summary of targeted survey method and effort per site**

Species	Method	Duration	Number per site	Effort per site
All	Daytime survey to identify potential den / nest trees	Variable	1	Variable
Brush-tailed Phascogale Squirrel Glider	Spotlight survey	30 minutes per 500m; maximum 1km	3	3 nights; minimum 3 hours
	Remote cameras	5 weeks; 33 nights	5	165 nights
Barking Owl	Call playback	12 minutes	5	5 nights; minimum 2.5 hours
	Spotlight survey	Up to 15 minutes, 200 m		

### 3.4 Timing

Surveys were undertaken in November and December 2020 (late spring – early summer). The schedule for surveys is provided in Table 4.

**Table 4 Targeted fauna survey schedule**

Date	Site 1	Site 2	Site 3	Site 4	Site 5
11 Nov 2020		Cameras deployed			
12 Nov 2020	Cameras deployed		Cameras deployed	Cameras deployed	
17 Nov 2020	Spotlighting Call playback	Spotlighting Call playback			
18 Nov 2020			Spotlighting Call playback	Spotlighting Call playback	Call playback
30 Nov 2020	Spotlighting Call playback	Spotlighting Call playback	Spotlighting Call playback		
1 Dec 2020				Spotlighting Call playback	Call playback
7 Dec 2020	Call playback	Call playback	Call playback	Call playback	Call playback
8 Dec 2020	Spotlighting	Spotlighting	Spotlighting	Spotlighting	
9 Dec 2020	Call playback	Call playback	Call playback	Call playback	Call playback*
14 Dec 2020	Call playback	Call playback	Call playback	Call playback	Call playback*
15 Dec 2020	Cameras retrieved	Cameras retrieved	Cameras retrieved	Cameras retrieved	Cameras retrieved

\*Survey unable to be completed due to a campsite being set up in Lion's Park



Survey timing was dictated primarily by project time constraints but was generally deemed to be suitable for this type of survey.

Although Brush-tailed Phascogale are more likely to be active during their winter breeding season between mid-May and early-July, survey can be undertaken between June and February (Mallow, 2018). It is acknowledged that detectability of the species may be lower in November and December as there are fewer adults in the population due to most males dying after the breeding season (DSE 2003a).

Squirrel Glider surveys can be conducted across all seasons (VicForests 2015) although ideally surveys are best conducted in spring and autumn.

Barking Owl surveys can generally be conducted at any time of year. Although it is acknowledged that Barking Owl tend to call more frequently at the start of the breeding season when establishing territories. Barking Owls are understood to breed from August to October. Detectability of breeding success is more likely in Spring (late September to early November) as young can usually be heard begging during this time (DSE 2011).

Daytime searches for potential nest trees are not influenced by weather conditions or survey timing.

Camera trapping by its very nature allows for a longer duration of survey and therefore survey effort does not need to be adjusted due to timing of survey.

### 3.5 Weather conditions

Weather conditions influence the success of surveys. Spotlighting and call playback surveys were scheduled to avoid inclement weather conditions such as extreme heat or cold, heavy rain and or strong wind. Call playback surveys were conducted during calm, fine weather where possible in accordance with the recommendations in DSE (2011).

Observations of weather conditions at the time of each survey were noted and are described in Appendix B. Wind speed was assigned a score according to the Beaufort wind scale. Owl survey guidelines following the Beaufort wind scale to ensure nocturnal call playback survey is conducted on suitable nights (VicForests 2017). Suitable nights are those when wind speed is less than 3 of the Beaufort scale. The Beaufort scale is:

- 0: calm (< 1 km/h); smoke rises vertically;
- 1: light air (1 - 5 km/h); wind direction shown by smoke-drift, but not by wind vanes;
- 2: light breeze (6 - 11 km/h); wind felt on face; leaves rustle; ordinary vanes moved by wind;
- 3: gentle breeze (12 - 19 km/h); leaves, twigs in constant motion; wind extends light flag;
- 4: moderate breeze (20 - 28 km/h); raises dust and loose paper; small branches are moved;
- 5: fresh breeze (29 - 38 km/h); small trees in leaf begin to sway; crested wavelets form on inland waters.

Weather conditions recorded at the Bureau of Meteorology Puckapunyal (Lyon's Hill) weather station during the survey period from 11 November 2020 to 15 December 2020 are listed in Appendix B.

### 3.6 Permits

Fauna surveys were conducted in accordance with the conditions of DELWP Wildlife Act 1975 and Flora and Fauna Guarantee Act 1988 Management Authorisation (Permit No: 10009528; expiry 1 September 2022) and Animal Ethics Committee approved project 16.19.



## 4.0 Results

### 4.1 Site descriptions

#### 4.1.1 Site 1 - Hume Highway Seymour Precinct (Seymour)

Habitat at Site 1 consisted of linear patches of Grey Box *eucalyptus macrocarpa*-dominated woodland in the roadsides of Seymour-Avenel Road and Kookaburra Lane.

Habitat along Seymour-Avenel Road was largely confined to a narrow strip between the road and rail reserve. A lack of sufficient cover and proximity to the road made the habitat unsuitable for survey.

Habitat within the Kookaburra Lane road reserve was more extensive than the roadside of Seymour-Avenel Road. Kookaburra Lane was a narrow informal dirt track largely only accessible to 4wd vehicles. As such, the habitat was less exposed to disturbance and its position between the rail easement and adjoining private farming land made it more suitable for the target species and for conducting camera trapping surveys.

Habitat along Kookaburra Lane consisted of good quality Grey Box woodland with large overstorey trees and an open grassy understorey (Plate 1). The shrub layer was dense in sections and a high density of hollow-bearing trees was noted. Hollows consisted of a trunk and spout hollows of various sizes with some showing evidence of use. Camera traps were set close to hollows of suitable size for the target species to increase likelihood of detection.

Noise disturbance from freight transport was notable in the area particularly during nocturnal surveys. Noise from trucks using the Hume Highway was more or less constant throughout the survey period.

The roadsides form a linear corridor of woodland in the landscape which may facilitate movement of more mobile fauna such as birds and bats. However, their narrow nature and exposure to light and noise disturbance from the adjoining road and rail network, is likely to reduce their suitability as habitat for the target species.



Plate 2 Woodland habitat at Site 1 – Kookaburra Lane, Hume Highway Seymour Precinct (Seymour)



#### 4.1.2 Site 2 – Seymour-Avenel Road Overbridge (Seymour)

Site 2 consisted of a number of woodland blocks located between Seymour-Avenel Road and the rail easement. The largest blocks, located in the south-west and north-east of the enhancement site were selected for targeted assessment.

Habitat at these sites was mainly limited to overstorey woodland vegetation with a homogenous cover of Grey Box. Understorey was largely open and limited to a low grass, shrub and herb layer. Ground cover at the site showed signs of significant disturbance with vegetation near the intersection of Avenel Road and Seymour-Avenel Road impacted by stockpiles likely associated with past rail and road works. All areas of habitat were noted to contain significant debris and litter likely to be associated with apparent regular use of the area for illegal dumping.

Despite signs of past disturbance the area did provide some habitat for the target species with a variety of hollow recorded and a number of very large old Grey Boxes present. Large old River Red Gums *Eucalyptus camaldulensis* were also present along an unnamed drainage channel that passed under the road and rail reserves via culverts.



Plate 3 Woodland habitat at Site 2 – Seymour-Avenel Road Overbridge (Seymour)



#### 4.1.3 Site 3 – Hume Highway Tallarook Precinct (Tallarook)

Habitat at Site 3 consisted of an extensive area of high quality Grey-Box Woodland with direct connectivity to a broader extensive area of high quality habitat on a landscape scale. Woodland habitat at Tallarook consisted of extensive areas of vegetation to the north west and south east of the rail reserve. On the Tallarook side of the Hume Highway overbridge the corridor is linked to a larger patch of habitat around the oval within the Tallarook Recreation Reserve and broader Tallarook Wildflower Sanctuary. Habitat selected for targeted survey included the roadside of Gairns Lane and to the west of the north bound Hume Highway C383 (Yea) exit. Habitat at both these sites consisted of Grey Box Woodland containing large old trees and a native mid and understorey containing logs, large woody debris and dense leaf litter. Hollows were prevalent with many having significant signs of usage such as worn edges and scratches.



Plate 4 Woodland habitat at Site 3 – Hume Highway Tallarook Precinct (Tallarook)



#### 4.1.4 Site 4 - Marchbanks Road Overbridge (Broadford)

The woodland habitat at this site was of lower quality and connectivity to the sites at Tallarook and Seymour. The road and rail line divide the area into five patches of woodland. Some of the patches support large trees (predominantly River Red Gum) with an understorey dominated by exotic grasses, thistles and thickets of Blackberry *Rubus fruticosus* spp. agg. Hollow were presented but a low density.



Plate 5 Woodland habitat at Site 4 – Marchbanks Road Overbridge (Broadford)



#### 4.1.5 Site 5 – Short Street Overbridge (Broadford)

The woodland habitat at this site is the most isolated of all the survey sites. Woodland habitat occurs mostly outside the enhancement site boundary along Sunday Creek and in a patch adjacent to the north of Lion's Park. Large hollow-bearing trees occur at this site, particularly the River Red Gums in Lion's Park, however most are in recreational areas with an exotic mown lawn understory.

The site is located in a landscape mostly utilised for residential land use in close proximity to the Broadford town centre. As such, the woodland at this site is more suited to birds that can readily disperse through the landscape.



**Plate 6** Woodland habitat at Site 5 – Short Street Overbridge (Broadford); Lion's Park (left) and riparian vegetation of Sunday Creek (right)



**Plate 7** Woodland habitat at Site 5 – Short Street Overbridge (Broadford); adjacent to the north of Lion's Park



## 4.2 Hollow-bearing tree assessment

All five enhancement sites contained a variety of hollow-bearing trees. Although hollows were primarily observed in the larger trees, some of the smaller trees had already developed small spout and trunk hollows. Some of the hollows showed signs of use in the form of worn entrances. Other indicators of potential use were claw marks on the trunk. Remote cameras also detected eyeshine of an occupant in a hollow and a pardalote was observed emerging from a small hollow close to the ground during the diurnal assessment.

The number and distribution of hollow-bearing trees mapped within the study area is shown in Figure 3 in Appendix A. The number of hollow-bearing trees recorded at each site is provided in Table 5

**Table 5** Hollow-bearing trees recorded at each site

Site number	Enhancement site	Number of hollow bearing trees
1	Hume Highway Seymour Precinct (Seymour)	29
2	Seymour Avenel Road Overbridge (Seymour)	86
3	Hume Highway Tallarook Precinct (Tallarook)	65
4	Marchbanks Road Overbridge (Broadford)	17
5	Short Street Overbridge (Broadford)	6

Some examples of the range of hollows at the sites are provided in Plate 8







**Plate 8** Example hollow types observed - trees supporting multiple hollows (top), trees with trunk hollows (middle), trees with spout hollows (bottom)



### 4.3 Targeted survey

The location of targeted survey at each of these sites is shown in Figure 2 in Appendix A.

Species detected during targeted survey are listed in Table 6.

**Table 6 Species recorded during targeted survey**

Common name	Scientific name	Site 1	Site 2	Site 3	Site 4	Site 5
<b>Mammals</b>						
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	Y	Y#	Y	Y	Y
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	Y#	Y#	Y	Y	Y
Sugar Glider	<i>Petaurus breviceps</i>	N	N	Y	N	N
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	N	N	Y	N	N
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	Y	Y	Y	Y	N
Swamp Wallaby	<i>Wallabia bicolor</i>	N	N	Y	N	N
White-striped Freetail Bat	<i>Austronomus australis</i>	Y	Y	Y	Y	Y
Unidentified microbat	-	N	N	Y	N	N
Unidentified whiskers	-	Y	Y	N	Y	N
Unidentified mammal in hollow	-	Y	N	N	N	N
Black Rat*	<i>Rattus rattus</i>	Y	Y	N	N	N
European Hare*	<i>Lepus europaeus</i>	Y	N	N	N	N
House Mouse*	<i>Mus musculus</i>	N	Y	N	N	N
Red Fox*	<i>Vulpes Vulpes</i>	Y	Y	Y	Y	N
European Rabbit*	<i>Oryctolagus cuniculus</i>	N	N	Y	Y	N
Sheep**	<i>Ovis aries</i>	Y	N	Y	N	N
Human**	<i>Homo sapien</i>	N	N	Y	Y	Y
Dog**	<i>Canis lupus</i>	N	N	N	Y	N
<b>Birds</b>						
Australian Magpie	<i>Gymorhina tibicen</i>	Y	Y	Y	N	Y
Noisy Miner	<i>Manorina melanocephala</i>	Y	N	N	N	N
White-winged Chough	<i>Corcorax melanorhamphos</i>	Y	Y#	N	N	N
Unidentified raven	<i>Corvus sp.</i>	N	Y	Y#	Y	N
Brown Falcon	<i>Falco berigora</i>	N	N	N	Y	N
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	N	N	N	Y	N
Galah	<i>Eolophus roseicapilla</i>	Y	N	N	N	N
Little Corella	<i>Cacatua sanguinea</i>	N	N	N	N	Y
Tawny Frogmouth	<i>Podargus stigoides</i>	N	N	N	N	Y
Barking Owl	<i>Ninox connivens</i>	N	P	P	N	N
Unidentified waterbird		Y	N	N	N	N
Australian Wood Duck	<i>Chenonetta jubata</i>	I	N	N	N	N



Common name	Scientific name	Site 1	Site 2	Site 3	Site 4	Site 5
Unidentified bird	-	N	N	Y	N	N
Common Blackbird*	<i>Turdus merula</i>	N	Y	N	N	N
<b>Frogs</b>						
Common Froglet	<i>Crinia signifera</i>	N	N	N	Y	Y
Eastern Sign-bearing Frog	<i>Crinia parinsignifera</i>	Y	N	Y	Y	N
Southern Brown Tree Frog	<i>Litoria ewingi</i>	N	N	N	N	Y
Peron's Tree Frog	<i>Litoria peroni</i>	Y	Y	Y	Y	Y

Key: \*introduced; \*\*introduced domestic; #juveniles observed indicating breeding; I incidental observation during diurnal assessment; P possible

Numerous invertebrates including moths, butterflies, ants, beetles, spiders, millipedes, cicada and other smaller flying insects were observed.

Incidental observations of fauna during the diurnal hollow-bearing tree assessment and during deployment of cameras) were noted but do not constitute a general fauna survey

Species of note that are not already listed in Table 6 include:

- Black-faced Cuckoo-shrike *Coracina novahollandiae*
- Blue-faced Honeyeater *Entomyzon cyanotis*
- Buff-rumped Thornbill *Acanthiza reguloides*
- Dollarbird *Eurystomus orientalis*
- Forest Kingfisher *Todiramphus macleayii*
- Nankeen Kestrel *Falco cenchroides*
- Little Friar Bird *Philemon citreogularis*
- Purple-crowned Lorikeet *Glossopsitta porphyrocephala*
- Spotted Pardalote *Pardalotus punctatus*
- Red-rumped Parrot *Psephotus haematonotus*
- Rufous Whistler *Pachycephala rufiventris*
- Whistling Kite *Haliastur sphenurus*
- Yellow-rumped Thornbill *Acanthiza chrysorrhoa*



### 4.3.1 Remote cameras

Species detected by remote cameras are listed in Table 7. A section of remote camera images is provided in Appendix C.

**Table 7 Remote camera results per site**

Site	Site name	Remote camera
1	Hume Highway Seymour Precinct (Seymour)	Common Brushtail Possum Common Ringtail Possum Black Rat* Unidentified mammal in hollow White-winged Chough European Hare* Australian Magpie Noisy Miner Red Fox* Sheep** Eastern Grey Kangaroo Unidentified waterbird
2	Seymour-Avenel Road Overbridge (Seymour)	Common Brushtail Possum Common Ringtail Possum House Mouse* Black Rat* Red Fox* Australian Magpie Raven species – Forest Raven to confirm Common Blackbird*
3	Hume Highway Tallarook Precinct (Tallarook)	Brush-tailed Phascogale Sugar Glider Common Brushtail Possum Eastern Grey Kangaroo Swamp Wallaby Red Fox* Sheep** Australian Magpie Unidentified Raven Unidentified skink
4	Marchbanks Road Overbridge (Broadford)	Eastern Grey Kangaroo Brown Falcon Sulphur-crested Cockatoo Raven species Red Fox* European Rabbit* Dog**
5	Short Street Overbridge (Broadford)	n/a

Key: \*introduced; \*\*introduced domestic;

Some of the images showing detections of fauna from remote cameras are collated in Appendix D. Images of the target species are provided in Section 4.4.



### 4.3.2 Spotlighting

Species recorded during spotlighting surveys are listed in Table 8.

**Table 8** Spotlighting survey results per site

Site	Site name	Species observed
1	Hume Highway Seymour Precinct (Seymour)	Common Brushtail Possum Common Ringtail Possum# White-striped Freetail Bat Red Fox* Galah Peron's Tree Frog
2	Seymour-Avenel Road Overbridge (Seymour)	Common Brushtail Possum# Common Ringtail Possum# Red Fox* White-striped Freetail Bat White-winged Chough# Peron's Tree Frog
3	Hume Highway Tallarook Precinct (Tallarook)	Sugar Glider Common Brushtail Possum Common Ringtail Possum White-striped Freetail Bat Unidentified microbat Peron's Tree Frog Eastern Sign-bearing Frog
4	Marchbanks Road Overbridge (Broadford)	Common Ringtail Possum European Rabbit Peron's Tree Frog Eastern Sign-bearing Frog White-striped Freetail Bat Common Froglet
5	Short Street Overbridge (Broadford)	n/a

Key: \*introduced;; #juveniles observed indicating breeding.



**Plate 9** Common Ringtail Possum observed during spotlighting



### 4.3.3 Call playback

Species recorded during call playback surveys are listed in Table 9.

**Table 9 Call playback survey results per site**

Site	Site name	Species observed
1	Hume Highway Seymour Precinct (Seymour)	Common Brushtail Possum Eastern Sign-bearing Frog Peron's Tree Frog
2	Seymour-Avenel Road Overbridge (Seymour)	Possible Barking Owl (distant call heard by both observers) Common Ringtail Possum Common Brushtail Possum Peron's Tree Frog
3	Hume Highway Tallarook Precinct (Tallarook)	Sugar Glider Common Ringtail Possum European Rabbit Eastern Grey Kangaroo Unidentified microbat
4	Marchbanks Road Overbridge (Broadford)	Possible barking owl in response to call playback Common Ringtail Possum White-striped Freetail Bat Common Froglet
5	Short Street Overbridge (Broadford)	Tawny Frogmouth Common Ringtail Possum Common Brushtail Possum White-striped Freetail Bat Little Corella Common Brushtail Possum Southern Brown Tree Frog Common Froglet Peron's Tree Frog



**Plate 10 Tawny Frogmouth flew in during call playback at Short Street Overbridge (Broadford)**



## 4.4 Target species records

In summary:

- Brush-tailed Phascogale were detected at Hume Highway Tallarook Precinct (Site 3).
- Squirrel Glider were not confirm but a very similar species the Sugar Glider was observed at Hume Highway Tallarook Precinct (Site 3).
- Barking Owl were possibly heard in response to call playback at Seymour-Avenel Road Overbridge (Site 2). Both observers independently noted these potential responses which increases the confidence that Barking Owl is present at that site.

An outline of records of these species and images of those detections are provided below.

### 4.4.1 Brush-tailed Phascogale

Brush-tailed Phascogales were detected on four nights by remote cameras. They were not observed during spotlighting surveys. All observations of this species were at Site 3 - Hume Highway Tallarook Precinct. Details of the records of Brush-tailed Phascogale are provided below:

- Remote camera Site 3-2
  - 11 December 2020 at 21:59
- Remote cameras Site 3-5 (5 records):
  - 13 November 2020 at 02:50 and at 03:43,
  - 19 November 2020 at 04:09,
  - 10 December 2020 at 04:19 and at 04:30



Plate 11 Brush-tailed Phascogale at Tallarook (remote camera site 3-5) on 10 December 2020





**Plate 12** Brush-tailed Phascogale at Tallarook (remote camera site 3-5) on 10 December 2020



**Plate 13** Brush-tailed Phascogale as a train passes at Tallarook (remote cameras site 3-2) on 11 December 2020



#### 4.4.2 Squirrel Glider

Gliders were detected on five nights by remote cameras and were observed on two nights of spotlighting. All observations were at Hume Highway Tallarook Precinct (Site 3). Details of the records of gliders are provided below:

- Remote camera site 3-1:
  - 21 November 2020 at 04:04 (Plate 12)
  - 23 November 2020 at 03:24
- Remote camera site 3-3
  - 4 December 2020 at 00:08 (Plate 13)
- Remote camera site 3-5:
  - 14 November 2020 at 22:12
  - 10 December 2020 at 21:58 (video only) (Plate 14)
  - 23 November 2020 at 20:53 a glider was potentially detected. The images were not clear enough to confirm the identification and the animal may have been of Common Brushtail Possum instead.
- Spotlighting on Gairn's Lane, Tallarook:
  - 9 December 2020 – 5 individuals observed (Plates 15 to 17)
  - 14 December 2020 – 1 individual observed

All gliders observed are believed to be the non-threatened Sugar Glider and not Squirrel Glider. This determination was made on the basis of size, general appearance and on comparison with reference calls and detailed photos illustrating the differences between the species provided by Mitchell et al. (2016). However, caution in relation to species identification is warranted given the documented difficulty in differentiating between Sugar Glider and Squirrel Glider.

An outline of the differences sourced primarily from Mitchell et al. (2016) is provided below along with an assessment of the individuals observed during survey against those distinguishing features.

It is important to note that evaluating many of the distinguishing features is subjective, particularly when individuals are observed and not captured. Although the observations during survey suggest that Sugar Gliders and not Squirrel Gliders are present at Tallarook, the potential for Squirrel Glider to be present cannot be fully discounted and caution is warranted given the documented difficulty in species identification. Mitchell et al. (2016) highlight this difficulty whereby at the conclusion of an extensive field program involving camera traps (and the physical capture and handling of Sugar Glider) out of 31 images 22 images lacked enough of the important morphometric characteristics of a glider that allowed for confident determination of species.

#### Size

Sugar Gliders are smaller than Squirrel Gliders (Table 10). Squirrel Gliders in Victoria are larger than their northern counterparts therefore the size difference is more pronounced in the southern state. However, size can be difficult to determine in the field and in the absence of a scale / reference point as individuals are often high in the canopy and spotted briefly.

**Table 10 Average body measurement and weight of adult Squirrel Glider and Sugar Glider**

Species	Head and body length (mm)	Tail length (mm)	Weight (g)
Squirrel Glider	160-200	165-210	90-150
Sugar Glider	170-240	220-300	190-300

Source: Table 1 on page 12 in Mitchell et al. (2016)



As a reference for scale, the bait stations in the remote camera images measure 160mm long by 75mm wide at the cap tapering to 30mm at the end. Based on this scale, the individuals in those images are small and are therefore Sugar Gliders.

### **Appearance**

The main distinguishing features between Squirrel Glider and Sugar Glider in their appearance relates to their tails and face shape. These features are described below.

#### *Tail*

Squirrel Glider tails are wider and more 'flouncy' than those of Sugar Gliders. The point at which the tail joins the body is difficult to distinguish in Squirrel Gliders due to the width and fluffiness of their tail. In Sugar Gliders the end of the rump and where the tail begins is typically quite obvious (Mitchell et al. 2016).

Sugar Gliders also frequently have a white tipped tail. Whilst a white tail tip is reportedly not a characteristic of Squirrel Glider it is also not a consistent characteristic of Sugar Glider as it is not seen in all individuals. As such, the absence of a white tail tip does not indicate the individual is a Squirrel Glider.

As can be seen in Plate 13 only one of three individuals photographed during spotlight surveys at Tallarook has a white tip to its tail. The tails in the remote camera images and photos taken during spotlighting appear to be more consistent with Sugar Glider as the 'notch' between the rump and tail can be seen and the tails are not 'flouncy'.

### **Face shape**

Squirrel Gliders are considered to have a longer, more pointed muzzle and a 25% larger head than Sugar Gliders (Mitchell et al. 2016). In comparison, Sugar Gliders have a blunt face and high-arching forehead. However discerning the difference in head shape is reliant on a clear view of the individual and is also a subjective evaluation of appearance.

The images obtained during survey given the appearance of a small head which suggests the individuals are Sugar Glider.

### **Vocalisations**

Sugar Gliders are described as having a distinctive shrill call and repeated 'yip yip'. Squirrel Gliders call less frequently and make a honking sound. Call is possibly the least subjective characteristic.

Detection or distinction of species through vocalisations is reliant on an audible call at the time of observation. Fortunately some of the individuals vocalised extensively on the night of the 9 December 2020. The call sound and frequency was consistent with Sugar Glider. However, not all individuals observed were heard calling therefore it is not possible to fully discount the possibility that some individuals may have been Squirrel Glider based on vocalisations alone.





**Plate 14 Sugar Glider detected a remote camera Site 3-1 at Tallarook on 21 November 2020**



**Plate 15 Sugar Glider - Remote camera Site 3-3 at Tallarook on 4 December 2020**





Plate 16 Sugar Glider - Remote camera Site 3-5 at Tallarook on 10 December 2020



Plate 17 Glider observed along Gairn's Lane at Tallarook during spotlighting on 9 December 2020





**Plate 18** Two gliders at Tallarook observed during spotlighting on 9 December 2020



**Plate 19** Sugar Glider at Tallarook detected during spotlighting on 9 December 2020



#### 4.4.3 Barking Owl

Barking Owl was possibly heard responding to call playback at two sites:

- Seymour-Avenel Road, Seymour:
  - 18 November 2020 at 01:15 distant call heard by both observers
  - 7 December 2020 at 00:40 distant call heard by both observers
- Marchbanks Road, Broadford:
  - 17 November 2020 at 00:45 however it may have also been a domestic dog responding as the site is close a residential area.

On both occasions at Seymour-Avenel Road a single distant call was heard independently by both observers. As a second call was not heard it is not possible to be absolutely certain that Barking Owl are present but it is likely they do occur at that site. Barking Owl are known to occur in the region with a number of breeding territories known within the nearby Puckapunyal Military Area.

There are a number of possible reasons why a subdued response may have been received to call playback during the survey. These are:

- Timing. Whilst the species can be recorded at any time of year a subdued response may have been elicited as successful breeding had already been achieved for the season. Barking Owl breed from August to October and their brood can be heard begging from late September to early November (DSE, 2011). Whilst the species can be detected at any time of the year, Barking Owl are most detectable during these periods in particular when establishing their territories prior to breeding. Targeted surveys occurred outside the period of peak detectability.
- Home range. Habitat within Seymour-Avenel Road (Seymour) and Marchbanks Road (Broadford) enhancement sites might be part of a broader home range but not part of a core territory. Barking Owl are understood to defend a small territory within a much larger home range, with home range estimates varying from approximately 100 to 1000 ha (DSE, 2003). The enhancement sites therefore may be used for foraging but not used by breeding individuals. As such, the area may not be aggressively defended reducing the responsiveness of Barking Owl to call playback.
- The individual. The responding bird was a young male who has yet to establish a territory or and older bird that did not breed this season (or breeding was not successful).

Barking Owl are likely to use woodland habitat at the enhancement sites on an opportunistic basis to forage but would not be reliant on the habitat. The presence of hollows increases the potential that non-breeding birds may roost in habitat whilst moving through the landscape or the hollows could become breeding resources in the future as other territories become occupied by dispersing individuals.



## 5.0 Conclusion

Targeted surveys for Barking Owl, Brush Tail Phascogale and Squirrel Glider at 5 enhancement sites as per the recommendation of KBR, 2020.

Results per an enhancement site as they relate to these species are provided in Table 11 below.

**Table 11 Summary of detections by enhancement site**

Site #	Site Name	Summary of key findings
1	Hume Highway Seymour Precinct (Seymour)	None of the targeted species were detected.
2	Seymour Avenel Road Overbridge(Seymour)	Barking Owl were potentially heard in response to call playback. Several large hollows are present within the site which may suit the species for nesting.
3	Hume Highway Tallarook Precinct (Tallarook)	Brush-tailed Phascogale and Sugar Glider were detected. Squirrel Glider may also occur but presence was not confirmed during survey.
4	Marchbanks Overbridge (Broadford)	None of the targeted species were detected.
5	Short Street Overbridge (Broadford)	None of the targeted species were detected.

The implications of these findings and potential impacts on hollow-dependent fauna and connectivity will be discussed in the ecology impact assessment report for the enhancement sites, track slews and gantries. Habitat fragmentation and loss of hollow-bearing trees from Victorian native forest are listed as threatening processes under the FFG Act.



## 6.0 References

- AECOM (2016). Puckapunyal Military Area Flora and Fauna Monitoring 2015-2016. Prepared for Department of Defence by AECOM.
- DELWP (2016). *Flora and Fauna Guarantee Act 1988* Processes List - December 2016. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>
- DELWP (2019a). *Flora and Fauna Guarantee Act 1988* Threatened List – November 2019. Victorian Government Department of Environment, Land, Water and Planning Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>.
- DELWP (n.d.). *Flora and Fauna Guarantee Act 1988* – Threatened List: Characteristics of Threatened Communities. Victorian Government Department of Environment, Land, Water and Planning, Melbourne. Available at: <https://www.environment.vic.gov.au/conserving-threatened-species/threatened-list>
- DSE (2003a) Brush-tailed Phascogale *Phascogale tapoatafa*. *Flora and Fauna Guarantee Act 1988* Action Statement No. 79. Prepared by R. Humphries and J. Seebeck. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE (2003b). Squirrel Glider *Petaurus norfolcensis* *Flora and Fauna Guarantee Act 1988* Action Statement No. 166. Prepared by L. Ahern and R. van der Ree. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE (2003c). Barking Owl *Ninox connivens*. *Flora and Fauna Guarantee Act 1988* Action Statement No. 116. Prepared by N. Clemann and R. Loyn. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE (2011). Approved Survey Standards: Powerful Owl *Ninox strenua*. Victorian Government Department Sustainability and Environment, State of Victoria. Available at: [https://www.forestsandreserves.vic.gov.au/\\_\\_data/assets/pdf\\_file/0023/29282/1-Powerful-Owl-Survey-Standards-FINALv1.0\\_2MAY11-2.pdf](https://www.forestsandreserves.vic.gov.au/__data/assets/pdf_file/0023/29282/1-Powerful-Owl-Survey-Standards-FINALv1.0_2MAY11-2.pdf)
- DSE (2013). Advisory List of Threatened Vertebrate Fauna in Victoria – 2013. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSEWPaC (2011). Survey guidelines for Australia's threatened mammals - Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Australian Government Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic birds. Vol. 4 Parrots to Dollarbird. Oxford University Press, Victoria.
- KBR (2020). Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services, Tottenham to Albury Biodiversity Assessment. Prepared for Australian Rail Track Corporation (ARTC). Kellogg Brown & Root Pty Ltd, Victoria
- Malloy, J. (2018). Forest Protection Survey Program Survey Design Summary October 2018. Victorian Government Department of Environment, Land, Water and Planning, East Melbourne.
- Michell, B., van der Ree, R. and Soanes, K. (2016). Final report on targeted Squirrel Glider surveys for the Ellerton Drive Extension, Queanbeyan NSW. Report for the Office of Environment and Heritage, NSW prepared by The Australian Research Centre for Urban Ecology, Royal Botanic Victoria.
- Schodde and Mason Schodde, R. and Mason, I. J. (1980) Nocturnal Birds of Australia. Lansdowne, Melbourne
- Sloanes, K. and van der Ree, R. (2016). Long-term monitoring plan of Squirrel Glider populations in Thurgoona-Wirlinga: Final Report. Royal Botanic Gardens Victoria, Melbourne.
- van der Ree, R., Bennett, A.F. and Sodequist, T.R. (2006). Nest-tree selection by the threatened brush-tailed phascogale (*Phascogale tapoatafa*) (Marsupialia:Dasyuridae) in a highly fragmented agricultural landscape. *Wildlife Research* **33**: 113 – 119.



VicForests (2015). Pre-Harvest Fauna Survey Procedure. May 2015. Version 1.7. VicForests, Melbourne.

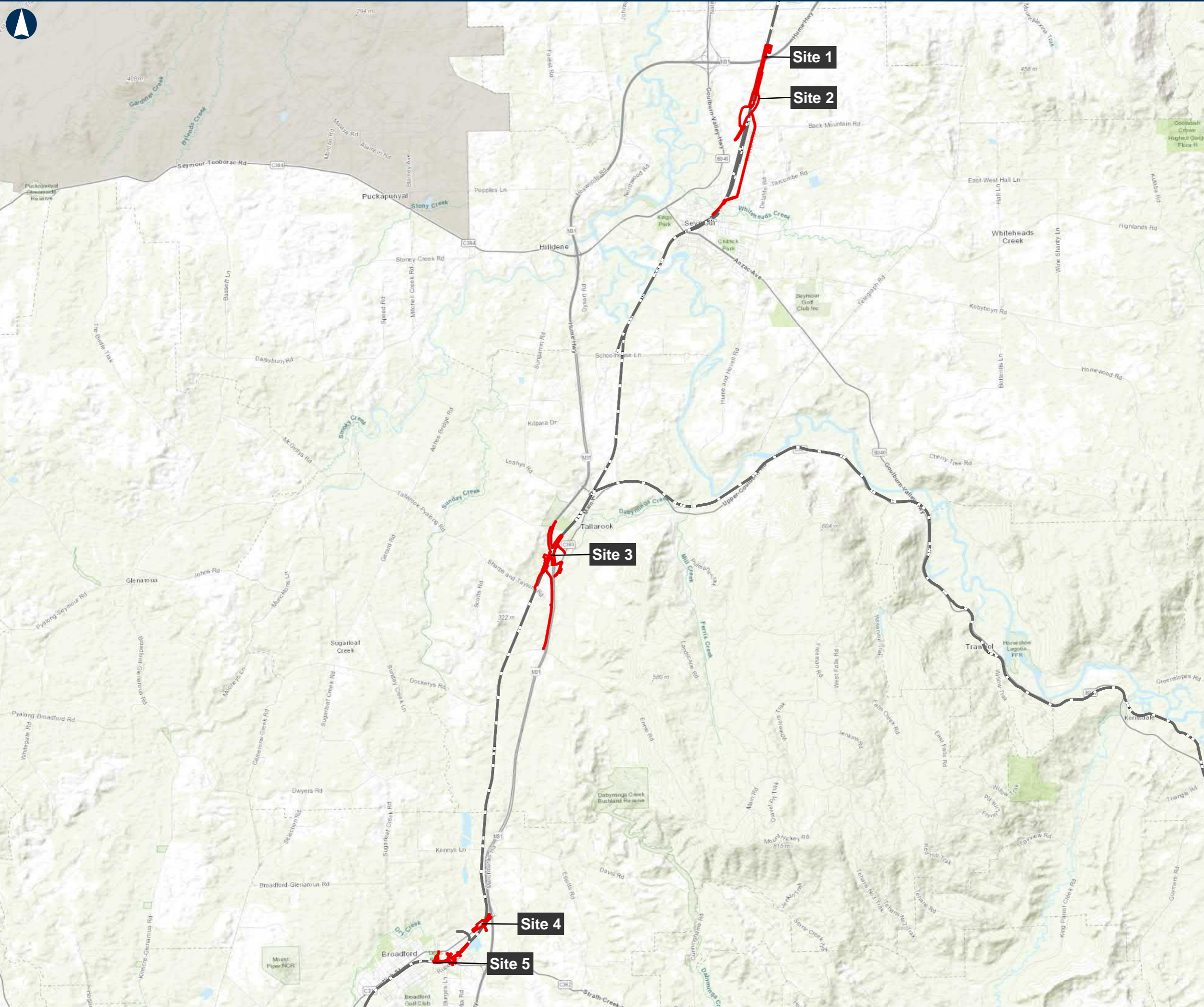
VicForests (2017). Pre-Harvest Surveys – Targeted Species Survey Procedure. Version 2.0. March 2017. VicForests, Melbourne.



# Appendix A

Figures

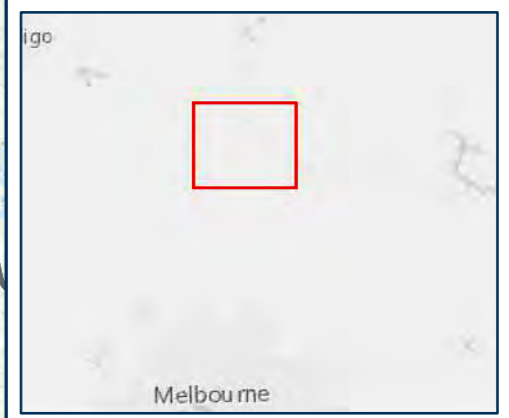




The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC) in partnership with the private sector.

## Targeted Fauna Survey Overview

- Enhancement Site Boundary
- Railway



Coordinate System: GDA 1994 MGA Zone 55

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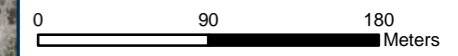
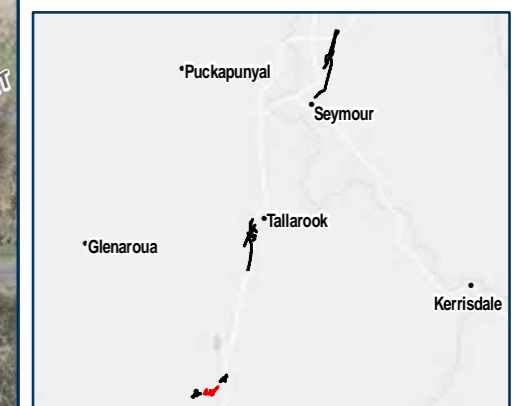


**Targeted Fauna Survey Locations**

Short Street Overbridge (Broadford)

MAP 1 OF 5

- Enhancement Site Boundary
- KM Posts
- Train Station
- Railway
- Call Playback Location
- Spotlight Transect



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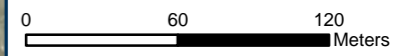
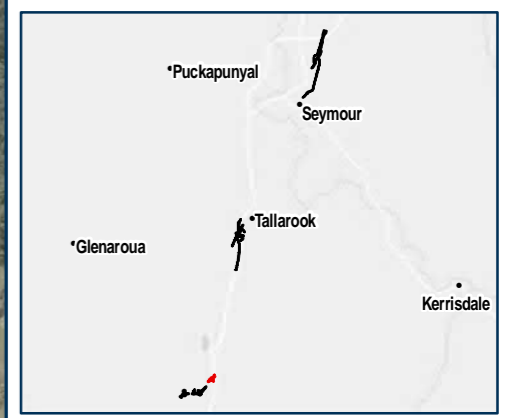
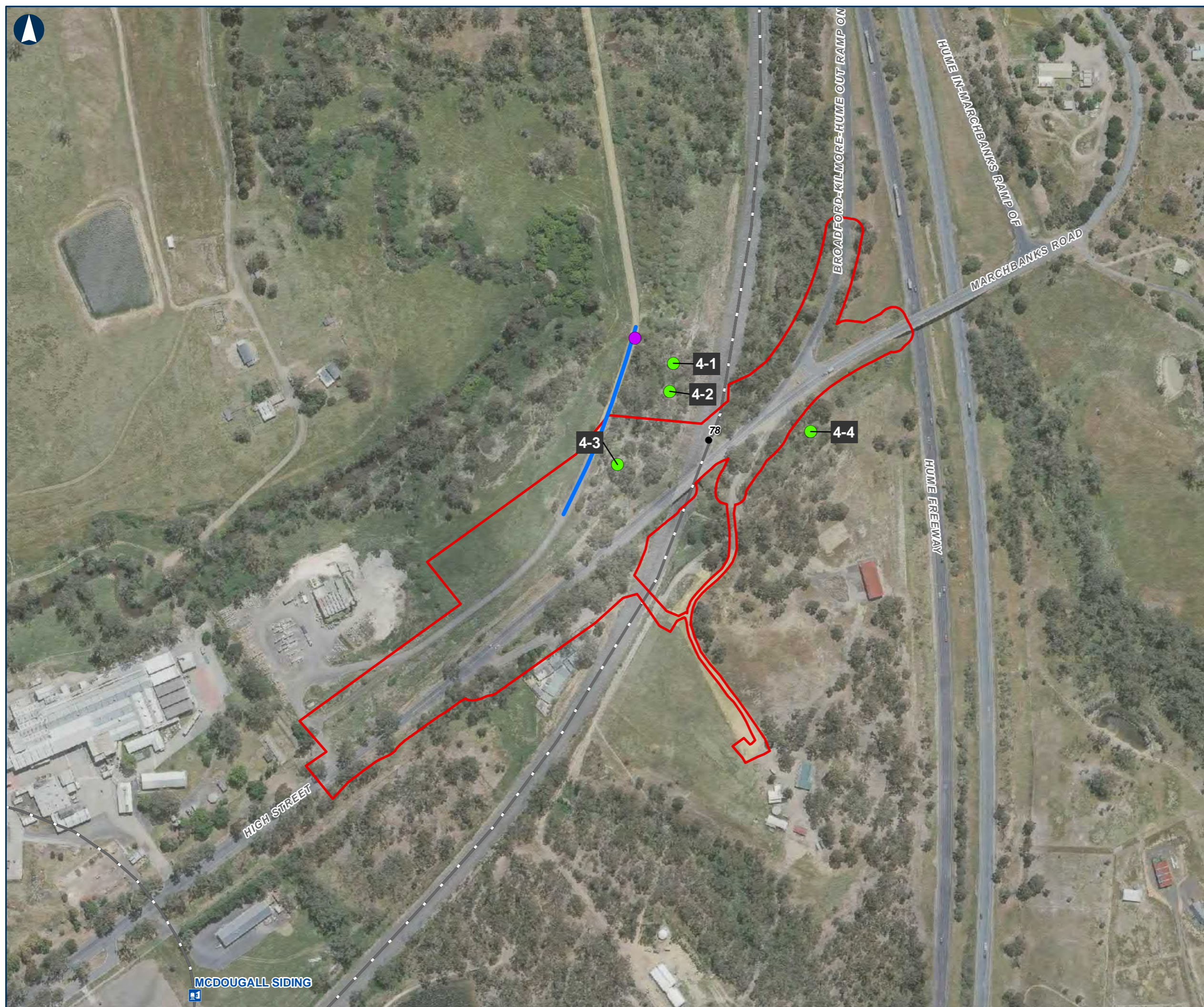


### Targeted Fauna Survey Locations

Marchbanks Road Overbridge (Broadford)

MAP 2 OF 5

- Enhancement Site Boundary
- KM Posts
- Train Station
- Railway
- Call Playback Location
- Remote Camera Location
- Spotlight Transect



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 Author: JB  
 Data Sources: DELWP (2020)

Paper: A3  
 Scale: 1:3,000

**MCDUGALL SIDING**

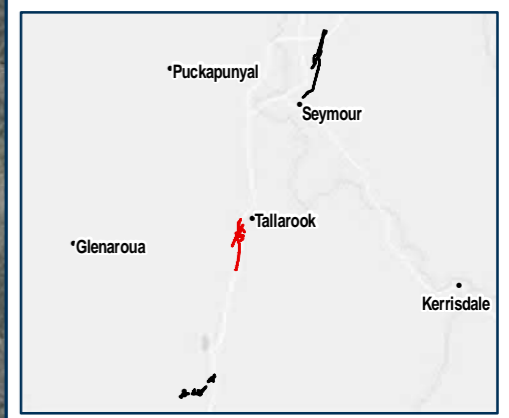




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**Targeted Fauna Survey Locations**  
 Hume Highway Tallarook Precinct (Tallarook)  
 MAP 3 OF 5

- Enhancement Site Boundary
- KM Posts
- Railway
- Call Playback Location
- Remote Camera Location
- Spotlight Transect



Coordinate System: GDA 1994 MGA Zone 55

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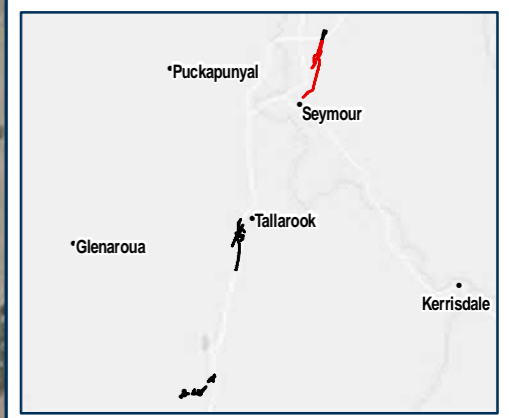
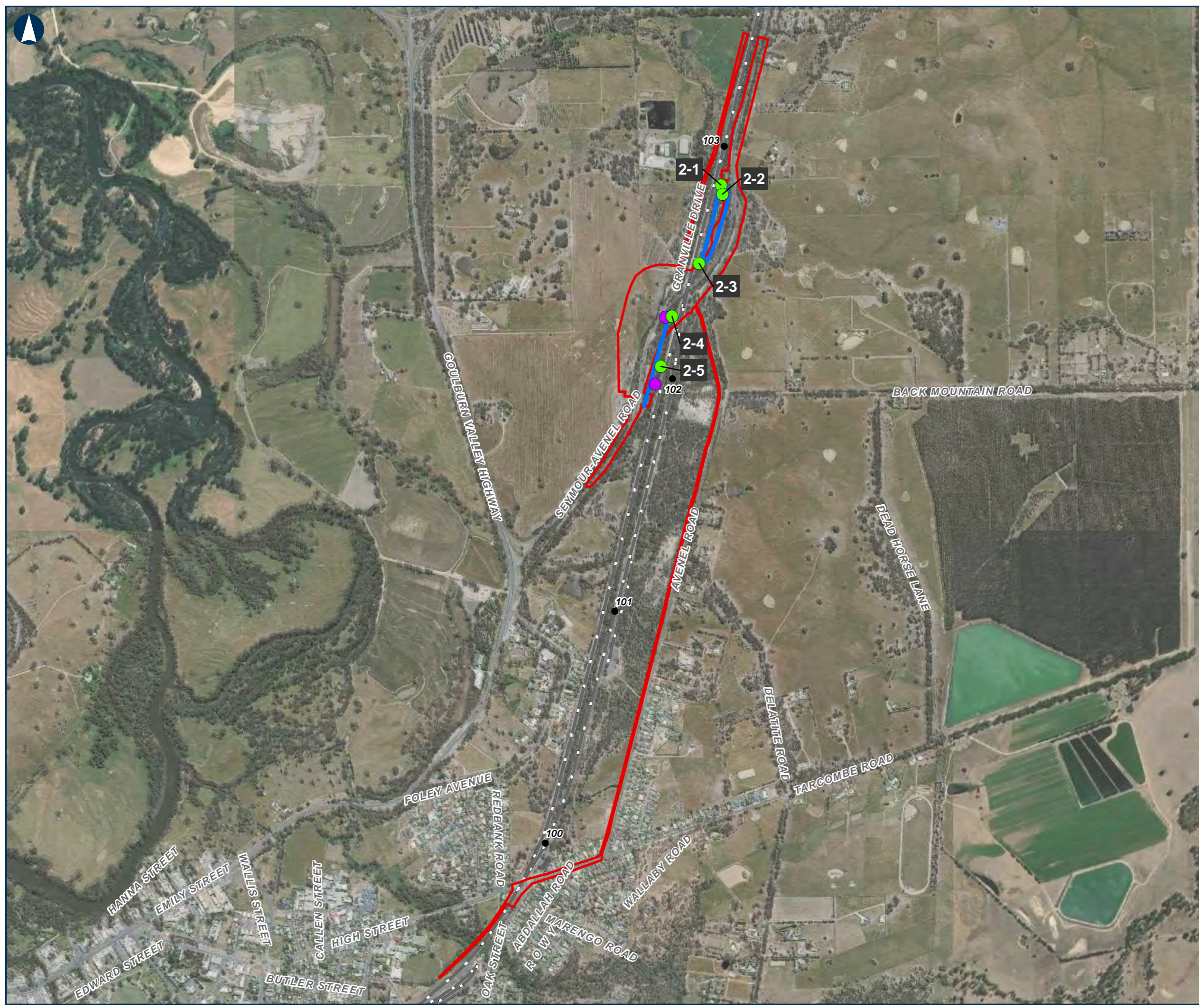
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### Targeted Fauna Survey Locations

Seymour Avenel Road Overbridge (Seymour)

MAP 4 OF 5

- Enhancement Site Boundary
- KM Posts
- Railway
- Call Playback Location
- Remote Camera Location
- Spotlight Transect



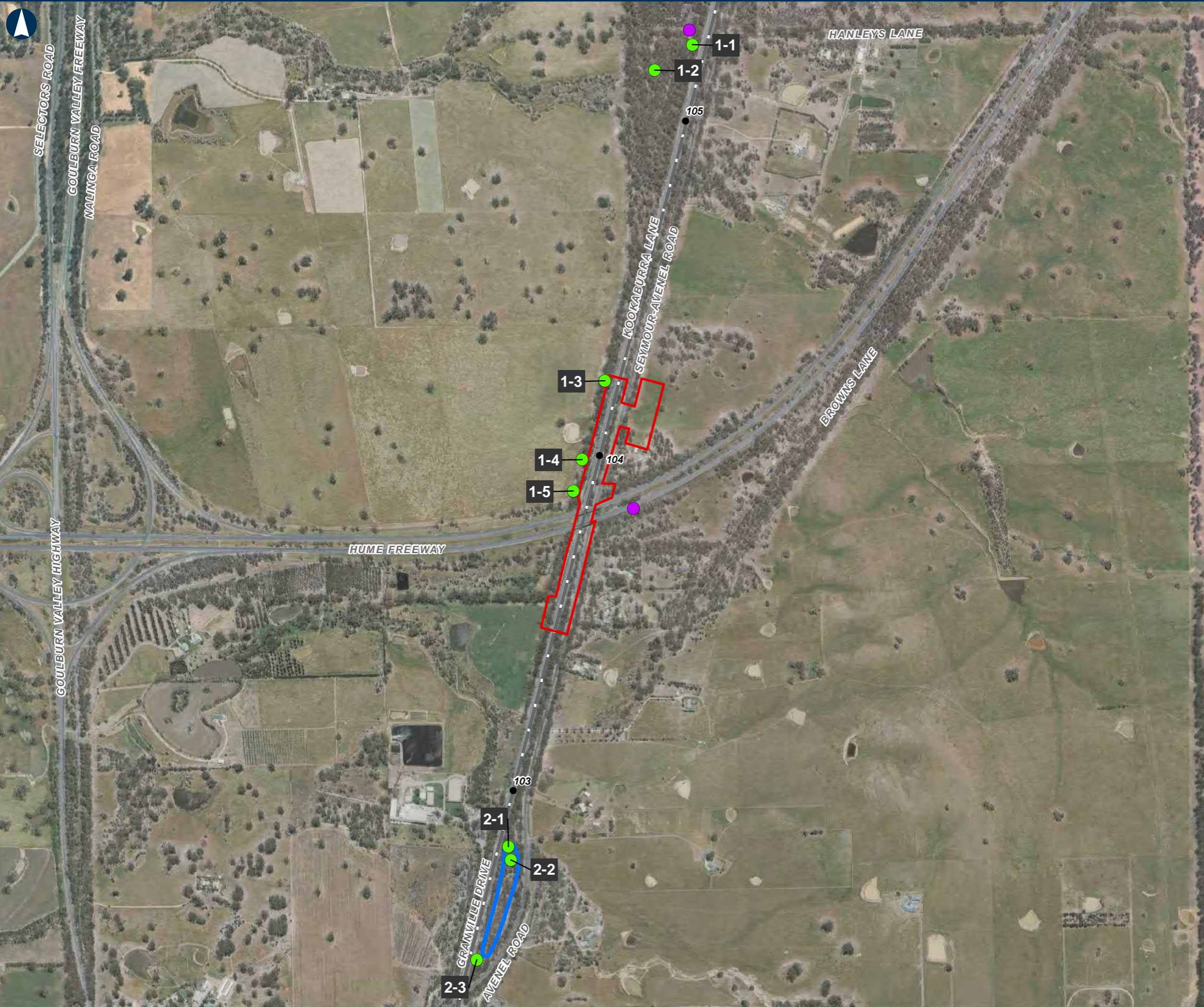
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 Author: JB Scale: 1:15,000  
 Data Sources: DELWP (2020)

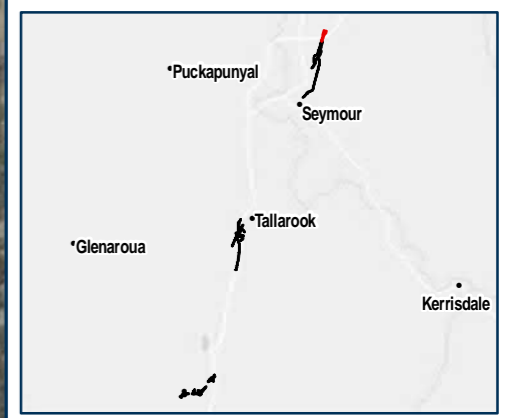




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**Targeted Fauna Survey Locations**  
 Hume Highway Seymour Precinct (Seymour)  
 MAP 5 OF 5

- Enhancement Site Boundary
- KM Posts
- Railway
- Call Playback Location
- Remote Camera Location
- Spotlight Transect



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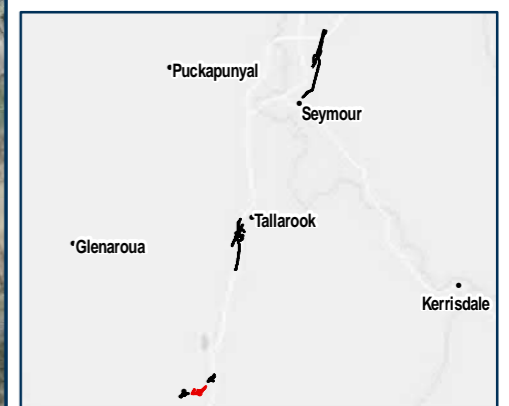
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### Hollow Bearing Tree Location

Short Street Overbridge (Broadford)

MAP 1 OF 5

- Enhancement Site Boundary
- Investigation Area 15m Buffer
- Hollow Bearing Tree
- High Value Hollow Bearing Tree
- KM Posts
- Train Station
- Railway



Coordinate System: GDA 1994 MGA Zone 55

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Data Sources: DELWP (2020)



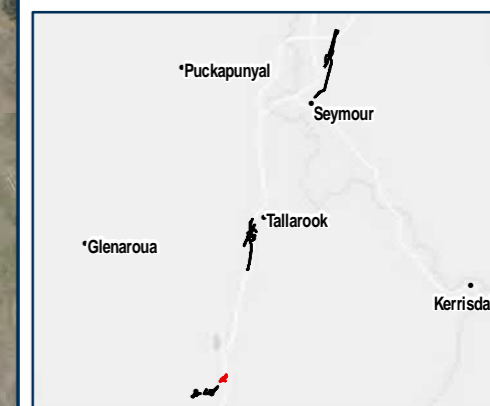


### Hollow Bearing Tree Location

Marchbanks Road Overbridge (Broadford)

MAP 2 OF 5

- Enhancement Site Boundary
- Investigation Area 15m Buffer
- Hollow Bearing Tree
- KM Posts
- Railway



0 40 80 Meters

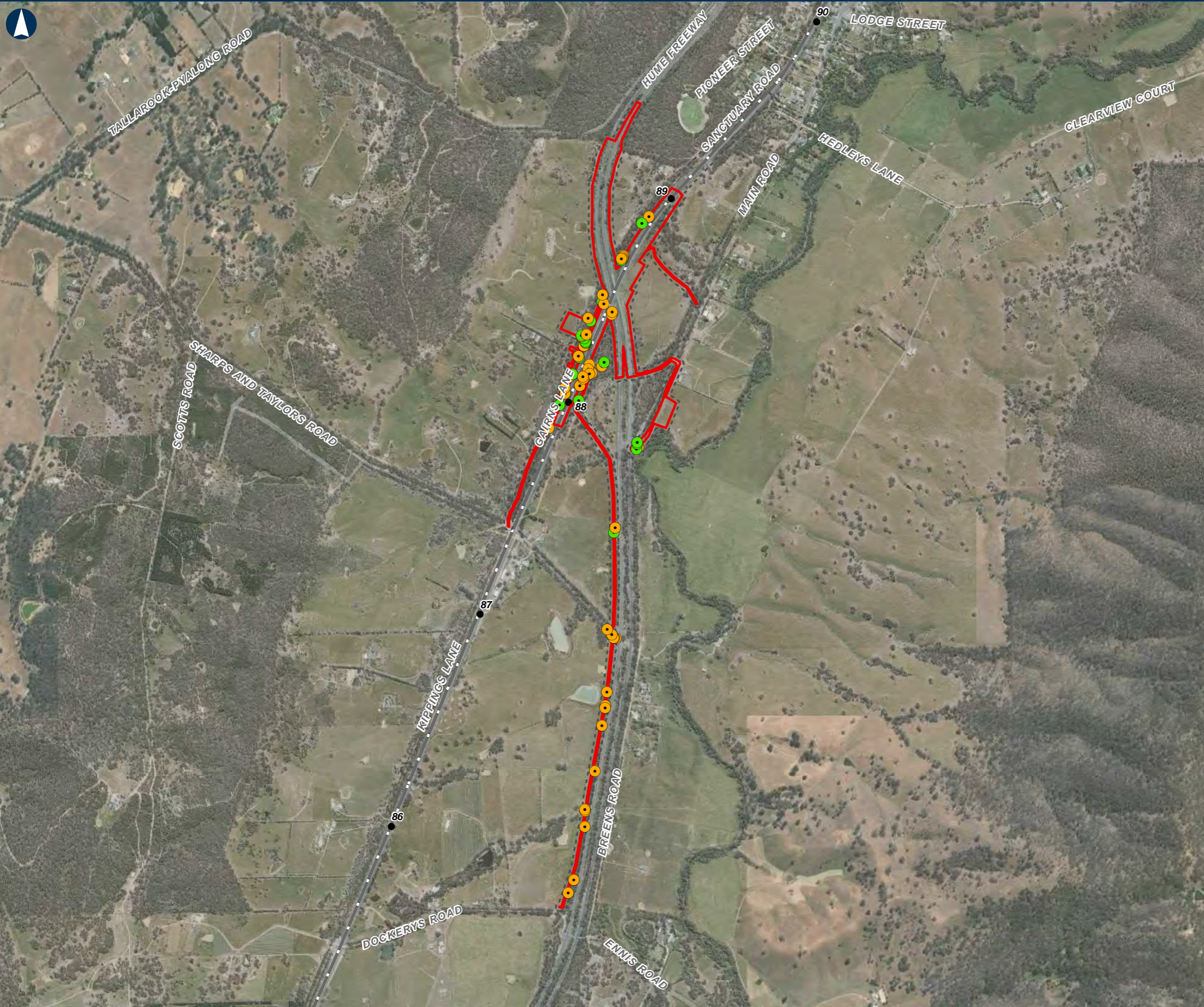
Coordinate System: GDA 1994 MGA Zone 55

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 Data Sources: DELWP (2020)

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### Hollow Bearing Tree Location

Hume Highway Tallarook Precinct (Tallarook)

MAP 3 OF 5

- Enhancement Site Boundary
- Investigation Area 15m Buffer
- Hollow Bearing Tree
- High Value Hollow Bearing Tree
- KM Posts
- Railway



Coordinate System: GDA 1994 MGA Zone 55

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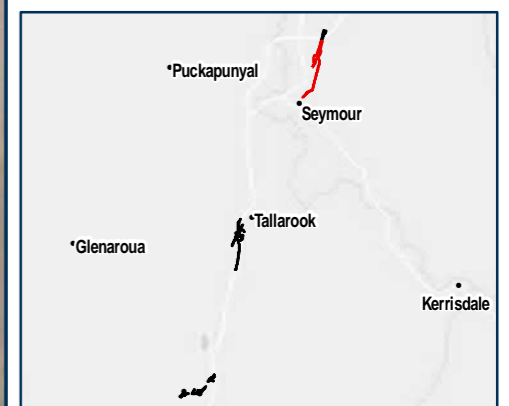
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### Hollow Bearing Tree Location

Seymour Avenel Road Overbridge (Seymour)

MAP 4 OF 5

- Enhancement Site Boundary
- Investigation Area 15m Buffer
- Hollow Bearing Tree
- High Value Hollow Bearing Tree
- KM Posts
- Train Station
- Railway



0 400 800 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 25/03/2021 Paper: A3  
Author: JB Scale: 1:17,770  
Data Sources: DELWP (2020)



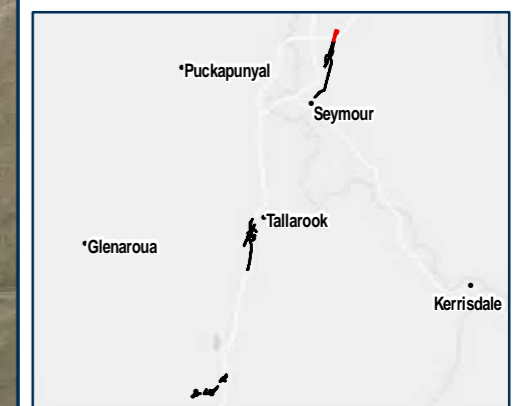


## Hollow Bearing Tree Location

Hume Highway Seymour Precinct (Seymour)

MAP 5 OF 5

- Enhancement Site Boundary
- Investigation Area 15m Buffer
- Hollow Bearing Tree
- High Value Hollow Bearing Tree
- KM Posts
- Railway



0 75 150 Meters

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 Author: JB Scale: 1:3,370  
 Data Sources: DELWP (2020)



# Appendix B

Survey data



## Remote cameras

Table 12 Remote camera information

Site	Site name	Camera site	Latitude	Longitude	Date set	AECOM ID	Brand	Type	SD card #	Date battery/SD changed	Replacement card #	Camera substituted	Brand	Type	Date collected
1	Hume Highway, Seymour	1-1	145.1639373330	-36.9710228333	12/11/2020	NB7	Bushnell	Covert	NB7	1/12/2020	09	n/a			15/12/2020
		1-2	145.1626905000	-36.9716706666	12/11/2020	MEL R8	Reconyx	White Flash	MEL R8	1/12/2020	n/a	MEL R12	Reconyx	Covert	15/12/2020
		1-3	145.1608808340	-36.9797506664	12/11/2020	NTL TC11	Bushnell	Covert	NTL TC11	1/12/2020	n/a	MEL R21	Reconyx	Covert	15/12/2020
		1-4	145.1600923340	-36.9817906670	12/11/2020	NB11	Bushnell	Covert	NB11	1/12/2020	n/a	MEL R17	Reconyx	Covert	15/12/2020
		1-5	145.1597850000	-36.9826095004	12/11/2020	MEL R7	Reconyx	White Flash	MEL R7	1/12/2020	n/a	MEL R13	Reconyx	Covert	15/12/2020
2	Seymour-Avenel Road	2-1	145.1574511660	-36.9918523331	11/11/2020	MEL R10	Reconyx	Covert	MEL R10	1/12/2020	12	n/a			15/12/2020
		2-2	145.1575198340	-36.9922038336	11/11/2020	NB8	Bushnell	Covert	NB8	1/12/2020	11	n/a			15/12/2020
		2-3	145.1563523340	-36.9947881667	11/11/2020	NTL TC15	Bushnell	Covert	NTL TC15	1/12/2020	10	n/a			15/12/2020
		2-4	145.1550445000	-36.9967604997	11/11/2020	MEL R9	Reconyx	White Flash	MEL R9	1/12/2020	n/a	MEL R11	Reconyx	Covert	15/12/2020
		2-5	145.1544613330	-36.9986418332	11/11/2020	NB9	Bushnell	Covert	NB9	1/12/2020	n/a	MEL R15	Reconyx	Covert	15/12/2020
3	Hume Highway Tallarook	3-1	145.0891085000	-37.1082776666	12/11/2020	NB10	Bushnell	Covert	NB10	30/11/2020	05	MEL R18 (extra)	Reconyx	Covert	15/12/2020
		3-2	145.0898210000	-37.1068538334	12/11/2020	NTL TC04	Bushnell	Covert	NTL TC04	30/11/2020	06	n/a			15/12/2020
		3-3	145.0904675000	-37.1054008333	12/11/2020	NTL TC08	Bushnell	Covert	NTL TC08	30/11/2020	07	n/a			15/12/2020
		3-4	145.0909548340	-37.1072690002	12/11/2020	MEL R6	Reconyx	White Flash	MEL R6	2/12/2020	13	MEL R16	Reconyx	Covert	15/12/2020
		3-5	145.0896123740	-37.1086328643	12/11/2020	NTL TC18	Bushnell	Covert	NTL TC18	2/12/2020	14	MEL R20 (extra)	Reconyx	Covert	15/12/2020
4	Marchbanks Road	4-1	145.0682421670	-37.1952824997	12/11/2020	NTL TC13	Bushnell	Covert	NTL TC13	30/11/2020	03	n/a			15/12/2020
		4-2	145.0682011670	-37.1954921664	12/11/2020	NTL TC17	Bushnell	Covert	NTL TC17	30/11/2020	02	n/a			15/12/2020
		4-3	145.0676981670	-37.1960326668	12/11/2020	NTL TC12	Bushnell	Covert	NTL TC12	30/11/2020	01	n/a			15/12/2020
		4-4	145.0695166670	-37.1958148333	12/11/2020	NTL TC03	Bushnell	Covert	NTL TC03	30/11/2020	04	n/a			15/12/2020



Table 13 Remote camera results

Site	Camera location	Species recorded by remote cameras
1) Hume Highway Seymour Precinct (Seymour)	1-1	Butterfly Common Brushtail Possum Black Rat White-winged Chough Brown Hare Unidentified object hanging over camera lens Unidentified animal running along road (blur in background)
	1-2	Arboreal mammal in hollow Eastern Grey Kangaroo Likely Common Brush-tail Possum whiskers and nose
	1-3	Australian Magpie Possum whiskers and moved camera Noisy Miner
	1-4	Butterfly Sheep Australian Magpie Common Ringtail Small swarm of insects Waterbird flying into dam – possibly Australian Wood Duck Water bird flying away from dam – possibly White-faced Heron or duck species. Whiskers at night
	1-5	Red Fox (several detections) Red Fox carrying prey



Site	Camera location	Species recorded by remote cameras
2) Seymour-Avenel Road Overbridge (Seymour)	2-1	Spider Common Blackbird (male) Butterfly Australian Magpie Common Brush-tail Possum Cicada Forest Raven
	2-2	Butterflies Moths Whiskers – arboreal mammal
	2-3	House Mouse Common Brushtail Possum Ants Millipedes Moth Butterfly Black Rat Common Ringtail Possum (mother and baby) Spider on bait station
	2-4	Red Fox Common Brush-tail Possum
	2-5	Common Brush-tail Possum Unidentified bird tail – likely honeyeater or Noisy Miner



Site	Camera location	Species recorded by remote cameras
3) Hume Highway Tallarook Precinct (Tallarook)	3-1	Ants Small bird Butterflies Common Brush-tail Possum Sheep Police in car and on foot <u>Sugar Glider – two nights 21/11/2020 at 0404 and 23/11/2020 at 03:24</u> Raven in flight
	3-2	Eastern Grey Kangaroo Butterflies Spider <u>Brush-tailed Phascogale on 11 December 2020 at 21:59</u>
	3-3	Distant eyeshine in trees (arboreal but unidentifiable) Australian Magpie Raven feeding juvenile <u>Sugar Glider - 4 December 2020 at 00:08</u> Insect or glider in flight Whiskers
	3-4	Red Fox Swamp Wallaby Raven Eastern Grey Kangaroo
	3-5	Beetles <u>Brush-tailed Phascogale (5 records) – 13 November 2020 at 02:50 and at 03:43, 19 November 2020 at 04:09, 10 December 2020 at 04:19 and at 04:30,</u> <u>Sugar Glider (2 records) - 15 November 2020 at 22:12 and 10 December 2020 at 21:58 (video only)</u> <u>Possible glider or Brushtail Possum 23 November 2020 at 20:53</u>



Site	Camera location	Species recorded by remote cameras
4) Marchbanks Road Overbridge (Broadford)	4-1	Whiskers at night Eastern Grey Kangaroo
	4-2	Whiskers at night Whiskers and camera moving at night Invertebrates Possible owl/frogmouth flying through Ground mammal (indistinct) at base of tree Small indistinct animal on distant tree with glimpse of eyeshine Ground mammal (indistinct) runs through in distance
	4-3	Eyeshine of rabbits (European Rabbit warren in frame) Possible cat Possible dog running through European Rabbit Maybe Brushtail possum 11270093 Brown Falcon with prey Red Fox Raven Human and dog Flock of Sulphur-crested Cockatoo Butterfly Brown Falcon
	4-4	Red Fox Common Brush-tail Possum Butterflies



## Spotlighting

Table 14 Spotlighting surveys for Brush-tailed Phascogale and Squirrel Glider

Site	Site name	Location	Survey number	Date	Start time	Finish time	Time	Species observed
1	Hume Highway Seymour Precinct	Seymour	1	18 Nov 2020	22:00	00:00	2 hours	11 x Common Ringtail Possum (one group of 4 including mum with baby on back) 1 x Red Fox
			2	30 Nov 2020	23:00	23:45	0.75 hour	9 x Common Ringtail Possum 1 x Common Brushtail Possum Galah Peron's Tree Frog
			3	8 Dec 2020	23:15	00:20	0.5 hour	3 x Common Brushtail Possum White-striped Freetail Bat (heard)
2	Seymour-Avenel Overbridge	Seymour	1	18 Nov 2020	00:10	13:00	0.75 hour	2 x Red Fox 1 x White-winged Chough on nest (west side of rail) 1 x White-winged Chough nest 1 x Common Brushtail Possum 3 x Common Ringtail Possum (a mum with 2 babies; one on back)
			2	30 Nov 2020	21:45	22:30	0.75 hour	5 x Common Ringtail Possum 3 x Common Brushtail Possum (mum and baby) Peron's Tree Frog
			3	8 Dec 2020	21:40	22:00	0.5 hour	5 x Common Ringtail Possum 1 x Common Brushtail Possum 1 x White-winged Chough on nest White-striped Freetail Bat



Site	Site name	Location	Survey number	Date	Start time	Finish time	Time	Species observed
3	Hume Highway Tallarook Precinct	Tallarook	1	17 Nov 2020	21:00	23:00	2 hours	Common Ringtail Possum Common Brushtail Possum Peron's Tree Frog White-striped Freetail Bat
			2	30 Nov 2020	00:30	01:45	1.25 hours	1 x Common Ringtail Possum 1 x Common Brushtail Possum Peron's Tree Frog Crinia parainsignifera Unidentified microbat
			3	8 Dec 2020	01:45	03:15	1.5 hours	4 x Sugar Glider (possible larger Squirrel Glider)
4	Marchbanks Road Overbridge	Broadford	1	17 Dec 2020	00:00	00:45	0.75 hours	Common Ringtail Crinia signifera Crinia parinsignifera Perons tree frog Rabbit
			2	1 Dec 2020	21:45	22:15	0.5 hours	No fauna detected
			3	8 Dec 2020	01:00	01:30	0.5 hour	White-striped Freetail Bat (heard)



## Call playback

Table 15 Call playback and spotlighting surveys for Barking Owl

Site	Site name	Location	Survey number	Date	Time commenced	Species observed
1	Hume Highway Seymour Precinct	Seymour	1	18 Nov 2020	23:45	No response
			2	30 Nov 2020	23:45	No response
			3	7 Dec 2020	01:25	Common Brushtail Possum
			4	9 Dec 2020	21:50	Crinia parinsignifera Peron's Tree Frog
			5	14 Dec 2020	21:45	Peron's Tree Frog
2	Seymour-Avenel Road Overbridge	Seymour	1	18 Nov 2020	01:15	Possible Barking Owl (distant call heard by both observers)
			2	30 Nov 2020	22:30	No response
			3	7 Dec 2020	00:40	Possible Barking Owl (distant call heard by both observers) Common Ringtail Possum Common Brushtail Possum
			4	9 Dec 2020	22:25	Peron's Tree Frog Common Ring-tail Possum
			5	14 Dec 2020	22:10	Common Ring-tail Possum
3	Hume Highway Tallarook Precinct	Tallarook	1	17 Nov 2020	22:45	No response
			2	30 Nov 2020	01:30	No response



Site	Site name	Location	Survey number	Date	Time commenced	Species observed
			3	7 Dec 2020	23:45	Common Ringtail Possum European Rabbit Eastern Grey Kangaroo
			4	9 Dec 2020	01:00	Sugar Glider Unidentified microbat
			5	14 Dec 2020	00:00	Sugar Glider Peron's Tree Frog
4	Marchbanks Road Overbridge	Broadford	1	17 Nov 2020	00:45	Possible barking owl in response to call playback
			2	1 Dec 2020	21:45	No fauna detected
			3	7 Dec 2020	23:05	White-striped Freetail Bat Common Froglet
			4	9 Dec 2020	12:20	Common Ringtail Possum White-striped Freetail Bat
			5	14 Dec 2020	23:00	No response
5	Short Street Overbridge	Broadford	1	17 Nov 2020	23:15	Tawny Frogmouth flew in after call playback Common Froglet Southern Brown Tree Frog Common Ringtail in acacia along Sunday creek Common Brushtail call also along creek area
			2	01 Dec 2020	22:45	Little Corella (x6) Common Brushtail Possum Southern Brown Tree Frog Peron's Tree Frog Common Froglet



Site	Site name	Location	Survey number	Date	Time commenced	Species observed
			3	7 Dec 2020	22:15	White-striped Freetail Bat Little Corella
			4	9 Dec 2020	-	Survey abandoned due to campers
			5	14 Dec 2020	-	Survey abandoned due to campers



## Weather conditions during survey

Table 16 General description of weather conditions at time of call playback and spotlighting surveys

Date	Survey conditions
17 Nov 2020	Calm, clear, cool night. Forecast 8°C overnight. Beaufort scale for owl surveys: 1
18 Nov 2020	Calm and mild night. Approximately 20 degrees at start of survey. Full moon partially obscured intermittently by clouds. Moon low on horizon and disappeared early in the night. Little ambient light. Traffic noise pronounced. Beaufort scale for owl surveys: 1
30 Nov 2020	Calm initially increasing to a light northerly wind. Warm night with temperature in the low 20°C after a hot day of low 30 degrees and no rain. Cloud haze cleared into more defined clouds with gaps (80% cover) as the night progressed. Moonlight was strong despite the cloud. Moon was on a low arc therefore long shadows across ground. Beaufort scale for owl surveys: 1 to 3
1 Dec 2020	Clear sky, full moon, slight wind initially with breeze increasing over the survey. Approximately 18°C at start of survey with moderate south-westerly wind. Cool compared with night before and follows a day with wind and rain rolling through.
7 Dec 2020	Very calm but also very cold (approximately 5°C). No moonlight. Beaufort scale for owl surveys: 0
8 Dec 2020	Cool and overcast with a slight wind. Low ambient light levels and moon not apparent. Approximate temperature of 15°C at start of survey dropping to about 10 °C later in evening. Beaufort scale for owl surveys: 2
9 Dec 2020	Slight breeze and dark night as overcast. Temperature started at around 18oC and dropped to about 15°C as wind picked up toward end of survey. Beaufort scale for owl surveys: 2 - 3
15 Dec 2020	Moderate wind, patchy cloud at start of survey with a temperature of approximately 18-20°C. Wind increased in strength and temperature dropped as the night progressed. No rain during the day or during the survey. Beaufort scale for owl surveys: 3 - 4



**Table 17 Daily Weather Observations for duration of survey - 11 November 2020 to 15 December 2020**

Daily weather observations for Puckapunyal (Lyon Hill), Victoria (Source: Commonwealth Bureau of Meteorology)

Date	Temperature (°C)		Rain fall (mm)	Max wind gust			9am				3pm			
	Min.	Max.		Direction	Speed (km/h)	Time	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)
11/11/2020	20.6	28.9	0	NE	65	12:04	22	43	NE	30	23.4	49	NW	22
12/11/2020	17.7	24.6	7.8	NNW	44	11:03	19.7	64	NW	13	22.7	50	NW	26
13/11/2020	10.5	22.7	0.2	W	39	15:23	15.7	68	WSW	7	19.9	43	WNW	13
14/11/2020	10.6	24.1	0	NW	30	13:34	15.2	67	SE	6	21.7	37	WNW	11
15/11/2020	11.1	32.4	0	NNE	87	15:56	19.9	46	NE	20	31.2	20	N	26
16/11/2020	19.9	26.3	0	N	61	0:07	21.9	36	W	31	25.2	24	SW	26
17/11/2020	7	22.6	0	S	33	13:25	14.3	56	SE	6	21.2	35	SSW	13
18/11/2020	9.8	29.3	0	S	30	23:22	18	49	SE	7	27.9	16	ENE	7
19/11/2020	15	34.5	0	N	44	13:34	22.6	42	NE	15	32.8	14	N	22
20/11/2020	17.7	27.6	0	SSW	46	13:24	22.2	39	SSE	24	27.2	38	S	26



Date	Temperature (°C)		Rain fall (mm)	Max wind gust			9am				3pm			
	Min.	Max.		Direction	Speed (km/h)	Time	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)
21/11/2020	11.8	32.6	0	S	41	1:09	16.3	72	SSE	13	31.2	22	SSW	9
22/11/2020	16.1	28.1	0	SSW	70	18:21	25.7	46	SSE	9	27	43	E	6
23/11/2020	16	23.5	18.2	SW	54	6:52	16.4	90	NNE	7	20.5	65	S	26
24/11/2020	11.5	22.4	0.2	SSW	37	12:16	14.8	67	S	20	21.5	48	S	19
25/11/2020	11.8	30.5	0	S	35	22:37	19.4	55	SSW	6	28.4	31	N	11
26/11/2020	16.2	24.6	0	S	46	18:48	18.3	66	S	26	23.7	49	S	26
27/11/2020	10.2	37.3	0	W	37	14:37	18.9	57	ENE	6	34.9	19	NW	19
28/11/2020	16.9	29.5	0	S	59	2:51	22	56	SE	13	24.5	51	S	24
29/11/2020	16.2	21.4	0	WSW	57	5:50	17.3	68	S	30	19.3	52	S	17
30/11/2020	10.2	30.7	0	N	35	15:08	16.1	57	SSE	13	28	28	NNE	15
1/12/2020	16.1	26.9	0	W	65	10:53	23.7	50	NNE	19	22.1	67	NW	22



Date	Temperature (°C)		Rain fall (mm)	Max wind gust			9am				3pm			
	Min.	Max.		Direction	Speed (km/h)	Time	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)
2/12/2020	8.4	21.5	1.4	SSE	39	9:44	13.8	49	SSW	13	19.6	32	SSW	20
3/12/2020	8.2	27	0	S	33	21:31	15	54	SE	7	24.9	21	NW	13
4/12/2020	11.1	25.9	0	S	33	3:32	16.7	58	S	20	24.3	29	S	17
5/12/2020	11	28.3	0	NW	61	12:45	18.5	43	NE	13	17.3	86	NW	26
6/12/2020	9.5	20.3	9.2	NW	57	15:13	13.1	72	NW	20	18.6	41	WNW	35
7/12/2020	10.6	19.5	0.2	W	59	14:09	11.9	69	W	13	18.1	32	WNW	33
8/12/2020	7.1	18.1	0	SW	41	7:55	12.6	55	SW	22	16.7	44	S	13
9/12/2020	9.8	28.5	0	S	43	22:24	15.2	61	SSE	4	26.6	28	WNW	7
10/12/2020	12.5	21.1	0	SSW	61	15:56	16.4	58	SSE	31	20.2	33	S	31
11/12/2020	8.6	26.2	0	S	48	2:37	14.7	53	S	30	25.8	27	S	19
12/12/2020	12.5	29.3	0	NE	35	14:45	18.7	43	NE	19	26.5	23	NNE	13



Date	Temperature (°C)		Rain fall (mm)	Max wind gust			9am				3pm			
	Min.	Max.		Direction	Speed (km/h)	Time	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)	Temp (°C)	relative humidity (%)	wind direction	wind speed (km/h)
13/12/2020	16.5	29.9	0	ENE	43	0:30	20.4	48	NE	22	28.2	24	NE	22
14/12/2020	17.7	33	0	NE	54	11:30	22.7	47	NNE	26	31.7	23	NW	15
15/12/2020	17.6	34.9	0	S	50	19:43	25	49	NNE	17	33.3	22	ENE	6



# Appendix C





Remote camera  
images



DRAFT



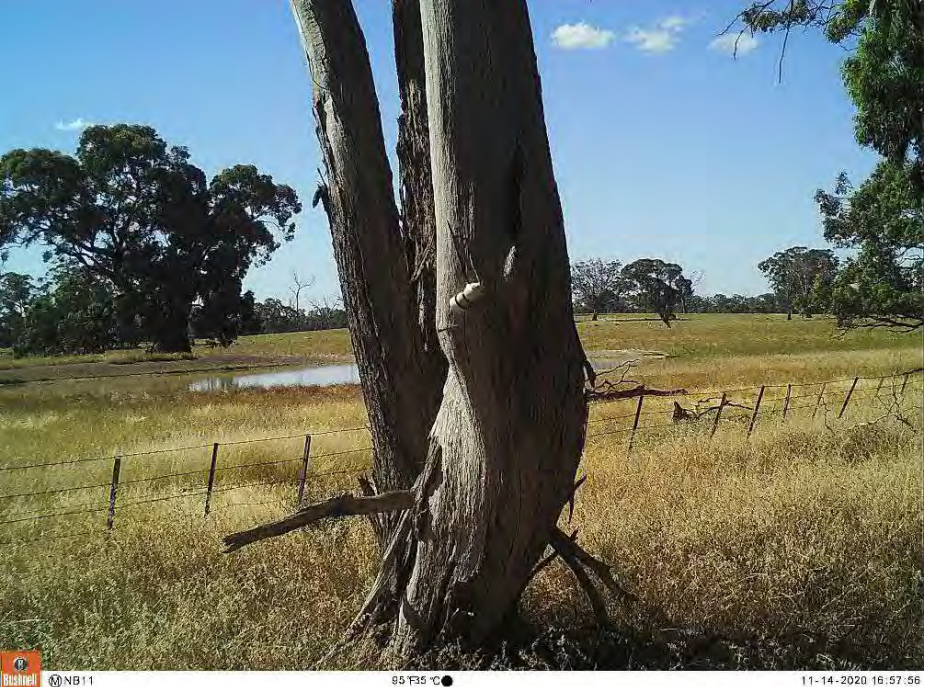

## Remote camera images

### Site 1 – Hume Highway, Seymour

Site	Camera	Location	Positioning	
1-1	NB7	Near clearing, between rubbish and intersection		
1-2	MEL R8 (swapped for covert R12 on 1 Dec 2020)	Kangaroo Lane in triangle		



**DRAFT**

Site	Camera	Location	Positioning	
1-3	NTL TC11 (swapped for R21 Reconyx cover on 1 Dec 2020)	Kangaroo Lane		
1-4	NB11 (swapped for Reconyx cover R17 on 1 Dec 2020)	Kangaroo Lane looking at dam		



# DRAFT

Site	Camera	Location	Positioning	
1-5	MEL R7 (swapped for Reconyx cover R13 on 1 Dec 2020)	Kangaroo Lane closest to Hume Hwy	 <p>2020-11-20 08:49:58 M 2/3 23°C HF2 PRO WHITE RECONYX</p>	 <p>2020-11-25 23:08:07 M 1/3 18°C HF2 PRO WHITE RECONYX</p>







**DRAFT**

**Site 2 - Seymour – Avenel Road, Seymour**

Site	Camera	Location	Positioning - day	Positioning - night
2-1	MEL R10	North-east – creekline (kingfisher)		
2-2	NB8	North-east - near VLOT		



**DRAFT**

Site	Camera	Location	Positioning - day	Positioning - night
2-3	NTL TC15	North-east - near rail/road corner		
2-4	MEL R9  Swapped for covert on 1/12/2020	South-west - near rail/road corner		






**DRAFT**

Site	Camera	Location	Positioning - day	Positioning - night
2-5	NB9 Swapped for R15 (Reconyx covert) on 1 Dec 2020)	South-west - most south	 <p>A daytime photograph showing a white camera mounted on a tree trunk with a black strap. The background shows a wooded area with green trees under a clear sky. The image includes a small logo in the bottom left and technical data in the bottom center: "56.920 °C" and "11-19-2020 08:09:42".</p>	 <p>A nighttime photograph of the same camera on the tree trunk, illuminated by a light source. The background is dark. The image includes a small logo in the bottom left and technical data in the bottom center: "53.711 °C" and "11-18-2020 22:52:48".</p>



**DRAFT**

**Site 3 – Hume Highway, Tallarook**

Site	Camera	Location	Positioning – day – November 2020	Positioning – night – November 2020
3-1-A	NB10	Gairns Lane - southern	 <p>A daytime photograph showing a white camera mounted on a tree trunk. The camera is positioned horizontally, facing left. The background shows a wooded area with green foliage and a building partially visible in the distance.</p>	 <p>A nighttime photograph showing the same white camera mounted on a tree trunk. The scene is dark, with the camera and the tree trunk illuminated by a light source, likely the camera's own light. The background is mostly black.</p>
3-1-B	R18		 <p>A daytime photograph of a wooded area. The trees have light-colored bark. In the foreground, there are several sheep grazing. The sky is bright. The image has a timestamp '2020-12-07 17:59:26' and 'M 1/3' at the top, and 'HF2 PRO COVERT' and a logo at the bottom.</p>	 <p>A nighttime photograph of the same wooded area. The scene is dark, with the trees and sheep illuminated by a light source. The image has a timestamp '2020-12-05 04:41:53' and 'M 1/3' at the top, and 'HF2 PRO COVERT' and a logo at the bottom.</p>



**DRAFT**

Site	Camera	Location	Positioning – day – November 2020	Positioning – night – November 2020
3-2	NTL TC04	Gairns Lane - middle	 <p>NTL TC 04 75°F 23°C 2020-11-12 16:20:43</p>	 <p>NTL TC 04 48°F 7°C 2020-11-13 04:34:04</p>
3-3	NTL TC08	Gairns Lane - northern	 <p>NTL TC 080 80°F 26°C 2020-11-20 14:10:36</p>	 <p>NTL TC 080 55°F 12°C 2020-11-20 22:14:31</p>



**DRAFT**

Site	Camera	Location	Positioning – day – November 2020	Positioning – night – November 2020
3-4	MEL R6 (swapped to Reconyx covert R16 on 2 Dec 2020)	East of rail, RoadsCorp	 <p>2020-12-02 11:47:22 M 1/3 23°C                      HF2 PRO WHITE</p>	 <p>2020-12-11 21:38:54 M 1/3 14°C                      HF2 PRO COVERT</p>
3-5-A	NTL TC18 / R20	East of rail, south of RoadsCorp	 <p>2020-12-14 08:25:17 M 2/3 25°C                      HF2 PRO COVERT</p>	 <p>2020-12-10 04:19:52 M 1/3 11°C                      HF2 PRO COVERT</p>







**DRAFT**

Site	Camera	Location	Positioning – day – November 2020	Positioning – night – November 2020
3-5-B	NB9		 <p>Daytime camera view showing a tree trunk on the left with a camera lens visible. The background is filled with green trees and foliage. The image includes a timestamp '12-08-2020 12:34:25' and a temperature reading '13.72 °C'.</p>	 <p>Nighttime camera view showing a tree trunk on the left with a camera lens visible. The background is dark, with some light reflecting off the tree trunk. The image includes a timestamp '12-10-2020 04:20:21' and a temperature reading '50.11 °C'.</p>







**DRAFT**

**Site 4 - Marchbanks Road, Broadford**

Site	Camera	Location	Positioning – day – Nov 2020	Positioning – night – Nov 2020
4-1	NTL TC13	West of rail - northern	 <p>CameraName 48 F3 °C 2020-11-24 06:35:19</p>	 <p>CameraName 60 F15 °C 2020-11-25 23:02:01</p>
4-2	NTL TC17	West of rail - middle	 <p>CameraName 73 F22 °C 2020-11-13 11:11:12</p>	 <p>CameraName 41 F5 °C 2020-11-15 05:19:51</p>



**DRAFT**

Site	Camera	Location	Positioning – day – Nov 2020	Positioning – night – Nov 2020
4-3	NTL TC12	West of rail - southern	 <p>CameraName 75°F23 °C 2020-11-27 10:50:05</p>	 <p>CameraName 60°F15 °C 2020-11-26 00:52:34</p>
4-	NTL TC03	East of rail	 <p>NTL TC 03 80°F26 °C 2020-11-15 12:24:27</p>	 <p>NTL TC 03 50°F10 °C 2020-11-13 04:55:29</p>



DRAFT

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## Appendix A Non-target fauna images

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Plate 1 Noisy Miner, Site 1-3, Hume Highway Seymour Precinct (Seymour)

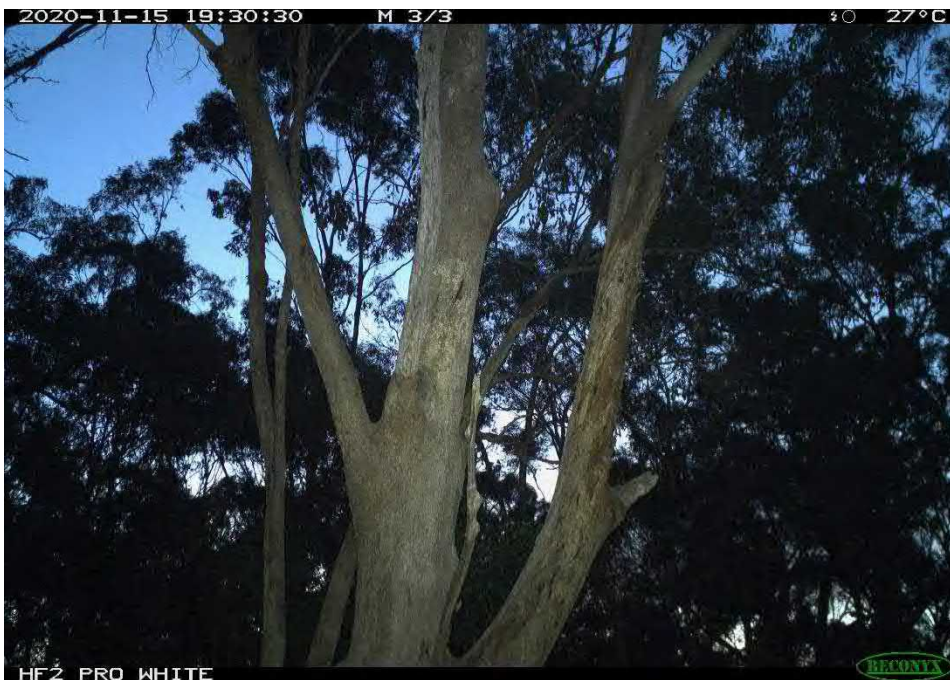


Plate 2 Eyeshine in hollow, Site 1-2, Hume Highway Seymour Precinct (Seymour)



# DRAFT



Plate 3 Brown Falcon with prey, Site 4-3, Marchbanks Road Overbridge (Broadford)



Plate 4 Swamp Wallaby, Site 3-4, Hume Highway Tallarook Precinct (Tallarook)



# DRAFT



Plate 5 Butterflies, Site 3-1, Hume Highway Tallarook Precinct (Tallarook)



Plate 6 Brush-tailed Possum, Site 2-5, Seymour-Avenel Road Overbridge (Seymour)



# DRAFT



Plate 7 Red Fox carrying prey, Site 1-5, Hume Highway Seymour Precinct (Seymour)



Plate 8 Domestic sheep, Site 3-1, Hume Highway Tallarook Precinct (Tallarook)



# DRAFT



Plate 9 Black Rat, Site 2-3, Seymour-Avenel Road Overbridge (Seymour)



Plate 10 European Hare, Site 1-1, Hume Highway Seymour Precinct (Seymour)



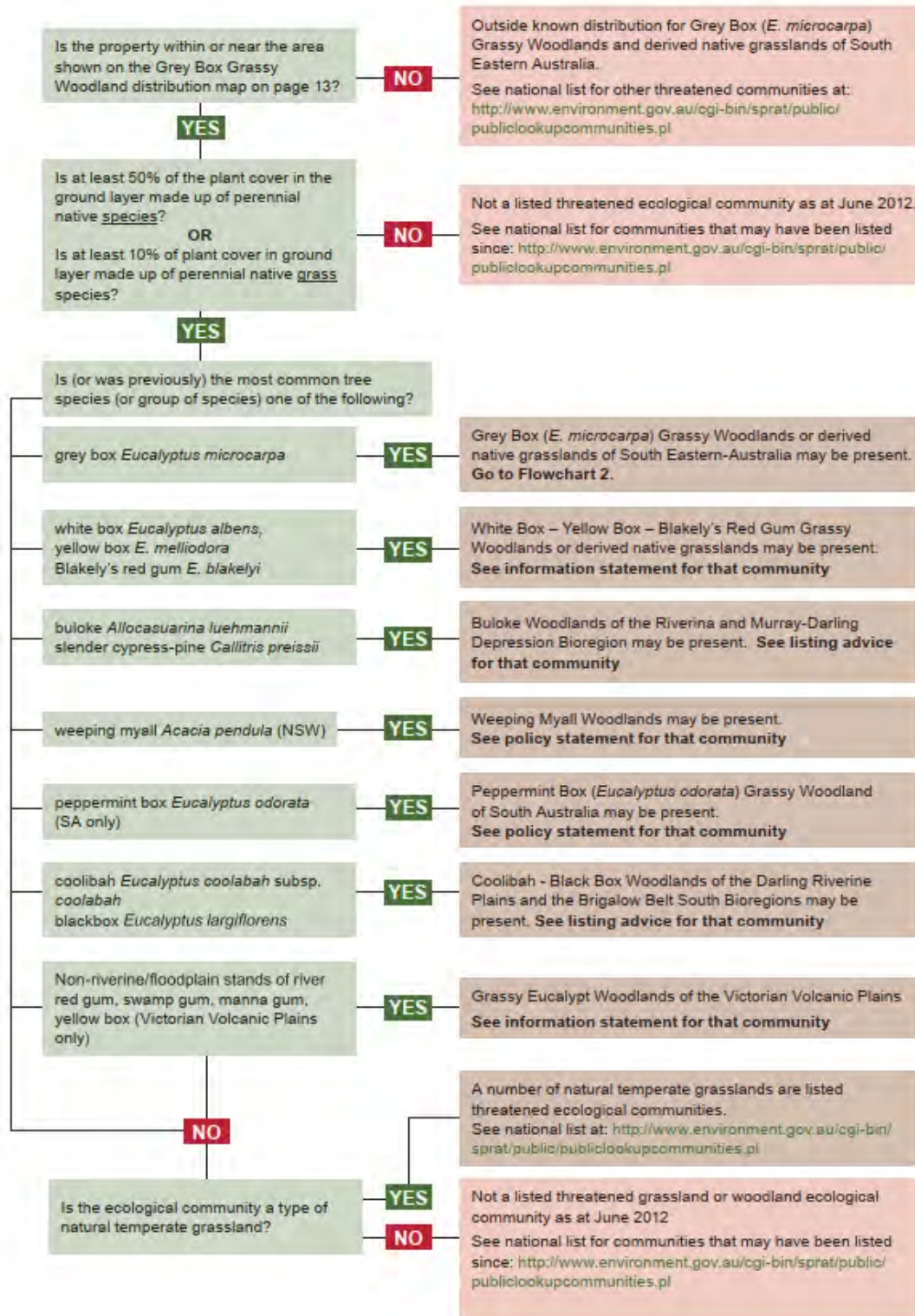
# Appendix D

TEC determining  
characteristics



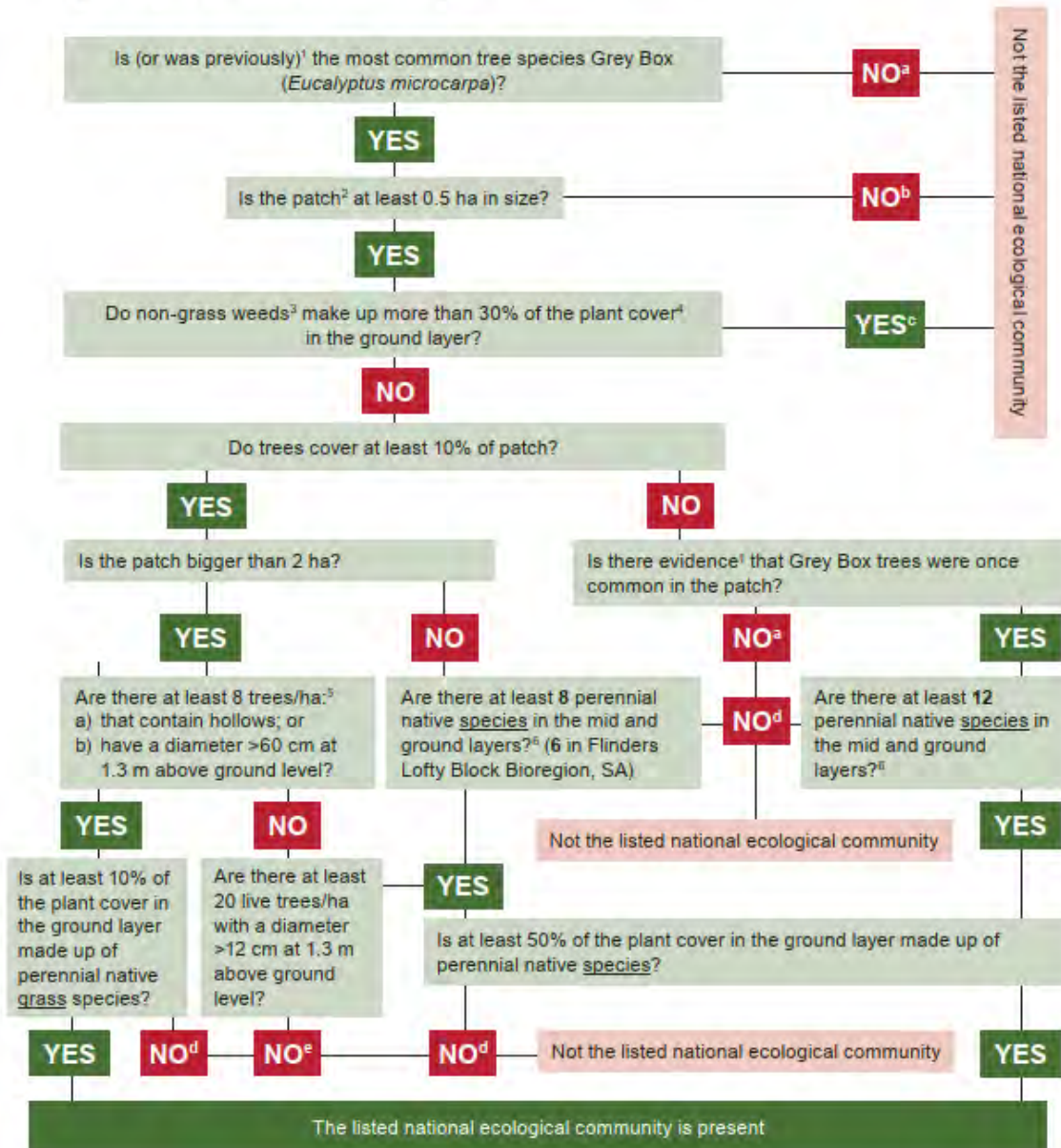
## Grey Box *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands (Source: DSEWPaC, 2012b)

### Flowchart 1: Could a nationally threatened grassland or grassy woodland community be present?





## Flowchart 2: Is the patch of potential Grey Box (*E. microcarpa*) Grassy Woodlands or derived native grasslands of sufficient quality for national listing?

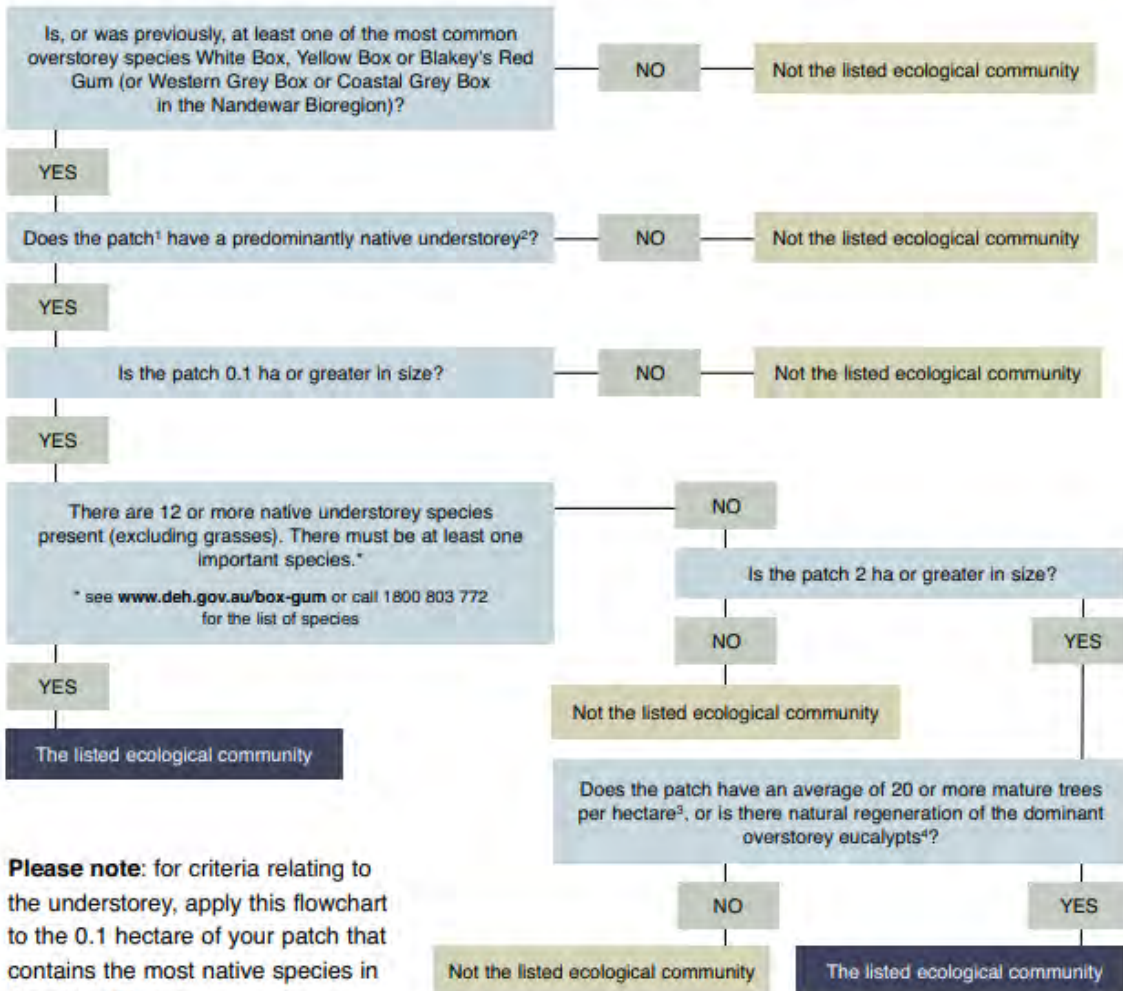


1 Evidence that Grey Box was originally present might include stumps, historical records or presence in nearby vegetation.  
 2 When considering a patch it is important to note that a patch may extend beyond a property or development site boundary. For the purposes of determining whether or not a patch meets the minimum patch size of the condition thresholds for the ecological community, the entire patch should be considered, not just the area occurring on a property or development site.  
 3 A weed is defined here as a plant species that is not native to Australia and the species has established viable self-sustaining populations in a region.  
 4 Plant cover excludes mosses and lichens. Patches of bare ground or leaf litter are also not included.  
 5 Dead trees are included if present, up to 50% of the total tree count.  
 6 Relevant growth-forms to include are: grasses, other graminoids, forbs and shrubs less than 4 metres tall. Shrubs that are 4 metres or more in height and non-vascular plants (mosses and lichens) are not included.  
**Why does my patch not belong to the listed national ecological community?** a Patch belongs to a different ecological community; b Patch is too small; c Degraded: patch is too weedy; d Degraded: too few native species or insufficient native species cover in ground layer; e Degraded: too few trees AND insufficient native species cover in ground layer. Rehabilitation work may be able to restore degraded patches enough to qualify as the listed community.



## White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and derived Native Grassland (Source: DECCW, 2010)

### Determining if your land has an area of the listed ecological community



**Please note:** for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

<sup>1</sup> Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:

- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m<sup>2</sup>) or greater.

<sup>2</sup> A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

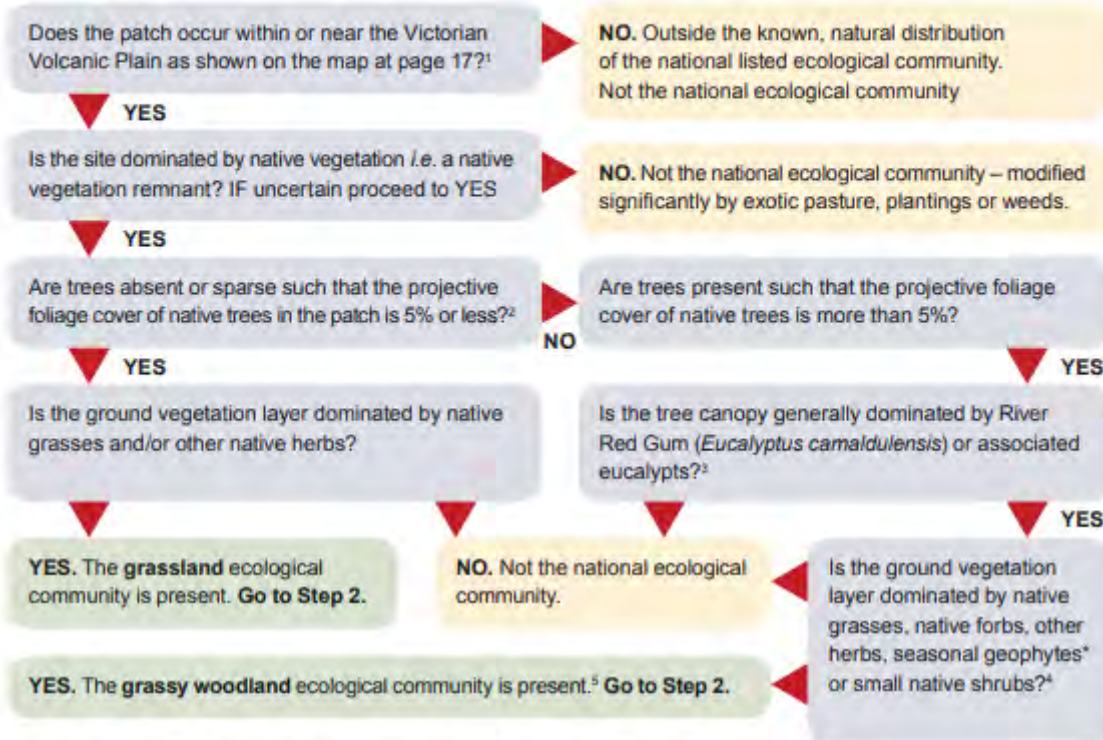
<sup>3</sup> Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

<sup>4</sup> Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

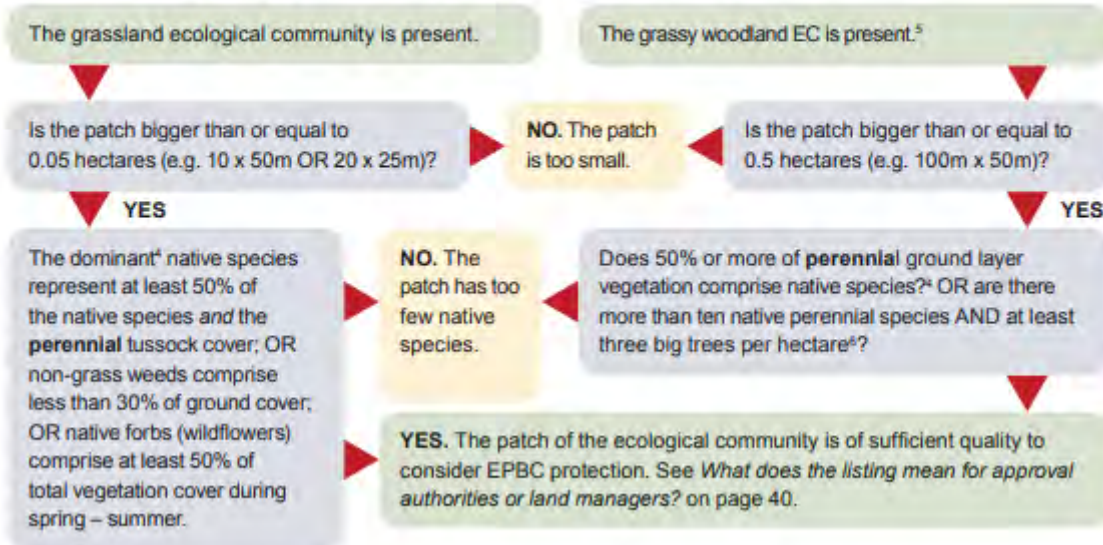


**Natural Temperate Grasslands of the Victorian Volcanic Plain (Western (Basalt) Plains Grassland Community is considered synonymous with NTGVVP, so is not included below) (Source: DSEWPaC, 2011)**

**STEP 1: Is the Natural Temperate Grassland or Grassy Eucalypt Woodland ecological community present at my site?**



**STEP 2: Is the patch of sufficient quality for national listing?**





## Victorian Temperate Woodland Bird Community

The Victorian Temperate Woodland Bird Community has been defined as a suite of bird species, mainly associated with drier woodlands on the slopes and plains north of the Great Dividing Range, that seem to have declined markedly in numbers since records began.

The 24 species in this group are the Painted Button-quail (*Turnix varia*), Bush Stone-curlew (*Burhinus grallarius*), Red-tailed Black-Cockatoo (*Calyptorhynchus banksii graptogyne*), Little Lorikeet (*Glossopsitta pusilla*), Superb Parrot (*Polytelis swainsonii*), Swift Parrot (*Lathamus discolor*), Turquoise Parrot (*Neophema pulchella*), Barking Owl (*Ninox connivens*), Brown Treecreeper (*Climacteris picumnus victoriae*), Speckled Warbler (*Chthonicola sagittata*), Western Gerygone (*Gerygone fusca*), Regent Honeyeater (*Anthochaera = Xanthomyza phrygia*), Yellow-tufted Honeyeater (*Lichenostomus melanops meltoni*), Fuscous Honeyeater (*Lichenostomus fuscus*), Black-chinned Honeyeater (*Melithreptus gularis*), Brown-headed Honeyeater (*Melithreptus brevirostris*), Painted Honeyeater (*Grantiella picta*), Jacky Winter (*Microeca fascinans*), Red-capped Robin (*Petroica goodenovii*), Hooded Robin (*Melanodryas cucullata*), Grey-crowned Babbler (*Pomatostomus temporalis*), Ground Cuckoo-shrike (*Coracina maxima*), Apostlebird (*Struthidea cinerea*), and Diamond Firetail (*Stagonopleura guttata*).

The distributions of these birds differ between species. Many are closely associated with (but not exclusive to) northern Victorian drier woodlands dominated by box, stringybark, ironbark, yellow gum or river red gum eucalypts, or by buloke or cypress-pine. Many such woodlands originally had an open structure, a light shrubby understorey, a grassy ground cover with fallen timber, an abundance of tree-hollows and other nesting sites, and available sources of seeds, nectar and insects throughout the year. Since European settlement, most of these woodlands have been cleared for agricultural production, or fragmented and degraded, greatly reducing the resources available to these birds; many sites now also have cats and foxes present. Some species are found in other habitats: the Superb Parrot, Apostlebird and, to a lesser extent, the 21 Ground Cuckoo-shrike are mainly found in habitats along or near the Murray River, while the Red-tailed Black-Cockatoo is confined to the far south-west of the state, in woodlands on sandy soils that are dominated by Brown Stringybark (*Eucalyptus baxteri*) and Desert Stringybark (*E. arenacea*) and the nearby woodlands dominated by River Red Gum (*E. camaldulensis*), Yellow Gum (*E. leucoxylon*) or Buloke (*Allocasuarina luehmannii*).

## Lowland Riverine Fish Community of the Southern Murray-Darling Basin

The Lowland Riverine Fish Community of the southern Murray-Darling Basin is characteristic of the geographical area that defines its distribution, and by a selected suite of native fish taxa that is typical of and largely restricted to the area.

The geographical area that delineates this fish assemblage can be broadly defined as the lowland river reaches and associated floodplains of the Murray River tributaries in Victoria that drain the northern slopes of the Great Dividing Range, together with the lowland section and floodplain of the Murray River upstream of the South Australian border. The major streams involved are: the Mitta Mitta, Ovens, Broken, Goulburn, Campaspe, Loddon and Avoca Rivers. Whilst this community mainly occurs in the lowland river reaches, some species may also occur (at least at certain times) in both the slope and upland river reaches.

The fish fauna is predominantly characterized by the following native fish species: Agassiz's Chanda Perch (*Ambassis agassizii*), Silver Perch (*Bidyanus bidyanus*), Murray Hardyhead (*Craterocephalus fluviatilis*), Non-speckled Hardyhead (*Craterocephalus stercusmuscarum fulvus*), Flat-headed Galaxias (*Galaxias rostratus*), Western Carp Gudgeons (*Hypseleotris klunzingeri*, now considered to be a species complex), Trout Cod (*Maccullochella macquariensis*), Murray Cod (*Maccullochella peelii*, previously *Maccullochella peelii peelii*), Golden Perch (*Macquaria ambigua*), Macquarie Perch (*Macquaria australasica*), Murray Rainbow Fish (*Melanotaenia fluviatilis*), Southern Purple-spotted Gudgeon (*Mogurnda adspersa*), Bony Bream (*Nematalosa erebi*), Flat-headed Gudgeon (*Philypnodon grandiceps*) and Freshwater Catfish (*Tandanus tandanus*). Other widespread or uncommon species may also occur over parts of the distribution of this community: Southern Pigmy Perch (*Nannoperca australis*), River Blackfish (*Gadopsis marmoratus*), Two-spined Blackfish (*Gadopsis bispinosus*), Australian Smelt (*Retropinna semoni*), Short-headed Lamprey (*Mordacia mordax*), Short-finned Eel (*Anguilla australis*), Broad-finned Galaxias (*Galaxias brevipinnis*) and Barred Galaxias (*Galaxias*



*fuscus*). Many of these constituent species have undergone significant reductions in range and abundance since European settlement. There have been considerable changes to habitats throughout the distribution of this community, caused by a range of factors, and the introduction of alien fish species within the range of the community, such as Brown Trout (*Salmo trutta*), Rainbow Trout (*Oncorhynchus mykiss*), Carp (*Cyprinus carpio*), Goldfish (*Carassius auratus*), Tench (*Tinca tinca*), Oriental Weatherloach (*Misgurnus anguillicaudatus*), Eastern Gambusia (*Gambusia holbrooki*) and Redfin Perch (*Perca fluviatilis*).



# Appendix E

Threatened and  
protected flora



## Appendix E – Threatened and protected flora species identified in the investigation area

**Table 39** Threatened and protected flora species observed in the investigation area.

Status	Scientific name	Common name	Investigation areas – current assessment	Habitat Zone #	KBR (2020a) investigation areas*
P	<i>Acacia acinacea</i>	Gold-dust Wattle	<ul style="list-style-type: none"> <li>• SG11 &amp; TS2</li> <li>• SG19 &amp; TS4</li> <li>• Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>	<ul style="list-style-type: none"> <li>• HZ 84</li> <li>• HZ 102</li> <li>• HZ 119</li> <li>• HZ 211</li> </ul>	<ul style="list-style-type: none"> <li>• Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>• Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>• Hume Highway (Seymour) [ES07]</li> </ul>
P	<i>Acacia genistifolia</i>	Spreading Wattle	<ul style="list-style-type: none"> <li>• SG7 &amp; SG8</li> </ul>	<ul style="list-style-type: none"> <li>• HZ 219</li> </ul>	Not identified by KBR (2020a)
P	<i>Acacia mearnsii</i>	Black Wattle	<ul style="list-style-type: none"> <li>• Broadford-Wandong Road (Wandong) [ES01]</li> <li>• Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>• SG19 &amp; TS4</li> <li>• Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>	<ul style="list-style-type: none"> <li>• HZ 102</li> <li>• HZ 221</li> <li>• HZ 435</li> </ul>	<ul style="list-style-type: none"> <li>• SG3</li> </ul>
P	<i>Acacia pycnantha</i>	Golden Wattle	<ul style="list-style-type: none"> <li>• Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>• SG19 &amp; TS4</li> <li>• Hume Highway (Seymour) [ES07]</li> </ul>	<ul style="list-style-type: none"> <li>• HZ 126</li> <li>• HZ 129</li> <li>• HZ 221</li> </ul>	<ul style="list-style-type: none"> <li>• Short Street Overbridge (Broadford),</li> <li>• Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>• Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>• Hume Highway (Seymour) [ES07]</li> </ul>



Status	Scientific name	Common name	Investigation areas – current assessment	Habitat Zone #	KBR (2020a) investigation areas*
P	<i>Acacia verniciflua s.l.</i>	Varnish Wattle	<ul style="list-style-type: none"> <li>SG19 &amp; TS4</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> </ul>	<ul style="list-style-type: none"> <li>HZ 119</li> <li>HZ 441</li> </ul>	Not identified by KBR (2020a)
P	<i>Acrotriche serrulata</i>	Honey-pots	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 102</li> </ul>	Not identified by KBR (2020a)
L, en, P	<i>Allocasuarina luehmannii</i>	Buloke	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>	<ul style="list-style-type: none"> <li>HZ 323</li> <li>HZ 324</li> </ul>	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>
P	<i>Cheilanthes</i> spp.	Rock Fern	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 102</li> <li>HZ 129</li> </ul>	Not identified by KBR (2020a)
P	<i>Cheiranthra linearis</i>	Blue Finger-flower	<ul style="list-style-type: none"> <li>SG9</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 72</li> <li>HZ 102</li> </ul>	Not identified by KBR (2020a)
P	<i>Chrysocephalum apiculatum s.l.</i>	Common Everlasting	<ul style="list-style-type: none"> <li>SG7 &amp; SG8</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 102</li> <li>HZ 129</li> <li>HZ 219</li> <li>HZ 211</li> </ul>	Not identified by KBR (2020a)
P	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	<ul style="list-style-type: none"> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 129</li> </ul>	<ul style="list-style-type: none"> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>



Status	Scientific name	Common name	Investigation areas – current assessment	Habitat Zone #	KBR (2020a) investigation areas*
P	<i>Cotula australis</i>	Common Cotula	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 102</li> </ul>	Not identified by KBR (2020a)
vu	<i>Dianella longifolia</i> var. <i>grandis</i> s.l.	Glaucous Flax-lily	<ul style="list-style-type: none"> <li>SG7 &amp; SG8</li> <li>SG9</li> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> <li>Hume Highway (Seymour) [ES07]</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 119</li> <li>HZ 102</li> <li>HZ 126</li> <li>HZ 129</li> <li>HZ 219</li> <li>HZ 221</li> <li>HZ 211</li> </ul>	Not identified by KBR (2020a)
P	<i>Laphangium luteoalbum</i>	Jersey Cudweed	Not identified in current assessment	N/A	<ul style="list-style-type: none"> <li>SG3</li> <li>SG4</li> <li>Hamilton Street (Broadford) [ES02] &amp; SG18</li> </ul>
P	<i>Ozothamnus obcordatus</i>	Grey Everlasting	<ul style="list-style-type: none"> <li>SG19 &amp; TS4</li> </ul>	<ul style="list-style-type: none"> <li>HZ 453</li> </ul>	Not identified by KBR (2020a)
P	<i>Senecio quadridentatus</i>	Cotton Fireweed	Not identified in current assessment	N/A	<ul style="list-style-type: none"> <li>SG3</li> <li>Short Street (Broadford) [ES03] &amp; SG6</li> <li>Marchbanks Road (Broadford) [ES04]</li> <li>Hume Highway (Tallarook) [ES05] &amp; TS5</li> </ul>



Status	Scientific name	Common name	Investigation areas – current assessment	Habitat Zone #	KBR (2020a) investigation areas*
P	<i>Vittadinia cuneata</i>	Fuzzy New Holland Daisy	<ul style="list-style-type: none"> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> <li>SG19 &amp; TS4</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> </ul>	<ul style="list-style-type: none"> <li>HZ 102</li> <li>HZ 129</li> <li>HZ 437</li> </ul>	<ul style="list-style-type: none"> <li>Short Street (Broadford) [ES03] &amp; SG6</li> <li>Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>Hume Highway (Seymour) [ES07]</li> <li>Seymour Avenel Road (Seymour) [ES06] &amp; SG14</li> </ul>
P	<i>Xerochrysum viscosum</i>	Shiny Everlasting	<ul style="list-style-type: none"> <li>Hume Highway (Tallaroo) [ES05] &amp; TS5</li> <li>SG19 &amp; TS4</li> <li>Beaconsfield Parade (Glenrowan) [ES10]</li> </ul>	<ul style="list-style-type: none"> <li>HZ 129</li> <li>HZ 437</li> <li>HZ 438</li> </ul>	Not identified by KBR (2020a)

Notes to table: P – protected, vu - vulnerable



# Appendix F

Habitat hectare data



## Appendix F - Habitat hectare data

Table 40 Habitat Hectare data

Habitat Zone		HZ 1	HZ 2	HZ 3	HZ 5	HZ 6	HZ 7	HZ 10	HZ 17	HZ 23	HZ 24	HZ 31	HZ 32	HZ 72	HZ 76	HZ 77	
EVC		Victorian Volcanic Plain	Victorian Volcanic Plain	Central Victorian Uplands	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	
Bioregion		Swampy Riparian Woodland (83)	Swampy Riparian Woodland (83)	Valley Grassy Forest (47)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Riparian Forest (18)	Grassy Woodland (175_61)	Box Ironbark Forest (61)	Grassy Woodland (175_61)	
Bioregional Conservation Status (BCS)		E	E	V	E	E	E	E	E	E	E	E	V	E	V	E	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	N/A	N/A	VTWBC	VTWBC	VTWBC	
Site Condition	Large Old Trees	10	0	0	8	0	0	7	7	0	10	6	9	0	2	9	8
	Tree Canopy Cover	5	0	0	0	2	0	4	4	5	3	5	2	0	4	4	4
	Lack of Weeds	15	2	2	2	6	6	13	13	6	11	6	13	2	11	7	0
	Understorey	25	5	5	5	5	5	5	5	15	15	5	5	5	5	15	5
	Recruitment	10	3	3	6	3	0	10	10	1	5	5	3	0	10	10	3
	Organic Litter	5	2	2	3	3	3	5	0	3	3	5	3	0	3	3	5
	Logs	5	0	0	2	5	0	0	5	0	4	0	0	0	2	0	2
	Total Site Score	75	12	12	26	24	14	44	44	30	51	32	35	7	37	48	27
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	1	1	8	8	4	8	8	8	8	1	8	1	8	8	8
	Distance to Core Area	5	4	4	4	4	1	4	4	4	4	3	4	4	4	4	4
	Neighbourhood	10	0	0	5	2	3	3	4	4	5	1	5	1	5	3	4
	Total Landscape Score	25	5	5	17	14	8	15	16	16	17	8	17	6	17	15	16
Habitat Score		100	17	17	43	38	22	59	60	46	68	37	52	13	54	63	43
Habitat Points = Score/100		1	0.17	0.17	0.43	0.38	0.22	0.59	0.6	0.46	0.68	0.37	0.52	0.13	0.54	0.63	0.43
Total area of Habitat Zone (ha)			0.006	0.010	0.032	0.017	0.018	0.093	0.067	1.240	1.038	0.266	0.304	0.035	0.444	1.684	0.161
Habitat Hectares (Hha)			0.001	0.002	0.014	0.007	0.004	0.055	0.040	0.570	0.706	0.099	0.158	0.005	0.240	1.061	0.069



Habitat Zone		HZ 81	HZ 82	HZ 84	HZ 86	HZ 87	HZ 88	HZ 89	HZ 90	HZ 93	HZ 102	HZ 103	HZ 119	HZ 123	HZ 124	HZ 126	
EVC		Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	
Bioregion		Grassy Woodland (175_61)	Grassy Woodland (175_61)	Floodplain Riparian Woodland (56)	Spike-sedge Wetland (819)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Tall Marsh (821)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Creekline Grassy Woodland (68)	
Bioregional Conservation Status (BCS)		E	E	V	V	V	V	V	V	D	V	V	V	V	V	E	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	GBGW	N/A	N/A	GBGW	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	N/A	N/A	VTWBC	N/A	
Site Condition	Large Old Trees	10	0	0	3	0	0	0	0	0	0	3	0	0	6	5	9
	Tree Canopy Cover	5	0	0	4	0	4	0	0	0	0	2	3	0	3	2	2
	Lack of Weeds	15	4	4	11	11	11	4	4	4	9	13	13	11	11	15	6
	Understorey	25	15	15	5	10	5	5	5	5	5	15	20	5	5	10	5
	Recruitment	10	10	10	5	3	5	5	5	5	3	10	10	3	5	6	5
	Organic Litter	5	2	2	5	3	5	3	3	3	3	3	3	2	5	5	3
	Logs	5	0	0	0	0	0	0	0	0	N/A	0	0	2	0	2	2
	Total Site Score	75	31	31	33	27	30	17	17	17	20	46	49	23	35	45	32
Standardiser		-	N/A	N/A	N/A	1.36	N/A	N/A	N/A	N/A	1.36	N/A	N/A	N/A	N/A	N/A	N/A
Standardised Site Score		-	N/A	N/A	N/A	36.72	N/A	N/A	N/A	N/A	27.2	N/A	N/A	N/A	N/A	N/A	N/A
Landscape Context	Patch Size	10	1	1	8	8	1	1	2	2	8	8	8	8	8	8	8
	Distance to Core Area	5	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
	Neighbourhood	10	3	3	3	3	3	2	2	2	4	5	5	5	4	5	5
	Total Landscape Score	25	7	7	15	15	8	7	8	8	16	17	17	17	16	17	17
Habitat Score		100	38	38	48	51.72	38	24	25	25	43.2	63	66	40	51	62	49
Habitat Points = Score/100		1	0.38	0.38	0.48	0.52	0.38	0.24	0.25	0.25	0.43	0.63	0.66	0.40	0.51	0.62	0.49
Total area of Habitat Zone (ha)			0.022	0.045	0.292	0.108	0.092	0.068	0.011	0.009	0.261	6.702	6.311	0.427	0.124	0.877	0.339
Habitat Hectares (Hha)			0.008	0.017	0.140	0.056	0.035	0.016	0.003	0.002	0.113	4.222	4.165	0.171	0.063	0.544	0.166



Habitat Zone		HZ 127	HZ 129	HZ 165	HZ 171	HZ 175	HZ 177	HZ 179	HZ 180	HZ 181	HZ 198	HZ 199	HZ 200	HZ 206	HZ 207	HZ 210	
EVC		Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	
Bioregion		Box Ironbark Forest (61)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55_61)	Grassy Woodland (Low Rises) (175_61)	Creekline Grassy Woodland (68)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Swampy Riparian Woodland (83)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Plains Grassy Woodland (55)	
Bioregional Conservation Status (BCS)		V	E	E	E	E	E	E	E	E	E	E	E	V	V	E	
EPBC Community		GBGW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		VTWBC	VTWBC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	N/A	N/A	VTWBC	
Site Condition	Large Old Trees	10	0	9	10	0	6	0	0	0	0	0	0	0	8	2	10
	Tree Canopy Cover	5	15	2	3	0	5	0	0	0	0	0	0	5	5	2	5
	Lack of Weeds	15	4	13	11	11	7	15	6	6	6	4	6	9	11	9	9
	Understorey	25	6	15	5	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	10	10	6	3	0	3	0	3	3	3	6	5	0	5	6	0
	Organic Litter	5	3	3	5	5	3	0	3	3	3	3	2	5	5	5	5
	Logs	5	2	0	0	0	0	0	2	2	2	0	0	2	2	0	2
	Total Site Score	75	40	48	37	21	29	20	19	19	19	18	18	26	41	29	36
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape Context	Patch Size	10	8	8	1	1	8	8	4	1	4	4	8	8	2	1	8
	Distance to Core Area	5	3	4	4	4	4	4	4	4	4	2	4	4	4	4	4
	Neighbourhood	10	2	4	0	1	1	1	1	0	1	0	6	5	3	3	5
	Total Landscape Score	25	13	16	5	6	13	13	9	5	9	6	18	17	9	8	17
Habitat Score		100	53	64	42	27	42	33	28	24	28	24	36	43	50	37	53
Habitat Points = Score/100		1	0.53	0.64	0.42	0.27	0.42	0.33	0.28	0.24	0.28	0.24	0.36	0.43	0.50	0.37	0.53
Total area of Habitat Zone (ha)		1.548	0.614	0.134	0.010	0.680	0.165	0.384	0.029	0.321	0.039	0.199	0.109	0.345	1.269	0.127	
Habitat Hectares (Hha)		0.820	0.393	0.056	0.003	0.285	0.054	0.108	0.007	0.090	0.009	0.072	0.047	0.172	0.469	0.067	



Habitat Zone		HZ 211	HZ 212	HZ 213	HZ 215	HZ 217	HZ 218	HZ 220	HZ 221	HZ 223	HZ 224	HZ 225	HZ 229*	HZ 232*	HZ 233*	HZ 234*	
EVC		Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	
Bioregion		Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Valley Grassy Forest (47)	Valley Grassy Forest (47)	Valley Grassy Forest (47)	DELWP Mapped Wetland	DELWP Mapped Wetland	DELWP Mapped Wetland	DELWP Mapped Wetland	
Bioregional Conservation Status (BCS)		V	V	V	V	V	V	E	E	V	V	V	ND	ND	ND	ND	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Site Condition	Large Old Trees	10	0	0	0	0	0	0	7	0	0	0	0	N/A	N/A	N/A	N/A
	Tree Canopy Cover	5	0	0	0	5	4	0	2	3	0	0	0	N/A	N/A	N/A	N/A
	Lack of Weeds	15	6	6	6	0	11	15	6	9	2	2	4	N/A	N/A	N/A	N/A
	Understorey	25	5	5	5	5	5	5	5	5	5	5	5	N/A	N/A	N/A	N/A
	Recruitment	10	6	6	6	10	5	5	3	3	5	5	5	N/A	N/A	N/A	N/A
	Organic Litter	5	0	0	0	3	5	5	3	3	0	0	0	N/A	N/A	N/A	N/A
	Logs	5	0	0	0	0	0	0	4	2	0	0	0	N/A	N/A	N/A	N/A
	Total Site Score	75	17	17	17	23	30	30	30	25	12	12	14	N/A	N/A	N/A	N/A
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	8	8	8	8	8	8	8	8	1	1	8	N/A	N/A	N/A	N/A
	Distance to Core Area	5	4	4	4	4	4	4	4	4	4	4	4	N/A	N/A	N/A	N/A
	Neighbourhood	10	5	5	5	3	5	5	3	4	2	3	3	N/A	N/A	N/A	N/A
	Total Landscape Score	25	17	17	17	15	17	17	15	16	7	8	15	N/A	N/A	N/A	N/A
Habitat Score		100	34	34	34	38	47	47	45	41	19	20	29	N/A	N/A	N/A	N/A
Habitat Points = Score/100		1	0.34	0.34	0.34	0.38	0.47	0.47	0.45	0.41	0.19	0.20	0.29	0.80	0.60	0.60	0.60
Total area of Habitat Zone (ha)		1.533	0.057	0.036	0.113	0.084	0.006	0.208	2.499	0.028	0.014	0.005	28.934	0.163	0.001	3.395	
Habitat Hectares (Hha)		0.521	0.019	0.012	0.043	0.039	0.003	0.094	1.025	0.005	0.003	0.001	23.147	0.098	0.001	2.037	

\*Modelled native vegetation condition scores used



Habitat Zone		HZ 236	HZ 237	HZ 242	HZ 243	HZ 244	HZ 251	HZ 252	HZ 255	HZ 256	HZ 257	HZ 258	HZ 259	HZ 260	HZ 263	HZ 264	
EVC		Victorian Riverina	Victorian Riverina	Victorian Riverina	Northern Inland Slopes	Northern Inland Slopes	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Central Victorian Uplands	Victorian Riverina	
Bioregion		Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55_61)	Creekline Grassy Woodland (68)	Plains Woodland (803)	Plains Woodland (803)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55_61)	
Bioregional Conservation Status (BCS)		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		VTWBC	N/A	N/A	N/A	N/A	VTWBC	VTWBC	N/A	N/A	N/A	N/A	N/A	VTWBC	N/A	N/A	
Site Condition	Large Old Trees	10	6	0	10	0	0	6	10	0	0	10	0	0	5	0	0
	Tree Canopy Cover	5	3	0	5	5	0	5	5	0	0	3	0	0	1	0	0
	Lack of Weeds	15	4	9	9	0	4	6	0	9	0	0	0	0	9	4	0
	Understorey	25	5	5	15	5	5	5	5	15	5	5	5	5	15	15	5
	Recruitment	10	5	0	10	5	0	5	0	3	5	0	5	0	6	5	5
	Organic Litter	5	5	3	3	5	2	5	3	3	4	2	4	2	5	3	2
	Logs	5	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0
	Total Site Score	75	30	17	52	20	11	32	26	30	14	20	14	7	41	27	12
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	6	1	2	1	1	1	2	1	1	1	1	6	6	6	
	Distance to Core Area	5	3	3	1	1	1	3	3	1	3	3	3	3	3	3	
	Neighbourhood	10	0	0	1	0	0	1	1	0	0	0	0	0	0	0	
	Total Landscape Score	25	9	4	4	2	2	5	6	2	4	4	4	4	9	9	9
Habitat Score		100	39	21	56	22	13	37	32	32	18	24	18	11	50	36	21
Habitat Points = Score/100		1	0.39	0.21	0.56	0.22	0.13	0.37	0.32	0.32	0.18	0.24	0.18	0.11	0.5	0.36	0.21
Total area of Habitat Zone (ha)			0.972	0.036	0.829	0.054	0.019	0.128	0.249	0.142	0.013	0.064	0.008	0.082	3.226	0.048	0.055
Habitat Hectares (Hha)			0.379	0.008	0.464	0.012	0.002	0.047	0.080	0.046	0.002	0.015	0.001	0.009	1.613	0.017	0.012



Habitat Zone		HZ 265	HZ 266	HZ 267	HZ 268	HZ 269	HZ 270	HZ 271	HZ 272	HZ 273	HZ 274	HZ 275	HZ 276	HZ 281	HZ 282	HZ 283	
EVC		Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	
Bioregion		Grassy Woodland (Low Rises) (175_61)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Box Ironbark Forest (61)	Plains Grassy Woodland (55)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	
Bioregional Conservation Status (BCS)		E	E	E	E	E	V	E	V	V	V	V	V	V	V	V	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	GBGW	GBGW	N/A	N/A	N/A	GBGW	GBGW	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	VTWBC	N/A	N/A	N/A	VTWBC	VTWBC	
Site Condition	Large Old Trees	10	0	0	0	4	0	4	0	4	6	5	0	0	0	3	0
	Tree Canopy Cover	5	5	0	4	3	5	5	3	5	5	3	0	3	0	5	0
	Lack of Weeds	15	6	6	0	0	4	13	11	13	4	9	13	13	0	7	0
	Understorey	25	5	5	5	5	5	15	5	15	10	10	15	15	5	15	5
	Recruitment	10	0	0	3	3	0	6	5	10	3	10	10	10	5	10	5
	Organic Litter	5	5	3	5	4	3	3	5	5	5	3	5	5	4	5	4
	Logs	5	0	0	2	3	0	2	2	2	0	2	2	2	0	0	0
	Total Site Score	75	21	14	19	22	17	48	31	54	33	42	45	48	14	45	14
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	6	6	6	6	6	8	8	8	8	8	8	8	8	8	
	Distance to Core Area	5	3	3	1	1	1	4	4	3	3	4	4	4	4	4	
	Neighbourhood	10	0	0	0	0	0	2	2	2	2	5	2	2	1	1	
	Total Landscape Score	25	9	9	7	7	7	14	14	13	13	17	14	14	13	13	
Habitat Score		100	30	23	26	29	24	62	45	67	46	59	59	62	27	58	27
Habitat Points = Score/100		1	0.30	0.23	0.26	0.29	0.24	0.62	0.45	0.67	0.46	0.59	0.59	0.62	0.27	0.58	0.27
Total area of Habitat Zone (ha)			0.087	0.036	0.251	0.144	0.013	0.507	0.602	2.177	0.578	6.723	0.420	0.137	0.008	0.718	0.043
Habitat Hectares (Hha)			0.026	0.008	0.065	0.042	0.003	0.314	0.271	1.459	0.266	3.967	0.248	0.085	0.002	0.416	0.012



Habitat Zone		HZ 284	HZ 285	HZ 289	HZ 290	HZ 291	HZ 292	HZ 293	HZ 294	HZ 296	HZ 297	HZ 298	HZ 299	HZ 300	HZ 301	HZ 302	
EVC		Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	
Bioregion		Box Ironbark Forest (61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	
Bioregional Conservation Status (BCS)		V	V	V	E	E	E	E	E	E	E	E	E	E	E	E	
EPBC Community		GBGW	GBGW	GBGW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		VTWBC	VTWBC	VTWBC	N/A	VTWBC	N/A	VTWBC	VTWBC	N/A	N/A	N/A	VTWBC	VTWBC	N/A	VTWBC	
Site Condition	Large Old Trees	10	8	4	8	0	0	0	8	4	0	0	0	10	8	0	8
	Tree Canopy Cover	5	0	5	5	4	4	0	4	5	0	0	0	5	5	5	5
	Lack of Weeds	15	0	7	7	7	7	0	4	6	4	0	7	2	0	0	0
	Understorey	25	5	15	15	20	20	5	15	25	15	5	15	5	5	5	5
	Recruitment	10	5	10	10	10	10	3	10	10	10	3	6	3	3	3	3
	Organic Litter	5	4	5	5	5	5	2	5	3	2	2	5	5	5	5	5
	Logs	5	0	0	0	2	2	0	4	3	0	0	0	2	2	0	0
	Total Site Score	75	22	46	50	48	48	10	50	56	31	10	33	32	28	18	26
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape Context	Patch Size	10	8	8	8	8	8	1	8	8	1	1	8	1	1	4	4
	Distance to Core Area	5	4	3	4	4	4	3	4	4	3	3	4	3	3	3	3
	Neighbourhood	10	1	1	1	4	4	3	4	4	3	3	4	1	1	1	1
	Total Landscape Score	25	13	12	13	16	16	7	16	16	7	7	16	5	5	8	8
Habitat Score		100	35	58	63	64	64	17	66	72	38	17	49	37	33	26	34
Habitat Points = Score/100		1	0.35	0.58	0.63	0.64	0.64	0.17	0.66	0.72	0.38	0.17	0.49	0.37	0.33	0.26	0.34
Total area of Habitat Zone (ha)			0.067	0.509	2.354	0.129	2.413	0.066	1.762	0.828	0.061	0.048	0.395	0.356	0.314	0.085	0.493
Habitat Hectares (Hha)			0.024	0.295	1.483	0.083	1.554	0.011	1.163	0.596	0.023	0.008	0.193	0.132	0.104	0.022	0.168



Habitat Zone		HZ 303	HZ 304	HZ 305	HZ 306	HZ 307	HZ 308	HZ 309	HZ 310	HZ 318	HZ 319	HZ 322	HZ 323	HZ 324	HZ 325	HZ 326	
EVC		Central Victorian Uplands	Central Victorian Uplands	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Northern Inland Slopes	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	
Bioregion		Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Plains Woodland (803)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55_61)	
Bioregional Conservation Status (BCS)		E	E	E	E	E	E	E	E	E	E	E	V	V	E	E	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	GBGW	GBGW	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	VTWBC	VTWBC	N/A	
Site Condition	Large Old Trees	10	0	0	0	0	0	0	0	0	8	8	0	4	8	0	
	Tree Canopy Cover	5	0	3	3	0	0	0	0	0	5	4	5	3	5	0	
	Lack of Weeds	15	0	9	4	4	4	0	7	13	9	0	7	13	15	13	9
	Understorey	25	5	15	15	5	5	5	5	5	15	5	20	15	15	15	5
	Recruitment	10	0	3	10	0	0	0	0	0	3	3	10	6	6	10	5
	Organic Litter	5	3	5	5	2	2	2	4	2	3	5	5	3	5	5	3
	Logs	5	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0
	Total Site Score	75	8	35	37	11	11	7	16	20	30	26	56	44	50	58	22
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	1	8	1	1	1	1	1	1	4	8	8	8	8	1	
	Distance to Core Area	5	1	1	2	1	1	1	1	1	3	4	4	4	3	1	
	Neighbourhood	10	0	0	3	0	0	0	0	0	1	4	2	2	2	1	
	Total Landscape Score	25	2	9	6	2	2	2	2	2	2	8	16	14	14	13	3
Habitat Score		100	10	44	43	13	13	9	18	22	32	34	72	58	64	71	25
Habitat Points = Score/100		1	0.10	0.44	0.43	0.13	0.13	0.09	0.18	0.22	0.32	0.34	0.72	0.58	0.64	0.71	0.25
Total area of Habitat Zone (ha)			0.060	0.061	0.458	0.080	0.188	0.008	0.157	0.144	0.039	0.139	0.372	0.232	1.286	0.826	0.024
Habitat Hectares (Hha)			0.006	0.027	0.197	0.010	0.024	0.001	0.028	0.032	0.013	0.047	0.268	0.135	0.823	0.587	0.006



Habitat Zone		HZ 329	HZ 331	HZ 332	HZ 333	HZ 334	HZ 335	HZ 336	HZ 337	HZ 338	HZ 339	HZ 341	HZ 343	HZ 344	HZ 345	HZ 346	
EVC		Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	
Bioregion		Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Creekline Grassy Woodland (68)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Box Ironbark Forest (61)	Plains Grassy Woodland (55)	Box Ironbark Forest (61)	Box Ironbark Forest (61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Creekline Grassy Woodland (68)	Creekline Grassy Woodland (68)	Box Ironbark Forest (61)	
Bioregional Conservation Status (BCS)		E	E	E	E	E	E	V	E	V	V	E	E	E	E	V	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	GBGW	N/A	GBGW	N/A	N/A	N/A	N/A	N/A	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	N/A	VTWBC	N/A	VTWBC	VTWBC	N/A	N/A	N/A	
Site Condition	Large Old Trees	10	9	0	0	0	10	3	0	3	0	3	10	10	10	2	
	Tree Canopy Cover	5	2	5	5	0	4	5	5	3	0	5	5	5	5	0	
	Lack of Weeds	15	9	0	0	0	7	7	7	6	15	9	2	0	0	13	
	Understorey	25	15	5	5	5	20	20	15	5	15	15	5	5	5	10	
	Recruitment	10	3	3	3	5	10	10	10	5	5	3	3	3	5	6	
	Organic Litter	5	5	5	5	2	5	5	5	5	6	3	3	5	4	3	
	Logs	5	0	0	0	0	2	2	0	3	2	0	2	3	0	0	
	Total Site Score	75	43	18	18	12	44	58	45	29	49	30	23	31	29	28	34
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	1	1	1	1	8	8	8	8	8	4	4	2	2	8	
	Distance to Core Area	5	3	3	3	1	4	4	3	4	4	4	3	3	1	4	
	Neighbourhood	10	1	1	1	1	4	4	1	2	2	2	1	1	1	5	
	Total Landscape Score	25	5	5	5	3	16	16	12	14	14	14	8	8	4	17	
Habitat Score		100	48	23	23	15	60	74	57	43	63	44	31	39	33	32	51
Habitat Points = Score/100		1	0.48	0.23	0.23	0.15	0.60	0.74	0.57	0.43	0.63	0.44	0.31	0.39	0.33	0.32	0.51
Total area of Habitat Zone (ha)			0.071	0.130	0.061	0.004	0.130	4.567	1.194	0.213	1.467	1.095	0.907	1.310	0.081	0.344	1.922
Habitat Hectares (Hha)			0.034	0.030	0.014	0.001	0.078	3.380	0.680	0.092	0.924	0.482	0.281	0.511	0.027	0.110	0.980



Habitat Zone		HZ 347	HZ 348	HZ 349	HZ 350	HZ 351	HZ 361	HZ 362	HZ 363	HZ 367	HZ 368	HZ 369	HZ 371	HZ 373	HZ 376	HZ 377	
EVC		Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Northern Inland Slopes	Northern Inland Slopes	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Victorian Riverina	
Bioregion		Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Woodland (803)	Plains Woodland (803)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Box Ironbark Forest (61)	Plains Grassy Woodland (55)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	
Bioregional Conservation Status (BCS)		E	E	E	E	E	E	E	E	E	E	E	V	E	V	V	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	GBGW	GBGW	N/A	GBGW	N/A	N/A	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	
Site Condition	Large Old Trees	10	0	0	0	0	9	7	9	3	0	0	3	5	8	8	
	Tree Canopy Cover	5	5	0	5	5	4	4	4	4	4	4	3	5	5	5	
	Lack of Weeds	15	0	6	0	0	4	0	7	7	9	6	6	9	6	11	11
	Understorey	25	5	5	5	0	5	5	5	5	20	15	20	5	10	5	5
	Recruitment	10	0	0	0	0	0	5	5	5	10	10	10	5	5	5	5
	Organic Litter	5	5	3	5	5	5	3	3	3	3	3	3	4	4	5	5
	Logs	5	0	0	0	0	0	0	5	5	2	2	2	2	2	2	2
	Total Site Score	75	15	14	15	10	14	26	36	38	51	40	45	31	37	41	41
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	4	4	4	4	1	1	1	1	8	8	8	8	8	2	2
	Distance to Core Area	5	3	3	3	3	1	3	3	3	3	3	3	4	4	4	4
	Neighbourhood	10	1	1	1	1	0	3	0	0	2	2	2	1	2	3	3
	Total Landscape Score	25	8	8	8	8	2	7	4	4	13	13	13	13	14	9	9
Habitat Score		100	23	22	23	18	16	33	40	42	64	53	58	44	51	50	50
Habitat Points = Score/100		1	0.23	0.22	0.23	0.18	0.16	0.33	0.40	0.42	0.64	0.53	0.58	0.44	0.51	0.50	0.50
Total area of Habitat Zone (ha)			0.019	0.033	0.004	0.027	0.012	0.058	0.402	0.085	5.130	2.085	7.565	1.991	0.433	0.293	0.247
Habitat Hectares (Hha)			0.004	0.007	0.001	0.005	0.002	0.019	0.161	0.036	3.283	1.105	4.388	0.876	0.221	0.147	0.124



Habitat Zone		HZ 378	HZ 379	HZ 380	HZ 381	HZ 382	HZ 383	HZ 384	HZ 385	HZ 386	HZ 387	HZ 388	HZ 389	HZ 390	HZ 391	HZ 393
EVC		Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Victorian Riverina	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina
Bioregion		Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Floodplain Riparian Woodland (56)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55_61)
Bioregional Conservation Status (BCS)		V	V	V	V	V	V	V	V	V	E	E	E	E	E	E
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FFG Community		VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	VTWBC	N/A	N/A	N/A	N/A	N/A
Site Condition	Large Old Trees	10	8	8	8	8	8	8	8	8	8	4	0	4	0	0
	Tree Canopy Cover	5	5	5	5	5	5	5	5	5	5	3	3	0	0	2
	Lack of Weeds	15	11	11	11	11	11	11	11	11	11	11	11	11	0	2
	Understorey	25	5	5	5	5	5	5	5	5	5	15	15	10	5	5
	Recruitment	10	5	5	5	5	5	5	5	5	5	6	6	10	0	0
	Organic Litter	5	5	5	5	5	5	5	5	5	5	5	5	3	2	3
	Logs	5	2	2	2	2	2	2	2	2	2	0	0	0	0	2
	Total Site Score	75	41	41	41	41	41	41	41	41	41	44	40	38	7	14
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape Context	Patch Size	10	2	2	2	2	2	2	2	2	2	8	8	8	1	1
	Distance to Core Area	5	4	4	4	4	4	4	4	4	4	4	5	5	1	1
	Neighbourhood	10	3	3	3	3	3	3	3	3	3	5	4	4	0	0
	Total Landscape Score	25	9	9	9	9	9	9	9	9	9	17	17	17	2	2
Habitat Score		100	50	50	50	50	50	50	50	50	50	61	57	55	9	16
Habitat Points = Score/100		1	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.61	0.57	0.55	0.09	0.16
Total area of Habitat Zone (ha)			0.695	0.297	0.084	0.320	0.673	1.431	1.512	0.014	2.429	1.450	0.270	1.372	0.024	0.021
Habitat Hectares (Hha)			0.347	0.148	0.042	0.160	0.336	0.716	0.756	0.007	1.215	0.884	0.154	0.754	0.002	0.003



Habitat Zone			HZ 394	HZ 395	HZ 396	HZ 397	HZ 398	HZ 399	HZ 400	HZ 401	HZ 403	HZ 404	HZ 421	HZ 422	HZ 423	HZ 424	HZ 425
EVC			Central Victorian Uplands	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain	Victorian Volcanic Plain
Bioregion			Grassy Woodland (175_61)	Swampy Riparian Woodland (83)	Plains Grassland (132)	Swampy Riparian Woodland (83)	Swampy Riparian Woodland (83)	Swampy Riparian Woodland (83)	Swampy Riparian Woodland (83)	Plains Grassland (132)	Valley Grassy Forest (47)	Valley Grassy Forest (47)	Plains Grassland (132)	Swampy Riparian Woodland (83)	Swampy Riparian Woodland (83)	Plains Grassland (132)	Swampy Riparian Woodland (83)
Bioregional Conservation Status (BCS)			E	E	E	E	E	E	E	E	V	V	E	E	E	E	E
EPBC Community			N/A	N/A	N/A	N/A	N/A	N/A	N/A	NTGVVP	N/A	N/A	NTGVVP	N/A	N/A	N/A	N/A
FFG Community			N/A	N/A	N/A	N/A	N/A	N/A	N/A	WBPGC	N/A	N/A	WBPGC	N/A	N/A	N/A	N/A
Site Condition	Large Old Trees	10	0	5	N/A	0	0	0	0	N/A	0	0	N/A	0	0	N/A	0
	Tree Canopy Cover	5	4	0	N/A	0	0	0	0	N/A	0	0	N/A	0	0	N/A	0
	Lack of Weeds	15	9	9	4	0	2	2	0	7	0	0	4	0	0	4	0
	Understorey	25	15	5	15	5	5	5	5	10	5	5	15	5	5	15	5
	Recruitment	10	3	0	0	3	3	0	0	6	3	3	0	0	0	0	0
	Organic Litter	5	5	3	4	4	4	3	0	4	4	4	4	4	4	4	4
	Logs	5	0	4	N/A	0	0	4	4	5	0	0	N/A	0	0	N/A	0
	Total Site Score	75	36	26	23	12	14	14	9	32	12	12	23	9	9	23	9
Standardiser		-	N/A	N/A	1.36	N/A	N/A	N/A	N/A	1.36	N/A	N/A	1.36	N/A	N/A	1.36	N/A
Standardised Site Score		-	N/A	N/A	31.28	N/A	N/A	N/A	N/A	43.52	N/A	N/A	31.28	N/A	N/A	31.28	N/A
Landscape Context	Patch Size	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Distance to Core Area	5	1	2	2	2	2	2	2	2	3	3	2	2	2	2	2
	Neighbourhood	10	0	3	3	3	3	3	3	3	0	0	3	3	3	3	3
	Total Landscape Score	25	2	6	6	6	6	6	6	6	4	4	6	6	6	6	6
Habitat Score		100	38	32	37.28	18	20	20	15	49.52	16	16	37.28	15	15	37.28	15
Habitat Points = Score/100		1	0.38	0.32	0.37	0.18	0.20	0.20	0.15	0.50	0.16	0.16	0.37	0.15	0.15	0.37	0.15
Total area of Habitat Zone (ha)			0.031	0.163	0.029	0.148	0.020	0.009	0.113	0.246	0.037	0.012	0.374	0.023	0.010	0.021	0.022
Habitat Hectares (Hha)			0.012	0.052	0.011	0.027	0.004	0.002	0.017	0.122	0.006	0.002	0.139	0.003	0.002	0.008	0.003



Habitat Zone		HZ 426	HZ 430*	HZ 431	HZ 433	HZ 434	HZ 435	HZ 436	HZ 437	HZ 438	HZ 439	HZ 440	HZ 441	HZ 442	HZ 443	HZ 444	
EVC		Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Northern Inland Slopes	Central Victorian Uplands	Central Victorian Uplands	Victorian Riverina	Northern Inland Slopes	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	
Bioregion		Swampy Riparian Woodland (83)	Valley Grassy Forest (47)	Valley Grassy Forest (47)	Swampy Riparian Woodland (83)	Valley Grassy Forest (47)	Tall Marsh (821)	Creekline Grassy Woodland (68)	Grassy Woodland (Low Rises) (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Floodplain Riparian Woodland (56)	Grassy Woodland (Low Rises) (175_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Box Ironbark Forest (61)	
Bioregional Conservation Status (BCS)		E	V	V	E	V	D	E	E	E	E	V	E	E	E	V	
EPBC Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GBGW	N/A	N/A	N/A	N/A	N/A	GBGW	
FFG Community		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VTWBC	N/A	N/A	N/A	N/A	N/A	VTWBC	
Site Condition	Large Old Trees	10	0	N/A	N/A	0	0	0	0	2	9	9	8	9	2	10	10
	Tree Canopy Cover	5	0	N/A	N/A	0	0	0	2	2	3	2	5	2	2	5	5
	Lack of Weeds	15	0	N/A	N/A	2	0	4	2	9	6	9	11	13	7	11	13
	Understorey	25	5	N/A	N/A	5	5	5	5	5	5	5	5	5	5	5	15
	Recruitment	10	0	N/A	N/A	3	3	0	3	3	6	5	5	3	5	0	10
	Organic Litter	5	4	N/A	N/A	2	4	5	5	3	2	3	5	3	3	3	5
	Logs	5	0	N/A	N/A	0	0	N/A	0	5	2	0	2	0	0	0	2
	Total Site Score	75	9	N/A	N/A	12	12	14	17	29	33	33	41	35	24	34	60
Standardiser		-	N/A	N/A	N/A	N/A	N/A	1.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	19.04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landscape Context	Patch Size	10	1	N/A	N/A	1	1	1	1	1	8	1	2	1	8	1	8
	Distance to Core Area	5	2	N/A	N/A	4	3	3	4	4	4	1	4	4	4	3	4
	Neighbourhood	10	3	N/A	N/A	0	0	0	0	1	4	0	3	1	4	0	2
	Total Landscape Score	25	6	N/A	N/A	5	4	4	5	6	16	2	9	6	16	4	14
Habitat Score		100	15	N/A	N/A	17	16	23.04	22	35	49	35	50	41	40	38	74
Habitat Points = Score/100		1	0.15	0.80	0.80	0.17	0.16	0.23	0.22	0.35	0.49	0.35	0.50	0.41	0.40	0.38	0.74
Total area of Habitat Zone (ha)			0.096	0.871	1.533	0.015	0.019	0.079	0.015	0.323	9.005	0.123	0.382	0.156	0.352	0.053	1.752
Habitat Hectares (Hha)			0.014	0.697	1.226	0.003	0.003	0.018	0.003	0.113	4.413	0.043	0.191	0.064	0.141	0.020	1.296

\*Modelled native vegetation condition scores used



Habitat Zone			HZ 445	HZ 446	HZ 449	HZ 450	HZ 451	HZ 452	HZ 453	HZ 457*	HZ 458	HZ 459	HZ 460
EVC			Central Victorian Uplands	Victorian Volcanic Plain	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands	Central Victorian Uplands
Bioregion			Box Ironbark Forest (61)	Riparian Forest (18)	Plains Grassy Woodland (55)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Grassy Woodland (175_61)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)	Grassy Woodland (175)	Plains Grassy Woodland (55)	Plains Grassy Woodland (55)
Bioregional Conservation Status (BCS)			V	V	E	E	E	E	E	E	E	E	E
EPBC Community				N/A	N/A	N/A	N/A	N/A	GBGW	N/A	N/A	N/A	N/A
FFG Community			VTWBC	N/A	VTWBC	N/A	N/A	N/A	VTWBC	N/A	N/A	N/A	N/A
Site Condition	Large Old Trees	10	0	0	10	3	0	0	7	N/A	N/A	N/A	N/A
	Tree Canopy Cover	5	0	0	3	0	0	0	4	N/A	N/A	N/A	N/A
	Lack of Weeds	15	0	2	4	2	7	7	9	N/A	N/A	N/A	N/A
	Understorey	25	5	5	5	15	5	5	20	N/A	N/A	N/A	N/A
	Recruitment	10	5	0	5	10	10	10	10	N/A	N/A	N/A	N/A
	Organic Litter	5	4	0	3	5	3	3	2	N/A	N/A	N/A	N/A
	Logs	5	0	0	4	0	0	0	0	N/A	N/A	N/A	N/A
	Total Site Score	75	14	7	34	35	25	25	52	N/A	N/A	N/A	N/A
Standardiser		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standardised Site Score		-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape Context	Patch Size	10	8	1	8	8	8	8	8	N/A	N/A	N/A	N/A
	Distance to Core Area	5	4	4	4	4	4	4	3	N/A	N/A	N/A	N/A
	Neighbourhood	10	1	1	4	4	4	4	2	N/A	N/A	N/A	N/A
	Total Landscape Score	25	13	6	16	16	16	16	13	N/A	N/A	N/A	N/A
Habitat Score		100	27	13	50	51	41	41	65	N/A	N/A	N/A	N/A
Habitat Points = Score/100		1	0.27	0.13	0.50	0.51	0.41	0.41	0.65	0.80	0.80	0.80	0.80
Total area of Habitat Zone (ha)			0.028	0.023	0.202	0.617	0.497	0.237	9.214	2.578	3.461	0.384	0.178
Habitat Hectares (Hha)			0.007	0.003	0.101	0.315	0.204	0.097	5.989	2.062	2.769	0.307	0.142

\*Modelled native vegetation condition scores used



# Appendix G

Tree table



## Appendix G – Tree Table

**Table 41 Summary of native canopy trees (Large Trees in Patches and Scattered Trees) within the investigation area.**

Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
2	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
10	126	396	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
12	114	358	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
13	132	415	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
14	105	330	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
15	92	289	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
16	132	415	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
20	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
22	133	418	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
26	175	550	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
29	140	440	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch
30	115	361	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
31	125	393	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
33	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
34	102	320	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
36	102	320	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
38	115	361	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch
41	124	390	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch
42	124	390	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch
43	89	280	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch
44	95	298	Yellow Gum	<i>Eucalyptus leucoxyton</i> subsp. <i>pruinosa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
45	121	380	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
46	171	537	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
48	94	295	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
49	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
54	87	273	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
56	84	264	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
57	113	355	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
60	85	267	Stag	Stag	Large Tree in Patch
63	102	320	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
66	166	522	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
67	93	292	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
68	100	314	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
72	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
76	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
77	117	368	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
79	96	302	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
83	92	289	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
84	104	327	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
88	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
89	82	258	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
90	86	270	Stag	Stag	Large Tree in Patch
91	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
92	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
96	99	311	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
97	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
98	100	314	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
100	96	302	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
104	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
105	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
107	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
110	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
111	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
112	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
115	122	383	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
116	85	267	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
117	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
118	141	443	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
119	112	352	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
128	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
133	91	286	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
147	82	258	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
150	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
154	93	292	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
159	12	38	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
160	13	41	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
161	14	44	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
162	55	173	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
163	19	60	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
164	18	57	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
169	19	60	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
170	47	148	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
171	18	57	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
174	39	123	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
176	72	226	Stag	Stag	Large Tree in Patch
178	73	229	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
179	25	79	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
180	89	280	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
181	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
182	48	151	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
183	62	195	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
193	128	402	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
197	88	276	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
198	102	320	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
201	127	399	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
203	88	276	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
204	91	286	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
207	143	449	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
222	83	261	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
223	100	314	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
224	87	273	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
238	73	229	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
239	12	38	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
254	50	157	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
255	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
273	104	327	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
277	100	314	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
278	81	254	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
448	76	239	Red Stringybark	<i>Eucalyptus macrorhyncha</i>	Large Tree in Patch
450	121	380	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
451	74	232	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
452	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
453	116	364	Red Box	<i>Eucalyptus polyanthemus</i>	Large Tree in Patch
454	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
457	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
458	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
459	125	393	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
461	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
462	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
463	97	305	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
465	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
469	116	364	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
474	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
475	120	377	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
476	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
477	106	333	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
478	19	60	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
479	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
480	12	38	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
481	12	38	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
482	15	47	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
483	14	44	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
485	20	63	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
486	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
488	146	459	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
491	69	217	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
492	7	22	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
493	23	72	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
494	30	94	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
495*	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
496*	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
497*	12	38	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
498*	12	38	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
499	7	22	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
500	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
501	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
508	238	748	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
510	41	129	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
524	104	327	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
533	24	75	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
534	15	47	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
546	110	346	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
553	119	374	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
555	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
557	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
561	104	327	Stag	Stag	Large Tree in Patch
562	145	456	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
563	113	355	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
571	105	330	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
572	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
573	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
574	92	289	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
575	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
582	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
584	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
585	96	302	Stag	Stag	Large Tree in Patch
586	101	317	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
587	95	298	Stag	Stag	Large Tree in Patch
589	73	229	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
593	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
595	114	358	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
597	120	377	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
598	95	298	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
599	114	358	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
600	118	371	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
601	96	302	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
602	106	333	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
603	110	346	Stag	Stag	Large Tree in Patch
604	142	446	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
605	150	471	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
607	91	286	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
608	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
609	133	418	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
610	123	386	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
611	104	327	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
612	130	408	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
613	89	280	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
614	92	289	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
615	96	302	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
616	87	273	Stag	Stag	Large Tree in Patch
617	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
618	83	261	Stag	Stag	Large Tree in Patch
619	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
620	75	236	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
621	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
622	122	383	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
623	101	317	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
624	94	295	Stag	Stag	Large Tree in Patch
625	142	446	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
626	120	377	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
627	154	484	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
629	124	390	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
630	94	295	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
631	99	311	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
632	126	396	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
633	87	273	Eucalyptus sp.	<i>Eucalyptus</i> sp.	Large Tree in Patch
634	104	327	Eucalyptus sp.	<i>Eucalyptus</i> sp.	Large Tree in Patch
635	97	305	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
636	153	481	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
637	101	317	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
638	102	320	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
639	107	336	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
640	111	349	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
641	104	327	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
642	88	276	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
645	89	280	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
646	83	261	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
648	102	320	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
650	109	342	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
651	108	339	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
652	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
653	96	302	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
654	122	383	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
655	131	412	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
656	105	330	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
657	82	258	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
658	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
659	193	606	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
660	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
661	95	298	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
662	129	405	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
663	88	276	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
664	89	280	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
665	112	352	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
667	112	352	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
669	104	327	Stag	Stag	Large Tree in Patch
670	105	330	Stag	Stag	Large Tree in Patch
671	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
672	113	355	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
675	121	380	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
677	84	264	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
679	166	522	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
682	80	251	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
684	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
686	116	364	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
687	107	336	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
688	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
689	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
690	80	251	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
692	91	286	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
693	100	314	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
698	109	342	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
700	87	273	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
701	137	430	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
702	96	302	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
704	148	465	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
705	86	270	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
707	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
710	102	320	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
752	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
753	36	113	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
754	101	317	Stag	Stag	Large Scattered Tree
755	136	427	Stag	Stag	Large Tree in Patch
756	147	462	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
764	116	364	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
765	42	132	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
766	45	141	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
767	85	267	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Scattered Tree
768	110	346	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
773	62	195	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
780	81	254	Apple Box	<i>Eucalyptus bridgesiana</i> s.l.	Large Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
781	108	339	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
782	70	220	White Box	<i>Eucalyptus albens</i>	Large Scattered Tree
783	75	236	White Box	<i>Eucalyptus albens</i>	Large Scattered Tree
785	115	361	White Box	<i>Eucalyptus albens</i>	Large Scattered Tree
812	17	53	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
827	70	220	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
828	40	126	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
829	40	126	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
830	67	210	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
831	81	254	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
844	65	204	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
845	38	119	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
846	59	185	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
847	61	192	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
848	115	361	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
849	49	154	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
850	22	69	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
851	95	298	Yellow Box	<i>Eucalyptus melliodora</i>	Large Scattered Tree
852	76	239	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
853	128	402	Yellow Box	<i>Eucalyptus melliodora</i>	Large Scattered Tree
854	30	94	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
855	34	107	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
856	106	333	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
857	82	258	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
858	111	349	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
859	72	226	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
860	72	226	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
861	77	242	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
862	105	330	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
863	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
864	108	339	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
865	119	374	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
866	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
867	101	317	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
868	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
869	91	286	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
870	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
871	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
873	110	346	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
876	71	223	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
877	70	220	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
878	120	377	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
880	138	434	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
881	88	276	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
882	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
883	95	298	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
884	112	352	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
885	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
886	180	565	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
887	87	273	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
888	87	273	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
889	99	311	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
894	102	320	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
895	102	320	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
896	111	349	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
897	94	295	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
898	95	298	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
899	28	88	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
900	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
901	101	317	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
902	39	123	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
903	30	94	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
904	133	418	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
905	2	6	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
906	110	346	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
908	147	462	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
909	106	333	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
910	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
911	93	292	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
914	82	258	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
915	73	229	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
916	100	314	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
917	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
918	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
919	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
920	7	22	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
921	11	35	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
922	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
924	12	38	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
925	12	38	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
926	107	336	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
927	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
928	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
929	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
930	91	286	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
931	103	324	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
932	106	333	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
933	94	295	Eucalyptus sp.	<i>Eucalyptus sp.</i>	Large Tree in Patch
934	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
935	142	446	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
936	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
938	92	289	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
939	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
940	106	333	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
941	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
942	111	349	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
943	150	471	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
944	114	358	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
945	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
946	91	286	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
947	129	405	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
948	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
949	73	229	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
950	74	232	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
951	96	302	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
952	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
953	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
954	86	270	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
955	73	229	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
956	74	232	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
957	75	236	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
958	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
959	77	242	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
960	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
963	70	220	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
965	89	280	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
966	118	371	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
969	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
970	120	377	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
971	90	283	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
972	22	69	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
973	25	79	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
974	98	308	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
975	112	352	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
976	88	276	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
982	17	53	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
983	58	182	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
984	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
985	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
986	87	273	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
987	141	443	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
988	103	324	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
989	50	157	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
990	96	302	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
996	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
997	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
998	186	584	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
999	124	390	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1003	84	264	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1004	90	283	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1005	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1006	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1007	70	220	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1008	80	251	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1010	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1011	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1012	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1013	70	220	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1016	130	408	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1017	48	151	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1018	30	94	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1019	123	386	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1020	19	60	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1021	19	60	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1022	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1023	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1024	34	107	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1025	40	126	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1026	76	239	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1027	17	53	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1028	24	75	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1029	17	53	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1030	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1031	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1032	11	35	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1033	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1034	17	53	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1035	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1036	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1037	23	72	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1038	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1039	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1040	18	57	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1041	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1042	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1043	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1044	6	19	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1045	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1046	17	53	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1047	139	437	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1048	49	154	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1049	48	151	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1050	22	69	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1051	41	129	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1052	49	154	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1053	62	195	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1054	74	232	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1055	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1056	7	22	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1057	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1058	6	19	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1059	5	16	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1060	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1061	6	19	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1062	7	22	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1063	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1064	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1065	8	25	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1066	7	22	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1067	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1068	67	210	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1069	16	50	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1070	9	28	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1071	10	31	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1072	51	160	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1073	78	245	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1074	11	35	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1075	11	35	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1076	15	47	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1077	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1078	21	66	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1079	72	226	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1080	62	195	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1081	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1082	58	182	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1083	2	6	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1084	59	185	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1085	61	192	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1086	33	104	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1087	35	110	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1088	26	82	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1089	28	88	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1090	93	292	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1091	41	129	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Small Scattered Tree
1092	118	371	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1093	12	38	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1094	98	308	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Scattered Tree
1095	68	214	Red Box	<i>Eucalyptus polyanthemos</i>	Small Scattered Tree
1096	80	251	Red Box	<i>Eucalyptus polyanthemos</i>	Large Scattered Tree
1097	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1098	17	53	White Box	<i>Eucalyptus albens</i>	Small Scattered Tree
1139	54	170	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
1141	84	264	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Scattered Tree
1146	110	346	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1147	97	305	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1148	113	355	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Tree in Patch
1149	23	72	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
1150	61	192	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Small Scattered Tree
1159	107	336	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1160	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1163	92	289	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1164	62	195	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1165	32	101	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1166	37	116	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1167	96	302	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1168	56	176	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1169	54	170	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1170	25	79	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1171	42	132	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1172	33	104	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1173	156	490	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
1174	44	138	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
1175	169	531	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
1176	14	44	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
1177	16	50	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
1178	13	41	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
1181	97	305	Stag	Stag	Large Tree in Patch
1183	99	311	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1184	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1186	174	547	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1188	64	201	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1189	152	478	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1190	88	276	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1191	97	305	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1192	162	509	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1193	14	44	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1194	34	107	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1195	103	324	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1196	119	374	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1198	136	427	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1199	97	305	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1200	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1201	77	242	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1202	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1205	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1206	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1207	107	336	Grey Box	<i>Eucalyptus microcarpa</i>	Large Scattered Tree
1208	42	132	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1209	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1210	135	424	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1211	112	352	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1212	58	182	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
1213	21	66	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1214	43	135	Grey Box	<i>Eucalyptus microcarpa</i>	Small Scattered Tree
1215	114	358	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1216	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1217	80	251	Yellow Box	<i>Eucalyptus melliodora</i>	Large Scattered Tree
1218	31	97	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1219	32	101	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
1220	104	327	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1222	43	135	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1223	45	141	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1224	48	151	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1225	57	179	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1226	51	160	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1227	120	377	Swamp Gum	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Large Tree in Patch
1228	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1229	74	232	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1230	88	276	Stag	Stag	Large Tree in Patch
1231	83	261	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1232	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1233	39	123	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1234	69	217	Yellow Box	<i>Eucalyptus melliodora</i>	Small Scattered Tree
1236	141	443	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1237	139	437	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1238	104	327	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1239	89	280	Yellow Box	<i>Eucalyptus melliodora</i>	Large Scattered Tree
1240	13	41	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1243	40	126	Swamp Gum	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Small Scattered Tree
1244	37	116	Swamp Gum	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Small Scattered Tree
1245	49	154	Swamp Gum	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Small Scattered Tree
1246	51	160	Swamp Gum	<i>Eucalyptus ovata</i> var. <i>ovata</i>	Small Scattered Tree



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1247	27	85	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1248	21	66	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1249	51	160	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1250	22	69	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1251	11	35	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1252	43	135	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1253	78	245	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Scattered Tree
1258	46	145	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1259	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1260	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1261	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1262	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1264	98	308	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1265	84	264	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1267	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1268	90	283	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1269	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1270	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1271	82	258	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1272	109	342	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1273	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1274	170	534	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1275	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1276	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1277	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1278	101	317	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1279	123	386	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1281	98	308	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1282	90	283	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1283	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1284	98	308	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1285	77	242	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1286	124	390	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1287	109	342	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1289	78	245	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1290	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1291	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1292	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1293	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1294	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1295	76	239	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1296	87	273	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1297	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1298	78	245	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1299	71	223	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1300	89	280	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1301	103	324	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1302	93	292	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1303	81	254	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1304	90	283	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1307	110	346	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1308	82	258	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1309	136	427	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1310	103	324	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
1311	114	358	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1315	88	276	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1316	100	314	Yellow Gum	<i>Eucalyptus leucoxylon</i> subsp. <i>pruinosa</i>	Large Tree in Patch
1317	83	261	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Tree in Patch
1318	120	377	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Tree in Patch
1319	70	220	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Tree in Patch
1320	114	358	Blakely's Red-gum	<i>Eucalyptus blakelyi</i>	Large Tree in Patch
1321	72	226	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1322	71	223	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1323	109	342	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1324	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1325	115	361	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1326	115	361	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1327	102	320	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1328	155	487	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1329	138	434	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1331	72	226	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1332	85	267	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1333	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1334	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1336	89	280	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1337	99	311	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1338	35	110	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1339	178	559	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1340	70	220	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1341	88	276	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1342	74	232	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1343	81	254	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1344	77	242	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1345	118	371	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1346	98	308	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1347	133	418	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1348	82	258	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1349	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1350	98	308	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1351	84	264	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1352	74	232	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1353	72	226	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1354	71	223	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1355	83	261	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1356	88	276	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1357	74	232	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1358	73	229	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1359	75	236	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1360	73	229	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1361	75	236	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1362	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1363	75	236	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1364	79	248	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1365	74	232	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1367	79	248	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1369	70	220	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1370	83	261	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1371	102	320	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1376	30	94	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1377	20	63	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1378	82	258	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1379	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1380	100	314	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1381	30	94	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1382	94	295	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1383	113	355	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1384	51	160	River Red-gum	<i>Eucalyptus camaldulensis</i>	Small Scattered Tree
1385	81	254	Yellow Box	<i>Eucalyptus melliodora</i>	Large Tree in Patch
1386	90	283	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1399	98	308	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch



Tree ID	DBH (cm)	Circumference (cm)	Common name	Scientific name	Tree Category
1402	80	251	Grey Box	<i>Eucalyptus microcarpa</i>	Large Tree in Patch
1403	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1404	82	258	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1405	85	267	Red Box	<i>Eucalyptus polyanthemos</i>	Large Tree in Patch
1406	85	267	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1407	80	251	River Red-gum	<i>Eucalyptus camaldulensis</i>	Large Tree in Patch
1418*	80	251	Not assessed	Not assessed	Large Scattered Tree

\* DBH was estimated in the field or by desktop due to no access, safety issues, or May 2021 Project Area change.



# Appendix H

EnSym report



# Scenario test – native vegetation removal

This report provides offset requirements for internal testing of different proposals to remove native vegetation. **This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.** A report must be obtained from the Department of Environment, Land, Water and Planning (DELWP).

Date of issue: 16/06/2021  
Time of issue: 6:40 pm

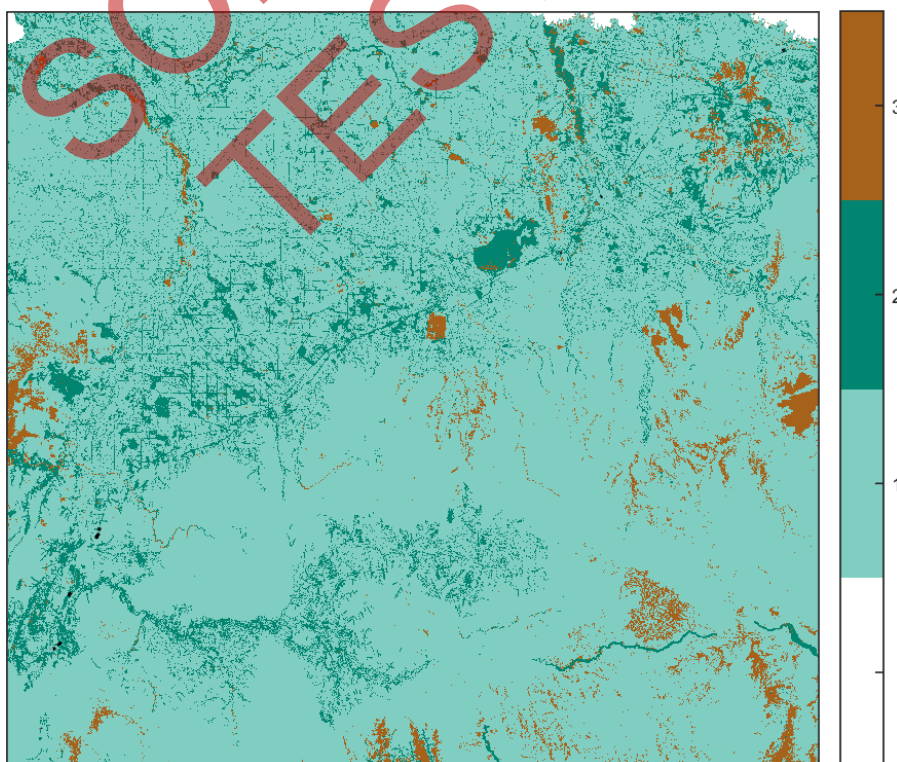
Report ID: Scenario Testing

Project ID	ENSYM_Enhancement_sites_SC6_16June2021
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## Assessment pathway

Assessment pathway	Detailed Assessment Pathway
Extent including past and proposed	15.818 ha
Extent of past removal	0.000 ha
Extent of proposed removal	15.818 ha
No. Large trees proposed to be removed	65
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

### 1. Location map





# Scenario test – native vegetation removal

## Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

<b>General offset amount<sup>1</sup></b>	9.083 general habitat units
Vicinity	Goulburn Broken, North East Catchment Management Authority (CMA) or Benalla Rural City, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, Wodonga City Council
Minimum strategic biodiversity value score <sup>2</sup>	0.476
Large trees	65 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

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<sup>1</sup> The general offset amount required is the sum of all general habitat units in Appendix 1.

<sup>2</sup> Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required



# Scenario test – native vegetation removal

## Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

**This report DOES NOT support an application to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of planning schemes in Victoria.**

If you wish to remove the mapped native vegetation you must submit the related shapefiles to the Department of Environment, Land, Water and Planning (DELWP) for processing, by email to [ensymnvrtool.support@delwp.vic.gov.au](mailto:ensymnvrtool.support@delwp.vic.gov.au). DELWP will provide a *Native vegetation removal report* that is required to meet the permit application requirements in accordance with *Guidelines for the removal, destruction or lopping of native vegetation* (Guidelines).

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## Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

$$\text{Species habitat units} = \text{extent} \times \text{condition} \times \text{species landscape factor} \times 2, \text{ where the species landscape factor} = 0.5 + (\text{habitat importance score}/2)$$

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

$$\text{General habitat units} = \text{extent} \times \text{condition} \times \text{general landscape factor} \times 1.5, \text{ where the general landscape factor} = 0.5 + (\text{strategic biodiversity value score}/2)$$

The general offset amount required is the sum of all general habitat units per zone.

### Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
119-HZ 119	Patch	cvu_0061	Vulnerable	0	no	0.400	0.006	0.006	0.580		0.003	General
187-HZ 175	Patch	vriv0068	Endangered	1	no	0.420	0.053	0.053	0.270		0.021	General
189-HZ 177	Patch	nis_0803	Endangered	0	no	0.330	0.031	0.031	0.434		0.011	General
190-HZ 177	Patch	nis_0803	Endangered	0	no	0.330	0.024	0.024	0.430		0.009	General
193-HZ 179	Patch	nis_0803	Endangered	0	no	0.280	0.376	0.376	0.240		0.098	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
242-HZ 236	Patch	vriv0055_61	Endangered	2	no	0.390	0.607	0.607	0.339		0.238	General
243-HZ 242	Patch	vriv0068	Endangered	1	no	0.560	0.041	0.041	0.270		0.022	General
244-HZ 242	Patch	vriv0068	Endangered	2	no	0.560	0.158	0.158	0.270		0.084	General
246-HZ 244	Patch	nis_0803	Endangered	0	no	0.130	0.019	0.019	0.770		0.003	General
247-HZ 255	Patch	cvu_0175_61	Endangered	0	no	0.320	0.038	0.038	0.100		0.010	General
248-HZ 256	Patch	cvu_0055	Endangered	0	no	0.180	0.013	0.013	0.100		0.002	General
249-HZ 257	Patch	cvu_0055	Endangered	0	no	0.240	0.000	0.000	0.100		0.000	General
250-HZ 257	Patch	cvu_0055	Endangered	0	no	0.240	0.000	0.000	0.100		0.000	General
251-HZ 258	Patch	cvu_0055	Endangered	0	no	0.180	0.008	0.008	0.100		0.001	General
252-HZ 259	Patch	cvu_0055	Endangered	0	no	0.110	0.007	0.007	0.100		0.001	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
253-HZ 259	Patch	cvu_0055	Endangered	0	no	0.110	0.002	0.002	0.100		0.000	General
255-HZ 260	Patch	vriv0055_61	Endangered	0	no	0.470	0.003	0.003	0.100		0.001	General
256-HZ 264	Patch	vriv0055_61	Endangered	0	no	0.210	0.026	0.026	0.510		0.006	General
257-HZ 265	Patch	vriv0175_61	Endangered	0	no	0.300	0.001	0.001	0.570		0.000	General
258-HZ 266	Patch	vriv0055_61	Endangered	0	no	0.230	0.036	0.036	0.570		0.010	General
260-HZ 270	Patch	cvu_0061	Vulnerable	2	no	0.620	0.456	0.456	0.648		0.349	General
261-HZ 271	Patch	cvu_0055	Endangered	0	no	0.450	0.507	0.507	0.572		0.269	General
262-HZ 272	Patch	cvu_0061	Vulnerable	1	no	0.670	0.064	0.064	0.610		0.052	General
263-HZ 272	Patch	cvu_0061	Vulnerable	1	no	0.670	0.402	0.402	0.566		0.316	General
264-HZ 273	Patch	cvu_0061	Vulnerable	2	no	0.460	0.172	0.172	0.610		0.096	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
265-HZ 274	Patch	cvu_0061	Vulnerable	13	no	0.590	2.460	2.460	0.708		1.859	General
266-HZ 275	Patch	cvu_0061	Vulnerable	0	no	0.590	0.343	0.343	0.620		0.246	General
267-HZ 276	Patch	cvu_0061	Vulnerable	0	no	0.620	0.137	0.137	0.760		0.112	General
268-HZ 281	Patch	cvu_0061	Vulnerable	0	no	0.270	0.004	0.004	0.600		0.001	General
269-HZ 282	Patch	cvu_0061	Vulnerable	0	no	0.580	0.001	0.001	0.520		0.000	General
270-HZ 282	Patch	cvu_0061	Vulnerable	0	no	0.580	0.000	0.000	0.520		0.000	General
271-HZ 282	Patch	cvu_0061	Vulnerable	0	no	0.580	0.068	0.068	0.541		0.045	General
272-HZ 283	Patch	cvu_0061	Vulnerable	0	no	0.270	0.043	0.043	0.580		0.014	General
273-HZ 284	Patch	cvu_0061	Vulnerable	1	no	0.350	0.067	0.067	0.600		0.028	General
274-HZ 285	Patch	cvu_0061	Vulnerable	1	no	0.580	0.314	0.314	0.604		0.219	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
275-HZ 289	Patch	cvu_0061	Vulnerable	3	no	0.630	0.352	0.352	0.555		0.258	General
276-HZ 290	Patch	cvu_0175_61	Endangered	0	no	0.640	0.129	0.129	0.549		0.096	General
277-HZ 291	Patch	cvu_0175_61	Endangered	0	no	0.640	0.000	0.000	0.530		0.000	General
278-HZ 291	Patch	cvu_0175_61	Endangered	1	no	0.640	0.466	0.466	0.549		0.346	General
279-HZ 292	Patch	cvu_0175_61	Endangered	0	no	0.170	0.049	0.049	0.519		0.010	General
280-HZ 293	Patch	cvu_0055	Endangered	1	no	0.600	0.222	0.222	0.577		0.157	General
281-HZ 294	Patch	cvu_0175_61	Endangered	2	no	0.720	0.383	0.383	0.557		0.322	General
282-HZ 296	Patch	cvu_0175_61	Endangered	0	no	0.380	0.061	0.061	0.490		0.026	General
283-HZ 297	Patch	cvu_0175_61	Endangered	0	no	0.170	0.048	0.048	0.530		0.009	General
284-HZ 298	Patch	cvu_0175_61	Endangered	0	no	0.490	0.373	0.373	0.523		0.209	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
285-HZ 299	Patch	cvu_0055	Endangered	5	no	0.370	0.293	0.293	0.640		0.133	General
286-HZ 300	Patch	cvu_0055	Endangered	1	no	0.330	0.206	0.206	0.640		0.083	General
288-HZ 301	Patch	cvu_0175_61	Endangered	0	no	0.260	0.085	0.085	0.771		0.029	General
289-HZ 302	Patch	cvu_0175_61	Endangered	0	no	0.340	0.004	0.004	0.890		0.002	General
290-HZ 302	Patch	cvu_0175_61	Endangered	2	no	0.340	0.221	0.221	0.809		0.102	General
291-HZ 305	Patch	nis_0803	Endangered	2	no	0.430	0.089	0.089	0.370		0.039	General
292-HZ 306	Patch	nis_0803	Endangered	0	no	0.130	0.080	0.080	0.560		0.012	General
293-HZ 307	Patch	nis_0803	Endangered	0	no	0.130	0.185	0.185	0.624		0.029	General
294-HZ 308	Patch	nis_0803	Endangered	0	no	0.090	0.008	0.008	0.770		0.001	General
295-HZ 309	Patch	nis_0803	Endangered	0	no	0.180	0.154	0.154	0.640		0.034	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
296-HZ 310	Patch	nis_0803	Endangered	0	no	0.220	0.133	0.133	0.770		0.039	General
297-HZ 319	Patch	cvu_0175_61	Endangered	1	no	0.340	0.069	0.069	0.680		0.030	General
299-HZ 322	Patch	cvu_0175_61	Endangered	3	no	0.720	0.335	0.335	0.526		0.276	General
300-HZ 325	Patch	cvu_0055	Endangered	2	no	0.710	0.207	0.207	0.709		0.188	General
301-HZ 326	Patch	vriv0055_61	Endangered	0	no	0.250	0.019	0.019	0.196		0.004	General
302-HZ 331	Patch	cvu_0055	Endangered	0	no	0.230	0.130	0.130	0.866		0.042	General
303-HZ 332	Patch	cvu_0055	Endangered	0	no	0.230	0.053	0.053	0.770		0.016	General
304-HZ 333	Patch	vriv0068	Endangered	0	no	0.150	0.004	0.004	0.270		0.001	General
305-HZ 334	Patch	cvu_0055	Endangered	0	no	0.600	0.033	0.033	0.574		0.023	General
306-HZ 335	Patch	cvu_0055	Endangered	1	no	0.670	0.062	0.062	0.567		0.049	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
307-HZ 336	Patch	cvu_0061	Vulnerable	0	no	0.570	0.199	0.199	0.604		0.136	General
308-HZ 337	Patch	cvu_0055	Endangered	0	no	0.430	0.160	0.160	0.610		0.083	General
309-HZ 338	Patch	cvu_0061	Vulnerable	1	no	0.630	0.073	0.073	0.590		0.055	General
310-HZ 339	Patch	cvu_0061	Vulnerable	0	no	0.440	0.928	0.928	0.644		0.503	General
311-HZ 341	Patch	cvu_0055	Endangered	0	no	0.310	0.000	0.000	0.770		0.000	General
312-HZ 341	Patch	cvu_0055	Endangered	0	no	0.310	0.188	0.188	0.726		0.076	General
315-HZ 343	Patch	cvu_0055	Endangered	1	no	0.390	0.445	0.445	0.833		0.238	General
316-HZ 345	Patch	vriv0068	Endangered	0	no	0.320	0.007	0.007	0.270		0.002	General
317-HZ 345	Patch	vriv0068	Endangered	0	no	0.320	0.002	0.002	0.270		0.001	General
318-HZ 346	Patch	cvu_0061	Vulnerable	0	no	0.510	0.944	0.944	0.720		0.621	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
319-HZ 347	Patch	cvu_0055	Endangered	0	no	0.230	0.019	0.019	0.640		0.006	General
320-HZ 348	Patch	cvu_0055	Endangered	0	no	0.220	0.000	0.000	0.640		0.000	General
321-HZ 349	Patch	cvu_0055	Endangered	0	no	0.230	0.004	0.004	0.640		0.001	General
322-HZ 350	Patch	cvu_0055	Endangered	0	no	0.180	0.027	0.027	0.640		0.006	General
324-HZ 362	Patch	vriv0055_61	Endangered	0	no	0.400	0.017	0.017	0.240		0.006	General
329-HZ 390	Patch	cvu_0055	Endangered	0	no	0.090	0.000	0.000	0.100		0.000	General
330-HZ 390	Patch	cvu_0055	Endangered	0	no	0.090	0.000	0.000	0.100		0.000	General
331-HZ 390	Patch	cvu_0055	Endangered	0	no	0.090	0.001	0.001	0.100		0.000	General
332-HZ 403	Patch	cvu_0047	Vulnerable	0	no	0.160	0.037	0.037	0.490		0.007	General
333-HZ 404	Patch	cvu_0047	Vulnerable	0	no	0.160	0.012	0.012	0.490		0.002	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
356-HZ 434	Patch	cvu_0047	Vulnerable	0	no	0.160	0.012	0.012	0.490		0.002	General
357-HZ 435	Patch	cvu_0821	Depleted	0	no	0.230	0.048	0.048	0.490		0.012	General
358-HZ 437	Patch	nis_0175_61	Endangered	0	no	0.350	0.050	0.050	0.170		0.016	General
359-HZ 438	Patch	cvu_0175_61	Endangered	1	no	0.490	0.266	0.266	0.526		0.149	General
360-HZ 441	Patch	nis_0175_61	Endangered	1	no	0.410	0.050	0.050	0.370		0.021	General
361-HZ 443	Patch	cvu_0055	Endangered	2	no	0.380	0.037	0.037	0.100		0.012	General
363-HZ 444	Patch	cvu_0061	Vulnerable	0	no	0.740	0.003	0.003	0.940		0.003	General
364-HZ 445	Patch	cvu_0061	Vulnerable	0	no	0.270	0.028	0.028	0.600		0.009	General
371-HZ 323	Patch	cvu_0061	Vulnerable	0	no	0.580	0.232	0.232	0.632		0.165	General
372-HZ 324	Patch	cvu_0061	Vulnerable	0	no	0.640	0.035	0.035	0.590		0.026	General
848-LST	Scattered Tree	nis_0175_61	Endangered	1	no	0.200	0.070	0.069	0.370		0.014	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
895-LST	Scattered Tree	cvu_0056	Endangered	1	no	0.200	0.070	0.065	0.640		0.016	General
901-LST	Scattered Tree	cvu_0056	Endangered	1	no	0.200	0.070	0.035	0.640		0.009	General
904-LST	Scattered Tree	cvu_0056	Endangered	1	no	0.200	0.070	0.039	0.640		0.010	General
915-LST	Scattered Tree	cvu_0175_61	Endangered	1	no	0.200	0.070	0.023	0.770		0.006	General
986-LST	Scattered Tree	vriv0068	Endangered	1	no	0.200	0.070	0.070	0.270		0.013	General
1207-LST	Scattered Tree	cvu_0056	Endangered	1	no	0.200	0.070	0.039	0.640		0.010	General
1210-LST	Scattered Tree	cvu_0056	Endangered	1	no	0.200	0.070	0.039	0.640		0.010	General
480-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.027	0.520		0.006	General
481-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.027	0.520		0.006	General
482-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.031	0.520		0.007	General
483-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.031	0.496		0.007	General
533-SST	Scattered Tree	vriv0055_61	Endangered	0	no	0.200	0.031	0.027	0.140		0.005	General
534-SST	Scattered Tree	vriv0055_61	Endangered	0	no	0.200	0.031	0.027	0.140		0.005	General
812-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.031	0.342		0.006	General
844-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.031	0.370		0.006	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
845-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.019	0.370		0.004	General
846-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.018	0.370		0.004	General
847-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.030	0.370		0.006	General
849-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.018	0.370		0.004	General
850-SST	Scattered Tree	nis_0175_61	Endangered	0	no	0.200	0.031	0.013	0.370		0.003	General
899-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.029	0.640		0.007	General
902-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.007	0.640		0.002	General
903-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.009	0.640		0.002	General
905-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.007	0.640		0.002	General
924-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.021	0.770		0.006	General
972-SST	Scattered Tree	vriv0068	Endangered	0	no	0.200	0.031	0.018	0.270		0.003	General
973-SST	Scattered Tree	vriv0068	Endangered	0	no	0.200	0.031	0.018	0.270		0.003	General
982-SST	Scattered Tree	vriv0055_61	Endangered	0	no	0.200	0.031	0.031	0.100		0.005	General
984-SST	Scattered Tree	vriv0068	Endangered	0	no	0.200	0.031	0.031	0.270		0.006	General
985-SST	Scattered Tree	vriv0068	Endangered	0	no	0.200	0.031	0.029	0.270		0.006	General



Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
1091-SST	Scattered Tree	vriv0055_61	Endangered	0	no	0.200	0.031	0.031	0.240		0.006	General
1208-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.010	0.640		0.003	General
1209-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.000	0.640		0.000	General
1212-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.011	0.647		0.003	General
1213-SST	Scattered Tree	cvu_0056	Endangered	0	no	0.200	0.031	0.017	0.641		0.004	General
1233-SST	Scattered Tree	cvu_0055	Endangered	0	no	0.200	0.031	0.030	0.490		0.007	General
1234-SST	Scattered Tree	cvu_0055	Endangered	0	no	0.200	0.031	0.030	0.490		0.007	General
925-SST	Scattered Tree	cvu_0175_61	Endangered	0	no	0.200	0.031	0.014	0.770		0.004	General

SCENARIO TESTING



## Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Crimson Spider-orchid	<i>Caladenia concolor</i>	504347	Endangered	Dispersed	Habitat importance map	0.0024
Squirrel Glider	<i>Petaurus norfolcensis</i>	11137	Endangered	Dispersed	Habitat importance map	0.0021
Brown Toadlet	<i>Pseudophryne bibronii</i>	13117	Endangered	Dispersed	Habitat importance map	0.0011
Painted Honeyeater	<i>Grantiella picta</i>	10598	Vulnerable	Dispersed	Habitat importance map	0.0010
Euroa Guinea-flower	<i>Hibbertia humifusa subsp. erigens</i>	505083	Vulnerable	Dispersed	Habitat importance map	0.0010
Barking Owl	<i>Ninox connivens connivens</i>	10246	Endangered	Dispersed	Habitat importance map	0.0009
Speckled Warbler	<i>Chthonicola sagittatus</i>	10504	Vulnerable	Dispersed	Habitat importance map	0.0008
Golden Sun Moth	<i>Synemon plana</i>	15021	Critically endangered	Dispersed	Habitat importance map	0.0005
Clover Glycine	<i>Glycine latrobeana</i>	501456	Vulnerable	Dispersed	Habitat importance map	0.0004
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	11017	Vulnerable	Dispersed	Habitat importance map	0.0004
Murray River Turtle	<i>Emydura macquarii</i>	5135	Vulnerable	Dispersed	Habitat importance map	0.0004
Silver Perch	<i>Bidyanus bidyanus</i>	528544	Vulnerable	Dispersed	Habitat importance map	0.0003
Cottony Cassinia	<i>Cassinia ozothamnoides</i>	501560	Vulnerable	Dispersed	Habitat importance map	0.0003
Bush Stone-curlew	<i>Burhinus grallarius</i>	10174	Endangered	Dispersed	Habitat importance map	0.0003
Regent Honeyeater	<i>Anthochaera phrygia</i>	10603	Critically endangered	Dispersed	Habitat importance map	0.0003
Bent-leaf Wattle	<i>Acacia flexifolia</i>	500035	Rare	Dispersed	Habitat importance map	0.0003
Deane's Wattle	<i>Acacia deanei subsp. paucijuga</i>	504201	Rare	Dispersed	Habitat importance map	0.0003
Chestnut-rumped Heathwren	<i>Calamanthus pyrrhopygius</i>	10498	Vulnerable	Dispersed	Habitat importance map	0.0002
Murray-Darling Rainbowfish	<i>Melanotaenia fluviatilis</i>	4774	Vulnerable	Dispersed	Habitat importance map	0.0002



Southern Pygmy Perch (Murray-Darling lineage)	<i>Nannoperca australis</i> (Murray-Darling lineage)	903231	Vulnerable	Dispersed	Habitat importance map	0.0002
Ausfeld's Wattle	<i>Acacia ausfeldii</i>	500013	Vulnerable	Dispersed	Habitat importance map	0.0002
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	10443	Endangered	Dispersed	Habitat importance map	0.0002
Yarra Gum	<i>Eucalyptus yarraensis</i>	501326	Rare	Dispersed	Habitat importance map	0.0002
Western Silver Wattle	<i>Acacia decora</i>	500027	Vulnerable	Dispersed	Habitat importance map	0.0002
Black Falcon	<i>Falco subniger</i>	10238	Vulnerable	Dispersed	Habitat importance map	0.0002
Late-flower Flax-lily	<i>Dianella tarda</i>	505085	Vulnerable	Dispersed	Habitat importance map	0.0002
Western Golden-tip	<i>Goodia medicaginea</i>	501518	Rare	Dispersed	Habitat importance map	0.0002
Growling Grass Frog	<i>Litoria raniformis</i>	13207	Endangered	Dispersed	Habitat importance map	0.0002
Striped Legless Lizard	<i>Delma impar</i>	12159	Endangered	Dispersed	Habitat importance map	0.0002
Swift Parrot	<i>Lathamus discolor</i>	10309	Endangered	Dispersed	Habitat importance map	0.0002
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	10045	Vulnerable	Dispersed	Habitat importance map	0.0002
Murray Cod	<i>Maccullochella peelii</i>	4871	Vulnerable	Dispersed	Habitat importance map	0.0002
Square-tailed Kite	<i>Lophoictinia isura</i>	10230	Vulnerable	Dispersed	Habitat importance map	0.0002
Broom Bitter-pea	<i>Daviesia genistifolia</i> s.s.	503813	Rare	Dispersed	Habitat importance map	0.0002
Purple Diuris	<i>Diuris punctata</i>	501084	Vulnerable	Dispersed	Habitat importance map	0.0002
Golden Cowslips	<i>Diuris behrii</i>	501061	Vulnerable	Dispersed	Habitat importance map	0.0002
Yarran Wattle	<i>Acacia omalophylla</i>	500069	Endangered	Dispersed	Habitat importance map	0.0002
Delicate Crane's-bill	<i>Geranium</i> sp. 6	505347	Vulnerable	Dispersed	Habitat importance map	0.0001
Grey Grass-tree	<i>Xanthorrhoea glauca</i> subsp. <i>angustifolia</i>	507229	Endangered	Dispersed	Habitat importance map	0.0001
Matted Flax-lily	<i>Dianella amoena</i>	505084	Endangered	Dispersed	Habitat importance map	0.0001
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i> subsp. <i>rosmarinifolia</i>	504066	Rare	Dispersed	Habitat importance map	0.0001
Broad-shelled Turtle	<i>Chelodina expansa</i>	5133	Endangered	Dispersed	Habitat importance map	0.0001



Bearded Dragon	<i>Pogona barbata</i>	12177	Vulnerable	Dispersed	Habitat importance map	0.0001
Mugga	<i>Eucalyptus sideroxylon subsp. sideroxylon</i>	504493	Rare	Dispersed	Habitat importance map	0.0001
Velvet Daisy-bush	<i>Olearia pannosa subsp. cardiophylla</i>	502317	Vulnerable	Dispersed	Habitat importance map	0.0001
Trailing Hop-bush	<i>Dodonaea procumbens</i>	501090	Vulnerable	Dispersed	Habitat importance map	0.0001
Superb Parrot	<i>Polytelis swainsonii</i>	10277	Endangered	Dispersed	Habitat importance map	0.0001
Slender Club-sedge	<i>Isolepis congrua</i>	501773	Vulnerable	Dispersed	Habitat importance map	0.0001
Fuzzy New Holland Daisy	<i>Vittadinia cuneata var. morrisii</i>	505060	Rare	Dispersed	Habitat importance map	0.0001
Eastern Great Egret	<i>Ardea modesta</i>	10187	Vulnerable	Dispersed	Habitat importance map	0.0001
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	11280	Vulnerable	Dispersed	Habitat importance map	0.0001
Floodplain Fireweed	<i>Senecio campylocarpus</i>	507136	Rare	Dispersed	Habitat importance map	0.0001
Veiled Fringe-sedge	<i>Fimbristylis velata</i>	501369	Rare	Dispersed	Habitat importance map	0.0001
Dwarf Brooklime	<i>Gratiola pumilo</i>	503753	Rare	Dispersed	Habitat importance map	0.0001
Pale Swamp Everlasting	<i>Coronidium gunnianum</i>	504655	Vulnerable	Dispersed	Habitat importance map	0.0001
Musk Duck	<i>Biziura lobata</i>	10217	Vulnerable	Dispersed	Habitat importance map	0.0001
Baillon's Crake	<i>Porzana pusilla palustris</i>	10050	Vulnerable	Dispersed	Habitat importance map	0.0001
Dark Wire-grass	<i>Aristida calycina var. calycina</i>	503630	Rare	Dispersed	Habitat importance map	0.0001
Hardhead	<i>Aythya australis</i>	10215	Vulnerable	Dispersed	Habitat importance map	0.0001
Northern Sandalwood	<i>Santalum lanceolatum</i>	503005	Endangered	Dispersed	Habitat importance map	0.0001
Australasian Shoveler	<i>Anas rhynchotis</i>	10212	Vulnerable	Dispersed	Habitat importance map	0.0001
Tick Indigo	<i>Indigofera adesmiifolia</i>	503780	Vulnerable	Dispersed	Habitat importance map	0.0001
Brolga	<i>Grus rubicunda</i>	10177	Vulnerable	Dispersed	Habitat importance map	0.0001
Narrow Goodenia	<i>Goodenia macbarronii</i>	501513	Vulnerable	Dispersed	Habitat importance map	0.0001
Dookie Daisy	<i>Brachyscome gracilis</i>	505494	Vulnerable	Dispersed	Habitat importance map	0.0001
Button Rush	<i>Lipocarpha microcephala</i>	502020	Vulnerable	Dispersed	Habitat importance map	0.0001



Lanky Buttons	<i>Leptorhynchus elongatus</i>	501941	Endangered	Dispersed	Habitat importance map	0.0001
Hairy Tails	<i>Ptilotus erubescens</i>	502825	Vulnerable	Dispersed	Habitat importance map	0.0000
Smooth Darling-pea	<i>Swainsona galegifolia</i>	503992	Endangered	Dispersed	Habitat importance map	0.0000
Australian Painted Snipe	<i>Rostratula australis</i>	10170	Critically endangered	Dispersed	Habitat importance map	0.0000
Currawang	<i>Acacia doratoxylon</i>	500030	Rare	Dispersed	Habitat importance map	0.0000
Blue-billed Duck	<i>Oxyura australis</i>	10216	Endangered	Dispersed	Habitat importance map	0.0000
Branching Groundsel	<i>Senecio cunninghamii</i> var. <i>cunninghamii</i>	503104	Rare	Dispersed	Habitat importance map	0.0000
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	10226	Vulnerable	Dispersed	Habitat importance map	0.0000
Small-leaf Bush-pea	<i>Pultenaea foliolosa</i>	502848	Rare	Dispersed	Habitat importance map	0.0000
Buloke	<i>Allocasuarina luehmannii</i>	500678	Endangered	Dispersed	Habitat importance map	0.0000
Umbrella Grass	<i>Digitaria divaricatissima</i> var. <i>divaricatissima</i>	501045	Vulnerable	Dispersed	Habitat importance map	0.0000
Grey Falcon	<i>Falco hypoleucos</i>	10236	Endangered	Dispersed	Habitat importance map	0.0000
Australian Little Bittern	<i>Ixobrychus dubius</i>	10195	Endangered	Dispersed	Habitat importance map	0.0000
Powerful Owl	<i>Ninox strenua</i>	10248	Vulnerable	Dispersed	Habitat importance map	0.0000
Lace Monitor	<i>Varanus varius</i>	12283	Endangered	Dispersed	Habitat importance map	0.0000
White-throated Needletail	<i>Hirundapus caudacutus</i>	10334	Vulnerable	Dispersed	Habitat importance map	0.0000
Little Egret	<i>Egretta garzetta nigripes</i>	10185	Endangered	Dispersed	Habitat importance map	0.0000
Intermediate Egret	<i>Ardea intermedia</i>	10186	Endangered	Dispersed	Habitat importance map	0.0000
Rough-grain Love-grass	<i>Eragrostis trachycarpa</i>	501197	Rare	Dispersed	Habitat importance map	0.0000
Riverina Bitter-cress	<i>Cardamine moirensis</i>	505032	Rare	Dispersed	Habitat importance map	0.0000
Dense Mint-bush	<i>Prostanthera decussata</i>	502739	Rare	Dispersed	Habitat importance map	0.0000
Waterbush	<i>Myoporum montanum</i>	502240	Rare	Dispersed	Habitat importance map	0.0000
Common Bent-wing Bat (eastern ssp.)	<i>Miniopterus schreibersii oceanensis</i>	61342	Vulnerable	Dispersed	Habitat importance map	0.0000



Dwarf Cassinia	<i>Cassinia diminuta</i>	507664	Rare	Dispersed	Habitat importance map	0.0000
Small Milkwort	<i>Comesperma polygaloides</i>	500798	Vulnerable	Dispersed	Habitat importance map	0.0000
Common Pipewort	<i>Eriocaulon scariosum</i>	501218	Rare	Dispersed	Habitat importance map	0.0000
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
Kamarooka Mallee	<i>Eucalyptus froggattii</i>	501279	Rare	Dispersed	Habitat importance map	0.0000

#### Habitat group

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

#### Habitat impacted

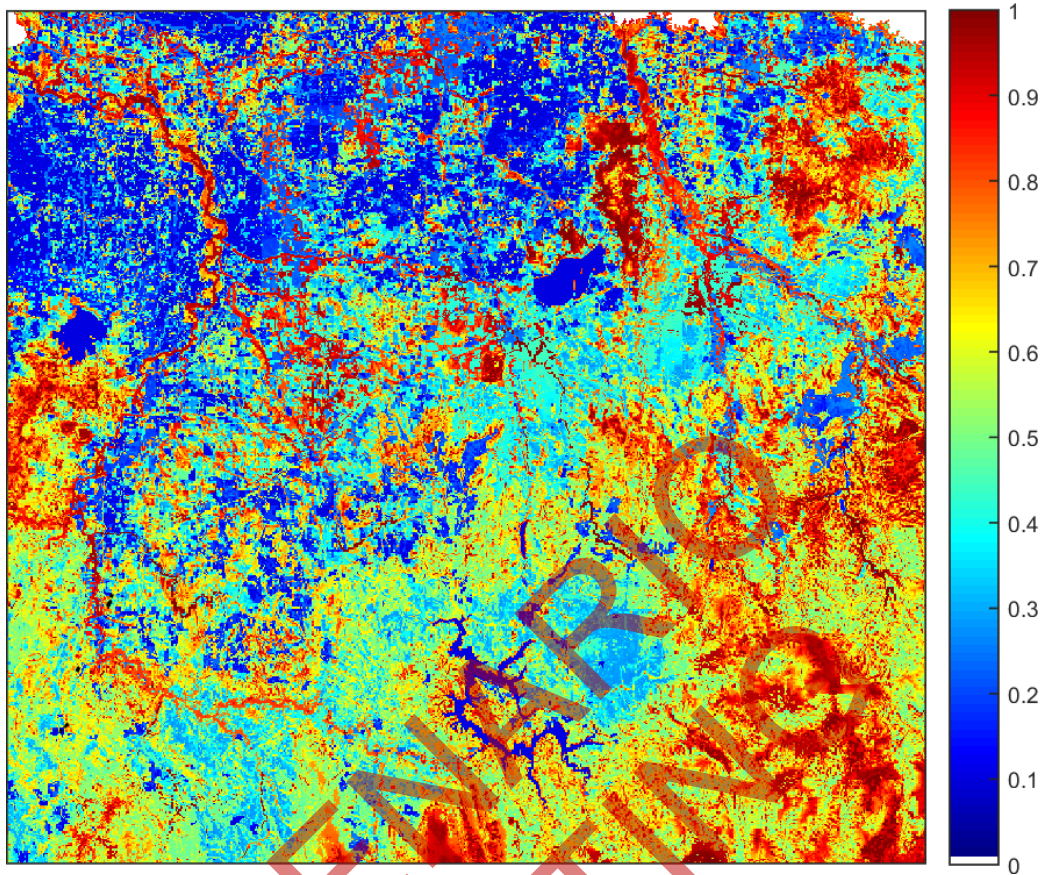
- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

SCENARIO TESTING



# Appendix 3 – Images of mapped native vegetation

## 2. Strategic biodiversity values map





# SCENARIO TESTING



# Appendix I

Biodiversity legislation &  
policy



## Appendix I – Biodiversity legislation & policy background information

### Commonwealth

#### ***Environment Protection and Biodiversity Conservation Act 1999***

One of the main aims of the EPBC Act is to provide for the conservation of biodiversity and the protection of the environment, particularly those aspects that are considered to be MNES. The EPBC Act defines nine MNES as follows:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements (JAMBA, CAMBA, ROKAMBA)
- Commonwealth marine environment
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, actions<sup>1</sup> that are likely<sup>2</sup> to have a significant impact upon MNES are required to be referred to the Environment Minister for approval.

The EPBC Act also covers actions by Commonwealth agencies and actions on, or impacting on, Commonwealth land. Activities in Commonwealth areas that may result in 'killing, injuring, taking, trading, keeping or moving' a listed threatened species or ecological community, listed migratory species or a member of a listed marine species. A list of marine species declared under s248 of the EPBC Act is available at <https://www.environment.gov.au/marine/marine-species/marine-species-list>.

All cetaceans (whales, dolphins and porpoises) are protected in Australian waters. All Commonwealth waters between the state waters limit (i.e. three nautical miles from shore) and the Exclusive Economic Zone (i.e. 200 nautical miles or further in some places) are included in the Australian Whale Sanctuary. A permit is required to 'injure, take, trade, keep, move, harass, chase, herd, tag, mark or brand' a cetacean in the Australian Whale Sanctuary.

#### ***Review of the EPBC Act***

Section 522A of the EPBC Act requires an independent review to be undertaken at least once every 10 years of its operation and the extent to which its objects have been achieved. The statutory review commenced on 29 October 2019. Reforms and amendments may be made to the EPBC Act in response to the outcomes of the review. Until then, the current requirements of the EPBC Act will continue to apply.

#### **Weeds of National Significance**

Weeds of National Significance (WoNS) are species that are recognised as a current and future threat which require coordinated and strategic management involving landowners and land managers at all levels (IPAC, 2017). The 32 species currently classified as WoNS have been agreed by Australian governments based on an assessment process that prioritised the weeds based on their invasiveness, potential for spread, environmental, social and economic impacts, and their ability to be successfully managed (DAWE undated). Targets for eradication have been identified for these species and landowners are responsible for managing WoNS on their land.

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<sup>1</sup> Under the EPBC Act an 'action' includes any project, development, undertaking, activity or series of activities.

<sup>2</sup> Under the EPBC Act 'likely' refers to when the potential for a significant impact on the environment to be real or not a remote chance or possibility.



## Victorian

### ***Planning and Environment Act 1987***

The *Planning and Environment Act 1987* (P&E Act) establishes the framework for the use, development and protection of land in Victoria. The P&E Act provides for the preparation of standard provisions for planning schemes which are administered by local government.

### **Native vegetation removal regulations**

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

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

- Location risk is determined by assessing the likelihood that the removal of a small amount of native vegetation may impact the persistence of a rare or threatened species. Location risk has been determined for all of Victoria with areas being categorised as Location 1, Location 2 or Location 3. The location risk of a particular site is determined using the native vegetation location risk map available from the NVIM tool found on the DELWP website.
- Extent risk is determined by the extent of the native vegetation including the presence or absence of large trees that is proposed to be removed.

Together, these two types of risk are used to determine the assessment pathway for a permit application to remove native vegetation (DELWP, 2017a).

Table 42 presents the risk-based pathways for patches of native vegetation and scattered trees.

**Table 42 Native vegetation patch risk-based pathways**

Extent	Location		
	Location 1	Location 2	Location 3
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
0.5 hectares or more	Detailed	Detailed	Detailed

The assessment-based pathway determines the process to be followed when applying to remove native vegetation:

- Basic or Intermediate assessment pathway: A habitat hectare assessment is not required, and modelled site condition scores can be used to assess basic and intermediate pathway applications. However, if a habitat hectare assessment report is available, then this can be used in place of modelled data for determining general offset requirements if a permit is granted.
- Detailed assessment pathway applications: A habitat-hectare assessment report must be included and accompanied by a statement outlining the steps that have been taken to ensure that impacts on biodiversity from the removal of native vegetation has been minimised. Offsets required for



detailed assessment pathway applications may trigger a *species offset requirement* (if the native vegetation is habitat for rare or threatened taxa).

### Habitat hectare assessments

Habitat hectare assessments are a site-based measure of biodiversity value calculated by multiplying the extent of native vegetation by its condition score. The Habitat Hectares method is described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004a).

The total extent of native vegetation is calculated for patches (including mapped wetlands) in hectares and scattered trees are expressed as the area of a circle with a 15 metre radius for large trees and a 10 metre radius for small trees (DELWP, 2017a).

### Mapped wetlands

Mapped wetlands are identified in the *Current wetlands map* and are included in Location 2 of the Location risk map in MapshareVic. Areas mapped as wetlands on MapshareVic need to be considered in efforts to avoid and minimise impacts on biodiversity.

*The Native Vegetation Newsletter* released by DELWP in November 2019 provides guidance on how to exclude a mapped wetland shown in the *Current wetlands map* from the native vegetation removal assessment process. This guidance supersedes information in Appendix 4D of the *Assessor's handbook: Applications to remove, destroy or lop native vegetation* (DELWP, 2018a). Mapped wetland (or part thereof) may be excluded from the assessment process if it meets one of the following scenarios:

1. Mapped wetland is covered by a hardened, man-made surface
2. Mapped wetland is geospatially misaligned with its on-ground location due to geospatial projections
3. *Current wetlands map* has incorrectly identified a wetland
4. Mapped wetland cannot support native vegetation.

Table 1

in DELWP (2019c) describes the evidence required to demonstrate a mapped wetland that cannot support native vegetation for each of these situations. With the exception of Scenario 1, the application to exclude requires written agreement from the Secretary to DELWP following submission of evidence to the DELWP Native Vegetation Support team.

### Offsets

Once the project design is completed and native vegetation clearance requirements are known, offsets can be officially determined via a Native Vegetation Removal (NVR) report. An NVR report is generated by DELWP following the submission of the relevant habitat hectare assessment field data.

A combination of site-based and landscape scale information is used to calculate the biodiversity value of the vegetation to be removed. Biodiversity offsets for removed vegetation is calculated in General Habitat Units (GHU) or Species Habitat Units (SHU).

### Application to remove native vegetation under Clause 52.17

A planning permit is usually required to remove, destroy or lop native vegetation under Clause 52.16 or 52.17 of Victorian planning schemes, unless an exemption applies.

Information required to inform an application to remove native vegetation is outlined in the *Applicant's guide: Application to remove, destroy or lop native vegetation* (DELWP, 2018b). This information includes an NVR report, Avoid and Minimise Statement, Offset Statement (evidence that offsets are available) and recent, dated photographs of the vegetation to be removed.

### Planning Overlays

Planning overlays are part of municipal planning schemes and are applied over areas of land to control development. Overlays may be applied to protect areas from adverse impacts or to allow easy



identification of constraints in developments on that area. One or more overlays may be applied to an area and most overlays also have schedules which specify municipal objectives and requirements.

For the purpose of this report, consideration of planning overlays is limited to those of particular relevance to flora and fauna values, which include:

- Environmental Significance Overlays (ESOs). The broad intent of an ESO is to identify areas where the development of land may be affected by environmental constraints, and to ensure that if development does happen, it is compatible with the values that are highlighted in any schedule to the identified ESO.
- Vegetation Protection Overlays (VPOs). A VPO is specific to the removal of vegetation that has been deemed to be significant and protects this vegetation against inappropriate development.
- Significant Landscape Overlay (SLOs). A SLO identifies significant landscapes and conserves and enhances the character of significant landscapes.

A schedule to these overlays contains a statement of the significance of the environmental, vegetation or landscape value that is protected by the overlay, and the objective to be achieved. Approval is typically required to remove most vegetation within an ESO, VPO or SLO, and the application for an approval for vegetation removal must show that the proponent has been cognisant of the intent of each overlay.

### ***Flora and Fauna Guarantee Act 1988***

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

The species and communities of flora and fauna and the potentially threatening processes listed under the FFG Act are published on the DELWP website. The website provides links to three lists:

- Threatened list (DELWP, 2019a) which includes taxa and communities of flora and fauna that have been listed as threatened in accordance with Section 10 of the FFG Act.
- Protected flora list (DELWP, 2019b) which includes:
  - plant taxa listed as threatened under the FFG Act
  - plant taxa belonging to communities listed as threatened under the FFG Act
  - plant taxa which are not threatened but require protection for other reasons.
- Processes list (DELWP, 2016) which includes processes that have been listed as potentially threatening processes in accordance with Section 10 of the FFG Act.

The FFG Act also enables habitat critical to the survival of native flora and fauna to be declared and requires permits for activities that could harm threatened plants, fish and communities.

Protected flora controls under the FFG Act means it is an offence to take, trade in, keep, move or process protected flora without a permit. 'Take' is defined as to kill, injure, disturb or collect.

Protected flora controls do not apply on private land, unless the land is identified as critical habitat for the species. There are currently no critical habitat determinations under the FFG Act.

A permit from DELWP is required to 'take' listed flora species that are members of listed communities or 'Protected' flora from public land. A permit is not required under the FFG Act for private land, unless listed species are present and the land is declared 'critical habitat' for the species. No critical habitat has been identified in Victoria to date. A permit under the FFG Act is also required for activities relating to protected fish.



### **Flora and Fauna Guarantee Amendment Act 2019**

The *Flora and Fauna Guarantee Amendment Act 2019* (the FFG Amendment Act) was recently passed by the State Government. The FFG Amendment Act updates the Flora and Fauna Guarantee Act 1988 (FFG Act) to provide a modern and strengthened framework for the protection of Victoria's biodiversity. The FFG Amendment Act took effect on 1 June 2020.

The main changes associated with the FFG Amendment Act that are relevant to the Project are:

- The adoption of a Common Assessment Method (CAM) to achieve a consistent national approach to assessing and listing threatened species. The CAM will reduce duplication of effort between jurisdictions with a species being assessed by either the Australian Government or a state or territory where the species occurs. The CAM will also facilitate the monitoring and reporting of species' conservation status. All states and territories in Australia have agreed to adopt the CAM for the assessment and listing of threatened species.
- Protected flora controls set out in Division 2 of Part 5 of the FFG Act now detail two categories of protected flora. These categories are:
  - Restricted use protected flora. This category refers to a taxon of flora that is declared under section 46 to be protected and is subject to a restriction on use.
  - Protected flora (threatened). This category relates to:
    - any flora that is a member of a taxon of flora that is declared to be protected under section 46; or
    - any flora that is a member of a listed taxon of flora; or
    - any flora that is a part or member of a listed community of flora or fauna to the extent that it occurs within that community.

### **Common Assessment Method**

Introduction of the CAM will align conservation status listings between Victorian and Commonwealth legislation and as part of this process, the matters listed under the FFG Act have been reviewed. The FFG Amendment Act enables the incorporation of species currently contained in the advisory lists for rare and threatened species in Victoria (DSE, 2009, 2013; DEPI, 2014) into the FFG Act species listing. This consolidation will result in a more complete listing of threatened species, using categories of threat which will align with the national listing status under the EPBC Act.

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. The current assessment coincides with the transition period for the CAM, and as such, an updated list is not yet available. When this list is released, the report should be revisited to incorporate any changes.

### **Protected Flora Controls**

Protected Flora Guidelines have not yet been finalised by DELWP on the categorisation of protected flora. It is expected that the two categories of protected flora will seek to strengthen the intention of the current protected flora controls under the FFG Act. That is, restricted use protected flora will likely relate to flora that can be extracted from public land for commercial uses such as cut-flower supply, seed collection, nursery production and sales (i.e. tree-ferns and grasstrees). Protected flora (threatened) will likely relate to the removal of flora on public land that is listed under the FFG Amendment Act.

A permit will still be required under the Act for the take, trade, keeping or movement of:

- 'restricted use protected flora' if those activities are for the purpose of sale or personal use; or
- 'generally protected flora' for any purpose.

There are some circumstances in which a permit is not required which are set out in Section 47 2D of the FFG Act and are summarised in DELWP (2019) as:

- If the member of protected flora was taken from private land and the person is the landowner or a person given permission by the landowner AND it was not taken for the purposes of sale;



- If the member of protected flora was lawfully propagated;
- If the person was acting in accordance with a Governor in Council Order;
- If the member of protected flora was accidentally taken despite reasonable care being exercised to not take the member;
- If the person is a public authority acting in accordance with a Public Authority Management Agreement (generally protected flora only).

Until the protected flora list has been updated, the existing listings should be used.

### Transition period

There will be a transition period during which DELWP will review the guidelines for determining protected flora, protected flora list, and assess threatened species under the CAM. This transition process will be open for public consultation and DELWP has advised that the transition is expected to take until the end of 2020 to complete.

### Environment Effects Act 1978

Under Victoria's *Environmental Effects Act 1978* (EE Act), projects that could have a 'significant effect' on Victoria's environment can require an Environmental Effect Statement (EES). This Act applies to any public works 'reasonably considered to have or be capable of having a significant effect on the environment'.

The EES referral criteria for impacts to ecological values are listed in Table 43 (DSE, 2006). If either any single mandatory referral criterion, or combination of two or more referral criteria are met, then the proponent is required to submit a referral to the Minister for Planning who will then determine whether an EES is required.

**Table 43 EES referral criteria for ecological matters considered in this assessment**

Criteria type	Criteria
Individual mandatory referral criteria for ecological matters	Potential clearing of 10 ha or more of native vegetation from an area that: <ul style="list-style-type: none"> <li>• Is of an Ecological Vegetation Class identified as endangered by the Department of Environment, Land, Water and Planning, or</li> <li>• Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework)</li> </ul>
	Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) or known remaining habitat or population of a threatened species within Victoria
	Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'
Combination referral criteria for ecological matters	Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan
	Matters listed under the <i>Flora and Fauna Guarantee Act 1988</i> : <ul style="list-style-type: none"> <li>• Potential loss of a significant area of a listed ecological community, or</li> <li>• Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listed), including as a result of loss of fragmentation of habitats, or</li> <li>• Potential loss of critical habitat, or</li> <li>• Potential significant effects on habitat values of a wetland supporting migratory bird species.</li> </ul>



Criteria type	Criteria
	Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the <i>National Parks Act 1975</i>

#### **Catchment and Land Protection Act 1994**

The *Catchment and Land Protection Act 1994* (CaLP Act) establishes a framework for management and protection of catchments through the management of land and water resources. The CaLP Act is the principal legislation relating to the management of pest plants and animals in Victoria.

Under the CaLP Act, landowners have a number of responsibilities including:

- Avoiding causing or contributing to land degradation
- Taking all reasonable steps to conserve soil
- Protecting water resources
- Eradicating regionally prohibited weeds
- Preventing the growth and spread of regionally controlled weeds
- Where possible eradicating established pest animals declared under the CaLP Act.

Invasive species can cause environmental and economic harm, or are considered to have the potential to cause such harm. They can also present risks to human health.

Invasive plants (weeds) can compete with and displace native flora which alters vegetation communities and affects habitat suitability for native fauna. Weed categories and their respective management requirements under the CaLP Act are summarised in Table 3.

**Table 44 CaLP Act Declared Noxious Weed Management requirements**

Weed Category	Enforceable Management Requirement
State prohibited weeds (SP)	These include weeds that either do not occur in Victoria but are a significant threat if they do invade, or are weeds that are present and pose a serious threat but are expected to be eradicated, as infestations are generally small. The Victorian Government is responsible for the eradication of these weeds and may direct land owners to prevent growth and spread.
Regionally prohibited weeds (RP)	Regionally prohibited weeds are not widely distributed in a region but are capable of spreading further. It is reasonable to expect that they can be eradicated from a region and they must be managed with that goal. Land owners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate Regionally prohibited weeds on their land.
Regionally controlled weeds (RC)	These invasive weeds are usually widespread in a region. To prevent their spread, ongoing control measures are required. Land owners have the responsibility to take all reasonable steps to prevent the growth and spread of Regionally controlled weeds on their land.
Restricted weeds (R)	This category includes weeds that pose an unacceptable risk of spreading in this State and are a serious threat to another State or Territory of Australia. Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials, is prohibited.

Introduced predators such as foxes and feral cats directly threaten native fauna via predation (DSE, 2003d; DSE, 2004b). Other introduced species such as rabbits and hares can cause indirect impacts through land degradation and can have significant impacts on native vegetation and fauna habitat.



Pest animals are listed under the CaLP Act that are, or have the potential to be, a serious threat to primary production, crown land, the environment or community health in Victoria. There are four categories of pest animals:

- Prohibited pest animals
- Controlled pest animals
- Regulated pest animals
- Established pest animals

Their classification is determined by their threat and potential for establishment in the wild. It is an offence to import, keep, sell or release any pest animals in Victoria without a valid permit.

Several pest animals are also listed as threatening processes under the EPBC Act and FFG Act.

For further information on the classification of weeds and pest animals in Victoria is available on the Agriculture Victoria website [www.agriculture.vic.gov.au](http://www.agriculture.vic.gov.au) including Victoria's consolidated lists of declared noxious weeds and pest animals.

### **Wildlife Act 1975**

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

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

Under the Wildlife Act, it is an offence to wilfully damage, disturb or destroy wildlife habitat, disturb protected wildlife or take or destroy take or destroy threatened or protected wildlife (including listed fish) without authorisation.

With the exception of pest animals declared under the CaLP Act or wildlife declared to be unprotected wildlife, all fauna species native to Victoria are listed as protected under the Wildlife Act. Threatened wildlife means protected wildlife that are listed under the FFG Act.

Translocation of wildlife requires approval under the Wildlife Act. Salvage and translocation of non-threatened native wildlife from an area to be disturbed to an area reserved or protected from future development is generally not supported by DELWP for wildlife welfare reasons (DELWP, 2020b). Translocation of threatened species requires authorisation. Applicants must apply for a scientific permit under the Wildlife Act which will not be issued unless a Translocation Plan is approved by the Threatened Fauna Translocation Evaluation Panel (TEP).

### **Other standards and guidelines**

#### **DELWP Victorian rare and threatened species advisory lists**

Advisory lists of rare and threatened flora, vertebrate fauna and invertebrates have been generated by DELWP (DSE, 2009, DSE, 2013, DEPI, 2014). These advisory lists do not afford the species contained within statutory protection, unless those species are listed under the EPBC Act and/or FFG Act. Advisory listed species are used by DELWP to determine whether species-specific habitat is required to be offset.