

Environment Report

Attachments

Inland Rail - Beveridge to Albury



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Attachment C

- Overhead Powerlines Ecology Existing Conditions Report



Inland Rail - Beveridge to Albury: Overhead Powerlines

Ecology: Existing Conditions Report

16-Aug-2021 Commercial-in-Confidence



Delivering a better world

Inland Rail - Beveridge to Albury: Overhead Powerlines

Ecology: Existing Conditions Report

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Acronyms

Acronym	Explanation	
BCS	Bioregional Conservation Status	
CaLP Act	Catchment and Land Protection Act 1994	
CVU	Central Victorian Uplands bioregion	
DBH	Diameter at Breast Height	
DAWE	Department of Agriculture, Water and Environment (formerly DoEE)	
DELWP	Department of Environment, Land, Water and Planning	
DoE	Department of Environment (now DAWE)	
DoEE	Department of Environment and Energy (now DAWE)	
DSE	Department of Sustainability and Environment (now DELWP)	
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DAWE)	
EE Act	Environment Effects Act 1978	
EnSym	Environmental Systems Modelling Platform Native Vegetation Regulations Tool managed by DELWP	
ESO	Environmental Significance Overlay	
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999	
EVC	Ecological Vegetation Class	
FFG Act	Flora and Fauna Guarantee Act 1988	
GBGW	Grey Box Eucalyptus microcarpa Grassy Woodlands and derived Native Grasslands	
ННа	Habitat Hectare	
HZ	Habitat Zone	
LGA	Local Government Area	
LRFCSMDB	Victorian Lowland Riverine Fish Community of the Southern Murray Darling Basin	
NVIM	Native Vegetation Information Management tool managed by DELWP	
NVR	Native Vegetation Removal report	
P&E Act	Planning and Environment Act 1987	
PMST	Protected Matters Search Tool managed by DAWE	
SLO	Significant Landscape Overlay	
VQA	Vegetation Quality Assessment	
VBA	Victorian Biodiversity Atlas	
VPO	Vegetation Protection Overlay	
VR	Victorian Riverina bioregion	
VROTS	Species listed as rare or threatened on a DELWP advisory list of threatened species in Victoria (flora, vertebrate fauna, or invertebrates)	
VTWBC	Victorian Temperate Woodland Bird Community	

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Acronym	Explanation	
VVP	Victorian Volcanic Plains bioregion	
WBYBRGGW	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	
WoNS	Weeds of National Significance	

Glossary

Term	Explanation	
Biodiversity	The variety of all life-forms, the different plans, 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.	
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:	
	Habitat hectares of patch = extent in hectares × condition multiplier For Scattered Trees:	
	Habitat hectares of Scattered Trees = (number of trees × standard extent) × condition multiplier	
	Where: Standard extent is a circle with 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.	
Indigenous vegetation	Indigenous vegetation includes vegetation that is native to Australia as well as being native to a specific geographic region.	
Investigation area	The Investigation area is the area assessed for existing ecological conditions at each of the Powerline project areas and is defined by the project area boundary plus a 15 m buffer.	

Term	Explanation	
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 - patchA patch of native vegetation is defined as: 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, in DELWP systems and tools (DELWP, 2017a).		
Native vegetation – Scattered Tree	 A Scattered Tree is defined as: a native canopy tree that does not form part of a patch (DELWP, 2017a). Scattered Trees were classified as large or small based on their Diameter at Breast Height (DBH). DBH is measured in centimetres at 1.3 metres 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</i> <i>equal to the large tree benchmark for the relevant bioregional EVC</i> (DELWP, 2017a). If the large tree is located within the extent of a patch of native vegetation, it is a Large Tree in a Patch.	
Native vegetation offset A native vegetation offset is any works of other actions to make reformed the loss of native vegetation arising from the removal of native vegetation. This may include an area of existing remnant vegetation protected and managed, an area that is revegetated and protected that is set aside for regeneration or restoration, or any combination. The relative size of an offset is graded according to its conservation significance.		
Non-indigenous vegetation	Vegetation that is native to Australia, but not to the geographic region to which a site is located.	
Project area	Inland Rail – Beveridge to Albury project overall; combined enhancement sites, track slews and signal gantries package and overhead powerline package.	
Powerline project area	The term used to collectively describe the 123 individual overhead powerline locations	

Term	Explanation
Investigation area	Individual powerline locations where proposed upgrade works will occur. The geographic boundary of each investigation area was provided by ARTC under GIS package no. 11 (29/01/2021)
Vegetation Quality Assessment (VQA)An assessment of vegetation condition undertaken using the Ha Hectares method as described in the Vegetation Quality Assess Manual – guidelines for applying the habitat hectare scoring method 2004). Individual patches are termed Habitat Zones (HZ) in accord DELWP terminology.	
Victorian Rare or Threatened Species (VROTS)Species listed on an advisory list of rare or threatened species in V (flora, vertebrate fauna, or invertebrates) prepared by the Victorian Government Department of Environment, Water, Land and Plannin (DELWP).	
Weeds of National Significance (WoNS)	The most problematic invasive plant species in Australia as determined by the federal government.

AECOM Australia Pty Ltd (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').

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.

Stage 1 of the Victorian portion of the Inland Rail - Beveridge to Albury 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. Stage 1 is divided into two works packages:

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

This report outlines the results of ecological assessments completed for overhead powerline ancillary works between Wallan and Wodonga.

Scope of report

This existing conditions and impact assessment report has been prepared to inform the preparation of the Environment Report to meet assessment requirements under the Victorian *Environment Effects Act 1978* (EE Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Project. Preparation of an Environment Report is an accredited state assessment process under a Bilateral Agreement between the Commonwealth of Australia and The State of Victoria signed under the EPBC Act in 2014.

This technical report will also be used to inform the planning approval requirements for any of the overhead powerline sites that occur outside an enhancement sites and are not subject to approval under the Planning Scheme Amendment for the project pursuant to the *Planning and Environment Act 1987*.

Ecological values and potential impacts

The overhead powerline investigation areas support extensive native vegetation patches and Scattered Trees, a number of threatened ecological communities, and habitat for species listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Flora and Fauna Guarantee Act 1988* (FFG Act), and other non-threatened wildlife.

A summary of ecological values and potential impacts of the overheard powerlines package of works for the Project on those values is outlined below.

Ecological value		Existing conditions	Potential impacts		
Matters of National Environmental Significance					
Environment Protection and Biodiversity Conservation Act 1999					
Threatened ecological	Grey Box <i>Eucalyptus microcarpa</i> Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	20.805 ha mapped at investigation areas 1018, 1020, 1036,1041, 1061, 1072, 1076, 1077 and 1078	1.378 ha		
communities	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland	4.111 ha at investigation areas 1042, 1046, 1047, 1080, 1081, 1086, 1087, 1088 and 1110	0.624 ha		
Threatened flora	Euroa Guinea-flower	Population of approximately 256 plants at investigation area 1047 south of Euroa.	No impacts anticipated. Population avoided.		
species	Mountain Swainson-pea	Planted individuals recorded adjacent to investigation area 1078 near Glenrowan.	No impacts anticipated. Reintroduced population avoided.		
	Growling Grass Frog	Terrestrial, non-breeding habitat occurs at investigation area 1001 (adjacent to Merri Creek), 1002, 1003 and investigation area 1076 near Glenrowan.	Impacts to this species are not anticipated to be significant as the project intends to avoid impacts to aquatic habitats and disturbance to terrestrial habitat will be kept small and localised.		
Threatened fauna species	Sloane's Froglet	Potential habitat at investigation area 1110	Impacts to this species are not anticipated to be significant as the project intends to avoid impacts to aquatic habitats.		
	Striped Legless Lizard	Potential habitat at investigation area 1088.	Approximately 0.38 ha of potential habitat.		
	Golden Sun Moth	Potential habitat at investigation area 1013.	Unlikely, impacts to potential habitat have been avoided.		
State significant biodiversity values					
Planning and Environment Act 1987					
Native vegetation Patches of native vegetation		235 patches, 99.647 ha mapped within the investigation area	9.525 ha		

Ecological value		Existing conditions	Potential impacts
	Large Trees in Patches	140 Large Trees in Patches mapped within the investigation area	25 Large Trees in Patches
	Scattered Trees	200 Scattered Trees (104 small and 96 large) mapped within the investigation area	92 Scattered Trees (52 small and 40 large)
	Endangered EVCs (subset of patches of native vegetation)	54.979 ha mapped within the investigation area	7.016 ha
	High quality vegetation (subset of patches of native vegetation)	62.191 ha (71 patches) mapped within the investigation area	2.263 ha
	Strategic Biodiversity Values	SBV ranges from 1 – 15 to 90 – 100 in investigation area.	Areas ≥ 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.
	Mapped wetlands	One mapped wetland at investigation area 1022.	Any impacts accounted for as part of native vegetation patches.
Environmental overlays	Mitchell - ESO3	-	 0.562 ha native vegetation 13 trees 0.886 non-native vegetation All native vegetation to be impacted within the overlay is considered to be fauna habitat Works extent does not extend into watercourses and impacts on watercourses are not anticipated with mitigation.
	Mitchell – SMO	-	0.004 ha native vegetation 0.099 non-native vegetation
	Mitchell – VPO1	-	0.732 ha native vegetation
	Mitchell – VPO2	-	0.020 ha native vegetation 1 tree

Ecological value		Existing conditions	Potential impacts
	Benalla – VPO3	-	 0.636 ha native vegetation 1.142 non-native vegetation No Mugga Ironbark, White Box or Blakely's Red Gum. Of the tree species specified in VPO3, the project may impact on Yellow Box (estimated 20 small trees in patches of native vegetation).
	Wangaratta – VPO 1	-	0.732 ha native vegetation 2 trees
	Wangaratta – VPO 2	-	0.571 ha native vegetation 2 trees
	Indigo – ESO3	-	0.514 ha native vegetation 14 trees 0.839 ha non-native vegetation
Flora and Fauna Guara	ntee Act 1988		
	Victorian Temperate Woodland Bird Community	Approximately 38 ha woodland habitat mapped within the investigation areas.	2.921 ha
Threatened ecological communities	Lowland Riverine Fish Community of the Southern Murray-Darling Basin	Powerline project area does not intercept any rives or tributaries that may support the TEC (KBR 2020).	No impact is anticipated to rivers or tributaries
Threatened flora (FFG Act, VROTS)	Buloke (FFG Act)	16 individuals within and adjacent to investigation area 1042	14 individuals at investigation area 1042
	Purple Diuris (FFG Act)	Potential habitat identified adjacent to investigation area 1088 in 2019	Impacts to potential habitat anticipated.
	Cottony Cassinia (VROTS)	Approximately 50 individuals recorded at investigation area 1041.	Impacts to some individuals may occur during works.

Ecological value		Existing conditions	Potential impacts
	Late-flower Flax-lily (VROTS)	Approximately 15 individuals recorded at investigation area 1012, 1041 and 1046.	2 individuals at powerline 1012
	Basalt Podolepis (VROTS)	Recorded at investigation area 1078 in 2019	No impacts anticipated.
	Golden Cowslips (VROTS)	Recorded at investigation area 1088 in 2019	No impacts anticipated.
	Glaucous Flax-lily (VROTS)	Recorded at investigation areas 1040, 1041, 1042, 1047	One individual at 1042
	Protected flora	27 Protected flora species were identified	Impacts to protected flora species are anticipated but total numbers will need to be determined following detailed design.
Threatened fauna (FFG Act, VROTS)	Woodland birds	Approximately 38 ha woodland habitat mapped within the investigation areas. Diamond Firetail observed at investigation area 1047 in 2019.	2.921 ha woodland habitat
	Woodland mammals	Potential woodland habitat. Brush-tailed Phascogale recorded near investigation area 1020 at Tallarook during targeted survey of enhancement site.	Potential habitat is largely avoided by the powerline investigation areas
	Brown Toadlet (FFG Act)	Recorded adjacent investigation area 1110 in 2019.	Impacts to habitat at investigation area 1110 and other potential habitat (terrestrial areas that become flooded by seasonal rains) will need to be determined following detailed design
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.	Native vegetation (patches and scattered trees) may contain hollows.	Native vegetation to be removed includes large trees of which an estimated 43 trees contain hollows.

Ecological value		Existing conditions	Potential impacts
Connectivity	Loss of landscape connectivity (habitat fragmentation) is a threatening process listed under the FFG Act.	Powerline investigation areas are primarily located in existing gaps in the tree canopy.	Powerline works are not considered likely to exacerbate habitat connectivity issues
Catchment and Land Pr	rotection Act 1994		
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 were 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 foxes and feral cats directly threaten native fauna via predation. Other introduced species such as rabbits and hares cause land degradation and can affect native vegetation and habitat. Predation of native wildlife by Red Fox and cat and grazing by European Rabbit are listed as threatening processes under the FFG Act.	European Rabbit, Brown Hare and Red Fox were observed during the field assessments for the Project.	The proposed works are unlikely to encourage the occurrence or increase the population of foxes or cats above current levels in the environment. The Project is unlikely to encourage the occurrence of rabbits.
Wildlife Act 1975			
Non-threatened fauna (Wildlife Act 1975)	All wildlife protected under the Wildlife Act	A diversity of species occurs in habitat within and adjacent to the investigation areas.	Loss of habitat. Potential to kill, injure, disturb, or displace fauna. Species most at risk are those that are more sedentary such as possums, frogs, and lizards (less likely to move away from construction works).

Threatening processes

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

EPBC Act listed threatening process	FFG Act listed threatening process
Land clearance	-
-	Loss of hollow-bearing trees from Victorian native forests and woodlands
Dieback caused by the root-rot	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
fungus Phytophthora cinnamomi	Use of Phytophthora-infected gravel in construction of roads, bridges, and reservoirs.
Infection of amphibians with chytrid fungus resulting in chytridiomycosis	Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.
-	Increase in sediment input into Victorian rivers and streams due to human activities
-	Invasion of native vegetation by Blackberry <i>Rubus</i> polyanthemus
-	Invasion of native vegetation by 'environmental weeds'.

Recommendations

Recommendations are provided to reduce impacts to ecological values and to consider the implications associated with relevant legislation and policy requirements when developing the design for the project.

The key recommendations are:

- Design the project to minimise the amount of native vegetation (and large trees) to be removed.
- Prioritise access via existing tracks to reduce impacts on native vegetation and fauna habitat, particularly in areas where threatened flora, fauna or ecological communities have been identified.
- Establish no-go zones to prevent inadvertent loss of retained native vegetation and habitat.
- Avoid or minimise impacts to WBYBBRGGW and GBGW at investigation areas in Table 47.
- Avoid impacts to the population of Mountain Swainson-pea (investigation area 1078).
- Avoid aquatic habitats to reduce the risk to threatened frogs, particularly investigation area 1110 (Brown Toadlet / Sloane's Froglet), 1001, 1002, 1003, 1076 (Growling Grass Frog).
- Minimise construction footprint at investigation area 1088 to reduce loss of potential habitat for Striped Legless Lizard.
- Minimise the removal of overstorey trees to reduce the risk to woodland fauna and reduce the risk
 of the project exacerbating threatening processes listed under the FFG Act (habitat fragmentation
 and loss of hollow-bearing trees).
- Conduct works in cleared and disturbed areas such as adjacent roads, tracks, and place laydown and stockpile locations away from native vegetation and fauna habitat.
- Conduct VQA and TEC assessments for investigation areas where no access or partial access was
 previously granted but native vegetation has been identified via desktop assessment.

- Develop and implement a Flora and Fauna Management Plan incorporating measures to reduce potential impacts on adjacent retained habitat and the wildlife living there during construction.
- Undertake threatened frog surveys if aquatic habitat cannot be avoided at investigation areas 1001, 1002, 1076 and 1110 to inform assessment against significant impact criteria for threatened species.
- Undertake a hollow-bearing tree assessment at investigation areas 1076 and 1078 if large trees cannot be avoided as those trees may support hollow-dwelling fauna.
- Undertake an assessment against the significant impact criteria if impacts on WBYBBRGGW and/or GBGW cannot be avoided.

If the proposed works at any of the overhead powerline sites that occur outside the enhancement site impact areas require the removal of vegetation, a planning permit application may be required to be submitted to the relevant Council for approval.

If significant impacts to MNES are likely, then an offset package to compensate for these losses will be required.

1.0 Introduction

AECOM Australia Pty Ltd (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 overhead powerline ancillary works (the 'Project Area') between Wallan and Wodonga 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 Inland Rail – Beveridge to Albury 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 1 – 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, Violet Town, Benalla, Glenrowan, Wangaratta, and Barnawartha North.

The Project passes through the jurisdictions of:

- Seven Local Government Areas (LGAs) Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta, Indigo, and Wodonga shires.
- Three Catchment Management Authorities (CMAs) 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 main components of the Project include 12 discrete project areas (also referred to as 'enhancement sites') from Beveridge to Albury where road and rail interfaces do not provide the required horizontal and vertical clearance for double-stacked freight trains. In addition, the Project includes works to signal gantries and track slews as well as ancillary works to overhead powerlines to ensure the appropriate horizontal and vertical clearances are achieved.

The Project is divided into two packages of works:

- Enhancement sites, track slews, and signal gantries
- 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 for each.

Enhancement sites, track slews, and signal gantries

The enhancement site, track slew and signal gantry works have been subject to several preliminary and detailed 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).

Assessment of the enhancement sites, track slews and signal gantries package 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.

Planning approval will be obtained through a Planning Scheme Amendment (PSA) in accordance with Section 20(4) of the *Planning and Environment Act 1987* (P&E Act). An amendment to the Whittlesea, Mitchell, Strathbogie, Benalla, Wangaratta and Wodonga Planning Scheme is being prepared. The PSA introduces *'Inland Rail – Beveridge to Albury April 2021'* Incorporated Document into the Planning Schemes to facilitate the use and development of the enhancement sites, track slews and signal gantries (excluding overhead powerline replacement works outside enhancement sites).

The detailed ecological investigation and results associated with enhancement sites, track slews and gantries package of works are provided in AECOM (2021a).

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 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's 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 located outside enhancements are not included in the PSA for the Project. Therefore, if any overhead powerline sites that occur outside the enhancement sites and require the removal of vegetation to facilitate the works, a separate planning permit application may be required to be submitted to the relevant Council for approval.

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 was 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. Assessment requirements are 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.

1.3 Assessment scope

ARTC commissioned a detailed ecological assessment of the project area to identify and quantify ecological values in line with Victorian and Commonwealth policy and legislation and to advise ARTC on the next steps in progressing planning approvals and inform the preparation of the Environment Report for the Project. The scope for the assessment and report were to:

- Review existing reports relating to the project area including:
 - Inland Rail Overhead Investigation Areas Desktop Ecological Assessment (ABZECO, 2019)
 - Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services.
 Overhead Powerline Biodiversity Assessment Report (KBR, 2020a)
- Document the flora and fauna values present including:
 - Native vegetation extent and quality (applying the habitat hectares method).
 - Threatened species and ecological communities.
- Provide a consolidated list of ecological values for each investigation area by combining results of the current assessment with that of the previous assessments undertaken by KBR (2020a) and ABZECO (2019).
- Consolidate results of flora and fauna values and threatened ecological communities for each Local Government Area (LGA) in anticipation that individual planning permit applications will be required.
- Quantify native vegetation impact required to facilitate the Project based on Victoria's native vegetation removal regulations (*Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017a).
- Assess impacts to threatened species and ecological communities.
- Recommend measures to reduce impacts during the design and planning phase of the Project to native vegetation, flora and fauna species which may occur in, or immediately adjacent to, project area.

This technical study has been undertaken to identify the ecological features present with the project area for the overhead powerline package of works for the Project. Species and ecological communities considered by this assessment were defined by the findings of the previous ecological assessments (ABZECO, 2019; KBR, 2020a).

1.4 Assessment area definitions

1.4.1 Project area

Project area is the term used to collectively describe the 123 individual overhead powerline locations that require upgrades (Figure 1 – Appendix A).

The project area represents the area considered for potential impacts of the Project. A full list of overhead powerline project areas assessed during the current assessment is provided in Appendix B as well as a comparison to investigation area naming used by KBR (2020a).

1.4.2 Investigation area

The investigation area is the area assessed for existing ecological conditions at each of the project areas. The investigation area was defined by the project area boundary plus a 15 m buffer. The purpose of the buffer is to document ecological values immediately adjacent to the project area as a conservative measure of values which may be affected by the Project and is designed to accommodate the maximum Tree Protection Zone (TPZ) of any adjacent trees. The investigation areas are listed in and their locations are shown in Figure 1 (Appendix A). An initial investigation area (received on 7 August 2020) was assessed via desktop assessment and in the field in 2020.

Modified investigation areas for 87 overhead powerline sites were received by AECOM on 18 May 2021 from ARTC. The desktop assessment method outlined in Section 2.5 has been conducted for these areas.

The investigation areas have been divided into LGA from south to north (Table 1).

Table 1 Investigation areas according to LGA

LGA	Number of investigation areas	Bioregions	CMAs
Mitchell	34	Central Victorian Uplands Victorian Volcanic Plain Victorian Riverina	Port Phillip and Westernport Goulburn Broken
Strathbogie	23	Central Victorian Uplands Victorian Riverina	Goulburn Broken
Benalla	17	Victorian Riverina	Goulburn Broken North East
Wangaratta	32	Northern Inland Slopes Victorian Riverina	Goulburn Broken North East
Indigo	12	Northern Inland Slopes Victorian Riverina	North East
Wodonga	5	Northern Inland Slopes Victorian Riverina	North East
Total	123		

2.0 Method

2.1 Review of previous ecological assessments

A review of the most recent ecological assessments previously completed by ABZECO (2019) and KBR (2020a) for the Tottenham to Albury (T2A) section of the Inland Rail project was undertaken to inform the current detailed field assessment. The documents reviewed were:

- Inland Rail Overhead Investigation Areas Desktop Ecological Assessment (ABZECO, 2019) which included a review of relevant databases and literature to identify biodiversity values within 5km of each overhead investigation area, as well as any potential legislative implications. A desktop Likelihood of Occurrence Rating Criteria was developed by ABZECO and was used to assign a likelihood of occurrence rating to each record of threatened species or community identified by the Victorian Biodiversity Atlas (VBA) search. A risk evaluation rating of High, Moderate, or Low was also assigned to each investigation area. Targeted surveys were recommended for species and communities that were assigned a moderate or high likelihood of occurrence. Targeted surveys were recommended for four ecological communities, three threatened fauna communities, 19 threatened flora species, and 15 threatened fauna species within the investigation area. Field verification of all investigation areas was recommended.
- Inland Rail Phase 2 Tottenham to Albury Technical & Approvals Consultancy Services. Overhead Powerline Biodiversity Assessment Report (KBR, 2020a) which reviewed the recommendations of the desktop assessment (ABZECO, 2019) in relation to the refined project area and scope refinements. A field assessment was undertaken to validate the findings of the desktop assessment and to identify the potential for increased or additional biodiversity values and ecological constraints that would need to be included in the EPBC Act and EE Act referrals for the T2A – Stage 1 project. Rapid field assessments were undertaken at 82 investigation areas that were assigned a low ecological risk rating or considered to have moderate potential for threatened fauna to occur. Targeted flora surveys were carried out at the remaining 18 Investigation areas that were assigned a high or moderate likelihood of supporting threatened flora and ecological community. Verification of threatened ecological communities was completed as part of the targeted flora survey work. A copy of KBR (2020a) is provided in Appendix H.

In reviewing the previous ecological assessments, AECOM had specific regard to threatened species and threatened ecological communities that were either known or likely to occur within the investigation area. The findings of this review informed the scope of the field assessment.

2.2 Database searches

Database searches were completed as part of the desktop ecological assessment for the project area (ABZECO, 2019). Databases reviewed included:

- EPBC Act Protected Matters Search Tool (PMST) administered by the Australian Government Department of Agriculture, Water, and the Environment (DAWE) to identity any MNES that may occur.
- Online tools administered by DELWP including:
 - VBA for records of Victoria's rare or threatened flora and fauna species (VROTS).
 - NatureKit and Native Vegetation Information Management (NVIM) for information on EVCs, Bioregions, LGAs, 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).
 - EVC benchmarks for descriptions and characteristics of each bioregion (DELWP, 2020)
 - Planning Maps Online (now VicPlan online) and Planning Schemes Online for all approved planning schemes on Victoria for the zoning and overlays relevant to each investigation area.

- Environmental Systems Modelling Platform Native Vegetation Regulations Tool (EnSym NVR tool) for native vegetation databases and offset requirements.
- Guidelines and other explanatory documents related to measuring value of native vegetation:
 - DELWP (2017a). Guidelines for the removal, destruction or lopping of native vegetation. Victorian Government Department of Environment, Land, Water and Planning, Melbourne.
 - 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.
 - DELWP (2018b). Applicant's guide: Applications to remove, destroy or lop native vegetation.
 Victorian Government Department of Environment, Land, Water and Planning. Melbourne, Victoria.

All database searches were completed within a 5-kilometre radius of each of the sites.

The biodiversity assessment completed by KBR (2020a) relied on the findings of the desktop assessment and database searches for identifying the likelihood of threatened flora, fauna, and communities occurring in the investigation areas.

Whilst the preparation of this assessment drew on the findings of the desktop assessment completed by ABZECO (2019) and the findings of KBR (2020a), a contemporary review of the VBA was completed in February 2021 to identify any recent records for Commonwealth and State significant species. The search area incorporated a 5 km buffer from the project area.

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

2.3 Likelihood of occurrence assessment for threatened species

A likelihood of occurrence assessment was completed during the desktop assessment for threatened ecological communities, flora, and fauna species (ABZECO, 2019). 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).

An extract of the likelihood of occurrence rating criteria from ABZECO (2019) is provided in Table 2.

Table 2 Desktop Likelihood of Occurrence Rating Criteria

Rating	Criteria
Unlikely	 Threatened Species and communities considered locally or regionally absent. The site is generally outside of the threatened species range, there are very few or no records nearby (less than 5). And/or any past records are very old (pre-1980). Habitat appears absent or unsuitable for the threatened species or community concerned.

Rating	Criteria
Low	 Habitat areas classed as being of low quality, appear fragmented with few structural elements such as tussock/hummock forming grasses or sedges, intertussock spaces, understorey shrubs, logs, rocks, and potential hollow bearing trees. Connectivity with higher quality patches may be limited or absent. Patches may be weed infested, have little or no natural regeneration, and remaining indigenous species are likely under threat from invasive exotic species. No species of conservation significance are known or likely to occur there, there are few records nearby (usually less than 10), and/or any past records are over
	20-30 years old.
Moderate	 Some structural elements appear to have been lost, and invasive species may not be dominant over indigenous species. There is usually some connectivity with adjacent habitat of apparent equal or greater quality. The site may provide suitable habitat for flora or fauna conservation significance
	 Some recent and historic records for the threatened species in the local area, usually less than 20 years old.
High	 Most structural elements for fauna present, understory species appear healthy. The site appears to support habitat or vegetation that is part of a mosaic of relatively contiguous vegetation with connectivity to other areas of habitat. The habitat/vegetation is likely to provide suitable habitat for flora and/or fauns of conservation significance known or considered highly likely to occur in the area, even if dominated by weeds. The threatened species is considered likely to be present based on the number of records from recent surveys or historically reported with or near to the study area (generally greater than 10), and/or records usually being less than 20 years

A revised likelihood of occurrence assessment has not been completed as no new records of threatened flora or fauna were identified during the contemporary review of the VBA.

2.4 Field assessment

Field assessments were undertaken for all investigation areas because previous assessments were either rapid in nature (and therefore not suitable to inform impact assessment calculations), the investigation area(s) had been refined, or new investigation areas had been added to the Project since previous assessments were completed.

The field assessments of the investigation areas were conducted between 23 October and 18 December 2020 and incorporated:

- Vegetation Quality Assessment (VQA) by a DELWP-accredited Vegetation Quality Assessor.
- Identification of threatened ecological communities.
- A preliminary evaluation of remnant native trees which may require an arboricultural assessment for the purpose of calculating native vegetation losses.
- Incidental observations of threatened flora and fauna species, and flora species listed as Protected under the FFG Act.

Further details for the field assessment techniques are provided in the subsections below.

2.4.1 Native vegetation (Habitat Hectare Assessment)

Native vegetation present within the investigation areas was mapped and assessed according to the prescriptions of the Guidelines (DELWP, 2017a). Native vegetation is defined in the Victorian Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. As per the Guidelines, native vegetation is either a patch, Scattered Tree, or Large Tree in a Patch (DELWP, 2017a), where:

A patch of native vegetation is:

- 1. an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or
- 2. 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'
- 3. 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' being greater than three 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 three 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 Vegetation Quality Assessment (VQA) was undertaken for all patches of native vegetation using the Habitat Hectares methodology as described in the *Vegetation Quality Assessment Manual – guidelines for applying the habitat hectare scoring method* (DSE, 2004) and Scattered Trees assessed using the criteria outlined in the Guidelines (DELWP 2017a). For further details on terms listed above, please refer to the Glossary.

Native vegetation was assessed using the 'Vegetation Quality Field Assessment Sheet' (version 1.3) provided by DELWP in conjunction with EVC benchmarks for the Victorian Volcanic Plain, Central Victorian Uplands, Victoria Riverina, and Northern Inland Slopes bioregions. Native Vegetation was classified as an EVC based on the biophysical characteristics outlines in the EVC benchmarks such as geology, vegetation, and species composition. The DELWP 2005 EVC layer was also reviewed to determine the correct EVC. Individual patches are termed Habitat Zones (HZ) in accordance with DELWP terminology.

The number, DBH, and circumference (in centimetres measured at 1.3 metres above ground level) of Large Trees in Patches and Scattered Trees 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 ± 5 five meters depending on access to satellites.

In some instances, trees could not be accurately recorded due to private land access restrictions. Where trees could be observed from outside private property, a visual estimate of DBH was used to determine whether it was a large or a small Scattered Tree. If a tree could not be observed clearly, a

conservative approach was adopted. In these cases, aerial image interpretation was used to mark the location of the tree and the tree was recorded as 'not assessed'. The tree was assigned the large tree DBH for the most relevant EVC in that location.

Where existing vegetation had been mapped by KBR (2020b) and was contiguous with unmapped vegetation in the updated investigation area, the extent, quality, and threatened community criteria (where applicable) were reviewed. Where mapped values were consistent with on-ground conditions, vegetation mapping was extended; however, if it was considered not to accurately represent vegetation within the investigation area, information was updated using the VQA method.

As per the method described in Section 2.6.1.1, native vegetation, including Scattered Trees and Large Trees in Patches, up to 15 m from the project area were mapped to inform indirect impacts to Tree Protection Zones (TPZ). Where a patch of native vegetation extended past the 15 m buffer, the patch mapping was extended to provide context to native vegetation located immediately outside the 15m buffer. Where EVC patch mapping was extended, Large Trees in Patches were not mapped but rather counted to inform Large Tree scoring for the Habitat Hectare assessment.

2.4.2 Preliminary arborist assessment

A preliminary evaluation of native trees was undertaken to assess which trees may require an arborist assessment to inform the calculation of native vegetation losses during the finalisation of the design. The reference design for the investigation areas was used to broadly identify:

- scattered 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 adjacent to an investigation area for which the boundary encroaches at least 10% into their TPZ which will require guidance from an arborist on whether they will be deemed lost or retained.
- trees for which there is no possibility of retention, and hence do not need further survey.

Information gathered as part of this impact assessment was used to inform the 15 m buffer distance described in Section 1.4.2 to determine native vegetation impact. This information will also be provided to ARTC to inform an arborist assessment following refinement of 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.

2.4.3 Targeted flora surveys

KBR (2020a) identified 18 investigation areas for targeted survey work; however, only 12 investigation areas were surveyed due to land access restrictions on private land. While no further targeted flora surveys were conducted, the detailed field assessment undertaken by AECOM covered these additional areas and notes around habitat suitability and incidental records of threatened flora species were noted and included as part of the results of the assessment.

2.4.4 Threatened ecological communities

Patches of native vegetation were assessed against the criteria for the listed Threatened Ecological Communities (TECs) previously identified within the investigation area by KBR (2020a). KBR (2020a) identified the following EPBC Act-listed and FFG Act-listed TECs within their investigation area:

- EPBC Act
 - 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 Grassland (WBYBBRGGW).
- FFG Act
 - Victorian Temperate Woodland Bird Community (VTWBC)

A precautionary approach was applied when considering whether a patch met the criteria listed for each TEC as some EVCs that are not listed as synonymous with a TEC may contain characteristics which align with the listing criteria. For 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 TECs criteria are summarised in Table 3. In addition, the VTWBC community description does not contain clear criteria for inclusion as the listed community.

Where patches of native vegetation were contiguous with TECs mapped by KBR, or if synonymous EVCs were found within the investigation area, the extent, quality, and species composition were compared against the listing criteria for the relevant EPBC and FFG Act-listed TECs to determine whether the TEC was present.

Results from KBR (2020a, b) and the occurrence of a TEC within the investigation area are incorporated into results in Section 3.0.

Table 3 Threatened Ecological Communities listed under the EPBC and FFG Acts and synonymous EVCs
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EVC Name	Bioregion	EPBC Act-listed TEC	FFG Act-listed TEC
EVC 55_61 – Plains Grassy Woodland	Central Victorian Uplands Northern Inland Slopes Victorian Riverina	Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	Grey Box – Buloke Woodland Community Victorian Temperate Woodland Bird Community
EVC 55_62 – <i>Riverina</i> Plains Grassy Woodland (<i>syn.</i> Plains Woodland)	Victorian Riverina	Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	Grey Box – Buloke Woodland Community Victorian Temperate Woodland Bird Community
EVC 55 – Plains Grassy Woodland	Victorian Volcanic Plain	Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Western Basalt Plains (River Red Gum) Grassy Woodland community
EVC 61 – Box Ironbark Forest	Central Victorian Uplands Northern Inland Slopes Victorian Riverina	Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	Grey Box – Buloke Woodland Community Victorian Temperate Woodland Bird Community
EVC 175_61 – Grassy Woodland	Central Victorian Uplands	Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	Grey Box – Buloke Woodland Community Victorian Temperate Woodland Bird Community

EVC Name	Bioregion	EPBC Act-listed TEC	FFG Act-listed TEC
EVC 175_61 – <i>Low rises</i> Grassy Woodland	Northern Inland Slopes Victorian Riverina	Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South- eastern Australia White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grasslands	Grey Box – Buloke Woodland Community Victorian Temperate Woodland Bird Community

2.5 Desktop mapping of ecological values

2.5.1 No access during field assessment

Access to private property was only partially available during the field assessment conducted between October 2020 and December 2020 for three investigation areas (1006, 1011, and 1116). Assessment of biodiversity values for these sites was therefore based on a combination of desktop and field assessments. Only investigation area 1009 had no access to private property and was assessed entirely by desktop assessment (Table 4 and Appendix C).

2.5.2 Modified project areas

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

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

For each investigation area with a modified project area, a desktop assessment was undertaken to determine whether the additional areas not subject to field assessment had the potential to contain native vegetation. The desktop assessment comprised the following:

- Aerial imagery was used to identify whether the additional areas contained vegetation or were comprised of disturbed areas such as rail ballast, roads, gravel or paved areas.
- Aerial imagery and knowledge from field assessments of adjacent areas (where available) was
 used to interpret the presence of patches of trees and Scattered Trees as an indication of the
 potential presence and extent of native vegetation for the investigation areas (Appendix C). For
 example, where a patch of vegetation and/or TEC was mapped in the field and occurred within
 or immediately adjacent to a modified project area, its extent was extended.
- EVCs were assigned to the treed patches based on DELWP modelled EVC datasets and/or observations during the field assessment of adjacent areas.
- Scattered Trees were assigned to the large tree benchmark of the relevant EVC.
- Condition of patches of potential native treed vegetation was assigned using the Native Vegetation Condition map in the NVIM online tool in accordance with section 3.2 of DELWP (2017a) for areas where native vegetation is not subject to a site assessment. The Native Vegetation Condition modelled dataset is presented at a 75 x 75 m scale with each grid square assigned one of the following five Habitat Hectare score classes: 0.00 0.20, 0.21 0.40, 0.41 0.60, 0.61 0.80, or 0.81 1.00. Taking a conservative approach, the upper value of each class was used when assigning native vegetation condition scores to desktop defined patches of native vegetation.
- Areas of potential treeless native vegetation were conservatively identified for all areas where
 vegetation was visible on the aerial photography, unless information from field assessments of
 adjacent areas provided confidence that the vegetation was dominated by exotic species.

The number of large trees in patches, the species and DBH of Scattered Trees, the presence of TECs, and habitat for threatened species was not able to be determined via the desktop assessment for the additional areas as these values can only be identified via field assessment.

Of the 87 investigation areas with project area additions (Table 4), 64 were identified through the desktop assessment to contain patches of trees, Scattered Trees, and/or potential treeless vegetation and 23 were areas of existing rail infrastructure, paved roads or footpaths, or exotic vegetation. Field assessment is proposed for the additional areas within the 64 investigation areas to validate the values identified by the desktop assessment, confirm EVC and condition of patches, and assess the presence of those values unable to be identified through the desktop assessment. The assessment will include those project areas for which no or only partial access was available during the field assessment. Field assessment is scheduled for the second half of 2021.

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

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

Table 4	Overhead powerline investigation areas that required the use of desktop data for part or all of the site
	overhead powernine investigation areas that required the use of desktop data for part of an of the site

*Site had partial access during the field assessment.

2.6 Impact assessment

Potential implications of the Project in relation to relevant biodiversity legislation and policy was informed by the following methods.

2.6.1 Native vegetation impact calculation method

Calculating the native vegetation impact for the project area required a number of considerations based on the Assessors Handbook (DELWP, 2018b), advice from DELWP, and the project area (access tracks, construction activities, and locations) provided by ARTC. These considerations are discussed below.

2.6.1.1 Determining impact extent

Following discussion with ARTC, it was determined that impacts outside of the project area, i.e. within the 15 m buffer were unlikely to occur as large-scale excavation at the margins of the project area were not required. Hence, it was assumed that 100% of vegetation would be lost from the project areas but no impacts would occur in the 15 m buffer area.

Impacts to some patches of TECs resulted in the remainder of the impacted patch falling below the extent necessary to meet the criteria for that TEC. Where this occurred, the whole patch of the TEC was considered lost and is included in calculation of residual impacts. TECs impacted by this assumption include:

- GBGW (extent threshold = 0.5 ha)
- WBYBBRGGW (extent threshold = 0.1 ha).

2.6.1.2 Overlap with enhancement site, track slew and signal gantry project areas

Overlap between 30 overhead powerline project areas and enhancement sites, track slews, and signal gantry project areas occurred throughout the Project. Where this overlap occurred, the impact was assigned to the relevant enhancement site, track slew, or signal gantry project area and is presented in AECOM (2021). This area of impact overlap has been excised from the current report to avoid any repetition and hence overstatement of impacts.

2.6.2 Calculating landscape context scores

Due to the large extent of land within the investigation areas, and the large number of habitat zones assessed, an automated method for calculating 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, 2004). 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 NVR2017 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 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%. 2 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, they were actually part of a much larger and linear patch of native vegetation. Thus, their distance to core area as described by the VQA manual (DSE, 2004). was considered continuous and these patches received an appropriately high score.

2.6.3 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). 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.

2.6.3.1 '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 they represent vegetation that is 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 majority of former area (DELWP, 2020).

2.6.3.2 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.

2.6.3.3 Strategic Biodiversity Values

DELWPs 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.

2.6.3.4 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 5). 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 5	CaLP Act Declared Noxious Weed Management requirements
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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 landowners 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. Landowners, 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. Landowners 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 AECOM (2021a). As part of that assessment, a method was developed to estimate the number of large old trees (either scattered or within patches) which may contain hollows. Using a comparison between known hollow-bearing trees and large trees mapped during the vegetation quality assessments at the five enhancement sites, an average ratio of 0.65 hollow-bearing trees for each large tree was identified. This ratio has been applied to large trees in patches and large scattered trees identified for the overhead powerline investigation areas.

It is acknowledged that hollows may also occur in trees that do 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). Nonetheless, 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 fragmentation

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

Habitat connectivity for woodland birds and mammals was considered as part of the assessment of potential impacts of the overhead powerlines package of works for the Project. The overhead powerlines investigation areas are associated with existing services and assets and as such, it is not considered that the works needed to be undertaken will exacerbate and existing connectivity issues for faunal groups.

2.7 Assumptions and limitations

The findings of this report are 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 Victorian Biodiversity Atlas (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 image interpretation. The accuracy of the mapping is subject to the accuracy of the units and access to satellite information (generally ± 5 metres). As such, these points should not be relied on for detailed design purposes but are considered accurate for impact determination.
- Targeted survey for threatened flora and fauna species was not part of the scope for the current assessment.
- 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. Fish and aquatic invertebrates were not recorded but were considered as part of this assessment.
- 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 area which forms part of the overall Project. 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

- The Victorian status of flora and fauna species for this assessment was based on the FFG Act Threatened List (DELWP, 2019a) and Advisory Lists (DSE, 2009, 2013; DEPI, 2014). Although the *Flora and Fauna Guarantee Amendment Act 2019* (FFG Amendment Act) took effect on 1 June 2020, the review of species status had not been completed at the time the field assessments and preparation of the draft report. The revised threatened species list was gazetted on 1 May 2021 and released in June 2021 (DELWP, 2021). Any changes that result from the review under the FFG Amendment Act will be addressed at the detailed design stage.
- 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 exceptions to this are Scattered Trees and Large Trees in Patches which are required to be mapped in accordance with the Guidelines.
- Sixty-four of the 123 overhead powerline investigation areas were partially assessed via desktop, and investigation area 1009 was wholly assessed via desktop, due to restricted land access and/or due to modification to project areas after field assessment. At these locations, the desktop assessment method described in Section 2.5 was applied. A field assessment of the desktop areas is proposed to accurately map native patch vegetation quality and extent, map and measure the DBH of Large Trees in Patches and Scattered Trees, and identify presence of potential TECs and habitat for threatened species.
- The potential occurrence of treeless native vegetation, the number of large trees in patches, the species and DBH of Scattered Trees, the presence of TECs, and habitat for threatened species was not able to be determined via the desktop assessment for the additional areas as these values can only be determined via field assessment.
- ARTC have advised that the project areas contain existing access tracks and that upgrades to
 existing access tracks are not required. While these have been included the calculation of potential
 impacts, it is anticipated that the overall impact from overhead powerline works will be reduced
 during detailed design.

3.0 Existing conditions

Existing conditions are presented as an overview for the investigation area (Section 3.1) followed by an outline of ecological values relevant to each LGA (Section 0 to 3.7) in anticipation that the information will be required for separate planning permit applications. Biodiversity values by LGA are detailed in Appendix D and trees are listed in Appendix E. Detailed VQA assessment results (habitat hectare data) are provided in Appendix F for each LGA.

Potential impacts to ecological values are discussed in Section 4.0.

3.1 Powerline investigation area

The following outline of existing conditions combines the results from KBR (2020a) with the findings of the current ecological assessment to provide a consolidated list of ecological constraints for the investigation area.

3.1.1 General description of the investigation area

The Project passes through the Victorian Volcanic Plain, Central Victorian Uplands, Northern Inland Slopes, and Victoria Riverina bioregions. Investigation areas are generally located within or adjacent to heavily modified environments such as rail and road corridors. In areas where powerlines cross the rail, canopy trees and shrubs have been removed during past clearance events and only the modified example of the community remains. In some locations higher quality remnants are located adjacent to investigation areas which are consistent with a TEC, notably GBGW or WBYBBRGW. Outside of these areas, investigation areas are generally located within previously cleared private land or within rural town centres.

Vegetation communities comprised numerous EVCs (Section 3.2.1.1) but Plains Grassy Woodland (EVC 55), Plains Woodland (803) and Grassy Woodland (175) were the most dominant. EVCs varied in both extent and quality and in private land had been modified through past clearance, typically associated with agricultural activity.

Native vegetation within the rail corridor itself was the highest quality due to its continuity, width (varying between 20 m and 80 m wide), and relatively intact understorey supporting a variety of lifeforms and large trees. Where mature canopy was present, it generally consisted of a mix of Eucalypt species 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 supported a mix of mid-storey shrubs including *Acacia sp*. (numerous species) and Sifton Bush *Cassinia sifton*, Gorse Bitterpea *Daviesia ulicifolia*. The ground cover was sparse but generally comprised species such as Spinyheaded Mat-rush *Lomandra longifolia*, Pale Flax-lily *Dianella longifolia s.l.*, and Kangaroo Grass *Themeda triandra*.

Vegetation within the rail corridor was more likely to represent a TEC such as GBGW due to its higher quality and composition of species.

The rail corridor also contained a number of drainage lines, culverts, and river/tributary crossings which contained native wetland species such as Cumbungi *Typha* spp., Common Spike-rush *Eleocharis acutus*, and Common Swamp Wallaby-grass *Amphibromus nervosus*, as well as exotic species such as Toowoomba Canary-grass *Phalaris aquatica*, Drain Flat-sedge *Cyperus eragrostis*, and Blackberry *Rubus polyanthemus*.

Vegetation associated with regional town centres was generally a mix of planted exotic tree species such as Pin Oak *Quercus palustris*. Some of the local parks and reserves such as Lions Park, Broadford contained disturbed but intact remnant native vegetation and a mature, developed canopy of River Red Gums.

Several weed species were also present throughout mapped vegetation, which reflects the disturbed nature of the environments. A list of noxious weeds is provided in Section 4.2.5.

3.1.2 Native vegetation

3.1.2.1 Ecological Vegetation Classes (EVCs)

Eighteen EVCs were recorded in the overhead powerline investigation area. These EVCs are summarised for each bioregion, along with their Bioregional Conservation Status (BCS) in Table 6. A description of each EVC across the investigation area is provided in Table 7. EVCs found in each LGA are described in Sections 0 to 3.7.

EVC Number	EVC Name	Biore	Bioregional Conservation Status				
EVC Number		VVP	CVU	NIS	VR		
18	Riparian Forest	V	V				
23	Herb-rich Foothill Forest		D				
47	Valley Grassy Forest		V	E			
55	Plains Grassy Woodland	E	E				
55_61	Plains Grassy Woodland				E		
56	Floodplain Riparian Woodland				V		
61	Box-Ironbark Forest		V		V		
67	Alluvial Terraces Herb-rich Woodland			E	V		
68	Creekline Grassy Woodland		E		E		
83	Swampy Riparian Woodland	E					
127	Valley Heathy Forest		V				
175	Grassy Woodland			E			
175_61	Grassy Woodland		E				
175_61	Grassy Woodland (Low Rises)		E	E			
292	Red Gum Swamp		E				
803	Plains Woodland			E	E		
815	Riverine Swampy Woodland				V		
819	Spike-sedge Wetland				V		
821	Tall Marsh	D			D		
N/A	Wetland		NI	D			

Table 6 EVCs identified within each Bioregion in the investigation area

ND=Not Described, D=Depleted, V=vulnerable, E=Endangered

Table 7 Descriptions of EVC identified within the investigation area

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
18	Riparian Forest	CVU (V), VVP (V)	Riparian Forest is typically a forest to 30 m tall associated with riverbanks 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 LTs and a moderate-quality understorey to heavily disturbed patches of understorey species and weeds.	
23	Herb-rich Foothill Forest	CVU (D)	This was identified during the desktop assessment as a modelled EVC. This was not assessed during the field assessment and so a description is not available.	Not available

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
47	Valley Grassy Forest	CVU (V), NIS (E)	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 <i>Eucalyptus</i> <i>melliodora</i> and to a lesser degree by Narrow-leaf Peppermint. Moving further north into the NIS the EVC included a mix of Blakely's Redgum <i>Eucalyptus</i> <i>blakeyi</i> and Red Box <i>Eucalyptus</i> polyanthemos. 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</i> <i>umbellata</i> .	
55	Plains Grassy Woodland	CVU (E), VVP (E)	Plains Grassy Woodland (PGW) is an open woodland to 15m 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 character canopy species; however, patches of PGW within the investigation area generally contained River Red Gum, Grey Box, and Yellow Box canopies similar to the description for VR. Within the investigation area the EVC was 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> .	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
55_61	Plains Grassy Woodland	VR (E)	In the VR 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. Patches of both varied in quality and contained native grass and herbaceous species such as Common Wheat-grass <i>Anthosachne scabra s.l.</i> , Nodding Saltbush <i>Einadia nutans</i> ssp. <i>nutans</i> , and Common Everlasting <i>Chrysocepahlum apculatum</i> <i>s.l.</i>	
55_62	Plains Grassy Woodland (Riverina)	VR (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 description of EVC within the investigation area.	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
56	Floodplain Riparian Woodland	VR (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>Cycnogeton procerum s.s</i> , and Swamp Wallaby- grass <i>Amphibromus</i> spp.	
61	Box-Ironbark Forest	CVU (V), VR (V)	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</i> <i>macrorhyncha</i> and Red Ironbark <i>Eucalyptus tricarpa</i> . Within the VR, the canopy species varies and can also include Grey Box and Mugga <i>Eucalyptus</i> <i>sideroxylon s.s.</i> , and Yellow Gum <i>Eucalyptus</i> <i>leucoxylon</i> . 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 Shiny Everlasting <i>Xerochrysum viscosum</i> , Gold-dust Wattle <i>Acacia</i> <i>acinacea</i> , and Bristly Wallaby-grass <i>Rytidosperma</i> <i>setaceum</i> .	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
67	Alluvial Terraces Herb- rich Woodland	NIS (E), VR (V)	Alluvial Terraces Herb-rich woodland in an open woodland that occurs on broad alluvial plains and along ephemeral drainage lines on duplex soils that typically contain a clay subsoil. The EVC is generally characterised by a low shrub cover and high species-richness of the ground-layer but with a low biomass, particularly in summer. In the investigation area, the sites were generally disturbed, lacking canopy cover, and of lower quality but contained a high species-richness in the ground layer including Sun-orchid <i>Thelymitra</i> spp., Spur Velleia <i>Velleia paradoxa</i> , Shiny Everlasting, Blue Finger-flower <i>Cheiranthera linearis</i> , Long-hair Plume-grass <i>Dichelachne crinita</i> , and Supple Spear- grass <i>Austrostipa mollis</i> .	
68	Creekline Grassy Woodland	CVU (E), VR (E)	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. Within the investigation area the community was considered low diversity 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.	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
83	Swampy Riparian Woodland	VVP (E)	Swampy Riparian Woodland generally occurs along drainage lines with a canopy dominated by Swamp Gum and a shrubby understorey. Within the investigation area, patches of Swampy Riparian Woodland are highly modified and dominated by Blackwood <i>Acacia melanoxylon</i> and Black Wattle <i>Acacia mearnsii.</i>	
127	Valley Heathy Forest	CVU (V)	Valley Heathy Forest is typically a low open forest with a prominent ericoid shrub layer and a grassy ground layer. The EVC typically comprises as canopy of Yellow Box, Bundy <i>Eucalyptus goniocalyx</i> and Red Stringybark. Within the investigation area the EVC was present around Wandong and comprised a canopy of Silver- leaf Stringy Bark <i>Eucalyptus cephalocarpa</i> and Messmate <i>Eucalyptus obliqua</i> over a diverse understorey of shrubs, herbs, and grasses.	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
175	Grassy Woodland	CVU (E)	This EVC is described as a variable open Eucalypt woodland over a diverse ground layer of grasses and herbs, and a sparse shrub cover. Within the investigation area the canopy contained a number of Eucalypt species including River Red Gum, Yellow Box, Grey Box, Red Box, Red Ironbark <i>Eucalyptus tricarpa</i> , and Red Stringybark. The understorey was generally disturbed and contained a higher cover of shrubs than other lifeforms.	
175_61	Grassy Woodland (Low Rises)	NIS (E), VR (E)	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 ow and 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. 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.	

27

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
292	Red Gum Swamp	CVU (E)	Red Gum Swamp EVC typically exists as a eucalypt woodland atop a sedgy/grassy understorey and supports a suite of species tolerant to periods of inundation. Dominant sedge species include Poong'ort <i>Carex tereticaulis</i> , Common Spike-rush <i>Eleocharis acuta</i> , <i>Poa labillardierei</i> and Common Swamp wallaby-grass <i>Amphibromus nervosus</i> . Within the investigation area only one patch of Red Gum Swamp was identified at the Marchbanks Road Overbridge enhancement site in a wetland that is thought to be permanently inundated.	
803	Plains Woodland	NIS (E), VR (E)	In both bioregions, Plains Woodland is listed as synonymous with Riverina Plains Grassy Woodland as described above.	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
815	Riverine Swampy Woodland	VR (V)	Riverine Swampy Woodland is characterised a River Red Gum and/or Black Box canopy over a grassy to sedgy – herbaceous ground layer. Generally sitting higher on the riverine floodplain, it experiences periodic inundation, with species indicative of this. Within the investigation area, this EVC was characterised by an overstorey of mature River Red Gum and an understorey dominated by weeds.	
819	Spike-sedge Wetland	VR (V)	Spike-sedge wetland EVC is typically treeless and supports a variety of rhizomatous sedge species capable of surviving periods on inundation. 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</i> <i>inversa</i> , Tall Sedge, Common Spike-sedge, Water- plantain <i>Alisma plantago-aquatica</i> , Poong'ort, and Water Plantain	

EVC No.	EVC name	Bioregion (BCS) ¹	Description	Representative photo
821	Tall Marsh	VR (D), VVP (D)	Tall Marsh exists as a wetland dominated by emergent graminoids (sedges, rushes, and reeds) tolerant to inundation. 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</i> <i>australis</i> , and Water Milfoil <i>Myriophyllum</i> sp., along with common weeds such as Toowoomba Canary- Grass and Blackberry.	

¹D = Depleted; E = Endangered; V = Vulnerable

3.1.2.2 Patches

A total of 235 patches (Habitat Zones) of native vegetation was recorded across the investigation area. These patches represent a total of 99.647 hectares of native vegetation (Table 8).

Vegetation quality scores for each of the habitat zones were based on the assessment of the floral and structural characteristics within each habitat zone and considered the extent of native vegetation within the surrounding landscape as detailed in the Habitat Hectare methodology (DSE, 2004). Across the investigation area, a total of 235 Habitat Zones (patches) were recorded. Habitat Hectare scoring was completed for each of the patches and is provided in Appendix F. These patches represent a total of 99.647 hectares of native vegetation (Table 8).

Table 8	Summary of EVCs that intersect the investigation areas
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EVC	Number of patches	Extent
Alluvial Terraces Herb-rich Woodland (67)	6	0.851
Box Ironbark Forest (61)	6	2.620
Creekline Grassy Woodland (68)	8	1.501
Floodplain Riparian Woodland (56)	9	3.133
Grassy Woodland (175)	8	1.174
Grassy Woodland (175_61)	16	6.966
Grassy Woodland (Low Rises) (175_61)	30	7.481
Herb-rich Foothill Forest (23)	2	0.238
Plains Grassy Woodland (55)	27	17.747
Plains Grassy Woodland (55_61)	18	1.731
Plains Woodland (803)	63	14.904
Red Gum Swamp (292)	1	0.688
Riparian Forest (18)	4	0.225
Riverine Swampy Woodland (815)	3	0.788
Spike-sedge Wetland (819)	4	0.490
Swampy Riparian Woodland (83)	1	0.022
Tall Marsh (821)	8	0.480
Valley Grassy Forest (47)	14	8.820
Valley Heathy Forest (127)	6	0.853
Wetland	1	28.934
Total	235	99.647

3.1.2.3 Trees

A total of 340 trees were recorded through desktop and field assessment, comprising 200 Scattered Trees (96 large and 104 small) and 140 Large Trees in Patches. A summary of the native trees recorded by the desktop and field assessments within the investigation area, the species, and size classification is presented in Table 9.

The dominant tree species across the investigation area (including Large Trees in Patches) was Grey Box, while sub-dominant species were River Red Gum and Blakely's Red Gum. The size class of

scattered indigenous trees was determined by the EVC benchmark for each EVC across the five bioregions as per methods prescribed in DELWP (2017a).

A complete list of trees recorded in the investigation area is provided in Appendix E and their location is shown in Figure 3.

Table 9 Summary of trees within the investigation area

Tree Categorisation							
Small Scattered Tree		Large Scattered Tree		Large Trees in Patch			
Field	Field Desktop		Desktop	Field	Desktop		
93	11	32	64	117	23		

3.1.2.4 Hollow-bearing trees

Applying the ratio of 0.65 hollow-bearing trees to the large trees identified in Section 3.1.2.3, an estimated 153 trees within the overhead powerlines investigation area contain hollows.

3.1.2.5 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. The location of these patches with respect to the investigation areas is presented in Figure 5 (Appendix A). Overall, 11 EVCs across four bioregions with a BCS of endangered were recorded, representing a total extent of 54.979 ha.

Table 10 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.

EVC Name	Extent (ha) recorded
Alluvial Terraces Herb-rich Woodland (67)	0.793
Creekline Grassy Woodland (68)	1.501
Grassy Woodland (175)	1.174
Grassy Woodland (175_61)	6.966
Grassy Woodland (Low Rises) (175_61)	7.481
Plains Grassy Woodland (55)	17.747
Plains Grassy Woodland (55_61)	1.731
Plains Woodland (803)	14.904
Red Gum Swamp (292)	0.688
Swampy Riparian Woodland (83)	0.022
Valley Grassy Forest (47)	1.971
Total	54.979

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

3.1.2.6 High quality native vegetation

As discussed in Section 2.6.3.2, 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.

Overall, 71 patches totalling 62.191 ha of high-quality native vegetation was recorded. These areas of vegetation are assessed as higher quality as they scored highly across all VQA scoring parameters and achieved an overall score of \geq 0.60.

3.1.2.7 Strategic Biodiversity Values

Figure 6 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. The SBV range contained within each LGA is summarised in the respective sections. As outlined in Section 2.6.3.3, 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.

3.1.2.8 Mapped wetlands

The Current Wetlands Map identified a single mapped wetland that intersected investigation area 1022. The wetland is within the Mitchell Shire LGA and Goulburn Broken CMA (Figure 3 – Appendix A). This wetland lies north of the investigation area 1022 and is fringed by Habitat Zone 204 mapped as Floodplain Riparian Woodland EVC. In total, the mapped wetland is part of a larger wetland that equates to 28.93 ha of native vegetation.

3.1.3 Threatened species and ecological communities

The likelihood of threatened species and communities occurring in the project area was completed as part of the desktop assessment (ABZECO, 2019). Threatened ecological communities and species identified with a moderate or high likelihood of occurrence were summarised in Table 2 of KBR (2020a). An extract of the table is provided in Table 11.

Common name	Scientific name	EPBC Act	FFG Act
Threatened ecological commu	nity		
Grey Box Grassy Woodland Der eastern Australia (GBGW)	ived Native Grasslands of South-	EN	-
White Box – Yellow Box – Blakel Native Grassland (WBYBBRGW	y's Red Gum Woodland and Derived)	CR	-
Threatened flora		•	
Clover Glycine	Glycine latrobeana	VU	threatened
Crimson Spider Orchid	Caledenia concolor	VU	threatened
Deane's Wattle	Acacia deanei	-	threatened
Euroa Guinea-flower	Hibbertia humifusa subsp. erigens	VU	threatened
Mountain Swainson-pea	Swainsona recta	EN	threatened
Narrow Goodenia	Goodenia macbarronii	-	threatened
Northern Sandalwood	Santalum lanceolatum	-	threatened
Purple Diuris	Diuris punctata var. punctata	-	threatened
Warby Range Swamp Gum	Eucalyptus cadens	V	threatened

Table 11 Potential threatened species and communities from desktop assessment

Common name	Scientific name	EPBC Act	FFG Act
Threatened fauna			
Barking Owl#	Ninox connivens	-	threatened
Brown Toadlet	Pseudophryne bibronii	-	threatened
Brush-tailed Phascogale	Phascogale tapoatafa	-	threatened
Golden Sun Moth	Synemon plana	CR	threatened
Grey-headed Flying-fox	Pteropus poliocephalus	VU	threatened
Growling Grass Frog	Litoria raniformis	VU	threatened
Powerful Owl#	Ninox strenua	-	threatened
Regent Honeyeater#	Anthochaera phrygia	CR	threatened
Sloane's Froglet	Crinia sloanei	EN	-
Squirrel Glider	Petaurus norfolcensis	-	threatened
Striped Legless Lizard	Delma impar	VU	threatened
Swift Parrot#	Lathamas discolor	CR	threatened
Turquoise Parrot#	Neophema pulchella	-	threatened
Blue-billed Duck	Owyura australis	-	threatened
Diamond Firetail#	Stagonopleura guttata	-	threatened
Bush Stone-curlew#	Burhinus grallarius	-	threatened
Freckled Duck	Stictonetta naevosa	-	threatened
Eastern Great Egret	Ardea modesta	-	threatened
Intermediate Egret	Ardea intermedia	-	threatened
White-bellied Sea-eagle	Haliaeetus leucogaster	-	threatened

Source: KBR (2020a). Key: VU – vulnerable, EN – endangered, CR – critically endangered, # - member of Victorian Temperate Woodland Bird Community

3.1.3.1 Threatened flora species

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

- 4. Euroa Guinea-flower *Hibbertia erigens* subsp. *erigens* which was recorded at investigation area 1047 south of Euroa. KBR (2020a) recorded 82 individual plants at this location in 2019, with two of those individuals located within or in close proximity to the investigation area. Approximately 256 plants were recorded at this location during the most recent field assessment.
- 5. Mountain Swainson-pea *Swainsona recta* identified south of Glenrowan adjacent to investigation area 1078. The presence of plant guards around these plants suggested that they may have been planted and this was confirmed by DELWP (D. Pendavingh, DELWP, pers. comm., 21/6/2021).

One FFG Act listed flora species has been recorded within the investigation area:

 Buloke Allocasuarina luehmannii which was recorded within and adjacent to investigation area 1042, between Avenel and Longwood. Sixteen individuals were recorded in 2019 (KBR, 2020a). Potential habitat for Purple Diuris (FFG Act listed) was also identified adjacent to investigation area 1088 in 2019 (KBR, 2020a).

Five species listed as threatened in Victoria on the *Advisory list of threatened flora* (DEPI, 2014), but not listed under the FFG Act or EPBC Act, were also recorded in the investigation area. These species were:

- Cottony Cassinia *Cassinia ozothamnoides* located at investigation area 1041. This species was observed in 2019 (KBR, 2020a) and approximately 50 individuals were recorded on the east and west side of the railway line during the most recent field assessment.
- Late-flower Flax-lily *Dianella tarda* located at investigation area 1012, 1041 and 1046. This species
 was observed in 2019 (KBR, 2020a) and approximately 15 individuals were recorded during the
 most recent field assessment.
- Basalt Podolepis Podolepis linearifolia located at investigation area 1078 in 2019 (KBR, 2020a).
- Golden Cowslips *Diuris behni* recorded at investigation area 1088 in 2019 (KBR, 2020a).
- Glaucous Flax-lily *Dianella longifolia* var. *grandis* was recorded at investigation areas 1040, 1041, 1042, 1047.

Numerous species of flora that are protected under the FFG Act but not listed as threatened were also recorded in the investigation area. A summary of threatened and protected flora species recorded within the investigation area is provided in Table 58 (Section 4.2.3.3).

3.1.3.2 Threatened fauna species

Potential habitat was identified in the investigation area for three EPBC Act-listed fauna species:

- Growling Grass Frog Litoria raniformis (also listed under the FFG Act) at four locations (Figure 4 -Appendix A). These were:
 - Three locations proximal to Merri Creek, a catchment known to support an important metapopulation of Growling Grass Frog (Clemann & Gillespie, 2012).
 - Investigation area 1002 on Kelby Lane, Wallan comprised of aquatic habitat at Merri Creek which is located 5m from the project area (KBR, 2020a).
 - Investigation area 1001 along Wallan Whittlesea Road, Wallan where a small tributary to Mittagong Creek crosses the project area under a culvert to the south (KBR, 2020a). The tributary enters Mittagong Creek near the confluence with the Merri Creek.
 - Adjacent to investigation area 1003 comprised of a pond and Merri Creek (KBR, 2020a).
 - One location near Glenrowan: Investigation area 1076. Habitat noted in this area was comprised of an approximately 5 m wide low-lying area that extends parallel to the rail and supports Spike-sedge Wetland (EVC 819). The area is connected to a tributary of Eleven Mile Creek and Show Creek south of Glenrowan. There are two historic records (both from 1982) of Growling Grass Frog on the VBA; one 2.9 km north-east and the other 4.4 km north-west of the project area. The persistence of Growling Grass Frog in the local area is unknown therefore the possibility that this area could provide habitat for the species cannot be discounted.
- Golden Sun Moth Synemon plana (also listed under the FFG Act) at:
 - Investigation area 1013 near Broadford which traverses an area of tussock grasses and needle-grass and is located close to VBA records of the species (Figure 4 – Appendix A).
 Habitat within the investigation area itself is less suitable with an absence of tussock grass cover and dense regenerating eucalypts and overstorey trees.
- Sloane's Froglet Crinia sloanei at:
 - Investigation area 1110 near Wenkes Road in the Chiltern Valley (Figure 4 Appendix A). Brown Toadlet (FFG Act listed, discussed below) was recorded calling in a drainage line at this location during field assessment in 2019 (KBR, 2020a).

- Striped Legless Lizard *Delma impar* at at two locations (Figure 4 Appendix A). These were:
 - Investigation area 1013 near Broadford which supports Grassy Woodland. While the area surrounding the overhead powerline has extensive open grassy structure which may support Striped Legless Lizard, habitat within the investigation area itself is less suitable with an absence of tussock grass cover and dense regenerating eucalypts and overstorey trees.
 - Investigation area 1088 near Glenrowan which supports Grassy Woodland (Low Rises) (175_61) vegetation. This investigation area has been identified as potential habitat based on its proximity to the Warby Ranges and relative intactness of the ground surface outside the rail corridor. As a semi-fossorial species, a key determinant of Striped Legless Lizard occurrence is the degree of soil disturbance and compaction.

Two threatened fauna species listed under the FFG Act were recorded in the investigation area:

- Diamond Firetail Stagonopleura guttata was observed at investigation area 1047 (Figure 4 -Appendix A) in 2019 (KBR, 2020a). This species is a member of the Victorian Temperate Woodland Bird Community that is listed as threatened under the FFG Act.
- Brown Toadlet *Pseudophryne bibroni* (also known as Bibron's Toadlet) was heard calling within a drainage line, near Wenkes Road west of Chiltern at investigation area 1110 (Figure 4 Appendix A) in 2019 (KBR, 2020a). 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.

Other species identified as having potential to occur during the desktop assessment (Table 11) are woodland species for which potential habitat is largely avoided by the powerline investigation areas. As such, the following species are not considered further in this assessment:

- EPBC Act Grey-headed Flying-fox (the known camp on Wodonga Creek is avoided), Swift Parrot
 and Regent Honeyeater which are highly mobile species that are likely to overfly and occasionally
 forage in planted and remnant trees, within or adjacent to, the investigation area. The species,
 however, are unlikely to make significant use of any of the vegetation or habitat present with the
 investigation area.
- FFG Act Barking Owl and Powerful Owl, Brush-tailed Phascogale (recorded during targeted survey of the Tallarook enhancement site in 2020), Squirrel Glider and Bush Stone-curlew.

3.1.3.3 Threatened ecological communities

EPBC Act listed threatened communities

Two threatened ecological communities have been recorded in the investigation area:

- Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia (GBGW), listed as endangered under the EPBC Act. This TEC was recorded at nine investigation areas and comprising a total extent of 20.805 hectares (Table 12).
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands (WBYBRGGW). Listed as critically endangered under the EPBC Act. This TEC was recorded at nine investigation areas during the most recent field assessment (Table 12). At the time of assessment, there was no access to the northern section of investigation area 1011, and so this area was subject to a desktop assessment. Investigation area 1110 has been refined and no longer impacts upon the listed community. This TEC comprised an area of 4.111 hectares

These TECs were identified based on the presence of a synonymous EVC as provided in Table 3. Each habitat zone identified as potentially supporting a TEC was subject to an assessment against the TEC threshold and listing advice. Where investigation areas have been modified, the desktop assessment process described in Section 2.5.2 has been undertaken. Two modified investigation areas, 1061 and 1087, had patches of GBGW and WBYBBRGGW respectively mapped during field assessment. The extent of these patches was extended to accommodate the modified areas based on an understanding of the investigation areas and/or the contiguous nature of the patches. The total additional area of TECs

mapped by the desktop assessment were 0.697 ha of GBGW at investigation area 1061 and 0.166 ha of WBYBBRGGW at investigation area 1087. These are included in the totals in Table 12.

Investigation areas where the GBGW and WBYBRGGW TECs were identified have (in most cases) been previously modified. Where the TEC was recorded, the community was often located outside the impact area within the adopted 15m buffer or adjacent to the investigation area. The GBGW TEC was identified as per the guidance in the TEC threshold criteria (DSEWPaC, 2012). The WBYBRGGW TEC was identified following the threshold criteria outlined in the White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands EPBC-Act Policy Statement (DoEH, 2006).

TEC		Investigation area	Total extent			
GBGW		1018, 1020, 1036, 1041, 1061, 1072, 1076, 1077, 1078	20.805			

1042, 1046, 1047, 1080, 1081, 1086, 1087, 1088, 1110

Table 12 Location and extent of GBGW and WBYBRGGW across the investigation areas

FFG Act listed ecological communities

WBYBRGGW

Two FFG Act listed ecological communities were identified for the investigation area:

- Victorian Temperate Woodland Bird Community (VTWBC) which is defined as a suite of bird species associated with drier woodlands on the slopes and plains north of the Great Dividing Range (DELWP, n.d.). These woodlands are mainly 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 (DELWP, n.d.).
- Victorian Lowland Riverine Fish Community of the Southern Murray Darling Basin (LRFCSMDB) which 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.).

Habitat for the VTWBC occurs within the investigation areas listed in Table 13. All patches containing a canopy component are considered to provide habitat for the community (DELWP, n.d.) adding additional significance to the native vegetation in these areas. Numerous powerline project areas were noted during the KBR (2020a) and current field assessments to support woodland habitat for VTWBC.

Two modified investigation areas, 1061 and 1087, had patches of VTWBC mapped during field assessment. During the desktop assessment, the extent of these patches was extended to accommodate the modified investigation areas based on site understanding from the field assessment and/or the contiguous nature of the patches.

LGA	Investigation areas	Total extent (ha)
Mitchell	1013, 1018, 1019, 1020, 1035, N10, N9	9.817
Strathbogie 1036, 1039, 1040, 1041, 1042, 1043, 1046, 1047		16.590
Benalla	1061, 1072, 1076, 1077	5.693
Wangaratta	1078, 1080, 1081, 1083, 1084, 1086, 1087, 1088, 1101	5.969
Indigo	1110, 1117	0.886
Wodonga	N/A	N/A

Table 13 Location and extent of VTWBC across the investigation areas

nt (ha)

4.455

Surveys for the Victorian Lowland Riverine Fish Community of the Southern Murray Darling Basin (LRFCSMDB) were not completed by KBR (2020a) or as part of the current assessment as the Powerline Project Area does not intercept any rivers or tributaries that are likely to support the TEC.

3.2 Mitchell Shire LGA existing conditions

3.2.1 Native vegetation

EVC's recorded across Mitchell Shire LGA are shown in Table 14. Scattered Tree and Large Trees in Patches results are shown in Table 15. An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.2.1.1 Patches of native vegetation

Seventy Habitat Zones (patches) were mapped during the VQA (see Figure 3). A VQA was completed for each of the patches using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 52.412 hectares of native vegetation.

Ten investigation areas did not support native vegetation – 1014, 1017, 1023, 1024, 1025, 1026, 1029, 1030, 1031, and 1033.

EVC	EVC no.	Number of patches	Extent (Ha)
Box Ironbark Forest	61	1	1.684
Creekline Grassy Woodland	68	3	0.127
Floodplain Riparian Woodland	56	5	2.028
Grassy Woodland	175_61	16	6.966
Herb-rich Foothill Forest	23	2	0.238
Plains Grassy Woodland	55	15	2.815
Plains Grassy Woodland	55_61	1	0.972
Red Gum Swamp	292	1	0.688
Riparian Forest	18	4	0.225
Swampy Riparian Woodland	83	1	0.022
Tall Marsh	821	3	0.011
Valley Grassy Forest	47	11	6.849
Valley Heathy Forest	127	6	0.853
DELWP Mapped Wetland	N/A	1	28.934
Total		70	52.412

Table 14 Summary of native vegetation within Mitchell Shire

3.2.1.2 Trees

A total of 88 trees were recorded by the desktop and field assessments within a 15m buffer of the investigation areas in Mitchell Shire LGA; this included 48 Scattered Trees (24 large and 24 small) and 40 Large Trees in Patches, as defined by the Guidelines (Table 15). These trees are listed in Appendix E and their location is shown in Figure 3 (Appendix A).

Table 15 Summary of trees within Mitchell Shire LGA

Tree Categorisation						
Small Scattered Tree		Large Scattered Tree		Large Trees in Patch		
Field	Desktop	Field	Desktop	Field	Desktop	
19	5	9	15	37	3	

3.2.1.3 Endangered EVCs

A total of 11.589 ha of endangered EVCs were recorded within Mitchell Shire at 14 investigation areas (Table 16).

Table 16 Summary of Endangered EVCs within Mitchell Shire LGA

Investigation areas	Total extent (ha)
1002, 1010, 1011, 1012, 1013, 1015, 1016, 1018, 1019, 1020, 1021, 1034, N10, N9	11.589

3.2.1.4 High quality native vegetation

A total of 36.391 ha of high quality native vegetation was recorded within Mitchell Shire at nine powerline sites (Table 17).

Table 17 Summary of high quality native vegetation within Mitchell Shire LGA

Investigation areas	Total extent (ha)	
1008, 1009, 1010, 1011, 1019, 1020, 1022, 1035, N9	36.391	

3.2.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 and ranged from 1 - 15 to 80 - 90. As outlined in Section 2.6.3.3, areas containing an SBV value of ≥ 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.

3.2.1.6 Mapped wetlands

A single mapped wetland on the Current Wetlands Map intersected investigation area 1022 (Figure 3). This wetland is fringed by Habitat Zone 204 mapped as Floodplain Riparian Woodland EVC.

3.2.2 Threatened ecological communities

TECs listed under the EPBC Act and FFG Act and recorded within Mitchell Shire LGA investigation areas are presented in Table 18 and Figure 4.

Table 18 Summary of TEC values within Mitchell Shire LGA

TEC	Legislation	Investigation area	Total extent (ha)
GBGW	EPBC	1018, 1020	1.151
VTWBC	FFG	1013, 1018, 1019, 1020, 1035, N10, N9	9.817

3.2.3 Threatened and protected species

One threatened flora species listed as VROTS and 15 species listed as 'Protected' under the FFG Act were identified within the Mitchell Shire LGA during the field assessments. The species, listing status, and investigation area is summarised in Table 19 and are presented in Figure 4.

Status	Scientific Name	Common Name	Investigation area
Р	Acacia acinacea	Gold-dust Wattle	1022
Р	Acacia pycnantha	Golden Wattle	1004, 1013, 1021
Р	Brunonia australis	Blue Pincushion	1006
Р	Chrysocephalum apiculatum s.l.	Common Everlasting	1003
Р	Coronidium scorpioides s.s.	Button Everlasting	1006
Р	Coronidium sp.	Everlasting	1004, 1021
Р	Correa sp.	Correa	1004
vu	Dianella tarda	Late-flower Flax-lily	1012
Р	Hardenbergia violacea	Purple Coral-pea	1003, 1004, 1006, 1021
Р	Leptorhynchos squamatus	Scaly Buttons	1004, 1021
Р	Prasophyllum sp.	Leek Orchid	1004
Р	Senecio quadridentatus	Cotton Fireweed	1003, 1004
Р	Thelymitra sp.	Sun Orchid	1004, 1006
Р	Thysanotus patersonii	Twining Fringe-lily	1004, 1006, 1021
Р	Vittadinia cuneata	Fuzzy New Holland Daisy	1015
Р	Xerochrysum viscosum	Shiny Everlasting	1003

Table 19	Summary of threatened and protected flora species within Mitchell Shire LGA
	Cuminary of uncatence and protected nord species within interior office LOA

P=Protected under the FFG Act, vu=vulnerable under DELWP advisory list for rare and threatened plants (DEPI 2014)

No threatened fauna species were identified within the investigation areas within the Mitchell LGA during the field assessment.

3.3 Strathbogie Shire LGA existing conditions

3.3.1 Native vegetation

EVC's recorded across Strathbogie LGA are shown in Table 20. Scattered Tree and Large Trees in Patches results are shown in Table 21 (Appendix A). An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.3.1.1 Patches of native vegetation

Forty-eight Habitat Zones (patches) were mapped during the VQA (see Figure 3 – Appendix A). A VQA was completed for each of the patches using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 18.446 hectares of native vegetation.

Four investigation areas did not support native vegetation – these include sites 1049, 1050, 1053, and 1054.

Table 20 Summary of native vegetation within Strathbogie LGA

EVC	EVC no.	Number of patches	Extent (ha)
Floodplain Riparian Woodland	56	1	0.025
Grassy Woodland (Low Rises)	175_61	9	1.505
Plains Grassy Woodland	55	8	14.569
Plains Grassy Woodland	55_61	2	0.056

EVC	EVC no.	Number of patches	Extent (ha)
Plains Woodland	803	27	2.249
Spike-sedge Wetland	819	1	0.043
Total		48	18.446

3.3.1.2 Trees

A total of 80 trees were recorded by the desktop and field assessments within a 15m buffer of investigation areas in Strathbogie LGA; this included 56 Scattered Trees (30 large and 26 small) and 24 Large Trees in Patches', as defined by the Guidelines (Table 21). These trees are listed in Appendix E and their location is shown in Figure 3 (Appendix A).

Table 21 Summary of trees within Strathbogie LGA

Tree Categorisation					
Small Sca	Small Scattered Tree Large Scattered Tree Large Trees in Patch				es in Patch
Field	Desktop	Field	Desktop	Field	Desktop
23	3	9	21	24	0

3.3.1.3 Endangered EVCs

A total of 18.378 ha of endangered EVCs were recorded within Strathbogie Shire at 16 powerline sites (Table 22).

Table 22 Summary of Endangered EVCs within Strathbogie Shire LGA

Investigation areas	Total extent (ha)
1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1045, 1046, 1047, 1051, 1052, 1056, 1057, 1058	18.378

3.3.1.4 High quality native vegetation

A total of 16.956 ha of high quality native vegetation was recorded within Strathbogie Shire at 10 powerline sites (Table 23).

Table 23 Summary of high quality native vegetation within Strathbogie Shire LGA

Investigation areas	Total extent (ha)
1036 ,1037, 1040, 1041, 1042, 1043, 1046, 1047, 1057, 1058	16.956

3.3.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 and ranged from 1 - 15 to 90 - 100. As outlined in Section 2.6.3.3, areas containing an SBV value of ≥ 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.

3.3.1.6 Mapped wetlands

No mapped wetlands were identified within the Strathbogie LGA.

3.3.2 Threatened ecological communities

TECs listed under the EPBC Act and FFG Act and recorded within Strathbogie LGA are presented in Table 24 and Figure 4.

TEC	Legislation	Investigation area	Total extent (ha)
GBGW	EPBC	1036, 1041	14.345
WBYBBRG	EPBC	1042, 1046, 1047	1.231
VTWBC	FFG	1036, 1039, 1040, 1041, 1042, 1043, 1046, 1047	16.590

Table 24 Summary of TEC values within Strathbogie LGA

3.3.3 Threatened and protected species

Five threatened flora were identified within the Strathbogie LGA during the field assessments. This included one species listed under the EPBC Act, two species listed under the FFG Act, and five VROTS. Fifteen Protected flora species under the FFG Act were also identified. The species, listing status, and investigation area is summarised in Table 25 and are presented in Figure 4.

Status	Scientific Name	Common Name	Investigation area
Р	Acacia acinacea	Gold-dust Wattle	1041
Р	Acacia genistifolia	Spreading Wattle	1040, 1041, 1042, 1043, 1046, 1057
Р	Acacia pycnantha	Golden Wattle	1040, 1041, 1043, 1057
L, en, P	Allocasuarina luehmannii	Buloke	1042
vu, P	Cassinia ozothamnoides	Cottony Cassinia	1041
Р	Cheiranthera linearis	Blue Finger-flower	1042, 1043
Р	Chrysocephalum apiculatum s.l.	Common Everlasting	1041, 1042, 1046, 1047
Р	Chrysocephalum semipapposum	Clustered Everlasting	1040, 1041, 1043
Р	Coronidium sp.	Everlasting	1043
vu	Dianella longifolia var. grandis s.l.	Glaucous Flax-lily	1040, 1041, 1042, 1047
vu	Dianella tarda	Late-flower Flax-lily	1041, 1046
Р	<i>Grevillea</i> sp.	Grevillea	1042
Р	Hardenbergia violacea	Purple Coral-pea	1058
VU, L, vu, P	Hibbertia humifusa subsp. erigens	Euroa Guinea-flower	1047
Р	<i>Microtis</i> sp.	Onion Orchid	1042
Р	Thelymitra sp.	Sun Orchid	1046, 1058
Р	Xerochrysum viscosum	Shiny Everlasting	1041

Table 25 Summary of threatened and protected flora species within Strathbogie LGA

VU = Vulnerable under the EPBC Act, L=Listed under the FFG Act, P = Protected under the FFG Act, en=endangered, vu=vulnerable under DELWP advisory list for rare and threatened plants (DEPI 2014)

At investigation area 1042, KBR (2020a) identified 16 Buloke individuals. As discussed in Section 3.1.3.1, KBR (2020a) identified Diamond Firetail (listed under the FFG Act) at investigation area 1047 within the Strathbogie LGA.

3.4 Benalla Rural City LGA existing conditions

3.4.1 Native vegetation

EVC's recorded across Benalla LGA are shown in Table 26. Scattered Tree and Large Trees in Patches results are shown in Table 27. An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.4.1.1 Patches of native vegetation

Thirty-nine Habitat Zones (patches) were mapped during the VQA (see Figure 3 – Appendix A). A VQA was completed for each of the patches using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 10.084 hectares of native vegetation.

Four investigation areas did not support native vegetation – 1064, 1067, 1075, and 1024.

EVC	EVC no.	Number of patches	Extent (ha)
Plains Grassy Woodland	55	4	0.363
Plains Grassy Woodland	55_61	11	0.581
Plains Woodland	803	17	8.600
Spike-sedge Wetland	819	2	0.071
Tall Marsh 821		5	0.469
Total		39	10.084

Table 26 Summary of native vegetation within Benalla LGA

3.4.1.2 Trees

A total of 71 trees were recorded by the desktop and field assessments within a 15m buffer of investigation areas in Benalla LGA; this included 30 Scattered Trees (16 large and 14 small) and 41 Large Trees in Patches, as defined by the Guidelines (Table 27). These trees are listed in Appendix E and their location is shown in Figure 3

Table 27 Summary of trees within Benalla LGA

Tree Categorisation					
Small Sca	ttered Tree	Large Scattered Tree Large Trees in Patch			
Field	Desktop	Field	Desktop	Field	Desktop
11	3	3	13	23	18

3.4.1.3 Endangered EVCs

A total of 9.544 ha of endangered EVC was recorded within Benalla Rural City at 12 powerline sites (Table 28).

 Table 28
 Summary of Endangered EVCs within Benalla Rural City LGA

Investigation areas	Total extent (ha)
1060, 1061, 1062, 1063, 1065, 1068, 1069, 1070, 1071, 1072, 1076, 1077	9.544

3.4.1.4 High quality native vegetation

A total of 2.382 ha of high quality native vegetation was recorded within Benalla Rural City LGA at seven powerline sites (Table 29).

Table 29 Summary of high quality native vegetation within Benalla Rural City LGA

Investigation areas	Total extent (ha)	
1060, 1061, 1062, 1068, 1069, 1071, 1072	2.382	

3.4.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 (Appendix A) and ranged from 1 - 15 to 80 - 90. As outlined in Section 2.6.3.3, 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.

3.4.1.6 Mapped wetlands

No mapped wetlands were identified within the Benalla LGA.

3.4.2 Threatened ecological communities

TECs listed under the FFG Act and recorded within Benalla LGA investigation areas are presented in Table 30 and Figure 4 (Appendix A).

Table 30 Summary of TEC values within Benalla LGA

TEC	Legislation	Investigation area	Total extent (ha)
GBGW	EPBC	1061, 1072, 1076, 1077	4.274
VTWBC	FFG	1061, 1072, 1076, 1077	5.693

3.4.3 Threatened and protected species

Six species listed as 'Protected' under the FFG Act were identified within the Benalla LGA during the field assessments. The species, listing status, and investigation areas is summarised in Table 31 and are presented in Figure 4 (Appendix A).

Table 31 Summary of threatened and protected flora species within Benalla LGA

Status	Scientific Name	Common Name	Investigation area
Р	Acacia acinacea	Gold-dust Wattle	1070, 1076
Р	Calocephalus lacteus	Milky Beauty-heads	1076
Р	Cheiranthera linearis	Blue Finger-flower	1076
Р	Chrysocephalum apiculatum s.l.	Common Everlasting	1072
Р	Senecio quadridentatus	Cotton Fireweed	1070
Р	Xerochrysum viscosum	Shiny Everlasting	1076

P = Protected under the FFG Act

No threatened fauna species were identified within the investigation areas within the Benalla LGA during the field assessment.

3.5 Rural City of Wangaratta LGA existing conditions

3.5.1 Native vegetation

EVC's recorded across Wangaratta LGA are shown in Table 32. Scattered Tree and Large Trees in Patches results are shown in Table 33. An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.5.1.1 Patches of native vegetation

Fifty-five Habitat Zones (patches) were mapped during the VQA (see Figure 3 – Appendix A). A VQA was completed for each of the patches using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 13.496 hectares of native vegetation.

Seven investigation areas did not support native vegetation – 1090, 1093, 1097, 1098, 1102, 1104, and 1205.

Table 32 Summary of native vegetation within Wangaratta LGA	
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EVC	EVC no.	Number of patches	Extent (Ha)
Box Ironbark Forest	61	5	0.936
Creekline Grassy Woodland	68	2	0.910
Floodplain Riparian Woodland	56	3	1.080
Grassy Woodland	175	8	1.174
Grassy Woodland (Low Rises)	175_61	16	5.152
Plains Grassy Woodland	55_61	4	0.123
Plains Woodland	803	16	3.746
Spike-sedge Wetland	819	1	0.376
Total		55	13.496

3.5.1.2 Trees

A total of 46 trees were recorded by the desktop and field assessments within a 15m buffer of investigation areas in Wangaratta LGA; this included 27 Scattered Trees (nine large and 18 small) and 19 Large Trees in Patches', as defined by the Guidelines (Table 33). These trees are listed in Appendix E and their location is shown in Figure 3 (Appendix A).

Table 33 Summary of trees within Wangaratta LGA

Tree Categorisation					
Small Sca	Small Scattered Tree Large Scattered Tree Large Trees in Patch				
Field	Desktop	Field	Desktop	Field	Desktop
18	0	3	6	17	2

3.5.1.3 Endangered EVCs

A total of 11.104 ha of endangered EVCs were recorded within the Rural City of Wangaratta LGA at 20 powerline sites (Table 34).

Table 34 Summary of Endangered EVCs within Rural City Wangaratta LGA

Investigation areas	Total extent (ha)
1078, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1092, 1094, 1095, 1103, 1105, 1106 ,1107, 1108, N2	5.969

3.5.1.4 High quality native vegetation

A total of 5.230 ha of high quality native vegetation was recorded within the Rural City of Wangaratta LGA at 11 powerline sites (Table 35).

Table 35 Summary of high quality native vegetation within Rural City of Wangaratta LGA

Investigation areas	Total extent (ha)	
1078, 1080, 1081, 1083, 1084, 1085, 1086, 1087, 1088, 1101, 1108	5.230	

3.5.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 (Appendix A) and ranged from 1 - 15 to 80 - 90. As outlined in Section 2.6.3.3, 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.

3.5.1.6 Mapped wetlands

No mapped wetlands were identified within the Wangaratta LGA.

3.5.2 Threatened ecological communities

TECs listed under the FFG Act and recorded within Wangaratta LGA investigation areas are presented in Table 36 and Figure 4 (Appendix A).

Table 36 Summary of TEC values within Wangaratta LGA

TEC	Legislation	Investigation area	Total extent (ha)
GBGW	EPBC	1078	1.035
WBYBRGGW	EPBC	1080, 1081, 1086, 1087, 1088	3.021
VTWBC	FFG	1078, 1080, 1081, 1083, 1084, 1086, 1087, 1088, 1101	5.696

3.5.3 Threatened and protected species

Three threatened flora species, including one listed under the EPBC Act and 14 listed as 'Protected' under the FFG Act identified within the Wangaratta LGA during the field assessments. The species and investigation area are summarised in Table 37 and are presented in Figure 4 (Appendix A).

Table 37 Summary of threatened and protected flora species within Wangaratta LGA

Status	Scientific Name	Common Name	Investigation area
Р	Acacia acinacea	Gold-dust Wattle	1078
Р	Acacia verniciflua s.l.	Varnish Wattle	1078, 1086, 1087, 1108
Р	Astroloma humifusum	Cranberry Heath	1078
Р	Brachyloma daphnoides	Daphne Heath	1078, 1088
Р	Brunonia australis	Blue Pincushion	1078
Р	Cheilanthes sp.	Rock Fern	1081, 1086, 1088, 1106
Р	Chrysocephalum semipapposum	Clustered Everlasting	1078
vu, P	Diuris behni	Golden Cowslips	1088
vu, L, P	Diuris punctata var. punctata	Purple Diuris	Potential habitat identified at 1088
Р	Laphangium luteoalbum	Jersey Cudweed	1089
Р	Microtis sp.	Onion Orchid	1081, 1086, 1088
en, P	Podolepis linearifolia	Basalt Podolepis	1078
EN, L, en	Swainsona recta	Mountain Swainson-pea	1078

Status	Scientific Name	Common Name	Investigation area
Р	<i>Thelymitra</i> sp.	Sun Orchid	1081, 1086, 1088
Р	Vittadinia cuneata	Fuzzy New Holland Daisy	1076, 1078, 1106
Р	Xerochrysum viscosum	Shiny Everlasting	1078

P = Protected under the FFG Act, vu=vulnerable, en=endangered under DELWP advisory list for rare and threatened plants (DEPI 2014)

Potential habitat for FFG Act-listed species, Purple Diuris, was identified at investigation area 1088; however, no individuals were identified (KBR, 2020a). Removal of vegetation at this site may result in the loss of habitat for this species.

3.6 Indigo Shire LGA existing conditions

3.6.1 Native vegetation

EVC's recorded across Indigo LGA are shown in Table 38. Scattered Tree and Large Trees in Patches results are shown in Table 40. An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.6.1.1 Patches of native vegetation

Seventeen Habitat Zones (patches) were mapped during the VQA (Figure 3 – Appendix A). A VQA was completed for each of the patches using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 4.112 hectares of native vegetation.

Two investigation areas did not support native vegetation – 1113 and 1121.

Table 38 Summary of native vegetation within Indigo LGA

EVC	EVC no	Number of patches	Extent (Ha)
Alluvial Terraces Herb-rich Woodland	67	6	0.851
Creekline Grassy Woodland	68	3	0.465
Grassy Woodland (Low Rises)	175_61	5	0.825
Valley Grassy Forest	47	3	1.971
Total	17	4.112	

3.6.1.2 Trees

A total of 36 trees were recorded by the desktop and field assessments within a 15m buffer of investigation area in Indigo LGA; this included 28 scattered trees (14 large and 14 small) and eight 'Large Trees in Patches', as defined by the Guidelines (Table 40). These trees are listed in Appendix E and their location is shown in Figure 3 (Appendix A).

Table 39	Summary of trees within Indigo LGA	
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Tree Categorisation						
Small Sca	Small Scattered Tree Large Scattered Tree Large Trees in Patch					
Field	Desktop	Field	Desktop	Field	Desktop	
14	0	5	9	8	0	

3.6.1.3 Endangered EVCs

A total of 4.054 ha of endangered EVCs were recorded within the Indigo Shire LGA at five powerline sites (Table 40).

Table 40 Summary of Endangered EVCs within Indigo Shire LGA

Investigation areas	Total extent (ha)
1109, 1110, 1115, 1116, 1117	4.054

3.6.1.4 High quality native vegetation

A total of 1.232 ha of high quality native vegetation was recorded within Indigo Shire LGA at three powerline sites (Table 41).

Table 41 Summary of high quality native vegetation within Indigo Shire LGA

Investigation areas	Total extent (ha)	
1109, 1116, 1117	1.232	

3.6.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 (Appendix A) and ranged from 15 - 25 to 80 - 90. As outlined in Section 2.6.3.3, 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.

3.6.1.6 Mapped wetlands

No mapped wetlands were identified within the Indigo LGA.

3.6.2 Threatened ecological communities

TECs listed under the FFG Act and recorded within Indigo LGA investigation areas are presented in Table 43 and Figure 4 (Appendix A).

Table 42 Summary of TEC values within Indigo LGA

TEC	Legislation	Investigation area	Total extent (ha)
VTWBC	FFG	1110, 1117	0.886
WBYBRGGW	EPBC	1110	0.203

3.6.3 Threatened and protected species

One threatened flora species listed as a VROTS and 10 species listed as 'Protected' under the FFG Act were identified within the Indigo LGA during the field assessments. The species, listing status, and investigation area is summarised in Table 43 and are presented in Figure 4 (Appendix A).

Table 43 Summary of threatened and protected flora species within Indigo LGA

Status	Scientific Name	Common Name	Investigation area
Р	Astroloma humifusum	Cranberry Heath	1117
Р	Cheiranthera linearis	Blue Finger-flower	1117
Р	Chrysocephalum apiculatum s.l.	Common Everlasting	1116
Р	Grevillea lanigera	Woolly Grevillea	1117
Р	Microtis sp.	Onion Orchid	1117
Р	Orthoceras strictum	Horned Orchid	1117
Р	Prasophyllum sp.	Leek Orchid	1116
Р	Thelymitra sp.	Sun Orchid	1116
r, P	Vittadinia cuneata	Fuzzy New Holland Daisy	1117
Р	Xerochrysum viscosum	Shiny Everlasting	1116, 1117

P = Protected under the FFG Act, r =rare under DELWP advisory list for rare and threatened plants (DEPI 2014)

As discussed in Section 3.1.3.1, KBR (2020a) identified Brown Toadlet (FFG Act) within investigation area 1110 within Indigo Shire LGA. There is also potential habitat for Sloane's Froglet at investigation area 1110.

3.7 Wodonga LGA existing conditions

3.7.1 Native vegetation

EVC's recorded across Wodonga LGA are shown in Table 44. Scattered Tree and Large Trees in Patches results are shown in Table 45. An outline of native vegetation values, habitat for threatened species, ecological communities, and predicted impacts for each investigation area, is described in Appendix D.

3.7.1.1 Patches of native vegetation

Six Habitat Zones (patch) was mapped during the VQA (see Figure 3 – Appendix A). A VQA was completed for the patch using the habitat hectare assessment method and is provided in Appendix F. These patches represent a total of 1.097 hectares of native vegetation.

Three investigation area did not support native vegetation - 1123, 1124, and 1207.

Table 44 Summary of native vegetation for investigation areas within Woodnga LGA	Table 44	Summary of native vegetation for investigation areas within Wodonga LGA
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EVC	EVC no.	Number of patches	Extent (Ha)
Plains Woodland	803	3	0.309
Riverine Swampy Woodland	815	3	0.788
Total		6	1.097

3.7.1.2 Trees

A total of 19 trees were recorded by the desktop and field assessments within a 15m buffer of investigation area in Wodonga LGA; this included 11 Scattered Trees (three large and eight small) and eight 'Large Trees in Patches', as defined by the Guidelines (Table 45). These trees are listed in Appendix E and their location is shown in Figure 3 (Appendix A).

Table 45 Summary of trees within Wodonga LGA

Tree Categorisation					
Small Scattered Tree Large Scattered Tree Large Trees in Patch					es in Patch
Field	Desktop	Field	Desktop	Field	Desktop
8	0	3	0	8	0

3.7.1.3 Endangered EVCs

A total of 0.309 ha of endangered EVCs were recorded within Wodonga LGA at one powerline site (Table 46).

Table 46 Summary of Endangered EVCs within Wodonga LGA

Investigation areas	Total extent (ha)
1122	0.309

3.7.1.4 High quality native vegetation

No high quality native vegetation was recorded within Wodonga LGA.

3.7.1.5 Strategic Biodiversity Values

The SBV of investigation areas contained within Mitchell Shire is presented in Figure 6 (Appendix A) and ranged from 15 - 25 to 65 - 80. As outlined in Section 2.6.3.3, 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.

3.7.1.6 Mapped wetlands

No mapped wetlands were identified within the Wodonga LGA.

3.7.2 Threatened ecological communities

No TECs listed under the EPBC Act or FFG Act and recorded within Wodonga LGA.

3.7.3 Threatened and protected species

No threatened flora or fauna species were recorded in this LGA during the current assessment.

4.0 Impact assessment

An outline of the potential implications of the impacts from the Project in relation to biodiversity legislation and policy is provided in this section. The discussion is intended to give an indication of potential impacts to inform decisions made during the design and planning phases of the Project. The actual implications will not be known until design is finalised. As the design process will be iterative, this section does not comment on options being considered or preliminary design concepts.

4.1 Commonwealth

4.1.1 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, actions¹ that are likely² to have a significant impact upon MNES are required to be referred to the Environment Minister for approval.

A number of MNES were recorded within the project area that may potentially be impacted including:

- Euroa Guinea-flower
- Mountain Swainson-pea
- Growling Grass Frog
- Sloane's Froglet
- Golden Sun Moth
- Striped Legless Lizard
- Grey Box *Eucalyptus microcarpa* Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands.

Their listing status and location within the project area are summarised in Table 47. For more detailed information, see Section 3.0.

¹ Under the EPBC Act an 'action' includes any project, development, undertaking, activity, or series of activities.

² 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.

MNES	Listing status under the EPBC Act	Location within the project area	
Threatened ecological comm			
WBYBBRGGW	Critically Endangered	Strathbogie:1042, 1046, 1047Wangaratta:1080, 1081, 1086, 1087, 1088Indigo:1110	
GBGW Endangered		Mitchell Shire: 1018, 1020 Benalla: 1061, 1072, 1076, 1077 Strathbogie: 1036, 1041 Wangaratta: 1078	
Threatened flora species			
Euroa Guinea-flower	Vulnerable	Strathbogie: 1047	
Mountain Swainson-pea	Endangered	Wangaratta: 1078	
Threatened fauna species			
Growling Grass Frog	Vulnerable	Mitchell: 1001, 1002, 1003 Benalla: 1076	
Sloane's Froglet	Endangered	Indigo 1110	
Golden Sun Moth	Critically Endangered	Mitchell: 1013	
Striped Legless Lizard	Vulnerable	Mitchell: 1013 Wangaratta: 1088	

Table 47 Summary of MNES potentially impacted within the project area

Assessment of impacts 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 Environmental Report to be prepared as part of that process will address the assessment of impacts on threatened species and communities listed under the EPBC Act, FFG Act and/or Victorian threatened species advisory lists.

Threatened ecological communities and species of relevance to the project area are described below.

4.1.1.1 Threatened ecological communities

Impacts to the critically endangered WBYBBRGGW may occur at investigation areas within Strathbogie LGA, Wangaratta LGA and Indigo LGA as outlined in Section 3.0. The worst-case scenario of clearance of this TEC is potentially 0.624 ha which is an increase from the 0.36 ha previously reported by KBR (2020a). The partial desktop assessment as Site 1087 accounted for 0.01 ha of this impact. This increase is primarily the result of changes to the overall project area, but is also due to the more detailed assessment undertaken by AECOM. The determination of extent provided in KBR (2020a) was based on a 'rapid site assessment'.

In addition, potential impacts to the GBGW community have been identified within four LGAs – Mitchell, Benalla, Strathbogie, and Wangaratta (Section 3.0). Total potential impact to the GBGW community, presented as a worst-case scenario, is 1.378 ha, which is an increase from the 0.568 ha of potential impact reported by KBR (2020a). The partial desktop assessment as Site 1061 accounted for approximately 0.012 ha of this impact. As described for WBYBBRGGW, this increase is a result of changes to the overall project area, and a more detailed field assessment being undertaken compared to the rapid assessment that was undertaken by KBR (2020a).

Once the Project design is finalised, and consideration has been given to avoiding the TECs at each investigation area listed below, a review of the potential impacts should be completed against the significant impact criteria for threatened ecological communities to determine whether the level of

impact to each TEC is likely to be significant. If impacts cannot be avoided, offsets will be required under the EPBC Act if such impacts are considered to be significant.

Table 48 Summary of impacts to TECs in the project area

TEC		
GBGW		
LGA	Project area	Extent (ha)
Mitchell Shire	1018, 1020	0.121
Benalla	1061, 1072, 1076, 1077	1.043
Strathbogie	1036, 1041	0.191
Wangaratta	1078	0.022
Total		1.378
WBYBBRGGW		
Strathbogie	1042, 1046, 1047	0.265
Wangaratta	1080, 1081, 1086, 1087	0.343
Indigo	1110	0.016
Total		0.624

4.1.1.2 Threatened flora species

The population of Euroa Guinea-flower at investigation area 1047 (Strathbogie LGA) is potentially an important population within land identified as 'Creighton Rail Reserve' and listed in the *National Recovery Plan for the Euroa Guinea-flower* (Murphy and Downe, 2006). The population of approximately 256 individual plants were initially considered likely to be impacted by the proposed works at investigation area 1047. As a result of the recommendations of both KBR (2020a) and AECOM, ARTC will seek alternative access to site 1047, avoiding the risk of any impacts to this important population.

Mountain Swainson-pea was recorded in exclusion fencing adjacent to investigation area 1078. These exclusion plots are likely to support an important population of the species as the species was considered extinct in Victoria (DELWP, 2017c). DELWP Hume region has been undertaking a program to reintroduce Mountain Swainson-pea into secure public and private sites that support habitat for the species within north-east Victoria (DELWP, 2017c). DELWP (D. Pendavingh, DELWP, pers. comm. 21.06.21) have confirmed that the area adjacent to investigation area 1078 is part of this reintroduction program. As a result of recommendations from AECOM, ARTC have committed to restricting impacts to the project area and developing site plans clearly identifying the project area boundaries. A Flora and Fauna Management Plan will also be prepared that will include any site-specific requirements to avoid impacts to this species.

4.1.1.3 Threatened fauna species

Potential habitat for Growling Grass Frog and Sloane's Froglet may be impacted by the proposed works. Potential impacts could occur at investigation areas 1001, 1002 and 1076 (Growling Grass Frog) and 1110 (Sloane's Froglet. Brown Toadlet). The project intends to avoid impacts to aquatic habitats therefore impacts to these species are not anticipated to be significant.

Golden Sun Moth is unlikely to be impacted. The area of potential habitat associated with investigation area 1013 is outside the project area.

Potential habitat for Striped Legless Lizard identified at investigation area 1088 may be impacted by the proposed works. Design and construction methods for works at investigation area 1088 have not been resolved, therefore a worst-case scenario that all potential habitat within investigation area 1088 (0.38 ha) will be impacted has been assumed. Once the Project design is finalised, and consideration has

been given to avoiding habitat for Striped Legless Lizard, a review of the potential impacts should be completed against the significant impact criteria for threatened species to determine whether the level of impact on Striped Legless Lizard is likely to be significant.

4.1.1.4 Threatening processes

Threatening processes listed under the EPBC Act of relevance to the Project and the potential for the overheard powerlines package of works for the Project to exacerbate those threatening processes is summarised in Table 49.

EPBC Act listed threatening process	Potential to exacerbate threatening process	Rationale
Land clearance	Yes	Native vegetation will be removed by the Project (see Section 4.2.2).
Predation by European Red Fox	No	The proposed works are unlikely to encourage the occurrence or increase the population of Red Fox in the local area.
Predation by feral cats	No	The Project is unlikely to encourage the occurrence of cats above current levels in the environment.
Competition and land degradation by rabbits	No	The Project is unlikely to encourage the occurrence of rabbits.
Dieback caused by the root-rot fungus <i>Phytophthora cinnamomi</i>	Yes	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). Little is known about the distribution and type of soil pathogens that may be present in the impact area or in surrounding areas. The Project therefore has the potential to exacerbate this threatening process.
Infection of amphibians with chytrid fungus resulting in chytridiomycosis	Yes	Chytrid Fungus <i>Batratchochytrium 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). It is unknown whether chytrid fungus is present in or adjacent to the impact area. All water and damp soil should be assumed to be infected unless testing shows otherwise. The Project therefore has the potential to exacerbate this threatening process.

Table 49 Potential for overheard powerlines package to exacerbate EPBC Act listed threatening processes

4.2 Victoria

4.2.1 Environment Effects Act 1978

Under Victoria's EE Act, projects that could have a 'significant effect' on Victoria's environment can require an EES if they meet criteria outlined *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (DSE, 2006).

The Project has already been referred under the EE Act. In August 2020 the Victorian Minister for Planning decided that an environment effects statement (EES) under the EE Act was not required for the project subject to conditions set out in the decision. Assessment of the Project was to be 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.

4.2.2 Planning and Environment Act 1987

The 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.

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.

4.2.2.1 Native vegetation removal regulations

Clause 52.17 of the relevant council planning scheme enacts the *Guidelines for the removal, destruction or lopping of native vegetation*. Any removal of native vegetation associated with the project is required to satisfy Clause 52.17 by submitting an application to the relevant planning authority for a permit to remove native vegetation.

Under the Guidelines, there are three risk-based pathways under which an application to remove native vegetation can be assessed including - Basic, Intermediate, or Detailed. The assessment pathway determines the types of offsets that are required to be implemented for the removals. The pathway for a particular project is determined via an assessment of risk to biodiversity comprised of location risk (Category 1, 2 or 3, 2) assigned in the DELWP NVIM tool, extent of native vegetation proposed to be removed and whether any large trees are to be removed (Table 50).

Table 50	Native vegetation risk-based pathways
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		Location	
Extent	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

Source: DELWP (2017a)

The overhead powerline project area contains location categories 1, 2 and 3 and greater than 0.5 hectares of native vegetation. As such, an application to remove native vegetation will be assessed under the *detailed* pathway of assessment. This means that 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 (DELWP, 2017b). Offsets required for detailed assessment pathway applications may trigger a *species offset requirement* (if the native vegetation to be removed is habitat for rare or threatened species).

The extent of native vegetation within the overhead powerlines project area that could potentially be impacted by the overhead powerlines package of the Project comprises:

- 9.525 ha patches of native vegetation contained within 150 Habitat Zones
- 25 Large Trees in Patches
- 92 Scattered Trees (40 large and 52 small).

A summary of impacts on native vegetation patches within each LGA is provided in Table 51 and impacts to native vegetation across the project area are presented in Figure 5 (Appendix A) and Appendix D. A summary of impacts to trees across the project area is also provided in Table 52.

Table 51 Summary of impacts to patches of native vegetation within the overhead powerlines project area

LGA	EVC	EVC no.	Number of patches	Extent (ha) of impacts
	Box Ironbark Forest	61	1	0.007
	Creekline Grassy Woodland	68	2	0.023
	Floodplain Riparian Woodland	56	5	0.117
	Grassy Woodland	175_61	11	0.378
	Herb-rich Foothill Forest	23	1	0.010
Mitchell Shire	Plains Grassy Woodland	55	9	0.120
Witchen Shire	Riparian Forest	18	4	0.068
	Swampy Riparian Woodland	83	1	0.017
	Tall Marsh	821	2	0.003
	Valley Heathy Forest	127	5	0.113
	Valley Grassy Forest	47	11	1.285
	Total		52	2.142
	Floodplain Riparian Woodland	56	1	0.006
	Grassy Woodland (Low Rises)	175_61	8	0.203
	Plains Grassy Woodland	55	5	0.143
Strathbogie	Plains Grassy Woodland	55_61	2	0.035
	Plains Woodland	803	19	0.573
	Spike-sedge Wetland	819	1	0.043
	Total		36	1.002
	Plains Grassy Woodland	55	2	0.049
	Plains Grassy Woodland	55_61	9	0.244
	Plains Woodland	803	16	2.689
Benalla	Spike-sedge Wetland	819	2	0.034
	Tall Marsh	821	3	0.129
	Total		32	3.145

LGA	EVC	EVC no.	Number of patches	Extent (ha) of impacts
	Box Ironbark Forest	61	3	0.191
	Creekline Grassy Woodland	68	1	0.008
	Floodplain Riparian Woodland	56	2	0.108
	Grassy Woodland	175	6	0.119
Wangaratta	Grassy Woodland (Low Rises)	175_61	15	0.940
	Plains Grassy Woodland	55_61	3	0.033
	Plains Woodland	803	15	0.889
	Spike-sedge Wetland	819	1	0.292
	Total		46	2.578
	Alluvial Terraces Herb-rich Woodland	67	6	0.198
	Creekline Grassy Woodland	68	2	0.052
Indigo	Grassy Woodland (Low Rises)	175_61	3	0.227
	Valley Grassy Forest	47	2	0.091
	Total		13	0.567
Wedenge	Riverine Swampy Woodland	815	3	0.090
Wodonga	Total		3	0.090
Project area total			150	9.525

Table 52 Summary of impacts to native trees

	Tree Categorisation					
LGA	Small Scat	ttered Tree	Large Sca	ttered Tree	Large Tree	es in Patch
	Field	Desktop	Field	Desktop	Field	Desktop
Mitchell Shire	14	0	4	5	6	0
Strathbogie	14	0	5	7	10	0
Benalla	7	0	0	3	4	0
Wangaratta	7	0	2	3	1	0
Indigo	7	0	5	3	1	0
Wodonga	3	0	3	0	3	0
Total	52	0	19	21	25	0

In order to understand the offset obligations of the Project, an EnSym Report scenario test was run and is provided in Appendix G. The EnSym scenario test determined a total loss of 13.385 ha. This value will differ from the total impact to patches of native vegetation (Table 51) as it considers total patch area plus automatically assigned extents to small and large Scattered Trees (see Section 2.4.1).

The EnSym report states that an offset obligation of 6.737 general habitat units and 65 large trees will be required for the overheard powerlines package based on current clearance estimates. Offsets will need to be sourced within the Goulburn Broken, North East, Port Phillip and Westernport Catchment Management Authority or Benalla Rural City, Indigo Shire, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, 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 in the required credit locations that meet these offset requirements.

Unit type	Amount	Minimum strategic biodiversity value score	Large trees	Credit location
General offset amount	6.737			Goulburn Broken, North East, Port Phillip, and Westernport Catchment Management Authority (CMA) or Benalla
Specific offset amount	N/A	0.500	65	Rural City, Indigo Shire, Mitchell Shire, Strathbogie Shire, Wangaratta Rural City, Wodonga City Council

Table 53	Native vegetation	offset requirement summary

As the design process is ongoing, there are many opportunities for ARTC to avoid and minimise impacts to native vegetation through measures such as siting changes, establishment of no-go zones, modifications to construction methodology. An arborist assessment may also be conducted for potentially impacted to trees to determine whether mitigation measures can be introduced to prevent loss.

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.

Impacts for the enhancement sites, track slews and signal gantries component of the Project (AECOM, 2021a) have been considered separately to the impacts described here for the overhead powerlines; 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.

4.2.2.2 Endangered EVCs

The total mapped extent of endangered EVCs recorded is 54.979 ha (Section 3.1.2.5) compared to a total impact extent of 7.016 ha (Table 54). As endangered EVCs are a subset of the native vegetation information contained in Table 8, 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 Section 5.0.

Table 54 Summary of impacts to Endangered EVCs

LGA	Extent (ha)
Mitchell Shire	0.539
Strathbogie	0.954
Benalla	2.982
Wangaratta	1.988
Indigo	0.554
Wodonga	0.00
Total	7.016

4.2.2.3 High quality native vegetation

The total mapped extent of high quality native vegetation recorded is 62.191 ha compared to an impact extent of 2.263 ha (Table 55). As high-quality patches are a subset of the native vegetation information contained in Table 8, 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 Section 5.0.

Table 55	Summary of impacts to high quality native vegetation
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LGA	Extent (ha)
Mitchell Shire	0.518
Strathbogie	0.561
Benalla	0.590
Wangaratta	0.542
Indigo	0.053
Wodonga	0.00
Total	2.263

4.2.2.4 Mapped wetlands

The single mapped wetland that intersected investigation area 1022 is part of a larger wetland (Habitat Zone 204 mapped as Floodplain Riparian Woodland EVC) that equates to 28.93 ha of native vegetation. During field assessment, 0.099 ha of Floodplain Riparian Woodland (EVC 56) was mapped within the boundary of the mapped wetland. As per DELWP's Native Vegetation Newsletter (DELWP, 2018c), if native vegetation was present and assessed on the site, the site-assessed condition score and EVC is to be used instead of the modelled EVC and condition score. Of this 0.099 ha mapped, 0.002 ha of Floodplain Riparian Woodland (EVC 56) will be impacted, and this has been included in the overall calculation of native vegetation loss.

4.2.2.5 Strategic Biodiversity Values

SBV categories within the investigation area ranged from 1 - 15 to 90 - 100. As outlined in Section 2.6.3.3, areas containing an SBV value of \geq 0.80 are those considered to be of high value. This information is presented spatially in Figure 6 and may be used to inform decision-making during the design process when prioritising areas of greater or lesser importance.

4.2.2.6 Planning overlays relevant to the powerlines

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.
- 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.

A list of overlays for each LGA is provided in Table 56 and the location of overlays and relevant ecological values is shown in Figure 7.

Table 56 Impacts to vegetation within environmental overlays

				Imp	acts to relevant	biodiversity value	es
LGA	LGA Overlay Permit requirement bioc		Required biodiversity information	Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
Mitchell	Environmental Significance Overlay – Schedule 3 (Watercourse Conservation)	In accordance with the ESO3, a permit is required to: • Remove, destroy, or lop any vegetation, including dead vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non- native) Extent of impact to fauna habitat areas (if any) Extent of impact to watercourses (if any)	0.562 ha 13 trees	0.886 ha	All native vegetation to be impacted within the overlay is considered to be fauna habitat, and as such any impacts to native vegetation are also considered impacts to fauna habitat.	Works extent does not extend into watercourses, and, with mitigation measures, indirect impacts to watercourses are not anticipated.
	Salinity Management Overlay	In accordance with the SMO, a permit is required to: • Remove, destroy, or lop any vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non- native)	0.004 ha	0.099 ha	N/A	N/A

				Imp	acts to relevant	biodiversity value	es
LGA	Overlay	Permit requirement	Required biodiversity information	Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
	Vegetation Protection Overlay – Schedule 1 (Roadside and Corridor Protection)	 In accordance with the VPO1, a permit is required to: Remove, destroy, or lop native vegetation. A permit is not required for the removal of exotic vegetation. 	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	0.732 ha	N/A	N/A	N/A
	Vegetation Protection Overlay – Schedule 2 (Freeway Environs Protection)	 In accordance with the VPO2, a permit is required to: Remove, destroy, or lop native vegetation. A permit is not required for the removal of exotic or dead vegetation. 	Extent of native vegetation to be removed / destroyed / lopped Number of trees impacted by the works	0.020 ha 1 tree	N/A	N/A	N/A

				Impacts to relevant biodiversity values				
LGA	Overlay	Permit requirement	Required biodiversity information	Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses	
Benalla	Vegetation Protection Overlay Schedule 3 – (Regent Honeyeater Habitat / Lurg Ironbark Vegetation Protection Area)	In accordance with the VPO3, a permit is required to: • Remove, destroy, or lop native vegetation.	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non- native) Number of Mugga Ironbark, White Box, Yellow Box, Blakeley's Red Gum impacted by the works (if any)	0.636 ha No Mugga Ironbark, White Box or Blakely's Red Gum. Of the tree species specified in VPO3, the project may impact on Yellow Box. The number of Yellow Box which may be impacted include an estimated 20 small trees within patches of native vegetation.	1.142 ha	N/A	N/A	
Wangaratta	Vegetation Protection Overlay – Schedule 1 (Glenrowan Township Vegetation Protection Area)	 In accordance with the VPO1, a permit is required to: Remove, destroy, or lop native vegetation with a height of more than 1 metre or a distance of more than 5 metres from a dwelling or outbuilding (permit required) 	Extent of native vegetation to be removed / destroyed / lopped	0.123 ha 2 trees	N/A	N/A	N/A	

				Imp	acts to relevant	biodiversity value	es
LGA	Overlay	Permit requirement	Required biodiversity information	Native vegetation extent (ha)	Non-native vegetation extent (ha)	Fauna habitat	Watercourses
	Vegetation Protection Overlay – Schedule 2 (Roadside vegetation of conservation significance)	 In accordance with the VPO2, a permit is required to: Remove, destroy, or lop native vegetation. A permit is not required for the removal of exotic or dead vegetation. 	Extent of native vegetation to be removed / destroyed / lopped	0.571 ha 2 trees	N/A	N/A	N/A
Indigo	Environmental Significance Overlay – Schedule 3 (Watercourse Conservation)	 In accordance with the ESO3, a permit is required to: Remove, destroy, or lop native vegetation including dead vegetation with the exception of land zoned for 'RDZ2 on Map1 and PAO1 on Map 1 PAO'. 	Extent of vegetation to be removed / destroyed / lopped, including dead vegetation (all vegetation categorised by native and non- native) Extent of impact to watercourses (if any)	0.514 ha 14 trees	0.839 ha	N/A	Works extent does not extend into watercourses, and, with mitigation measures, indirect impacts to watercourses are not anticipated.

4.2.3 Flora and Fauna Guarantee Act 1988

The 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 Act is the listing process, whereby native species and communities of flora and fauna, and the process that threaten native flora and fauna are listed in schedules of the Act. This assists in identifying those species and communities that require management to survive and identifies potentially threatening processes that require management to minimise the threat to native flora and fauna species and communities within Victoria. Under the FFG Act, DELWP maintains lists of threatened species (DELWP, 2019a), threatened communities (DELWP, n.d.), protected flora (DELWP, 2019b), and potentially threatening processes (DELWP, 2016).

Threatened ecological communities and species listed under the FFG Act that occur within the project area are described below.

4.2.3.1 Threatened ecological communities

A single FFG Act listed ecological community was recorded in the project area - the VTWBC. Table 57 summarises the extent and potential impact to this community within the project area and the locations are shown in Figure 4. Within the project area, a total of 38.681 ha of VTWBC was identified within the project area, of which 2.921 ha may potentially be impacted. This loss will need to be considered when determining overall impact of the Project and efforts should be made to avoid and minimise impacts to this community where possible during the design phase.

LGA	Project area	Impacted extent (ha)
Mitchell	1013, 1018, 1019, 1020, 1035, N9	0.342
Strathbogie	1036, 1039, 1040, 1041, 1042, 1043, 1046, 1047	0.627
Benalla	1061, 1072, 1076, 1077	1.099
Wangaratta	1078, 1080, 1081, 1084, 1086, 1087, 1088, 1101	0.620
Indigo	1110, 1117	0.233
Total		2.921

Table 57 Summary of impacts to the Victorian Temperate Woodland Bird Community within the project area

4.2.3.2 Threatened species

Two flora species listed as threatened under the FFG Act were recorded within the project area (both are located within the Strathbogie LGA):

- Euroa Guinea-flower Potential impacts to this population at investigation area 1047 have been avoided.
- Buloke As discussed in Section 3.3.3, 16 individuals were identified at investigation area 1042 (Figure 4). 14 of these individuals are located directly within the powerline investigation area and thus will potentially be impacted. However, once construction methods and impact extent have been defined, potential impacts to this species should be re-visited. All effort should be made to avoid the Buloke individuals during the design process.

Potential habitat for Diamond Firetail and other woodland birds, including the VTWBC occurs within and adjacent to numerous project areas (Appendix D). There is also confirmed Brush-tailed Phascogale habitat at powerline investigation area 1020 (Tallarook) and potential Brush-tailed Phascogale habitat in the vicinity of powerline project areas 1020, 1076, 1078, and 1080 near Benalla. These investigation areas support long, linear stretches of high-quality native vegetation and large trees. If loss of woodland vegetation can be minimised, then impacts to these species are not anticipated to be significant. The

risk of two threatening processes listed under the FFG Act being exacerbated (habitat fragmentation and loss of hollow-bearing trees) will also be reduced.

Quantification of loss of potential woodland habitat forms part of the process of determining obligations of the project under native vegetation removal regulations (see Section 4.2.2).

4.2.3.3 Protected flora

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 are:

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

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 defined under the FFG Act 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. Table 58 summarises protected flora identified during the assessment and their location within the project area. Impacts to protected flora are anticipated to occur as a result of the Project and a determination of numbers, along with a 'Permit to Take Protected Flora', will be required once detailed design has been finalised.

Status	Scientific name	Common name	Project area (current assessment)
Р	Acacia acinacea	Gold-dust Wattle	Mitchell: 1022 Strathbogie: 1041 Benalla: 1070, 1076 Wangaratta: 1078
Р	Acacia genistifolia	Spreading Wattle	Strathbogie: 1040, 1041, 1042, 1043, 1046, 1057
Р	Acacia pycnantha	Golden Wattle	Mitchell: 1004, 1013, 1021 Strathbogie: 1040, 1041, 1043, 1057
Р	Acacia verniciflua s.l.	Varnish Wattle	Wangaratta: 1078, 1086, 1087, 1108
L, en, P	Allocasuarina Iuehmannii	Buloke	Strathbogie: 1042
Р	Astroloma humifusum	Cranberry Heath	Wangaratta: 1078 Indigo: 1117
Р	Brachyloma daphnoides	Daphne Heath	Wangaratta: 1078, 1088
Р	Brunonia australis	Blue Pincushion	Mitchell: 1006 Wangaratta: 1078
Р	Calocephalus lacteus	Milky Beauty-heads	Benalla: 1076
vu, P	Cassinia ozothamnoides	Cottony Cassinia	Strathbogie: 1041

Table 58 Summary of protected flora species identified within the project area

Status	Scientific name	Common name	Project area (current assessment)
Р	Cheilanthes sp.	Rock Fern	Wangaratta: 1081 1086, 1088, 1106
Р	Cheiranthera linearis	Blue Finger-flower	Strathbogie: 1042, 1043 Benalla: 1076 Indigo: 1117
Р	Chrysocephalum apiculatum s.l.	Common Everlasting	Mitchell: 1003 Strathbogie: 1041, 1042, 1046, 1047 Benalla: 1072 Indigo: 1116
Р	Chrysocephalum semipapposum sp.	Clustered Everlasting	Strathbogie: 1040, 1041, 1043 Wangaratta: 1078
Р	Coronidium scorpioides s.s.	Button Everlasting	Mitchell: 1004, 1006, 1021, 1043 Strathbogie: 1043
Р	Correa sp.	Correa	Mitchell: 1004
vu, P	Diuris behni	Golden Cowslips	Wangaratta: 1088
Р	Grevillea lanigera	Woolly Grevillea	Indigo: 1117
Р	<i>Grevillea</i> sp.	Grevillea	Strathbogie: 1042
Р	Hardenbergia violacea	Purple Coral-pea	Mitchell: 1003 1004, 1006, 1021 Strathbogie: 1058
VU, L, vu, P	<i>Hibbertia humifusa</i> subsp. <i>erigens</i>	Euroa Guinea-flower	Strathbogie: 1047
Р	Laphangium luteoalbum	Jersey Cudweed	Wangaratta: 1089
Р	Leptorhynchos squamatus	Scaly Buttons	Mitchell: 1004, 1021 Strathbogie: 1046
Ρ	<i>Microtis</i> sp.	Onion Orchid	Strathbogie: 1042 Wangaratta: 1081, 1086, 1088, 1117 Indigo: 1117
Р	Orthoceras strictum	Horned Orchid	Indigo: 1117
en, P	Podolepis linearifolia	Basalt Podolepis	Wangaratta: 1078
Р	Prasophyllum sp.	Leek Orchid	Mitchell: 1004 Indigo: 1116
Р	Senecio quadridentatus	Cotton Fireweed	Mitchell: 1003 1004 Benalla: 1070

Status	Scientific name	Common name	Project area (current assessment)
Ρ	Thelymitra sp.	Sun Orchid	Mitchell: 1004, 1006 Strathbogie: 1046 1058 Wangaratta: 1083, 1084, 1086, 1088 Indigo: 1116
Р	Thysanotus patersonii	Twining Fringe-lily	Mitchell: 1004, 1006, 1021
Ρ	Vittadinia cuneata	Fuzzy New Holland Daisy	Mitchell: 1015 Wangaratta: 1076, 1078, 1106 Indigo: 1117
Ρ	Xerochrysum viscosum	Shiny Everlasting	Mitchell: 1003 Strathbogie: 1041 Benalla: 1076 Wangaratta: 1078 Indigo: 1116, 1117

4.2.3.4 Threatening processes

The potential for the overheard powerlines package of works to exacerbate FFG Act listed threatening processes relevant to the Project is summarised in Table 59.

Table 35 Totential for overhead powerline package to exacerbate in o Act listed threatening process	Table 59	Potential for overhead powerline package to exacerbate FFG Act listed threatening process
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FFG Act listed threatening process	Potential to exacerbate threatening process	Rationale
Habitat fragmentation as a threatening process for fauna in Victoria.	No	Overhead powerlines are primarily located in existing gaps in canopy therefore connectivity unlikely to be disrupted.
Loss of hollow-bearing trees from Victorian native forests and woodlands	Yes	Native vegetation to be removed includes large trees of which an estimated 43 trees contain hollows.
Predation of native wildlife by the introduced Red Fox <i>Vulpes vulpes</i>	No	The proposed works are unlikely to encourage the occurrence or increase the population of Red Fox in the local area.
Predation of native wildlife by the cat, <i>Felis catus</i>	No	The Project is unlikely to encourage the occurrence of cats above current levels in the environment.
Reduction in biomass and biodiversity of native vegetation through grazing by the Rabbit <i>Oryctolagus cuniculus</i>	No	The Project is unlikely to encourage the occurrence of rabbits.

FFG Act listed threatening process	Potential to exacerbate threatening process	Rationale
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	Yes	The Project has the potential to exacerbate this threatening process (see Table 49).
Use of Phytophthora-infected gravel in construction of roads, bridges, and reservoirs.		
Infection of amphibians with Chytrid Fungus, resulting in chytridiomycosis.	Yes	The Project has the potential to exacerbate this threatening process (see Table 49).
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 polyanthemus</i>	Yes	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	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	The project is unlikely to encourage the establishment of hives in nesting hollows.

4.2.4 Flora and Fauna Guarantee Amendment Act 2019

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 and the adoption of two categories of protected flora (restricted use and threatened).

The transitional process to bring the existing FFG Act threatened species list (DELWP, 2019a) and Advisory Lists (DSE, 2009, 2013; DEPI, 2014) in line was completed in June 2021 with the new FFG Act Threatened List gazetted on 1 May 2021 and released in June 2021 (DELWP, 2021). The Advisory Lists have therefore now been revoked.

The protected flora list is currently under review to apply the new 'restricted use protected flora' category. Until the review is completed, all current protected flora will remain as 'generally protected flora'.

Implications:

As the new FFG Act Threatened List was released and the Advisory Lists revoked after the database searches, field assessment and draft report were completed, the existing conditions and impact assessment are based on the listings available at the time as per Section 4.2.3.

The results and recommendations contained in this report may need to be revisited during detailed design to incorporate any transitional changes from the FFG Amendment Act that have implications for the project.

4.2.5 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 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.

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 Section 2.6.3.4.

Implications:

Twenty noxious weed species listed under the CaLP Act, including six that are listed as WoNS, were recorded during the field assessment. Their status and location within in the investigation area are listed in Table 60.

All works conducted by the project must be considerate of the CaLP Act and take reasonable measures, such as weed hygiene measures outlined in a construction environmental plan, to avoid the spread of CaLP Act-listed species.

Status	Scientific Name	Common Name	Investigation area
R	Allium triquetrum	Angled Onion	Mitchell: 1018
R, WoNS*	Asparagus asparagoides	Bridal Creeper	Mitchell: 1013, 1021 Strathbogie: 1042, 1057 Wangaratta: 1101
RC, WoNS	Chrysanthemoides monilifera	Boneseed	Mitchell: 1004
RC	Cirsium vulgare	Spear Thistle	Mitchell: 1022 Benalla: 1070, Wangaratta: 1078, 1083, 1084, 1086, 1087, 1101
RC	Crataegus monogyna	Hawthorn	Mitchell: 1004, 1018
RC	Echium plantagineum	Paterson's Curse	Mitchell: 1008, 1011, 1018 Strathbogie: 1051, 1056 Benalla: 1060, 1068, 1070, 1071, 1072, 1076 Wangaratta: 1078, 1081, 1088, 1092, 1105, 1108 Indigo: 1110, 1115
RC, WoNS	Genista monspessulana	Montpellier Broom	Mitchell: 1003 1004, 1006, 1011, 1022 Strathbogie: 1046, 1056 Wangaratta: 1088, 1101

Table 60 Noxious weeds recorded within the investigation area

Status	Scientific Name	Common Name	Investigation area
RC	Hypericum perforatum subsp. veronense	St John's Wort	Mitchell: 1010, 1012, 1013 Strathbogie: 1052 Benalla: 1061, 1072, 1076 Wangaratta: 1036 1078, 1105, 1106, 1108 Indigo: 1109, 1110, 1116
RC	<i>Juncus acutus</i> subsp. <i>acutus</i>	Spiny Rush	Mitchell: 1010, 1011, 1018, 1022
RC	Marrubium vulgare	Horehound	Indigo: 1109
RC	Opuntia stricta	Common Prickly-pear	Wangaratta: 1086, 1087
R	Oxalis pes-caprae	Soursob	Strathbogie: 1040, 1043, 1046
R, WoNS	Nassella neesiana	Chilean Needle-grass	Mitchell: 1012
RC	Physalis hederifolia	Sticky Ground-cherry	Wangaratta: 1101
RC	Rosa rubiginosa	Sweet Briar	Mitchell: 1004, 1012, 1013, 1018, 1022 Wangaratta: 1092 Indigo: 1116
RC, WoNS	Rubus polyanthemus	Blackberry	Mitchell: 1001, 1003, 1004, 1008, 1010, 1012, 1013, 1018, 1019, Strathbogie: 1047 Wangaratta: 1101
RC	Senecio jacobaea	Ragwort	Mitchell: 1008
RC, WoNS	Ulex europaeus	Gorse	Mitchell: 1006, 1010, 1011, 1012
R	Verbascum thapsus subsp. thapsus	Great Mullein	Wangaratta: 1101
RC	Watsonia meriana	Bugle Lily	Mitchell: 1003, 1004

*No legislative requirements under the CaLP Act

European Rabbit *Oryctolagus cuniculus*, Brown Hare *Lepus europaeus*, and Red Fox *Vulpes vulpes* were observed during the field assessments for the Project. The proposed works are unlikely to encourage the occurrence or increase the population of Red Fox or cats above current levels in the environment. The Project is unlikely to encourage the occurrence of rabbits or hares.

4.2.6 Wildlife Act 1975

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.

Habitat within the project area may be occupied by protected wildlife. Minimising loss of vegetation will reduce the risk of protected wildlife being displaced, injured, or killed during construction.

Wildlife in adjacent habitat may be indirectly affected by noise, vibration, light, or visual disturbance from human activity (vehicles and personnel). Wildlife occurring in areas already subject to anthropogenic sources of disturbance such as towns, major roads and the active rail line may respond

less to disturbance than their counterparts in areas not regularly subject to such disturbance mechanisms.

As all native species are protected under the Wildlife Act, any potential impacts should be discussed with DELWP to ascertain their expectations in relation to the Wildlife Act.

4.2.7 DELWP Victorian 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 and as such are considered along with potential offset requirements in Section 4.2.2.

5.0 Recommendations

The project area supports extensive native vegetation, a number of threatened ecological values, and habitat for threatened flora and fauna species and other non-threatened wildlife. The following are recommendations to reduce impacts to those ecological values and the implications associated with relevant legislation and policy requirements when developing the design and planning for the project:

- Design the project to minimise native vegetation (and large trees) and fauna habitat removal.
- Design the project so that impacts are restricted to areas of native vegetation that have the least biodiversity or other values.
- Establish no-go zones to prevent inadvertent loss of retained native vegetation and fauna habitat.
- Prioritise access via existing access tracks to reduce potential impacts on native vegetation and fauna habitat, particularly overstorey trees.
- Conduct works in cleared and disturbed areas such as adjacent roads, tracks, and cleared laydown
 or stockpile locations away from native vegetation, fauna habitat, and threatened species and
 communities.
- Avoid the population of Mountain Swainson-pea at investigation area 1078.
- Avoid overstorey trees to reduce the risk to woodland fauna and reduce the risk of the project exacerbating threatening processes listed under the FFG Act (habitat fragmentation and loss of hollow-bearing trees).
- Avoid aquatic habitat at investigation area 1110 to avoid impacts on Brown Toadlet and potential impacts on Sloane's Froglet.
- Avoid aquatic habitat at investigation areas 1001, 1002, 1003, 1076 to avoid impacts on Growling Grass Frog.
- Avoid or minimise impacts to the WBYBBRGGW and GBGW at investigation areas identified in Table **47**.
- Minimise construction footprint at investigation area 1088 to reduce loss of potential habitat for Striped Legless Lizard.
- Once detailed design has been finalised, ARTC will need to determine the number of Protected Flora that will be impacted and apply for a 'Permit to Take Protected Flora.'
- Engage a suitably qualified wildlife handler to be present when areas of potential habitat are to be disturbed by construction works.
- Develop and implement a Flora and Fauna Management Plan (or equivalent) incorporating measures to reduce potential impacts on adjacent retained habitat and the wildlife living there during construction. The management plan should specify measures to:
 - control surface water runoff and therefore minimise the risk of changes to water quality in aquatic habitats.
 - protect retained vegetation, threatened species, and habitat to reduce the risk of indirect loss of habitat through inadvertent placement of construction materials.
 - minimise disturbance to wildlife in adjacent habitats.
 - control/prevent the introduction and spread of weeds and pathogens.

Further investigations that may be required include:

- VQA and TEC assessments for investigation areas where native vegetation was identified via desktop assessment as a result of no access or changes to investigation areas after the field assessment had been conducted (Section 2.5).
- If aquatic habitat cannot be avoided at investigation area 1110, then targeted survey for Sloane's Froglet may be warranted to confirm the presence of the species (in addition to the known

occurrence of Brown Toadlet at that location) to inform an assessment against the significant impact assessment criteria for threatened species if required.

- If aquatic habitat cannot be avoided at investigation areas 1001, 1002, and 1076, then further consideration on the potential presence of Growling Grass Frog may be warranted. Timing for surveys if required would be between October and December during the peak of the breeding period.
- If large trees cannot be avoided at investigation areas 1076 and 1078 then a hollow-bearing tree
 assessment may be required due to the continuity of high-quality native vegetation and habitat
 zones supporting the benchmark number of Large Trees in Patches and the potential for those
 areas to support hollow-dwelling fauna.
- If impacts to TECs listed in Table 48 cannot be avoided, an assessment against the significant impacts criteria for the critically endangered WBYBBRGGW and endangered GBGW will be required.

Next steps:

If the proposed works at the overhead powerline sites require the removal of native vegetation, then:

• A planning permit application may be required to be submitted to the relevant Council for approval for overheard powerline sites that occur outside the enhancement sites. Although overhead powerline replacement works that occur outside enhancement sites are largely exempt from planning approval under Clause 62.02-1 of the relevant Planning Schemes as the works are defined as a 'minor utility installation', where native vegetation removal is required to facilitate the works, a planning permit may be required in accordance with Clause 52.17 of the Planning Schemes.

The application to remove native vegetation must meet the requirements of the Applicant's guide – Applications to remove, destroy or lop native vegetation (DELWP, 2018b). These requirements include:

- a statement that identifies the process undertaken to avoid and minimise vegetation loss
- an offset statement that identifies that required biodiversity offsets for the project are available
- an official NVR report generated by DELWP following the submission of habitat hectare assessment field data.

It is noted the Planning Scheme Amendment currently being prepared for the Project includes any powerline sites that are located within the enhancement sites. Therefore, any overhead powerline sites within an enhancement site do not require a separate planning permit application to be submitted to the relevant Council.

 If significant impacts to MNES are likely, then an offset package to compensate for these losses will be required. Advice on the determination of the significance of the impacts will be provided in Environment Report (AECOM, 2021b).

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Inland Rail - Beveridge to Albury: Overhead Powerlines

Ecology: Existing Conditions Report

16-Aug-2021 Commercial-in-Confidence



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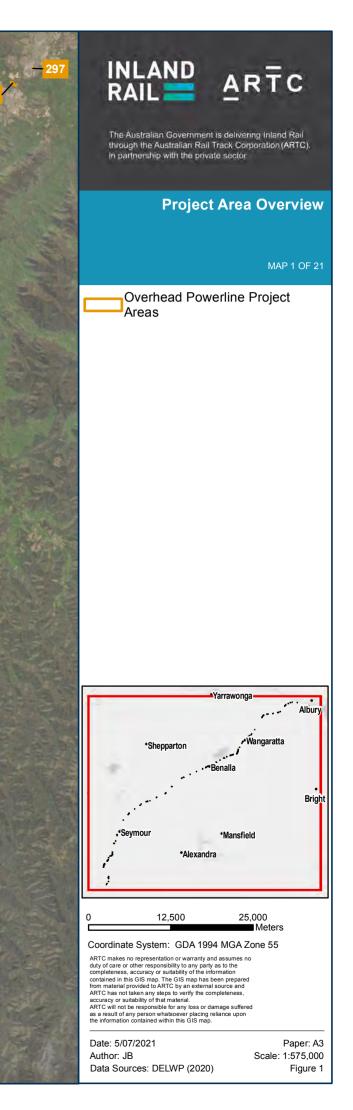
Appendix A

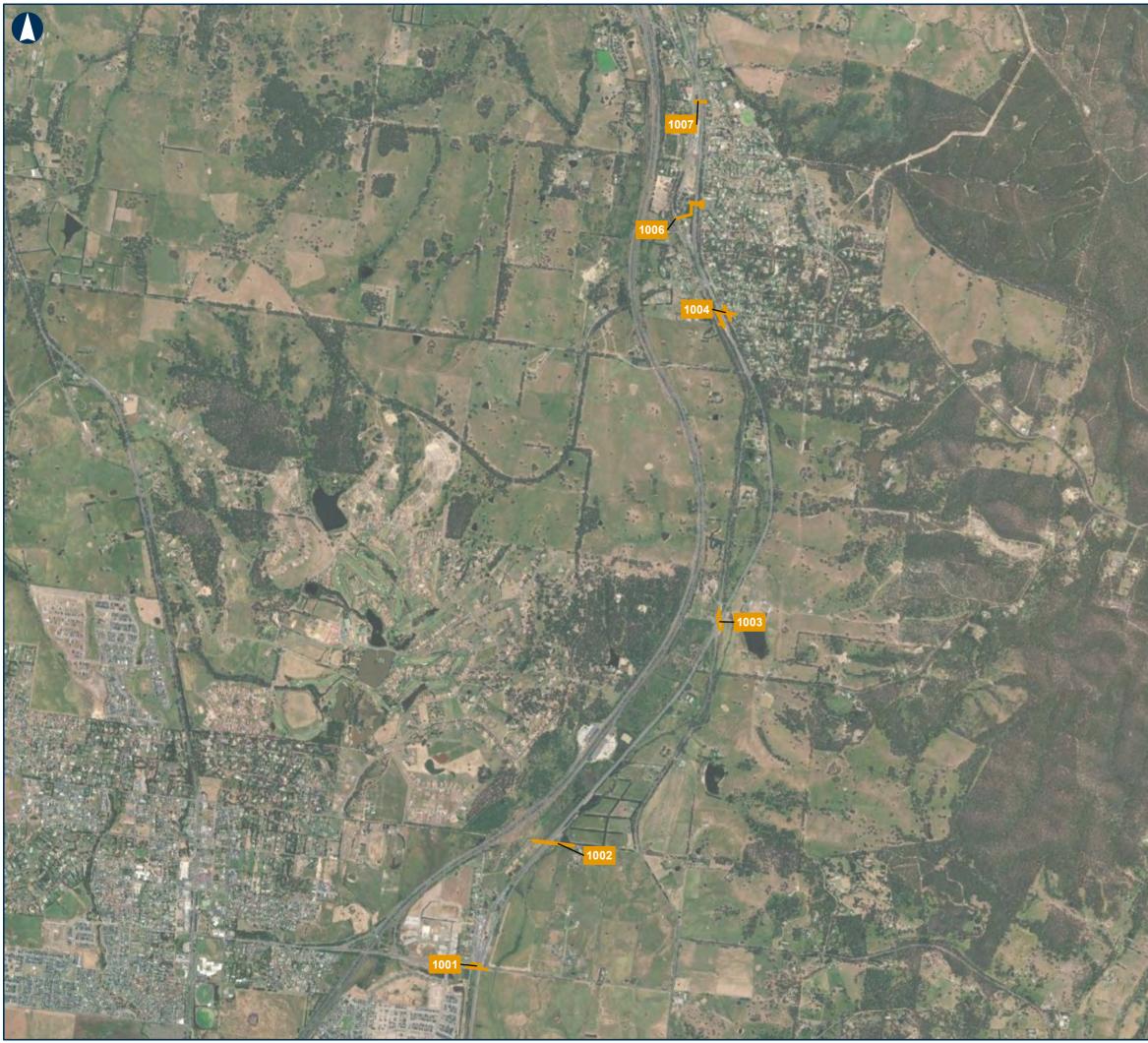
Figures

Appendix A – Figures

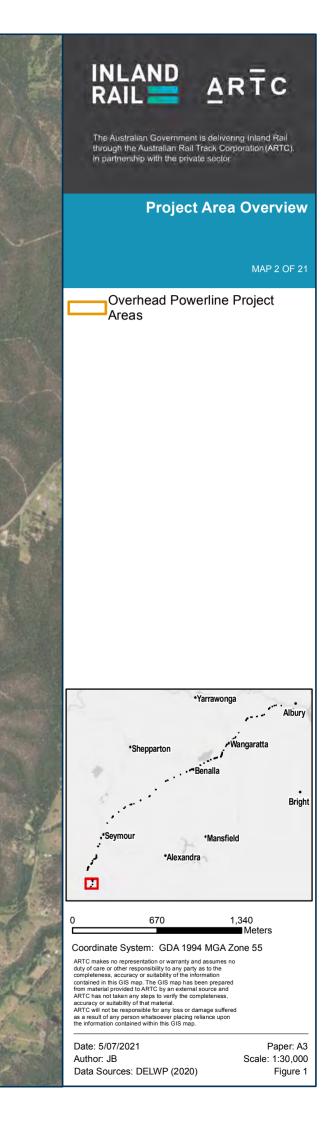
Figure 1 Project area overview

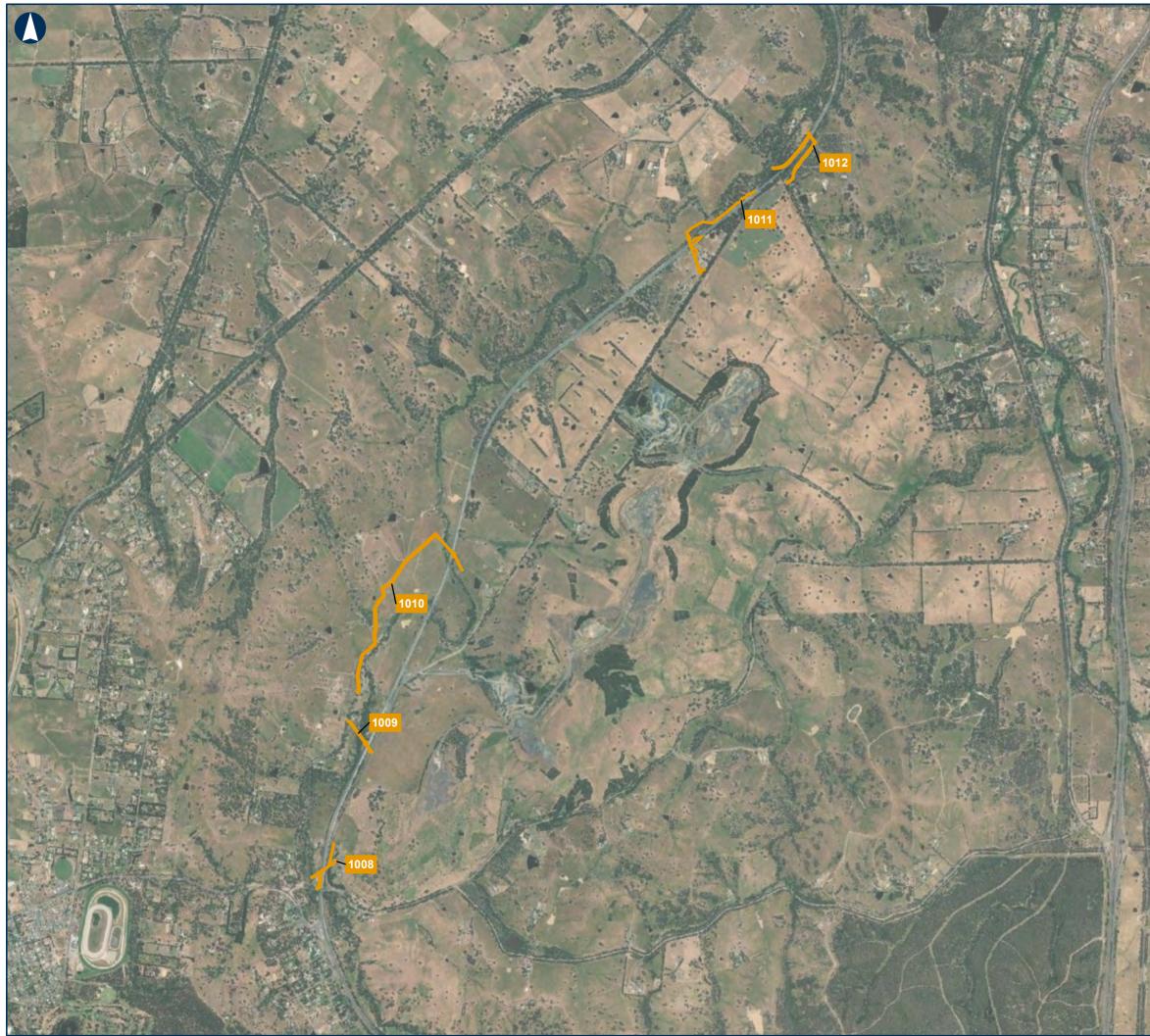


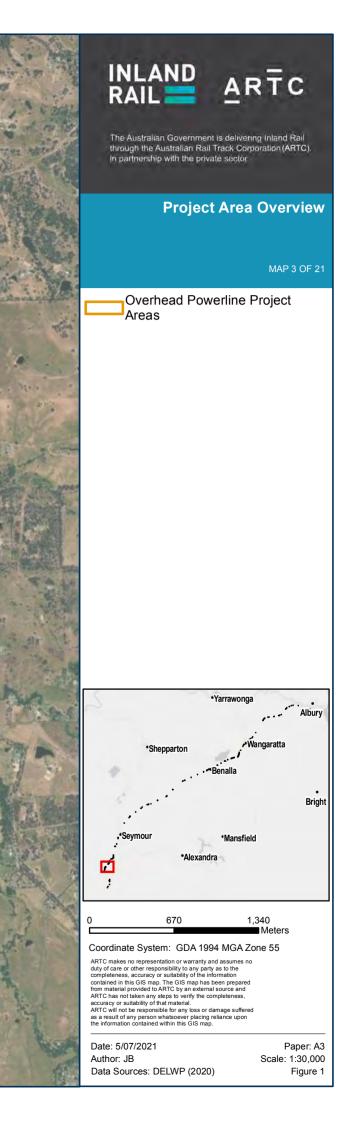


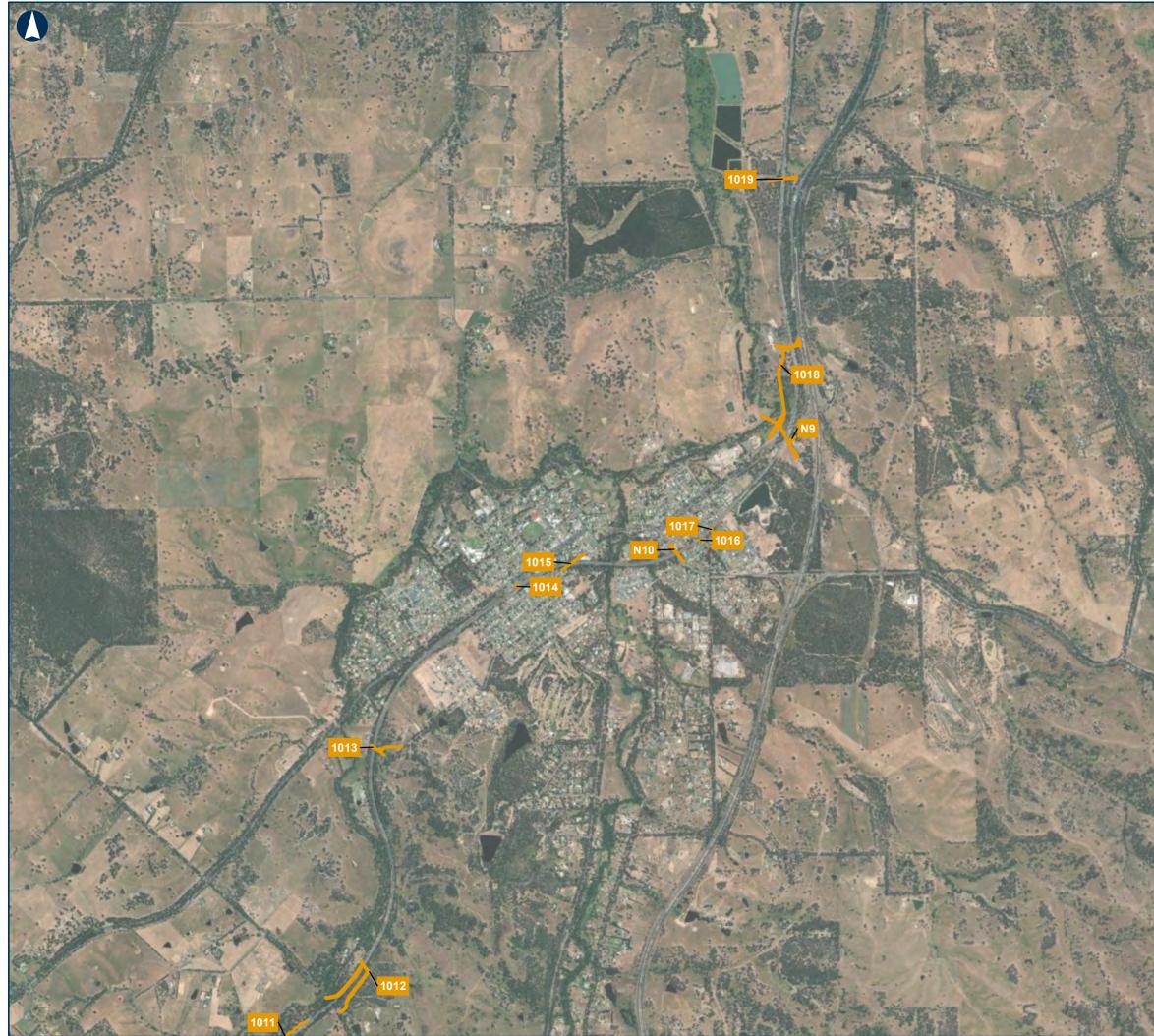


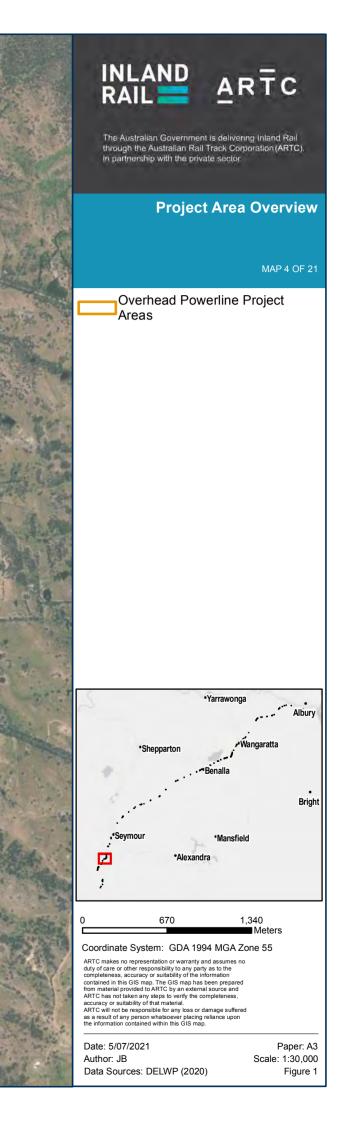
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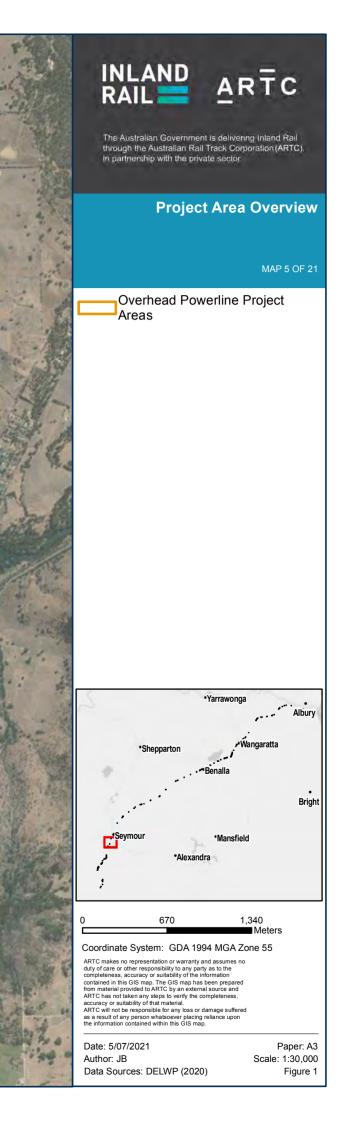


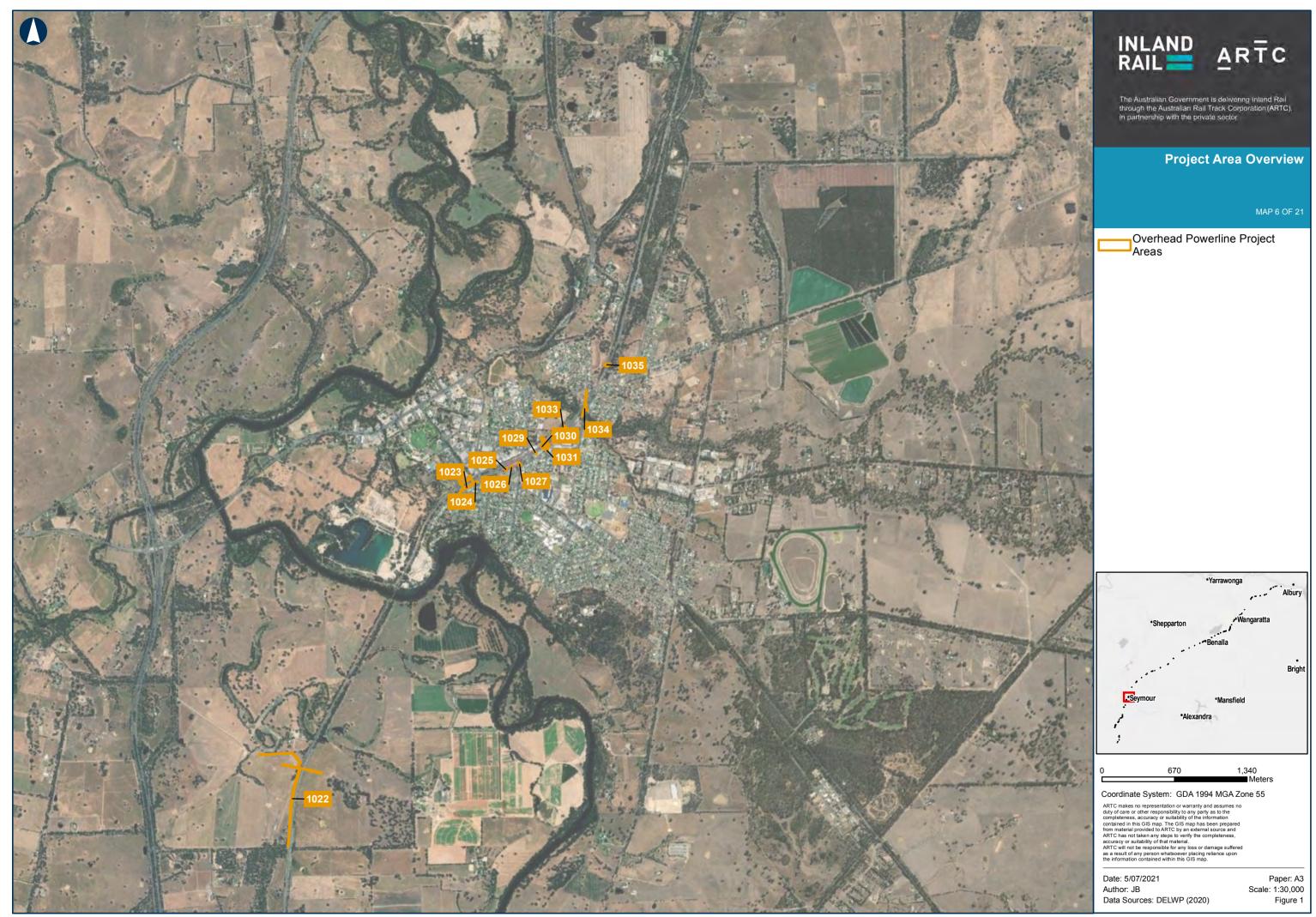






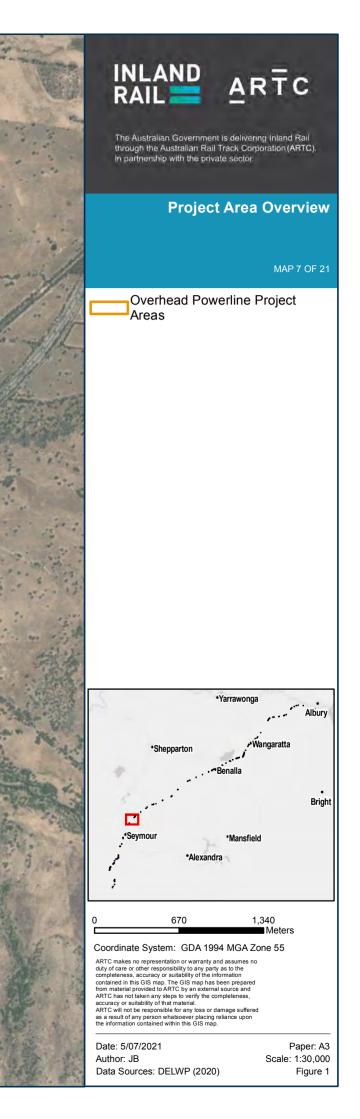






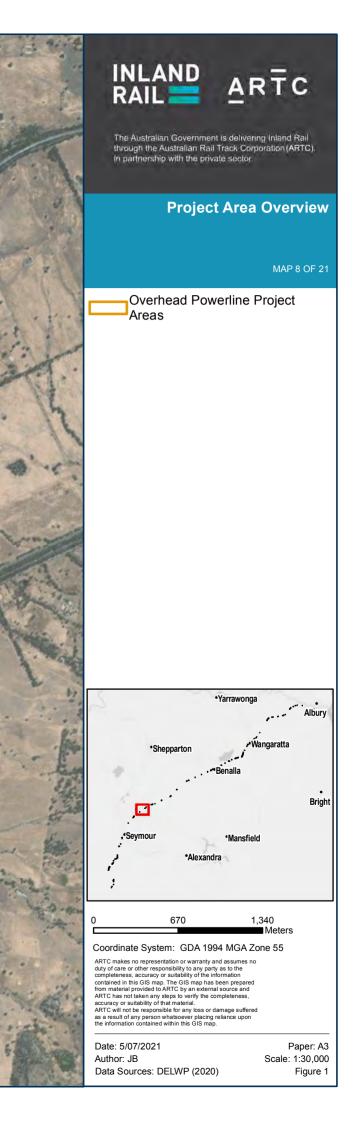


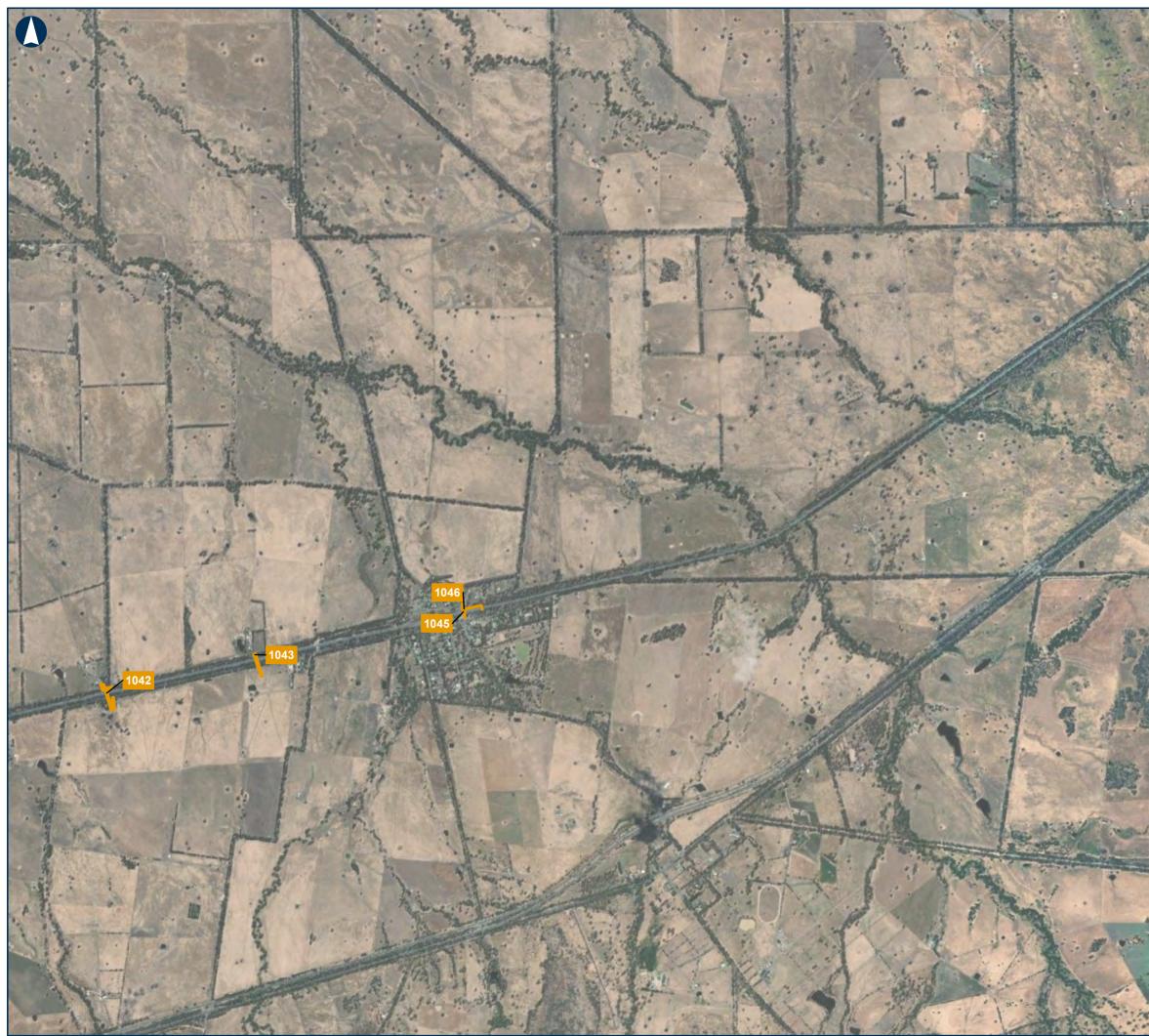
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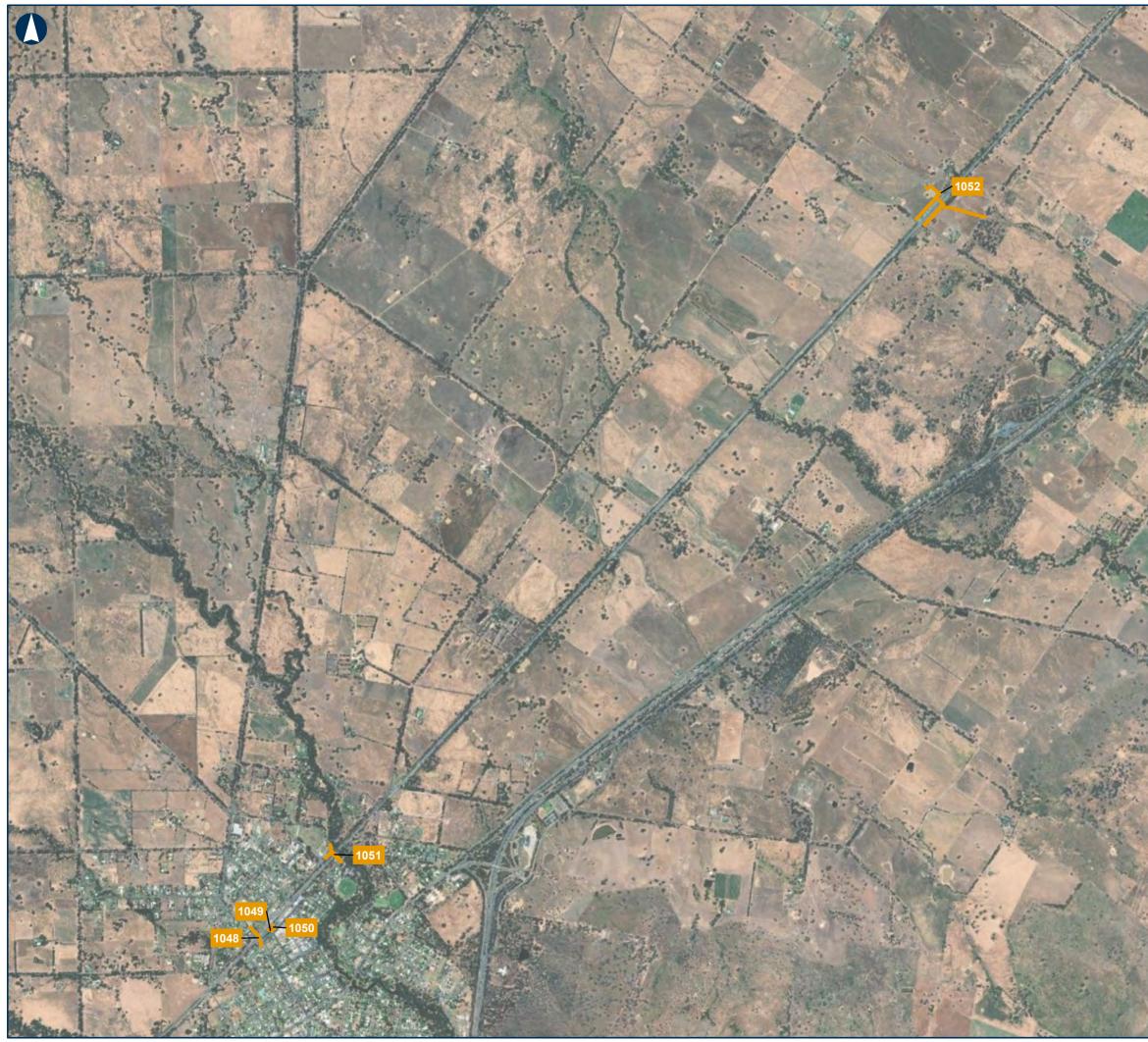
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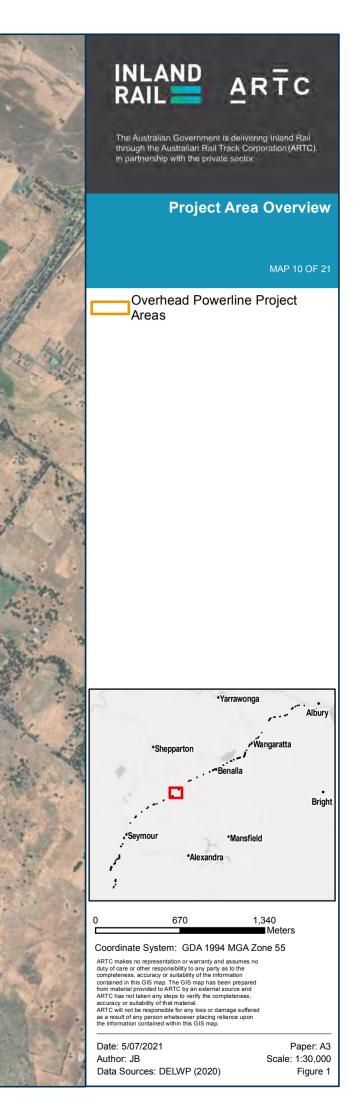


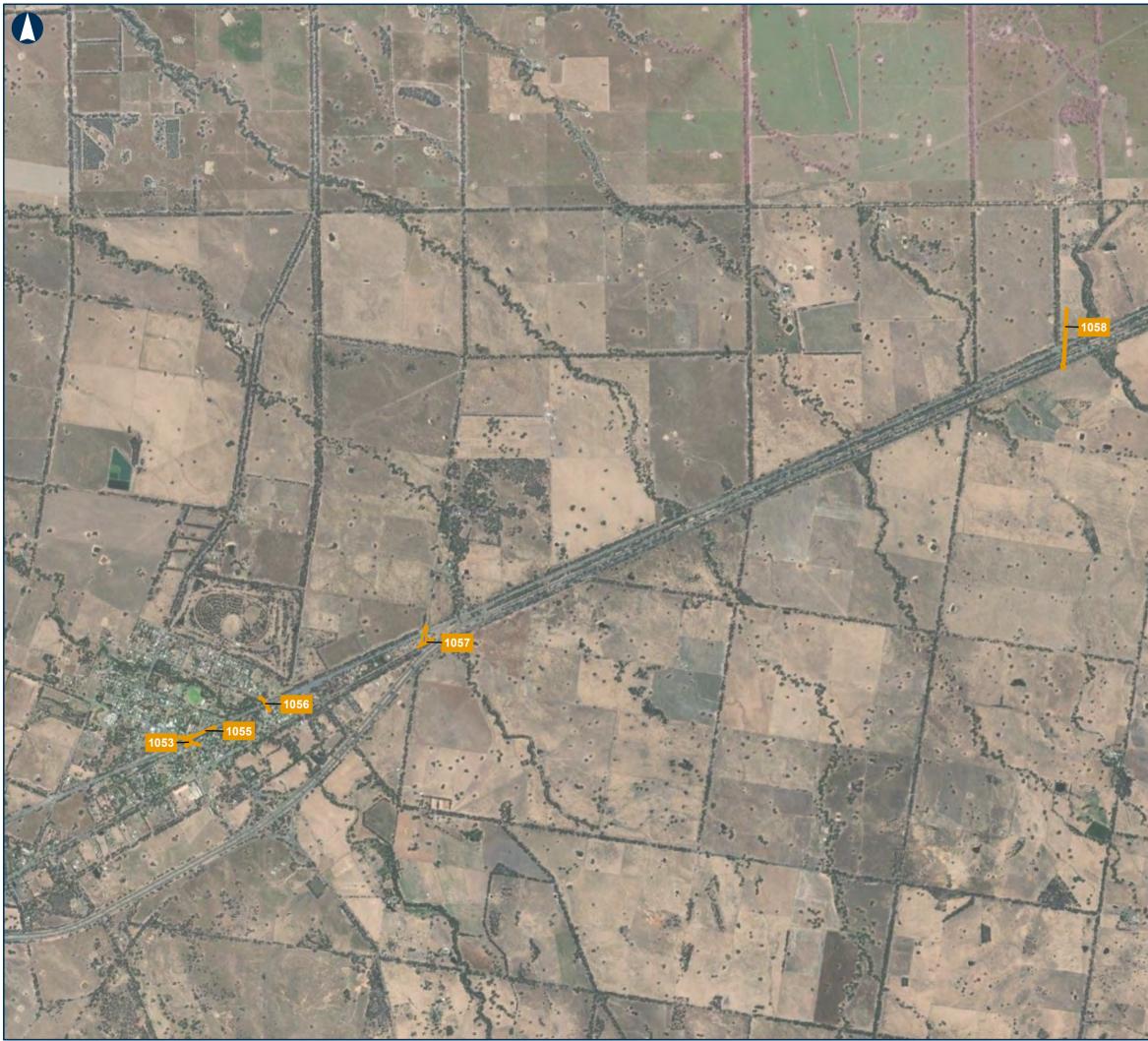
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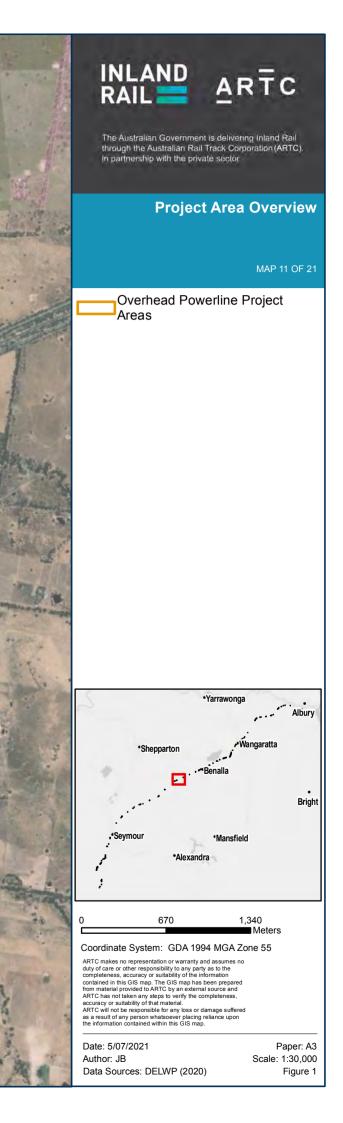




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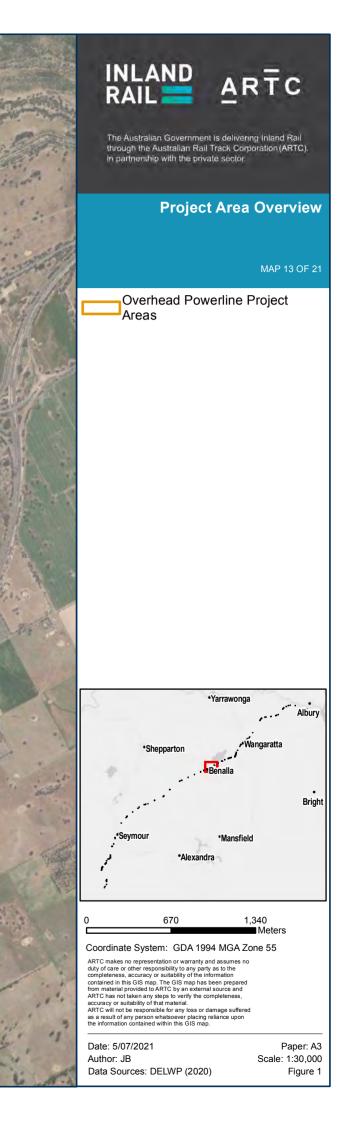




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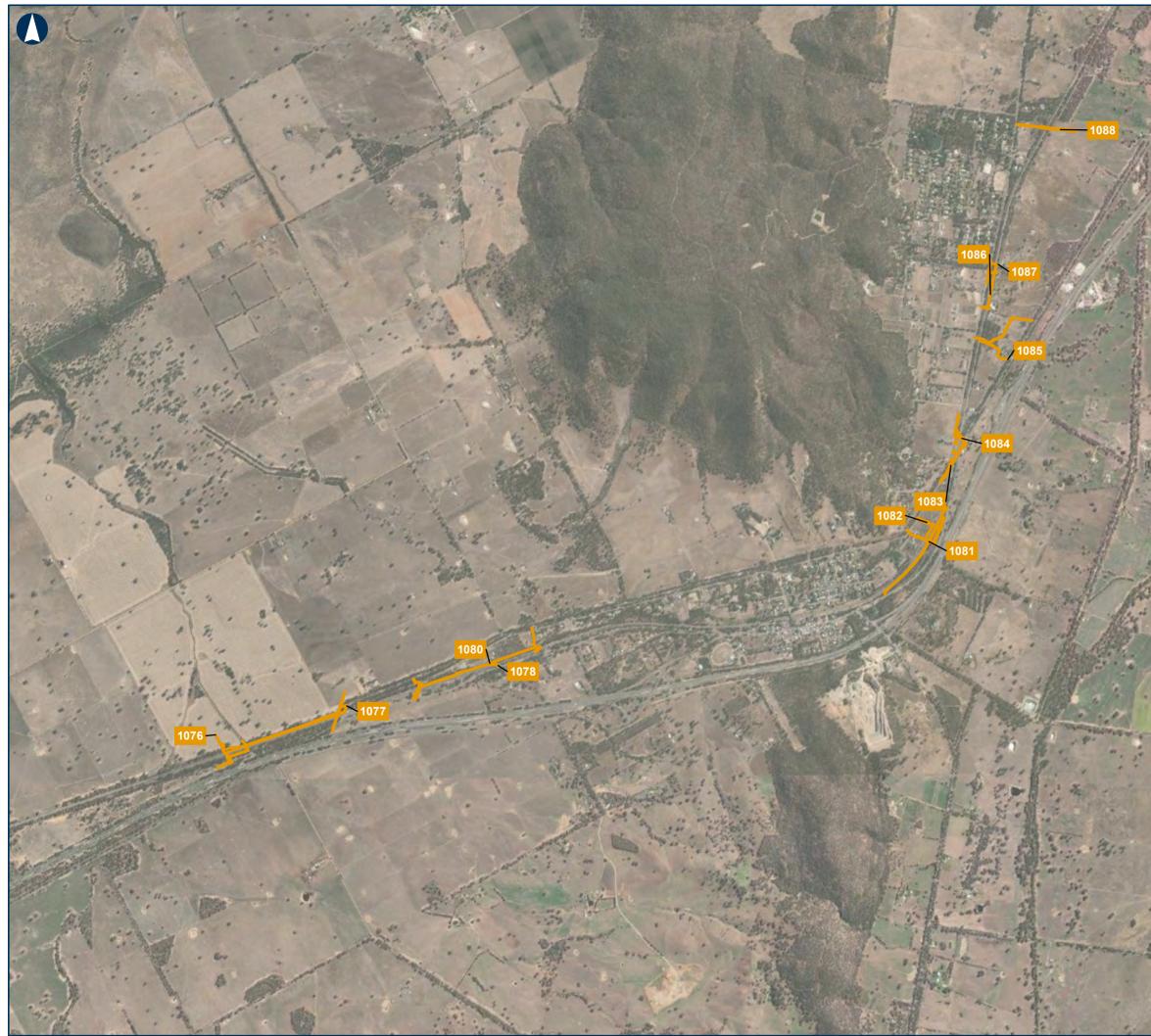
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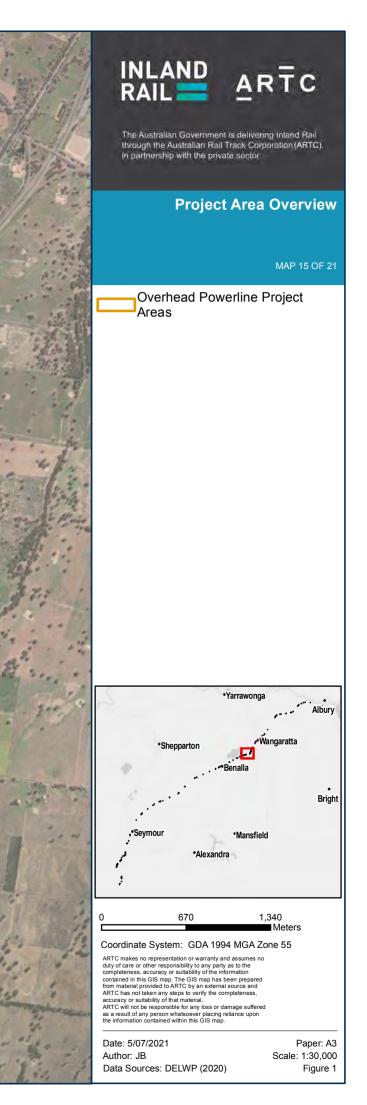


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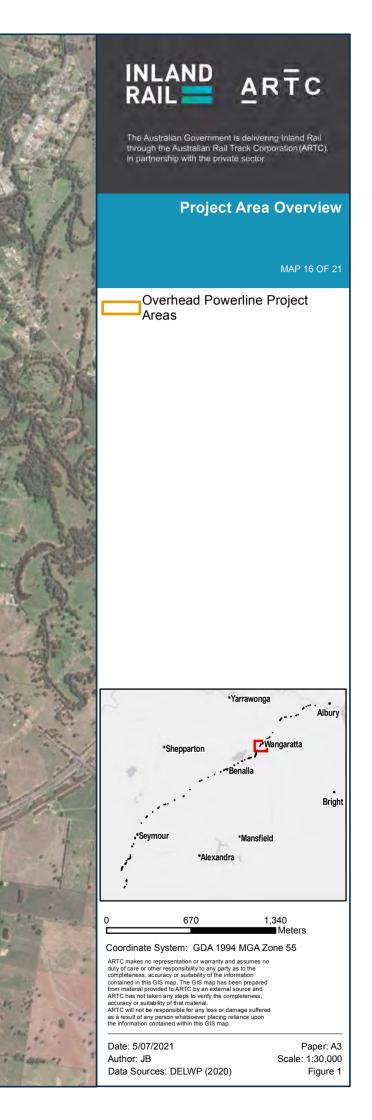


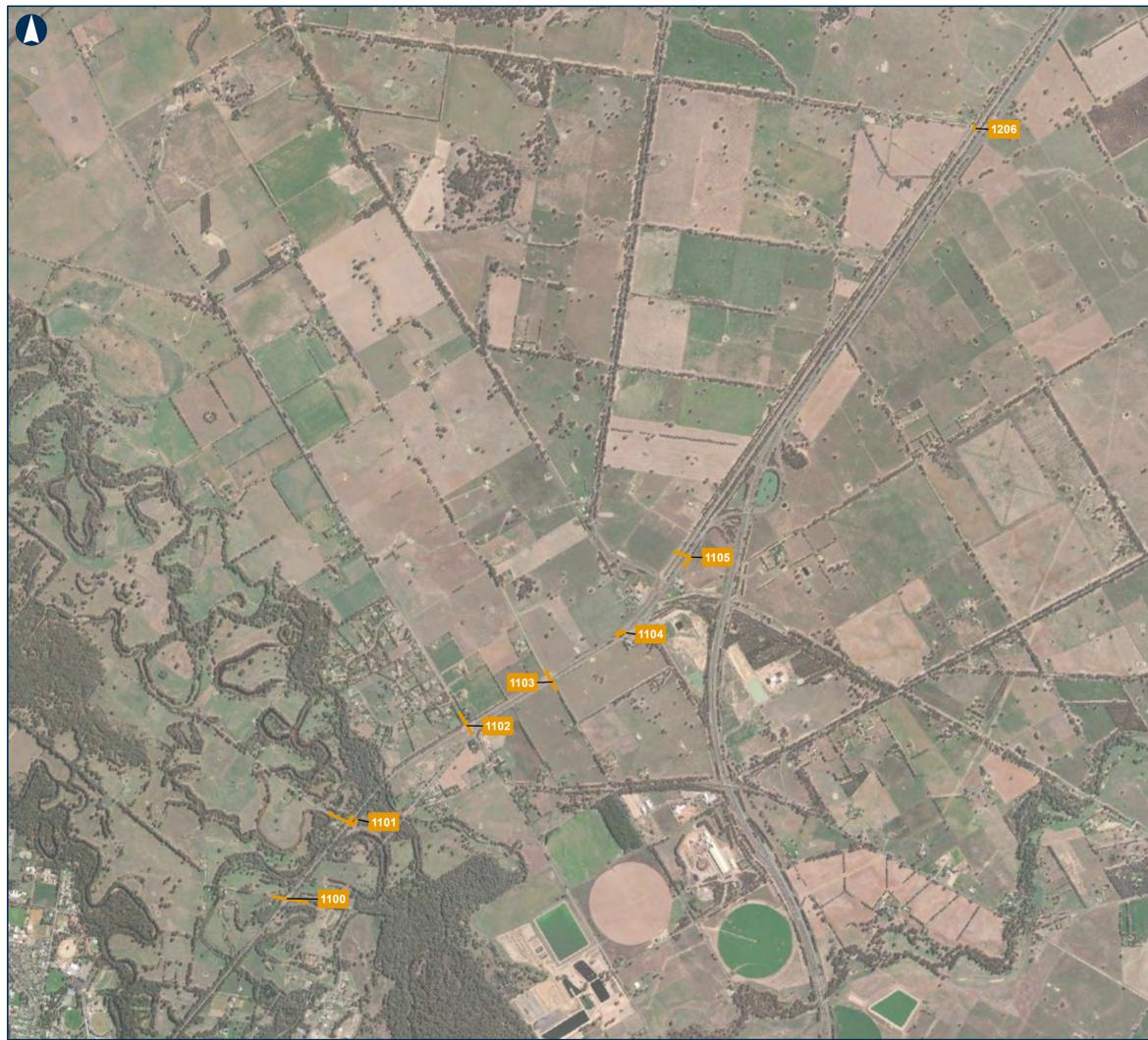


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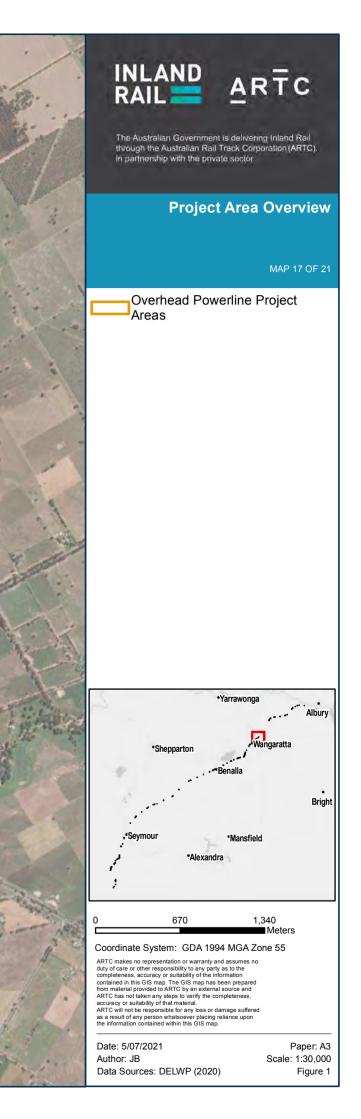








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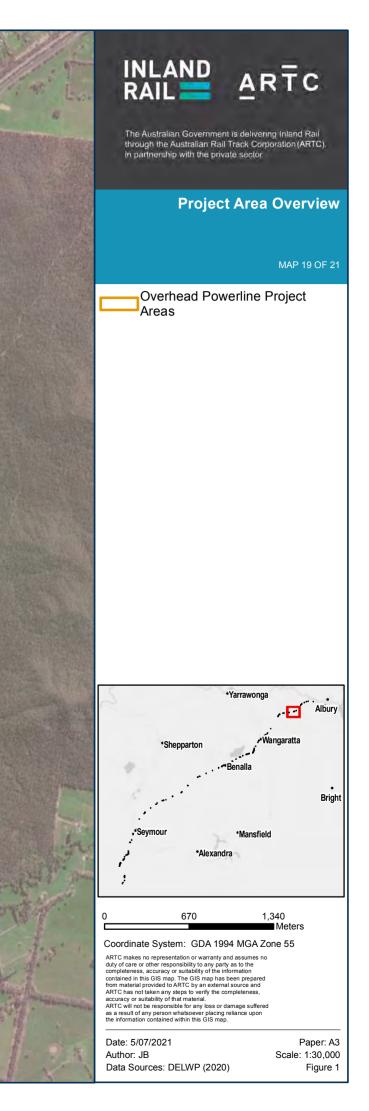








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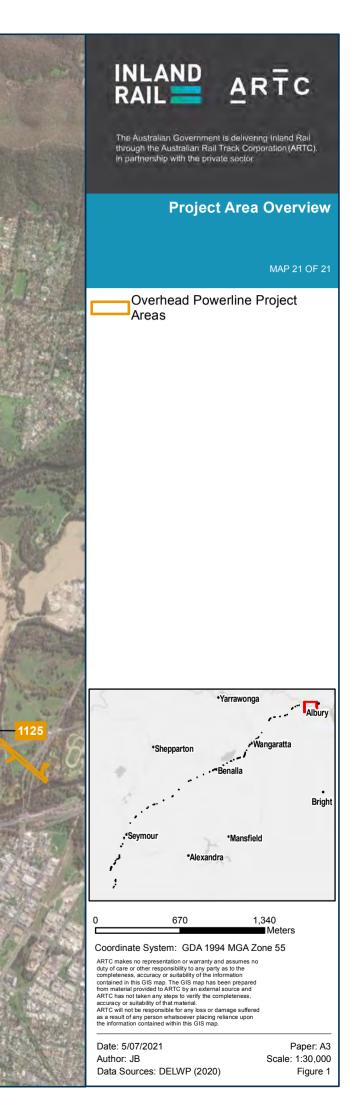


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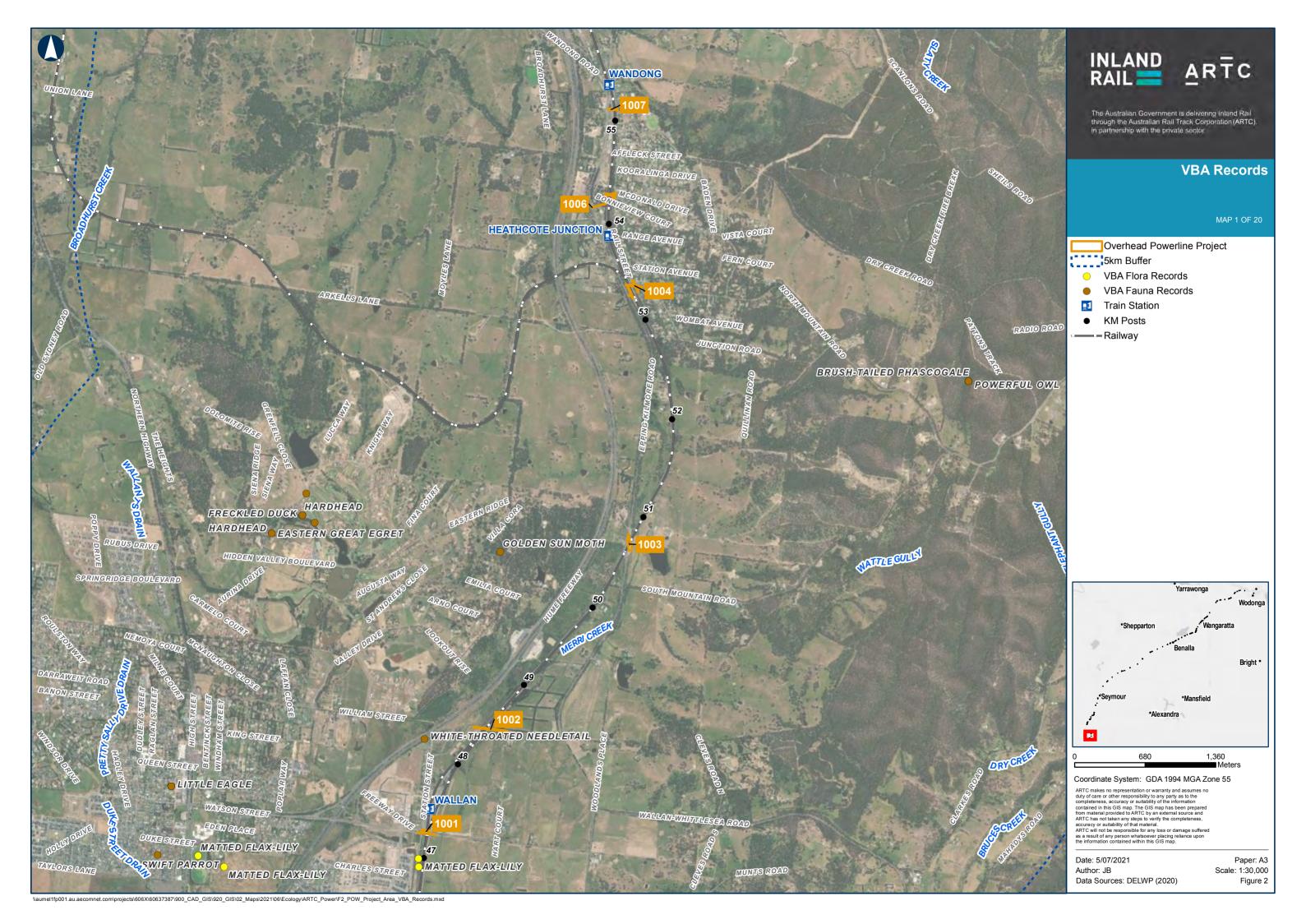


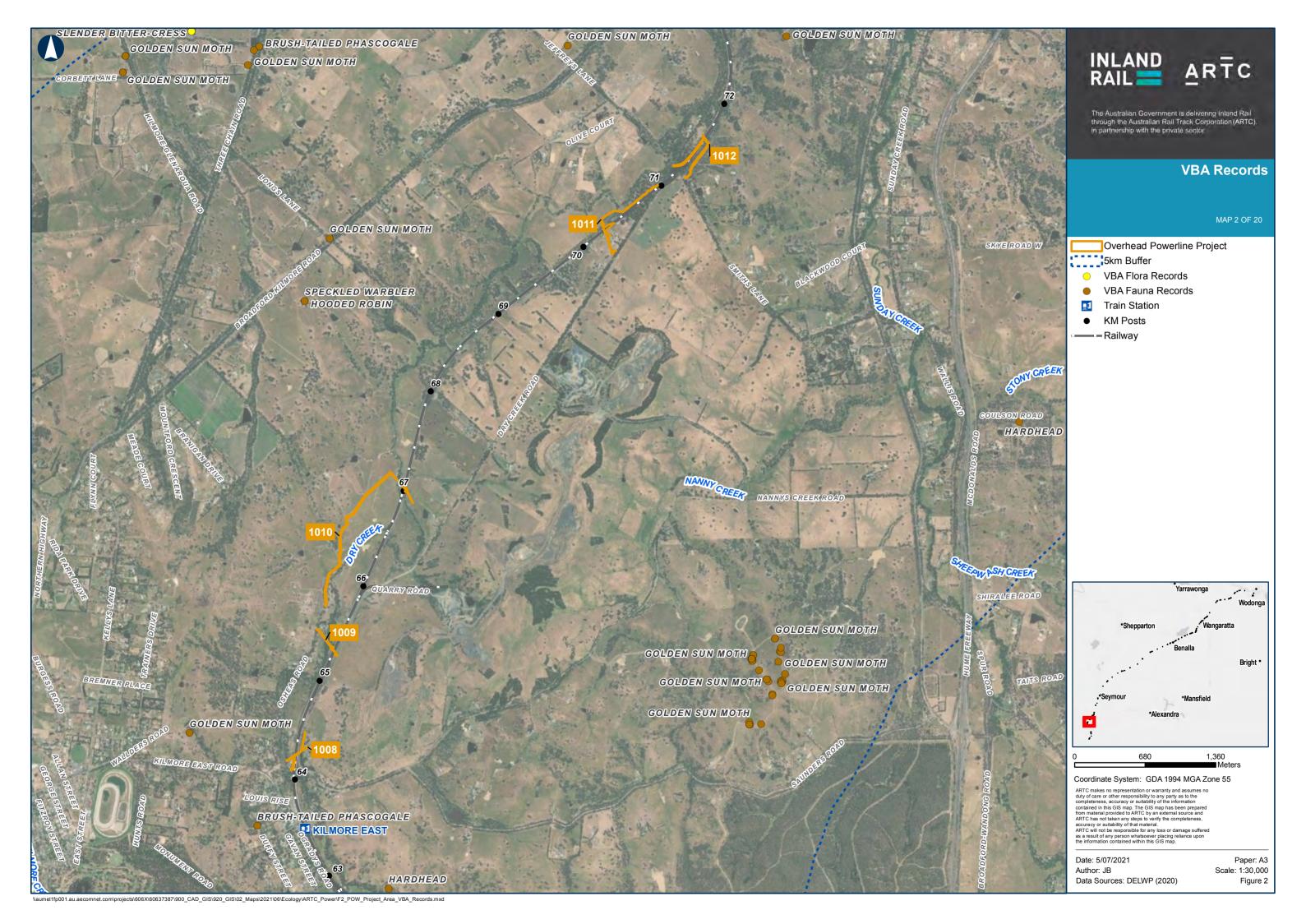
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Appendix A – Figures

Figure 2 VBA records





GOLDEN SUN MOTH LARGE ANT BLUE BUTTERFLY SMALL ANT BLUE BUTTERFLY

Jewel Beetle

ADEORD-GLENAROUA RO

OBRUSHETAILEDEPHASCOGALE GOLDEN SUN MOTH DIAMOND FIRETAIL BRUSH-TAILED PHASCOGALE SPECKLED WARBLER ROBIN

SPECKLED WARBLER

GOLDEN SUN MOTH

GOLDEN SUN MOTH

73

GOLDEN SWHITE THROATEDINEEDLETAIL SQUARE-TAILED KITE

GOLDEN SUN MOTH

GOLDEN SUN MOTH

GOLDEN SUN MOTH

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GOLDEN SUN MOTH

FRECKLED DUCK HARDHEAD MUSK DUCK BLUE-BILLED DUCK

AUSTRALASIAN SHOVELER BLUE-BILLED DUCK HARDHEAD

80 KENNYS LANE

MCDOUGALL SIDING MUSK DUCK 1 HARDHEAD QUARE-TAILED KITE

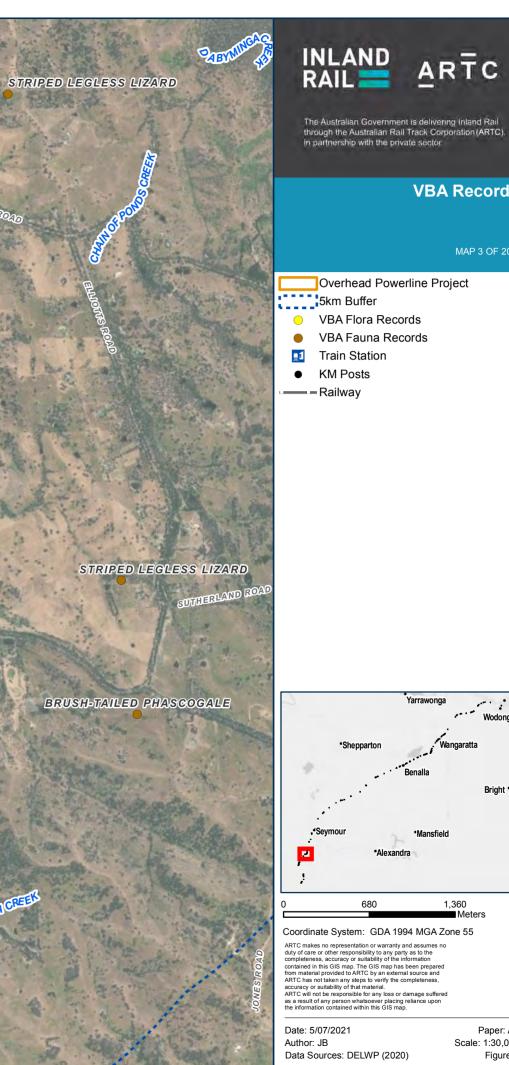
1015 COMMON SANDPIPER N10-SPECKLED WARBLER DIAMOND FRETAIL STRATH CREEK

SQUARE-TAILED KITE

GOLDEN SUN MOTH

MIA MIA ROAD

BRUSH-TAILED PHASCOGALE



Paper: A3 Scale: 1:30,000 Figure 2

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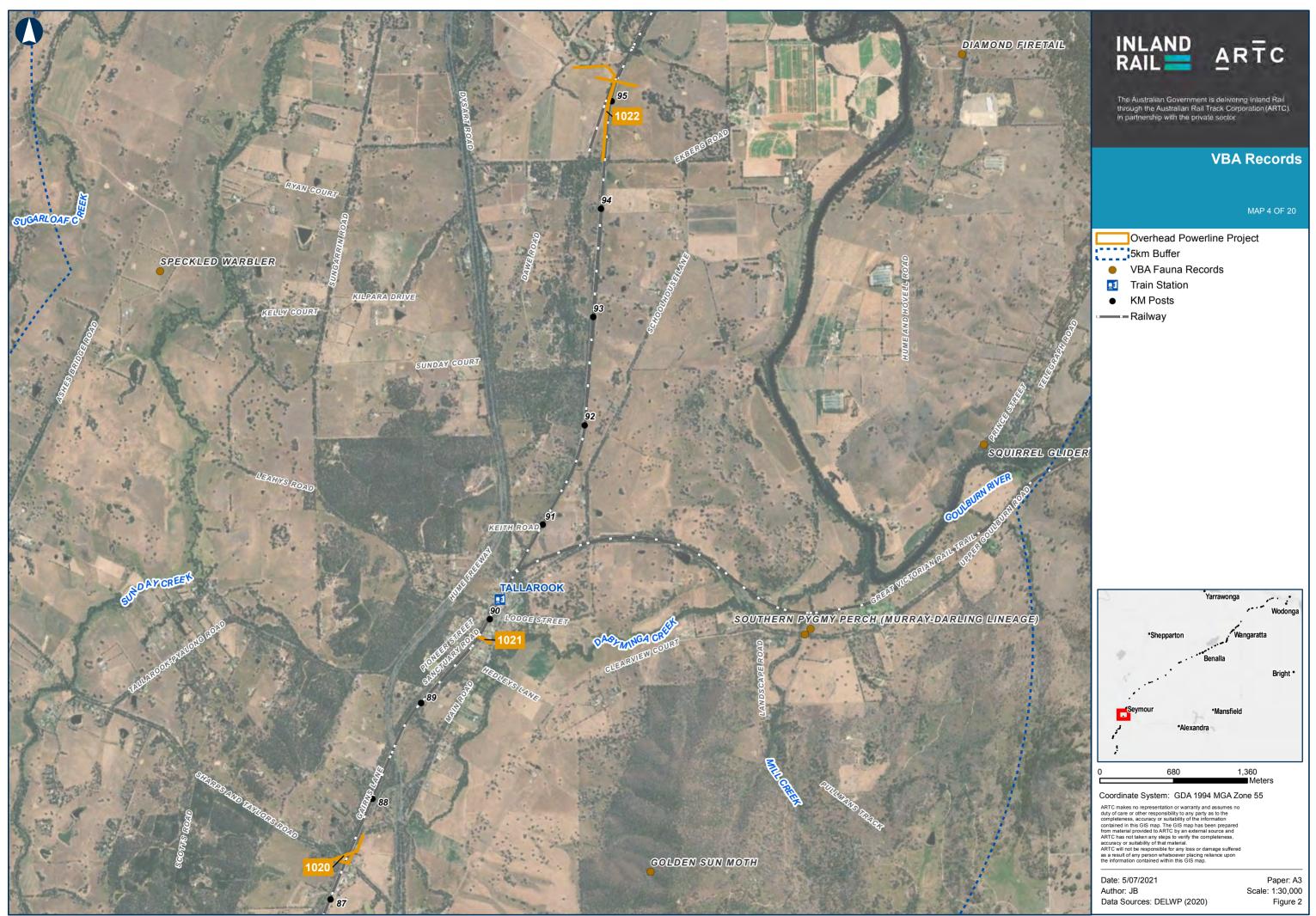
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ARTC

VBA Records

MAP 3 OF 20



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> AUSTRALASIAN SHOVELER MUSK DUCK BLUE-BILLED DUCK HARDHEAD AUSTRALASIAN SHOVELER MUSK DUCK HARDHEAD

WHITEHEADS CROED BACKCREEK

STRIPED LEGLESS LIZARD DIAMOND FIRETAIL

TURQUOISE PARROT

SQUARE-TAILED KITE LITTLE EAGLE PAINTED HONEYEATER DIAMOND FIRETAIL BRUSH-TAILED PHASCOCALE BARKINGLOWLRBLER SQUIRREL GLIDER DIAMOND FIRETAIL SQUARE-TAILED KITE LATE-FLOWER FLAX-LILY

SECKLED WARBLER DIAMOND FIRETAIL

AUSTRALASIAN SHOVELER DIAMOND FIRETAIL

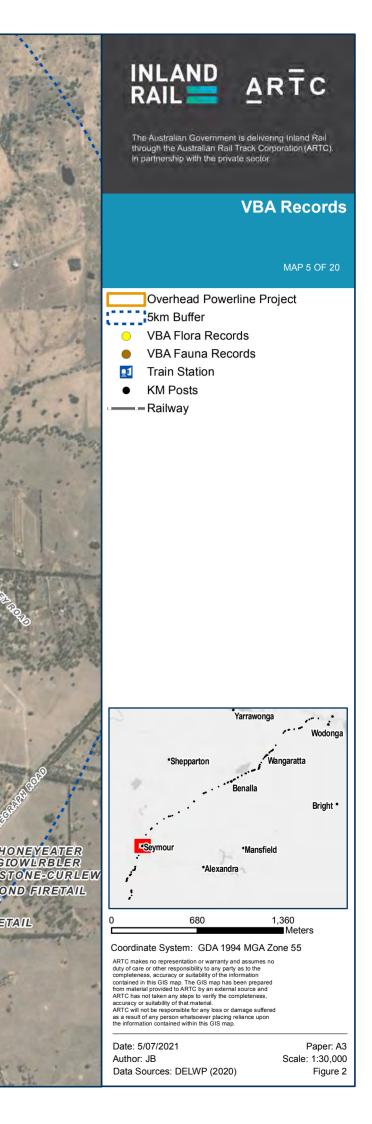
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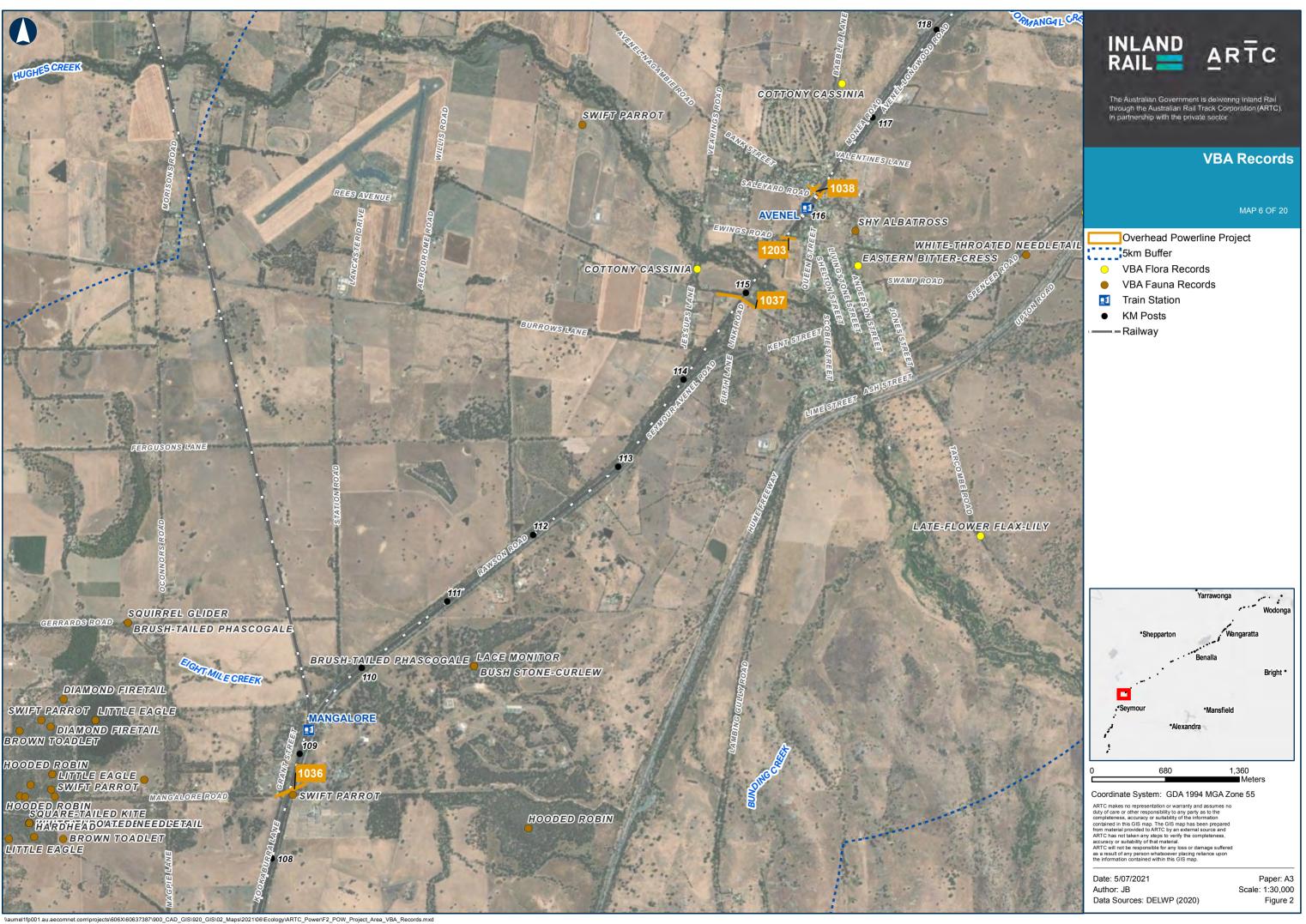
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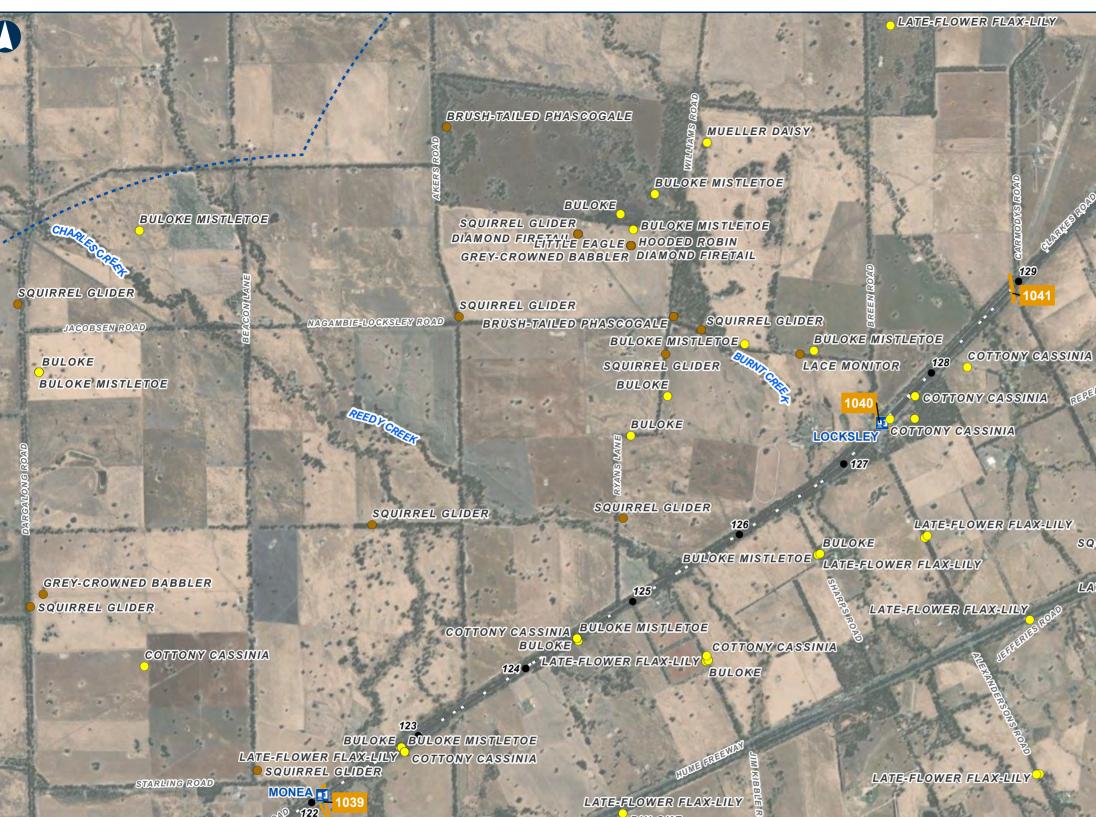
97 POWERFUL OWL AUSTRALASIAN SHOVELER

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POPPLES LANE







COTTONY CASSINIA COTTONY CASSINIA LATE-FLOWER FLAX-LILY 120 BULOKE 部のに回日

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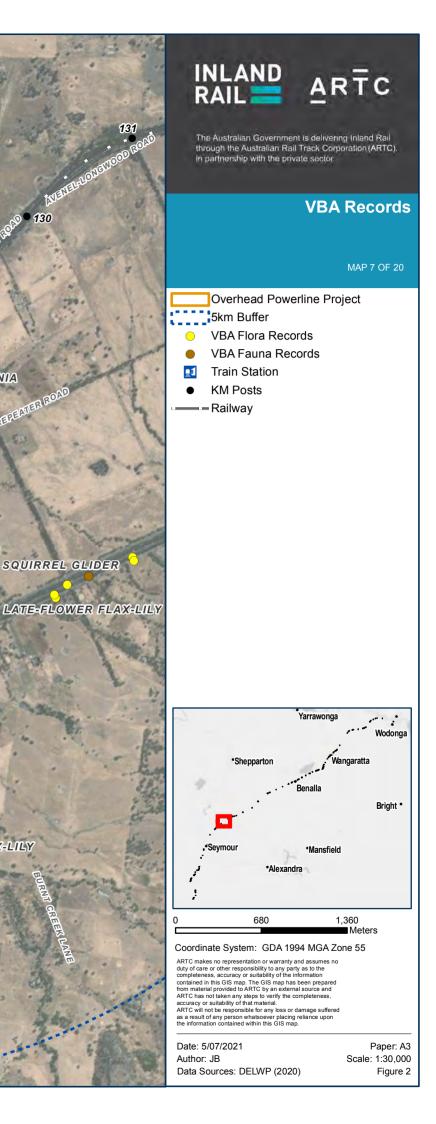
COTTONY CASSINIA BULOKE 119. LATE-FLOWER FLAX-LILY

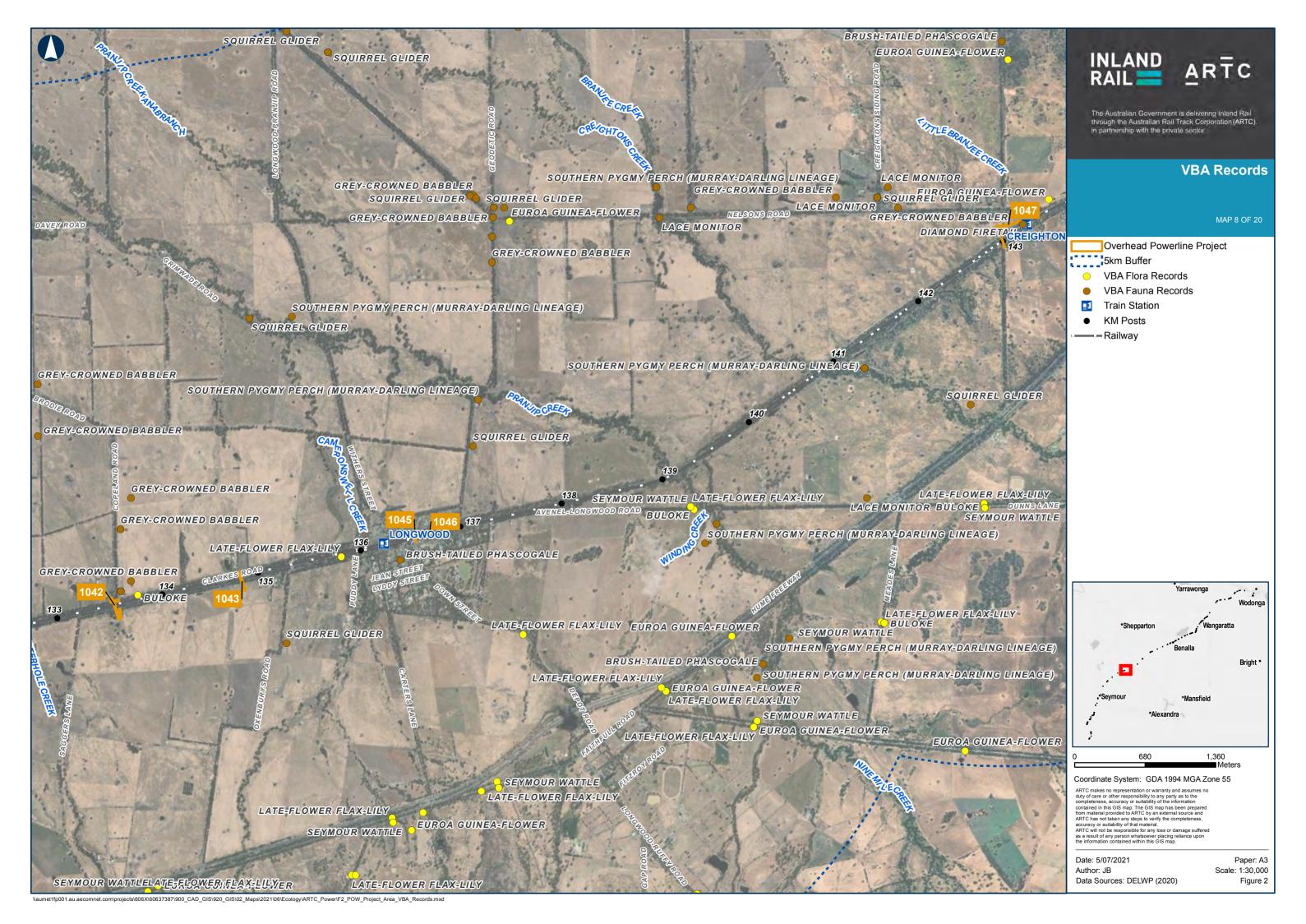
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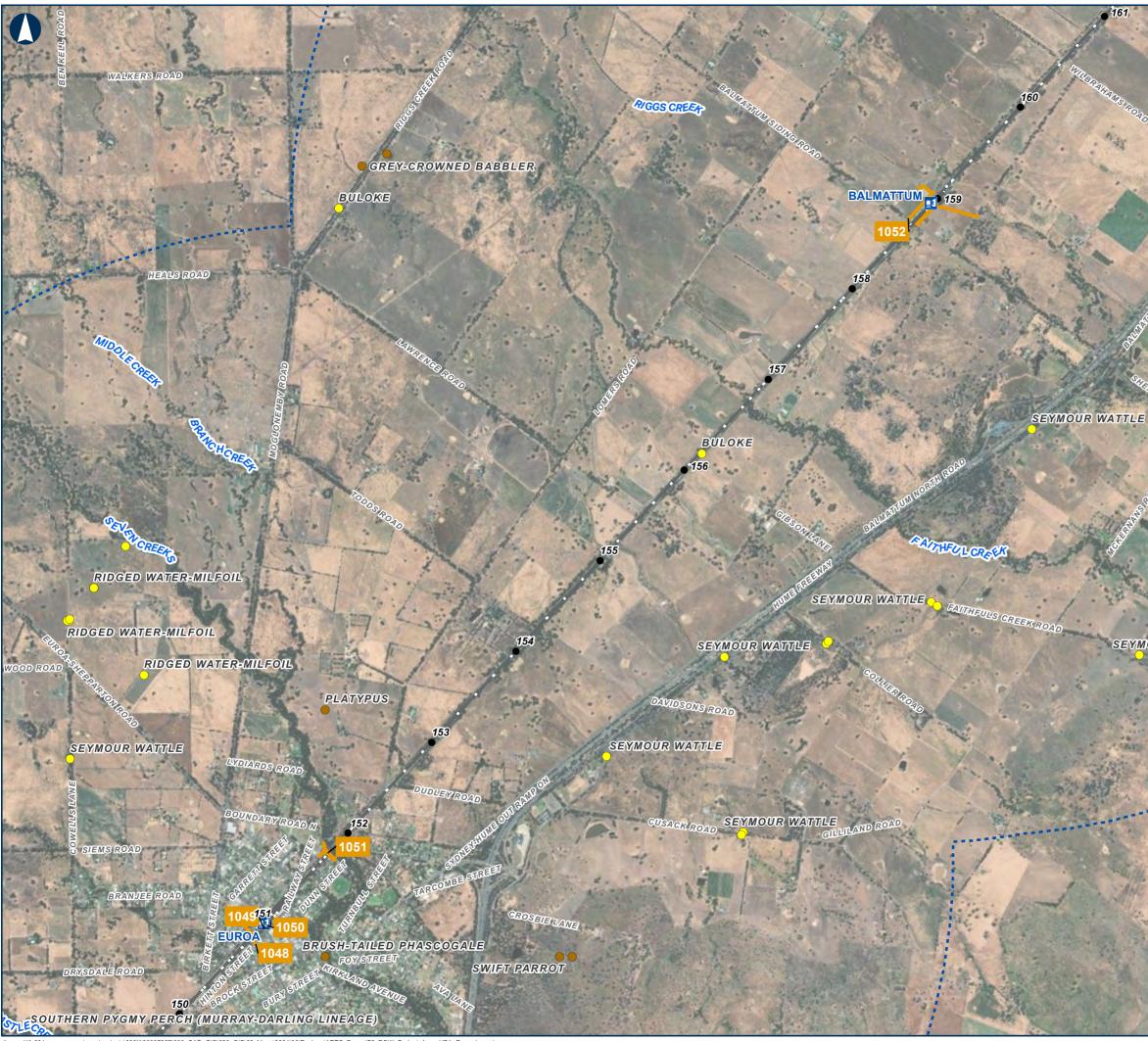
BULOKE

LATE-FLOWER FLAX-LILY

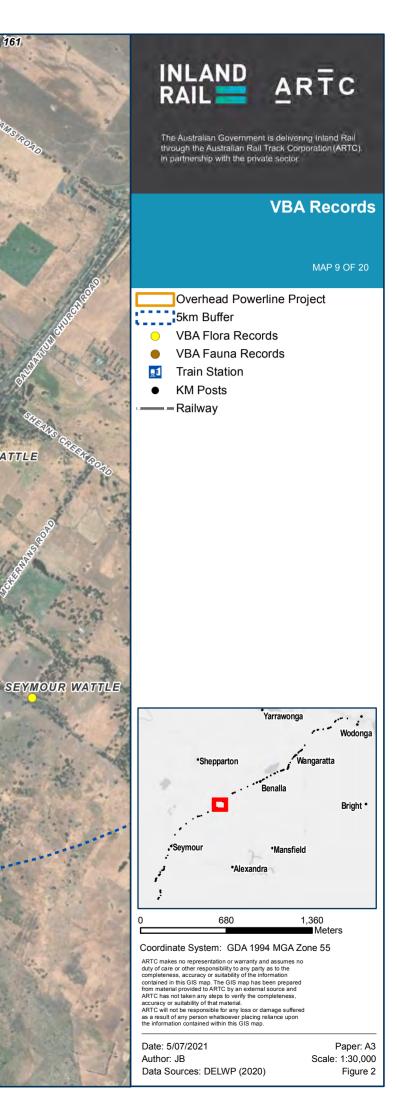
LATE-FLOWER FLAX-LILY

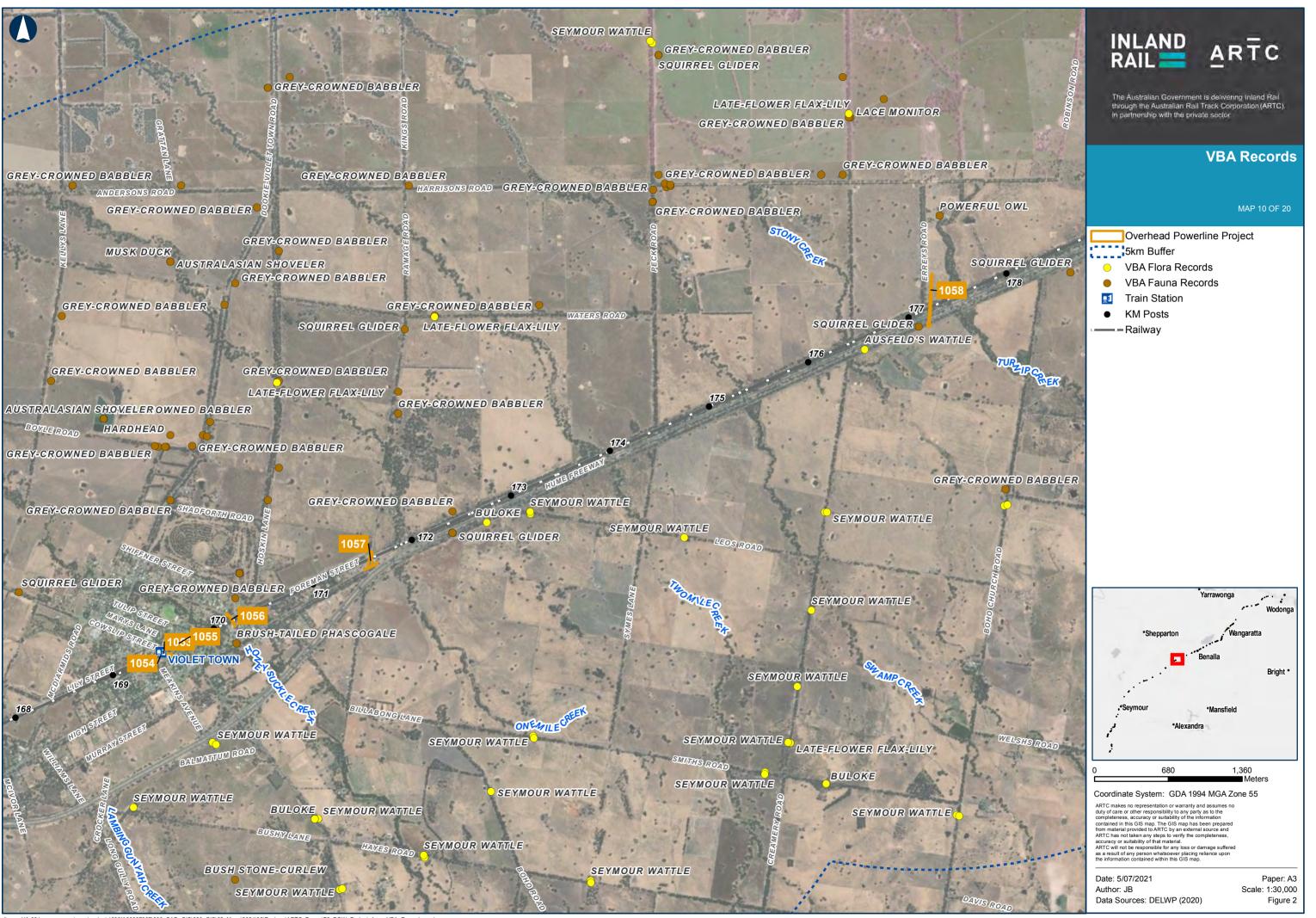




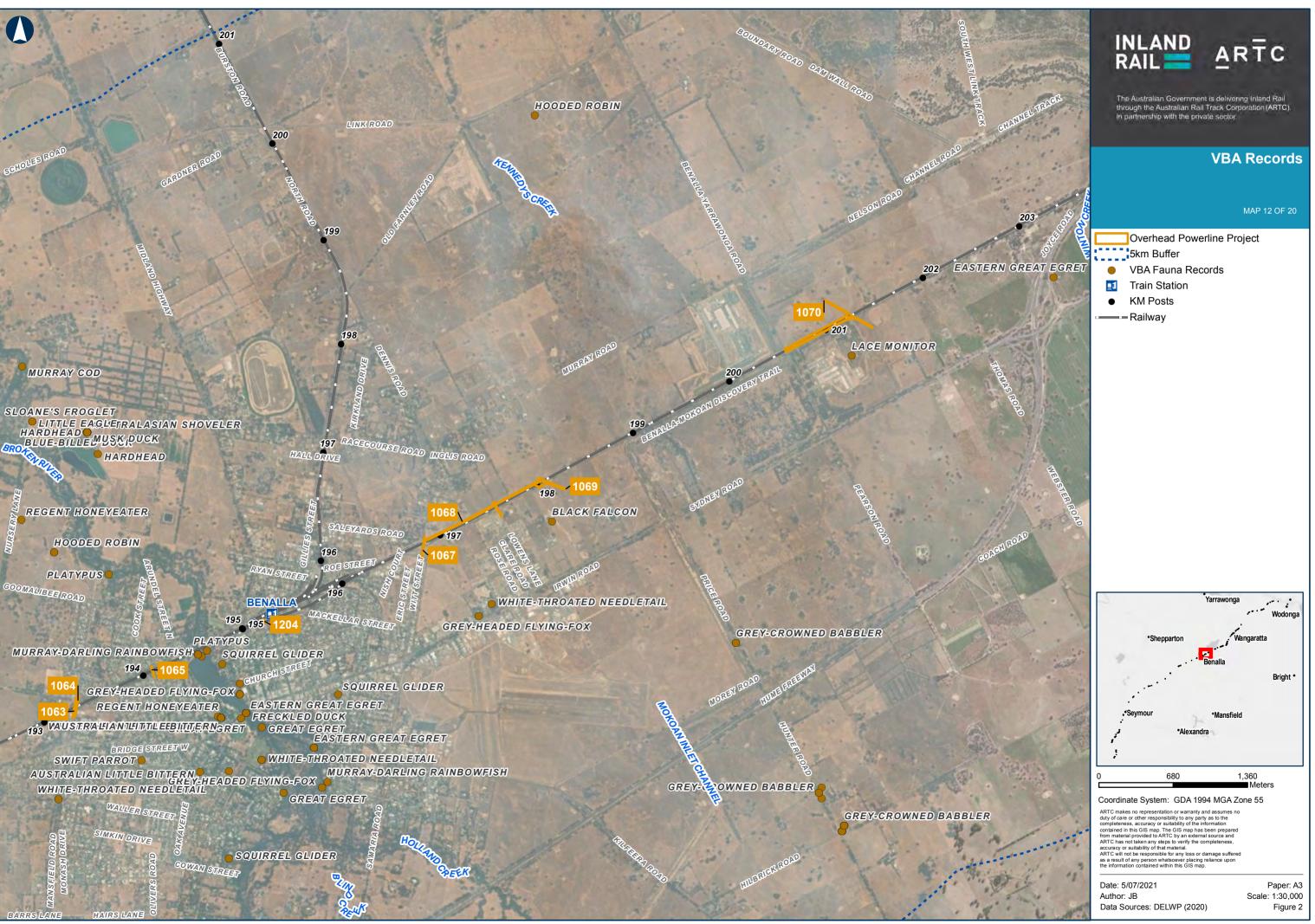


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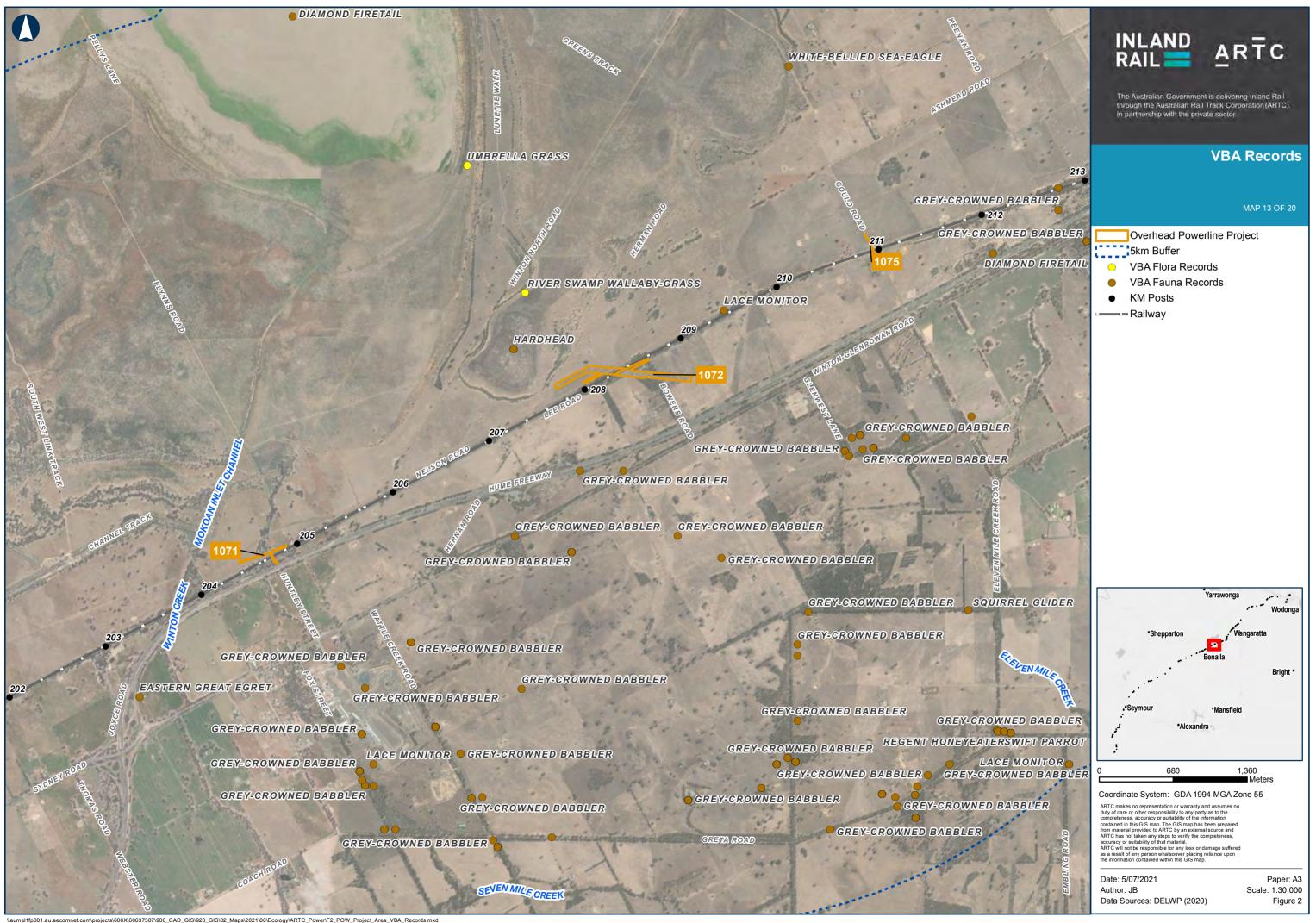




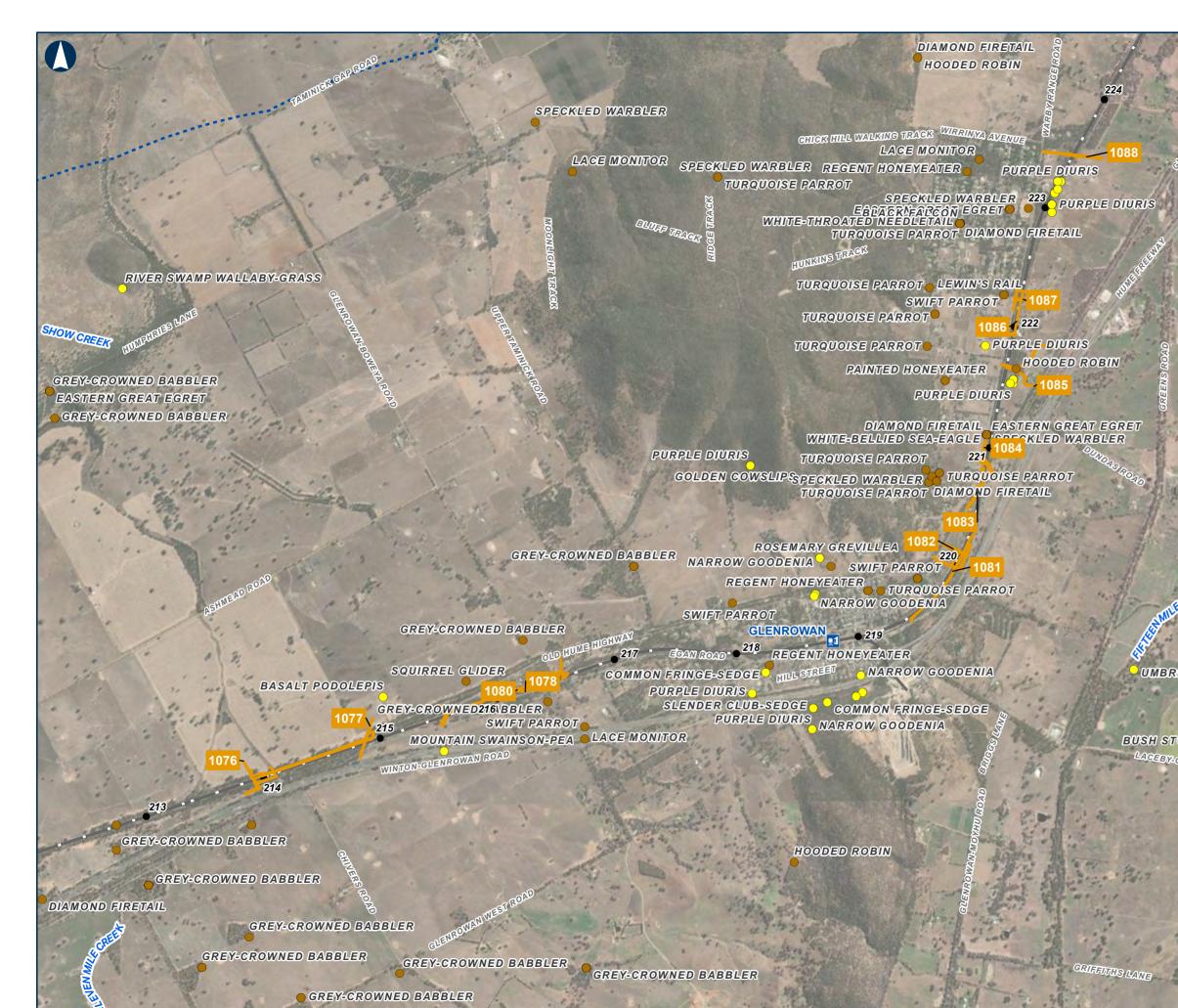




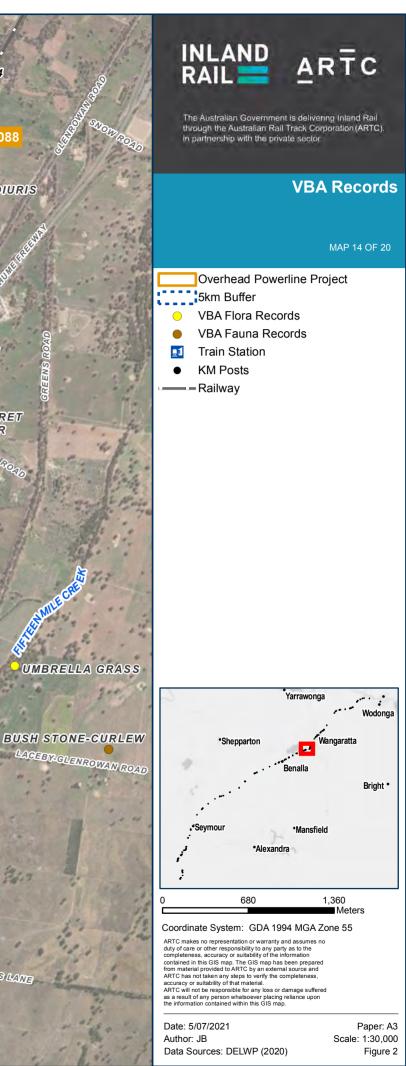
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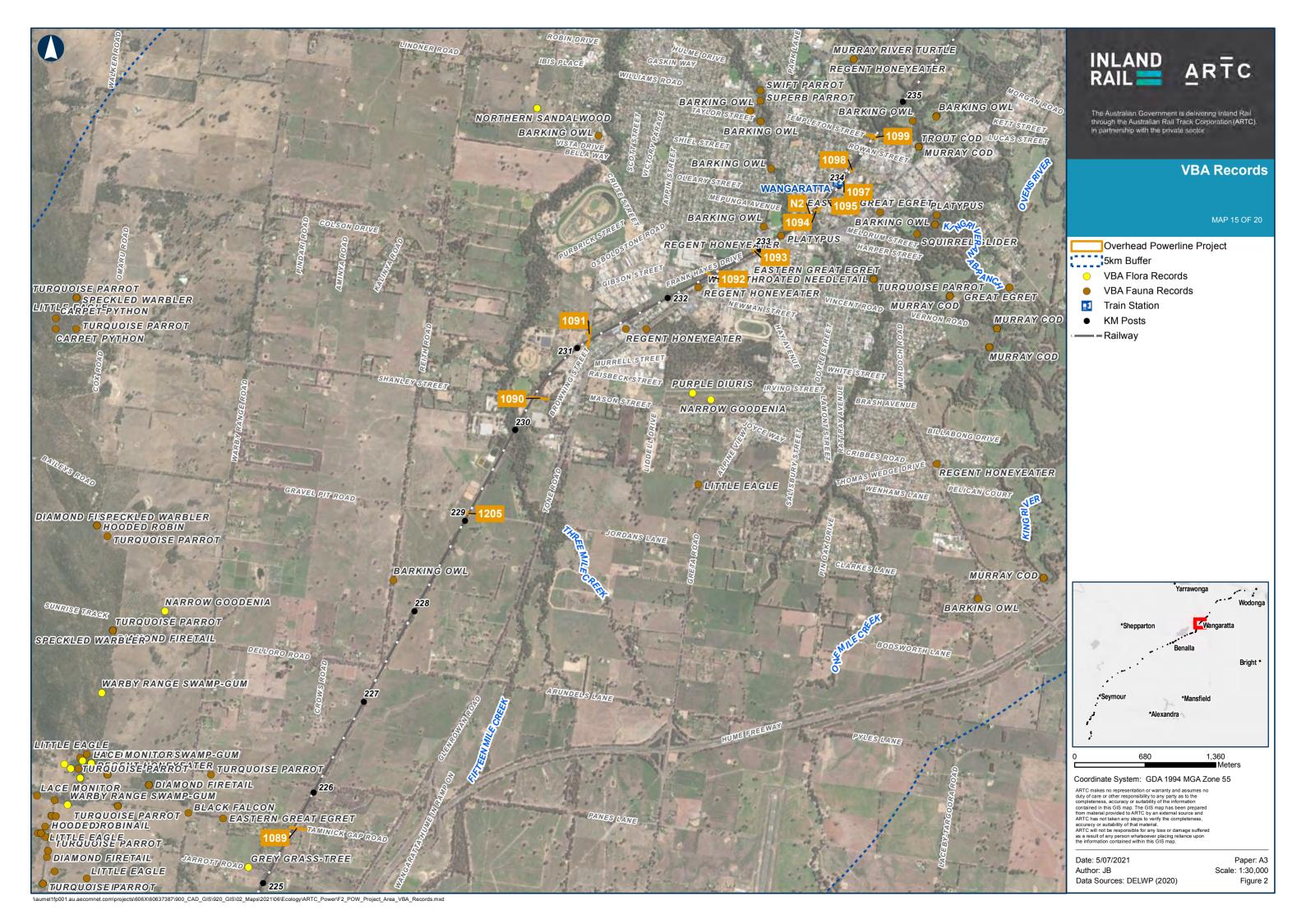


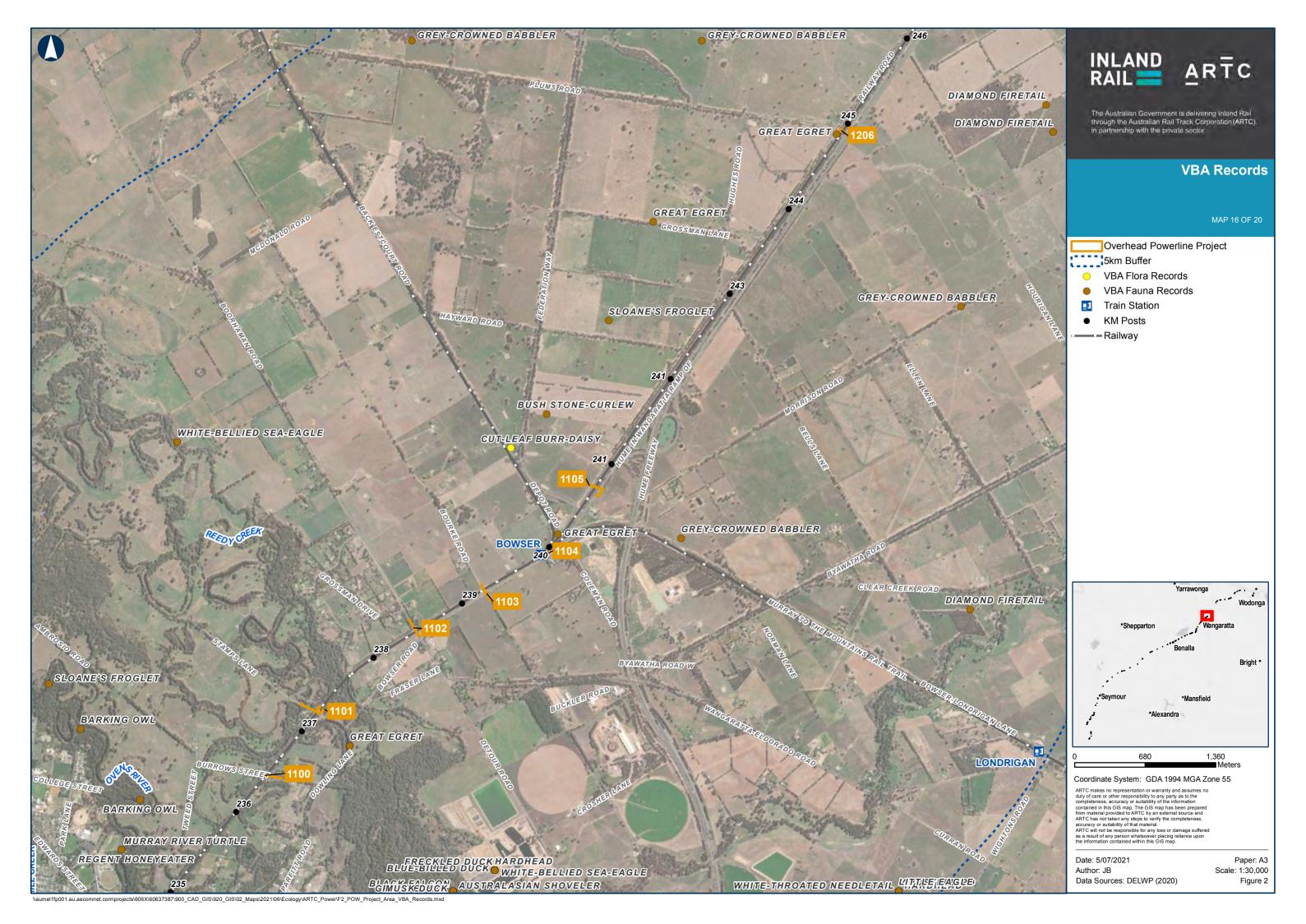
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GREY-CROWNED BABBLER









BARKINGIOWLD HO

PAINTED HONEYEATER DIAMOND FIRETAIL

SQUIRREL GLIDER



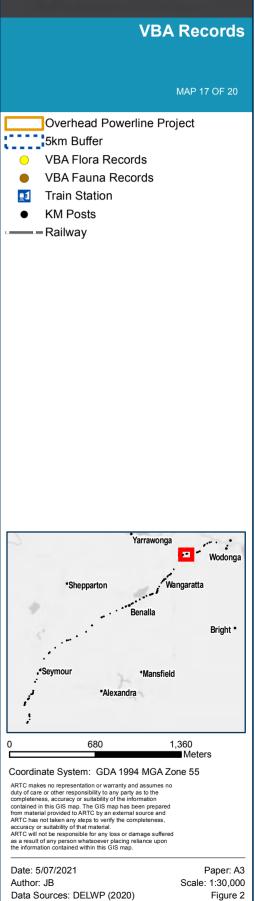
HARDHEAD

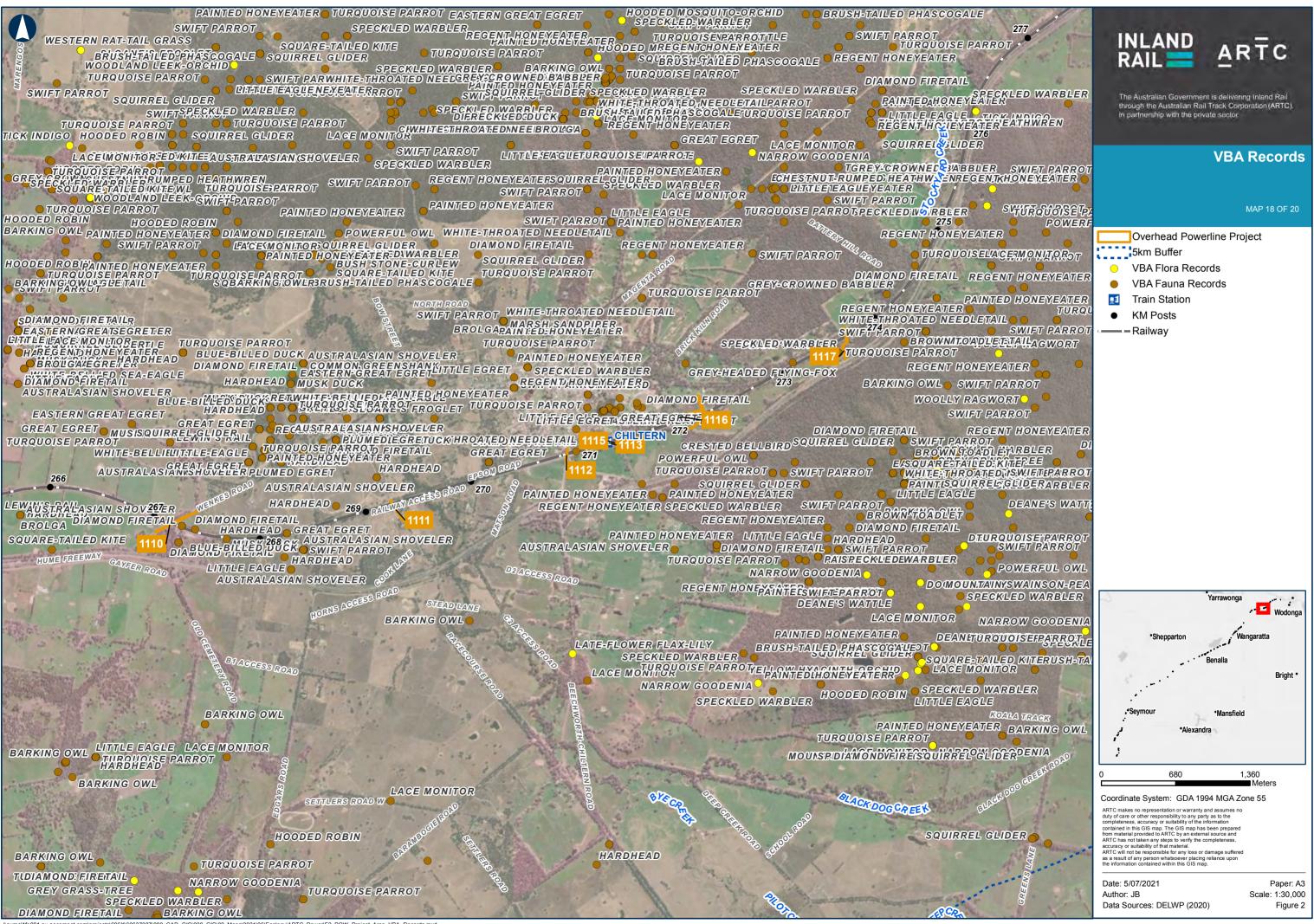






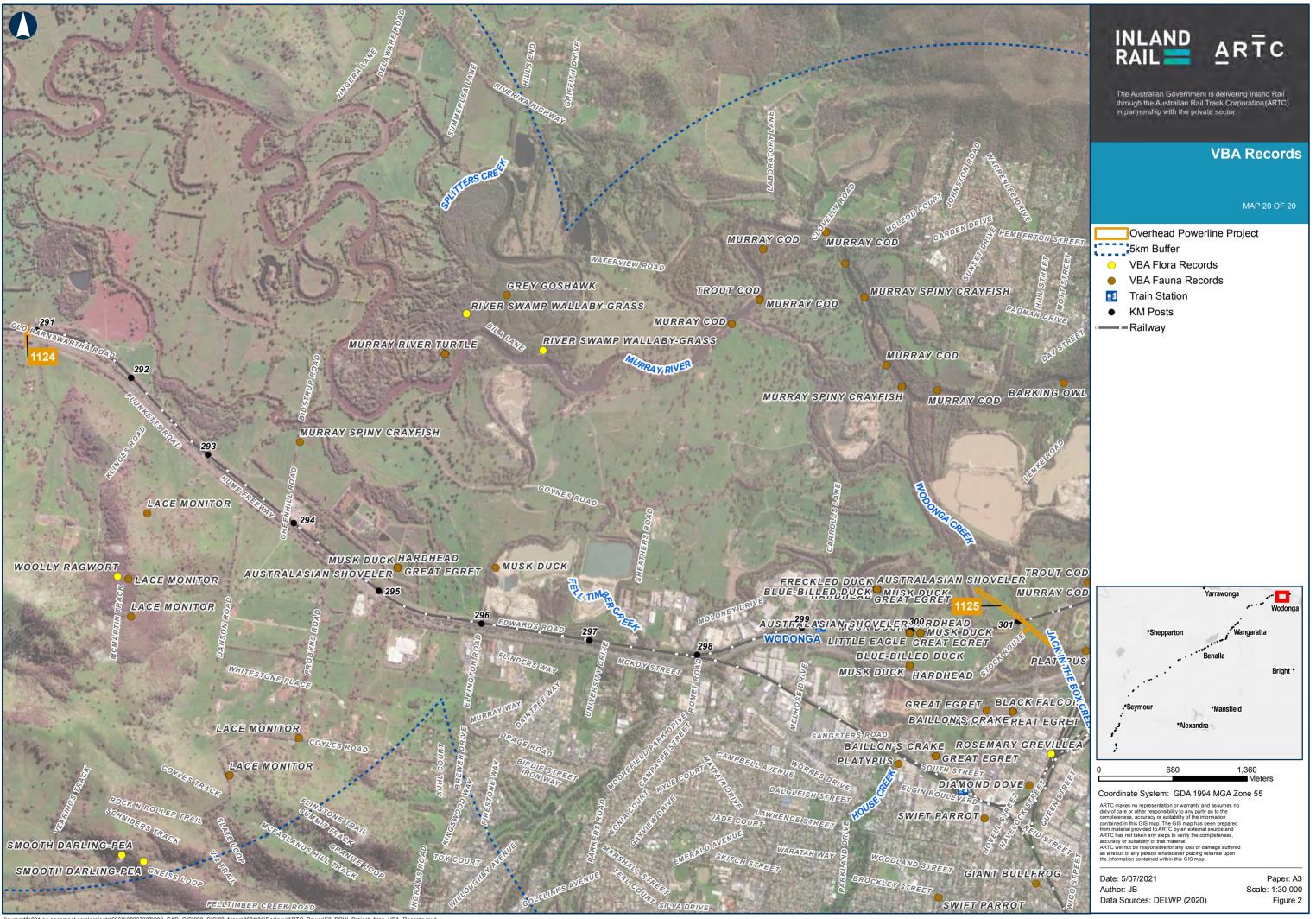
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.





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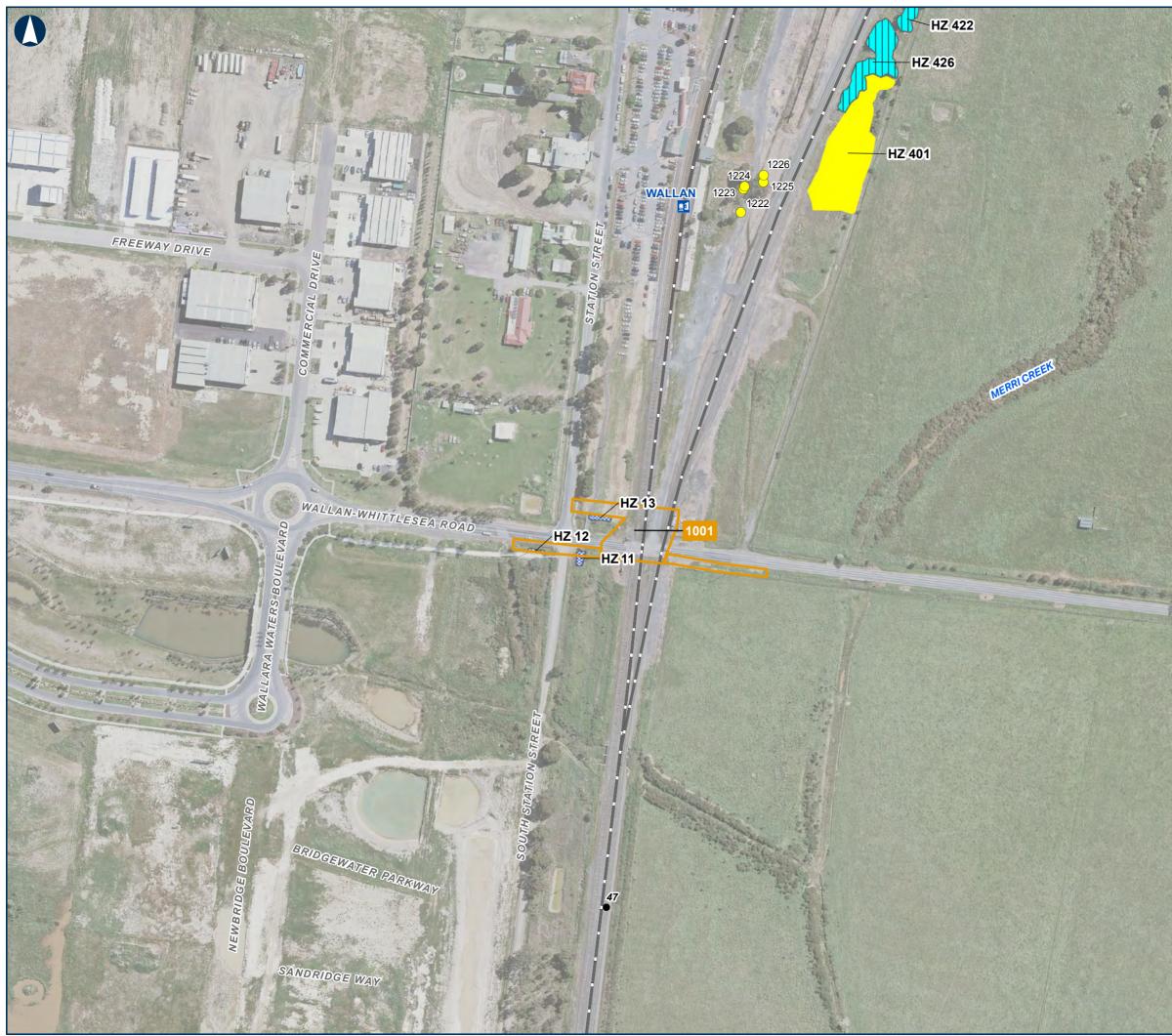


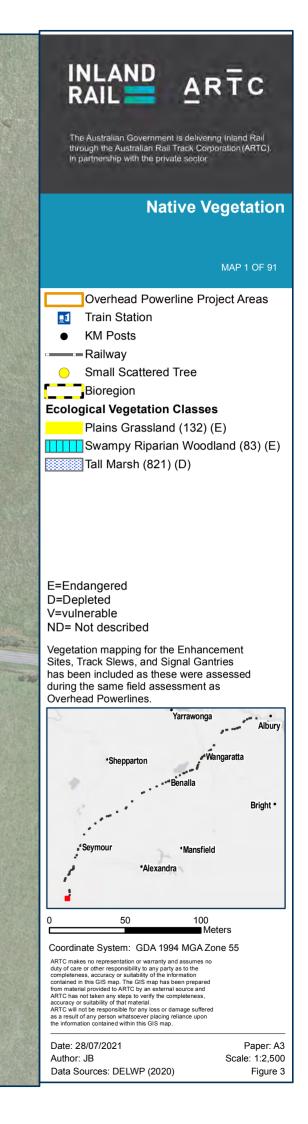


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Appendix A – Figures

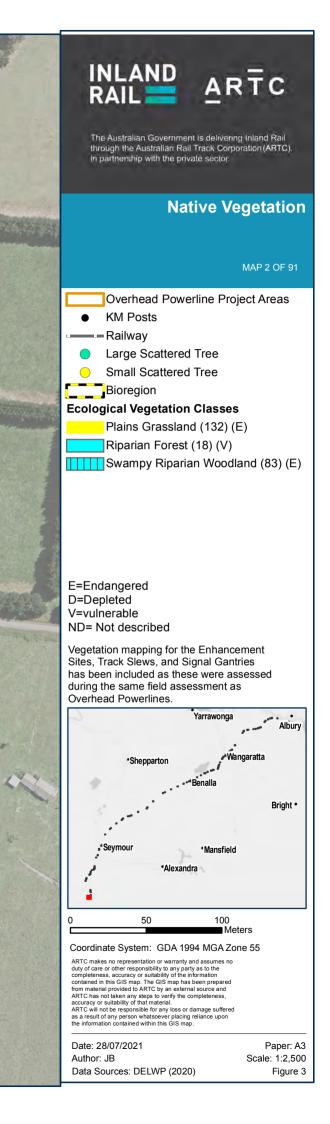
Figure 3 Native vegetation



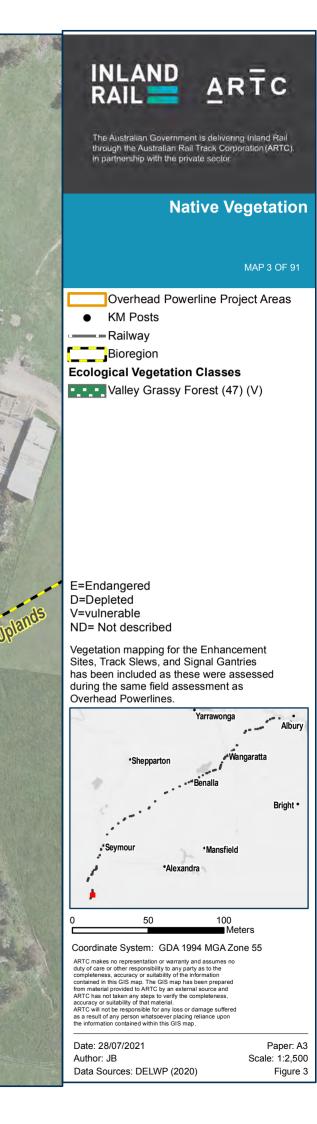




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Native Vegetation

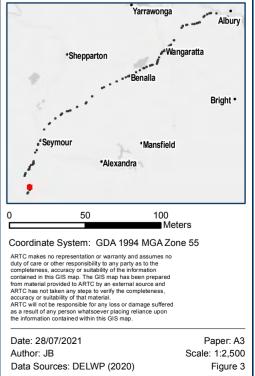
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MAP 4 OF 91

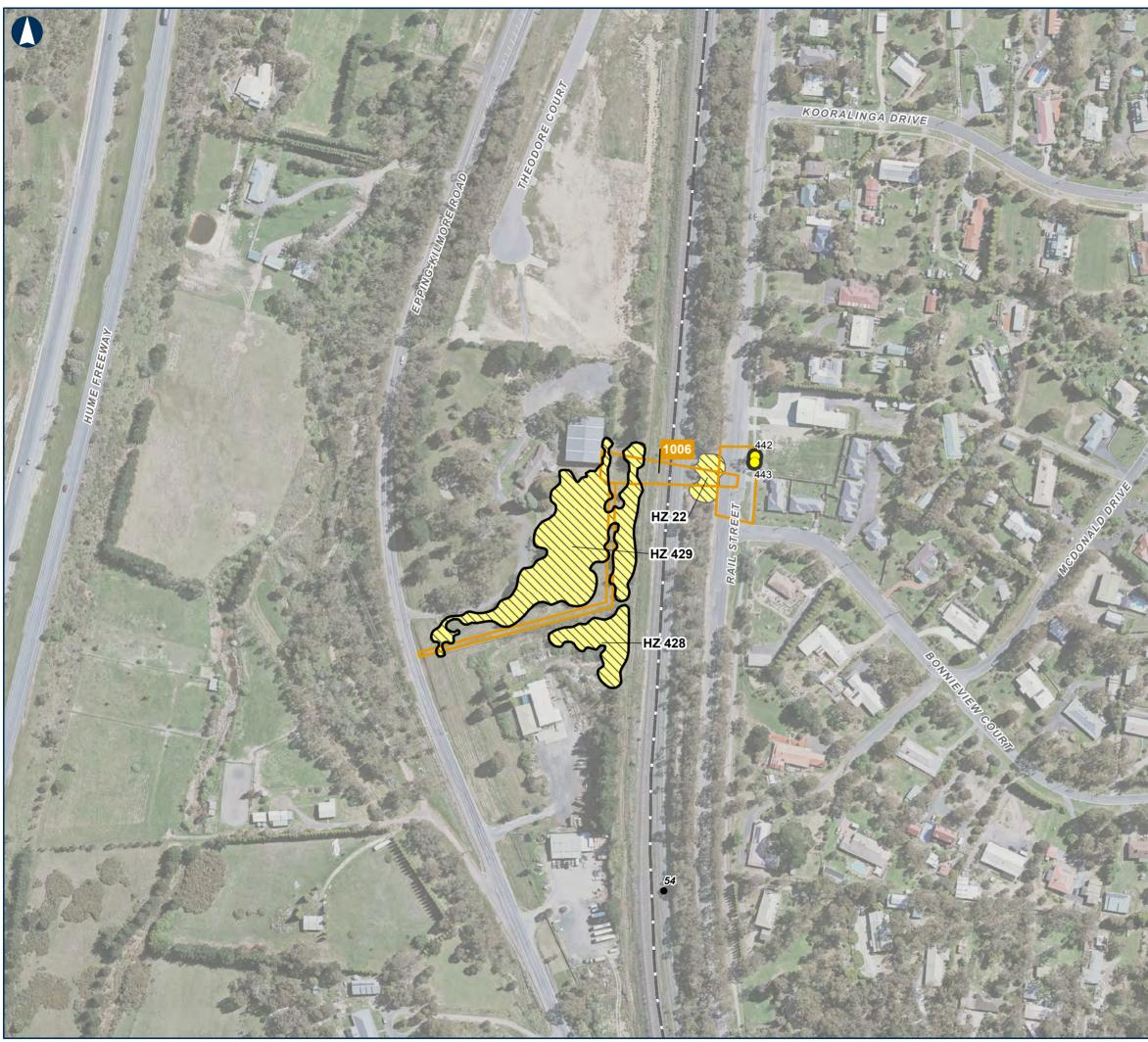
Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 Bioregion
 Trees Desktop/No access
 Ecological Vegetation Classes
 Valley Grassy Forest (47) (V)
 Valley Heathy Forest (127) (V)

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

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



WOMBAT AVENUE





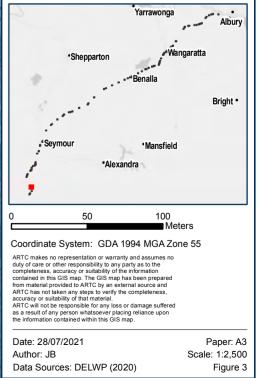
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Native Vegetation

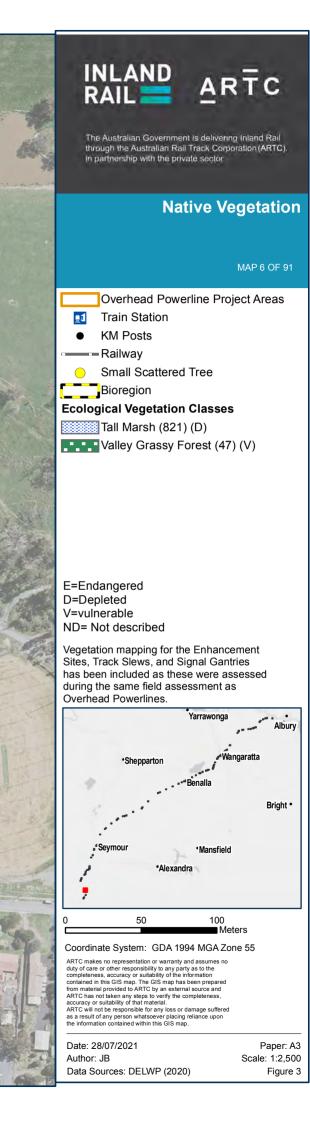
MAP 5 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Small Scattered Tree
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Valley Heathy Forest (127) (V)

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











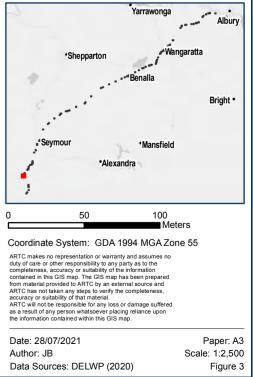
The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Native Vegetation

MAP 7 OF 91

	Overhead Powerline Project Areas
•	KM Posts
	Railway
	Large Scattered Tree
	High Quality Native Vegetation
	Bioregion
	Trees Desktop/No access
	Habitat Zones Desktop/No access
Ecological Vegetation Classes	
\times	Herb-rich Foothill Forest (23) (D)
	Riparian Forest (18) (V)

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



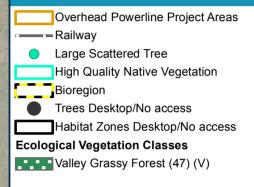




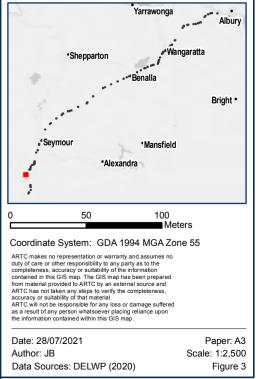
Native Vegetation

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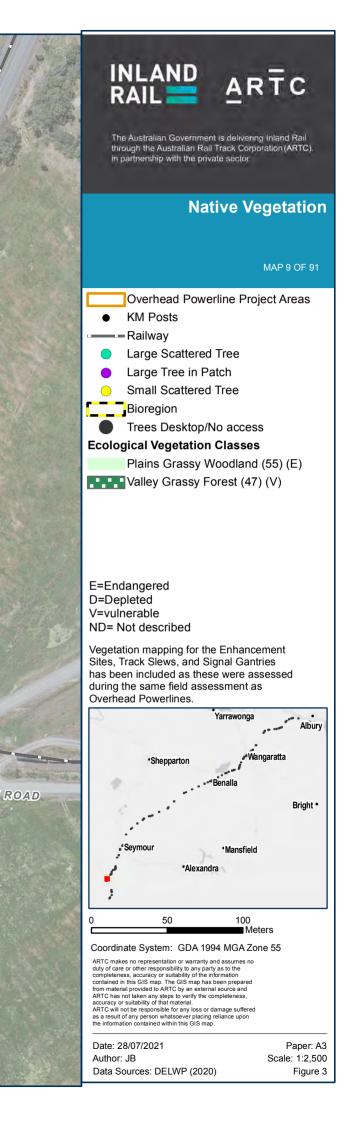
MAP 8 OF 91



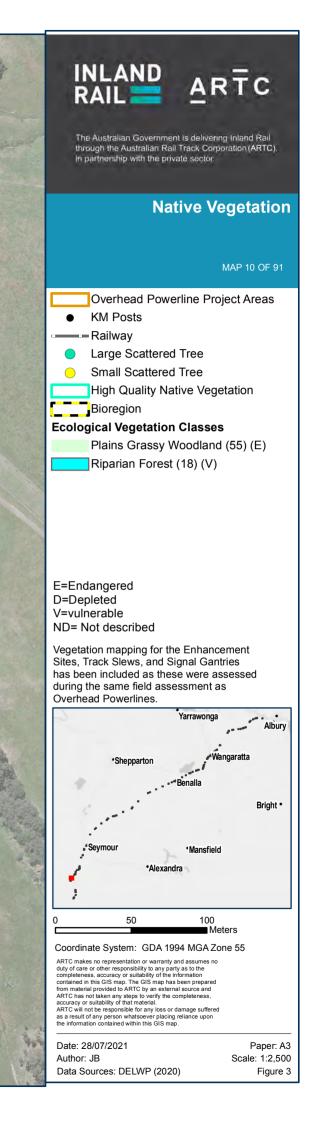
E=Endangered D=Depleted V=vulnerable ND= Not described

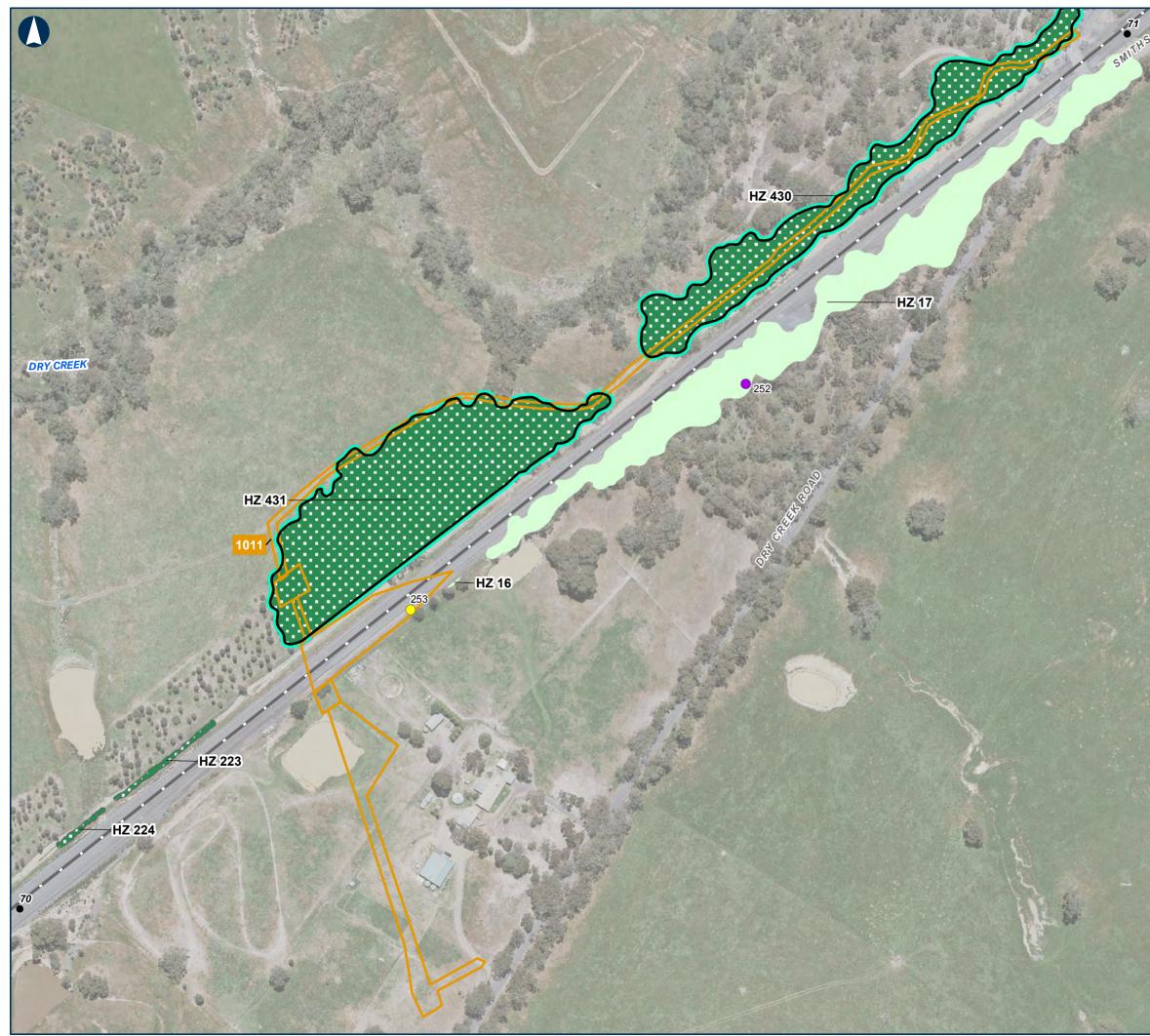


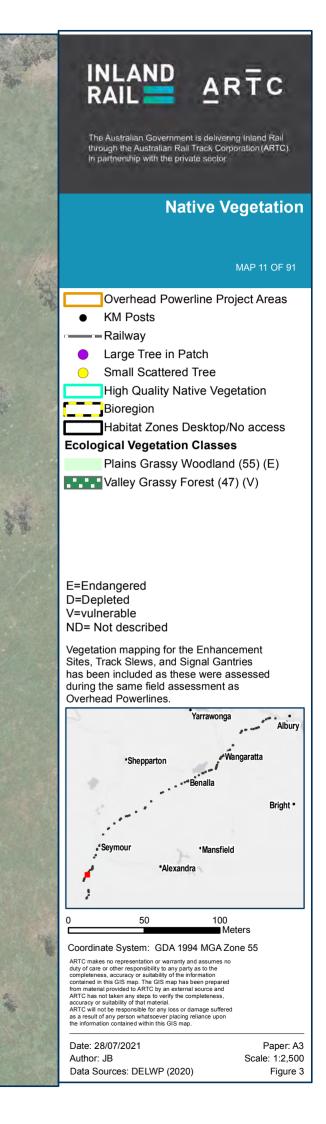


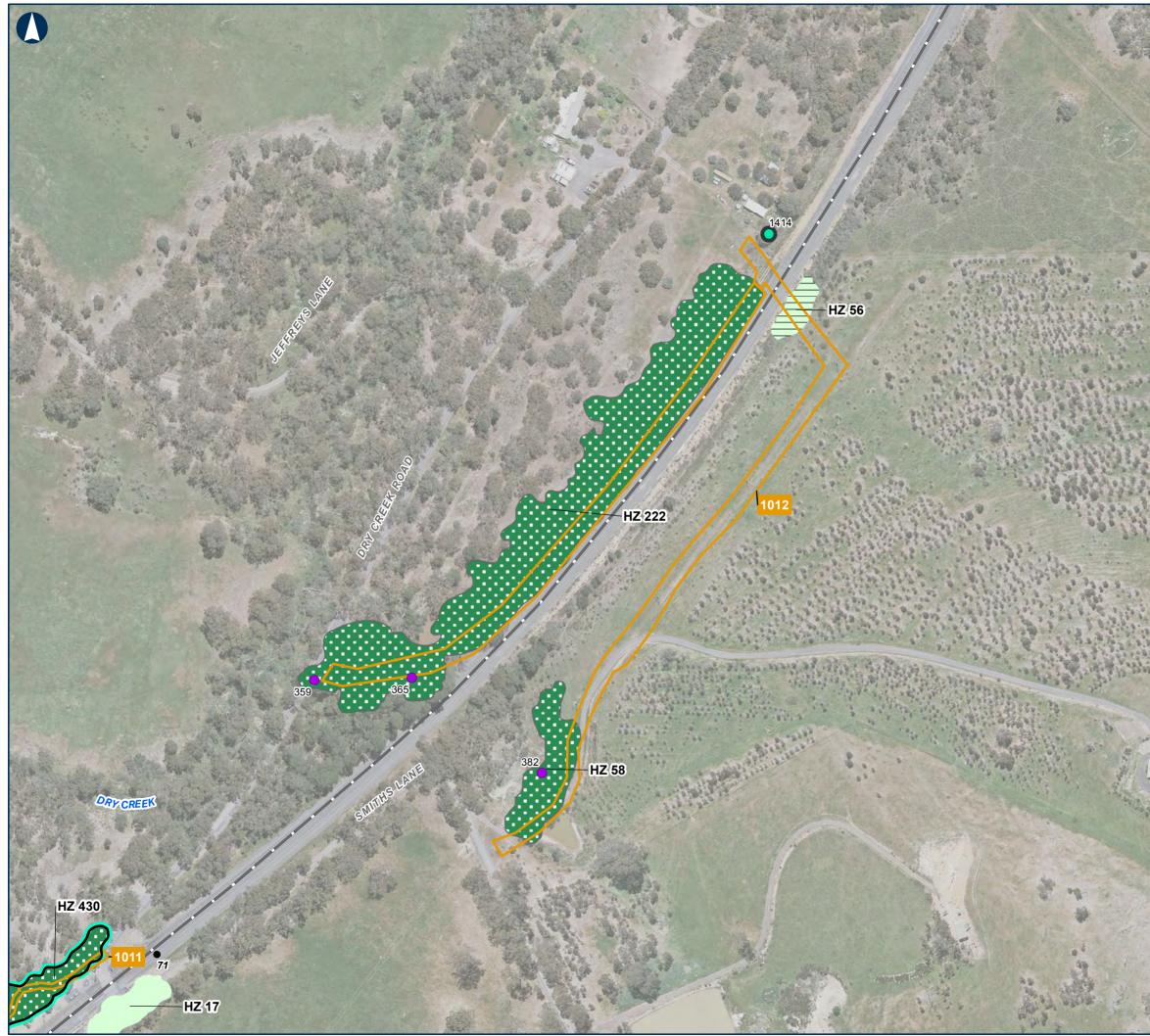


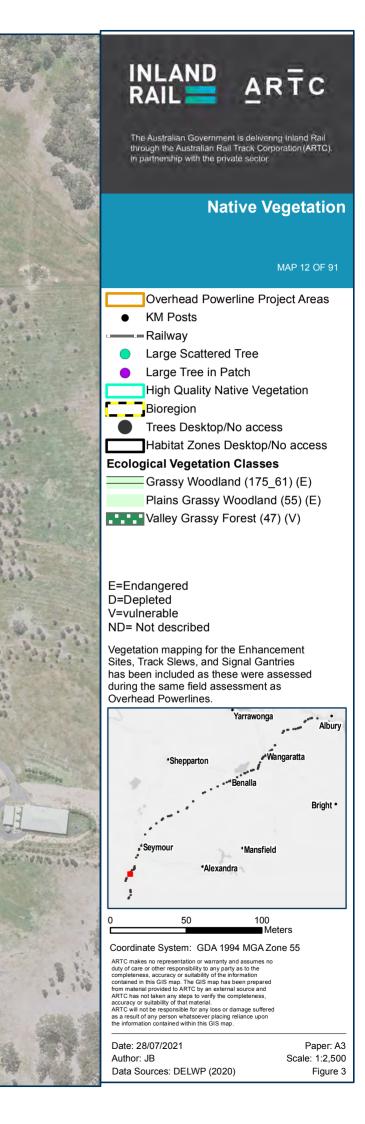












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Native Vegetation

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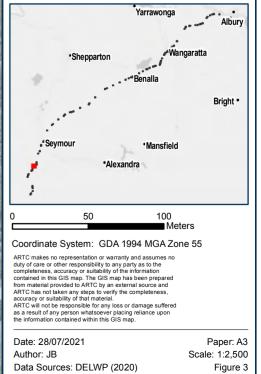
MAP 14 OF 91

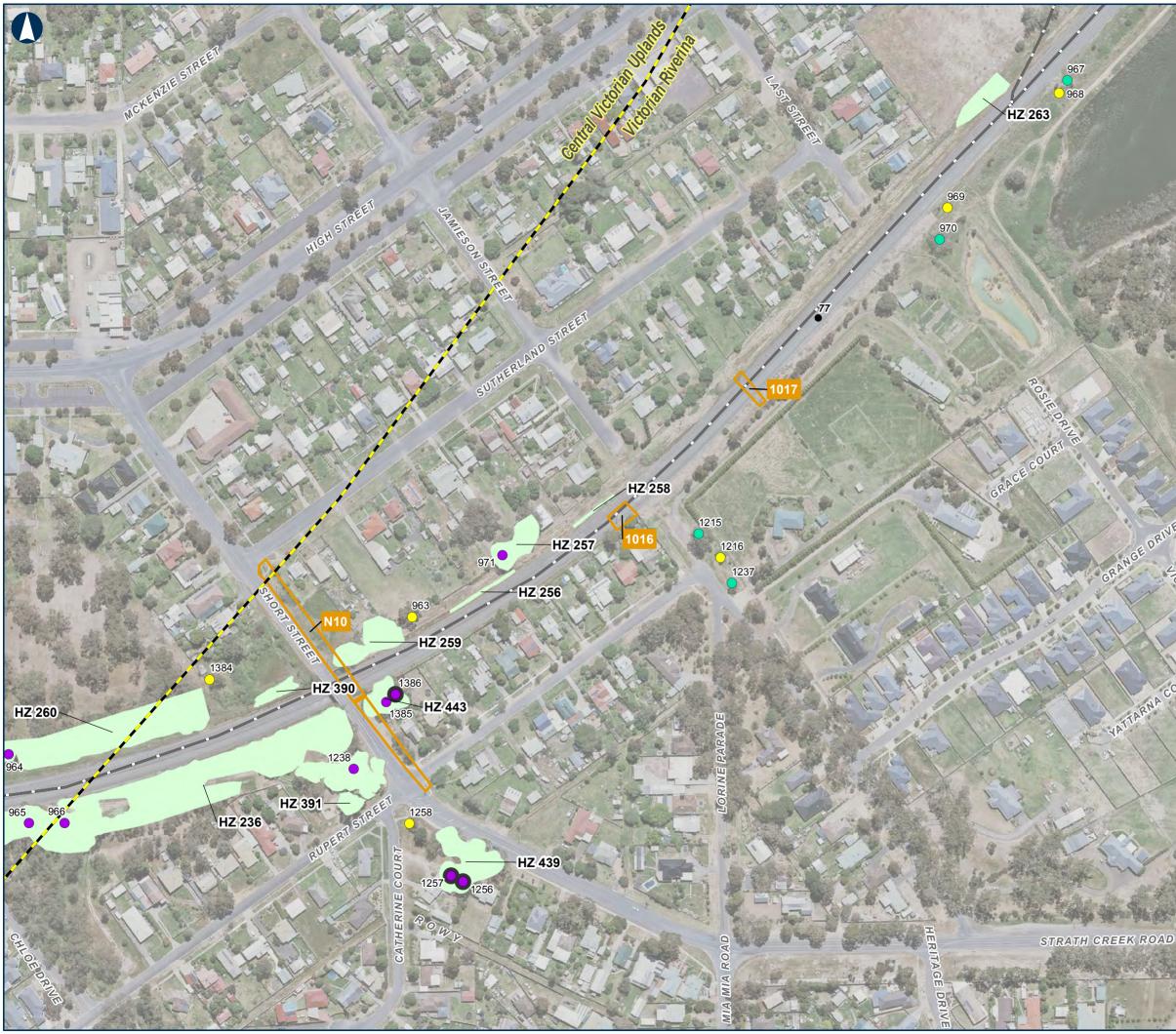
- Overhead Powerline Project Areas
- Train Station
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion

Ecological Vegetation Classes

- Grassy Woodland (175_61) (E)
- Plains Grassy Woodland (55) (E)

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





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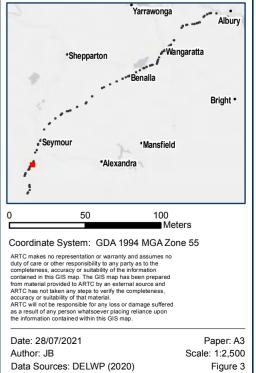
Native Vegetation

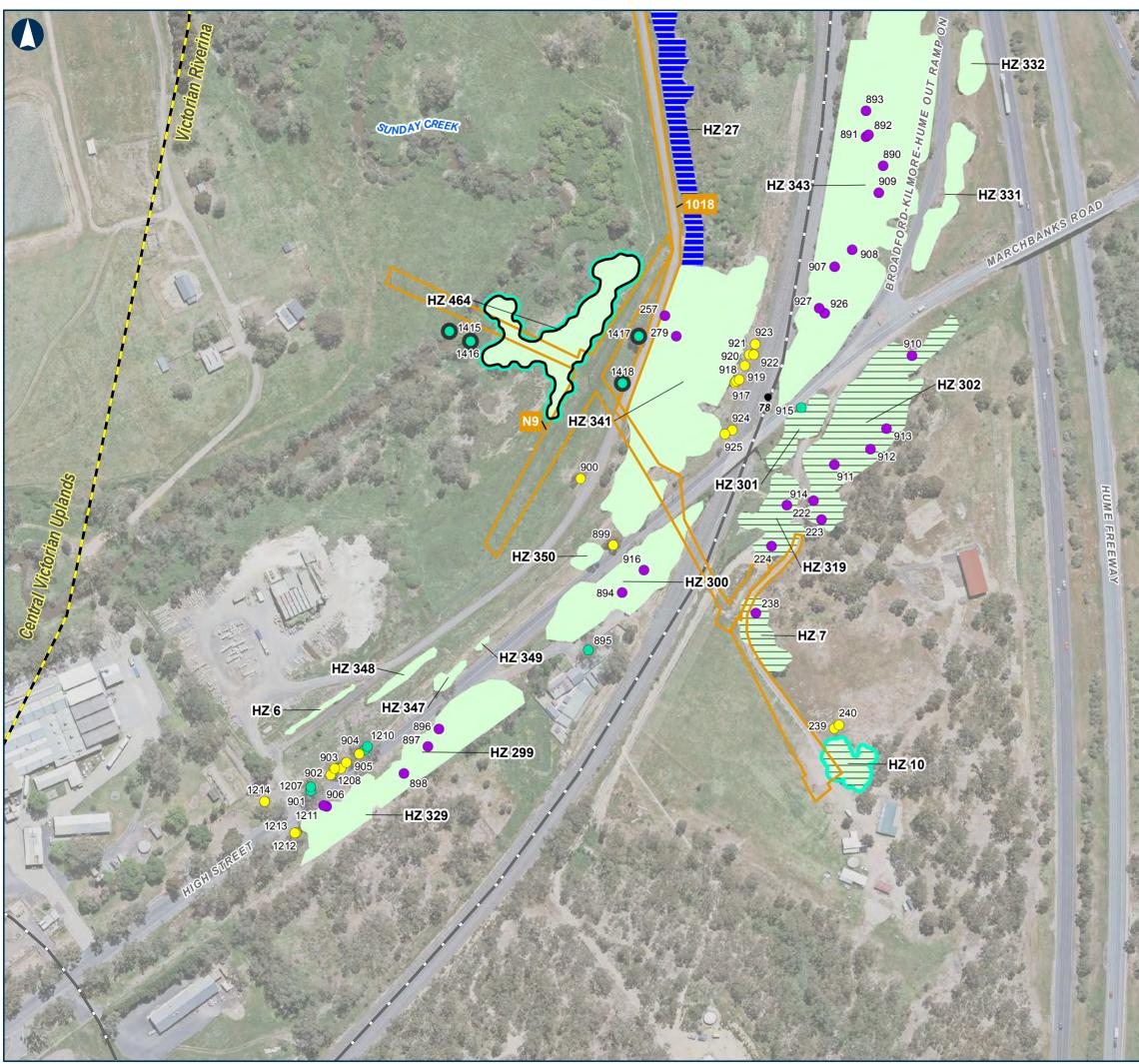
ARTC

MAP 15 OF 91

Overhead Powerline Project Areas KM Posts -Railway • Large Scattered Tree • Large Tree in Patch \bigcirc 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







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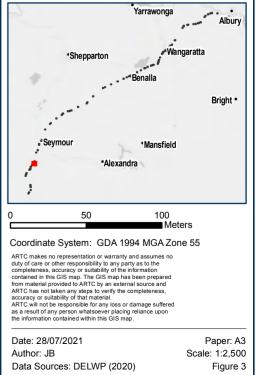
Native Vegetation

ARTC

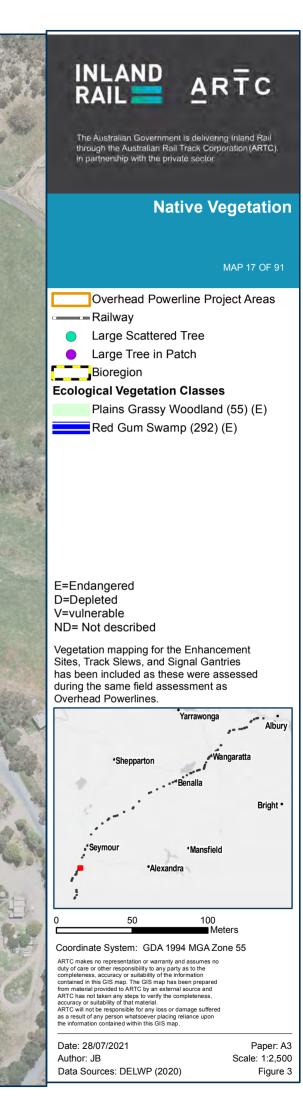
MAP 16 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Grassy Woodland (175_61) (E)
 Plains Grassy Woodland (55) (E)
 Red Gum Swamp (292) (E)

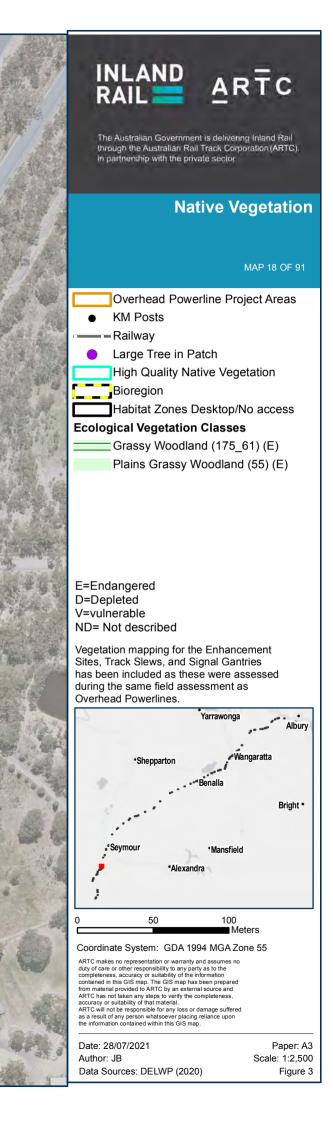
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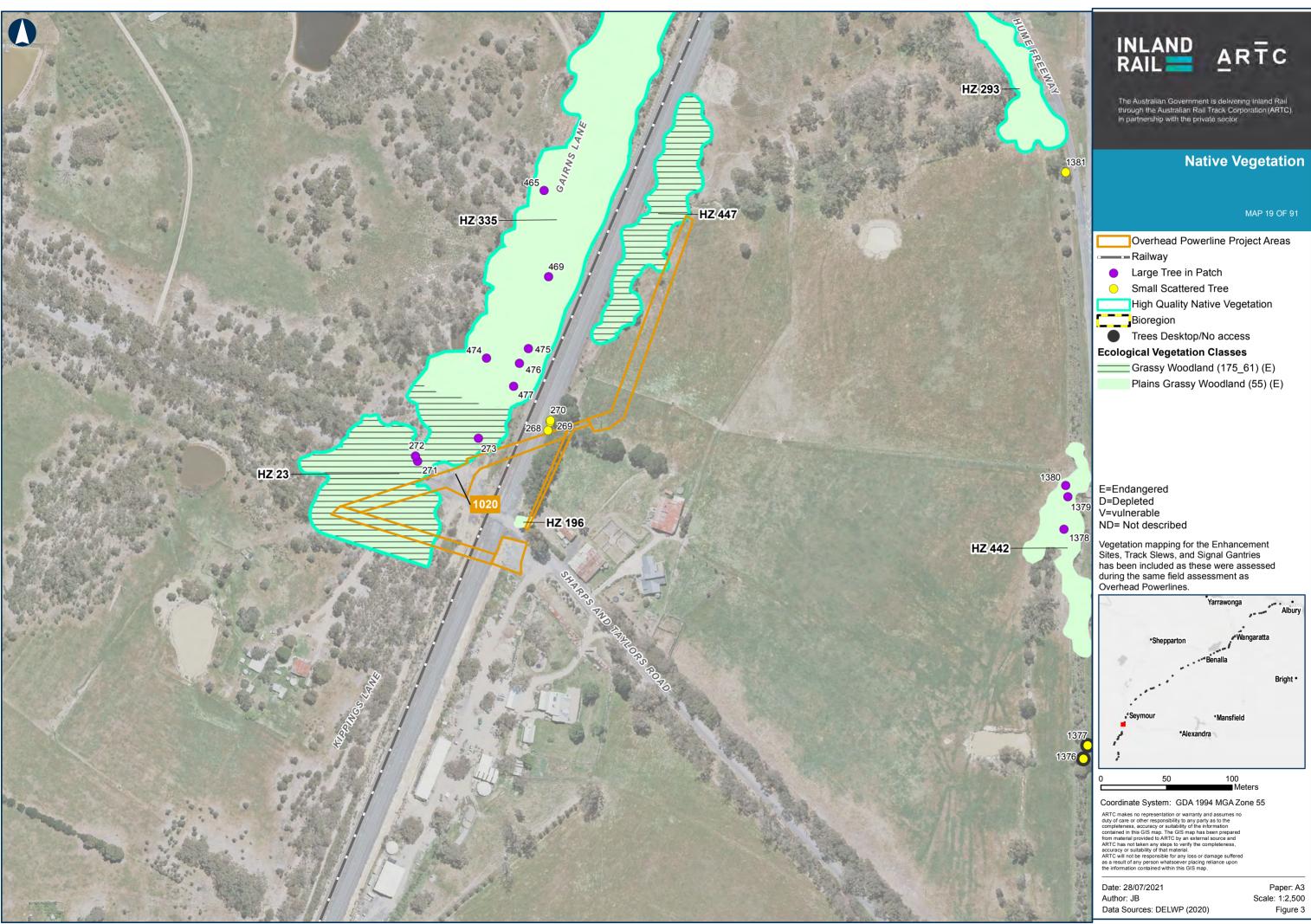












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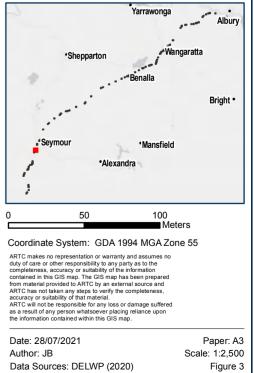
Native Vegetation

ARTC

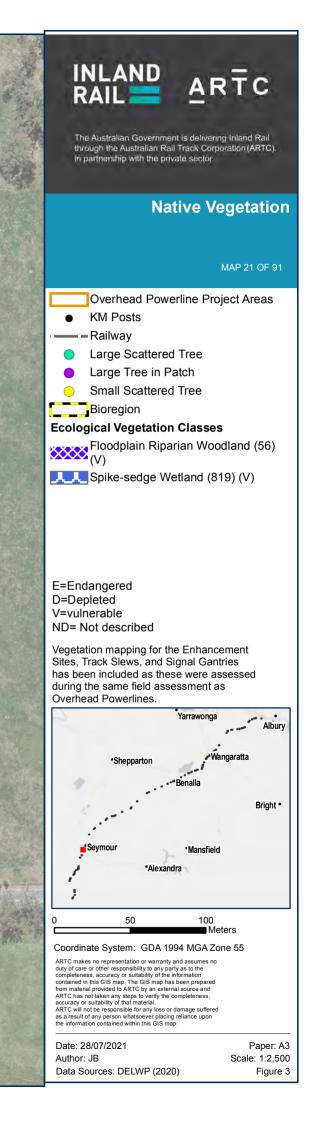
MAP 20 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Ecological Vegetation Classes
 Grassy Woodland (175_61) (E)

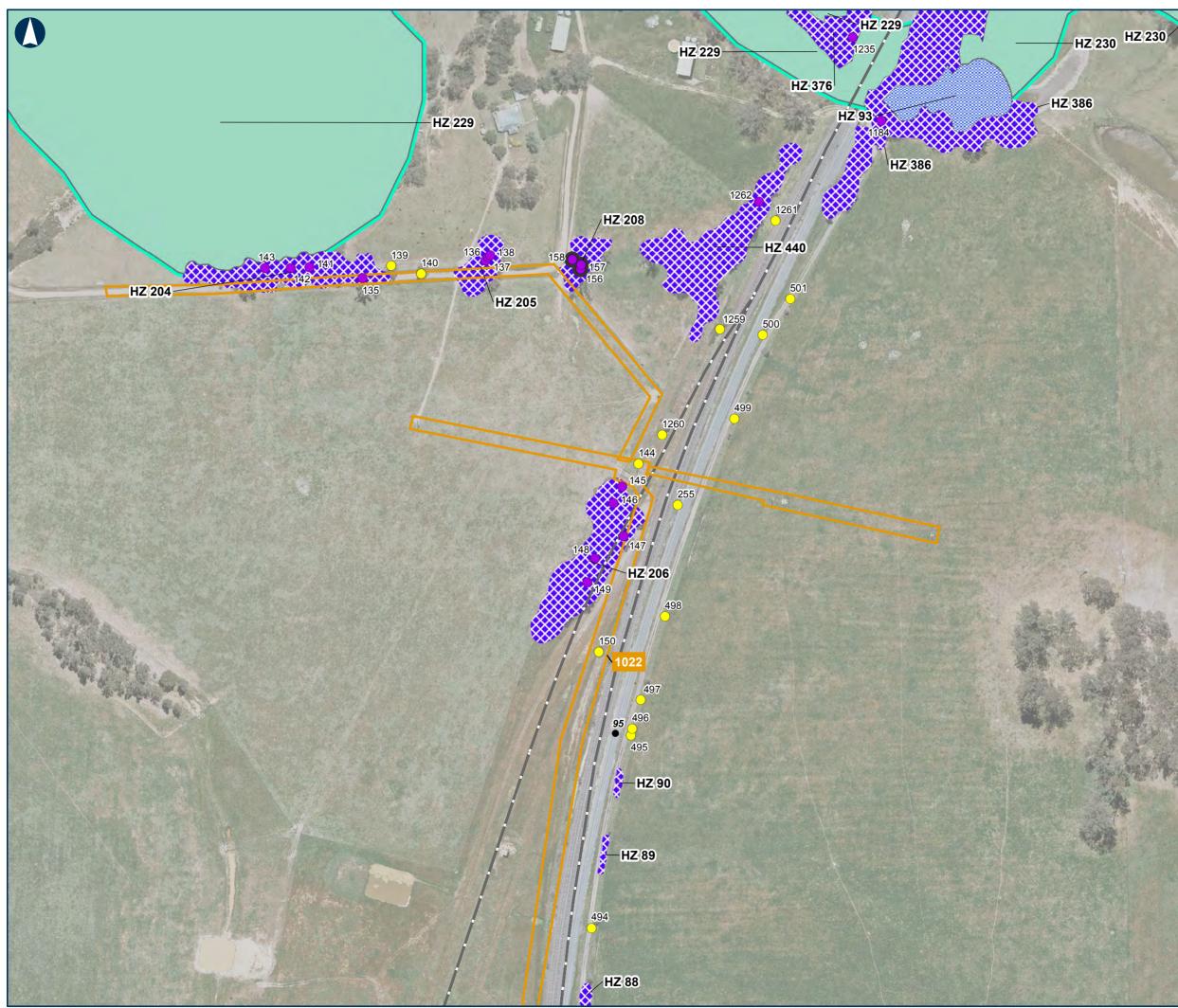
E=Endangered D=Depleted V=vulnerable ND= Not described

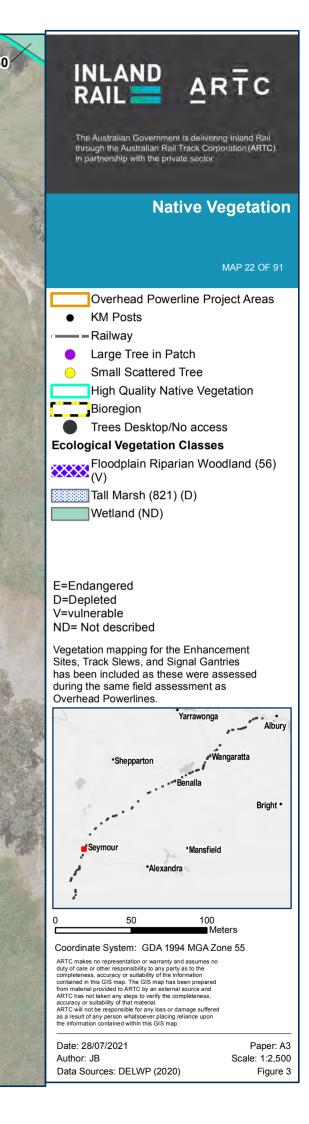






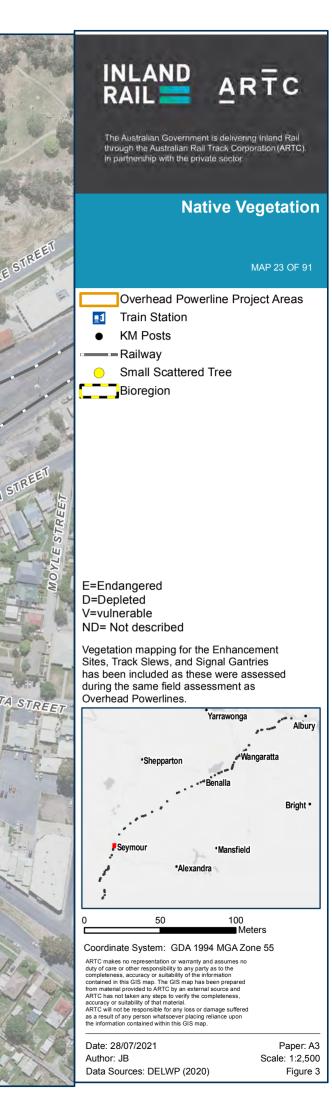
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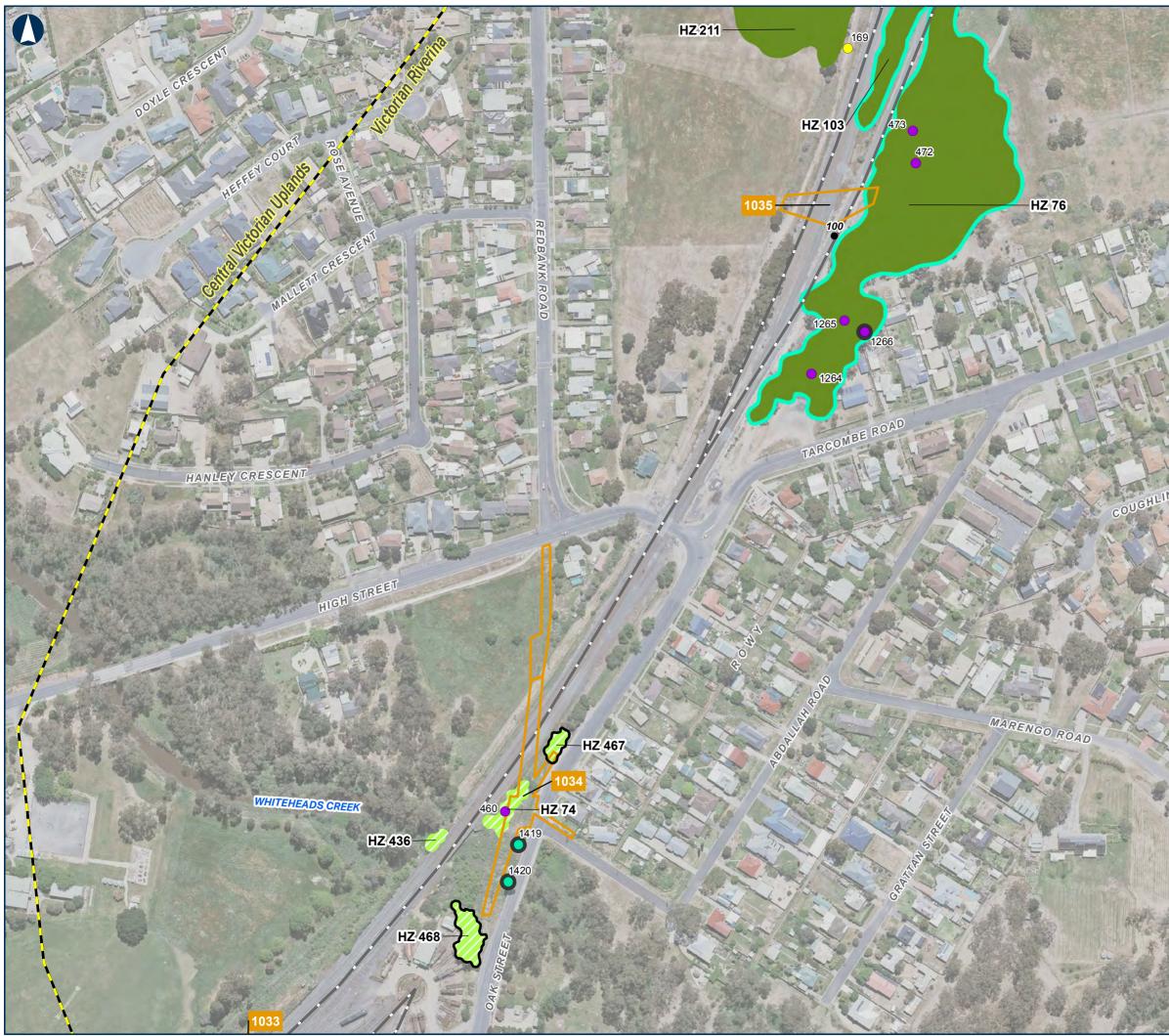
Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Albury Bright • Alexand 100 Meters Coordinate System: GDA 1994 MGA Zone 55 ARTC makes no representation or warrany and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.

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MAP 24 OF 91

Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 3





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

Native Vegetation

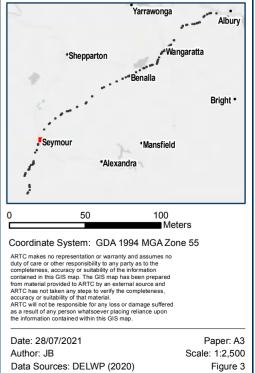
ARTC

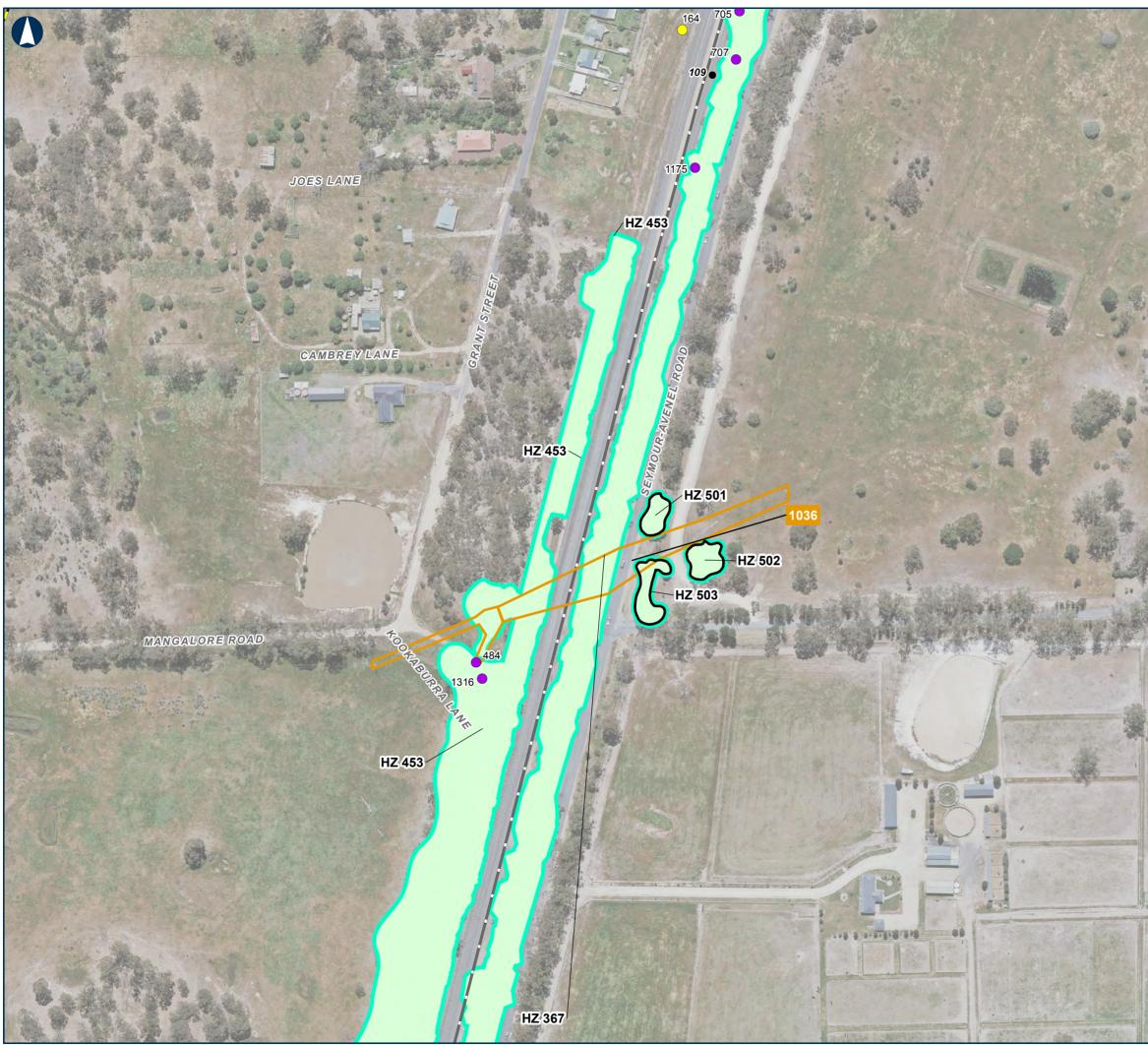
MAP 25 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Box Ironbark Forest (61) (V)
 Creekline Grassy Woodland (68) (E)

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

COURT







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

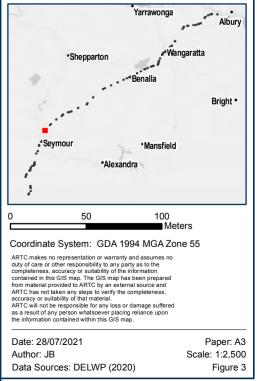
Native Vegetation

ARTC

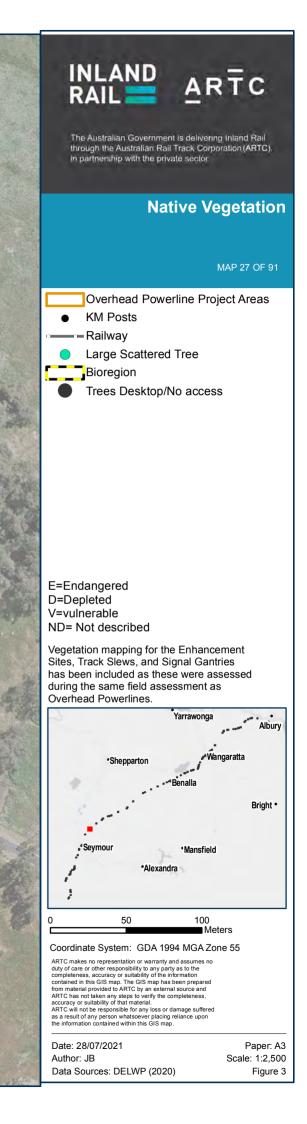
MAP 26 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Tree in Patch
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Plains Grassy Woodland (55) (E)

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

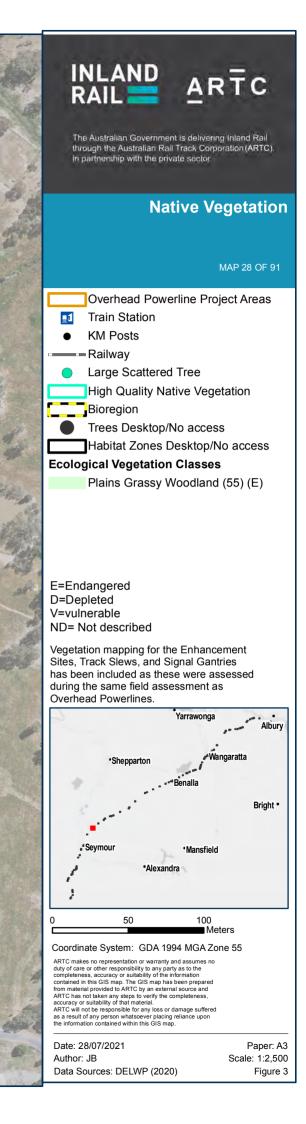




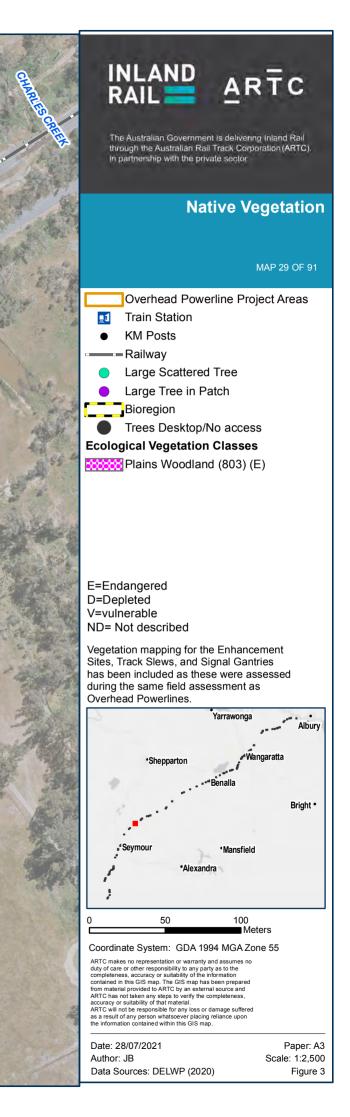




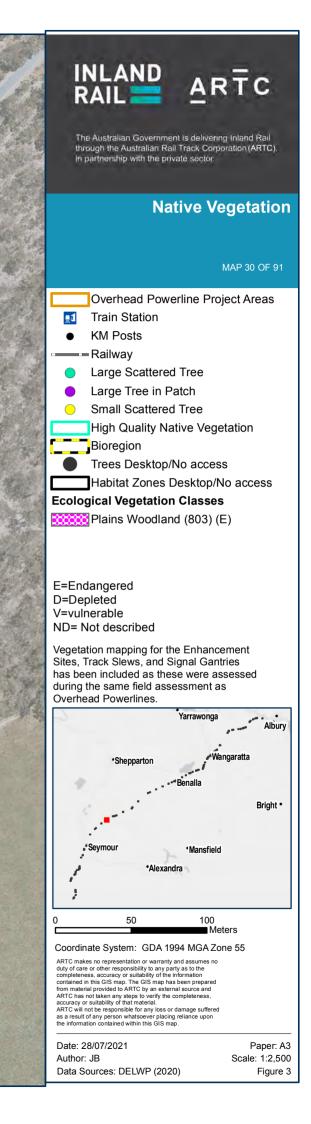
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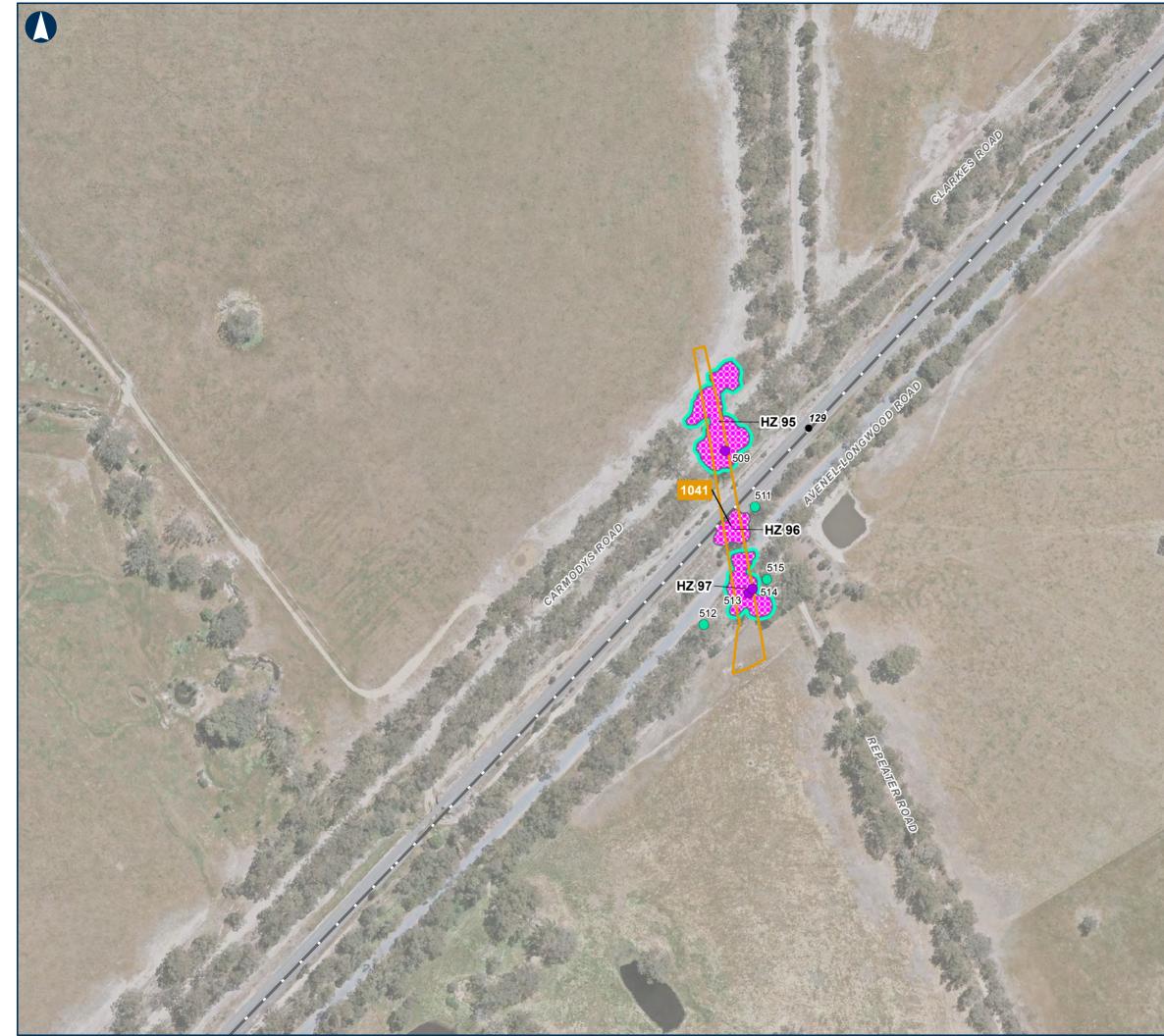


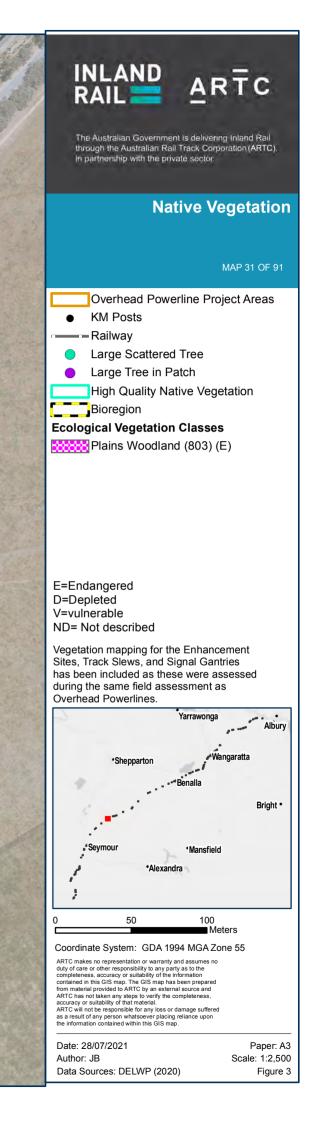


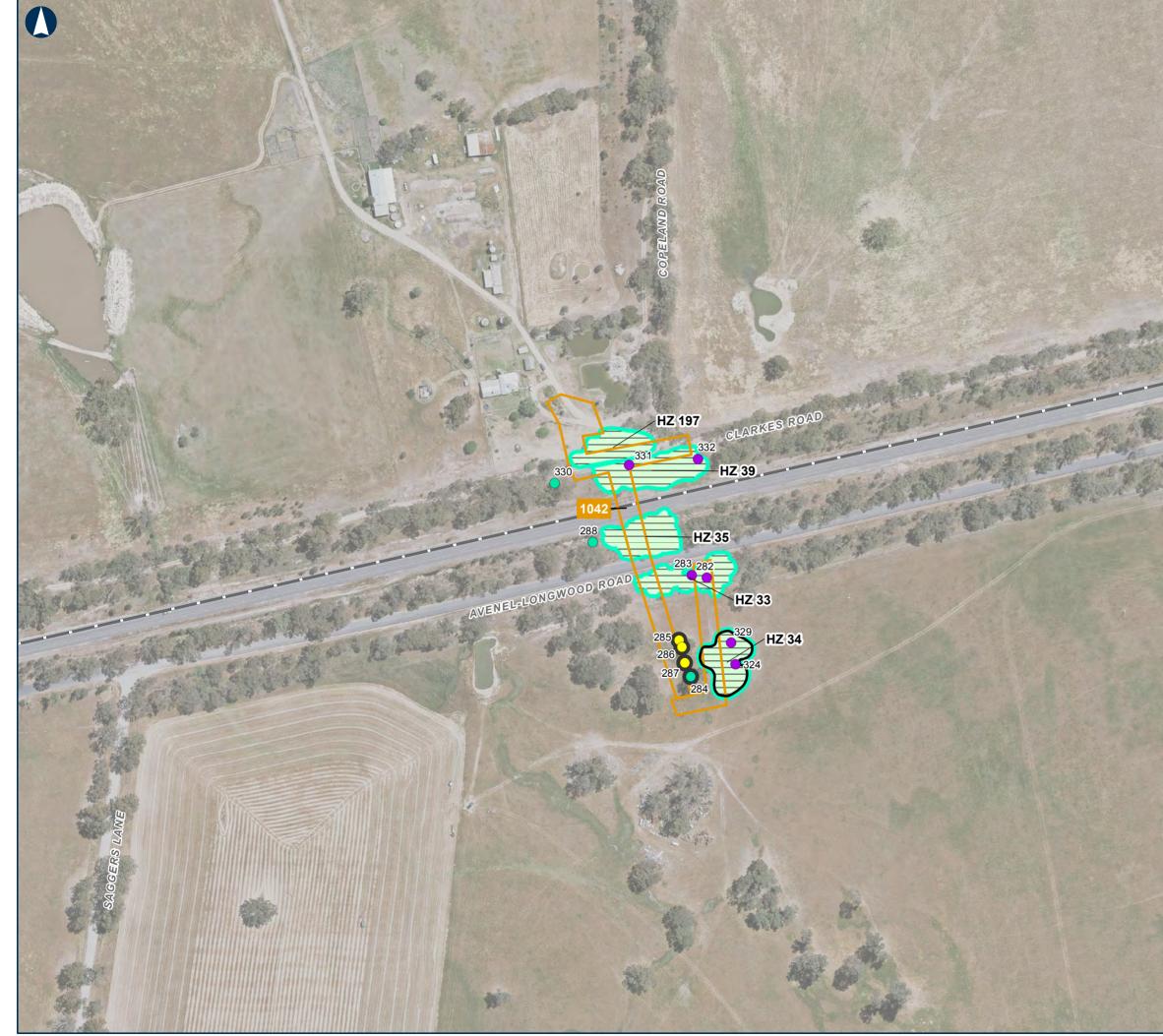










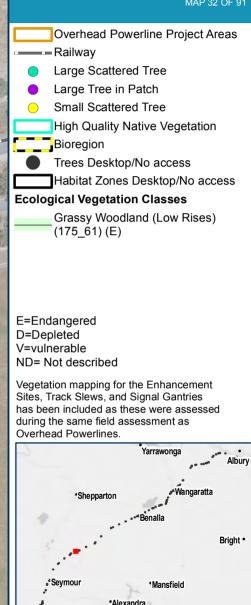




Native Vegetation

ARTC

MAP 32 OF 91



50 100 Meters

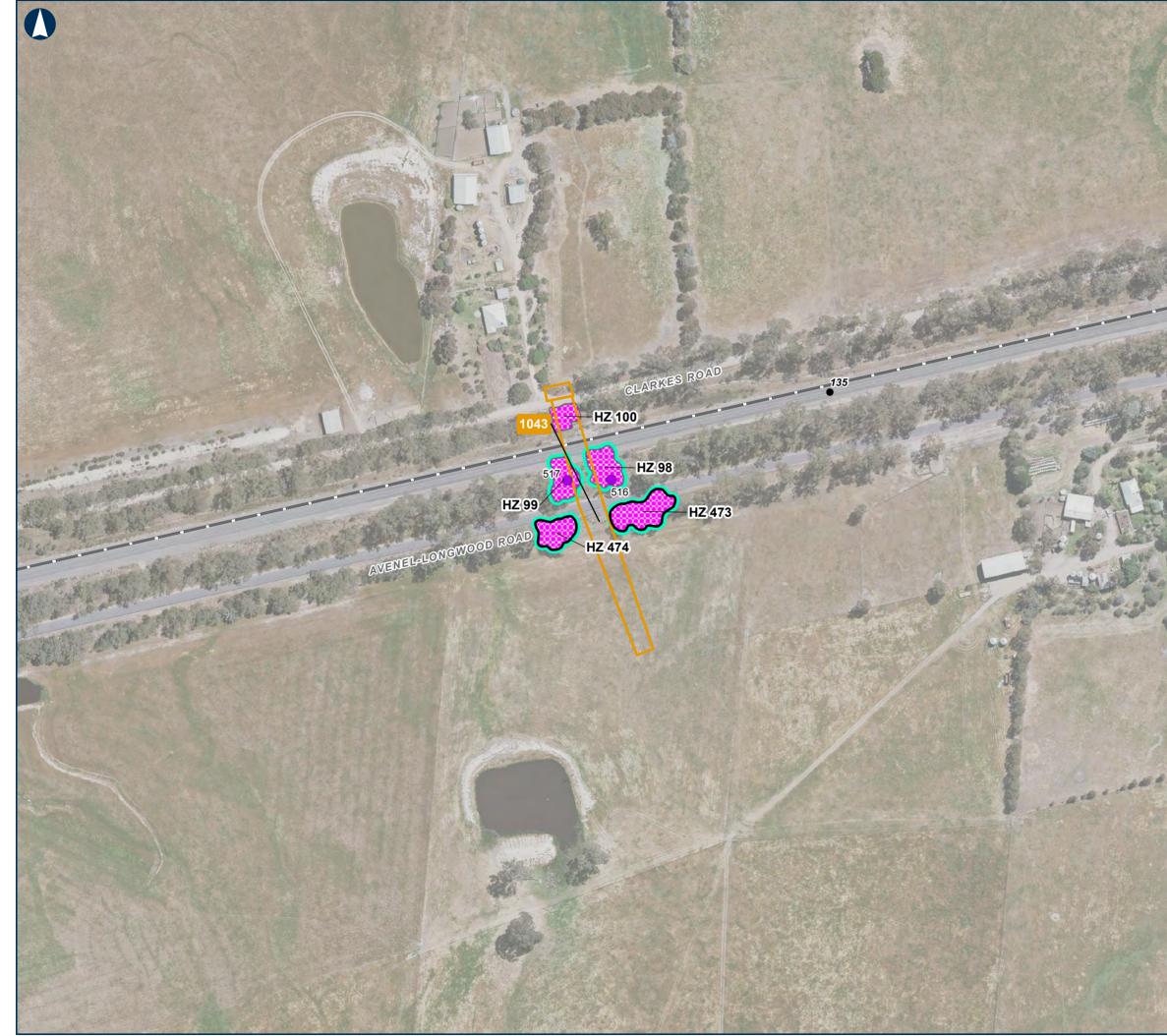
Coordinate System: GDA 1994 MGA Zone 55

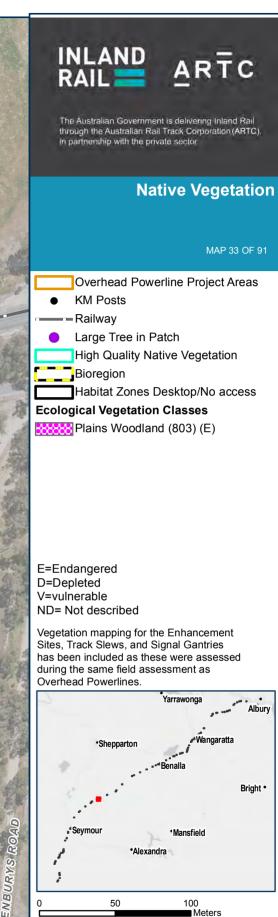
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Date: 28/07/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 3



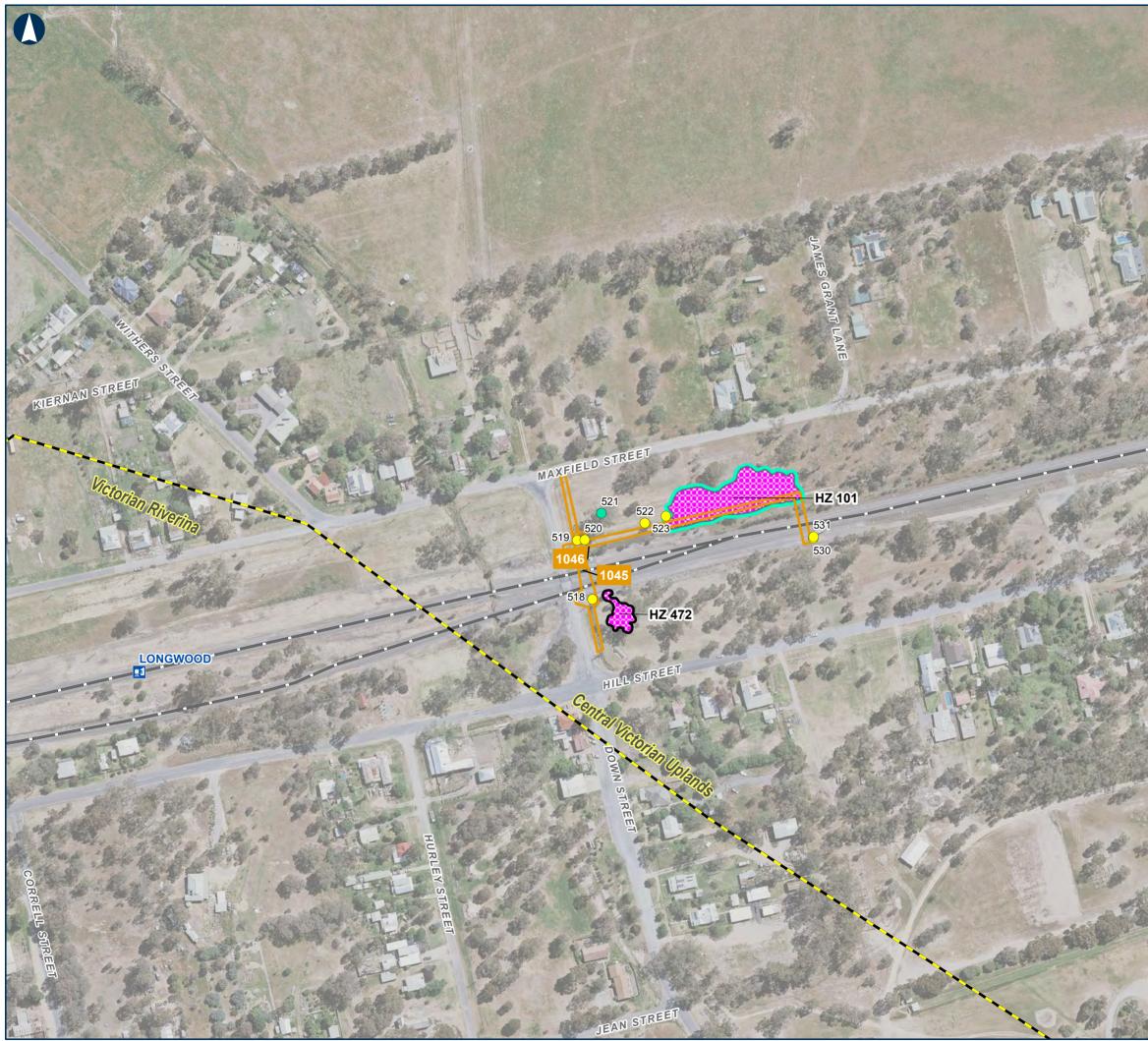


Coordinate System: GDA 1994 MGA Zone 55

ARTC makes no representation or warrany and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map.

Author: JB

Date: 28/07/2021 Paper: A3 Scale: 1:2,500 Data Sources: DELWP (2020) Figure 3





Native Vegetation

MAP 34 OF 91

- Overhead Powerline Project Areas
 Train Station
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 High Quality Native Vegetation
- Bioregion

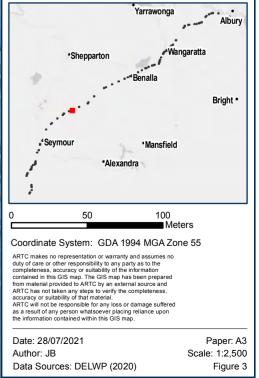
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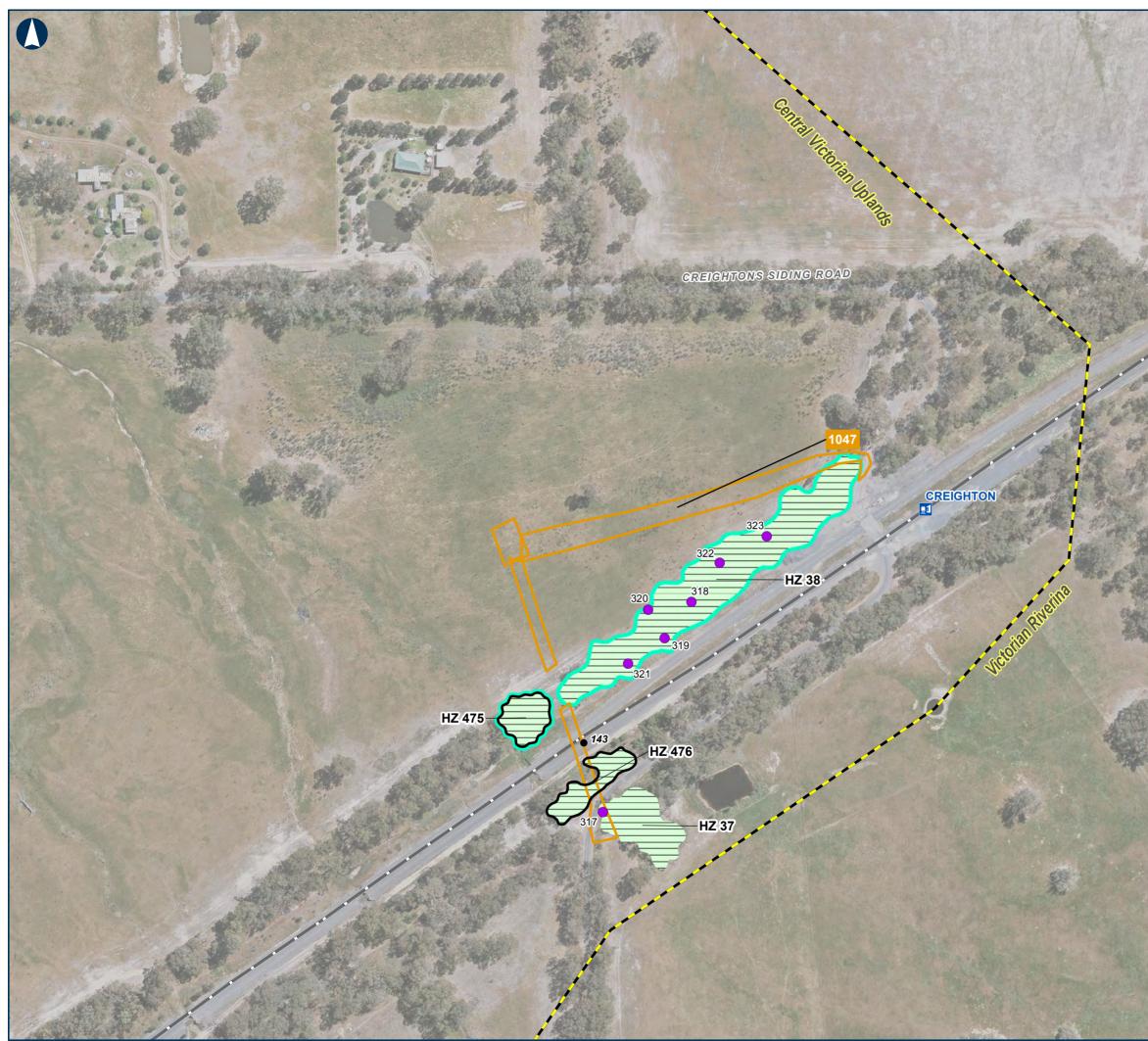
Habitat Zones Desktop/No access

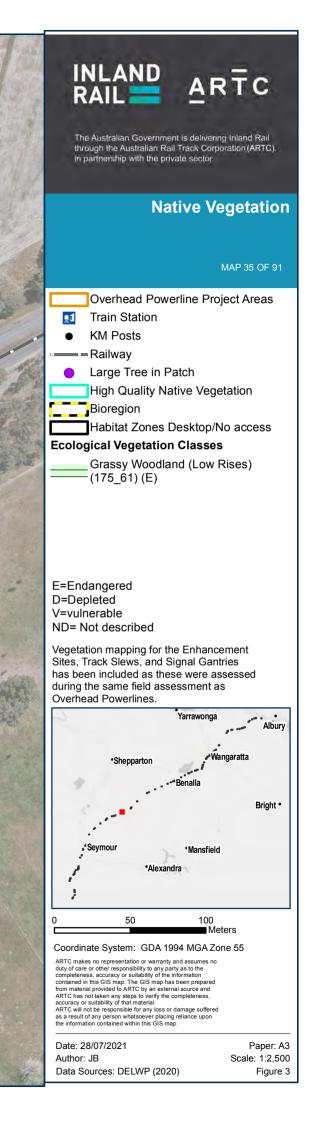
Ecological Vegetation Classes

Plains Woodland (803) (E)

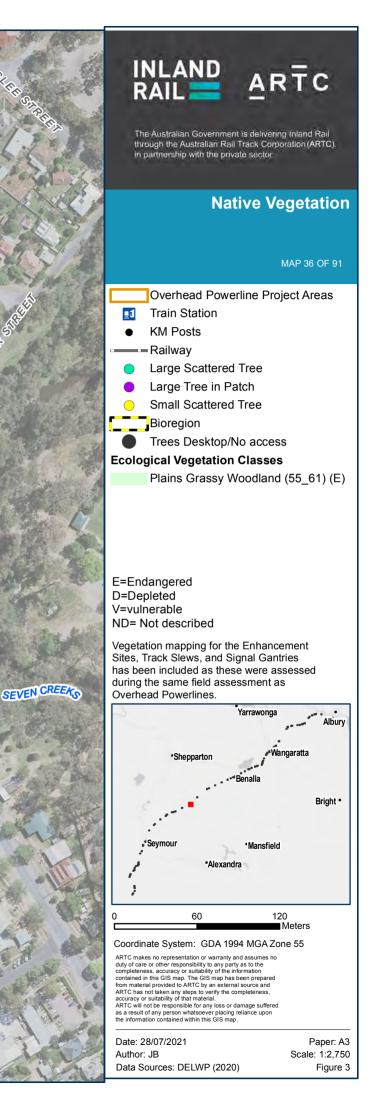
E=Endangered D=Depleted V=vulnerable ND= Not described

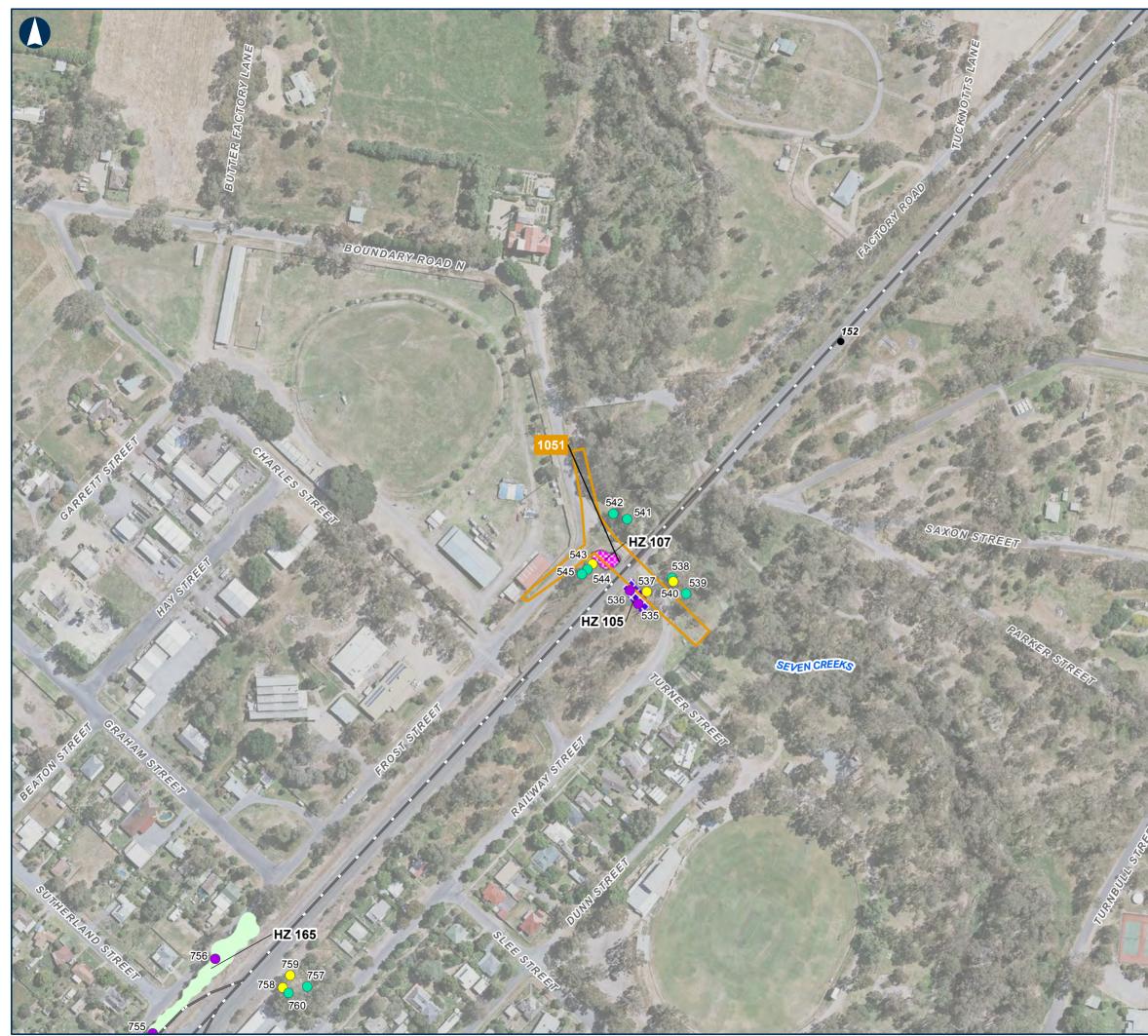












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Native Vegetation

MAP 37 OF 91

- Overhead Powerline Project Areas
- KM Posts
- -Railway

魏

- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion

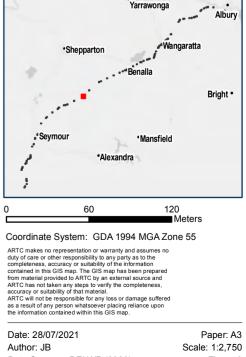
Ecological Vegetation Classes

Floodplain Riparian Woodland (56)

Plains	Grassy Wo	odland (55	_61) (E)
Plains	Woodland ((803) (E)	

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

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



Data Sources: DELWP (2020)

Figure 3





Native Vegetation

ARTC

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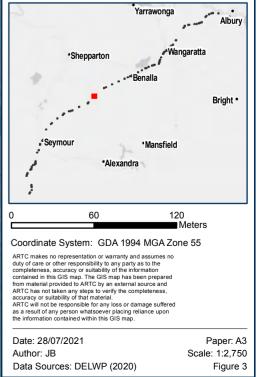
- Overhead Powerline Project Areas
- Train Station
- KM Posts
- Large Tree in Patch
- Small Scattered Tree
- Bioregion

Ecological Vegetation Classes

Plains Woodland (803) (E)

Spike-sedge Wetland (819) (V)

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







Native Vegetation

ARTC

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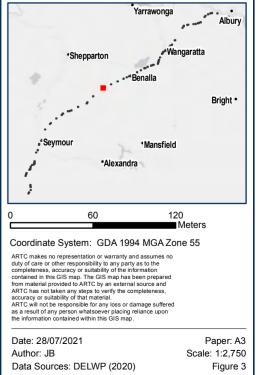
Overhead Powerline Project Areas

- Train Station
- KM Posts
- 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







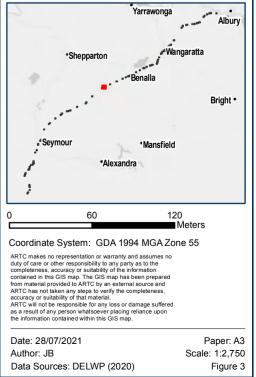
Native Vegetation

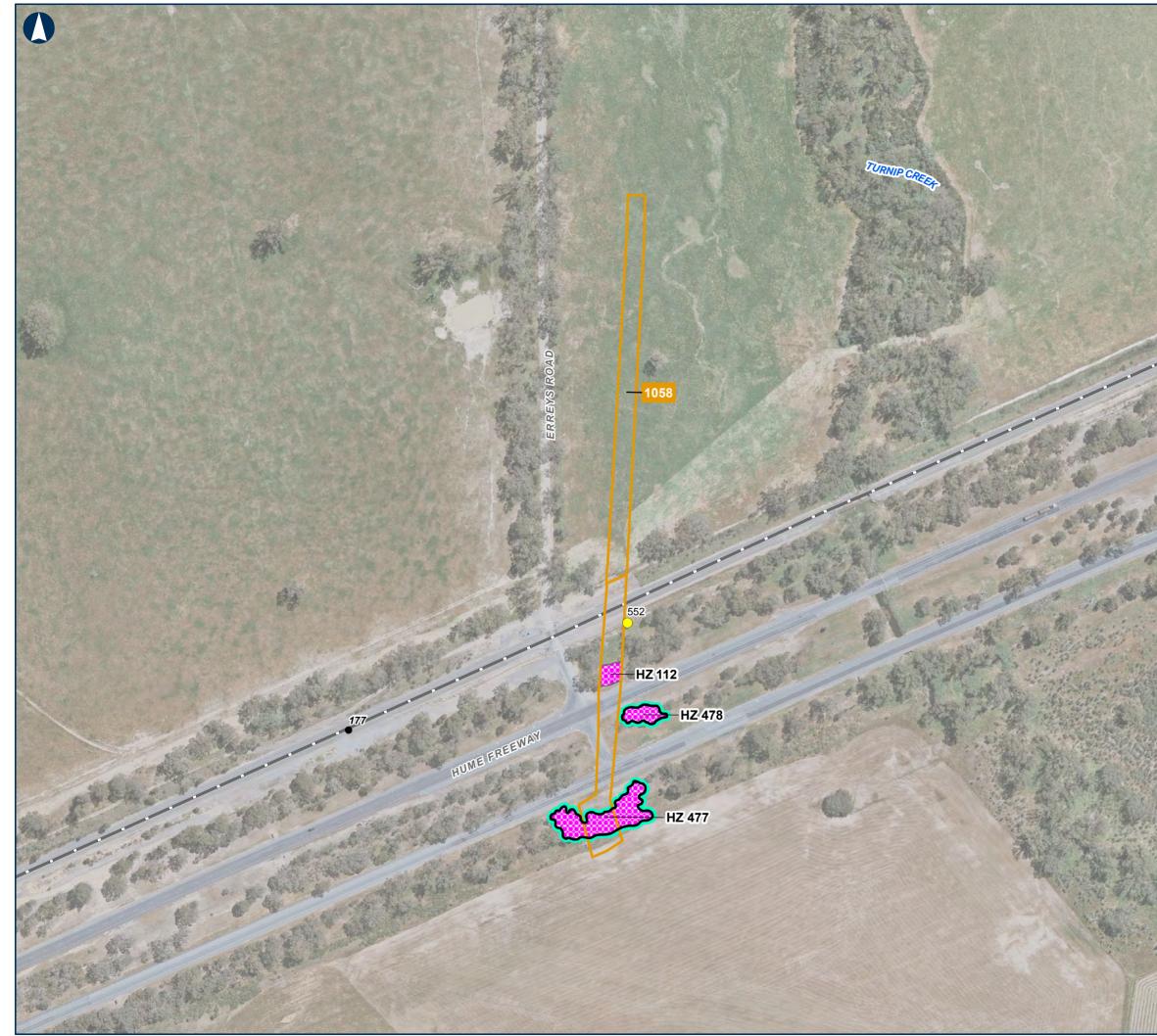
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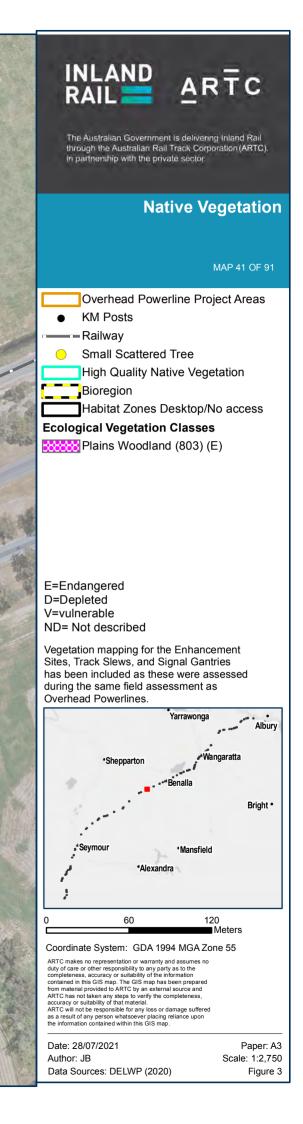
MAP 40 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Plains Woodland (803) (E)

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

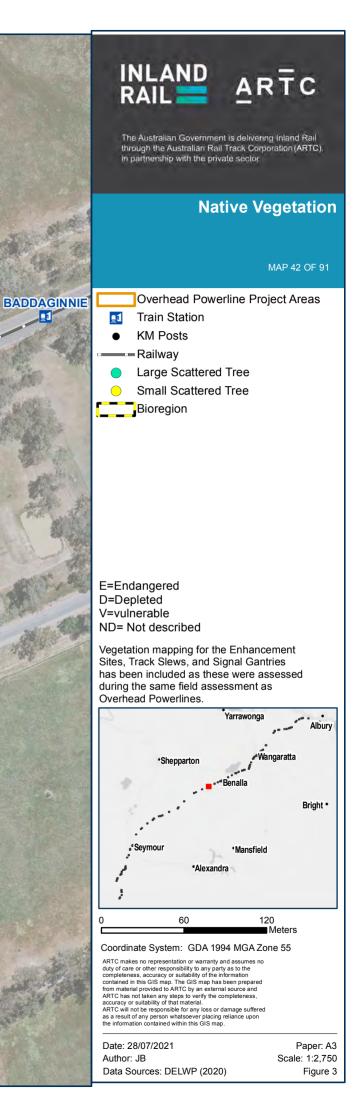








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Native Vegetation

ARTC

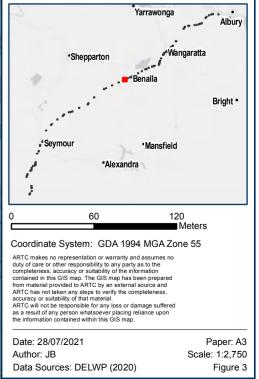
MAP 43 OF 91

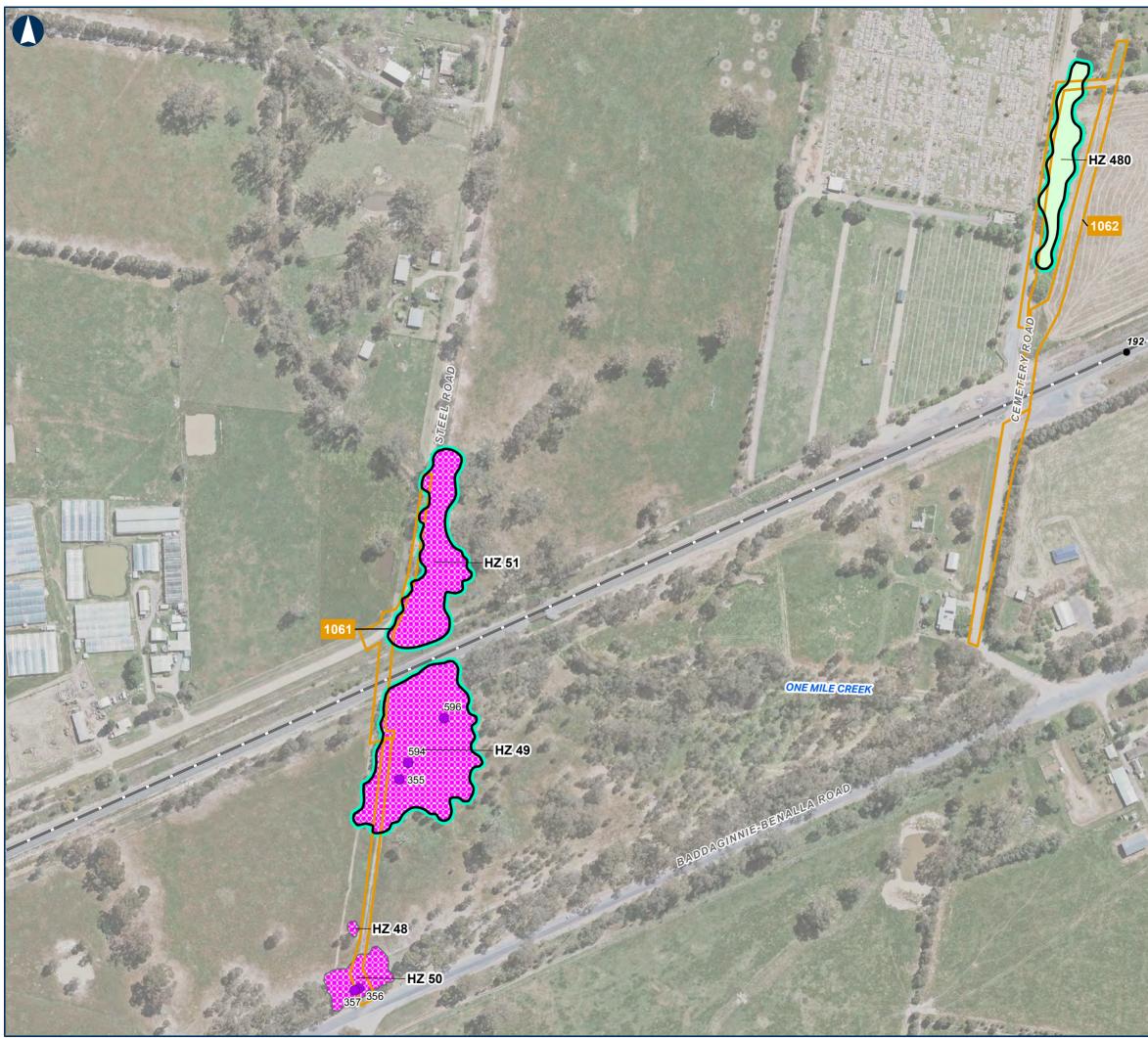
- Overhead Powerline Project Areas
 KM Posts
- – Railway
- Small Scattered Tree
- High Quality Native Vegetation
- Bioregion

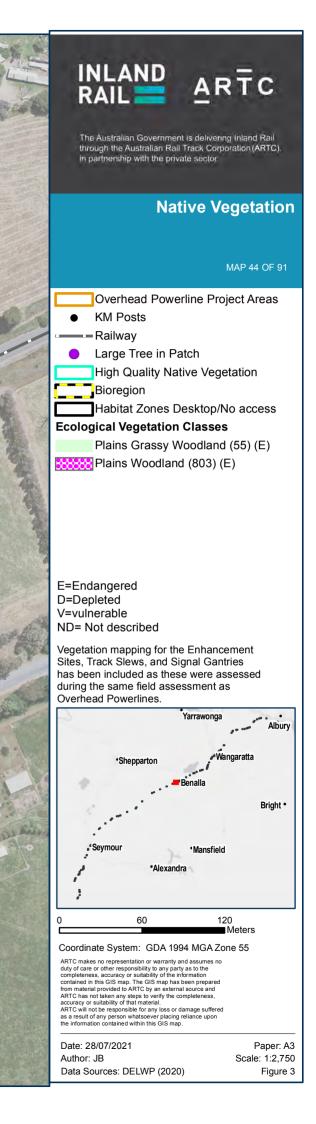
Ecological Vegetation Classes

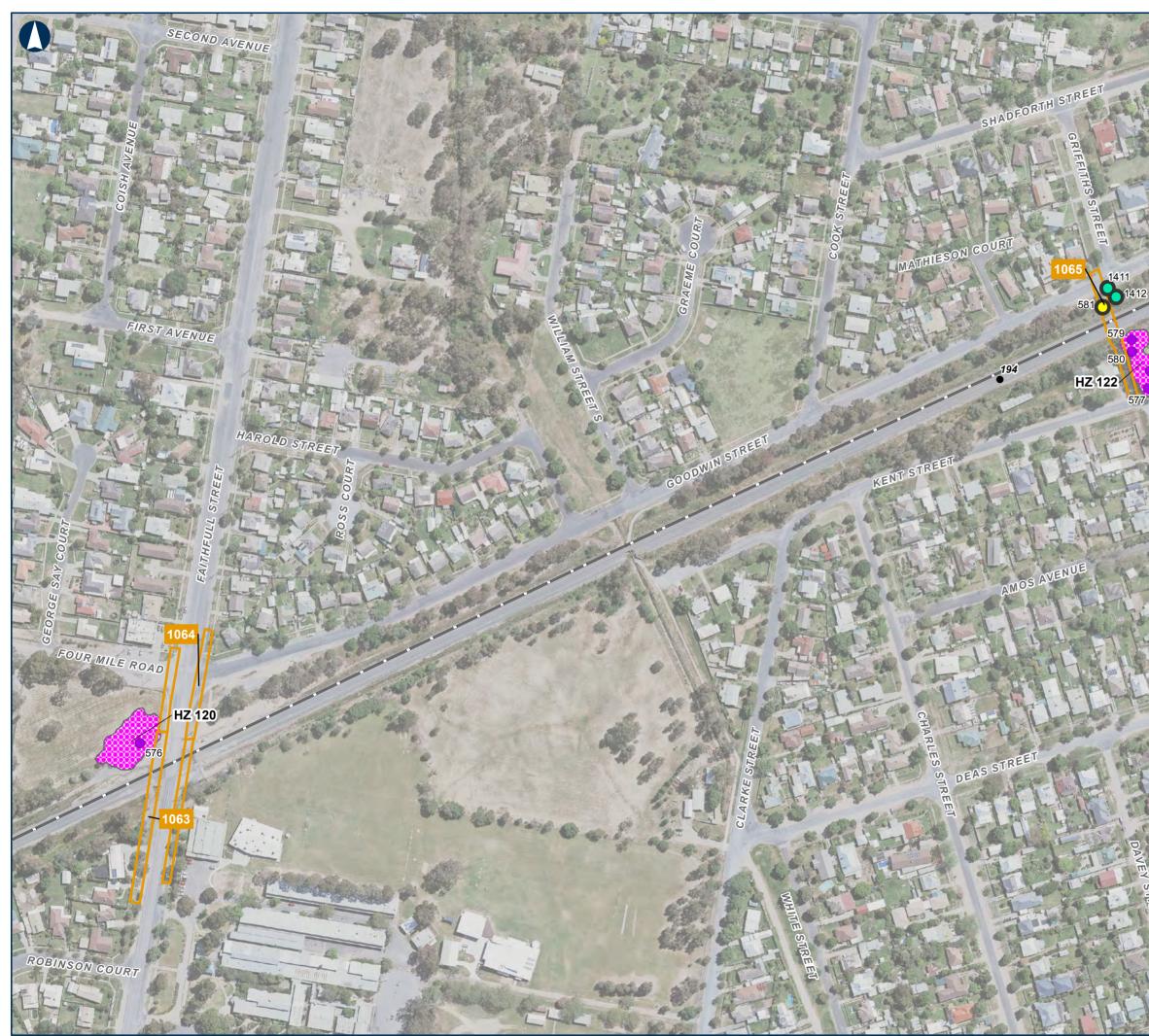
Plains Grassy Woodland (55_61) (E)

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











Native Vegetation

ARTC

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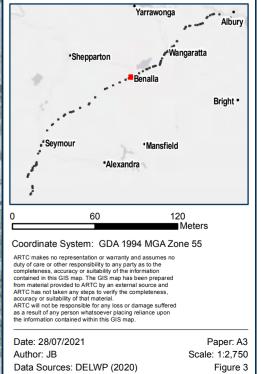
- Overhead Powerline Project AreasKM Posts
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion

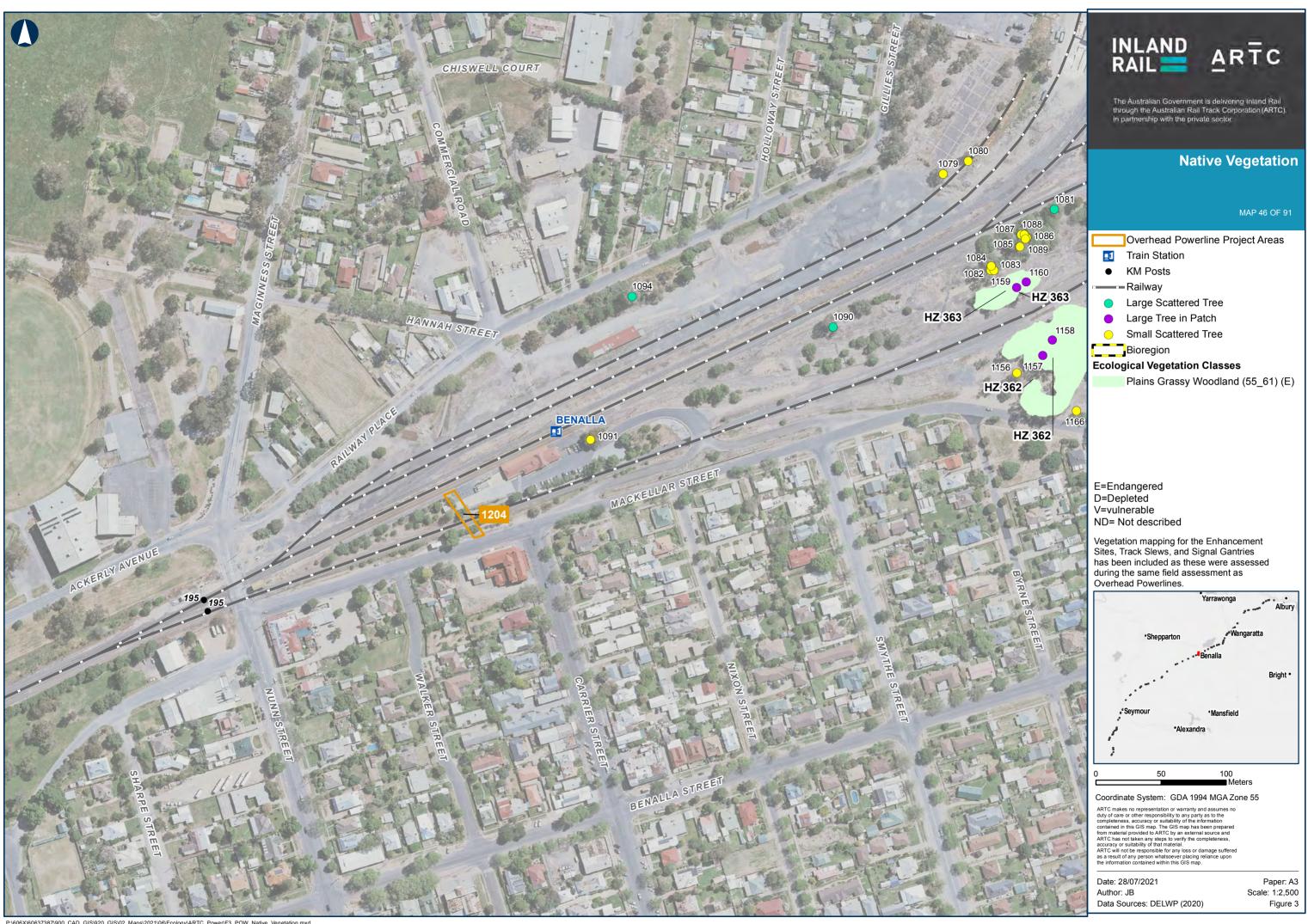
Trees Desktop/No access

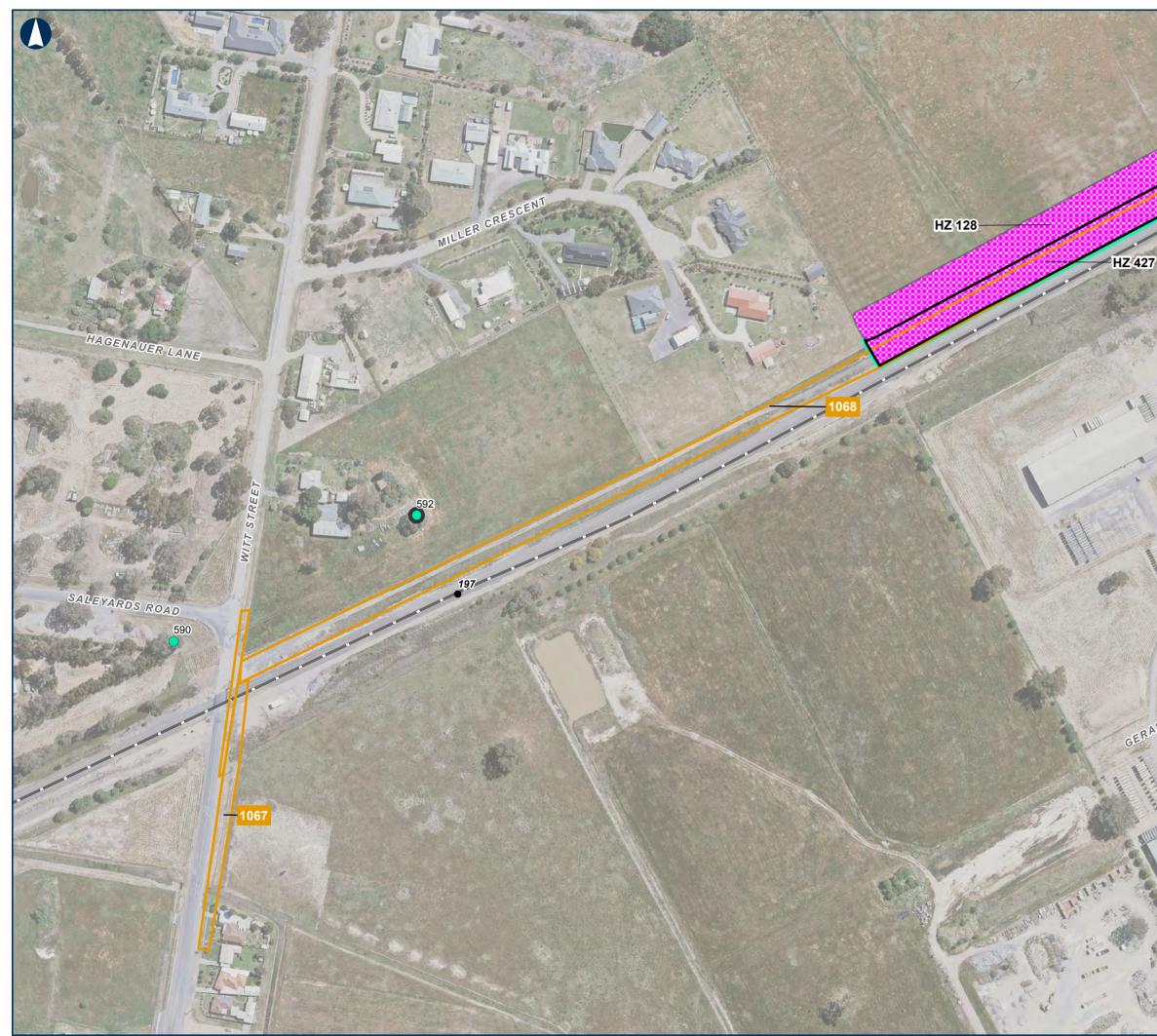
Ecological Vegetation Classes

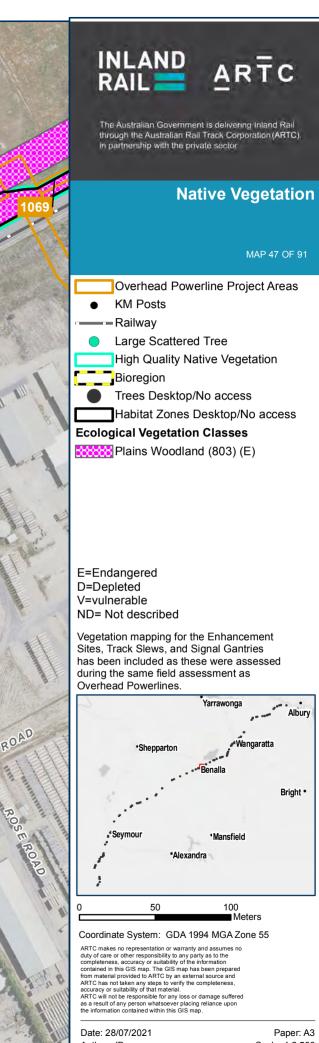
Plains Woodland (803) (E)

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

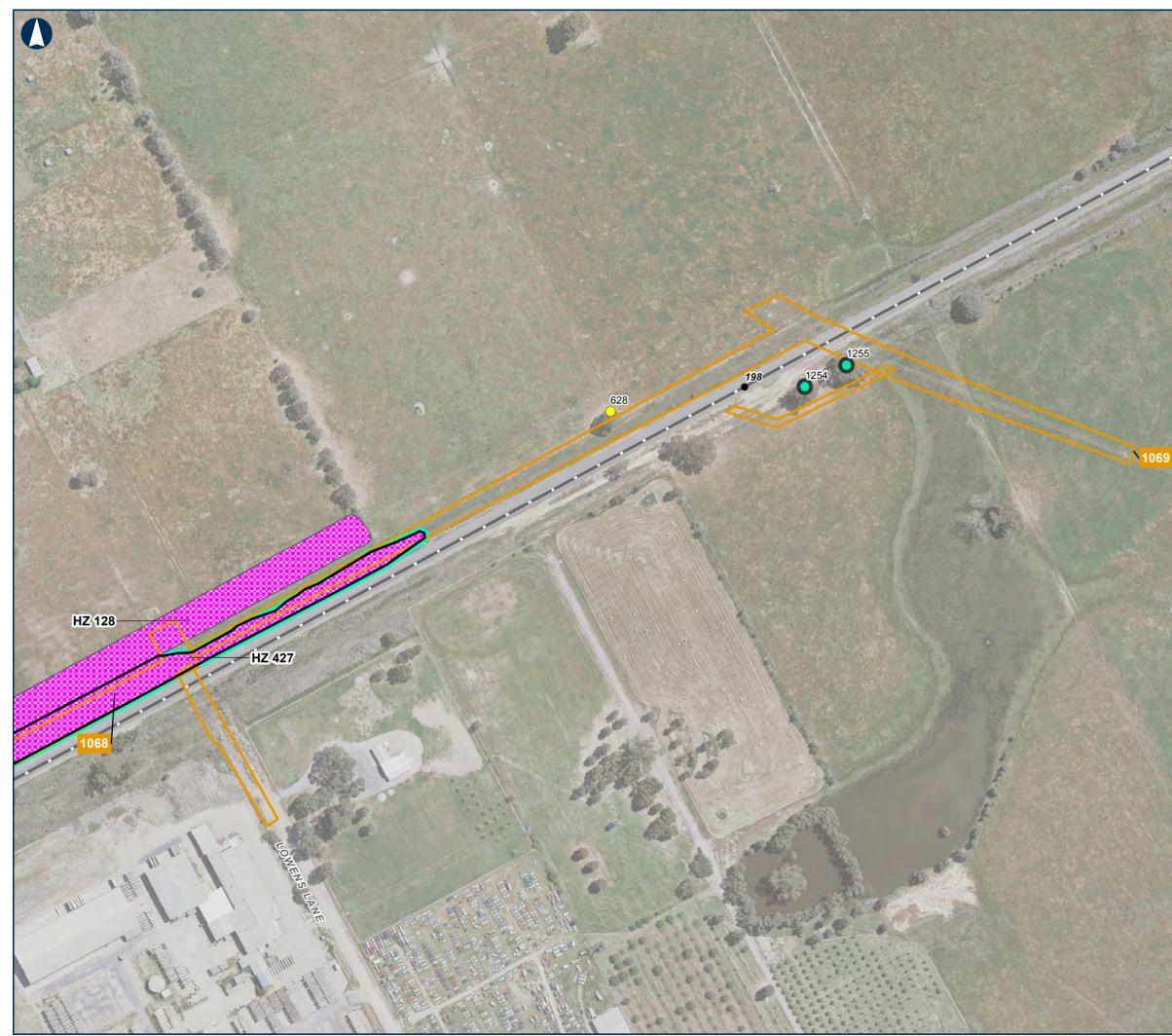








Author: JB Data Sources: DELWP (2020) Paper: A3 Scale: 1:2,500 Figure 3





Native Vegetation

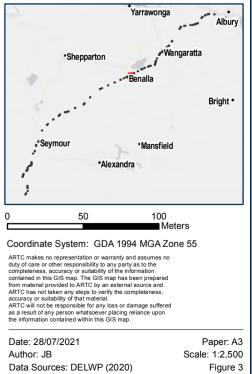
ARTC

MAP 48 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Plains Woodland (803) (E)

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

2





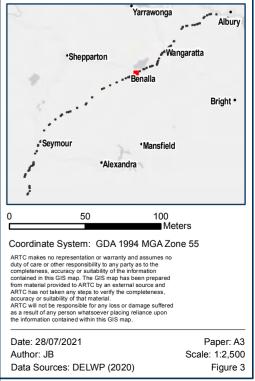


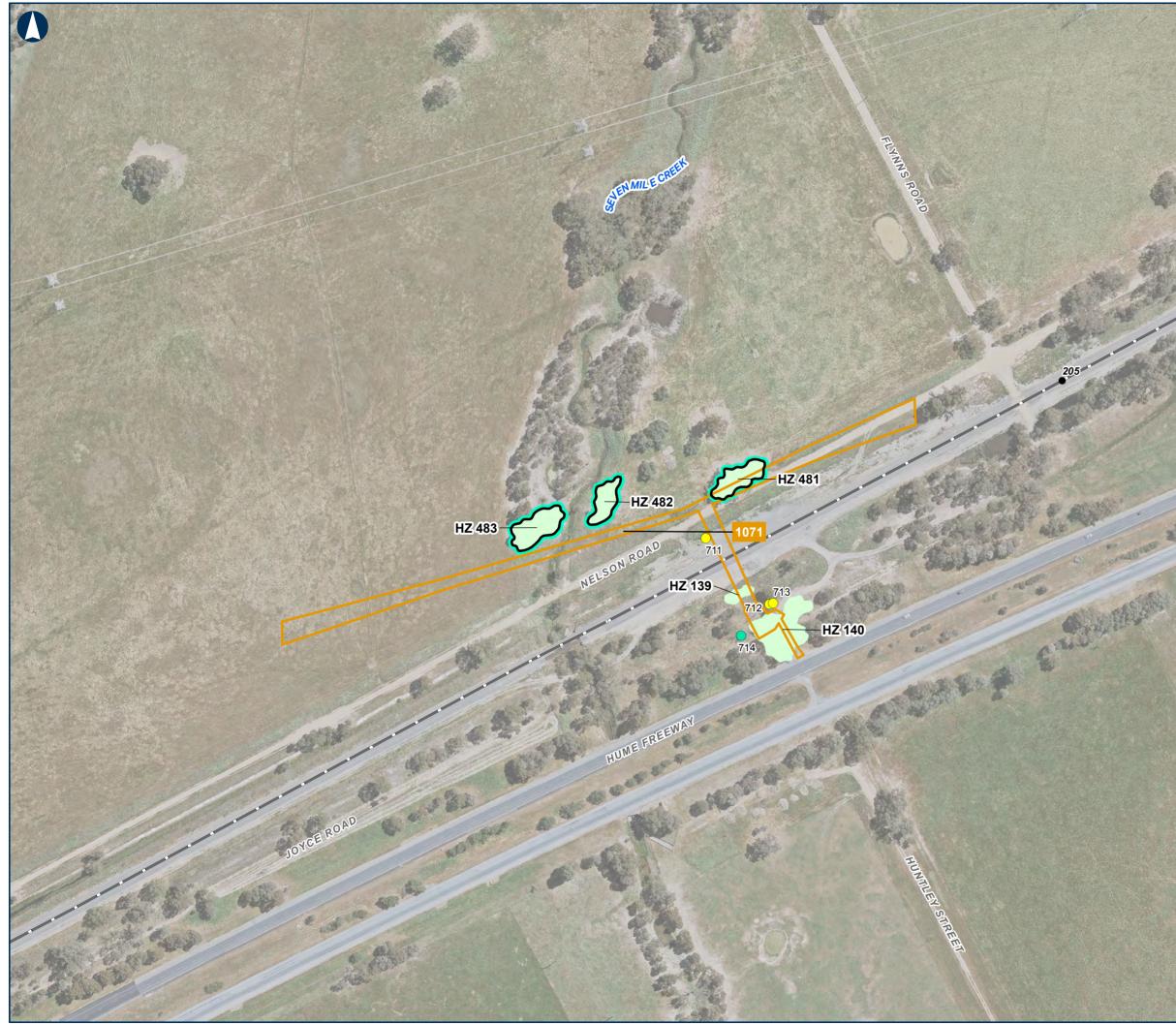
Native Vegetation

MAP 49 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Small Scattered Tree
 Bioregion
 Trees Desktop/No access
 Ecological Vegetation Classes
 Plains Grassy Woodland (55_61) (E)
 Tall Marsh (821) (D)

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







Native Vegetation

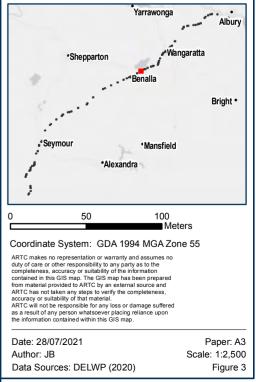
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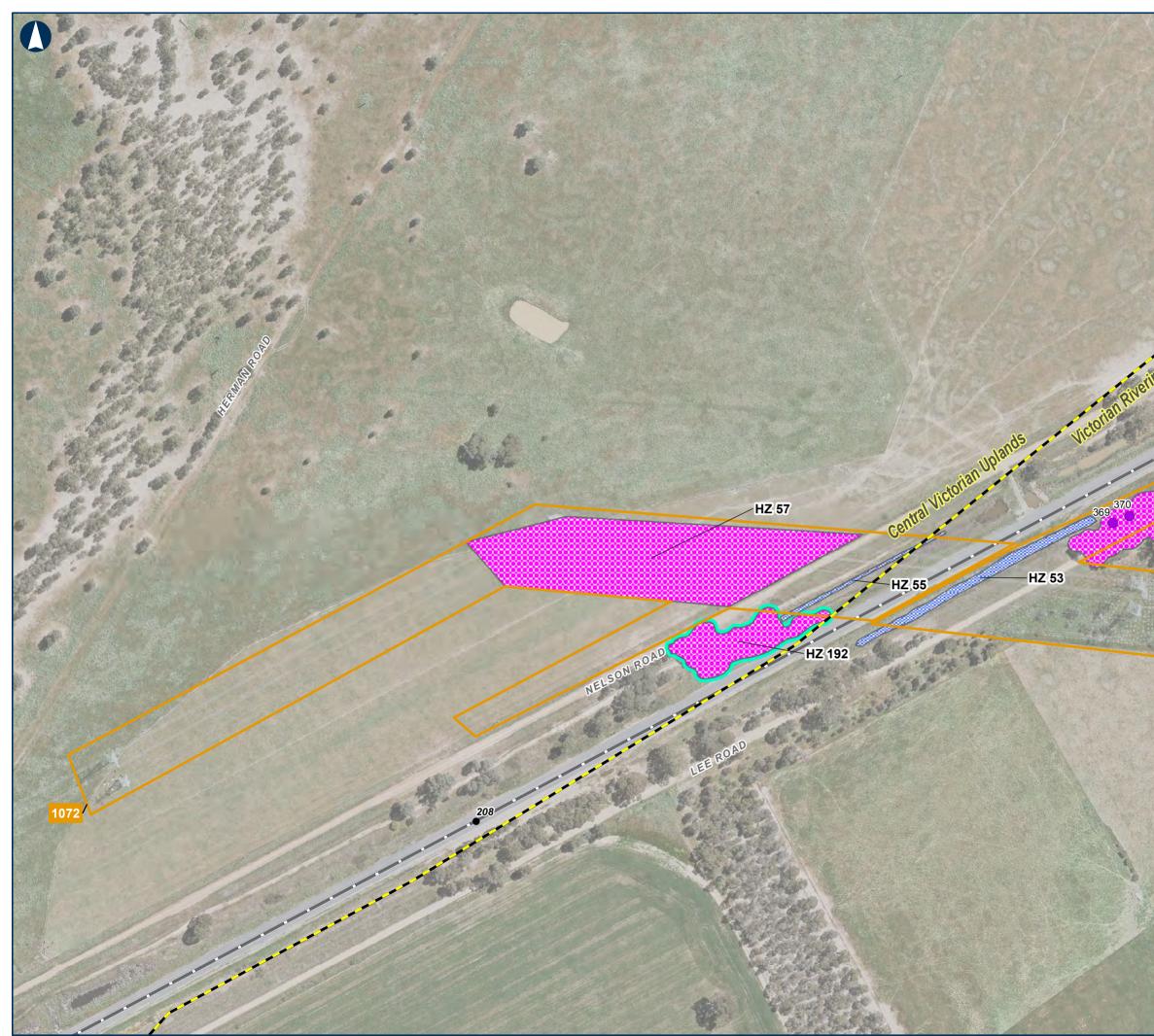
MAP 50 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Plains Grassy Woodland (55) (E)
 Plains Grassy Woodland (55–61) (E)

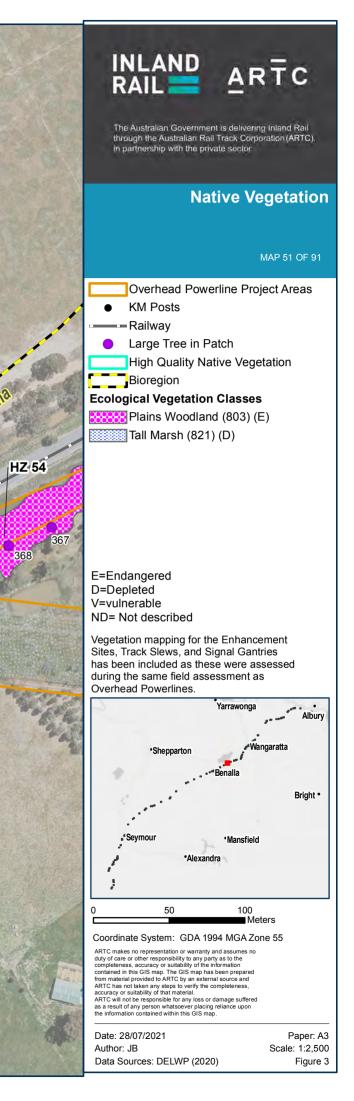
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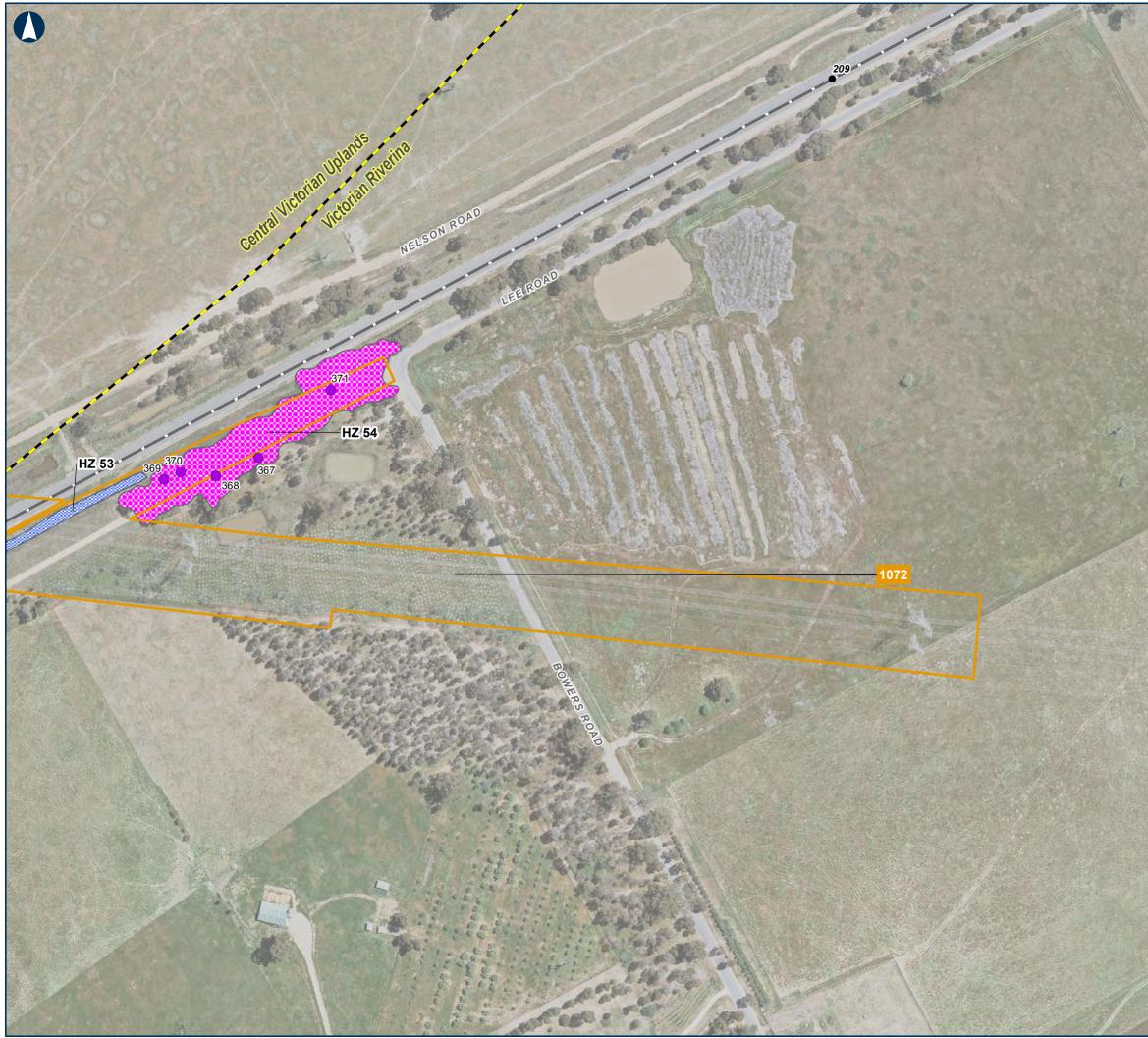
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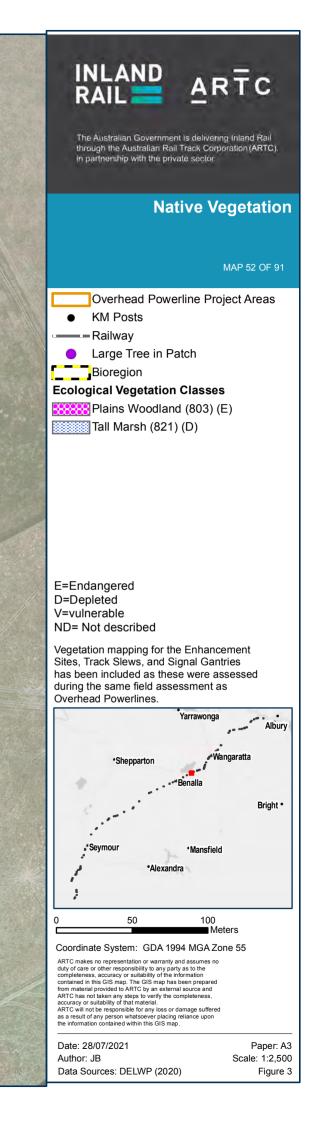


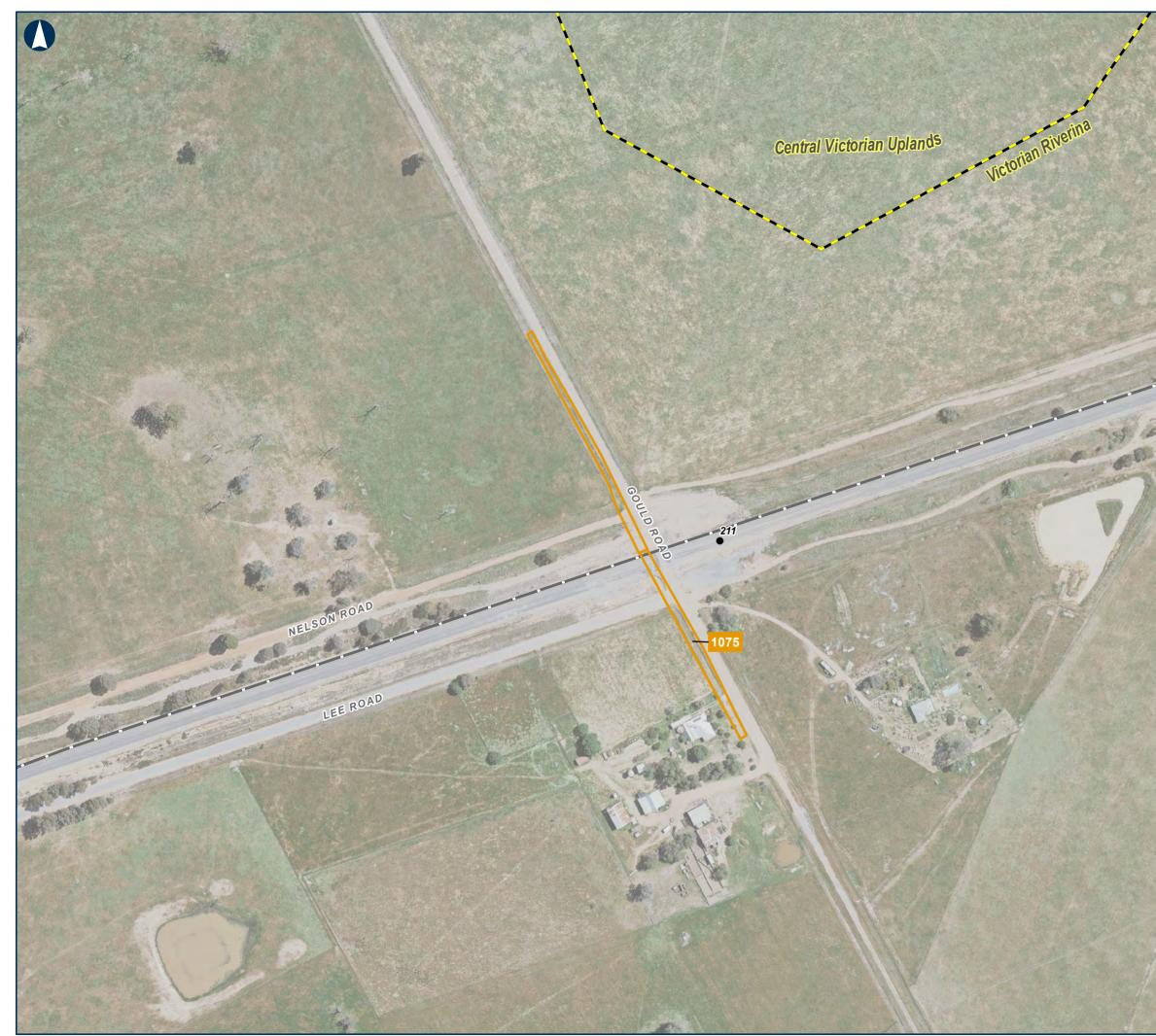


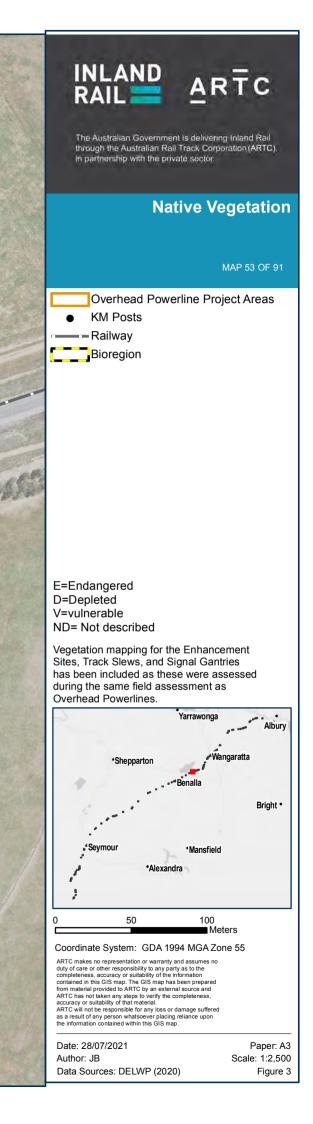
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Native Vegetation

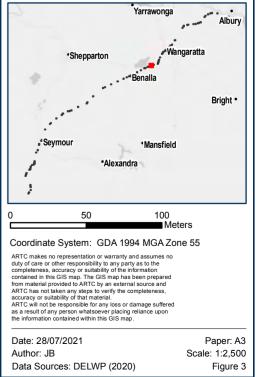
ARTC

MAP 54 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Spike-sedge Wetland (819) (V)
 Tall Marsh (821) (D)

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

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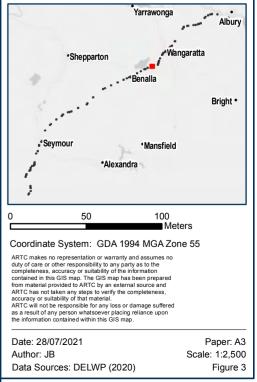
Native Vegetation

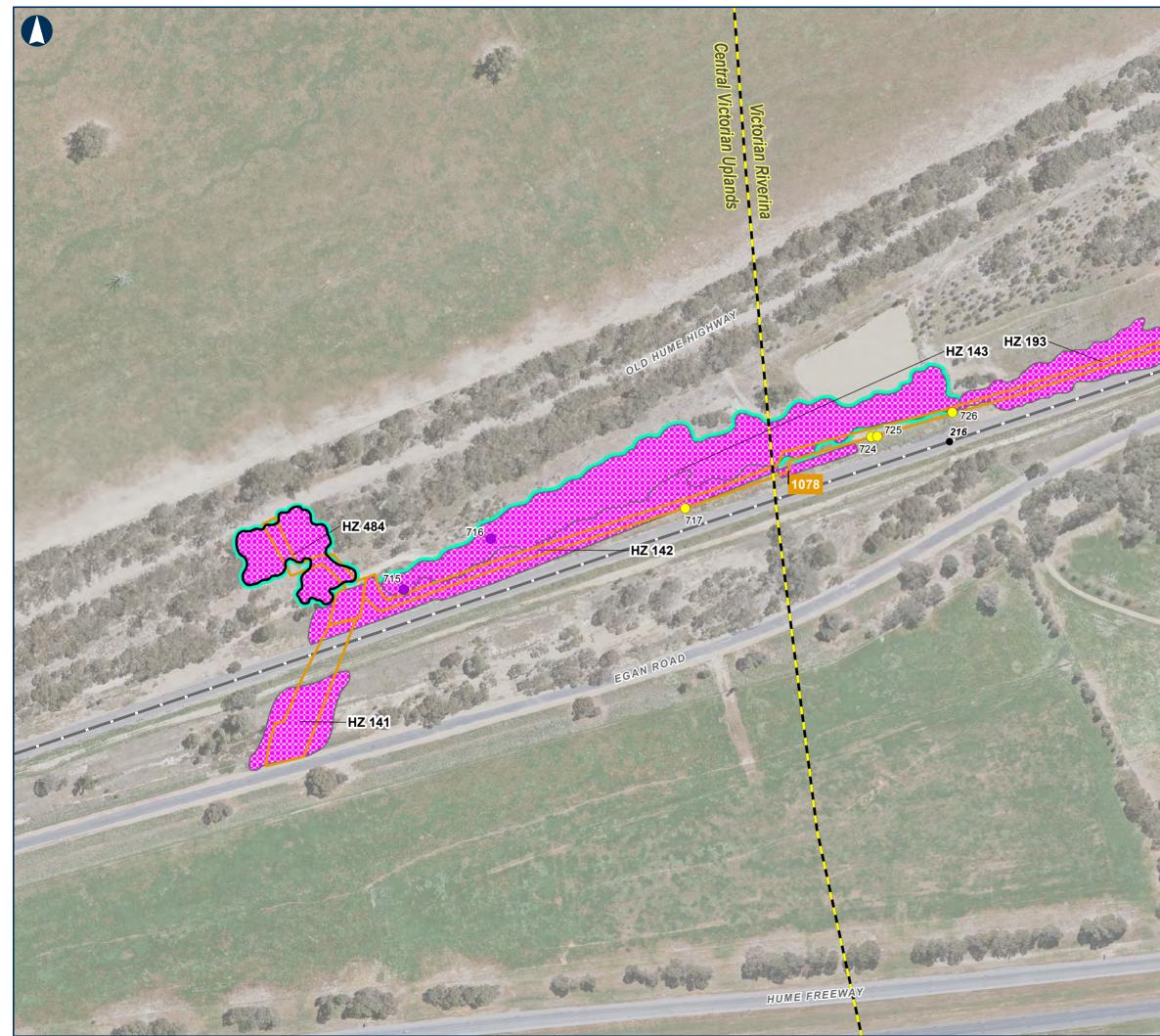
ARTC

MAP 55 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Plains Woodland (803) (E)

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







Native Vegetation

ARTC

MAP 56 OF 91

- Overhead Powerline Project AreasKM Posts
- – Railway
- Large Tree in Patch
- Small Scattered Tree
- High Quality Native Vegetation
- Bioregion

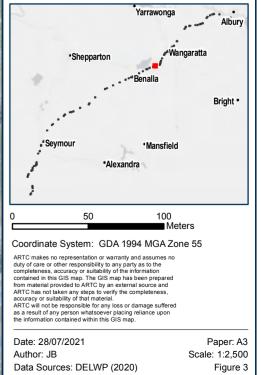
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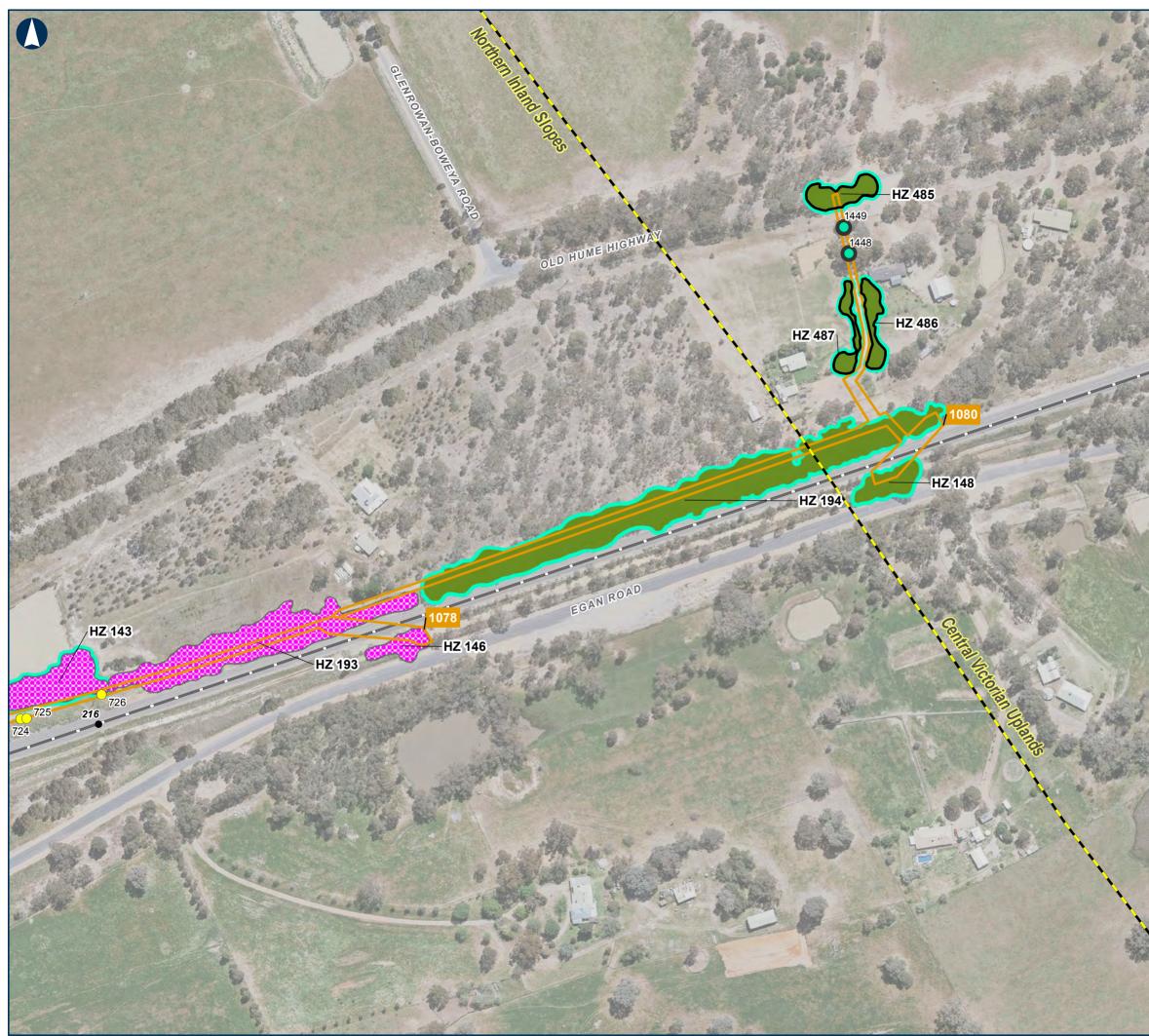
Habitat Zones Desktop/No access

Ecological Vegetation Classes

Plains Woodland (803) (E)

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







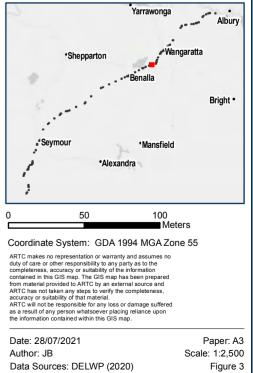
Native Vegetation

ARTC

MAP 57 OF 91

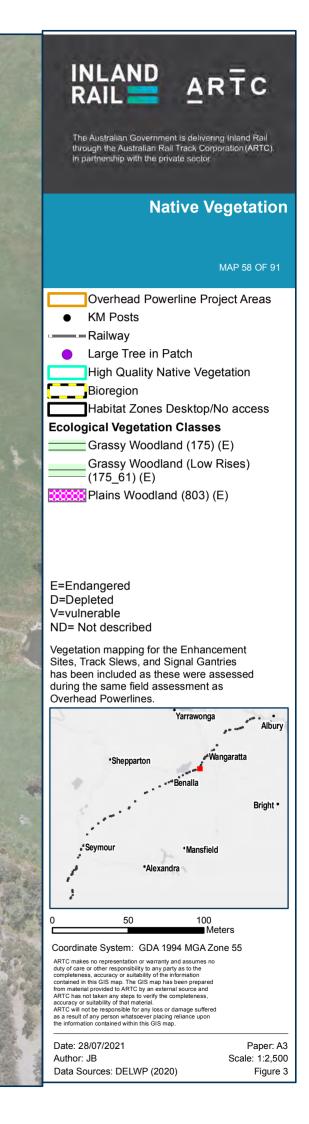
Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Small Scattered Tree
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Habitat Zones Desktop/No access
 Ecological Vegetation Classes
 Box Ironbark Forest (61) (V)
 Plains Woodland (803) (E)

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



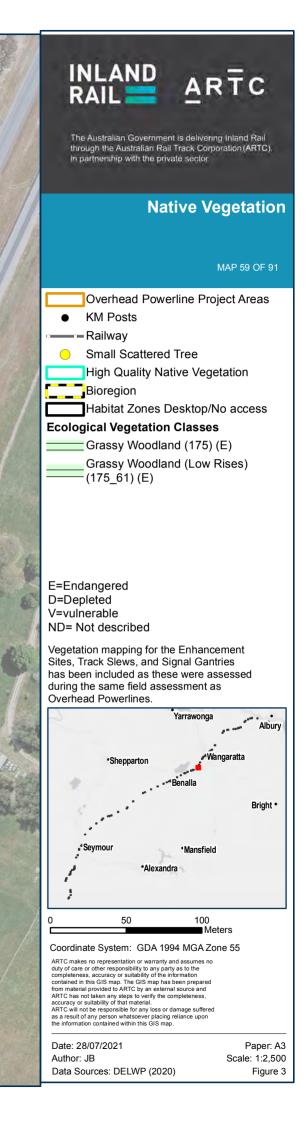


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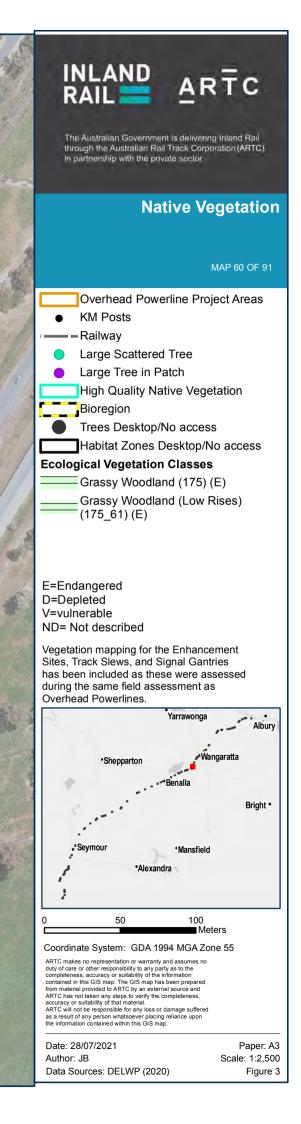




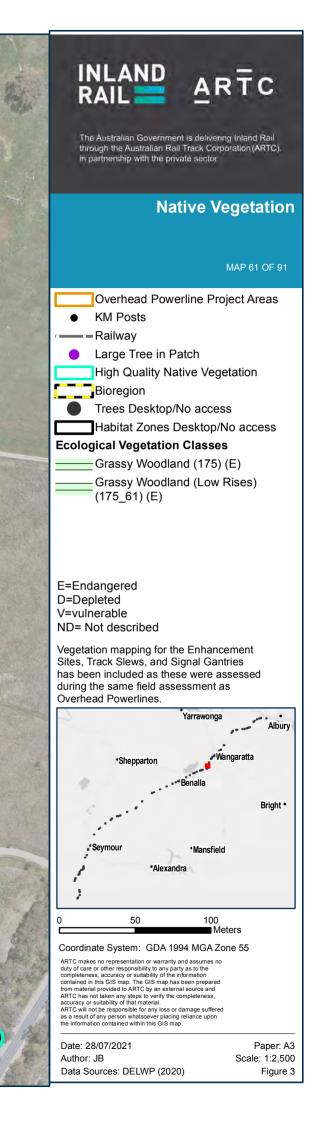
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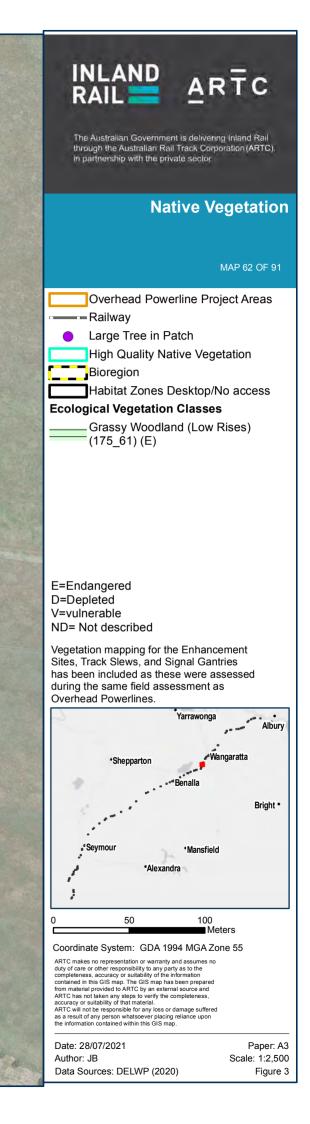










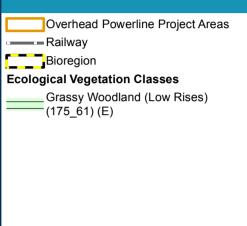




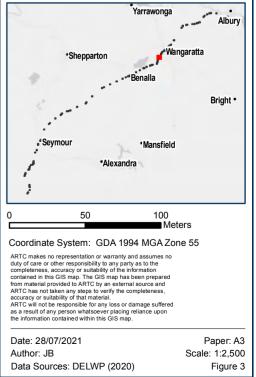


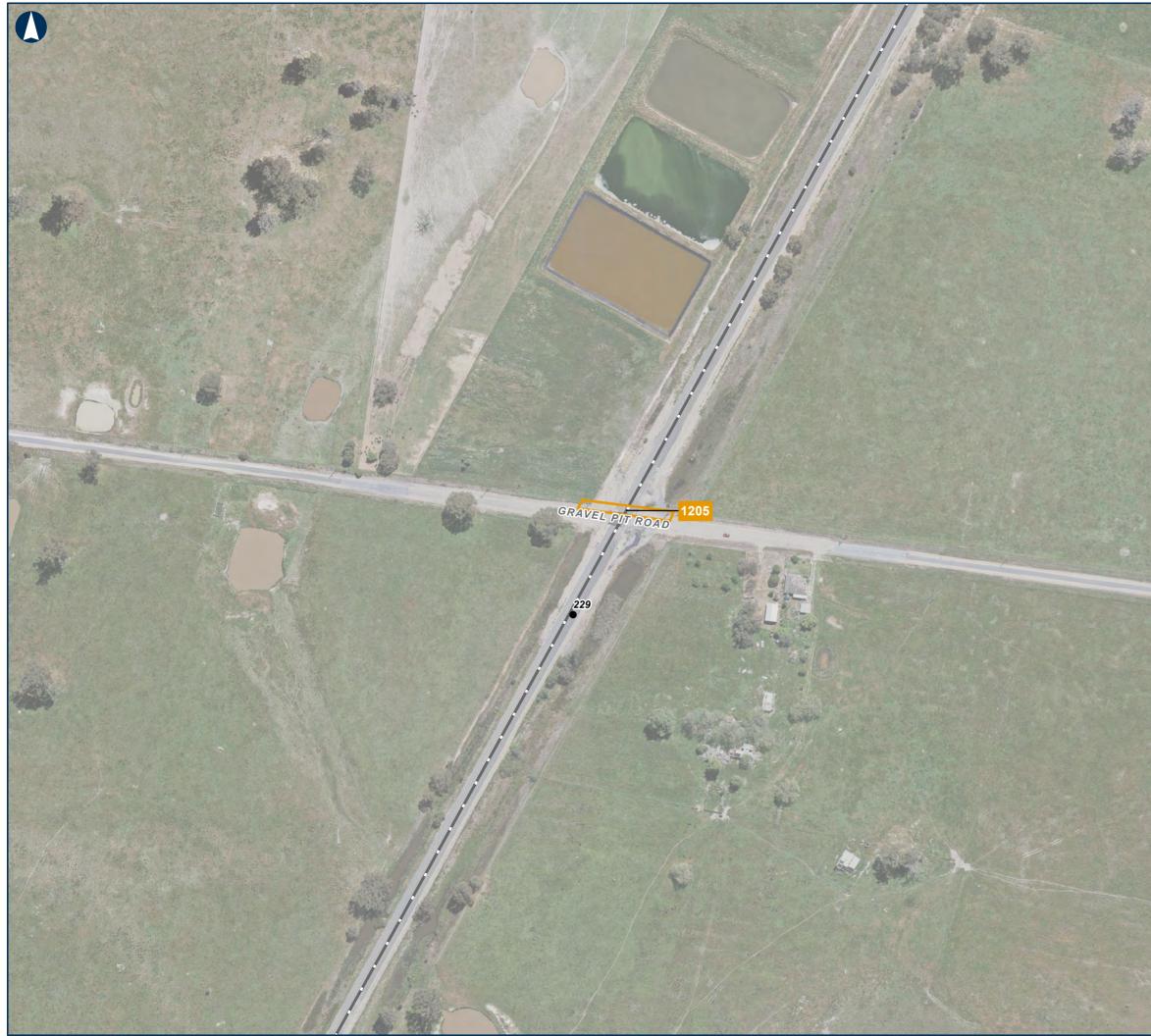
Native Vegetation

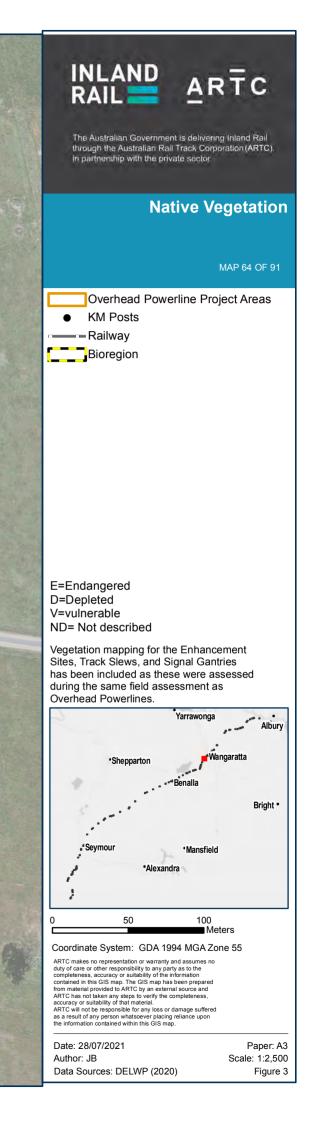
MAP 63 OF 91



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

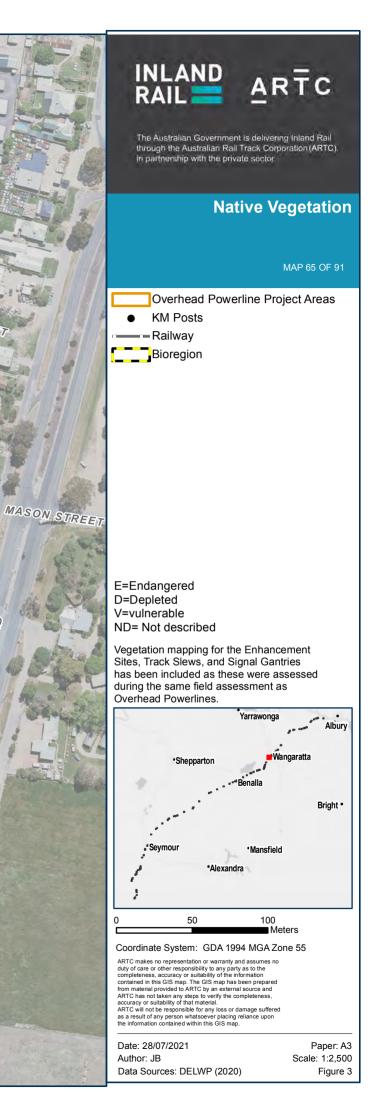






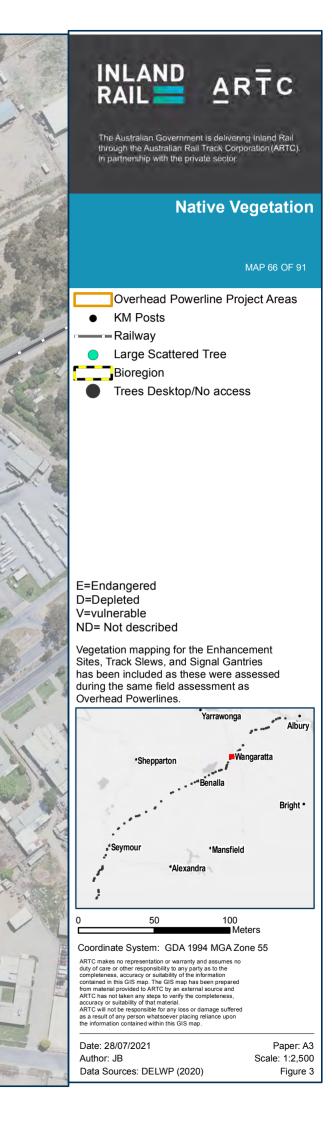
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The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Native Vegetation

ARTC

MAP 67 OF 91

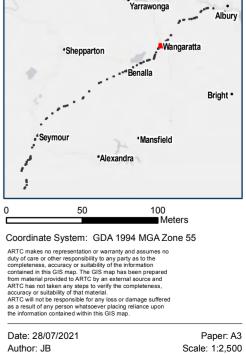
- Overhead Powerline Project Areas
- KM Posts
- -Railway
- Large Scattered Tree
- Small Scattered Tree
- Bioregion

Ecological Vegetation Classes

Plains Grassy Woodland (55_61) (E)

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

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



Data Sources: DELWP (2020)

Figure 3



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The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Native Vegetation

ARTC

MAP 68 OF 91

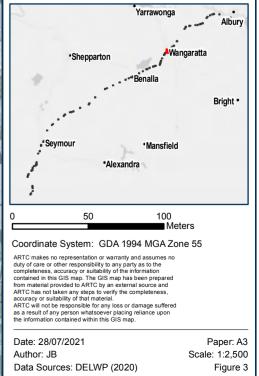
- Overhead Powerline Project Areas
- Train Station
- KM Posts
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Significant Tree Wangaratta Rural City
- Bioregion

Ecological Vegetation Classes

Creekline Grassy Woodland (68) (E) Plains Grassy Woodland (55_61) (E)

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

-





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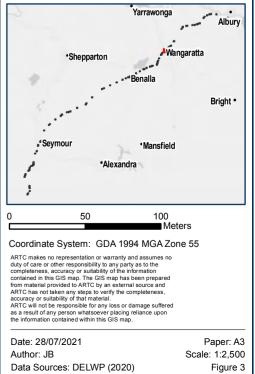
Native Vegetation

MAP 69 OF 91

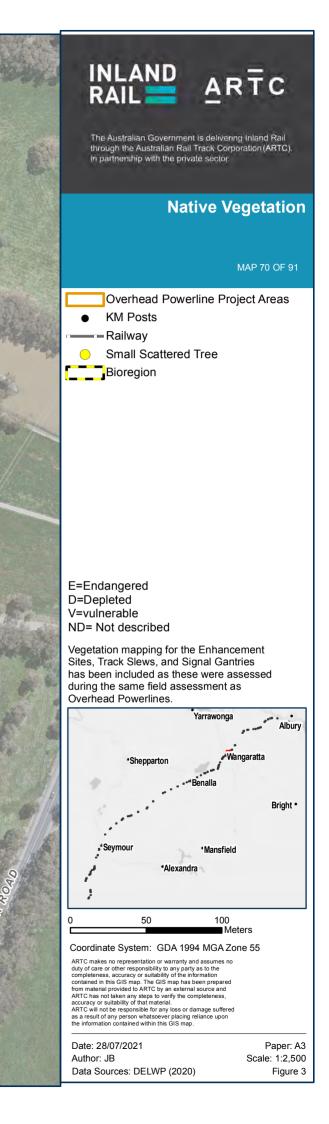
- Overhead Powerline Project Areas
- Train Station
- KM Posts
- Large Scattered Tree
- Small Scattered Tree
- Significant Tree Wangaratta Rural City
- Bioregion

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

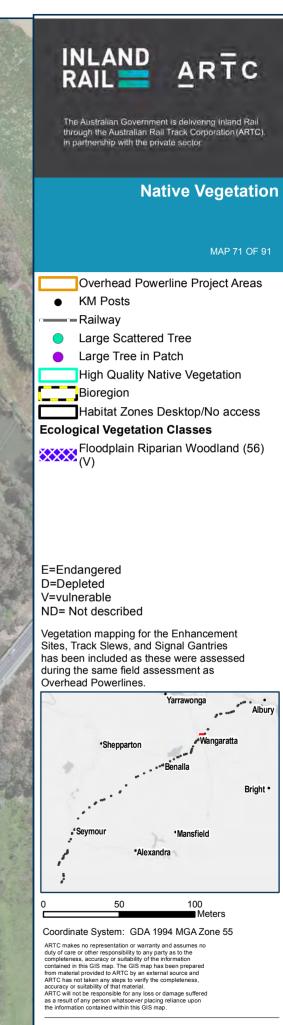
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Date: 28/07/2021 Author: JB Sc Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 3





Native Vegetation

MAP 72 OF 91

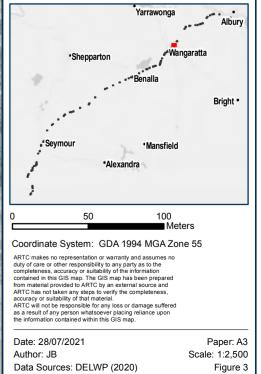
Overhead Powerline Project Areas

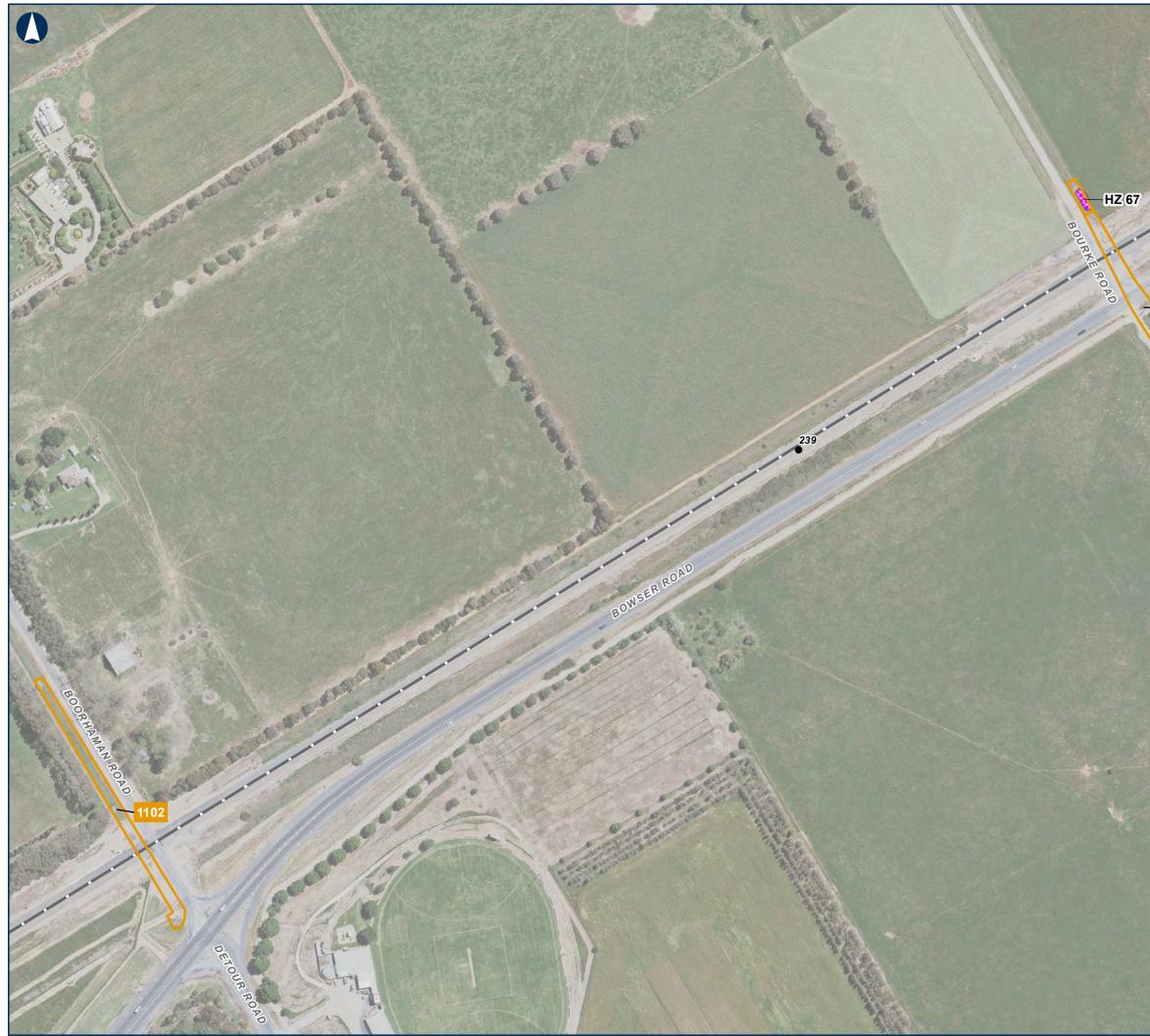
- Train Station
- KM Posts
- Large Tree in Patch
- \bigcirc Small Scattered Tree

Ecological Vegetation Classes

Plains Woodland (803) (E)

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







Native Vegetation

MAP 73 OF 91

- Overhead Powerline Project Areas
- KM Posts
- -Railway

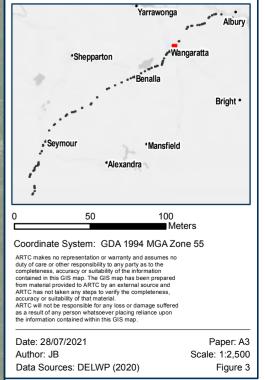
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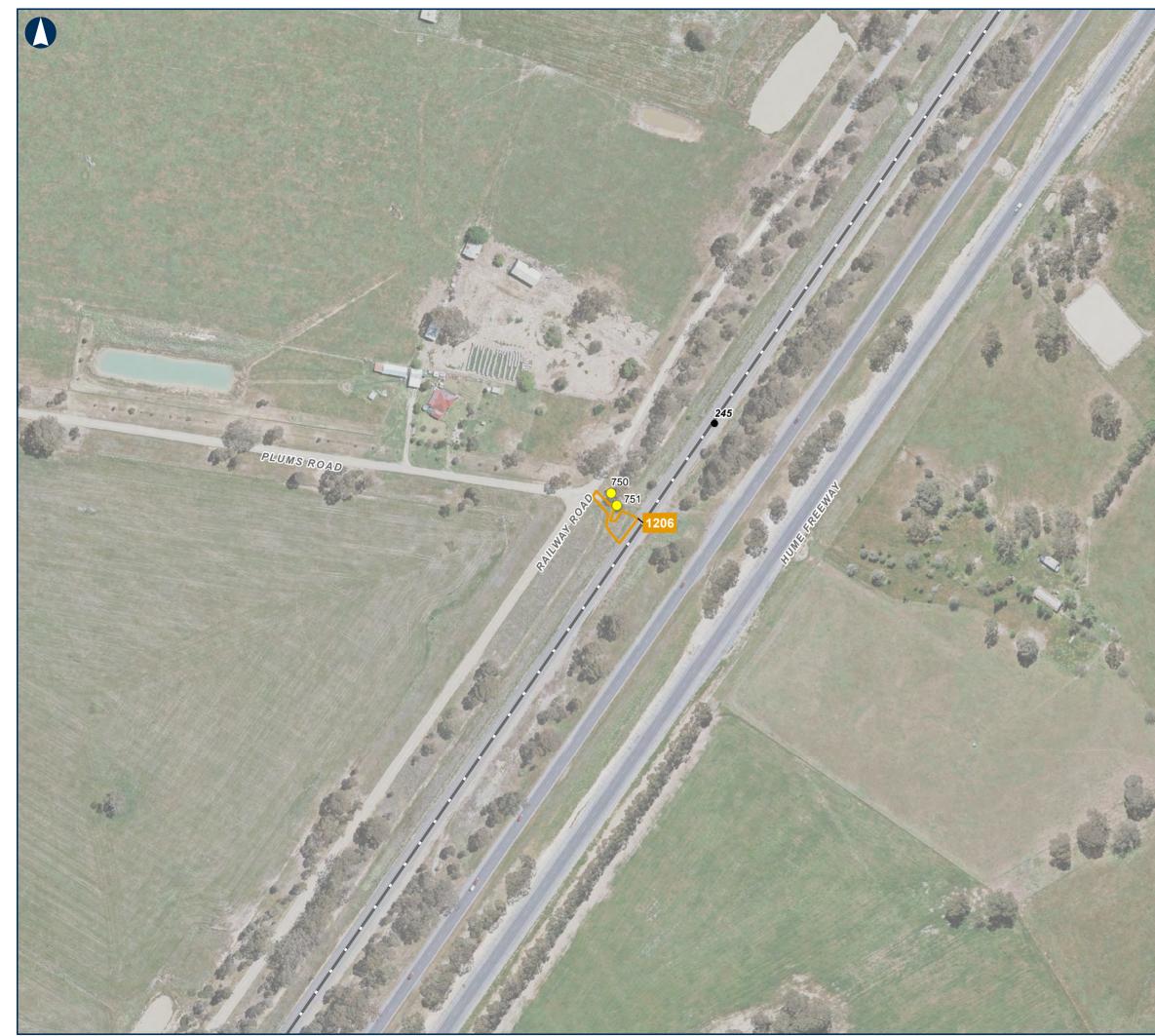
Bioregion

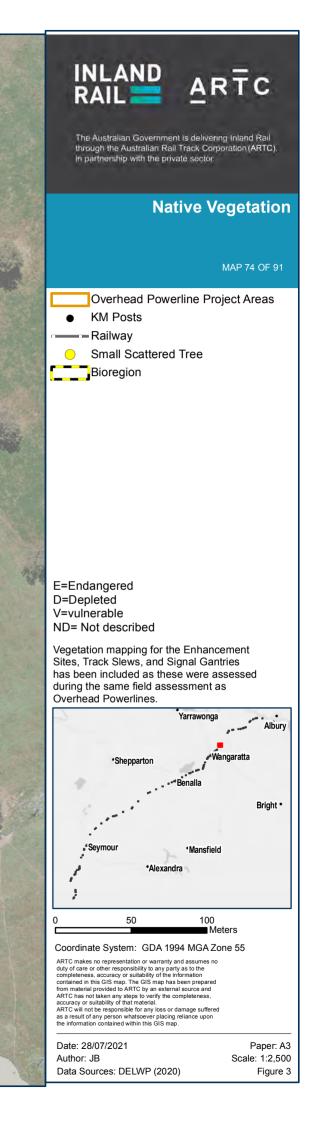
Ecological Vegetation Classes

Plains Woodland (803) (E)

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











Native Vegetation

ARTC

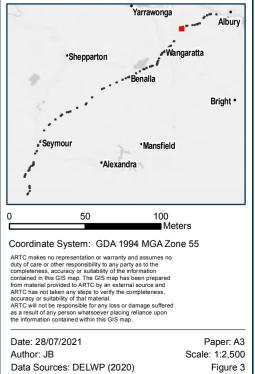
MAP 75 OF 91

- Overhead Powerline Project Areas
- KM Posts
- – Railway
- Small Scattered Tree
- Bioregion

Ecological Vegetation Classes

Plains Grassy Woodland (55_61) (E)

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





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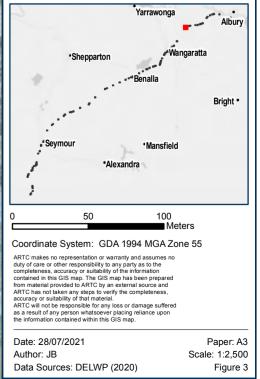
Native Vegetation

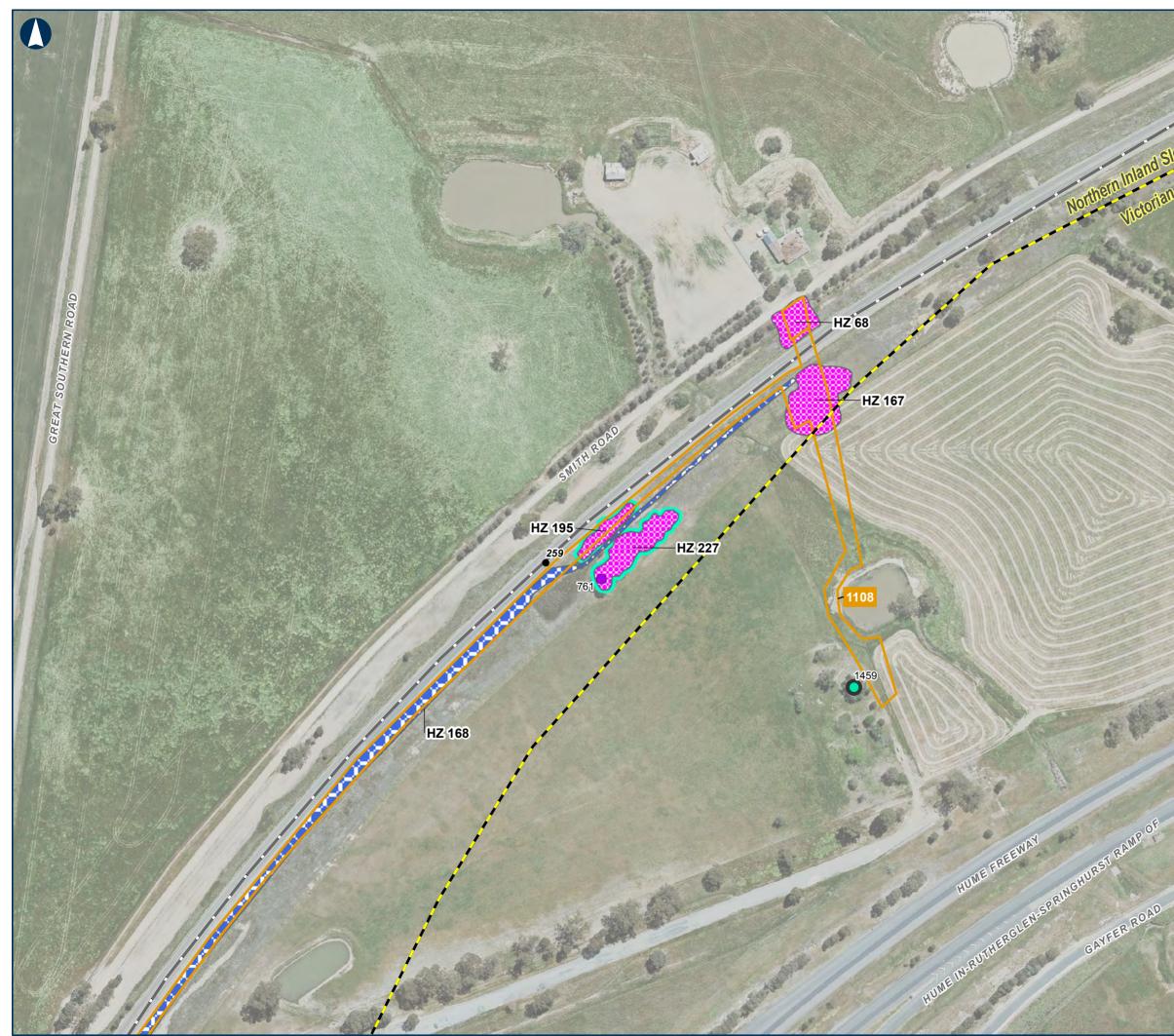
ARTC

MAP 76 OF 91

Overhead Powerline Project Areas Railway Bioregion Ecological Vegetation Classes Plains Woodland (803) (E) Spike-sedge Wetland (819) (V)

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







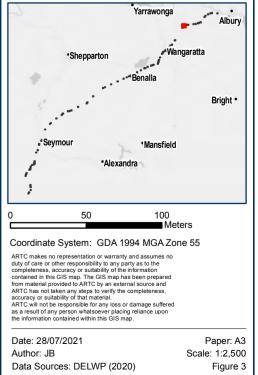
Native Vegetation

ARTC

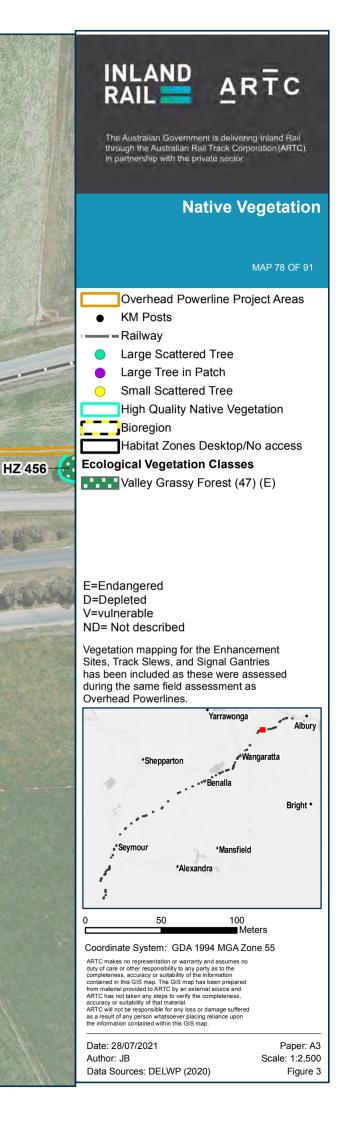
MAP 77 OF 91

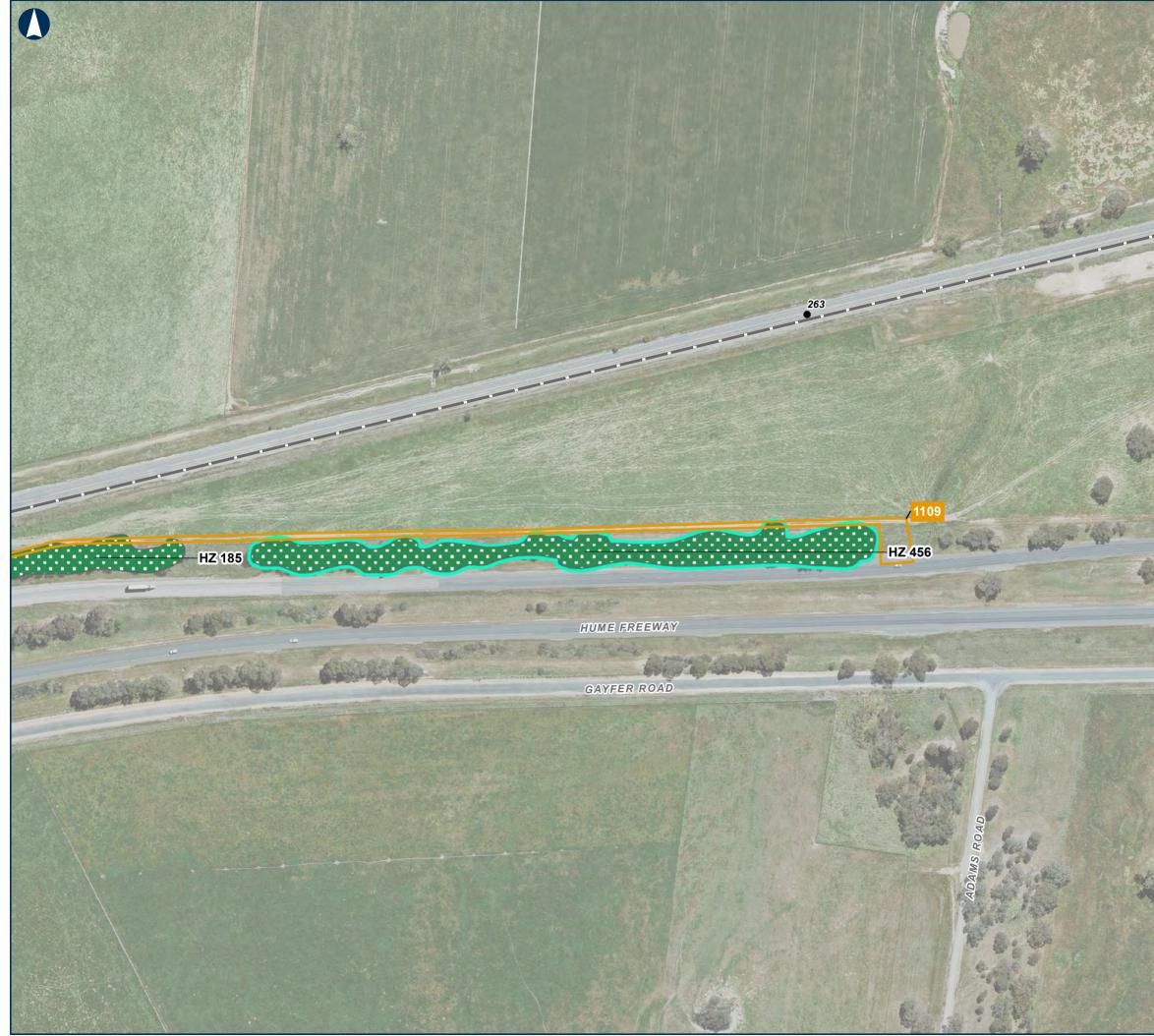
Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 High Quality Native Vegetation
 Bioregion
 Trees Desktop/No access
 Ecological Vegetation Classes
 Plains Woodland (803) (E)
 Spike-sedge Wetland (819) (V)

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











Native Vegetation

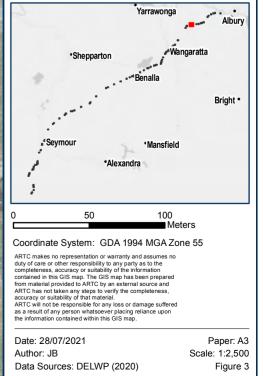
ARTC

MAP 79 OF 91

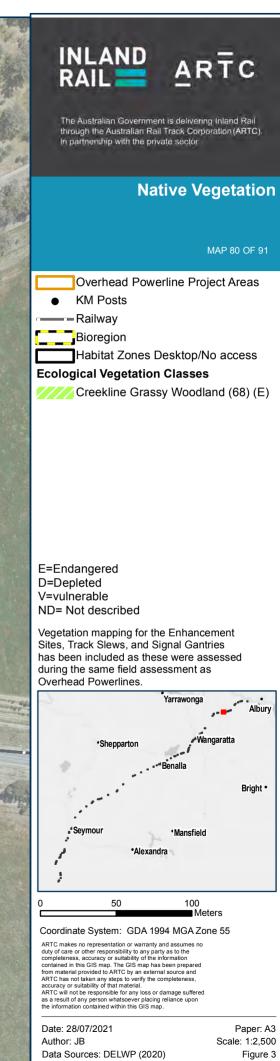
Overhead Powerline Project Areas
KM Posts
Railway
High Quality Native Vegetation
Bioregion
Ecological Vegetation Classes

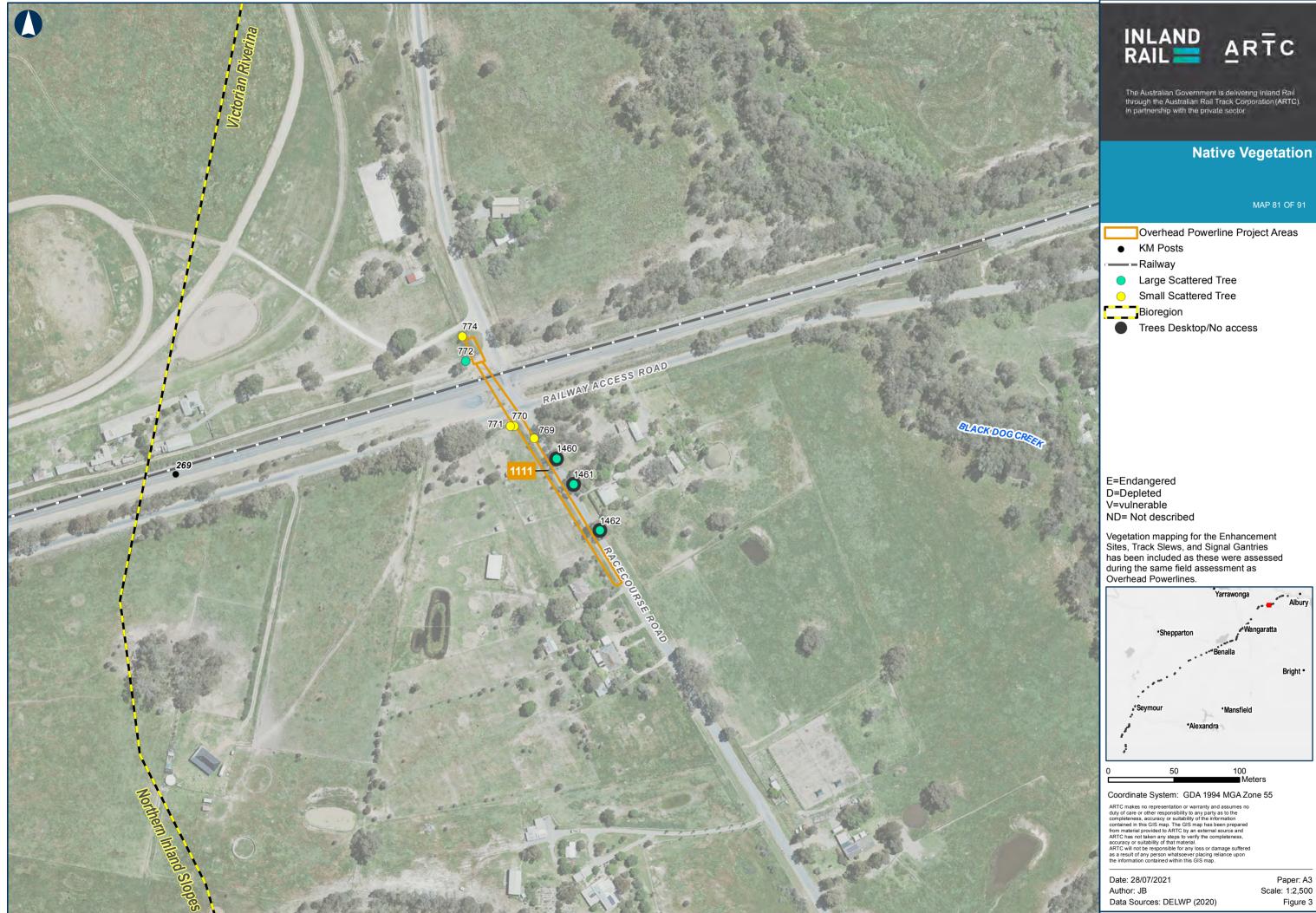
Valley Grassy Forest (47) (E)

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



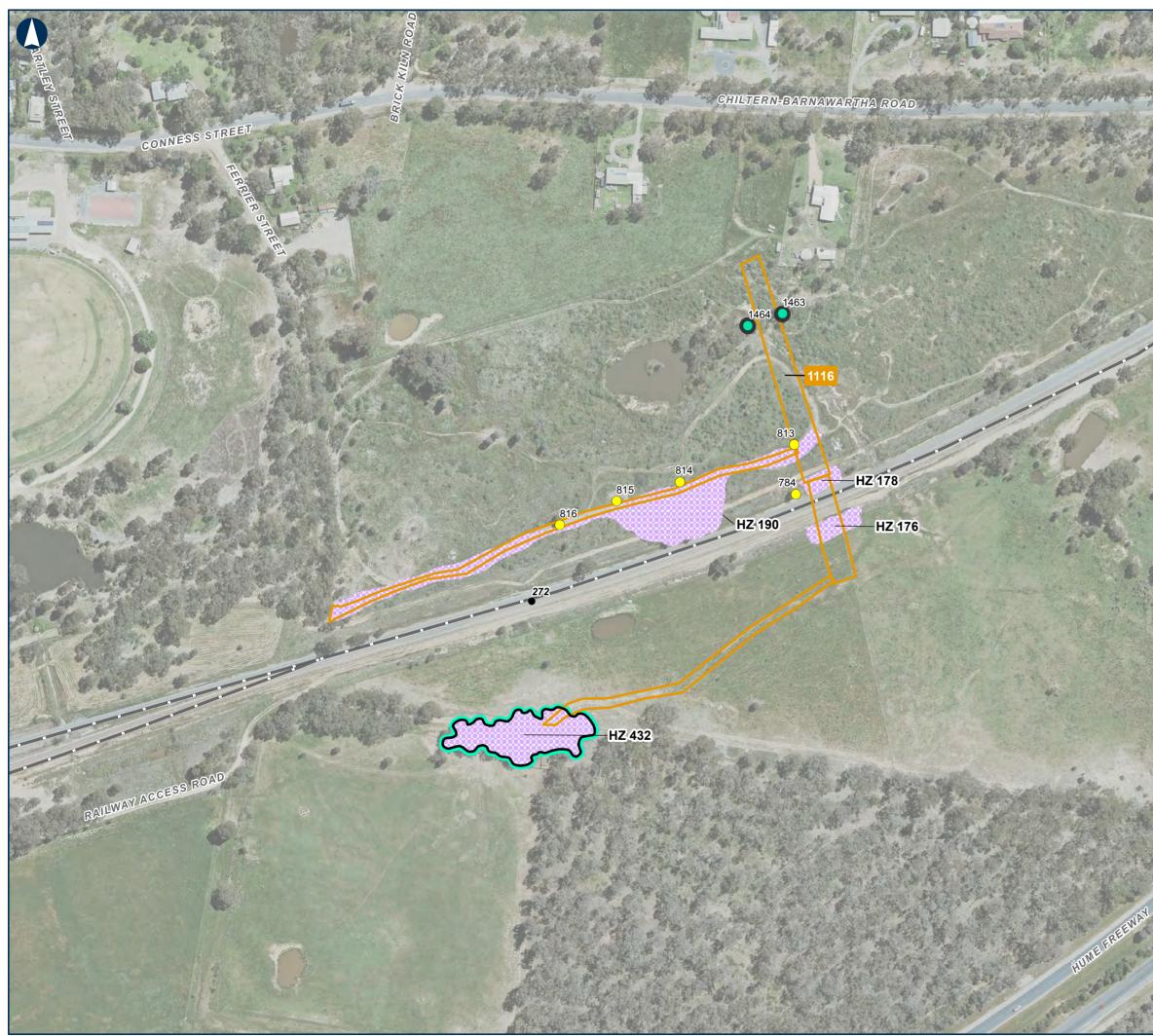


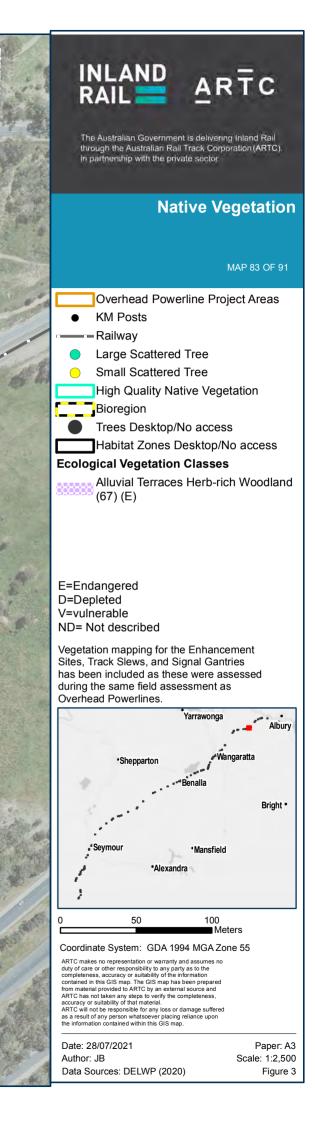


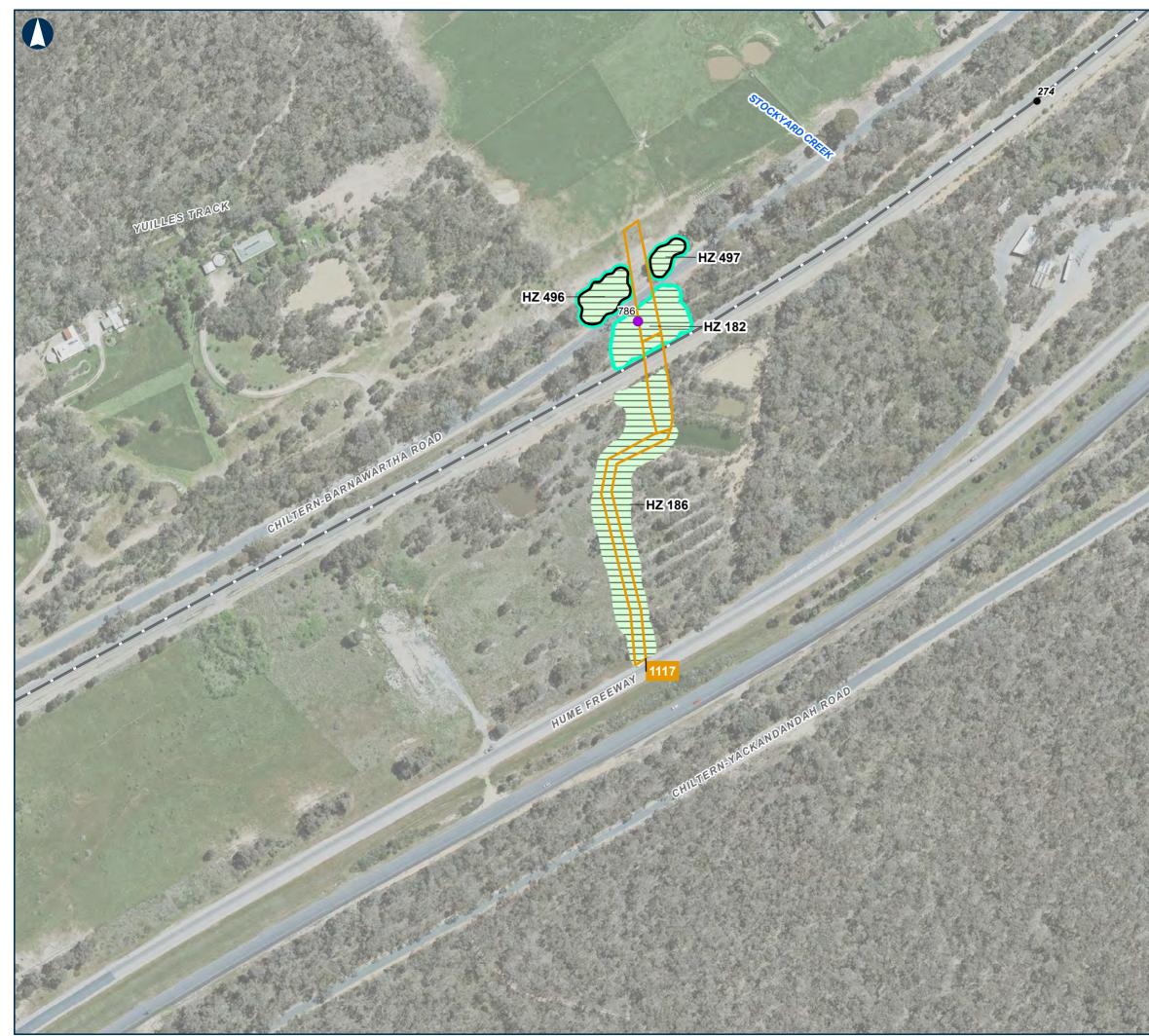


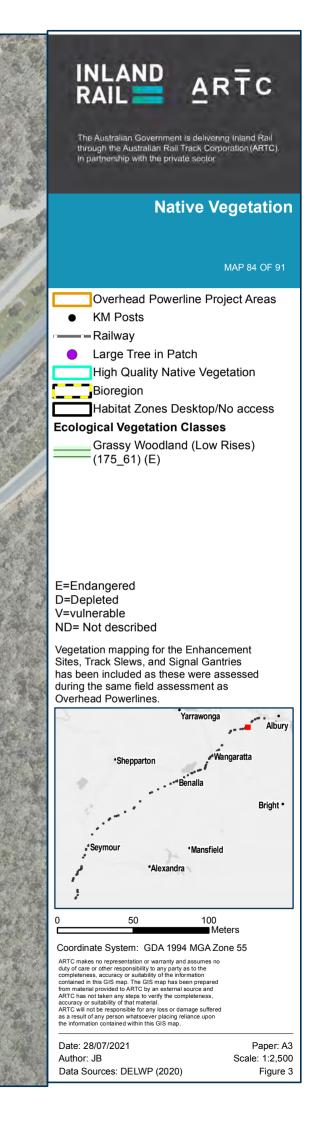


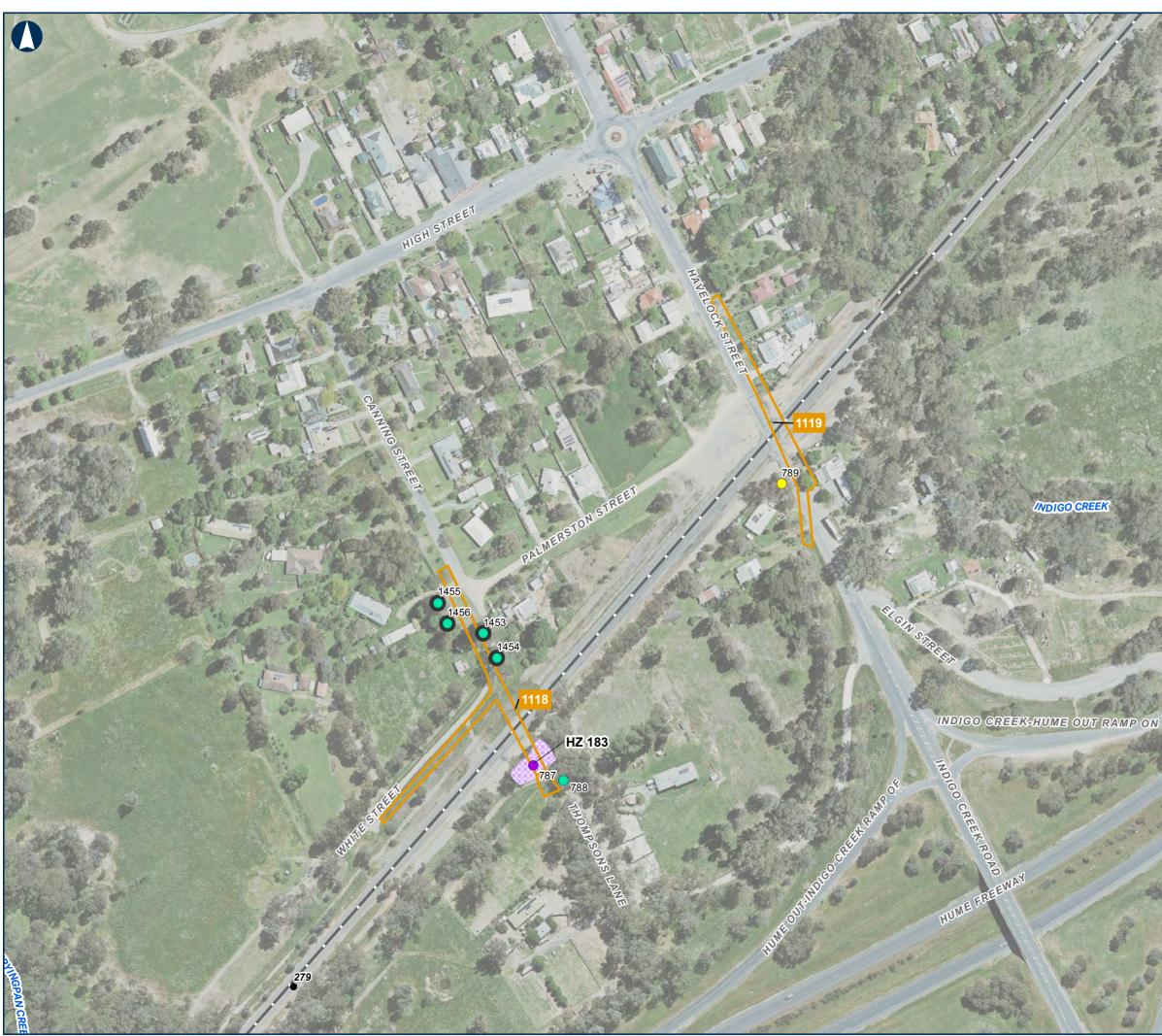














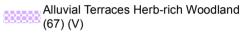
Native Vegetation

ARTC

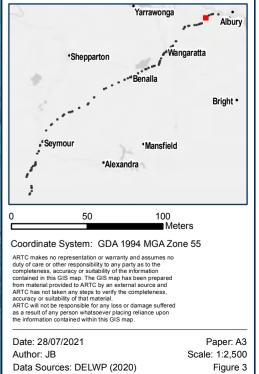
MAP 85 OF 91

- Overhead Powerline Project Areas
 KM Posts
 Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree
- Bioregion
- Trees Desktop/No access

Ecological Vegetation Classes



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







Native Vegetation

ARTC

MAP 86 OF 91

- Overhead Powerline Project Areas
- Train Station
- KM Posts
- Railway

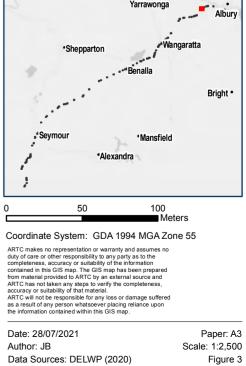
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Bioregion

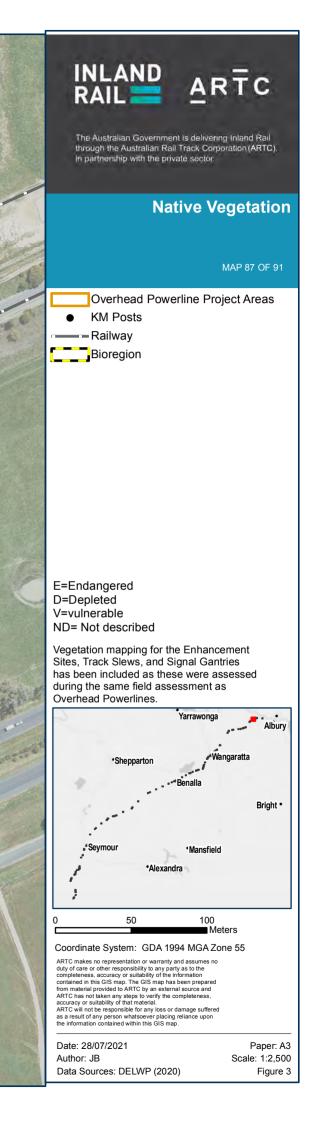
Ecological Vegetation Classes

Alluvial Terraces Herb-rich Woodland (67) (V)

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

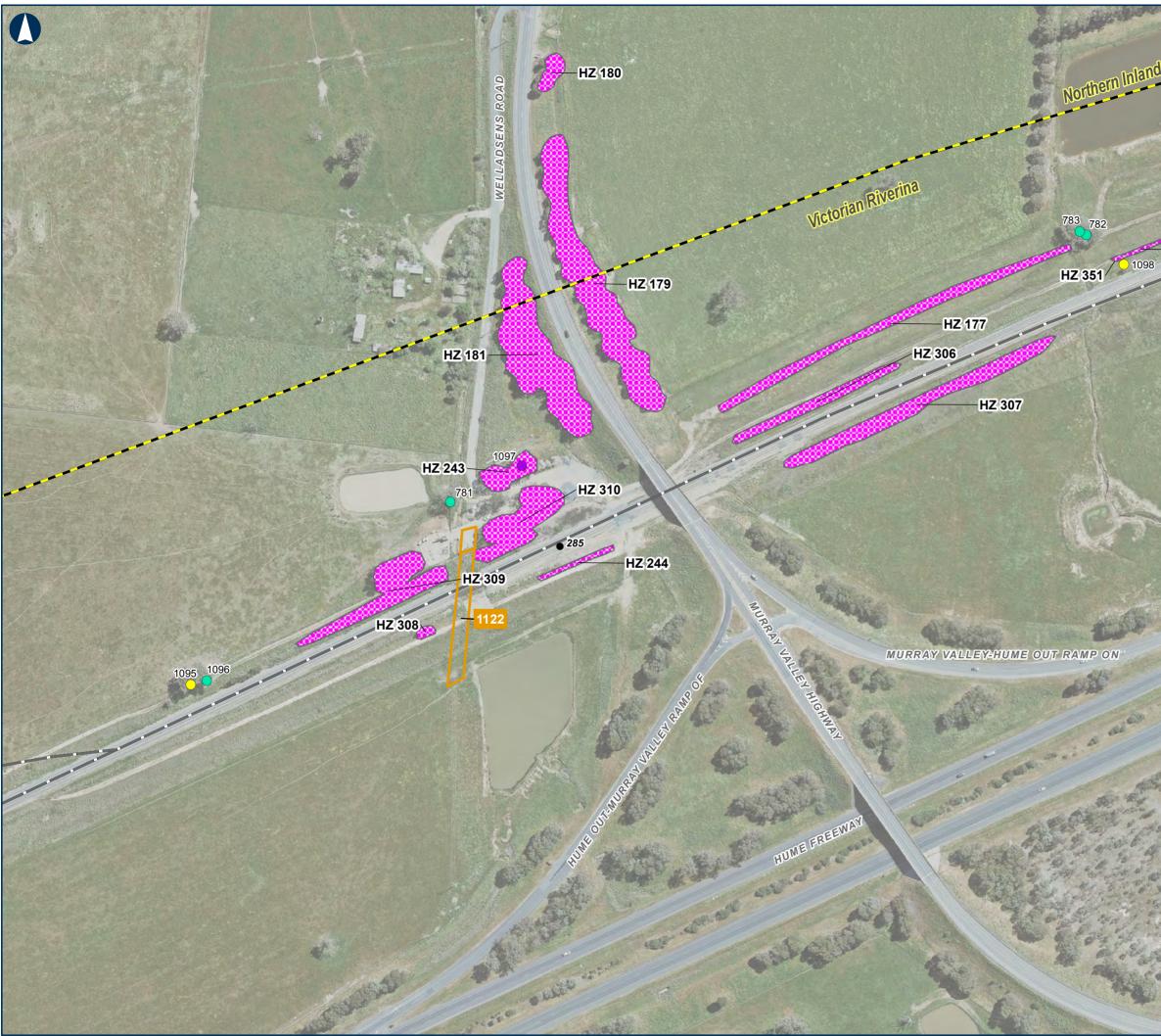






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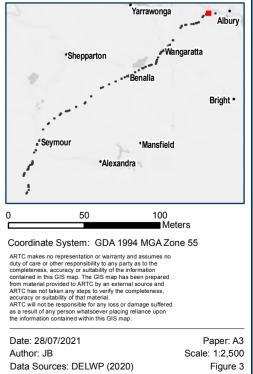
Native Vegetation

ARTC

MAP 88 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Large Scattered Tree
 Large Tree in Patch
 Small Scattered Tree
 Bioregion
 Ecological Vegetation Classes
 Woodland (803) (E)

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





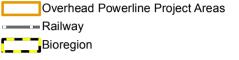




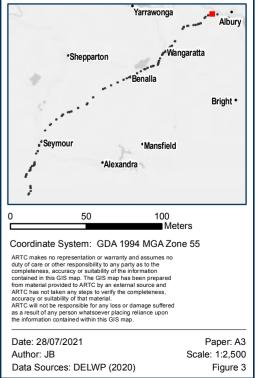
Native Vegetation

ARTC

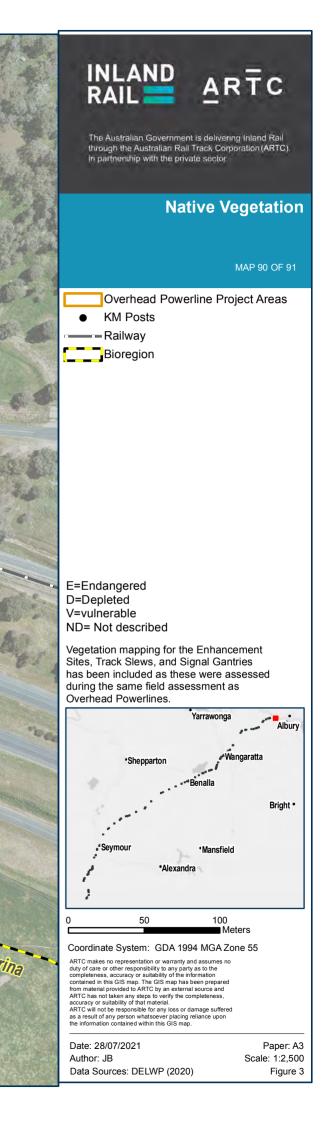
MAP 89 OF 91



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











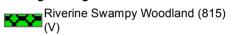
Native Vegetation

MAP 91 OF 91

- Overhead Powerline Project Areas
- KM Posts
- -Railway
- Large Scattered Tree
- Large Tree in Patch
- Small Scattered Tree

Bioregion

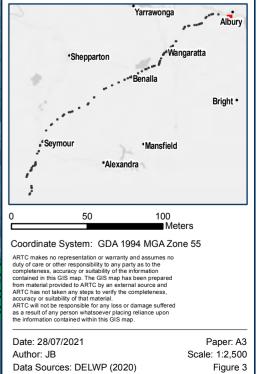
Ecological Vegetation Classes



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

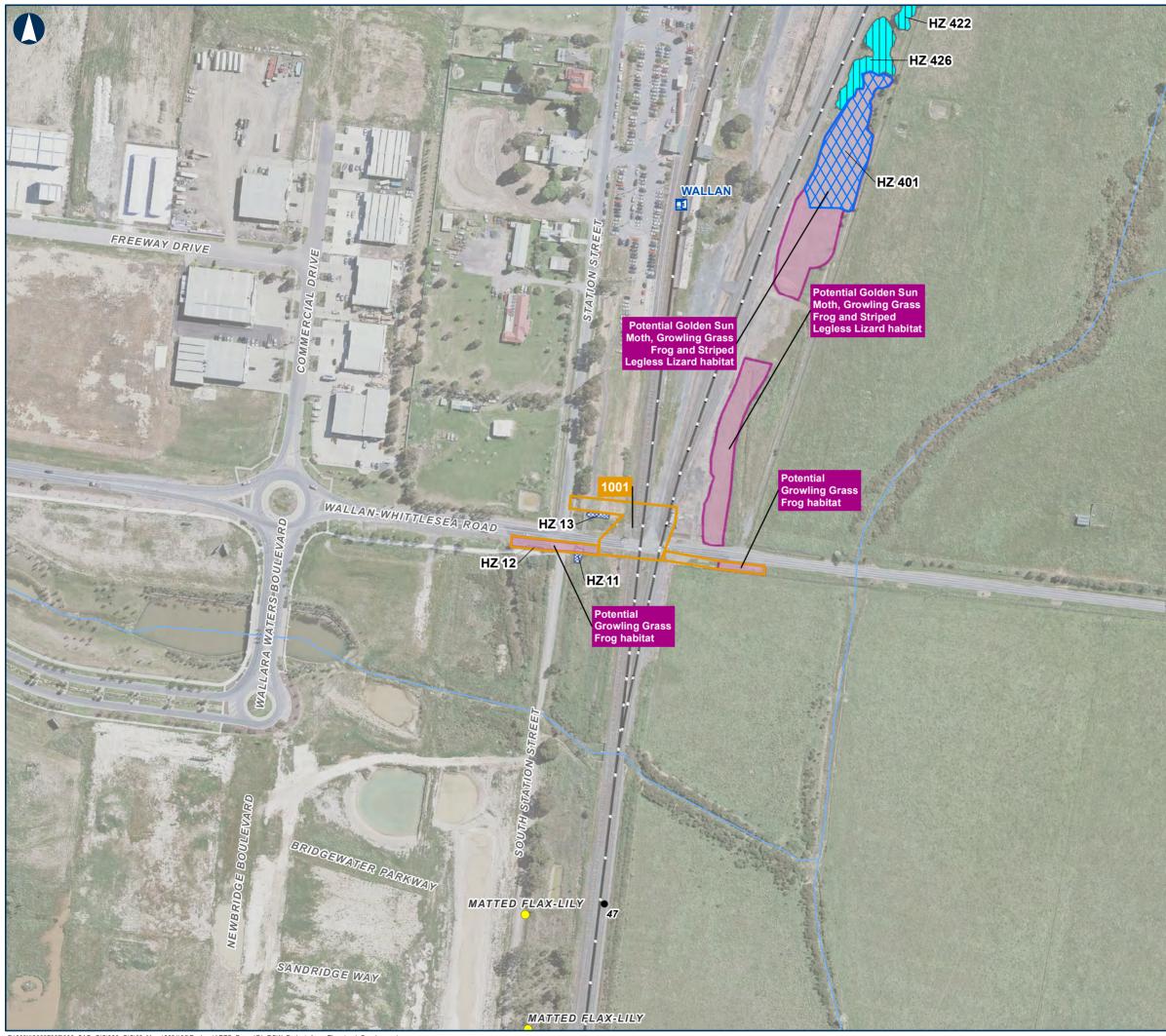
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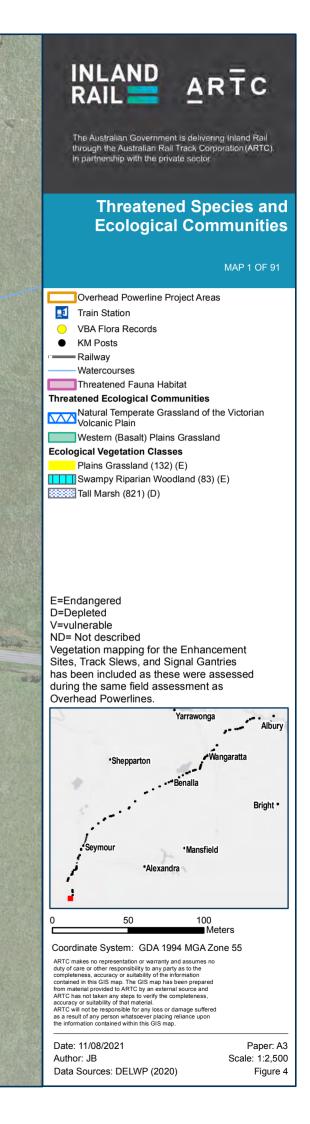


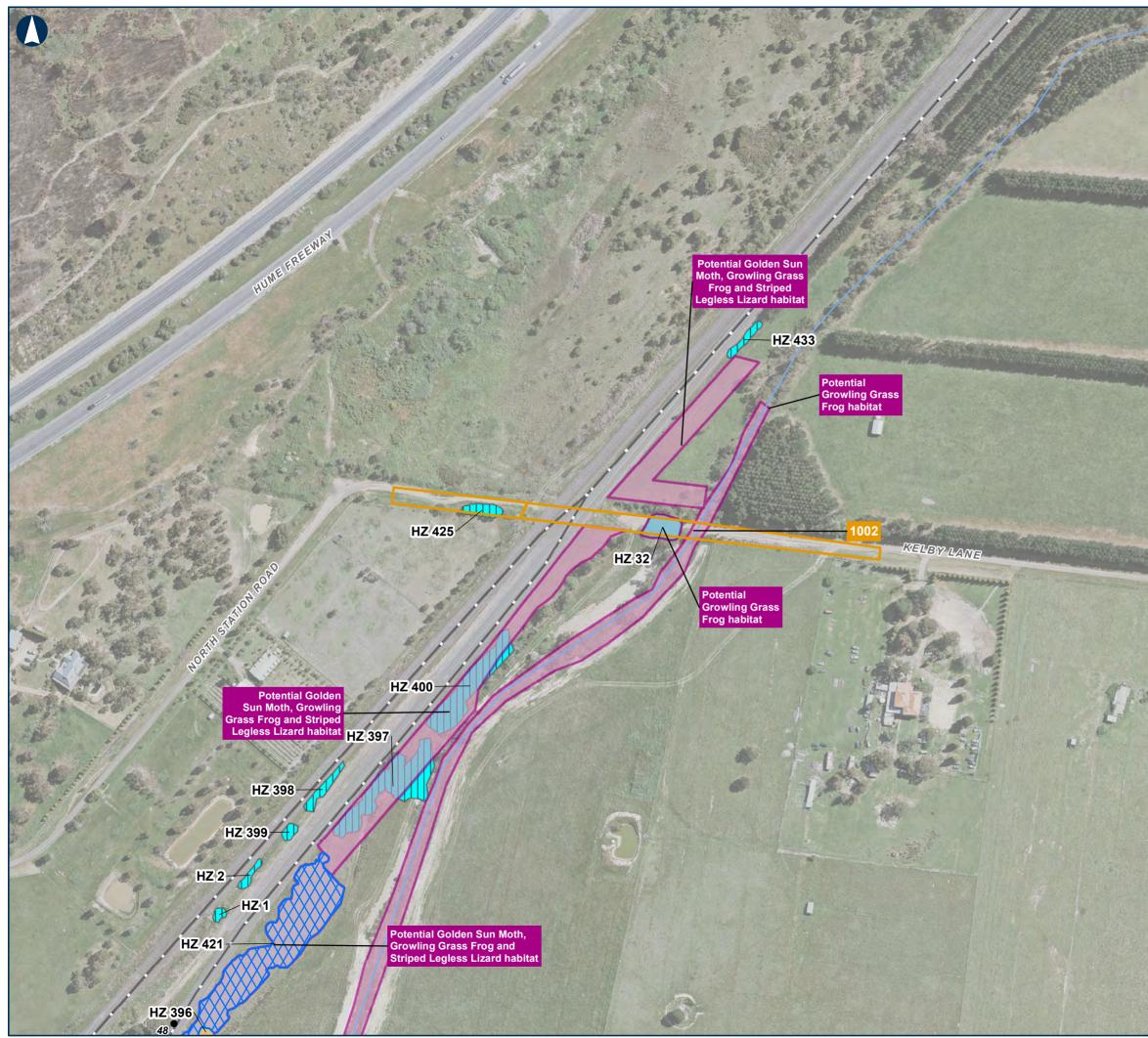
Appendix A – Figures

Figure 4 Threatened species and ecological communities



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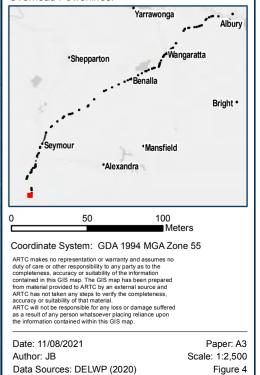
Threatened Species and Ecological Communities

ARTC

MAP 2 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Watercourses
 Threatened Fauna Habitat
 Threatened Ecological Communities
 Natural Temperate Grassland of the Victorian Volcanic Plain
 Western (Basalt) Plains Grassland
 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 Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.





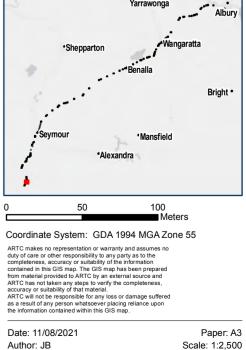


Threatened Species and **Ecological Communities**

MAP 3 OF 91

Overhead Powerline Project Areas KM Posts Railway -Watercourses Threatened Fauna Habitat Ecological Vegetation Classes Valley Grassy Forest (47) (V)

E=Endangered D=Depleted V=vulnerable ND= Not described ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.

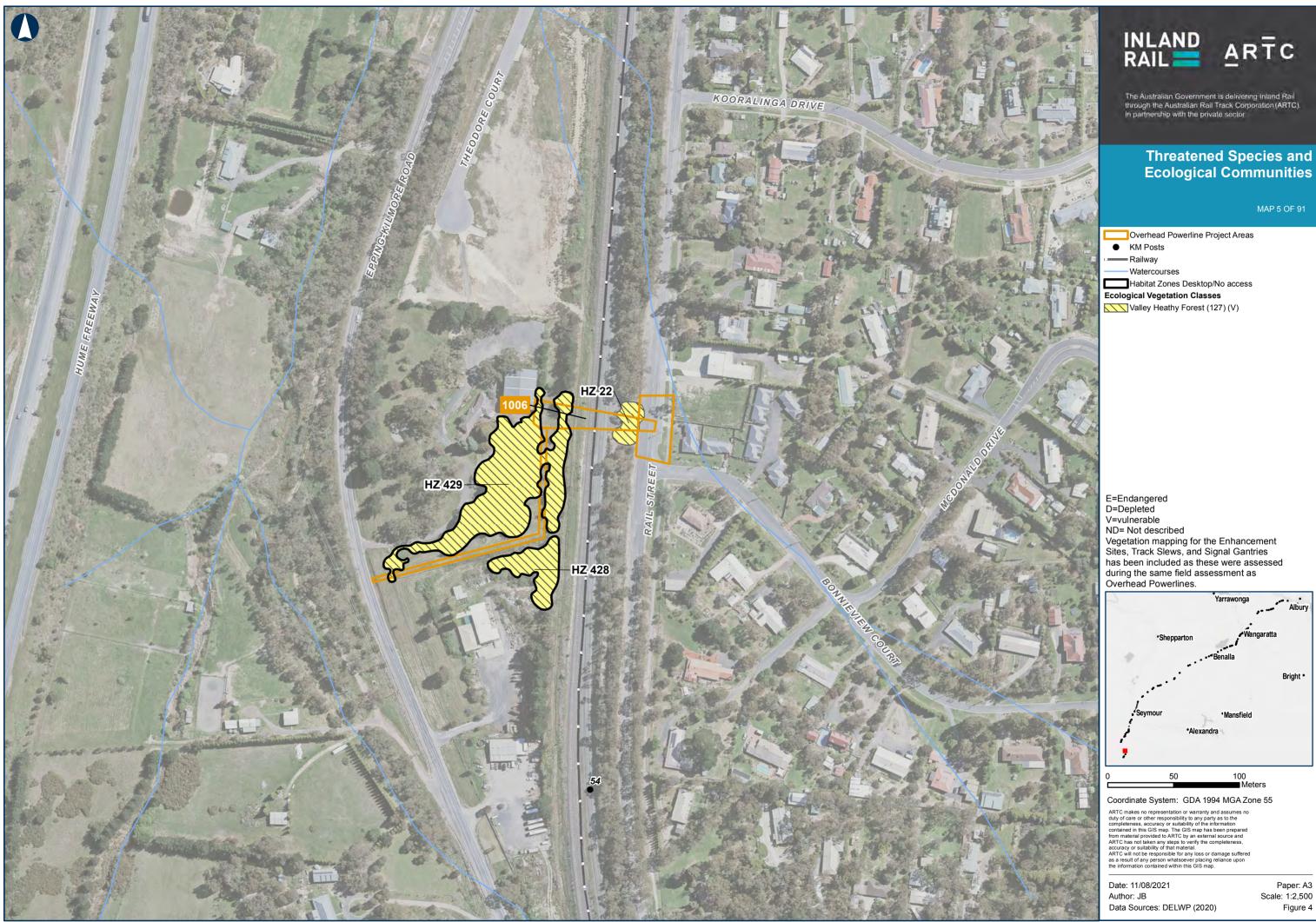


Data Sources: DELWP (2020)

Scale: 1:2,500 Figure 4



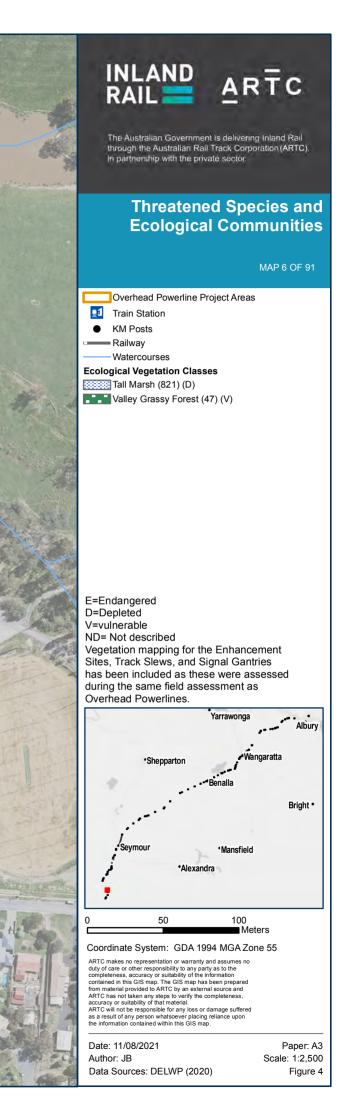








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Threatened Species and **Ecological Communities**

MAP 7 OF 91

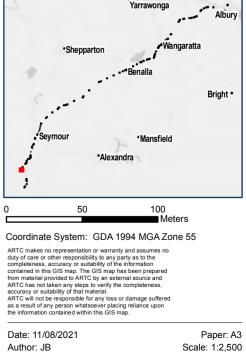
Overhead Powerline Project Areas KM Posts Railway -Watercourses Habitat Zones Desktop/No access Ecological Vegetation Classes Herb-rich Foothill Forest (23) (D) Riparian Forest (18) (V)

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E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



Data Sources: DELWP (2020)

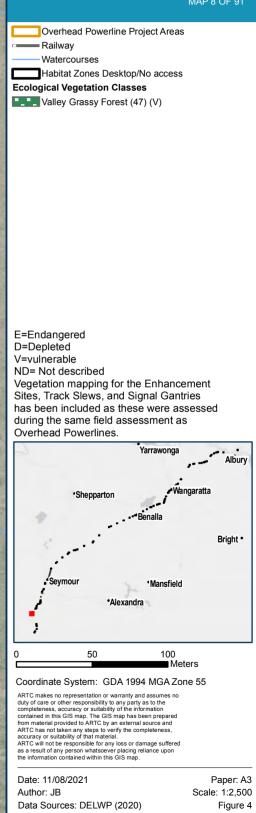
Figure 4

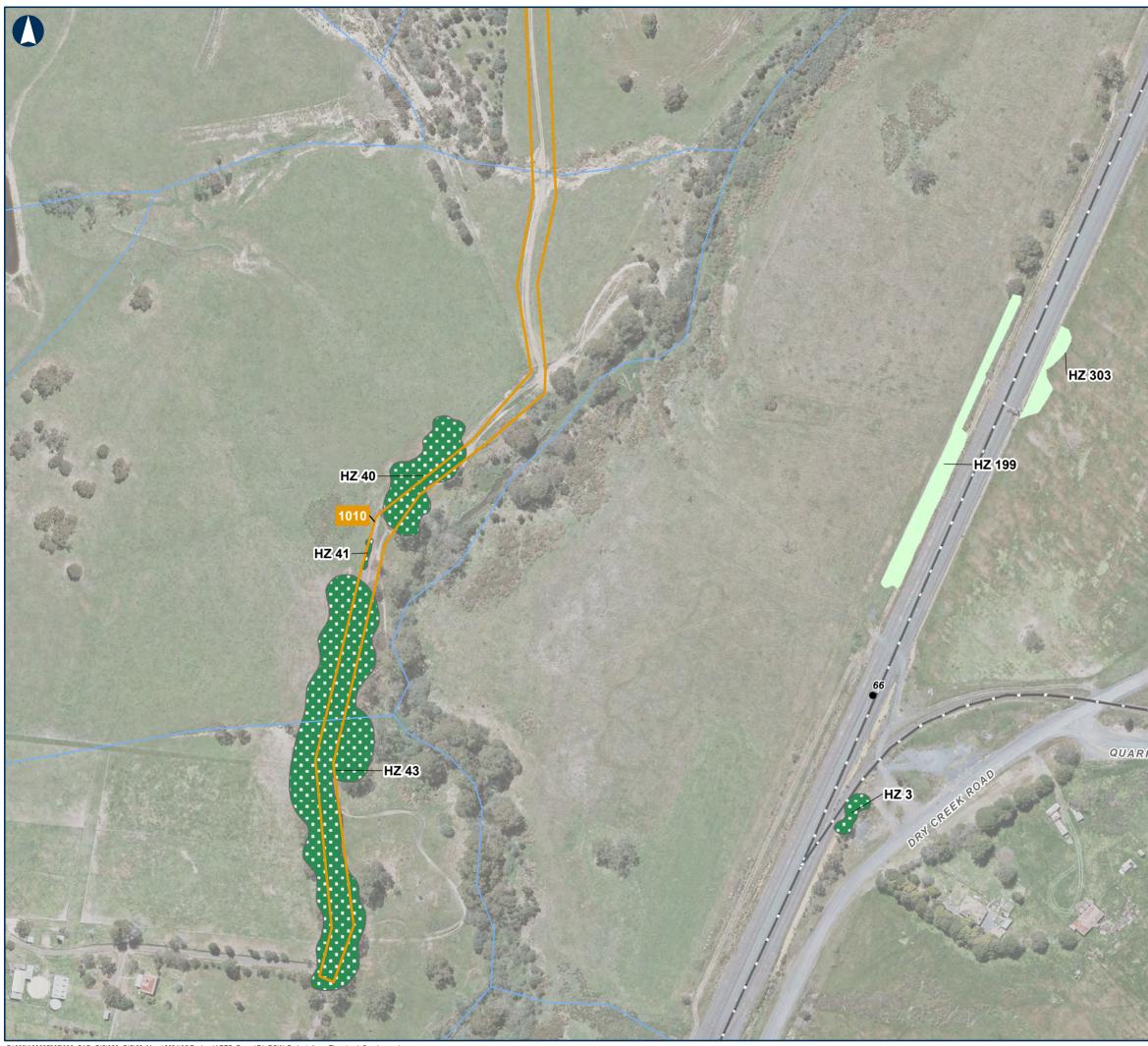




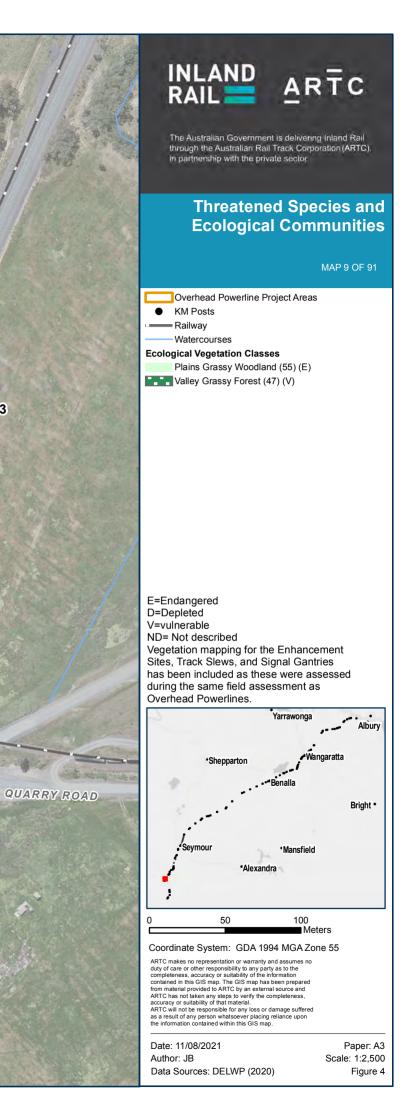
Threatened Species and Ecological Communities

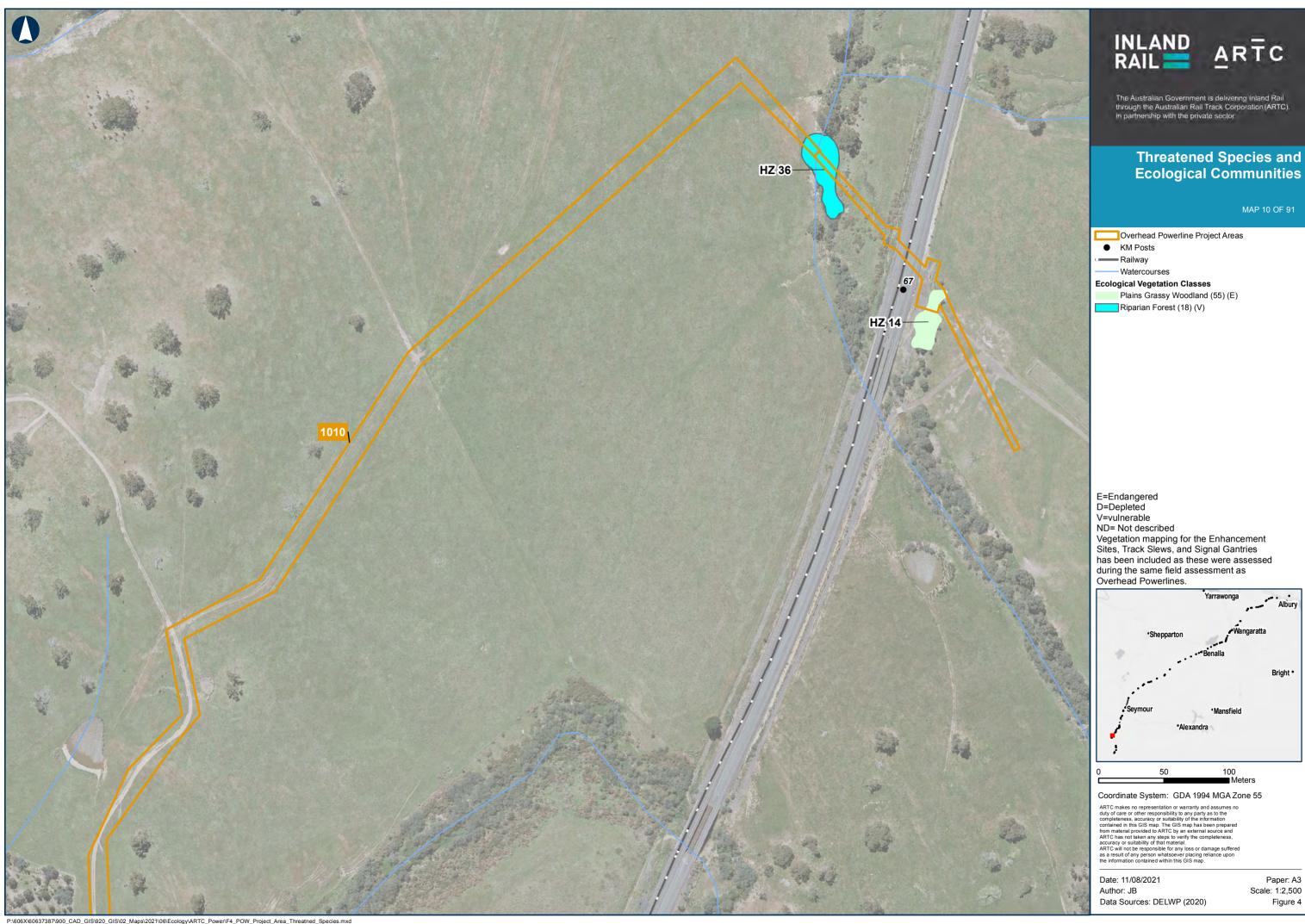
MAP 8 OF 91

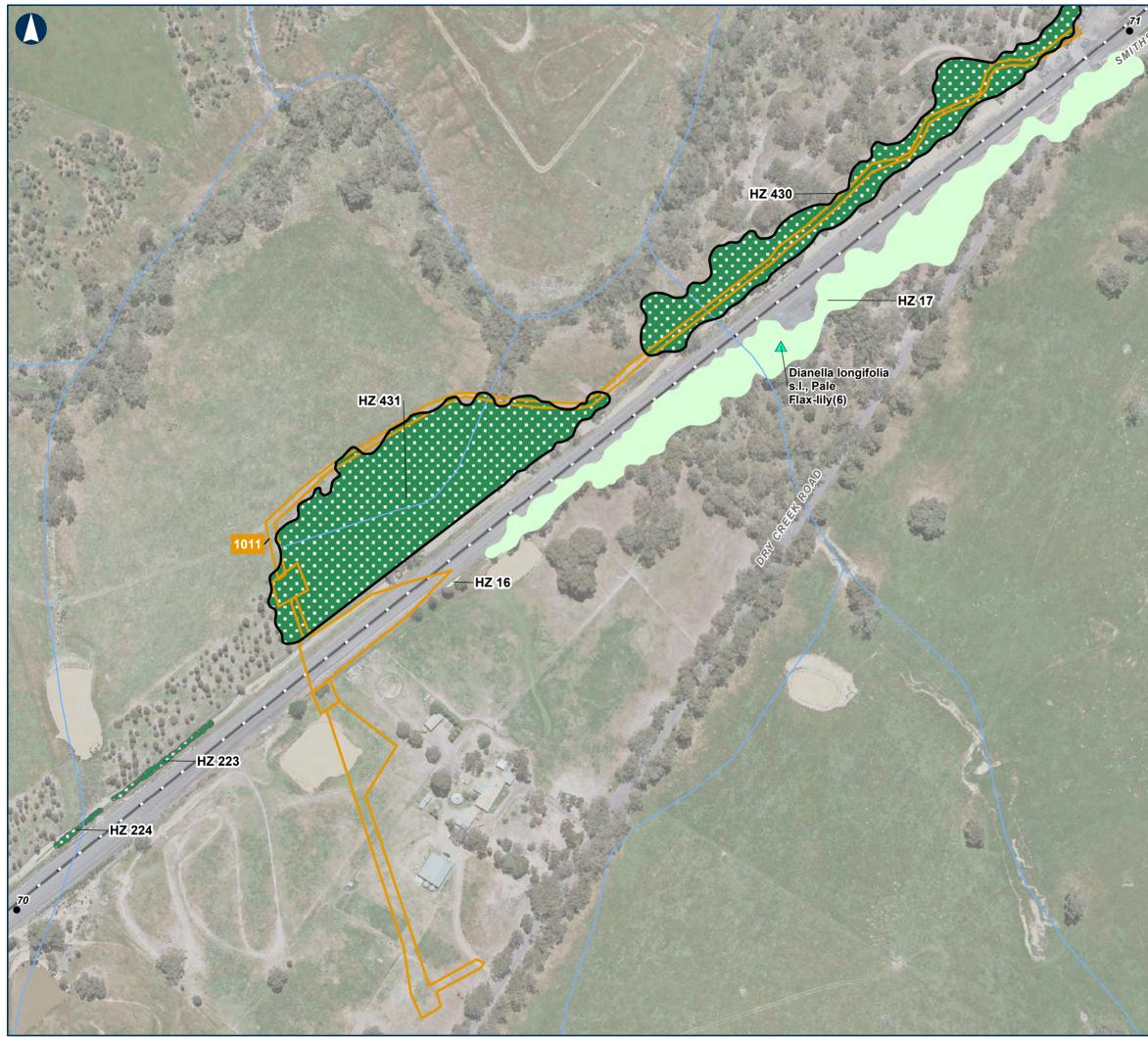


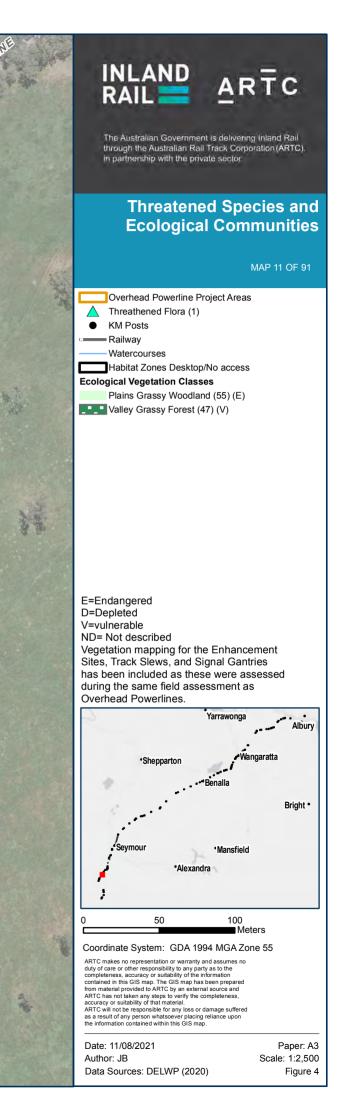


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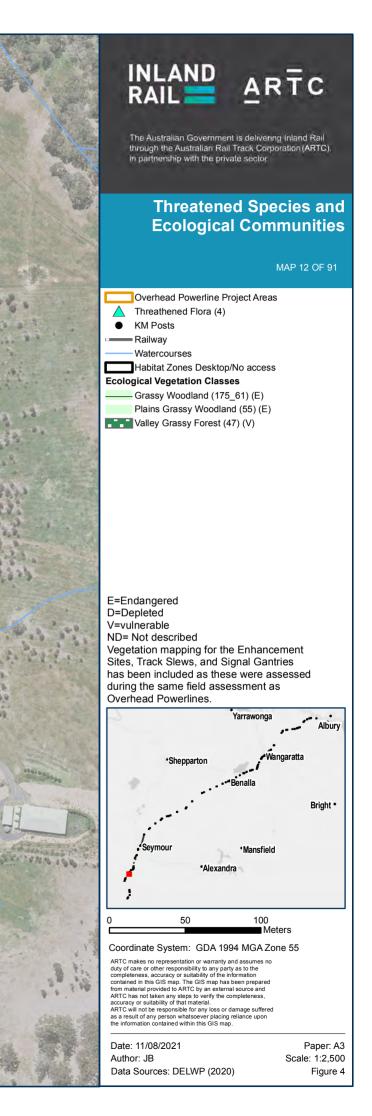


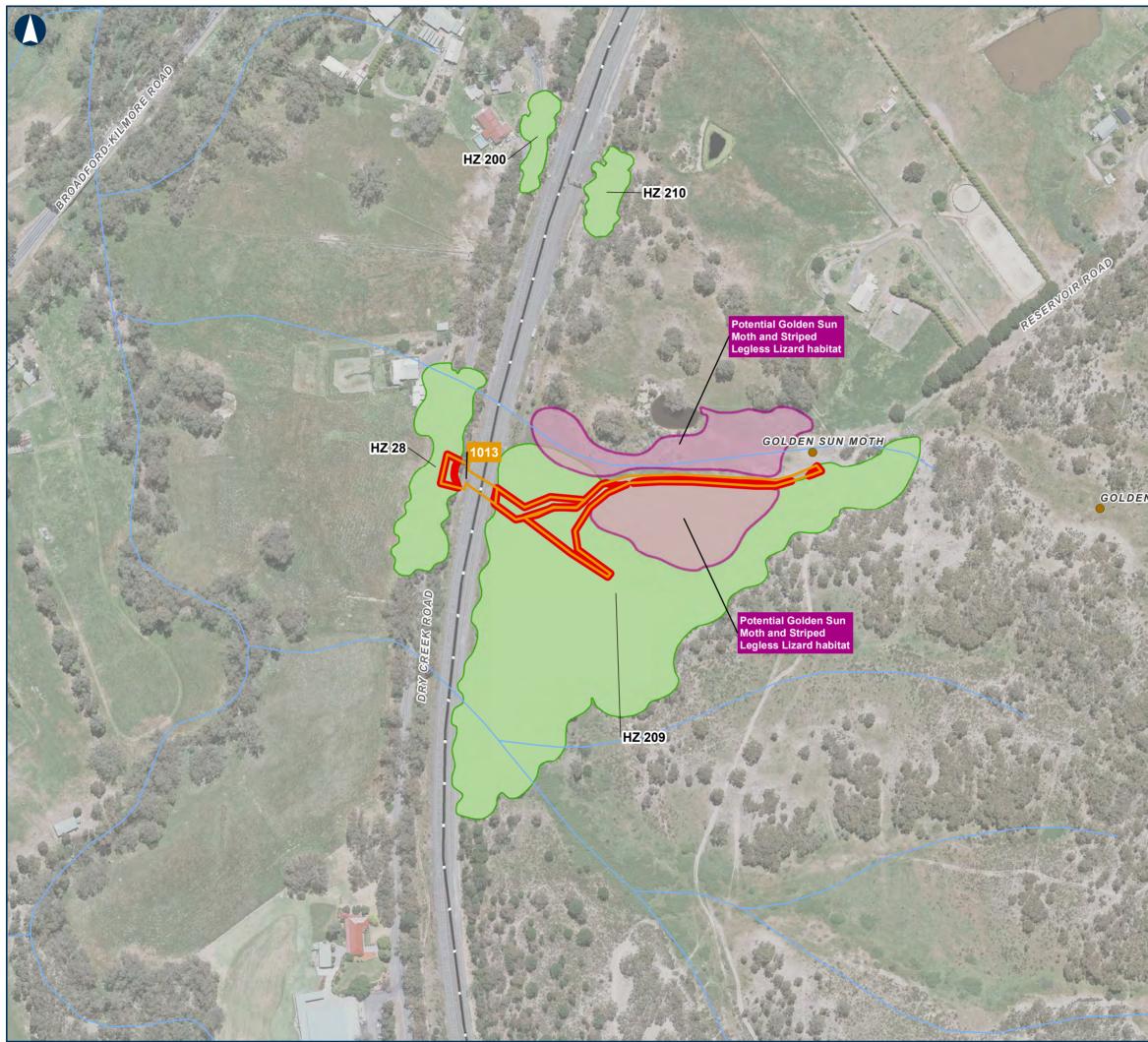




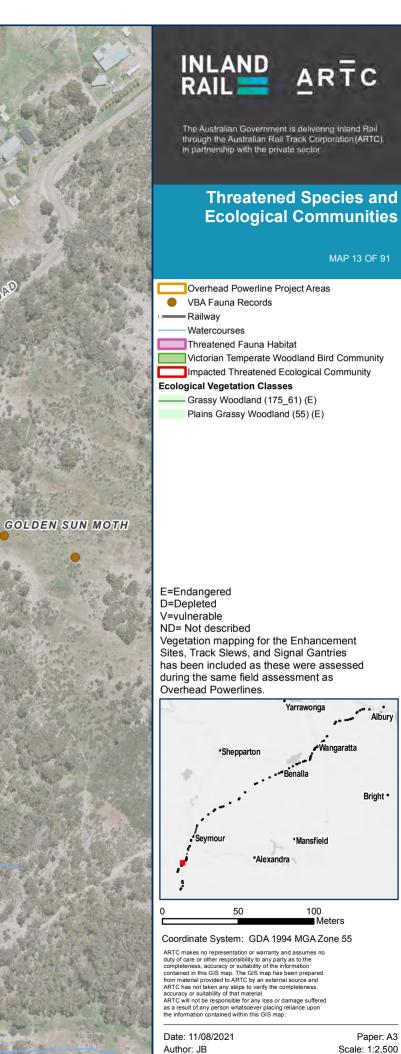


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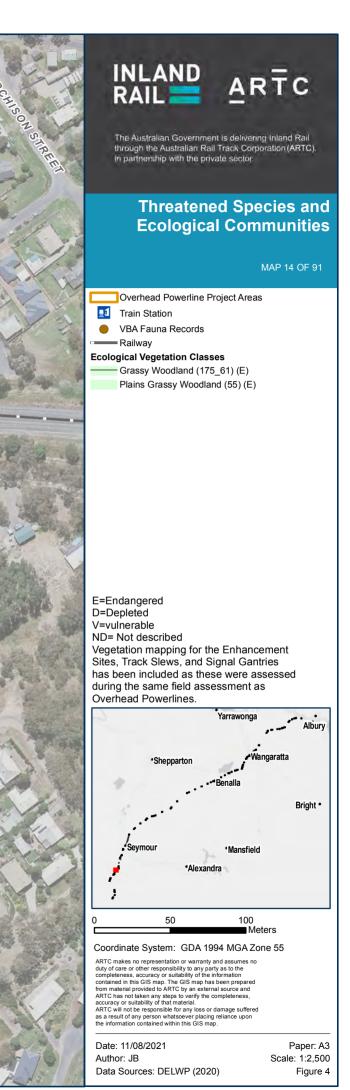
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Data Sources: DELWP (2020)

Scale: 1:2,500 Figure 4



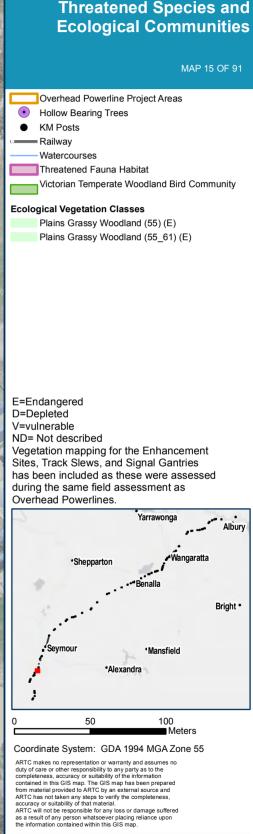




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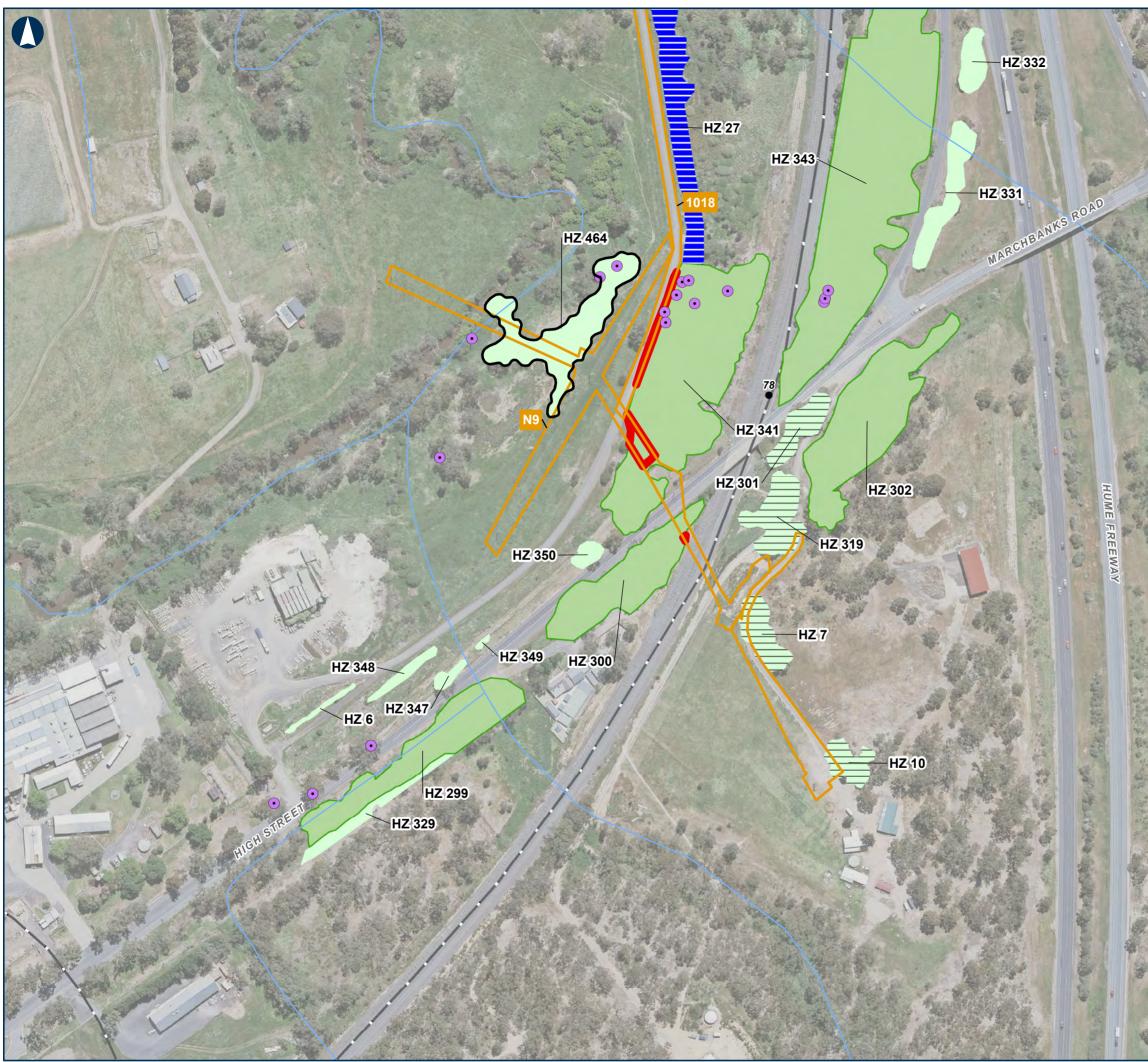


Threatened Species and

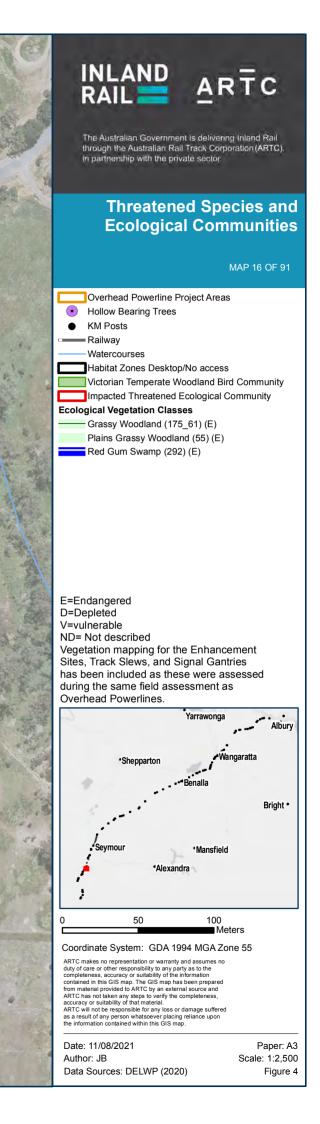


Date: 11/08/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 4



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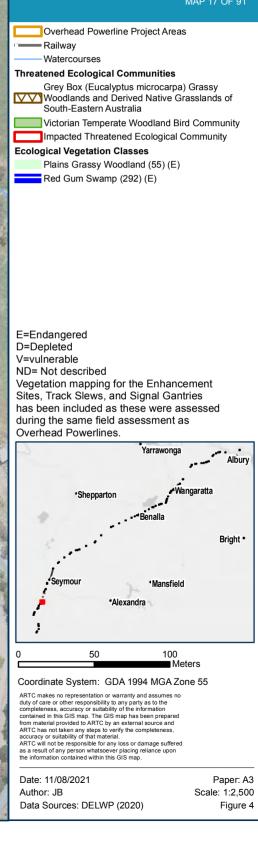






Threatened Species and **Ecological Communities**

MAP 17 OF 91





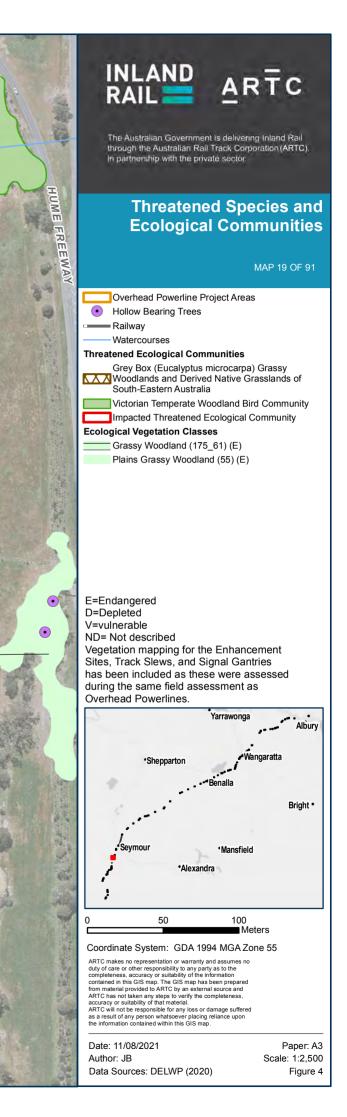
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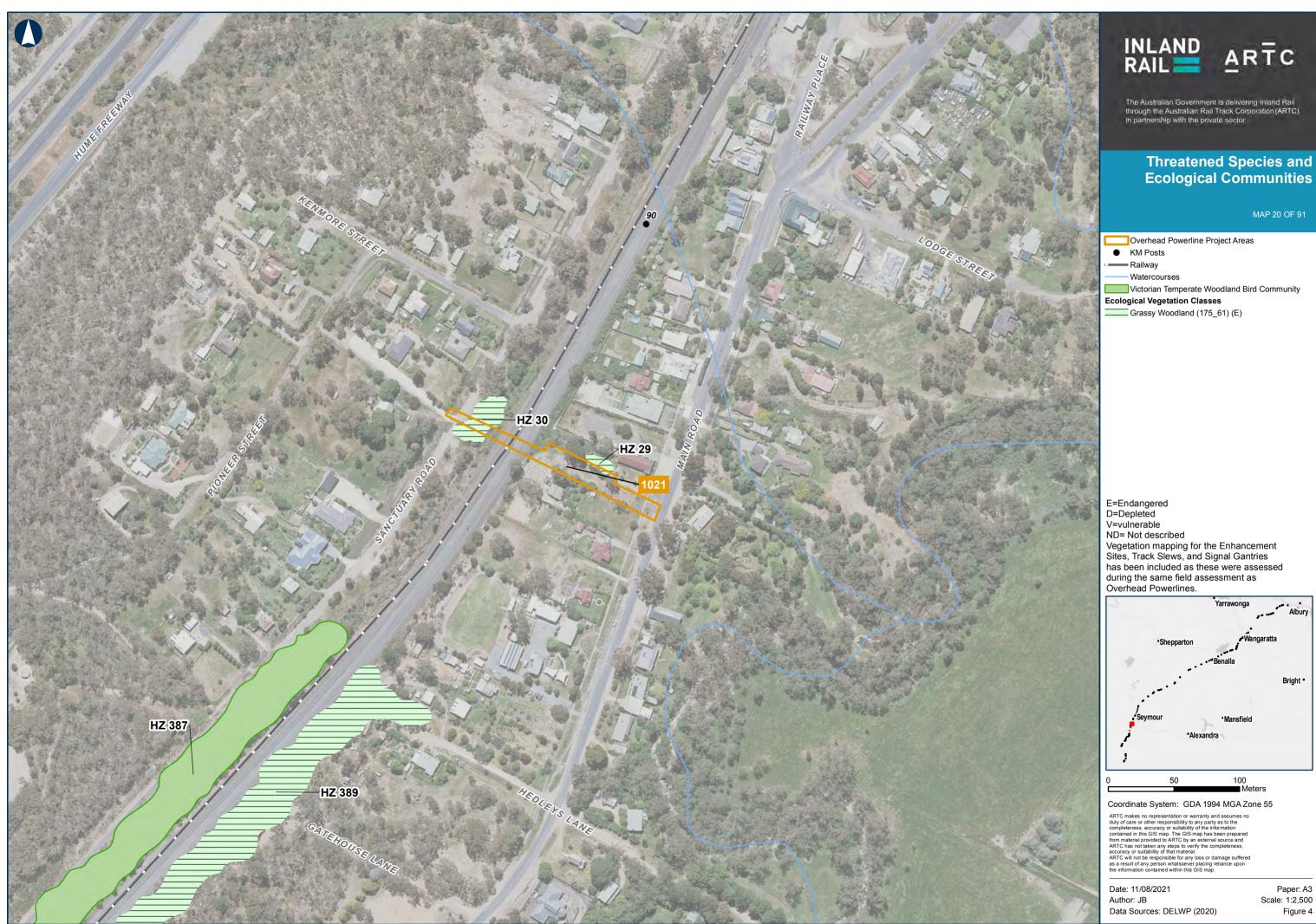
Grassy Woodland (175_61) (E) Plains Grassy Woodland (55) (E) E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines. Albury Shepparto Bright • 50 100 Meters Coordinate System: GDA 1994 MGA Zone 55 ARTC makes no representation or warrany and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Date: 11/08/2021 Paper: A3 Author: JB Scale: 1:2,500 Data Sources: DELWP (2020) Figure 4

Threatened Species and **Ecological Communities**

MAP 18 OF 91







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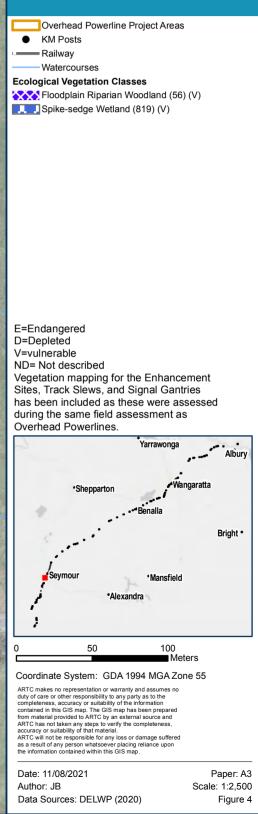




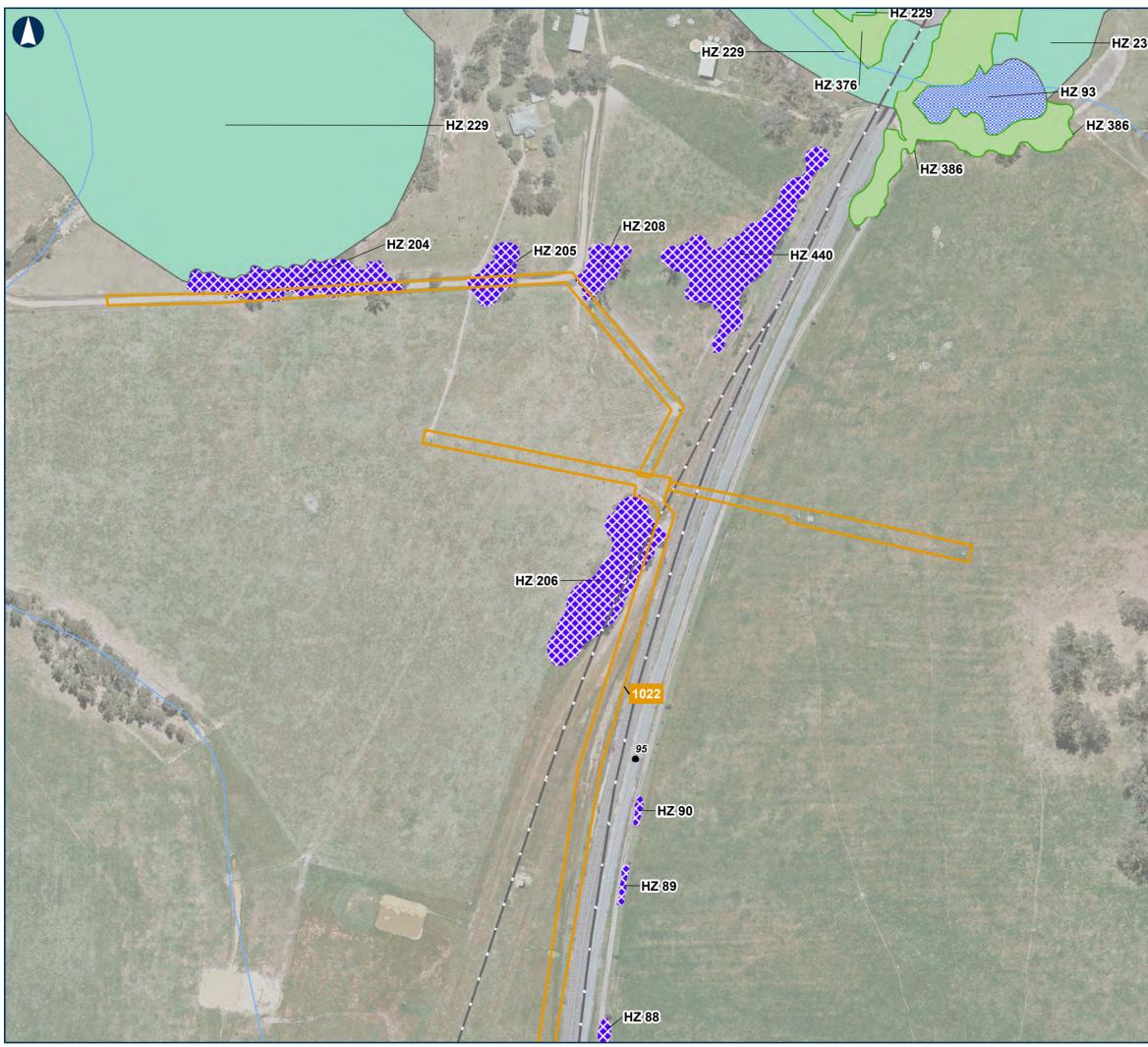
Threatened Species and Ecological Communities

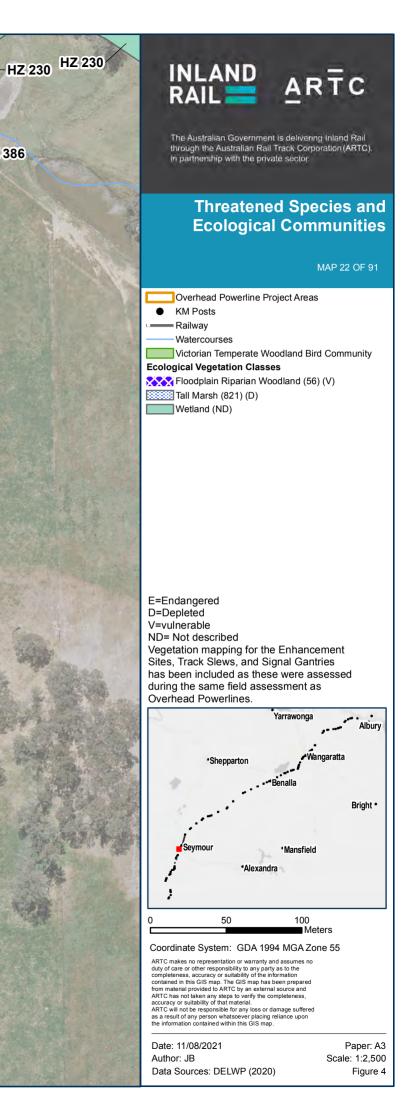
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MAP 21 OF 91



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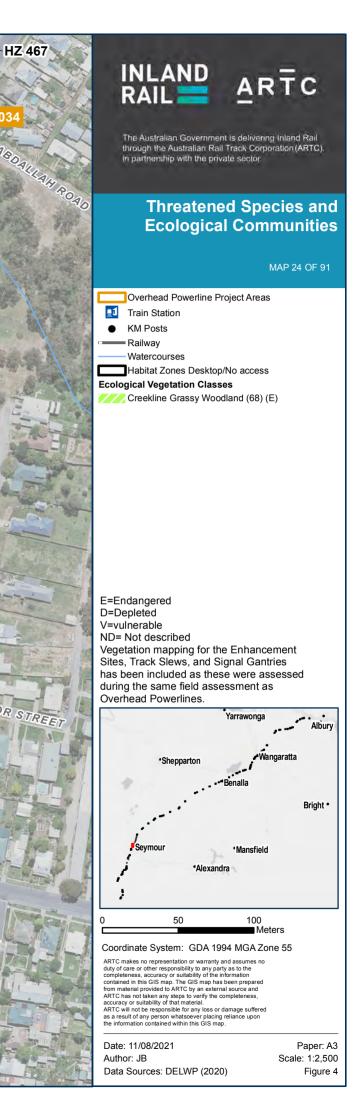


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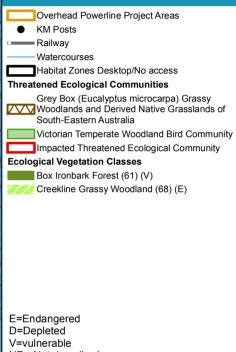


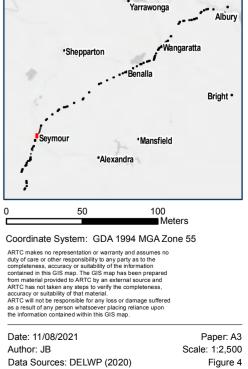
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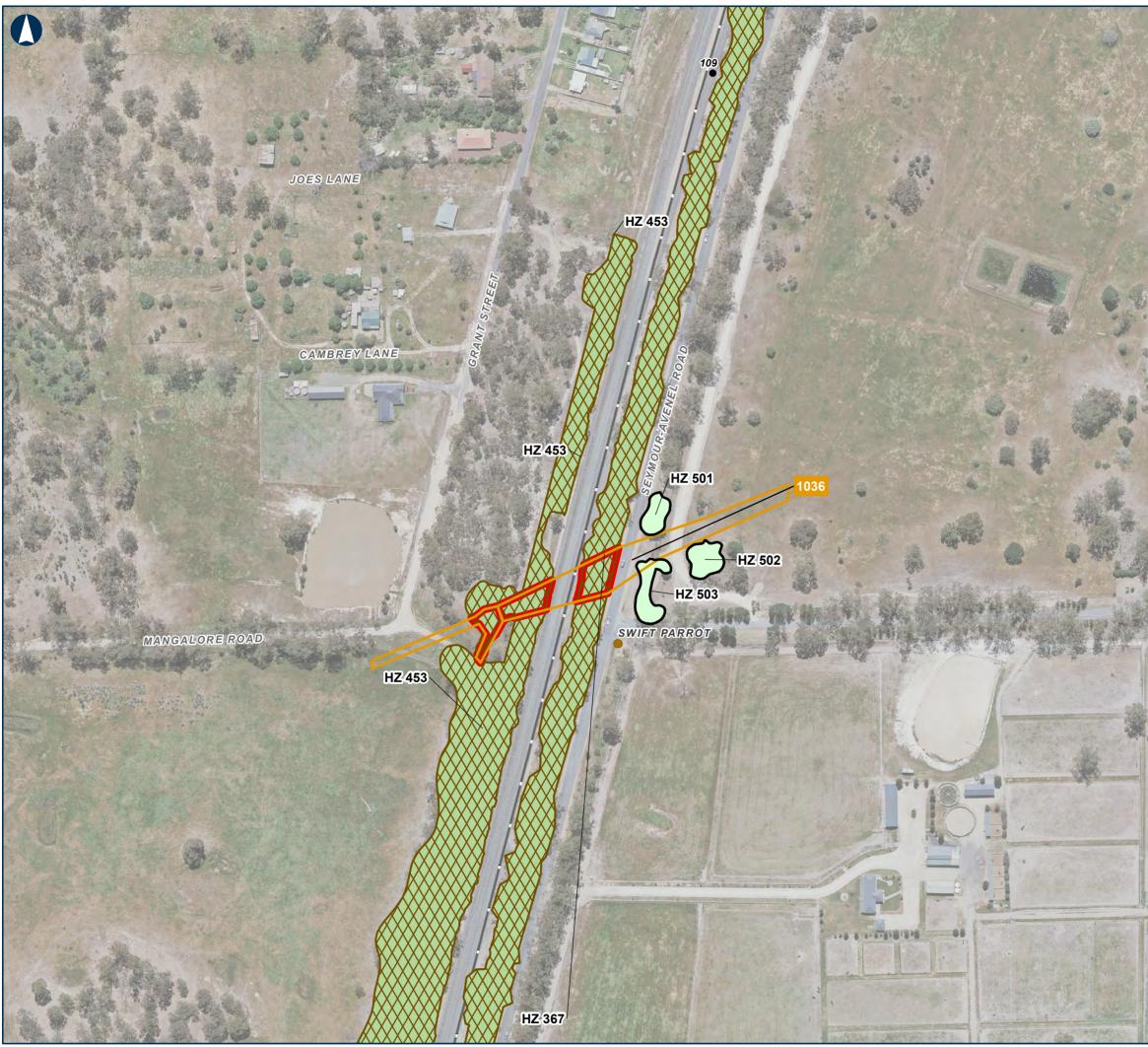


Threatened Species and Ecological Communities

MAP 25 OF 91



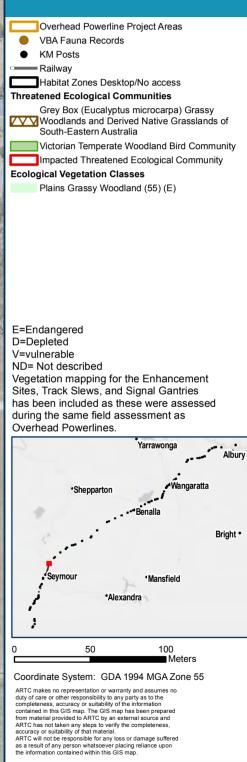






Threatened Species and Ecological Communities

MAP 26 OF 91



Date: 11/08/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 4

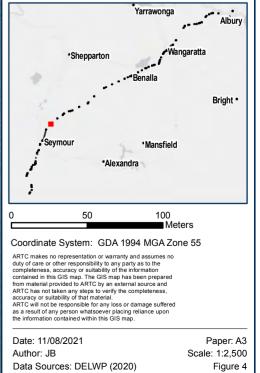




Threatened Species and Ecological Communities

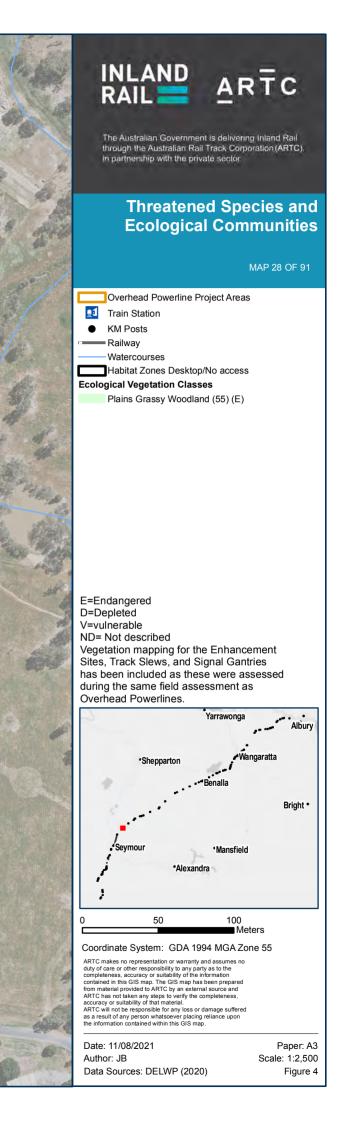
MAP 27 OF 91

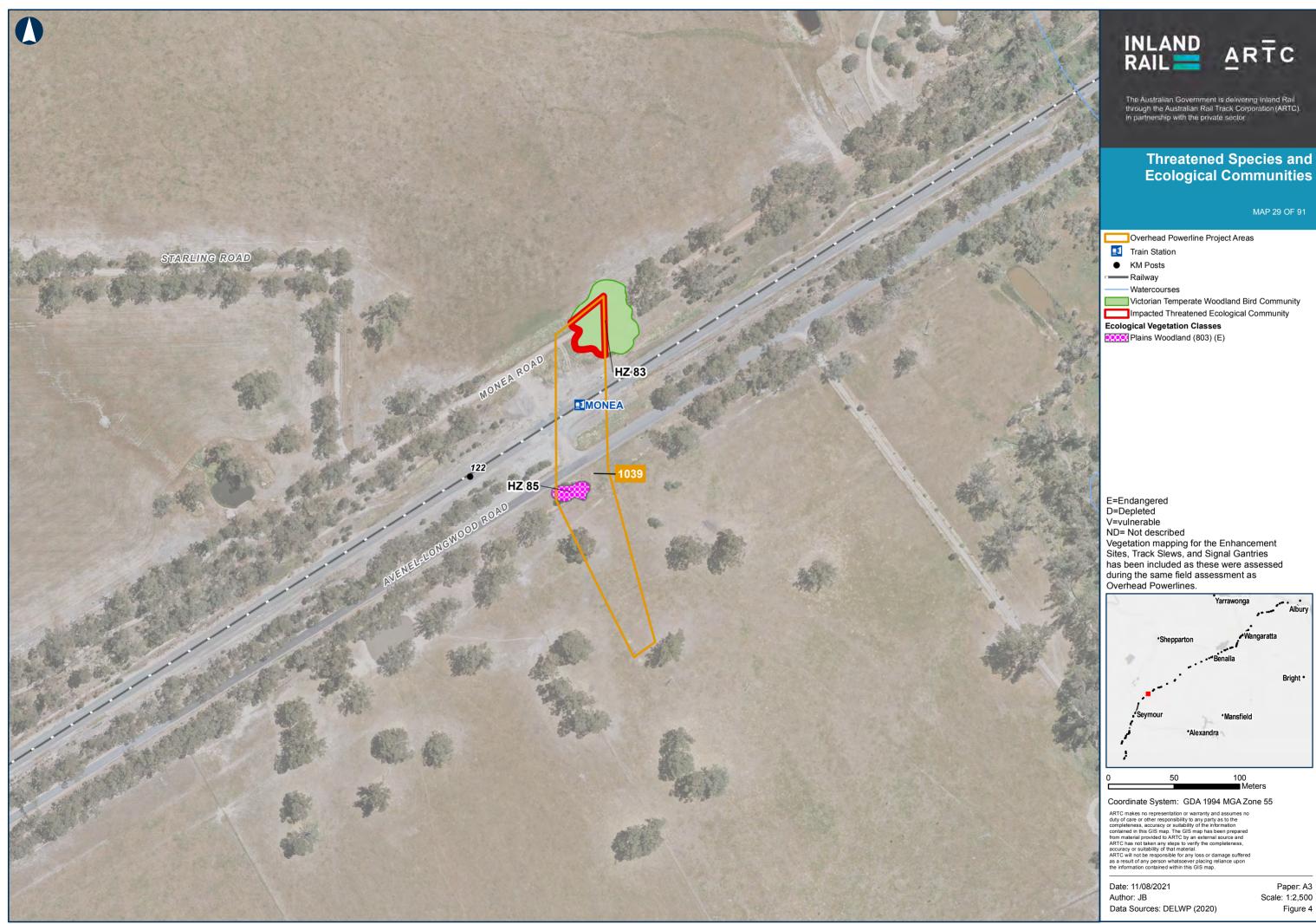




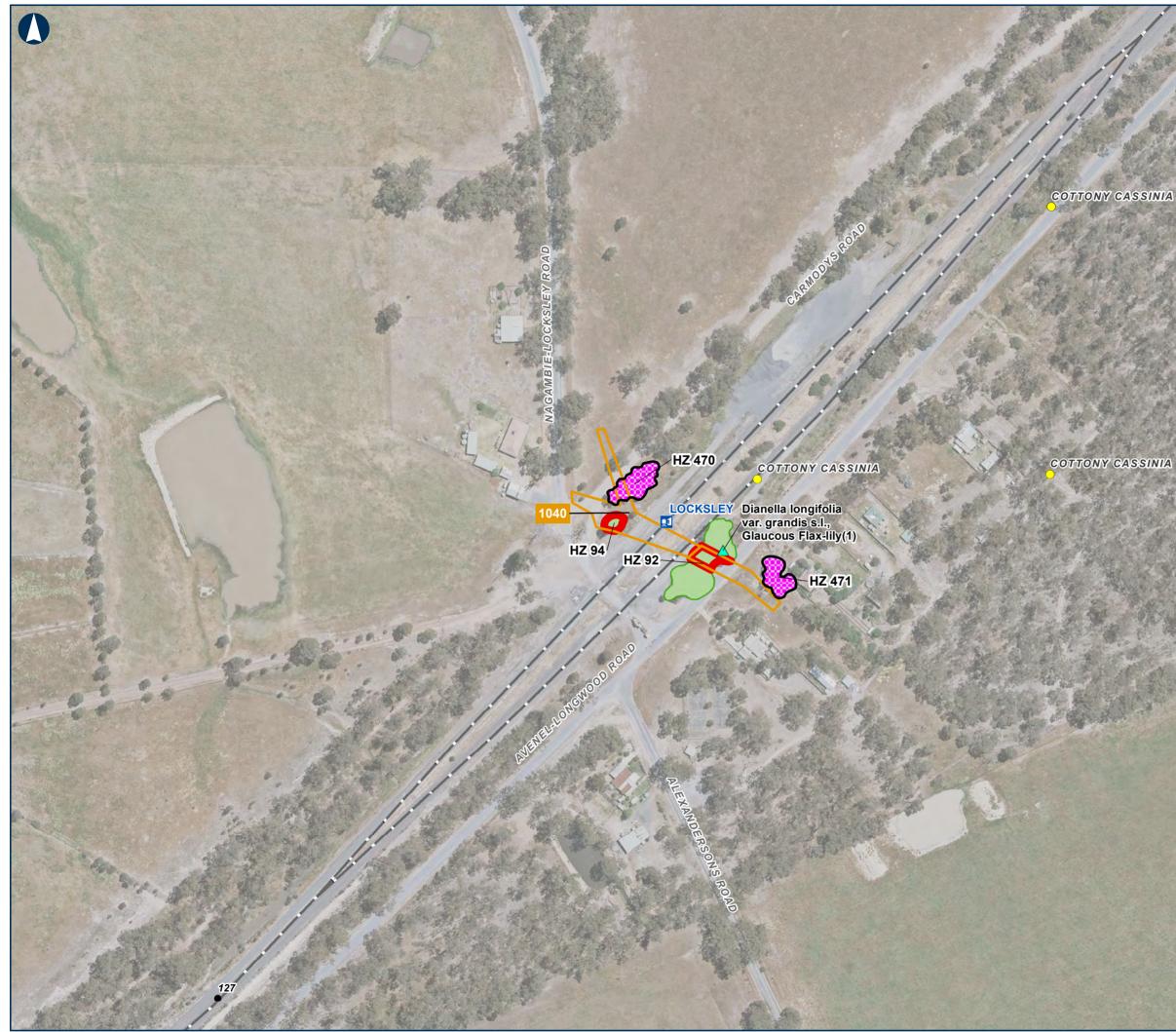


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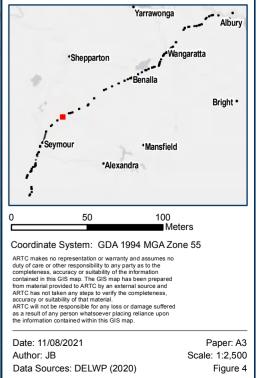


Threatened Species and Ecological Communities

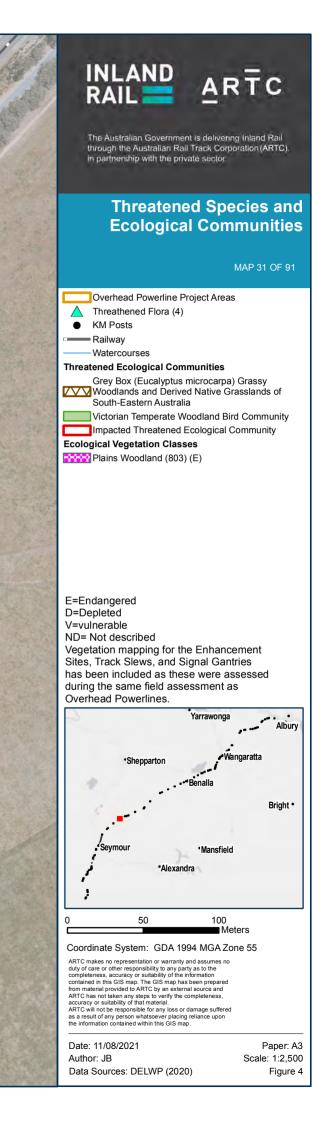
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MAP 30 OF 91

Overhead Powerline Project Areas Train Station Threathened Flora (1) VBA Flora Records KM Posts Railway Habitat Zones Desktop/No access Victorian Temperate Woodland Bird Community Impacted Threatened Ecological Community Ecological Vegetation Classes Plains Woodland (803) (E)







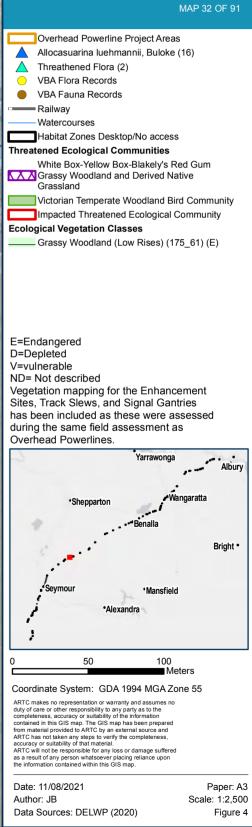


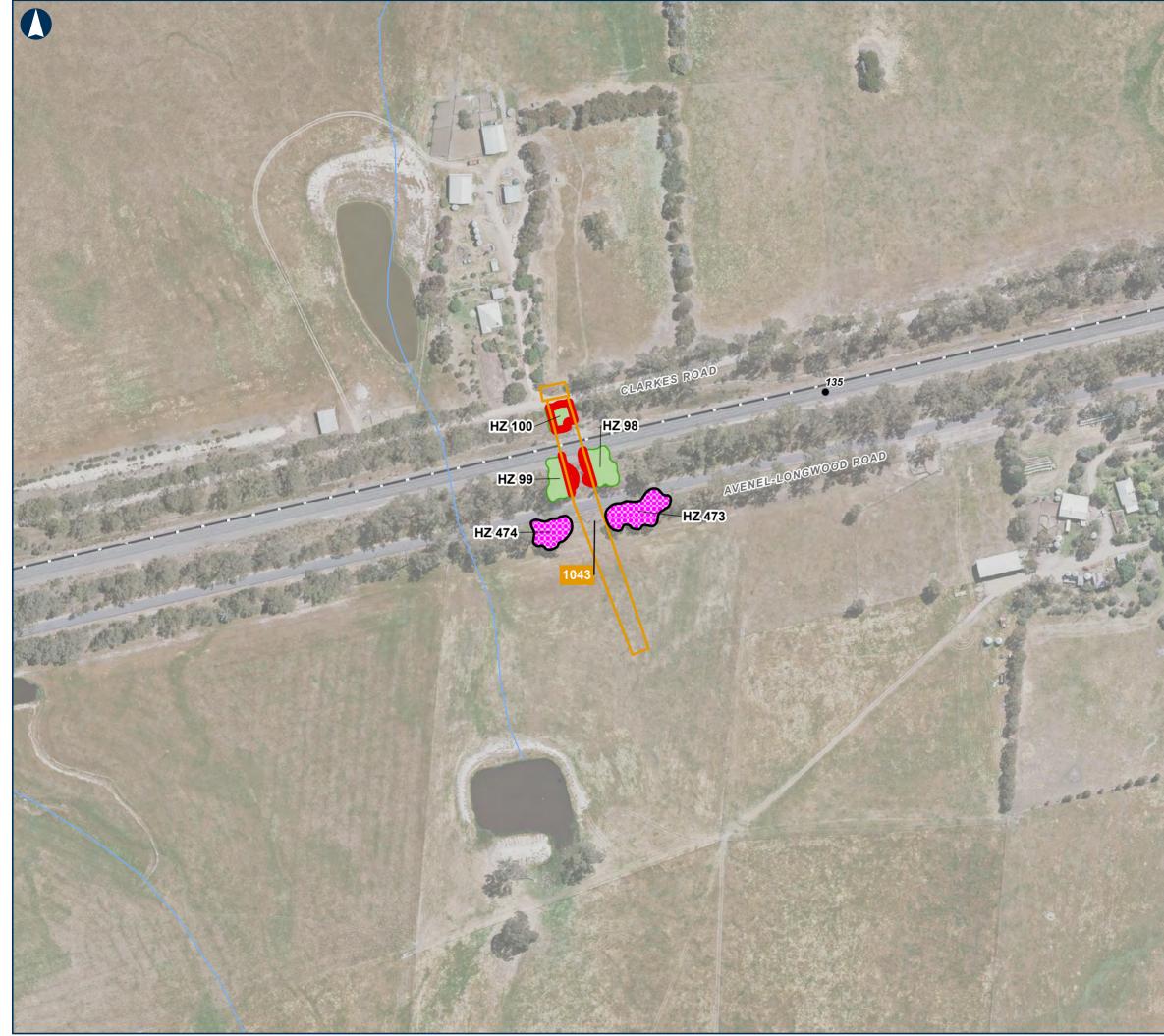
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Threatened Species and Ecological Communities

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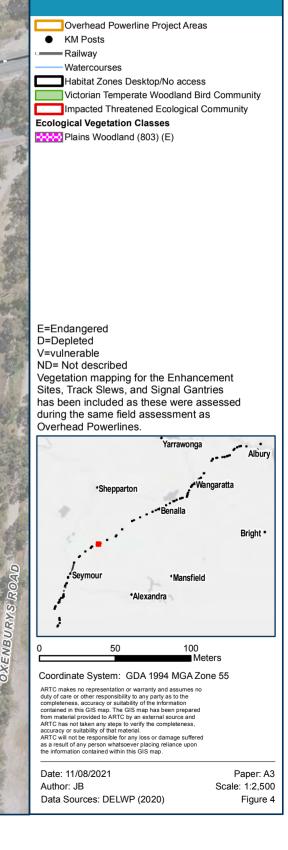


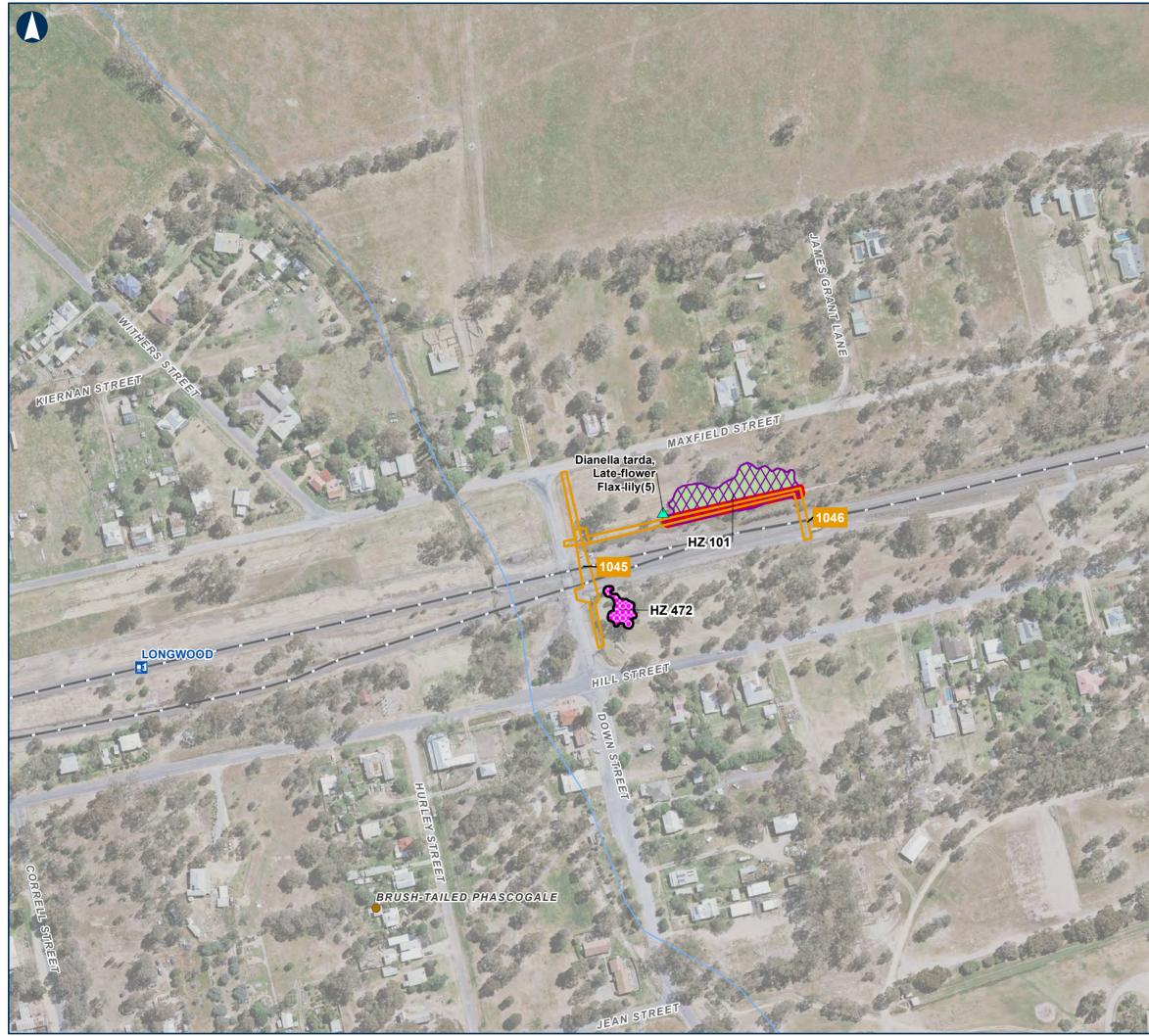




Threatened Species and Ecological Communities

MAP 33 OF 91



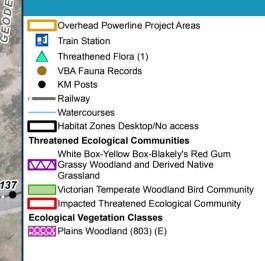


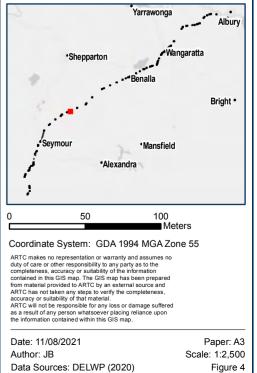


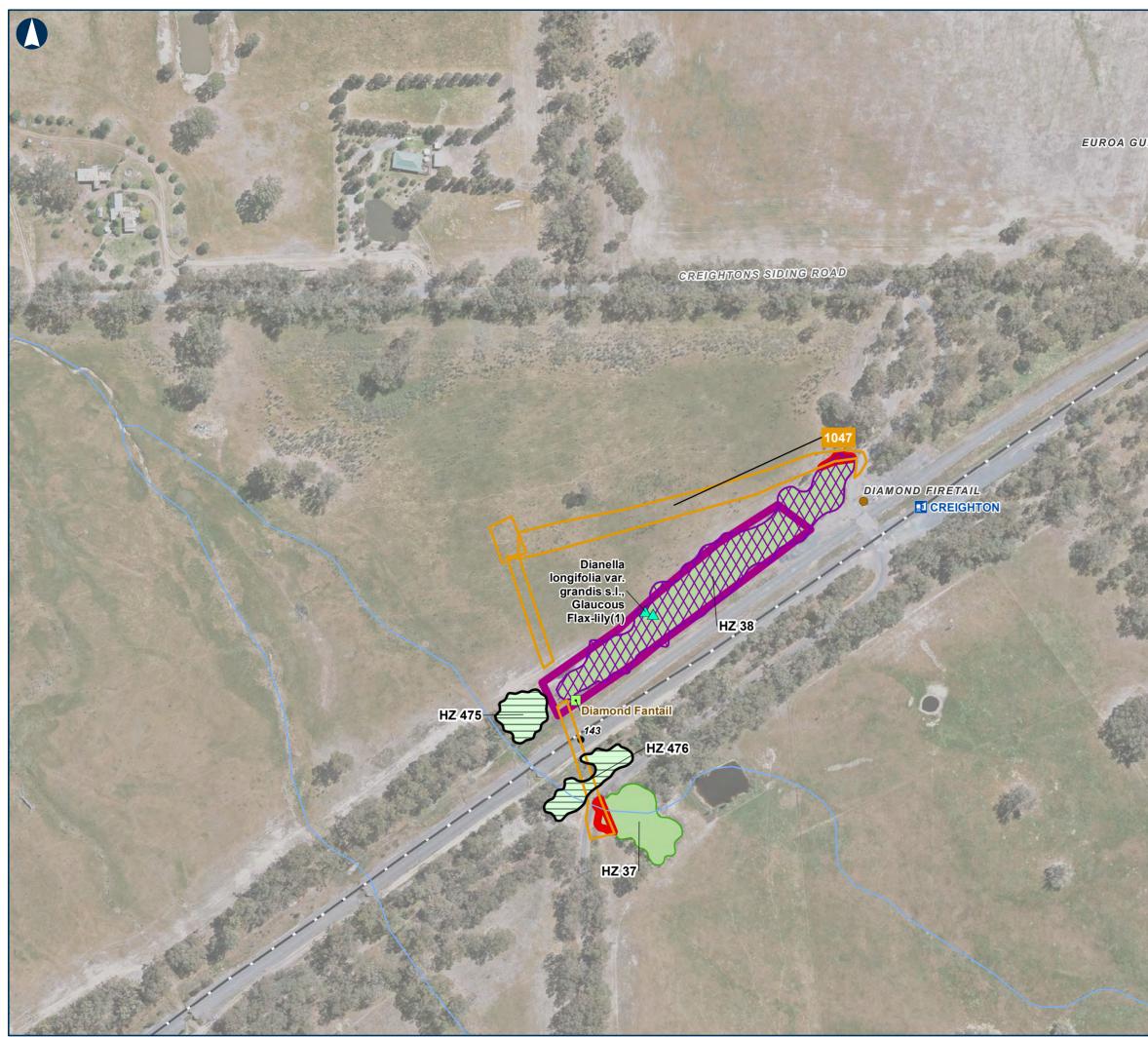
Threatened Species and Ecological Communities

ARTC

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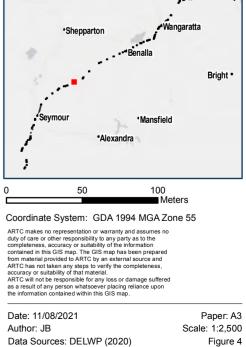




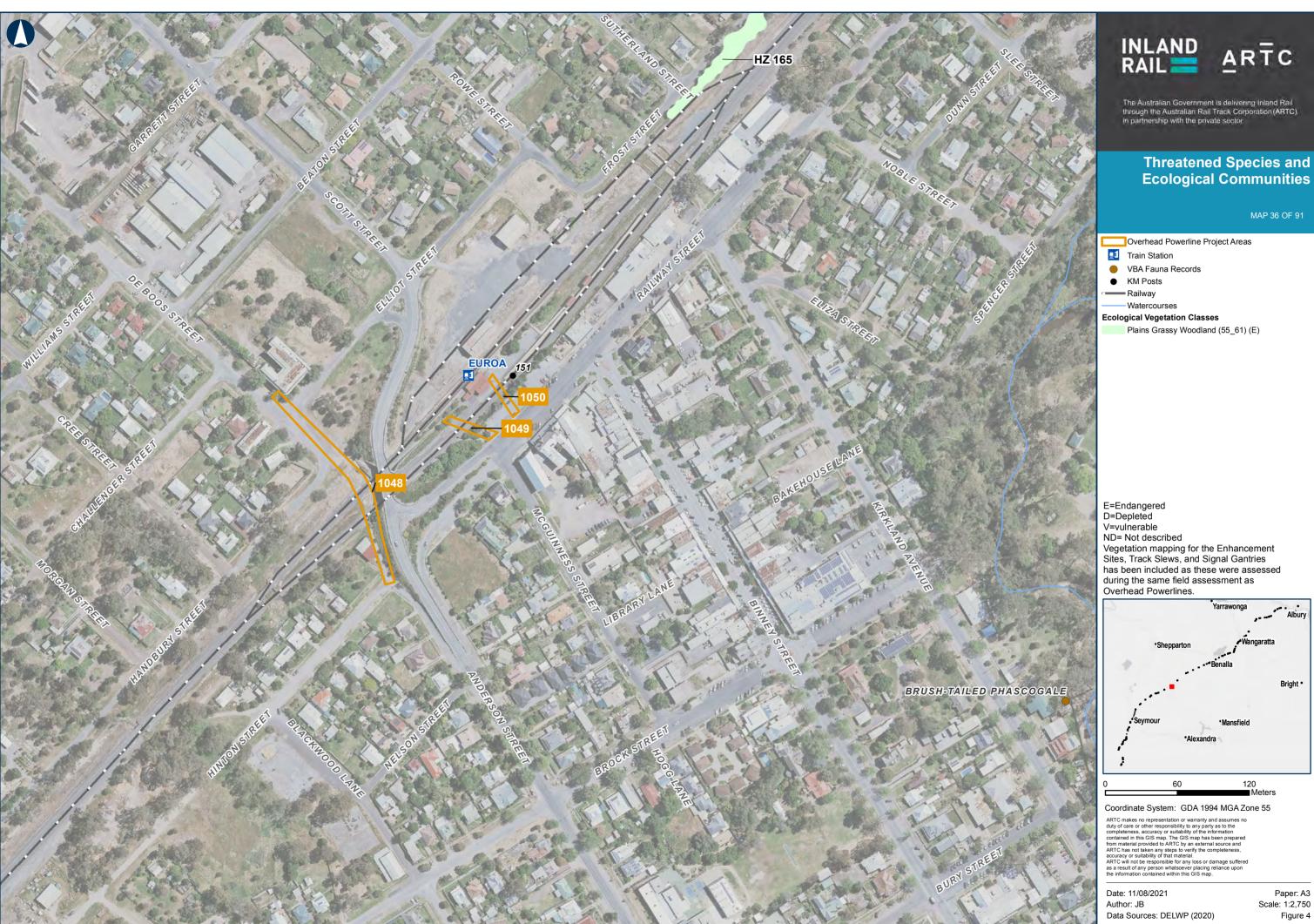
Threatened Species and Ecological Communities

ARTC

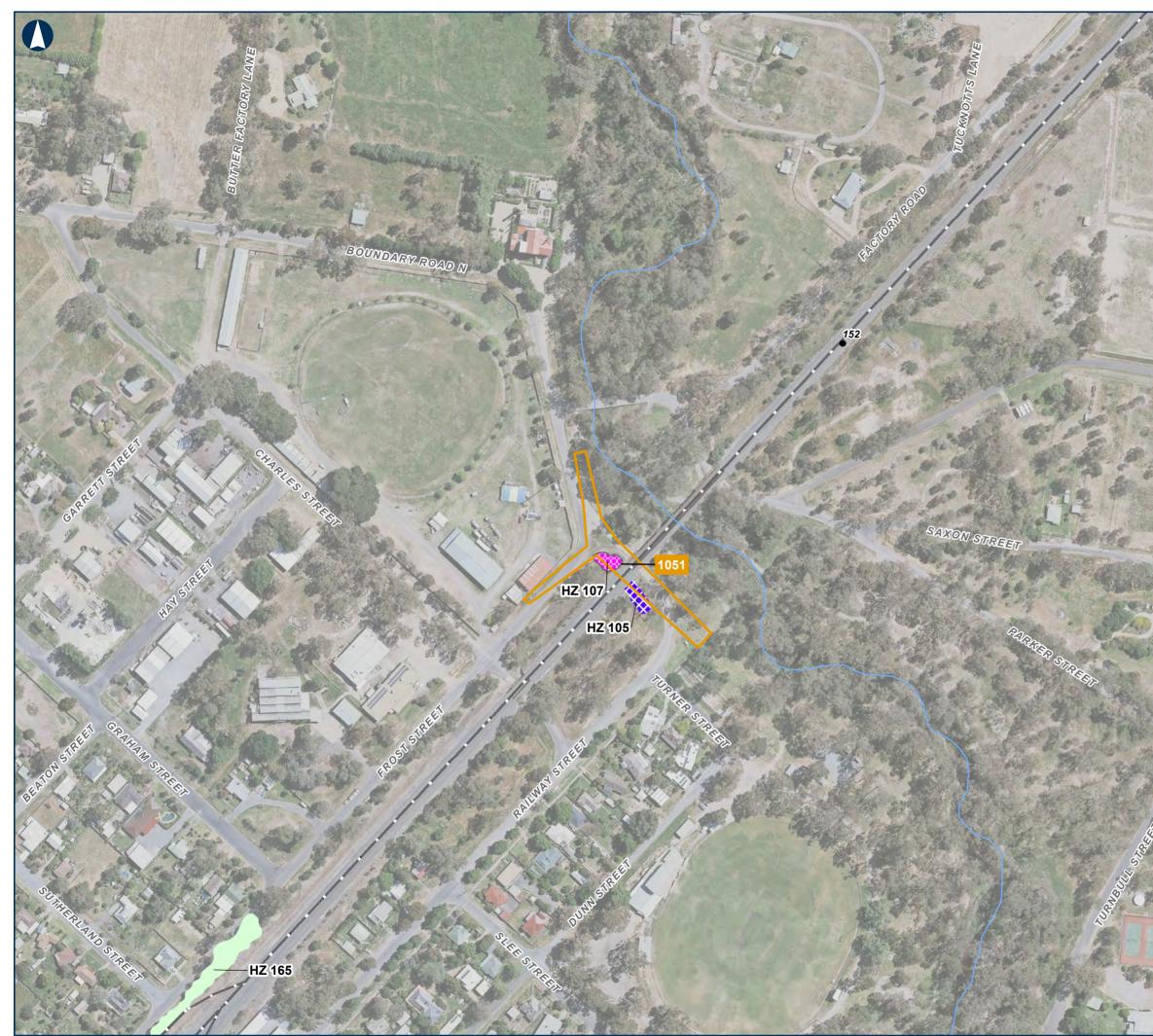
MAP 35 OF 91 Overhead Powerline Project Areas Train Station Threatened Fauna Species Threathened Flora (2) VBA Flora Records VBA Fauna Records KM Posts Railway Watercourses Hibbertia humifusa subsp. erigens, Euroa Guinea-flower Habitat Zones Desktop/No access Threatened Ecological Communities White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Victorian Temperate Woodland Bird Community Impacted Threatened Ecological Community Ecological Vegetation Classes Grassy Woodland (Low Rises) (175_61) (E) E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines. Yarrawonga Albury



EUROA GUINEA-FLOWER



Paper: A3 Scale: 1:2,750 Figure 4



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The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

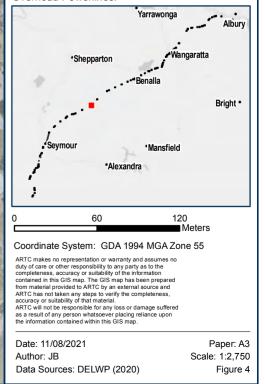
Threatened Species and Ecological Communities

MAP 37 OF 91

Overhead Powerline Project Areas
KM Posts
Railway
Watercourses

Ecological Vegetation Classes

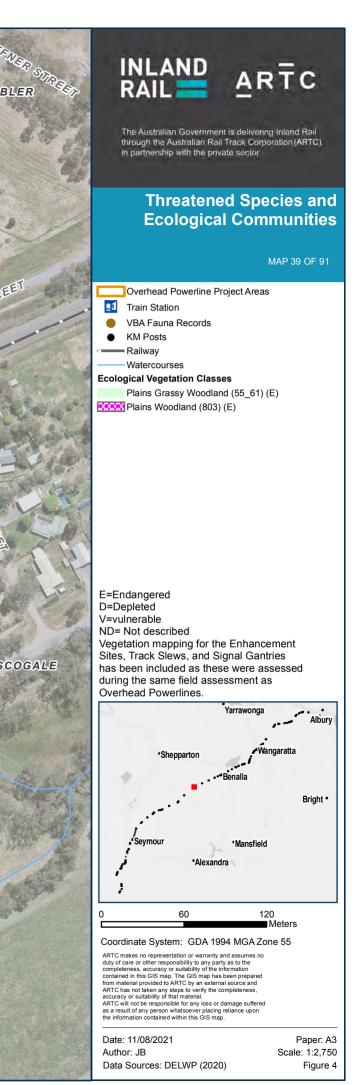
Floodplain Riparian Woodland (56) (V) Plains Grassy Woodland (55_61) (E) Plains Woodland (803) (E)

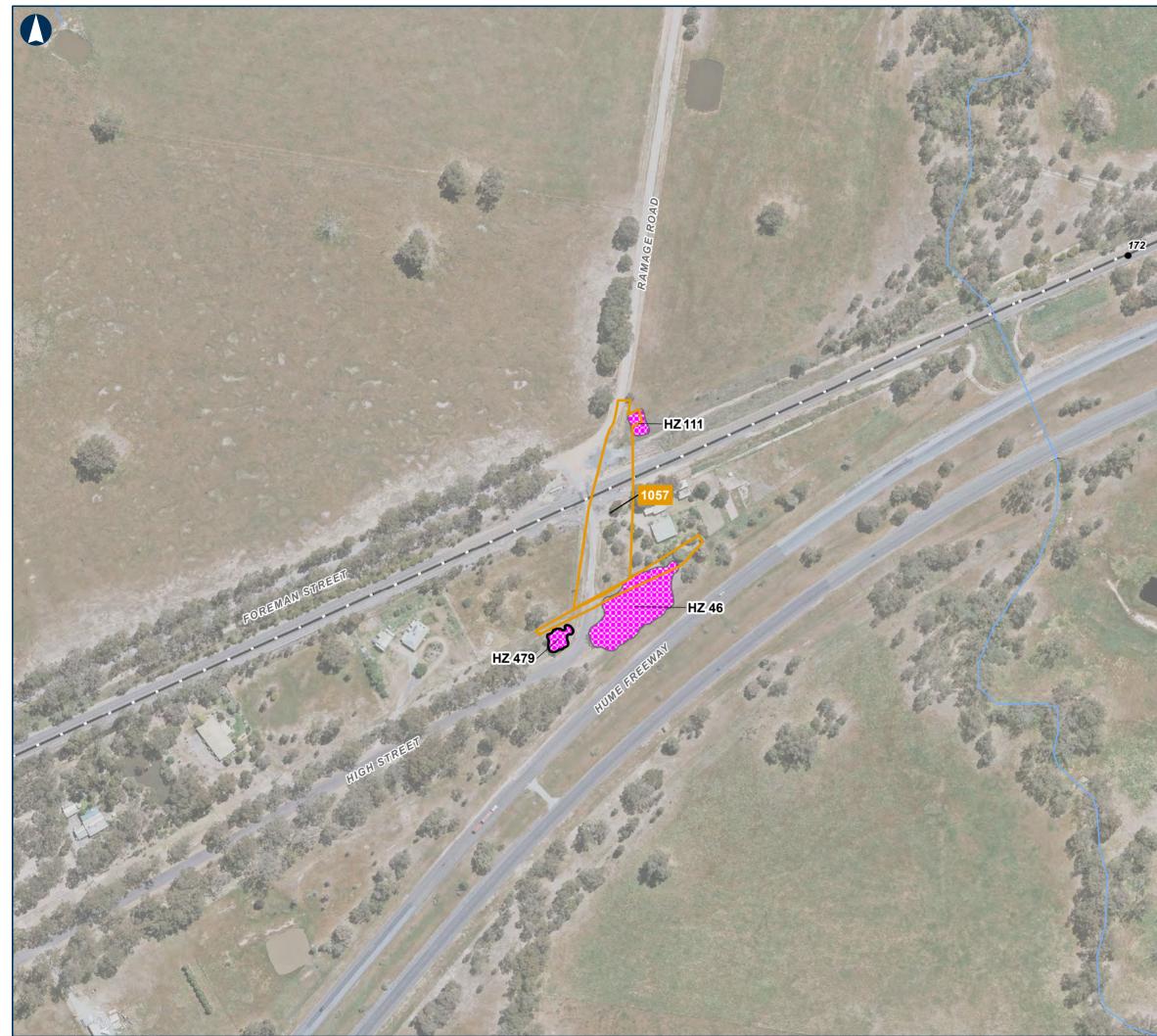










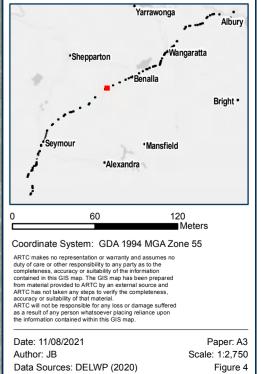




Threatened Species and Ecological Communities

MAP 40 OF 91

Overhead Powerline Project Areas
KM Posts
Railway
Watercourses
Habitat Zones Desktop/No access
Ecological Vegetation Classes
Plains Woodland (803) (E)



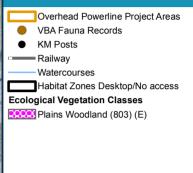


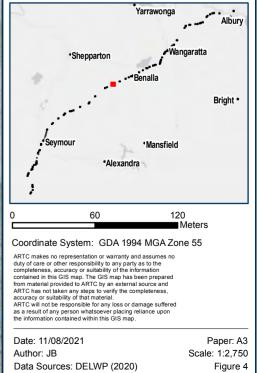


Threatened Species and Ecological Communities

ARTC

MAP 41 OF 91









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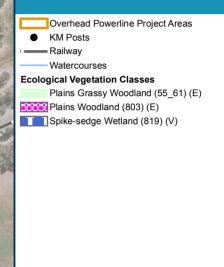


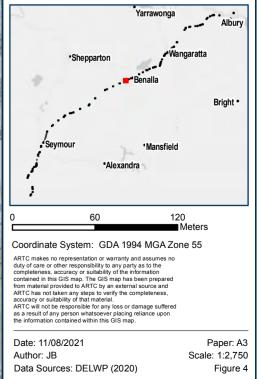
The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

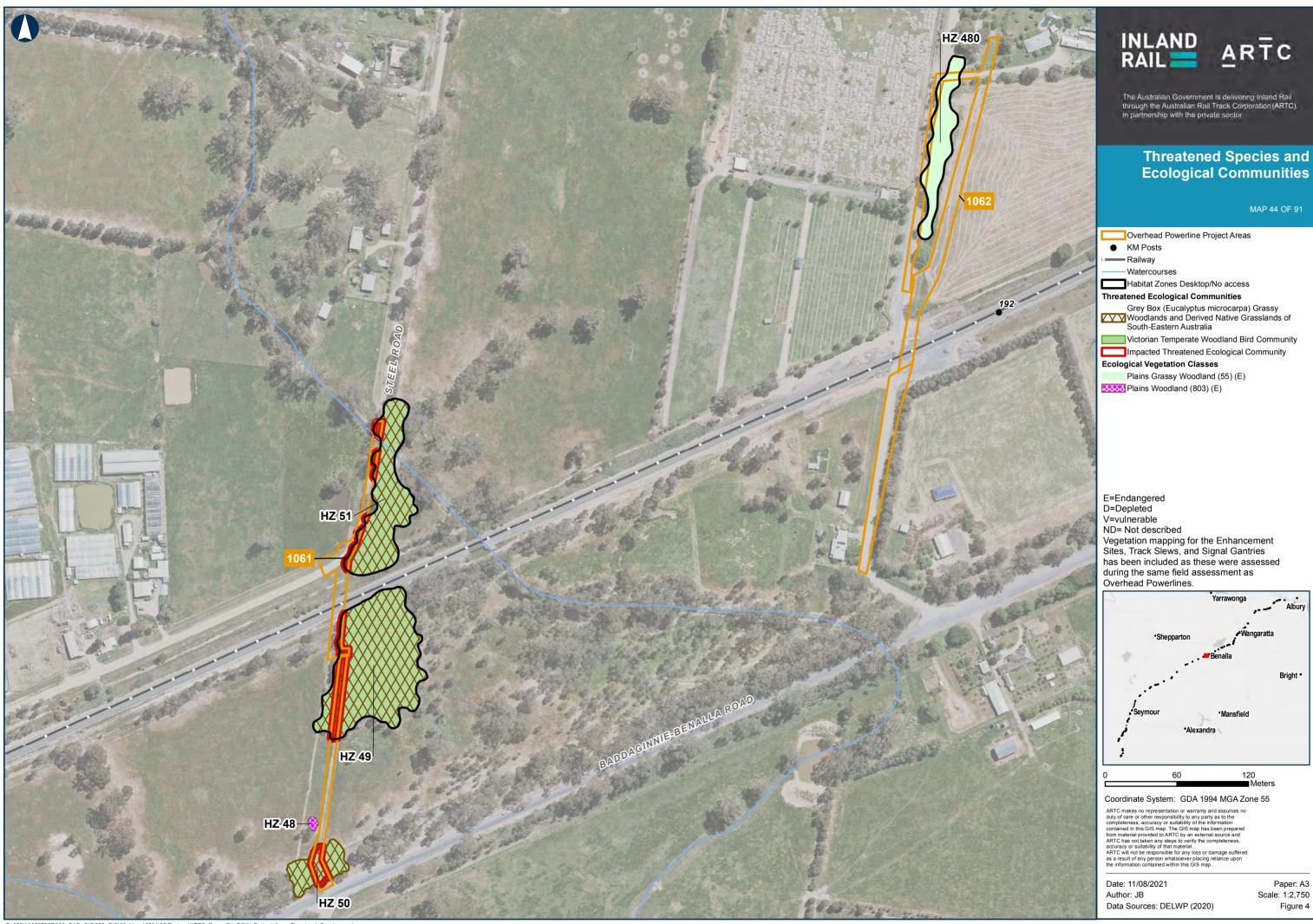
Threatened Species and Ecological Communities

ARTC

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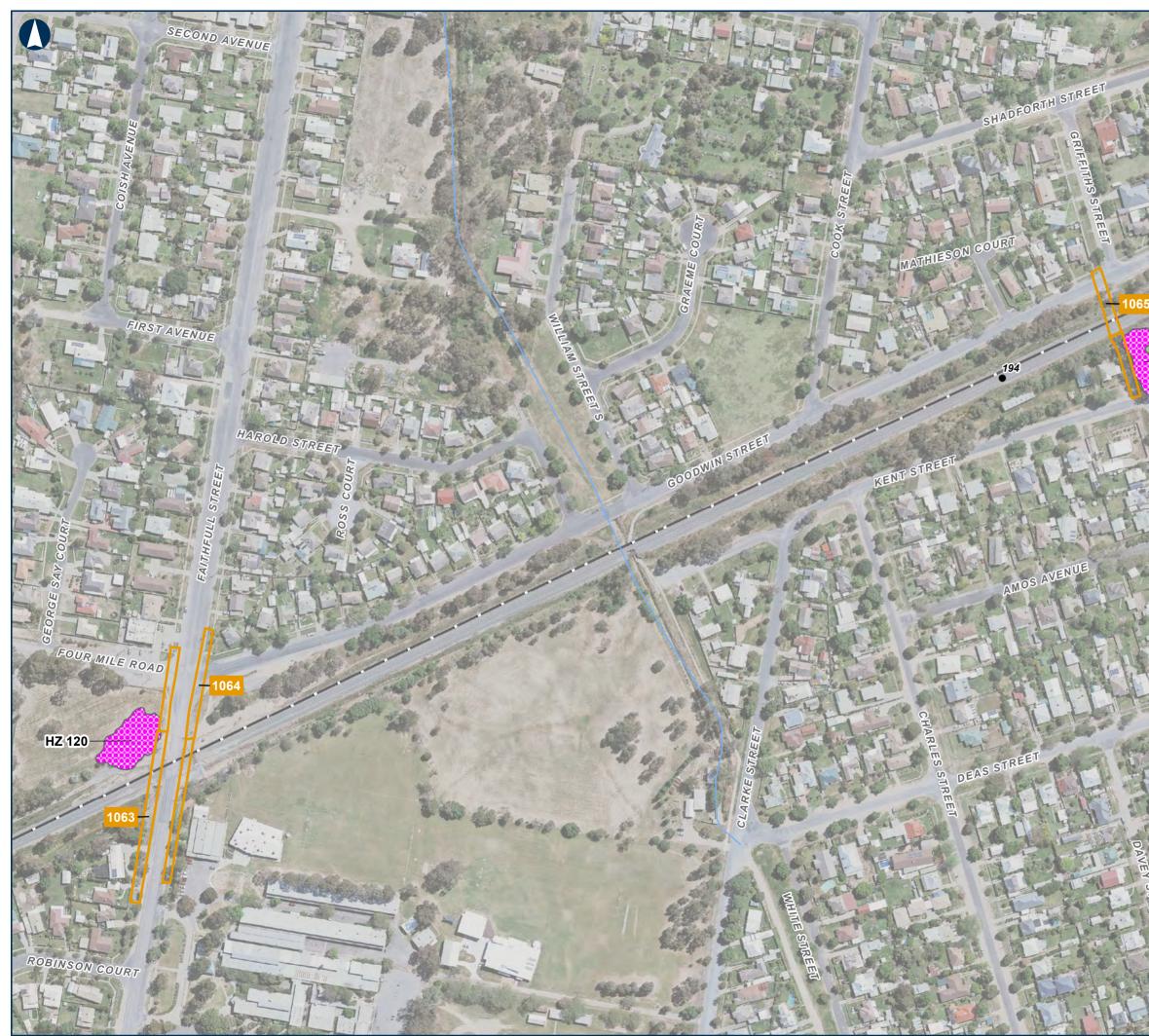




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Scale: 1:2,750 Figure 4

Albury





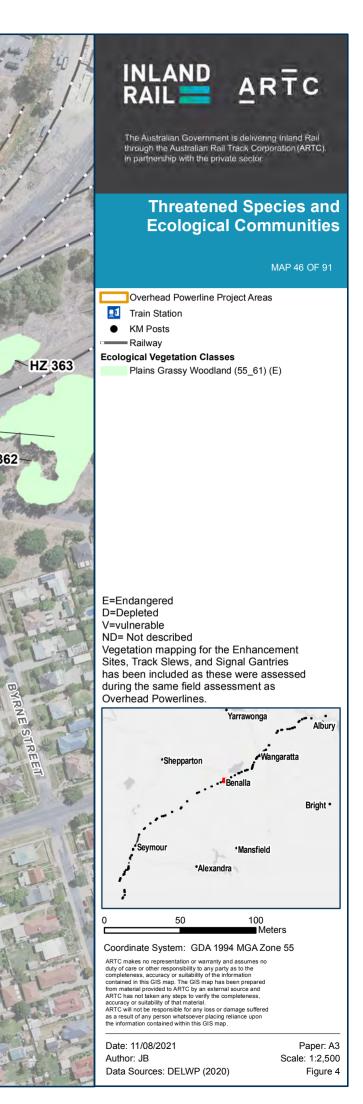
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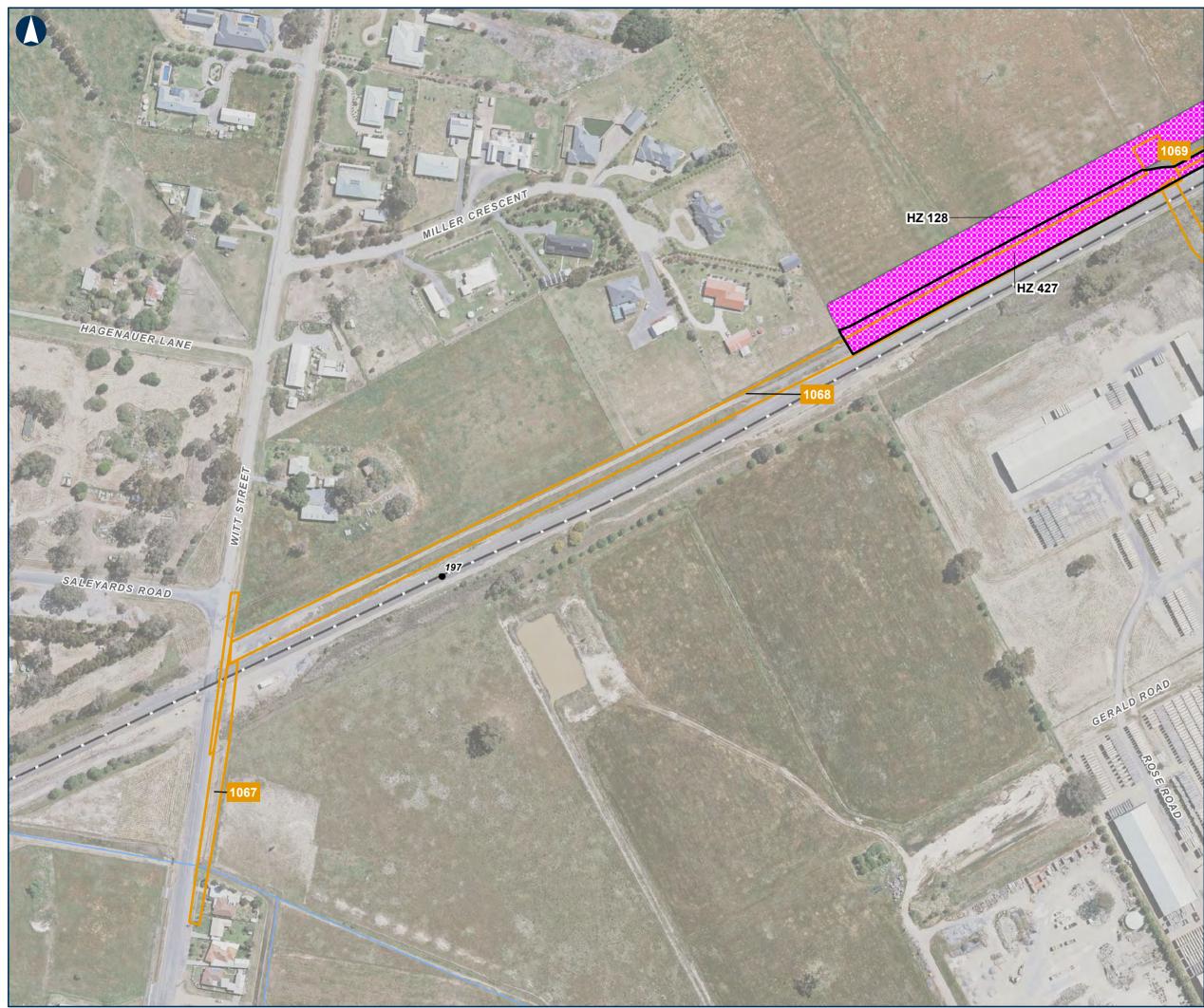
Albury

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Author: JB Data Sources: DELWP (2020)





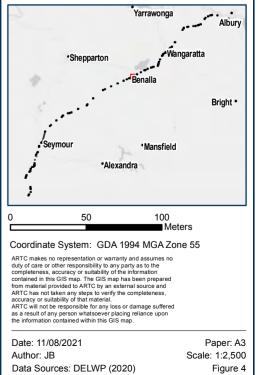


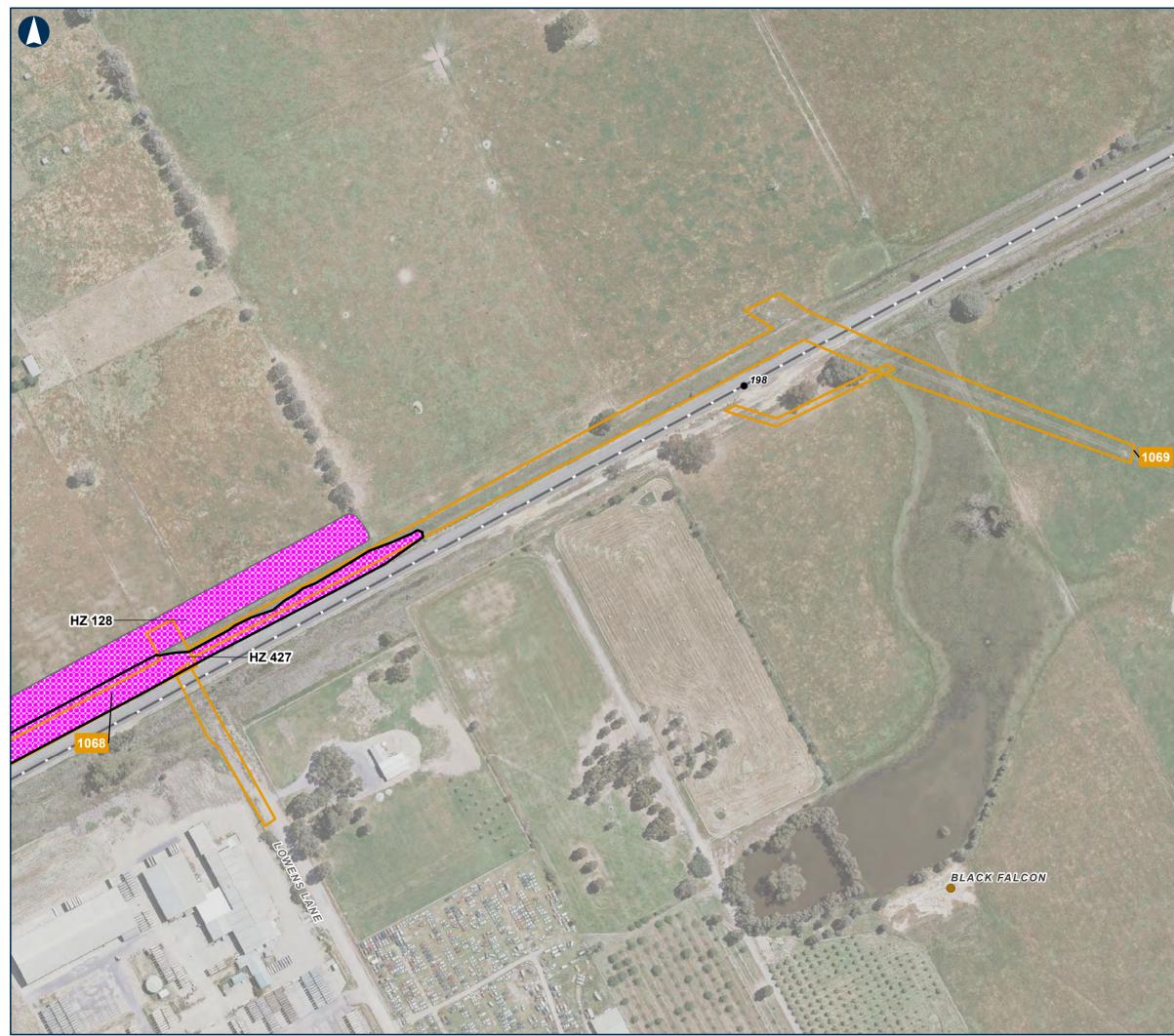


Threatened Species and Ecological Communities

MAP 47 OF 91

Overhead Powerline Project Areas
KM Posts
Railway
Watercourses
Habitat Zones Desktop/No access
Ecological Vegetation Classes
Plains Woodland (803) (E)







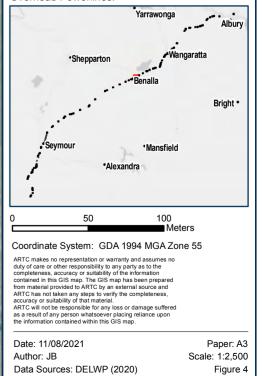
Threatened Species and Ecological Communities

MAP 48 OF 91

Overhead Powerline Project Areas
VBA Fauna Records
KM Posts
Railway
Habitat Zones Desktop/No access
Ecological Vegetation Classes

Plains Woodland (803) (E)

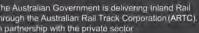
E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



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Threatened Species and Ecological Communities

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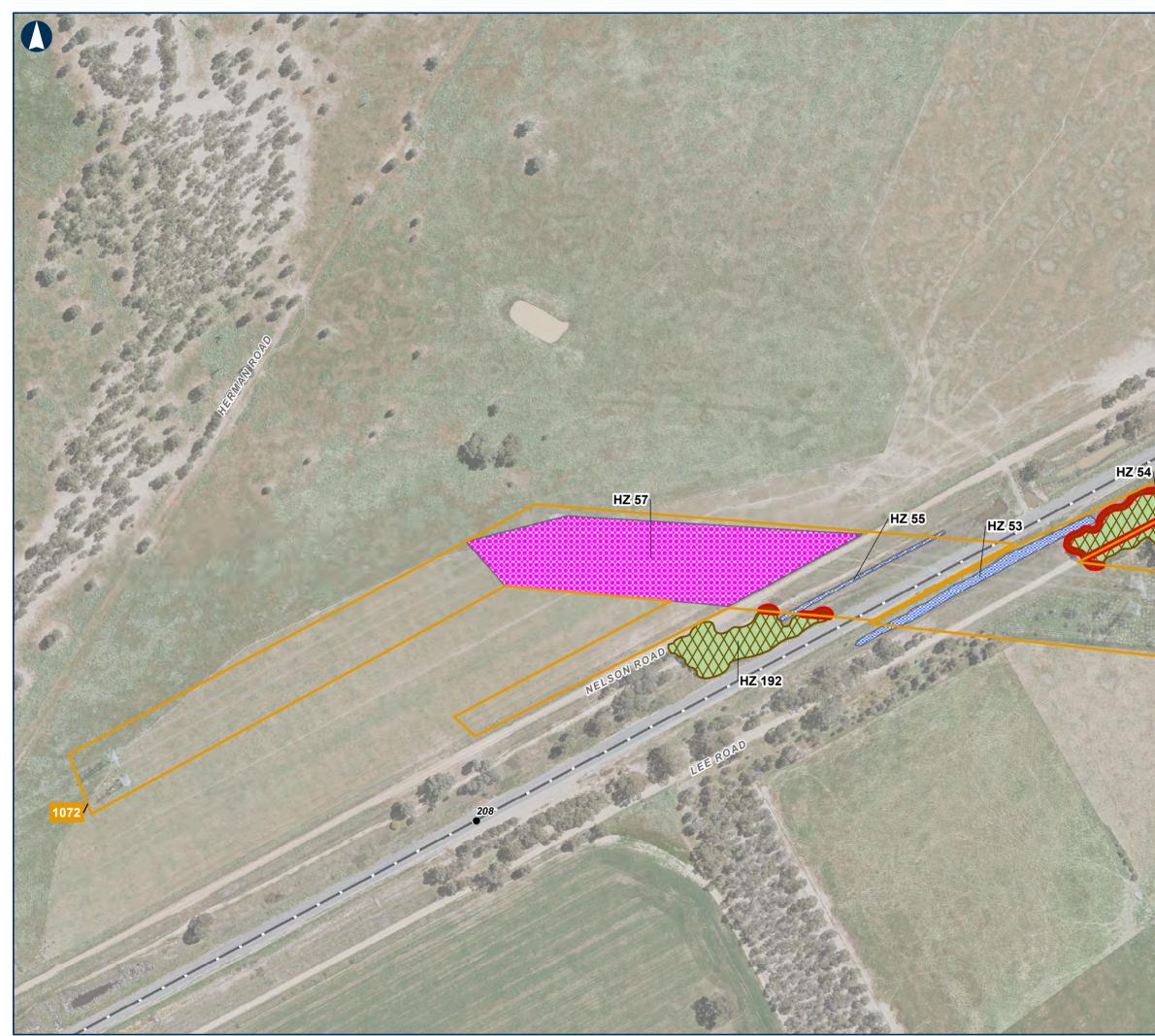
MAP 50 OF 91

Overhead Powerline Project Areas KM Posts Railway Watercourses Habitat Zones 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 Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines. Albury Sheppartor Bright • 2 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 11/08/2021 Author: JB Data Sources: DELWP (2020) Paper: A3 Scale: 1:2,500 Figure 4



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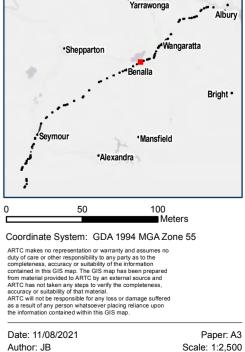
The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Threatened Species and Ecological Communities

MAP 51 OF 91

Overhead Powerline Project Areas KM Posts Railway Threatened Ecological Communities Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia Victorian Temperate Woodland Bird Community Impacted Threatened Ecological Community **Ecological Vegetation Classes** Plains Woodland (803) (E) Tall Marsh (821) (D)

E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



Data Sources: DELWP (2020)

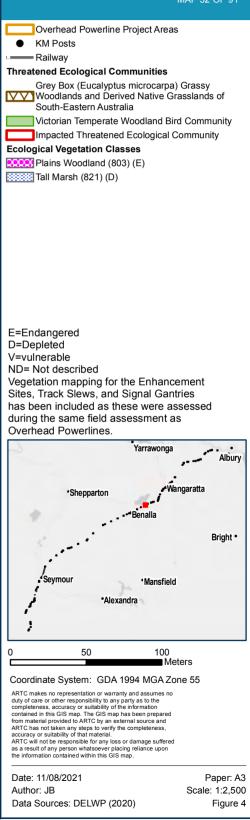
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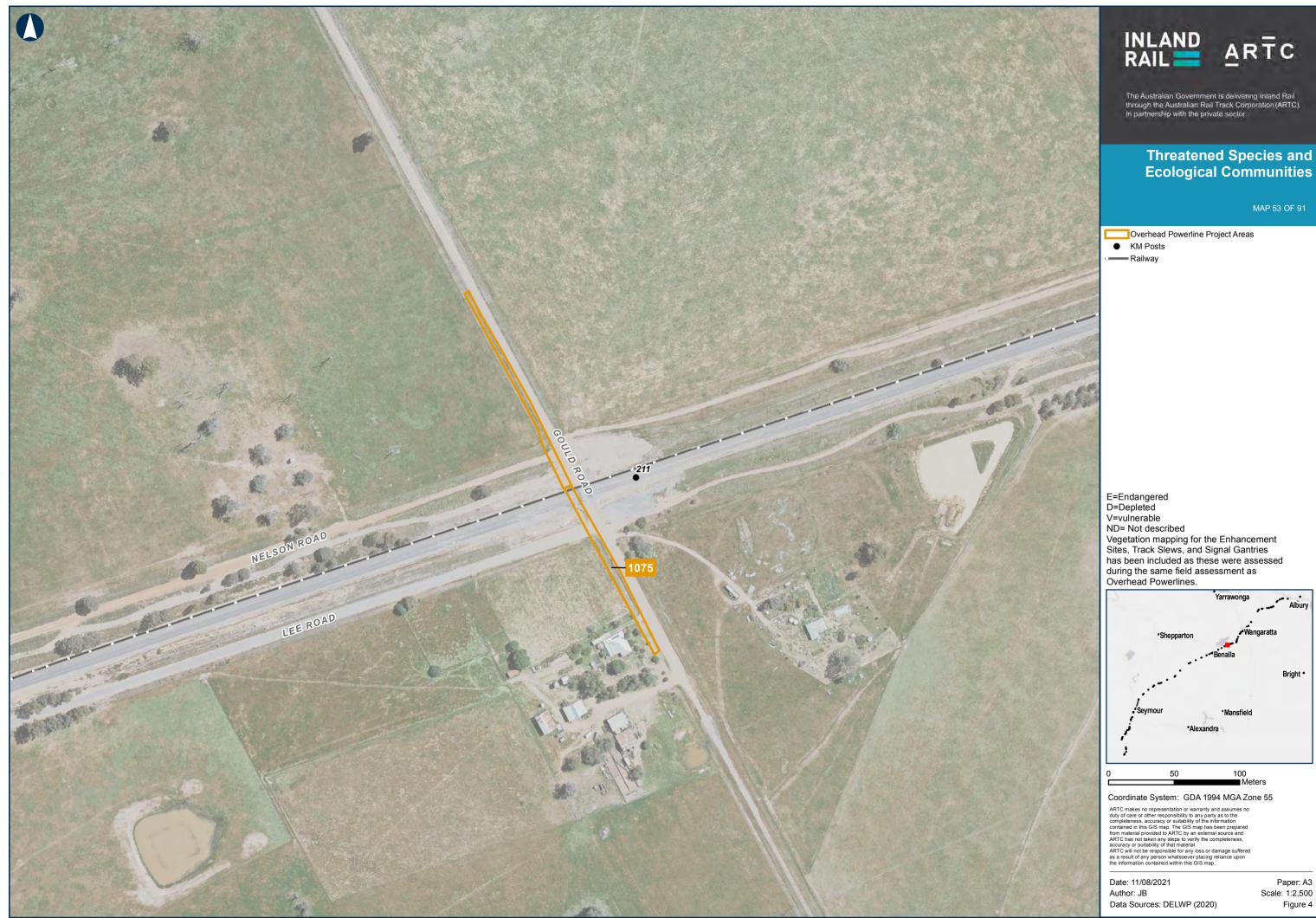




Threatened Species and Ecological Communities

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Paper: A3 Scale: 1:2,500 Figure 4

Albury

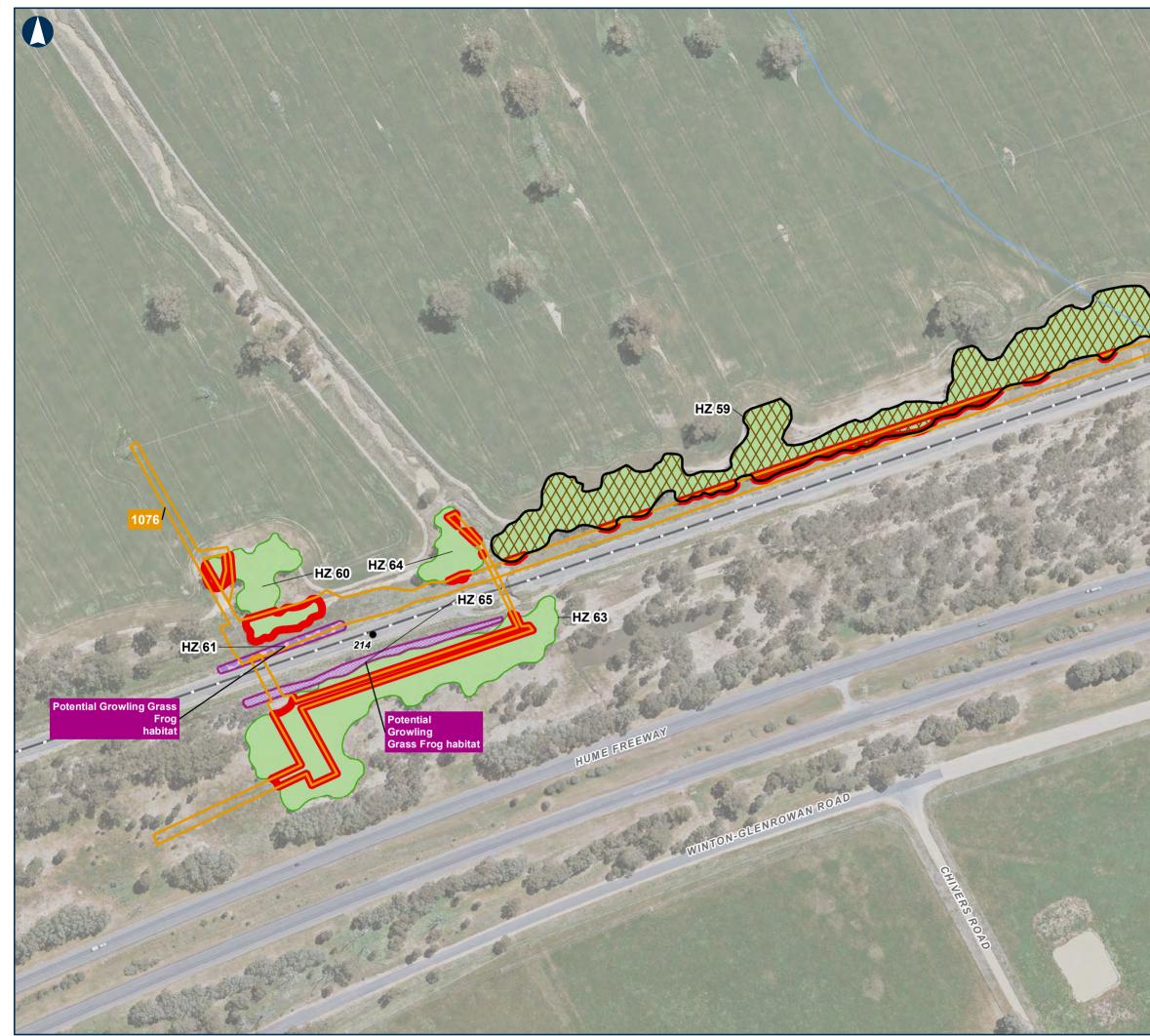
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Yarrawonga

sfield

100 Meters

MAP 53 OF 91

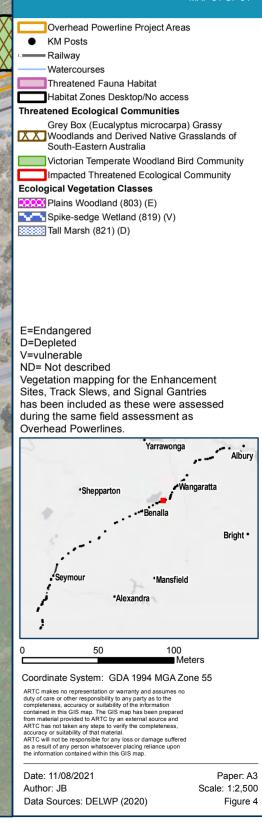




Threatened Species and Ecological Communities

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ARTC



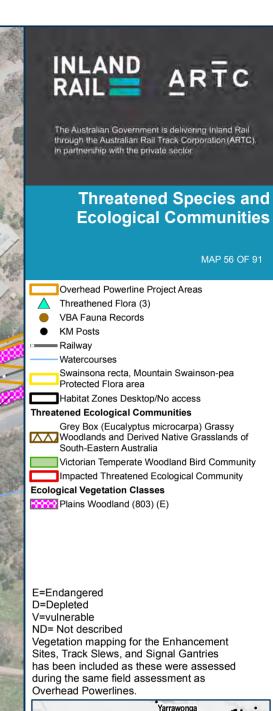
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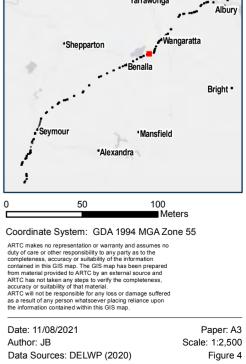
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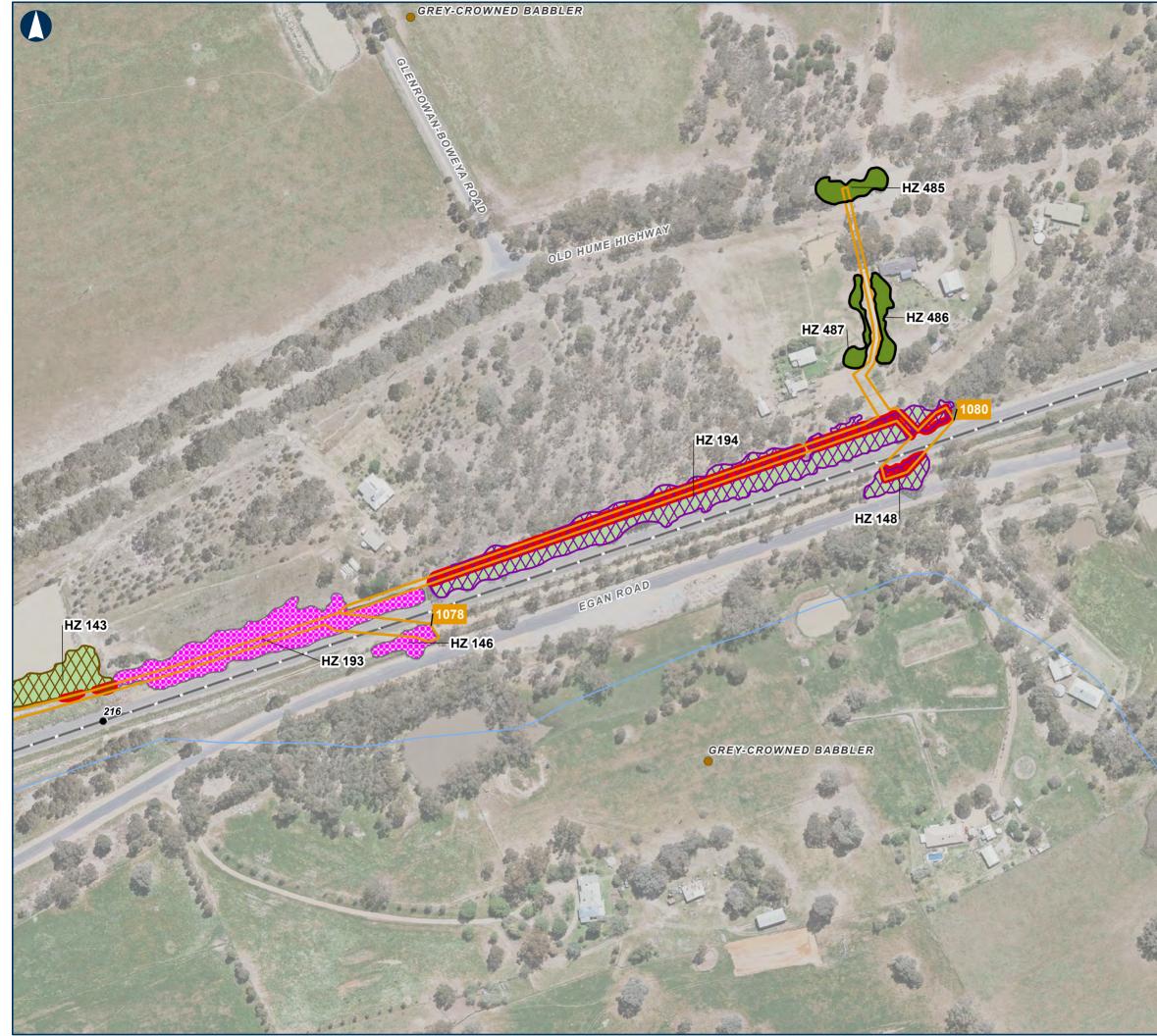
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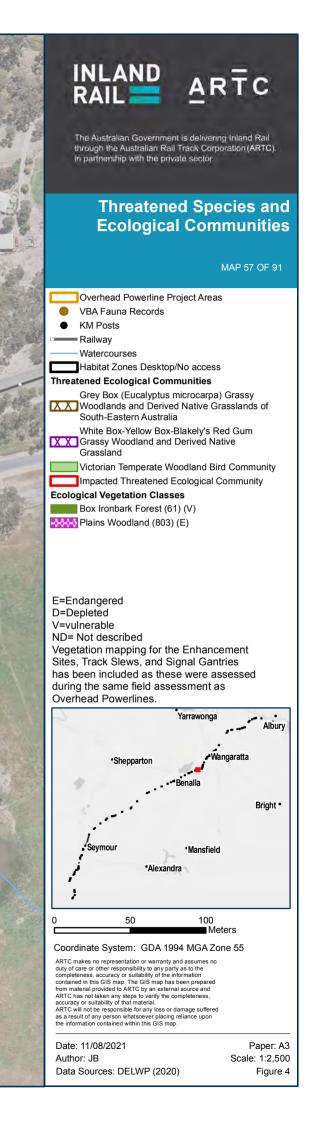




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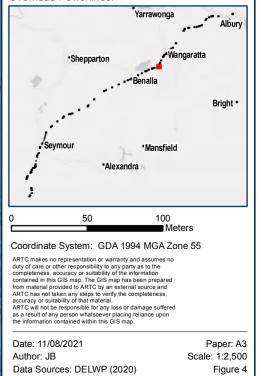






Threatened Species and Ecological Communities







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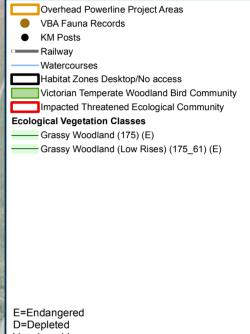


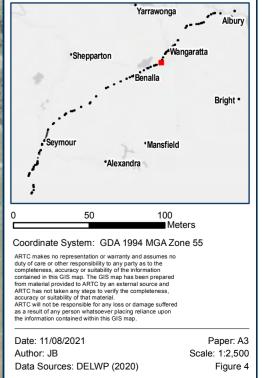


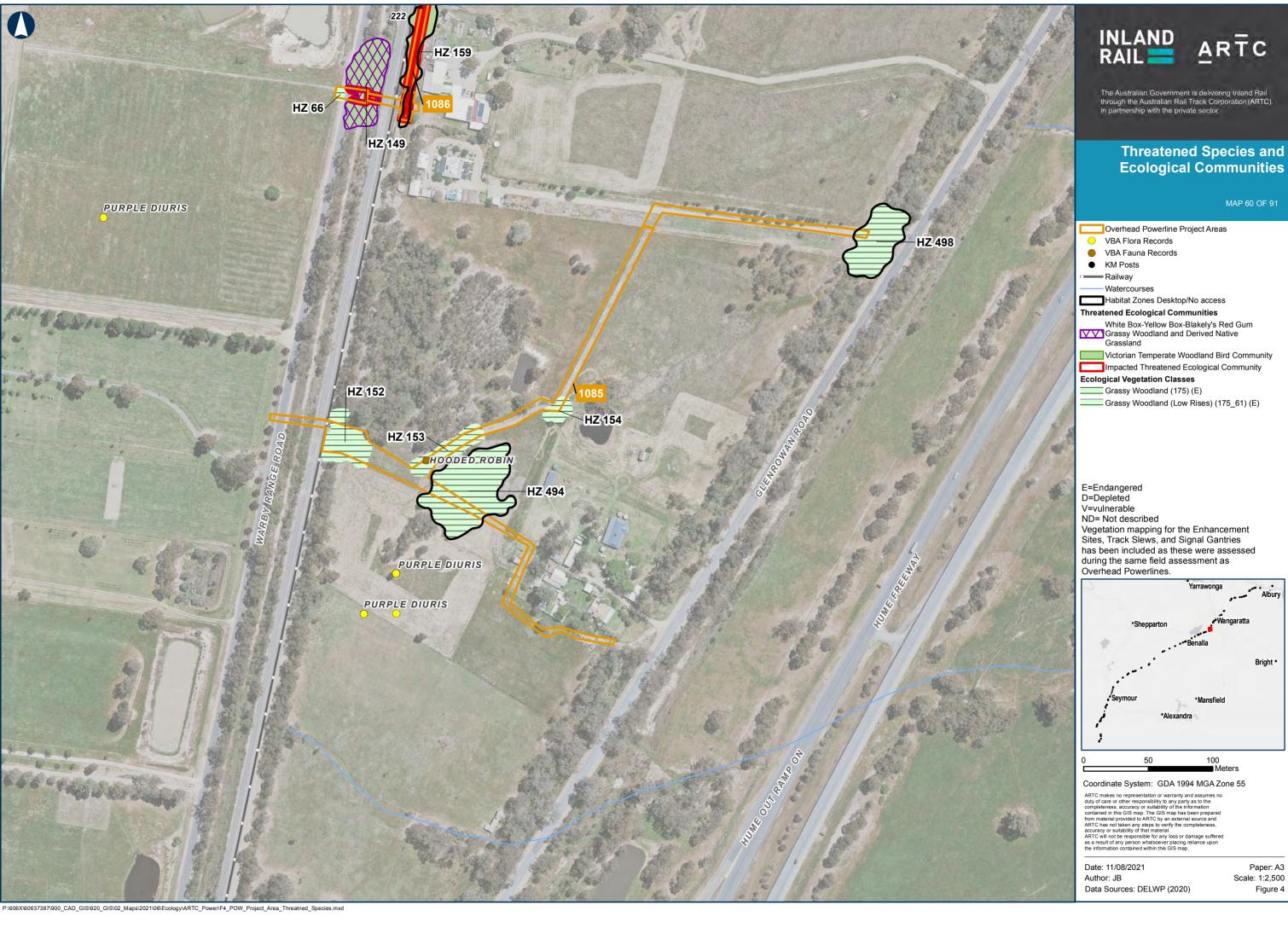
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Threatened Species and Ecological Communities

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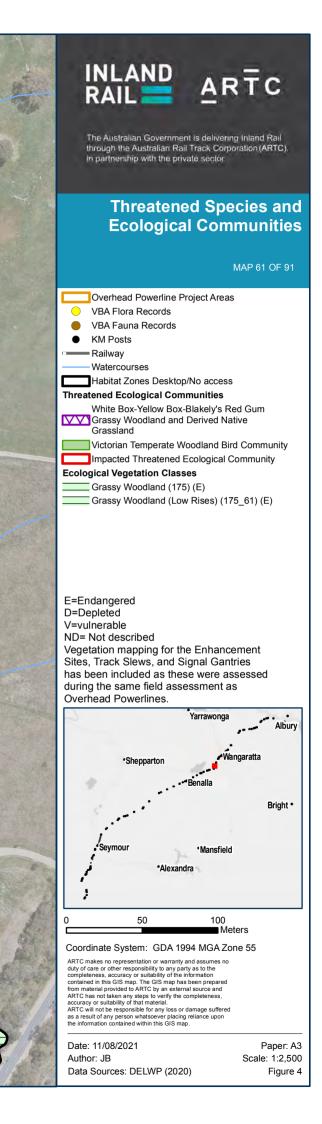




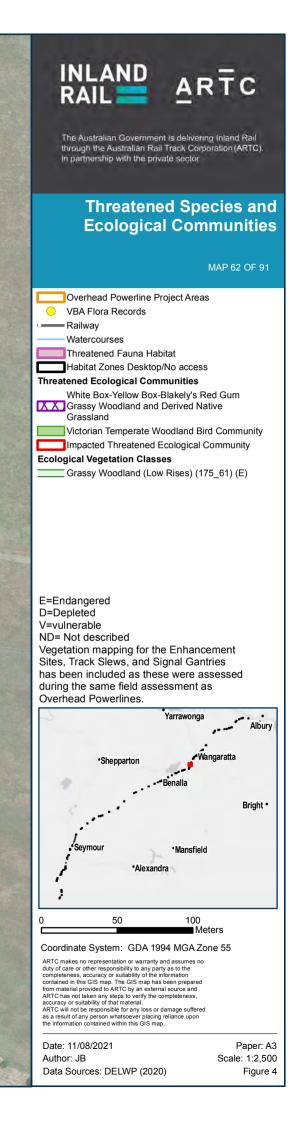




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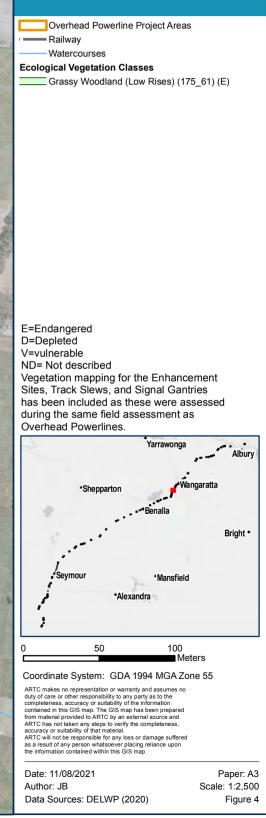


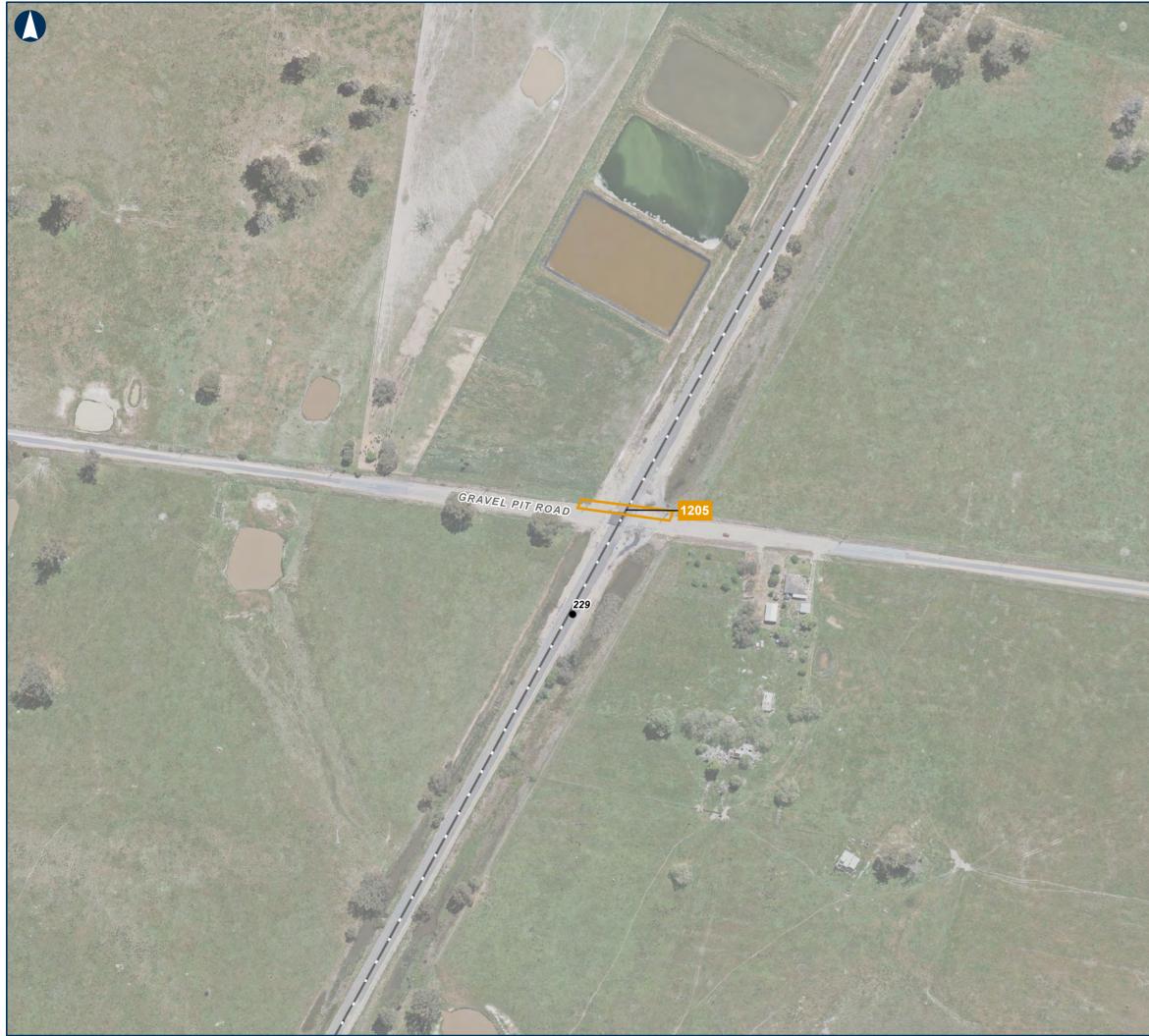


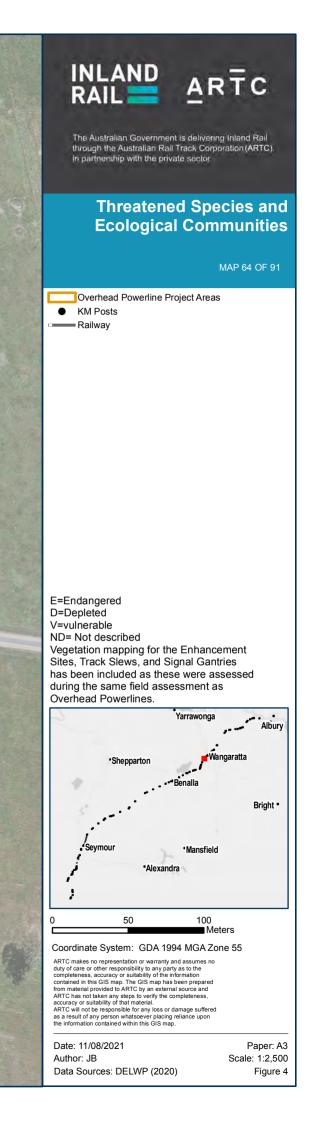


Threatened Species and **Ecological Communities**

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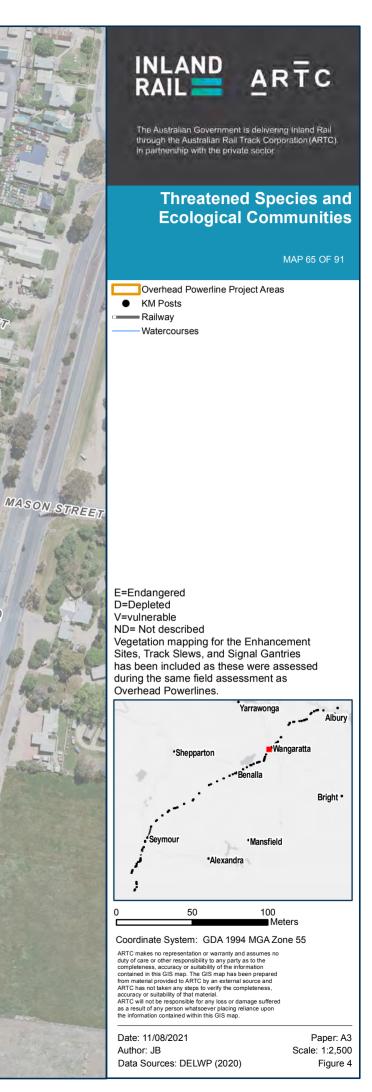


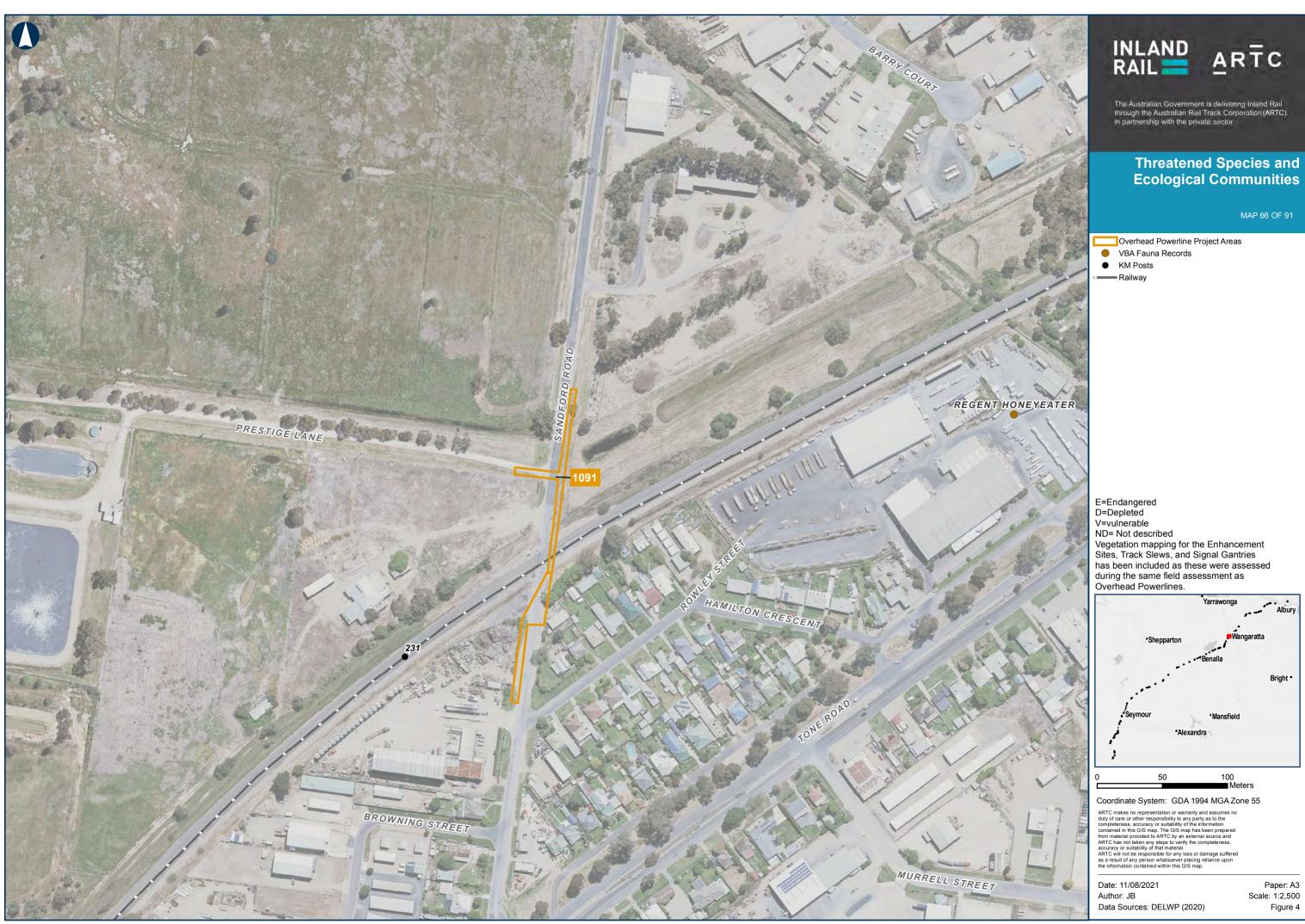




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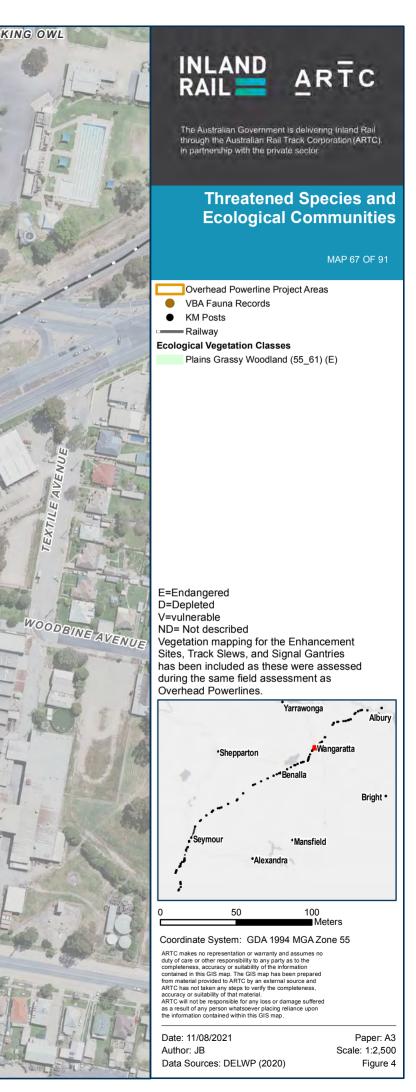




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Threatened Species and Ecological Communities

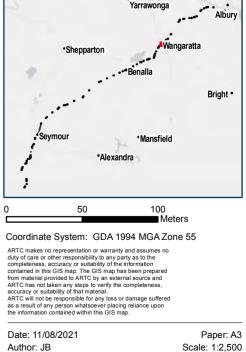
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- Overhead Powerline Project Areas
- Train Station
- VBA Fauna Records
- KM Posts
- Railway
- -Watercourses

Ecological Vegetation Classes

Creekline Grassy Woodland (68) (E) Plains Grassy Woodland (55_61) (E)

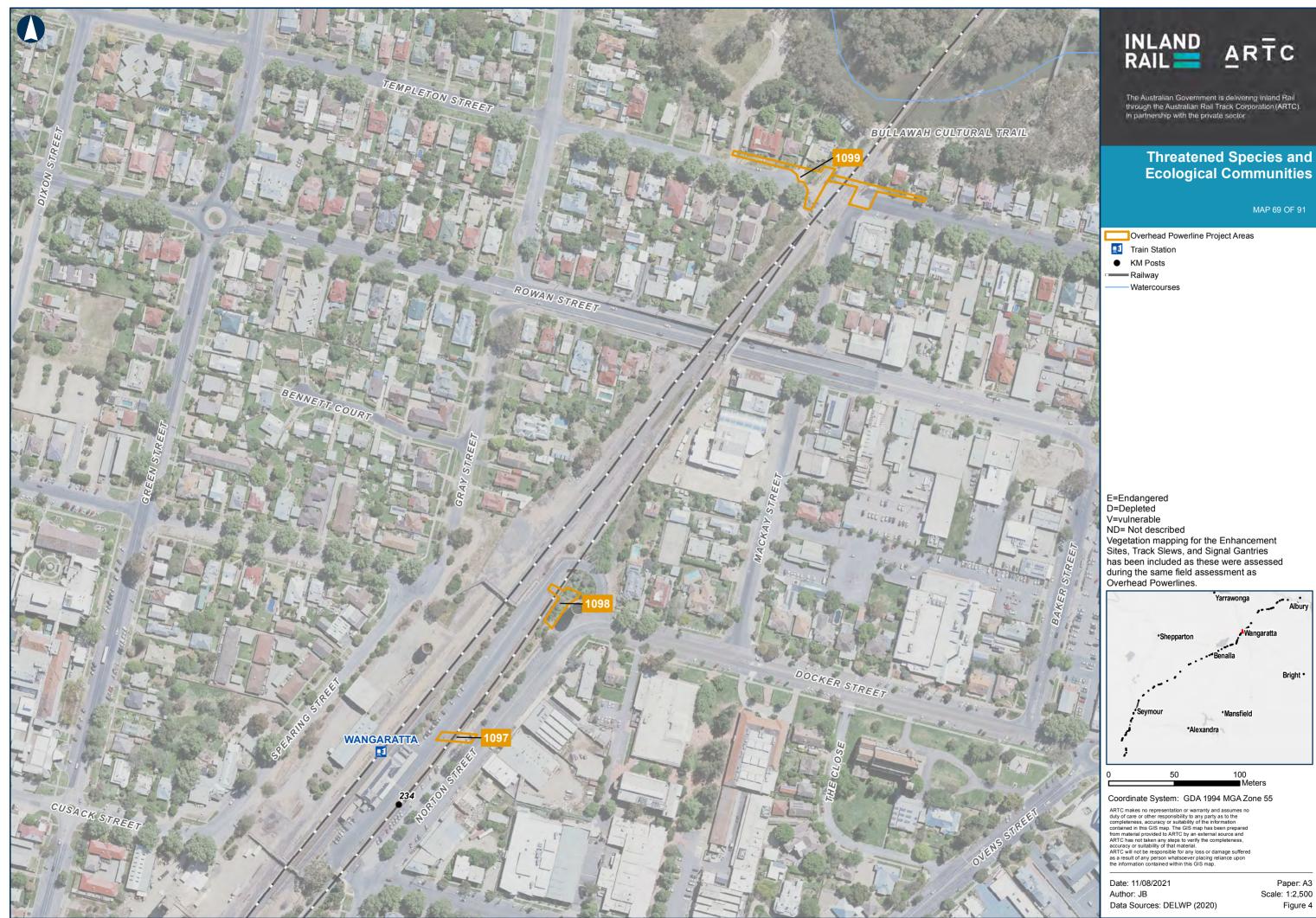
E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



Data Sources: DELWP (2020)

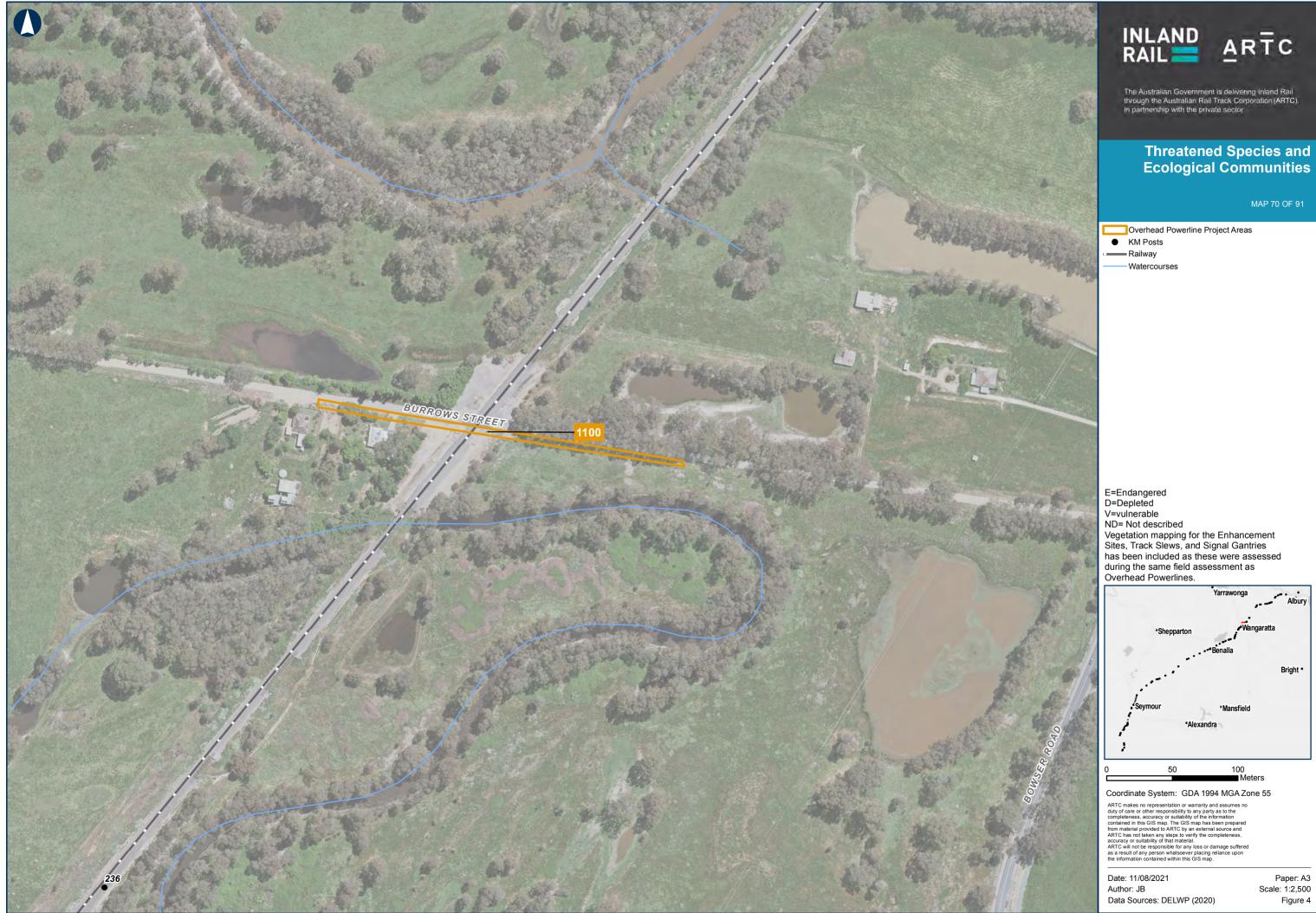
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Figure 4



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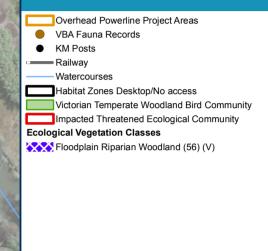


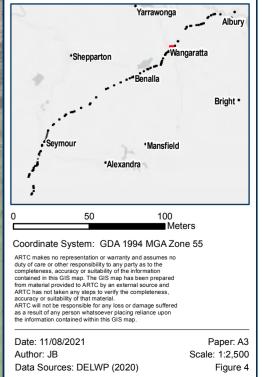


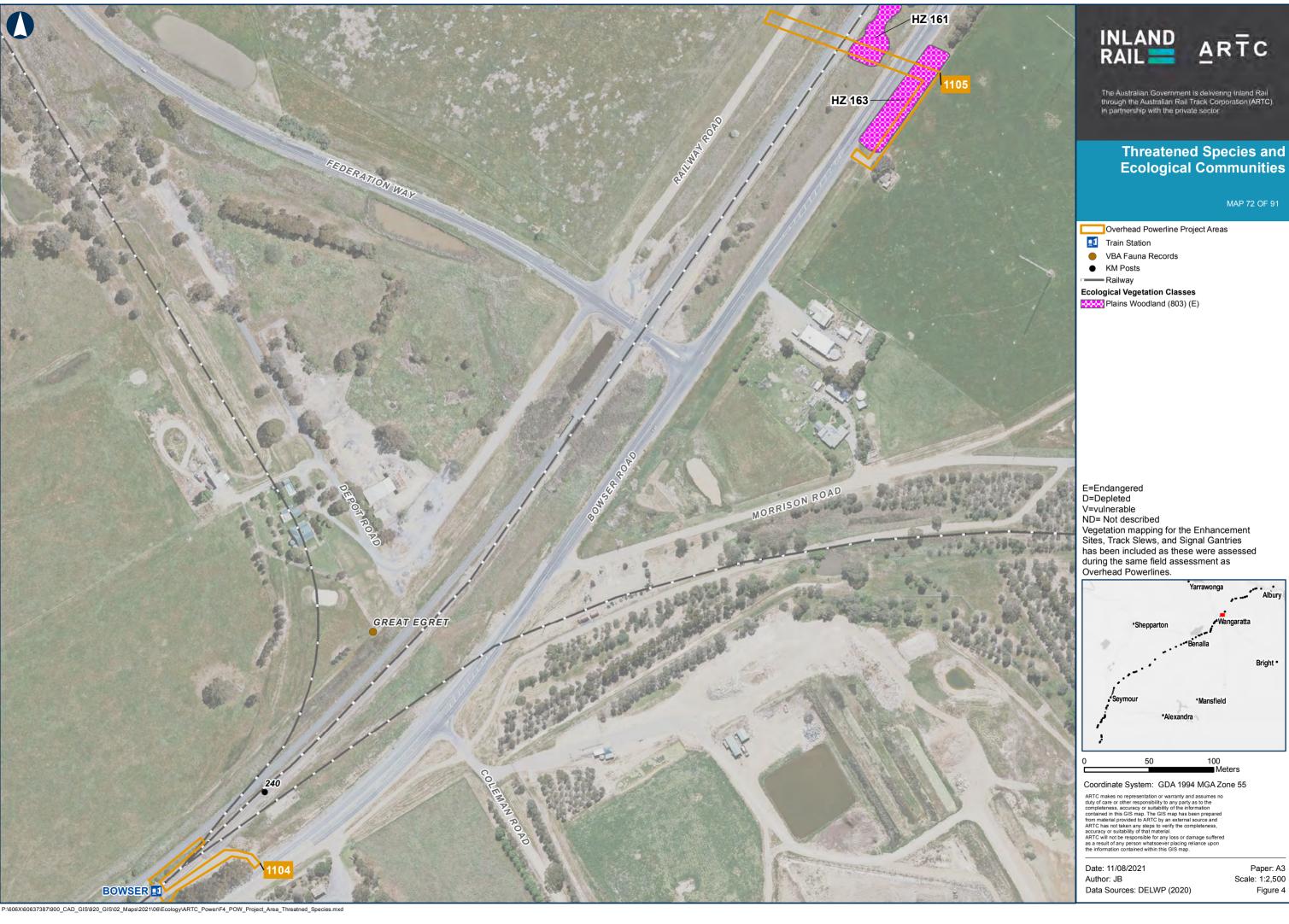


Threatened Species and Ecological Communities

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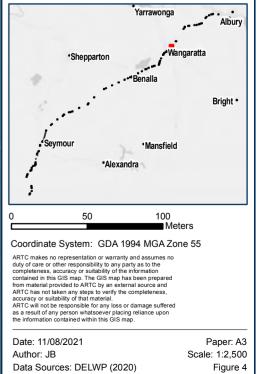
Threatened Species and Ecological Communities

MAP 73 OF 91

Overhead Powerline Project Areas
KM Posts
Railway
Ecological Vegetation Classes

Ecological Vegetation Classes

103



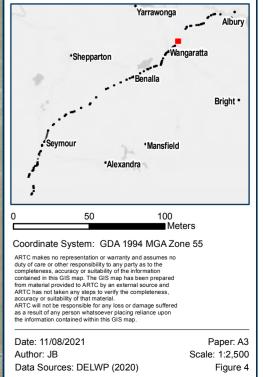




Threatened Species and Ecological Communities

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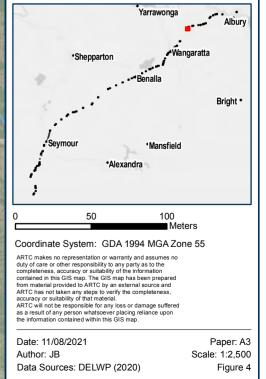


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Threatened Species and **Ecological Communities**

MAP 75 OF 91







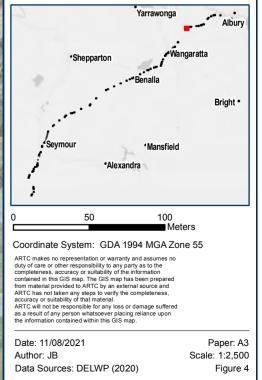


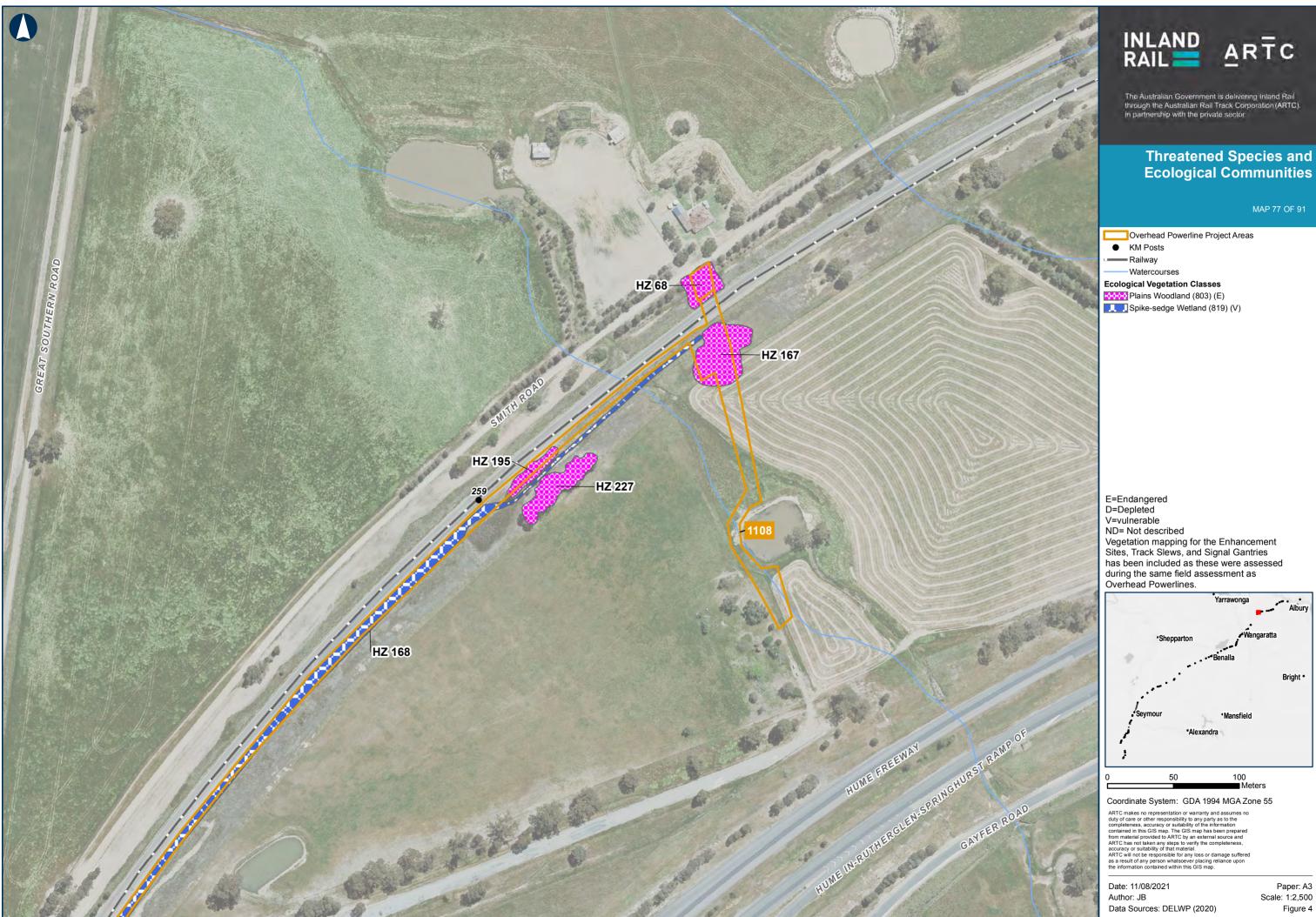
Threatened Species and Ecological Communities

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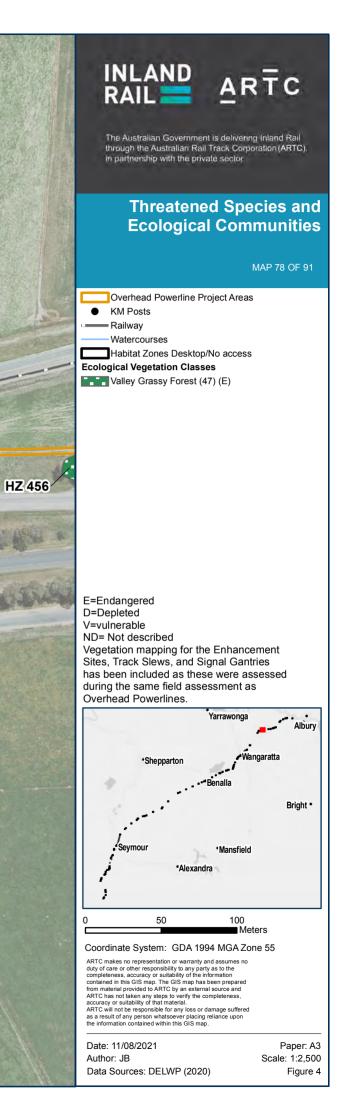
Overhead Powerline Project Areas Railway Watercourses Ecological Vegetation Classes Plains Woodland (803) (E) Spike-sedge Wetland (819) (V)

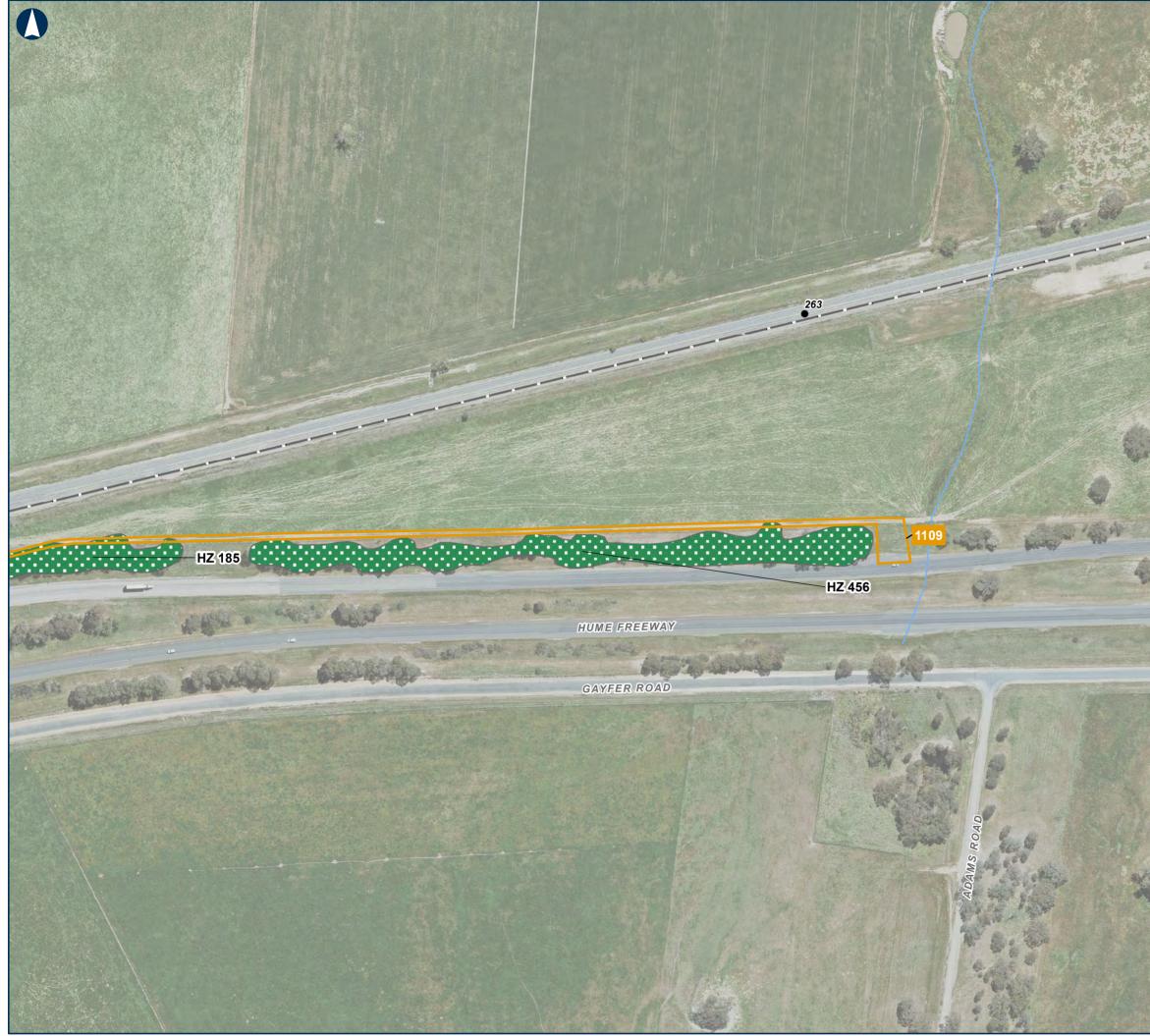










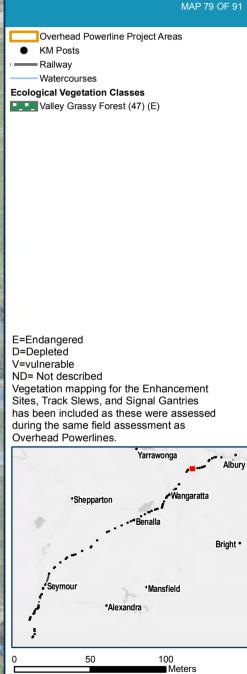




Threatened Species and Ecological Communities

ARTC

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Coordinate System: GDA 1994 MGA Zone 55

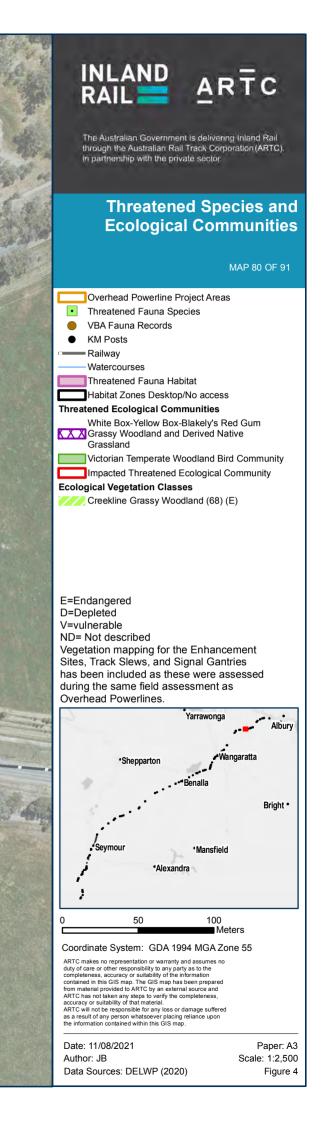
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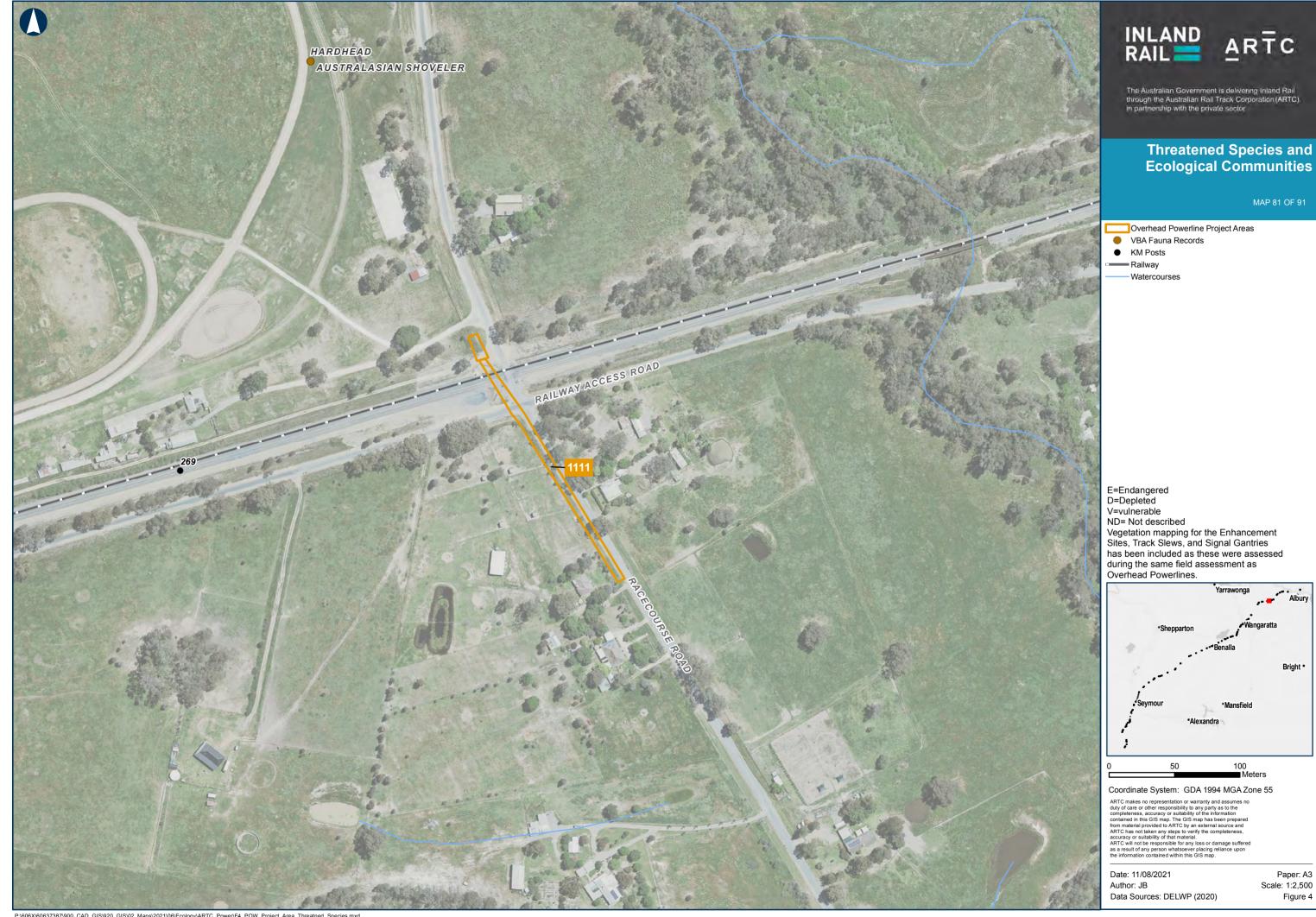
Date: 11/08/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 4



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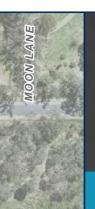










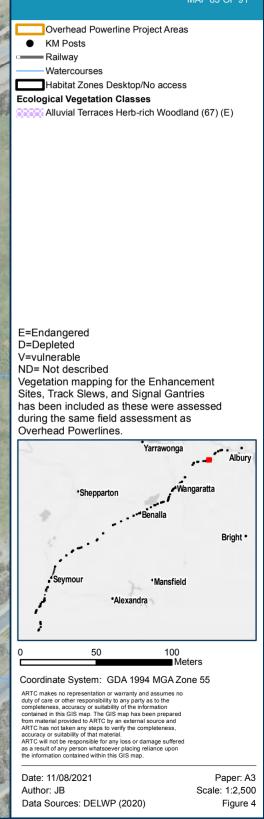




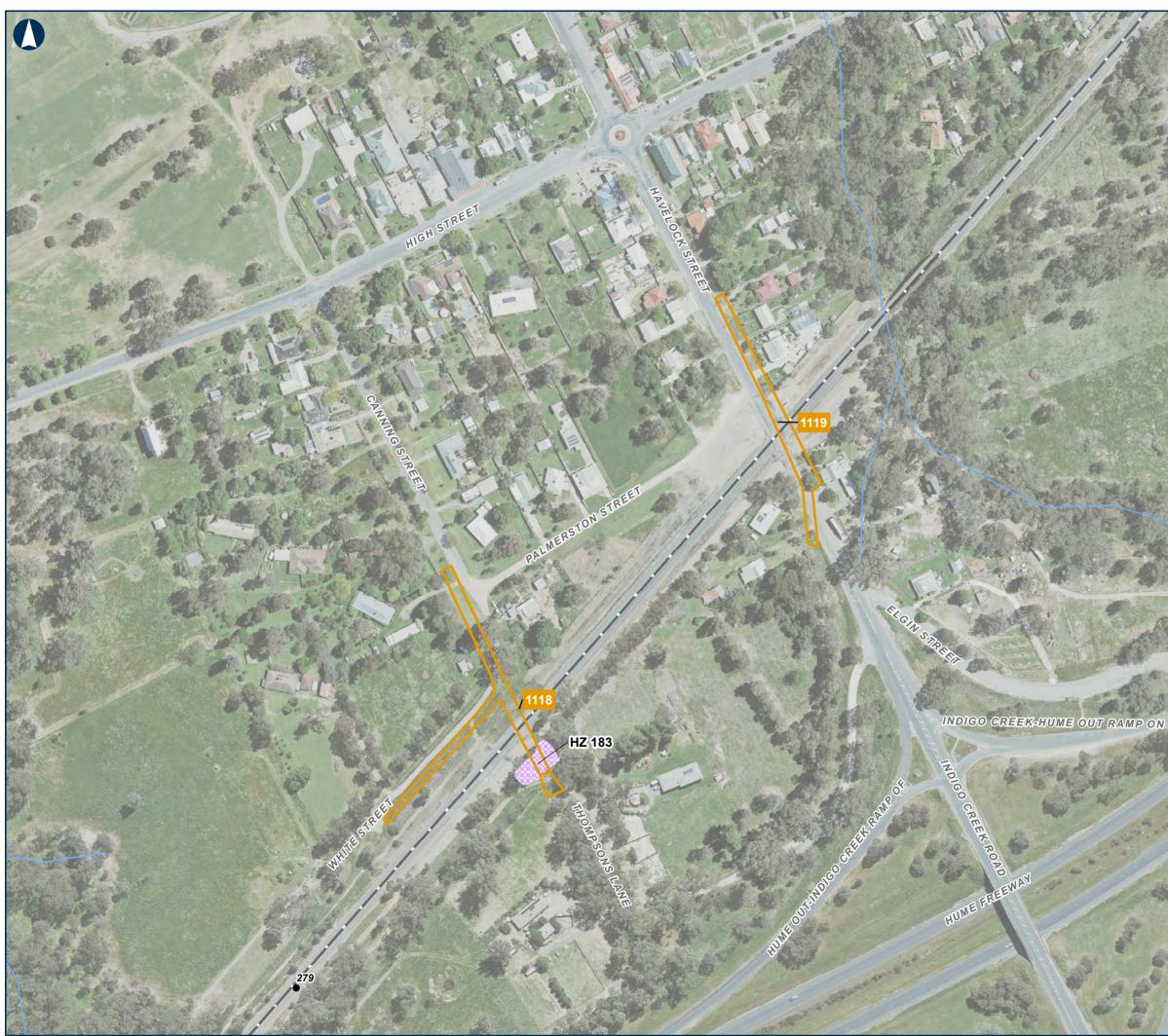
Threatened Species and Ecological Communities

ARTC

MAP 83 OF 91









Threatened Species and **Ecological Communities**

MAP 85 OF 91









Threatened Species and **Ecological Communities**

MAP 86 OF 91

Overhead Powerline Project Areas Train Station KM Posts Railway

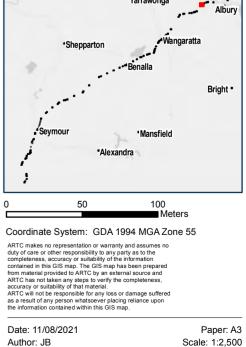
-Watercourses

CT 3

Ecological Vegetation Classes

Alluvial Terraces Herb-rich Woodland (67) (V)

E=Endangered D=Depleted V=vulnerable ND= Not described ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



Data Sources: DELWP (2020)

Scale: 1:2,500 Figure 4





4 C

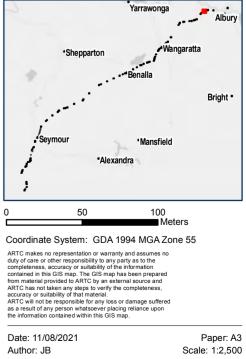
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Threatened Species and Ecological Communities

MAP 87 OF 91

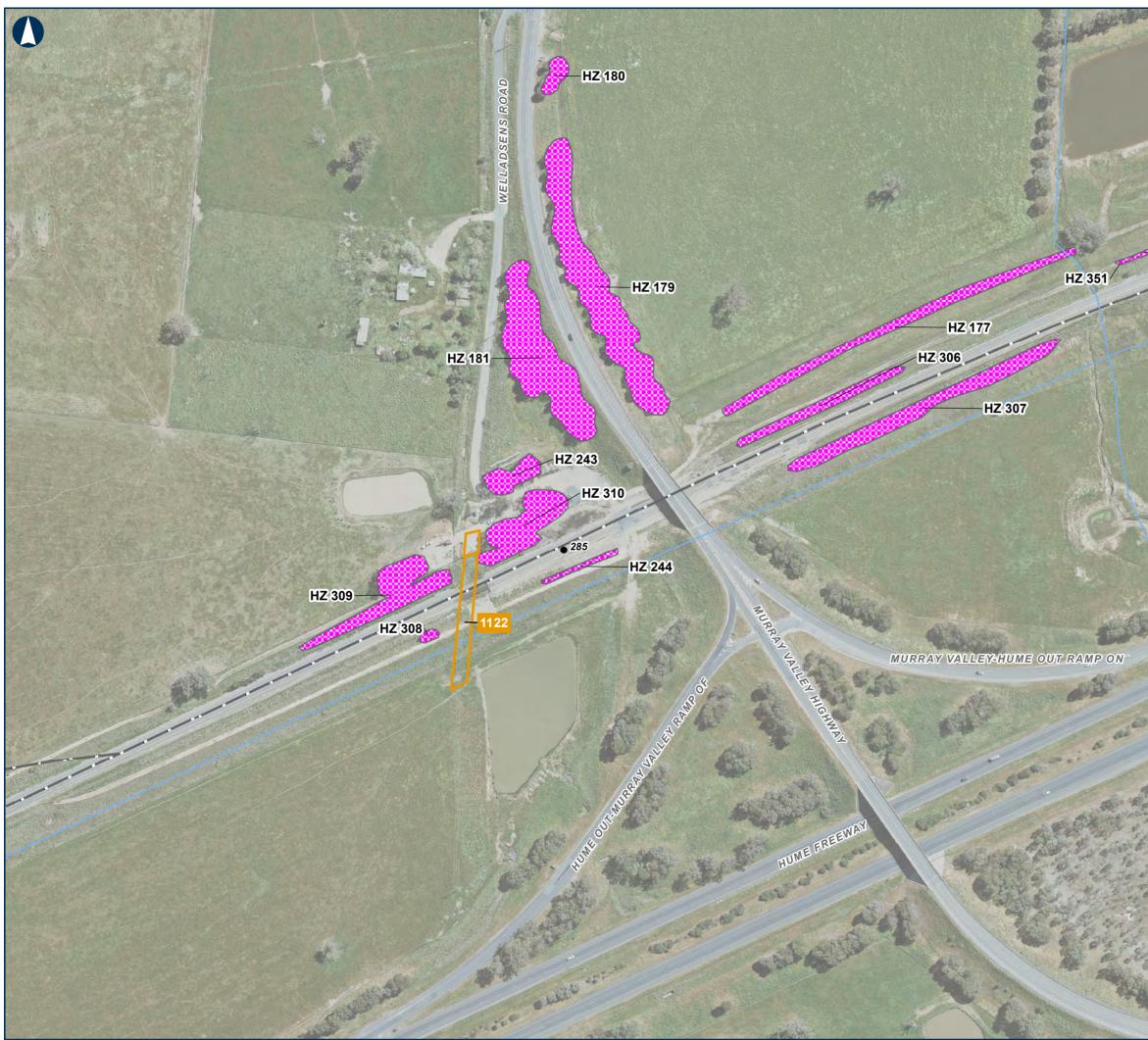


E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



Data Sources: DELWP (2020)

Figure 4





Threatened Species and Ecological Communities

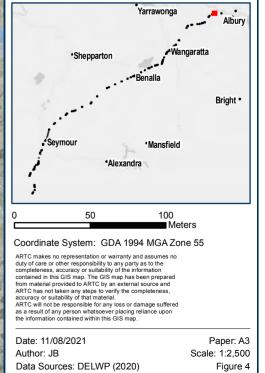
ARTC

MAP 88 OF 91

Overhead Powerline Project Areas
 KM Posts
 Railway
 Watercourses
Ecological Vegetation Classes
 Plains Woodland (803) (E)

-HZ 351

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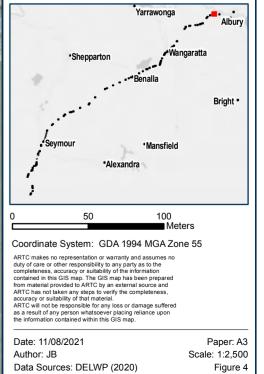
Threatened Species and Ecological Communities

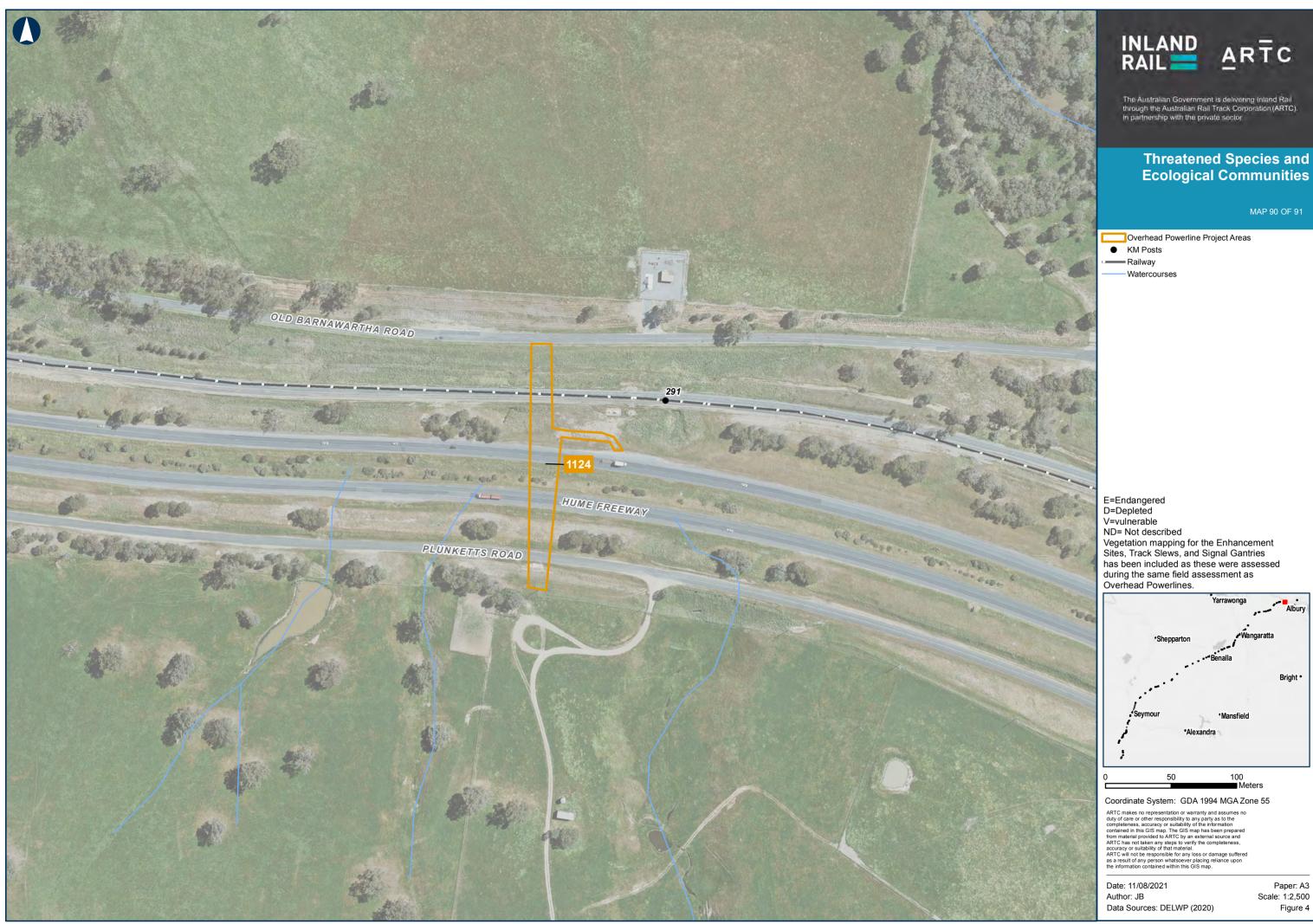
MAP 89 OF 91

ARTC

Overhead Powerline Project Areas Railway Watercourses

E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.







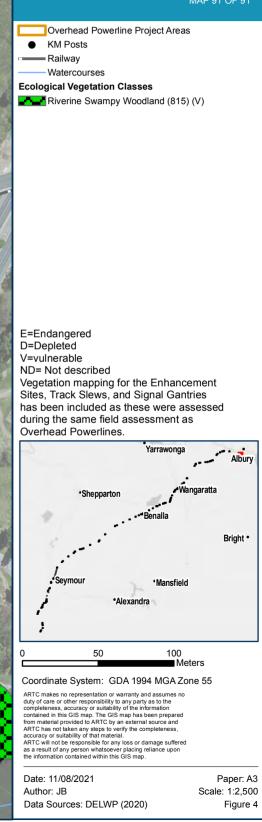




The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

Threatened Species and Ecological Communities

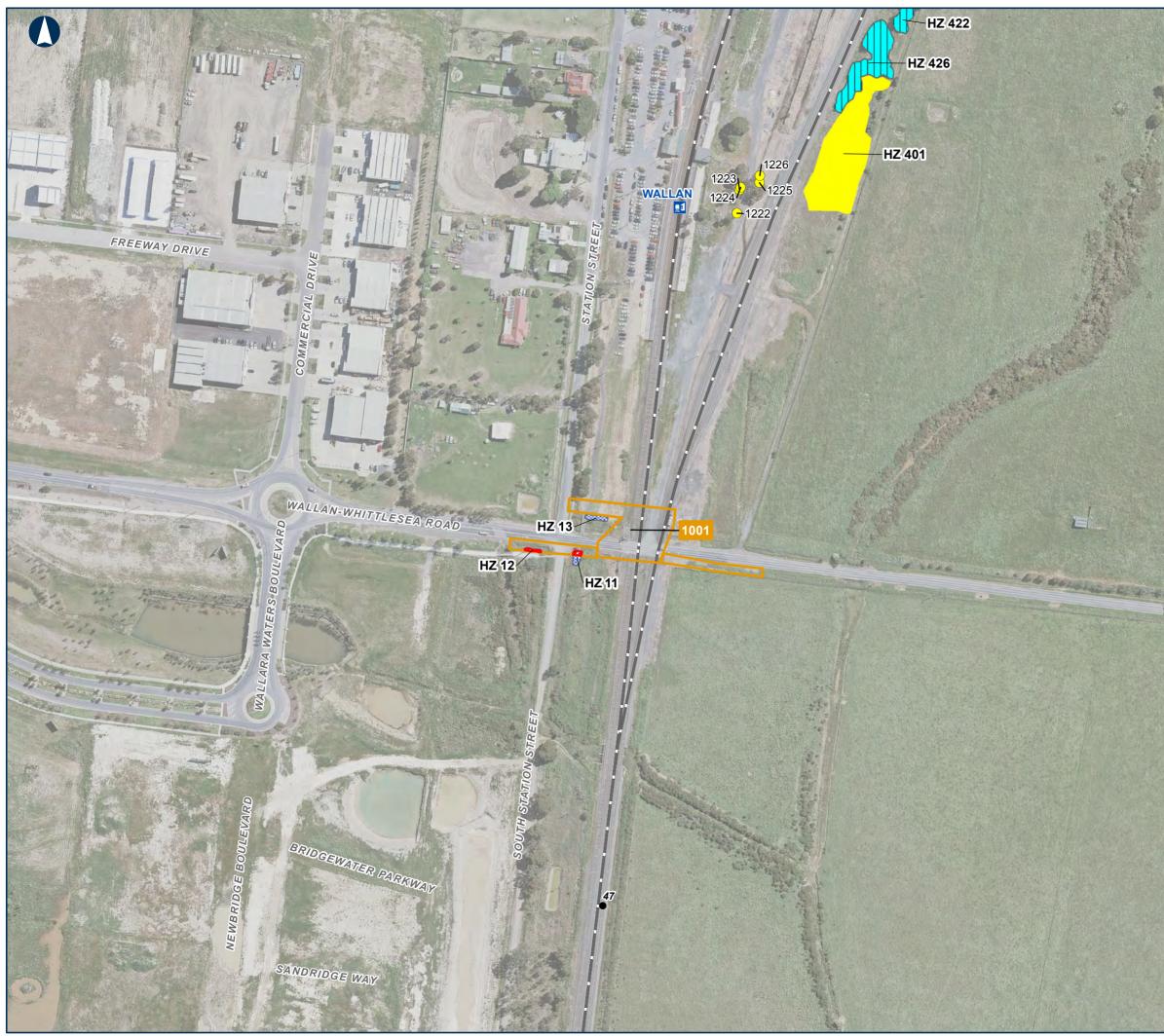
MAP 91 OF 91

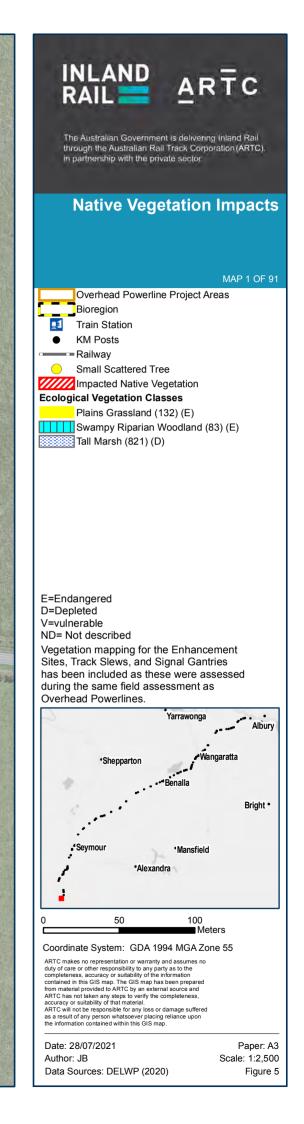


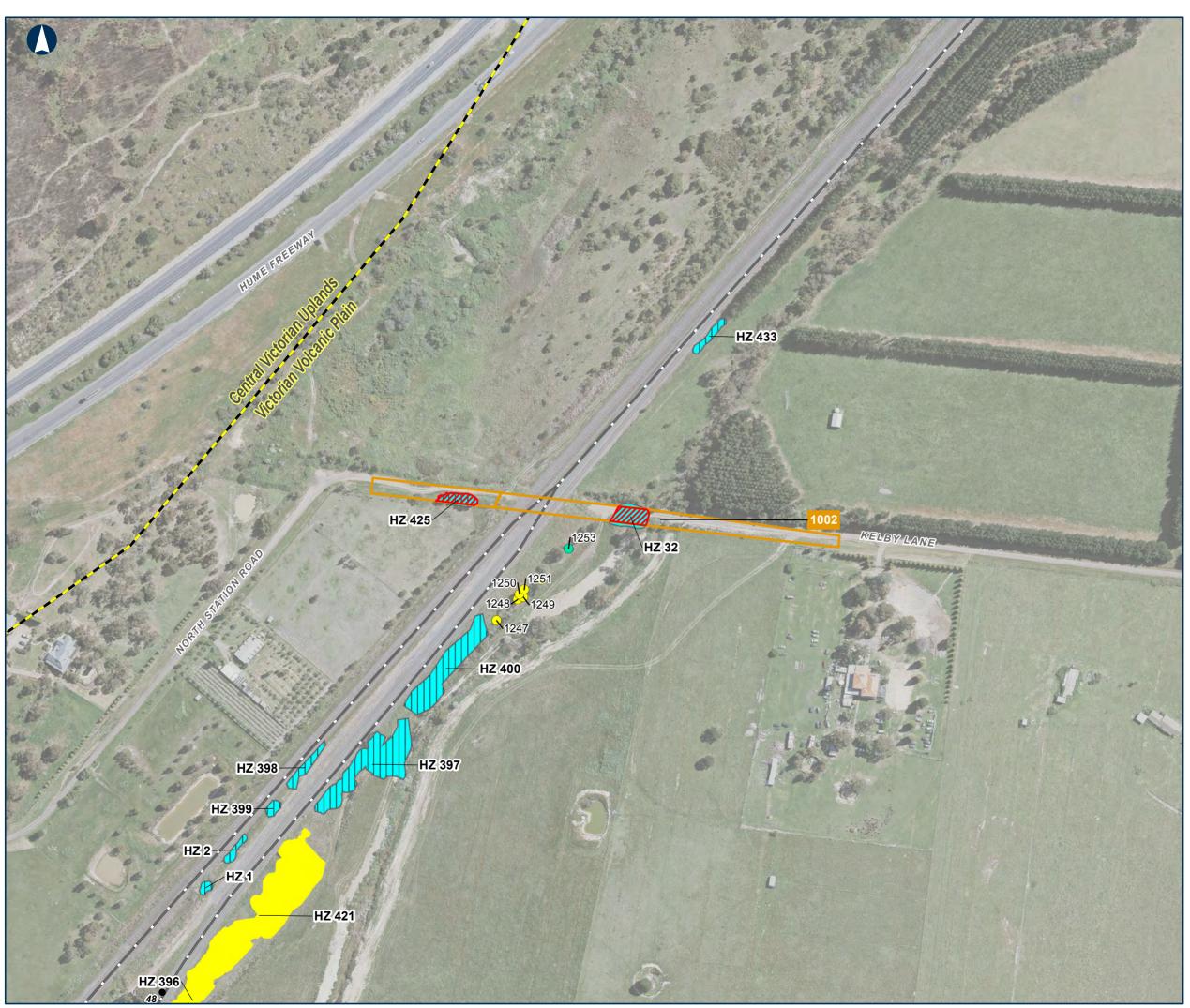
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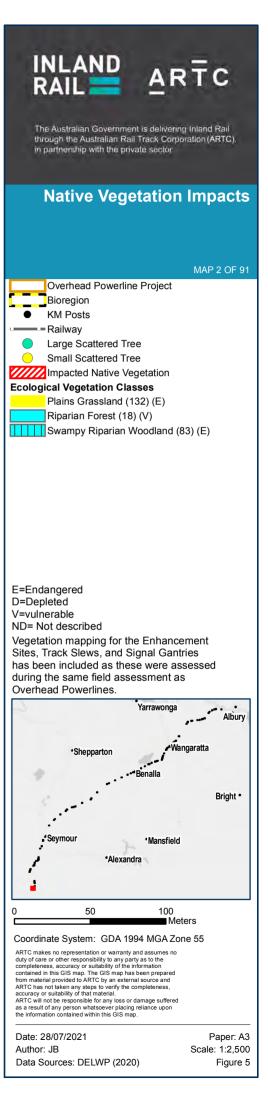
Appendix A – Figures

Figure 5 Native vegetation impacts





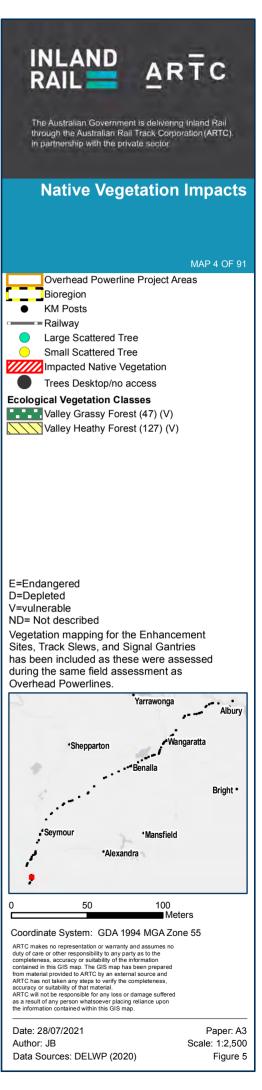




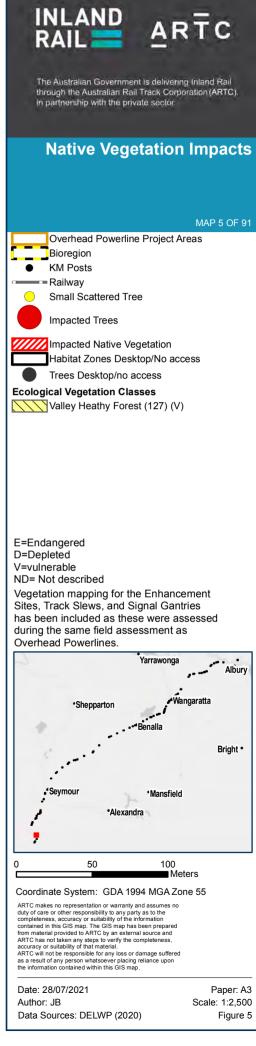
















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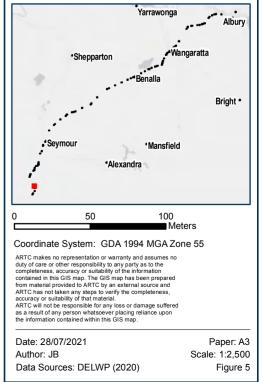
Native Vegetation Impacts



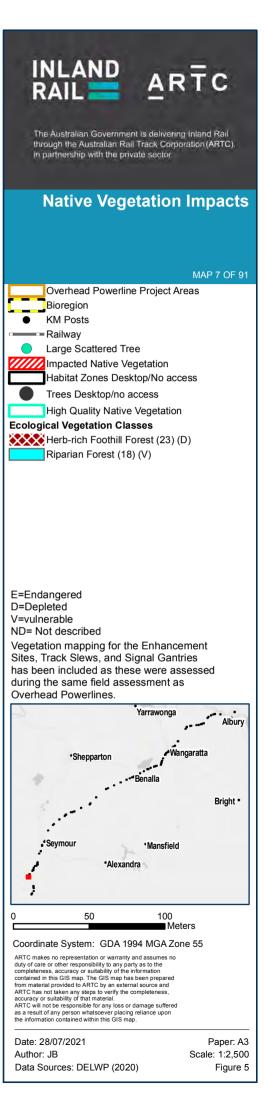
Ecological Vegetation Classes

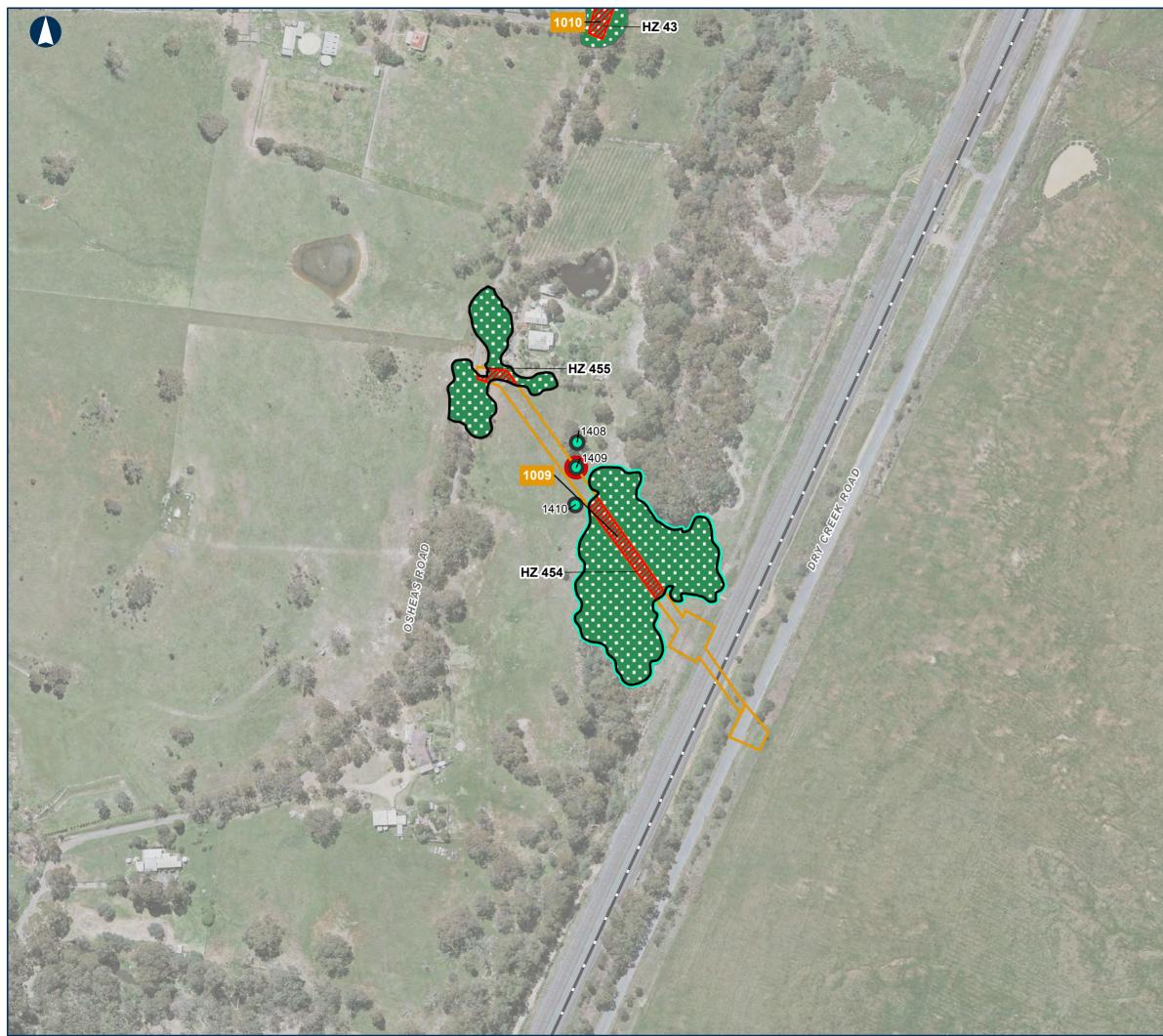
Tall Marsh (821) (D)
Valley Grassy Forest (47) (V)

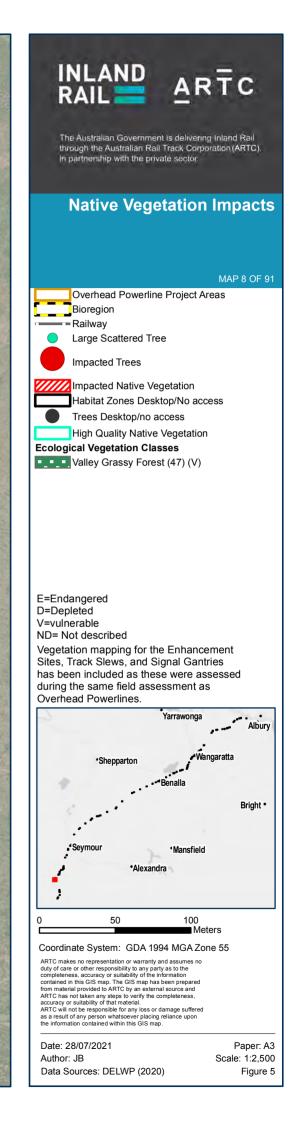
E=Endangered D=Depleted V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.



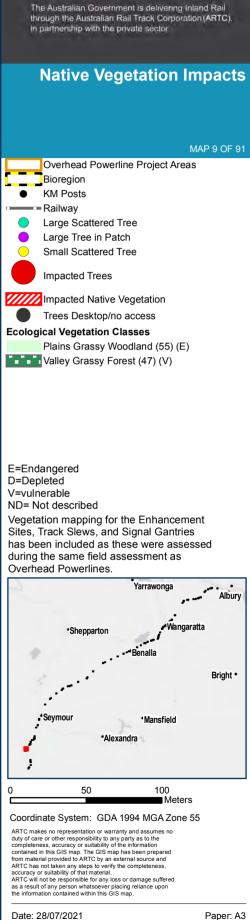












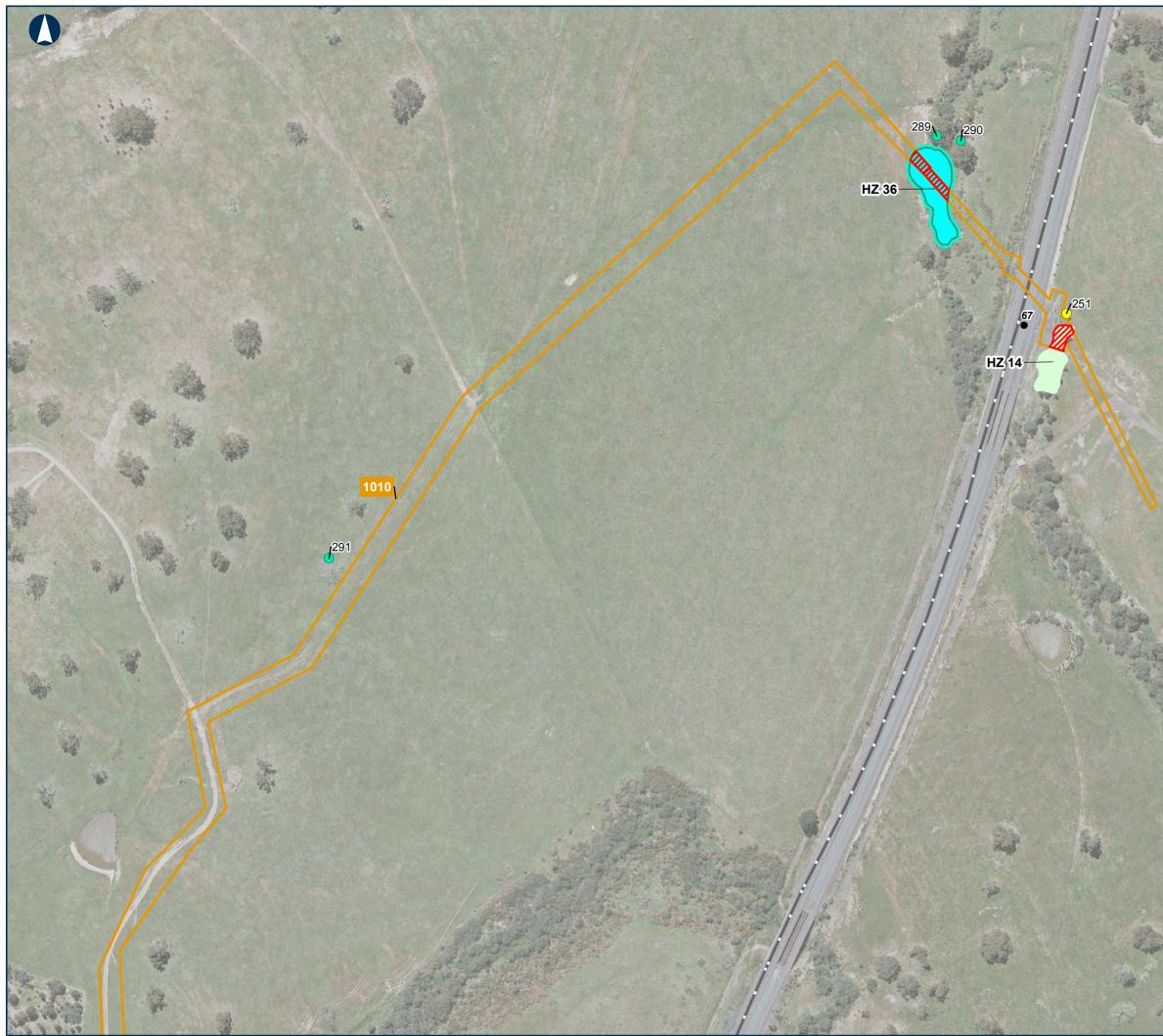
Author: JB

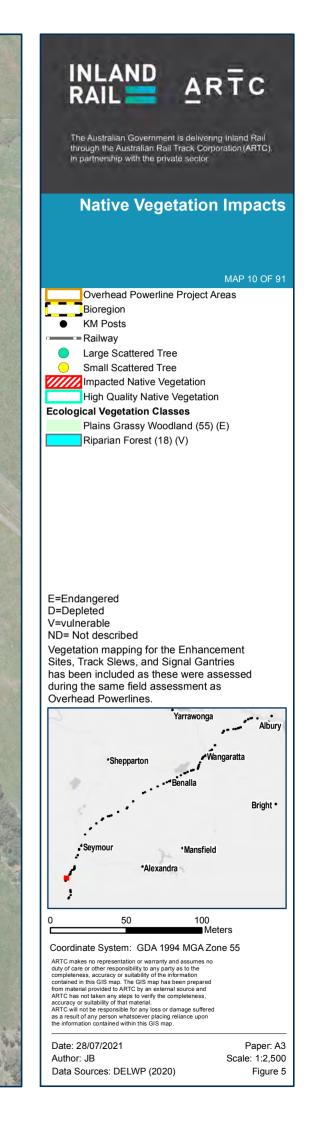
Data Sources: DELWP (2020)

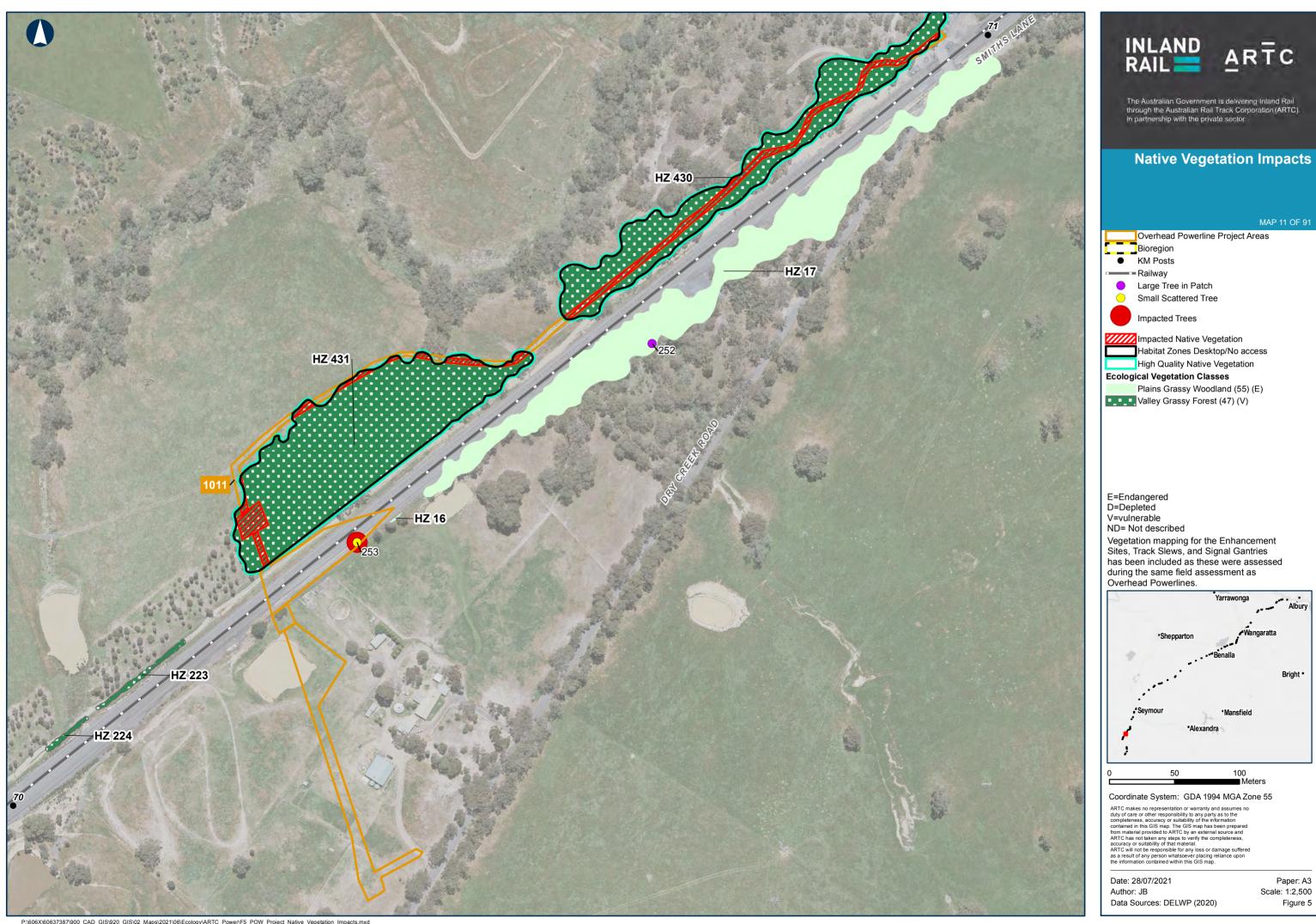
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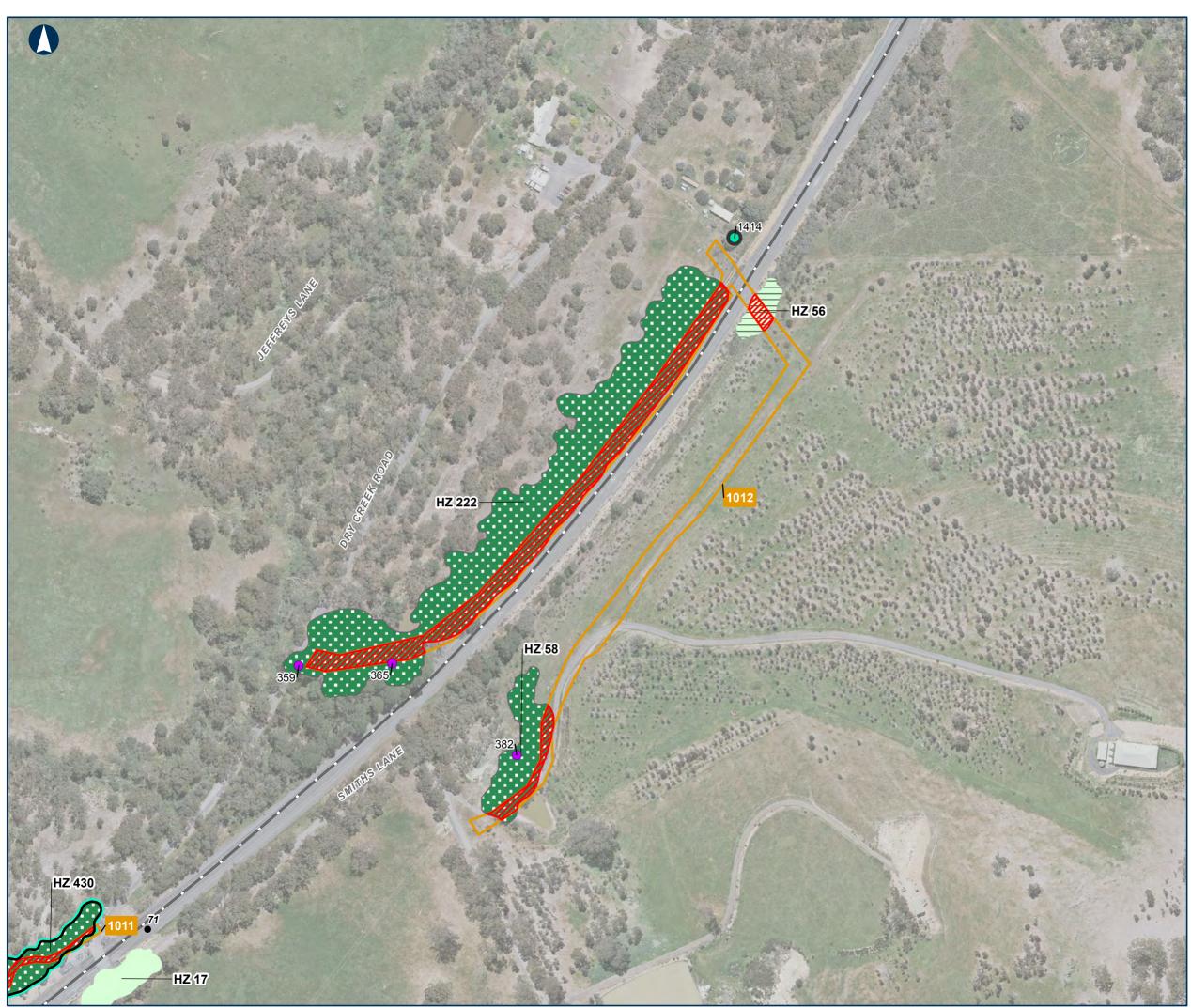
Paper: A3 Scale: 1:2,500 Figure 5

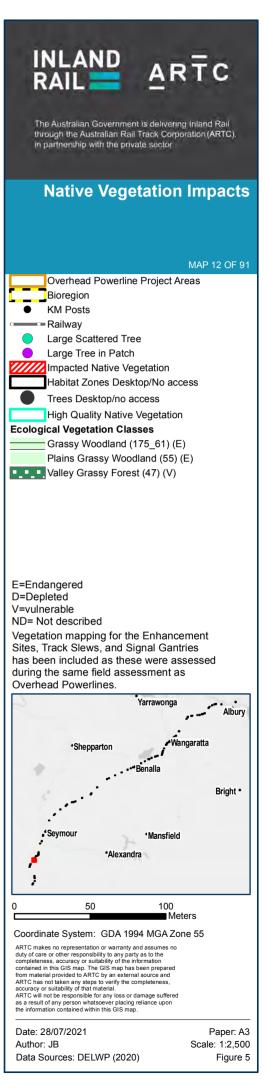
Albury







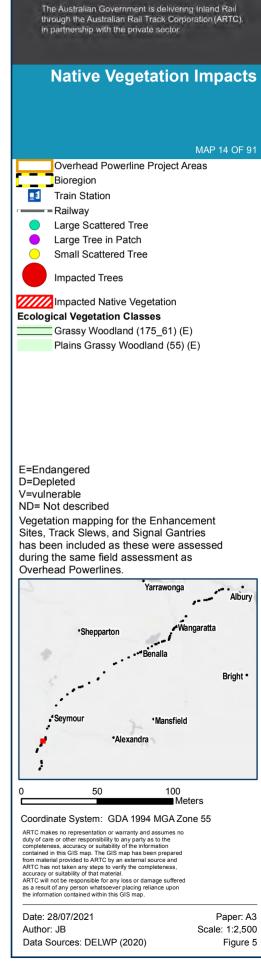




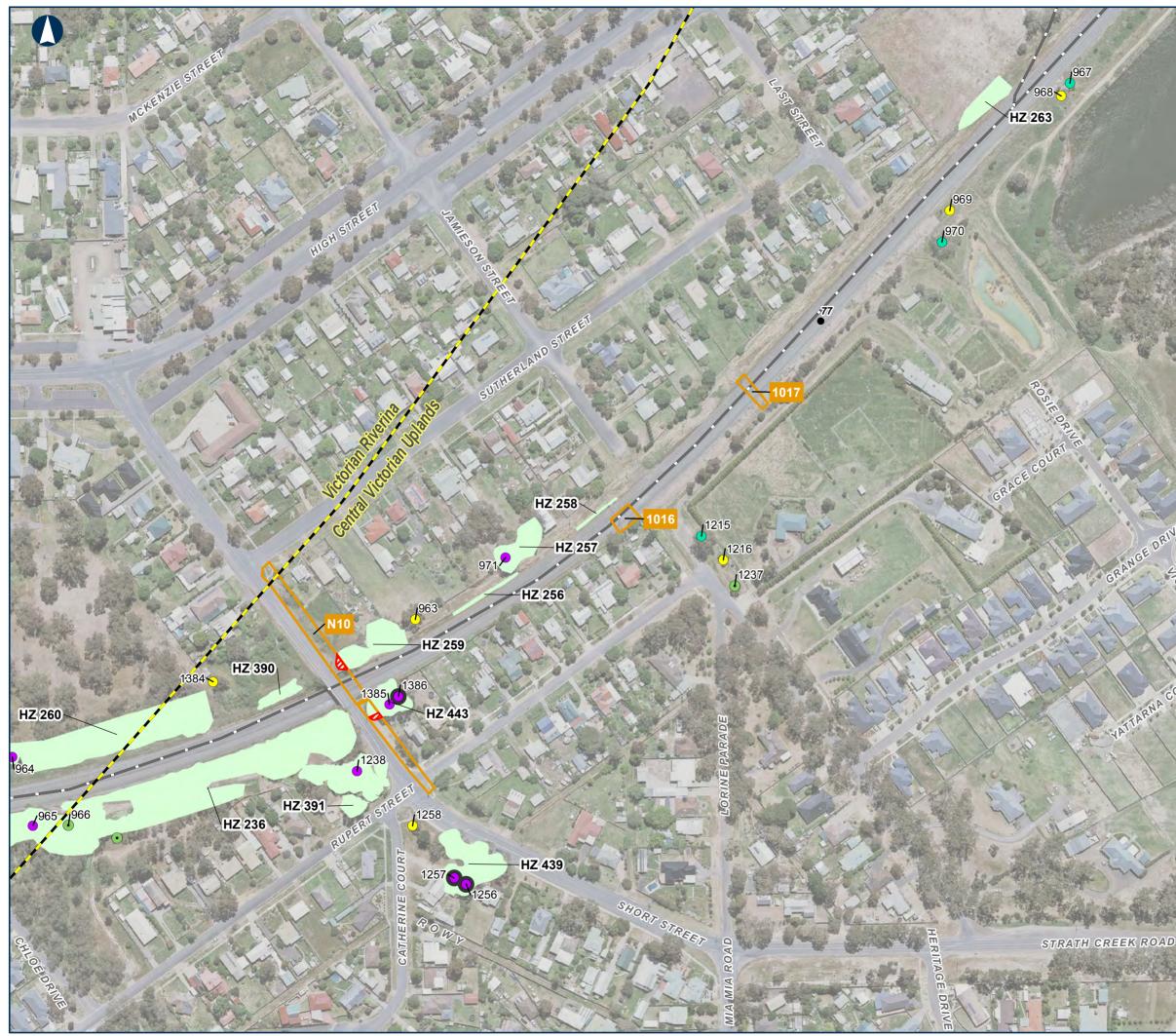




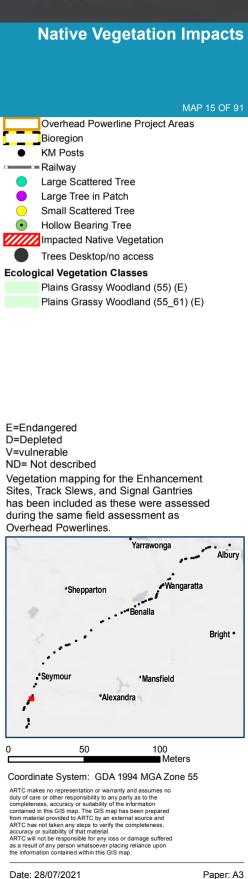




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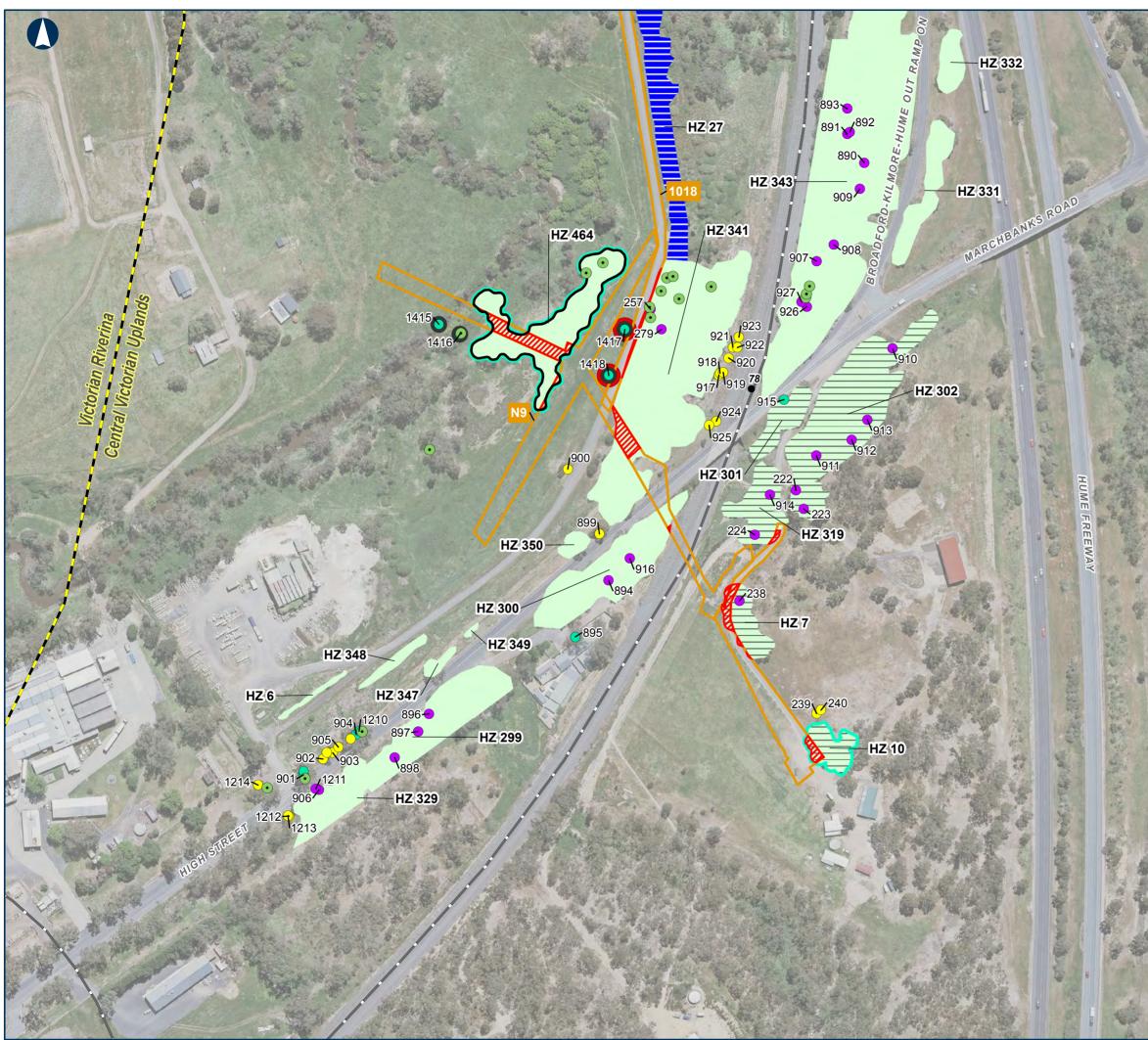
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Data Sources: DELWP (2020)

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Paper: A3 Scale: 1:2,500 Figure 5



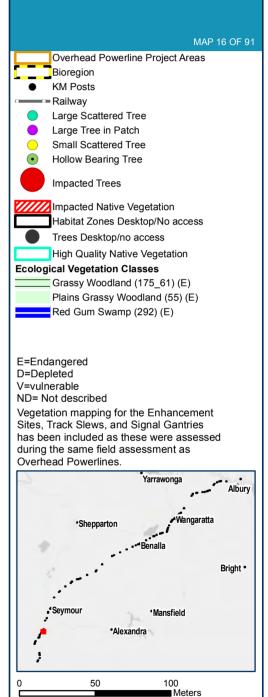




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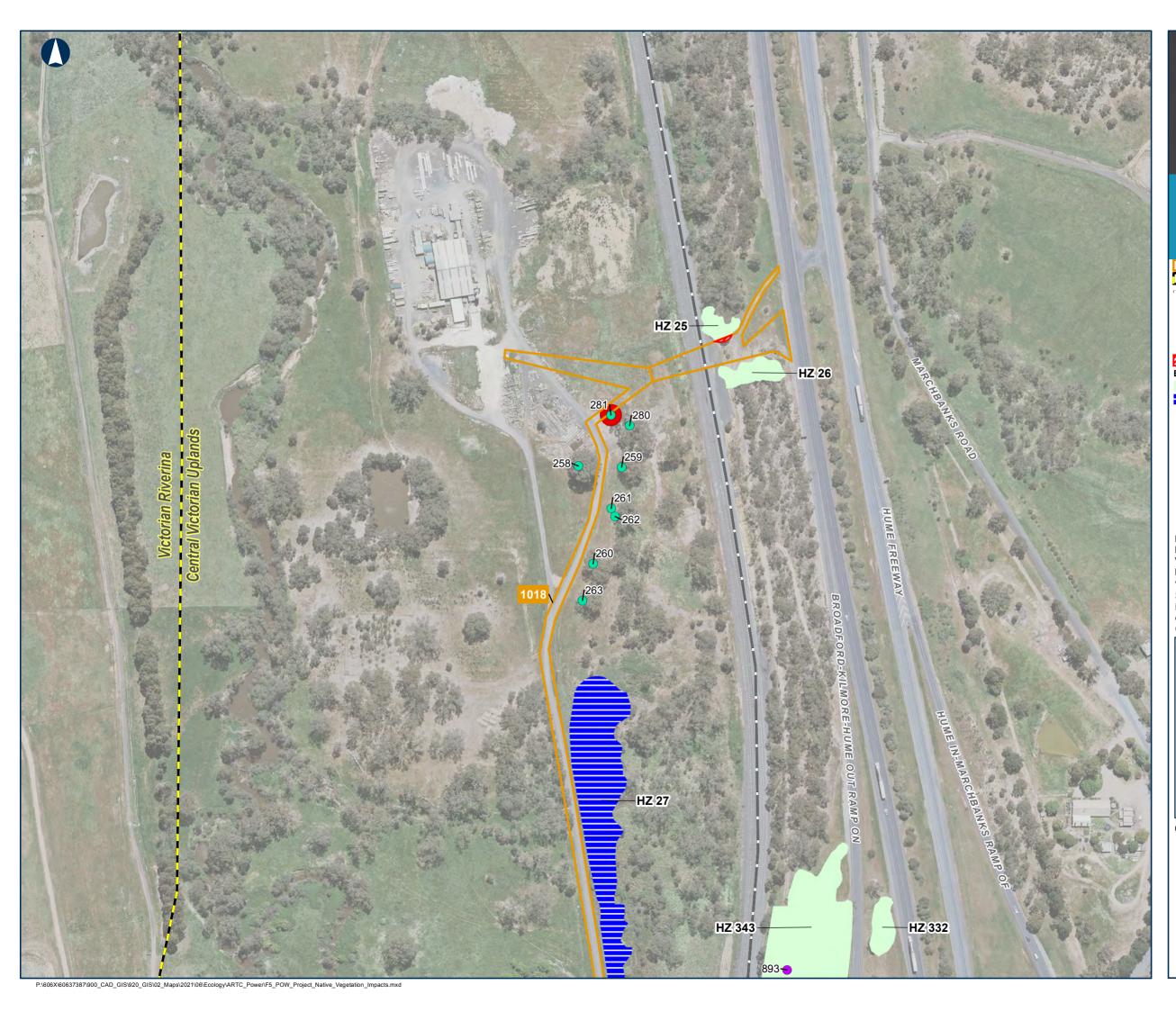
Native Vegetation Impacts



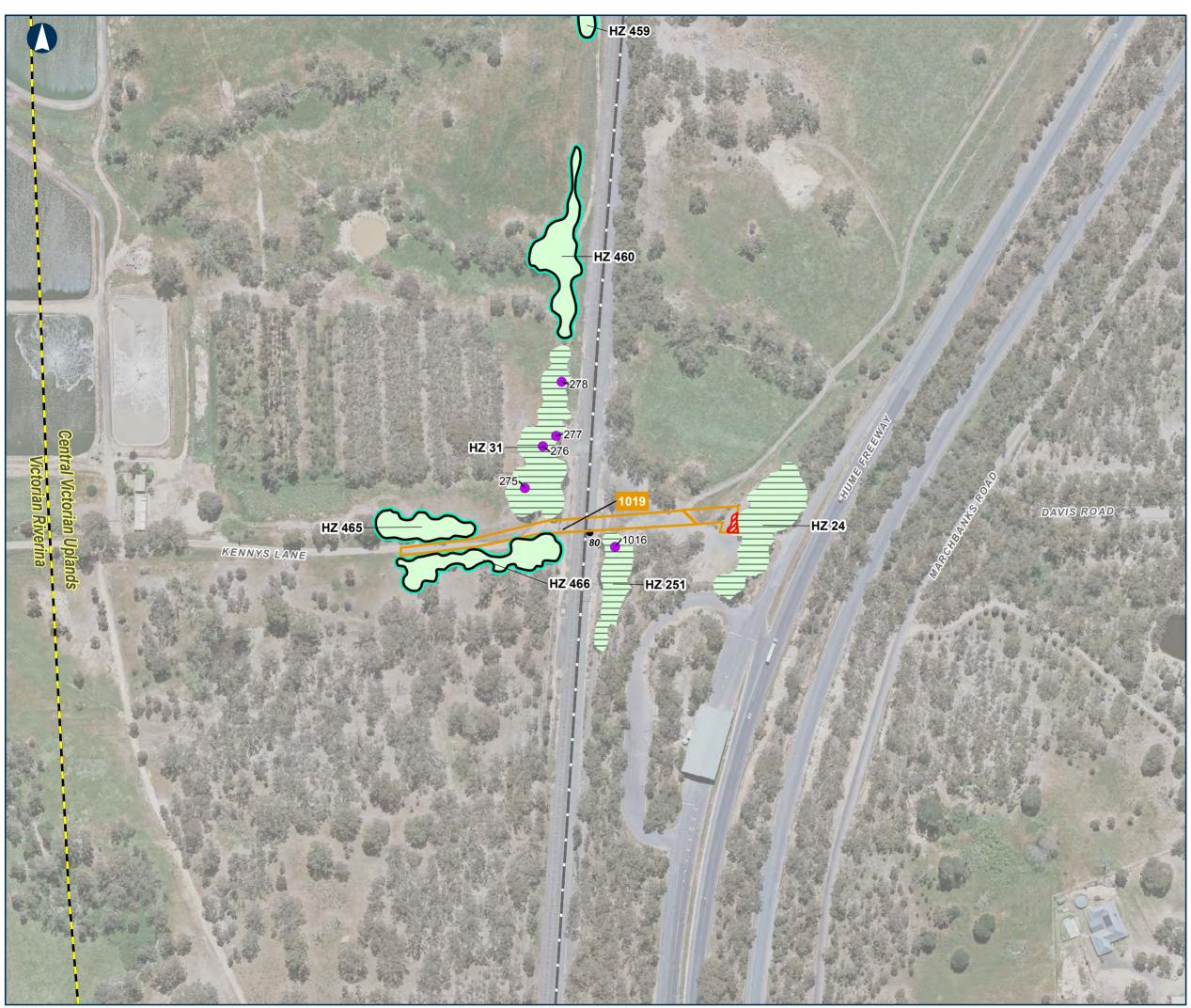
Coordinate System: GDA 1994 MGA Zone 55

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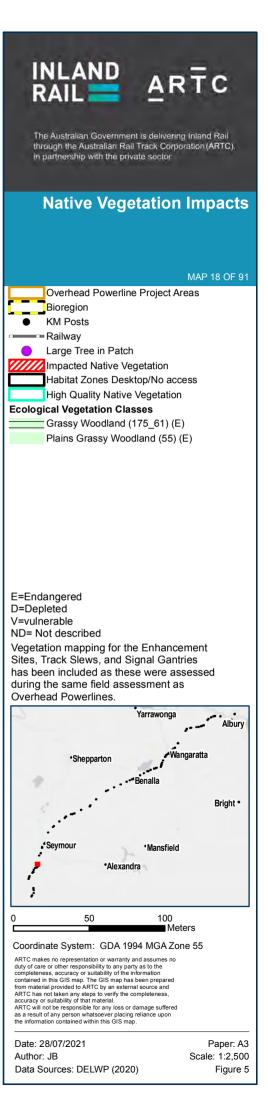
Date: 28/07/2021 Author: JB Data Sources: DELWP (2020) Paper: A3 Scale: 1:2,500 Figure 5

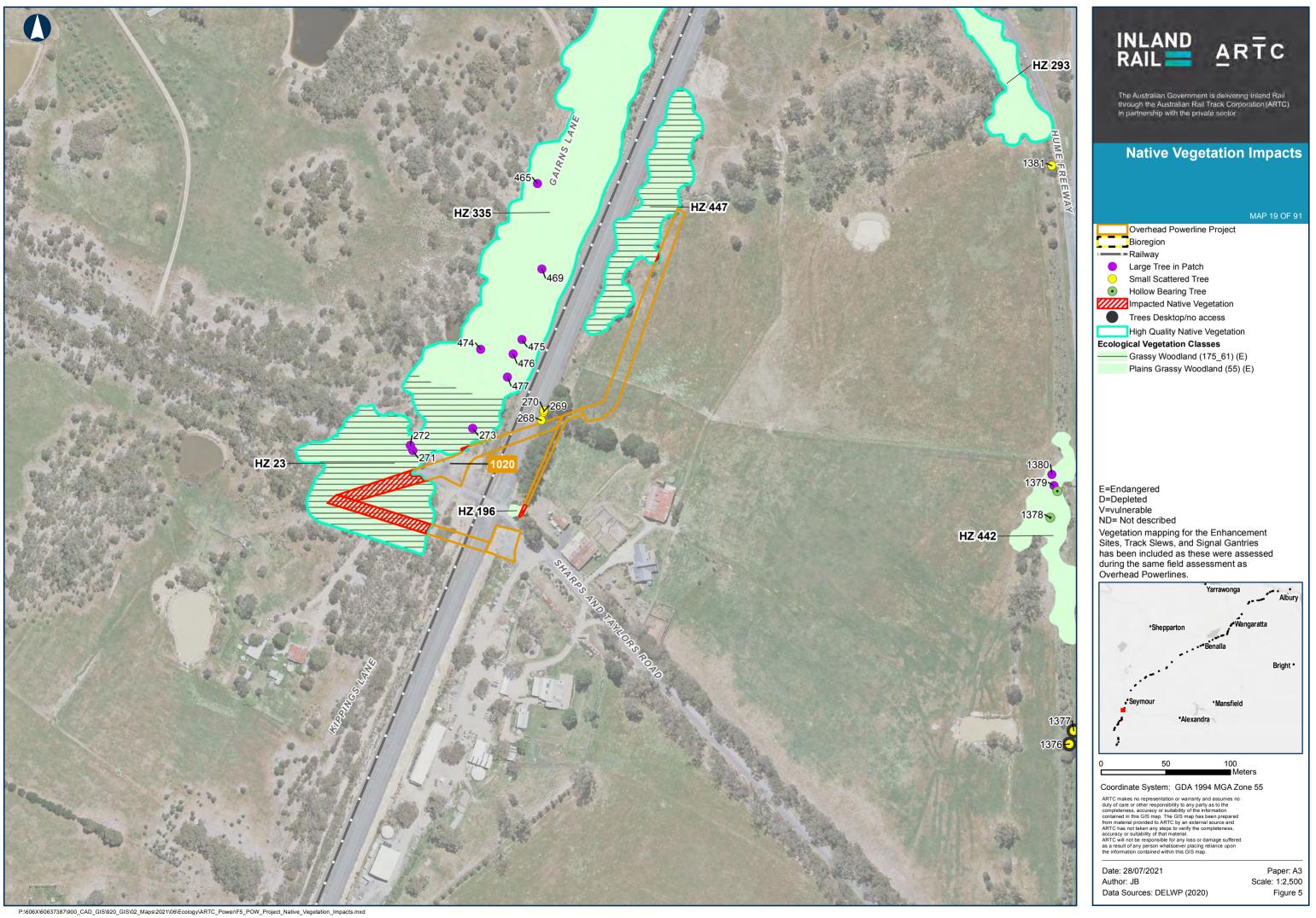




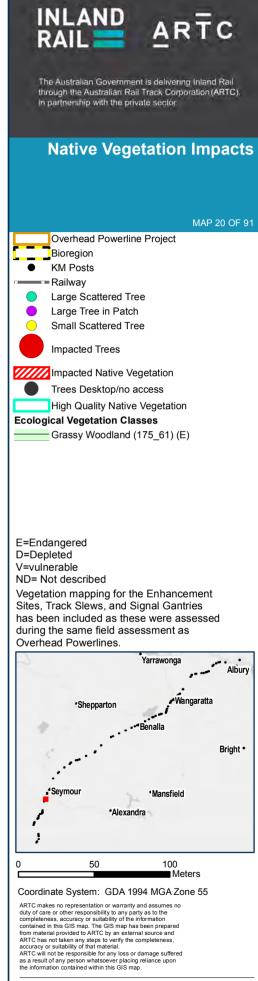


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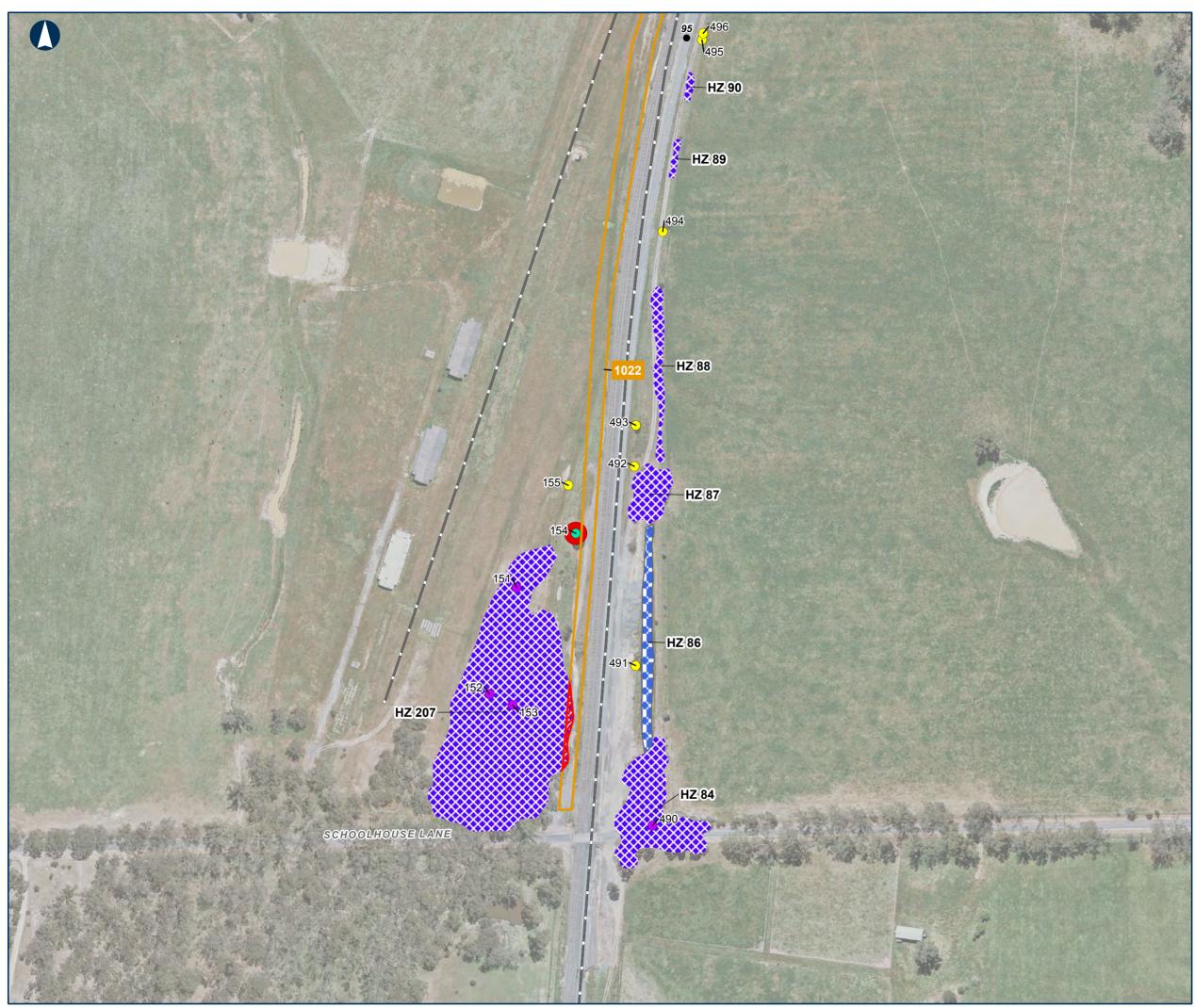




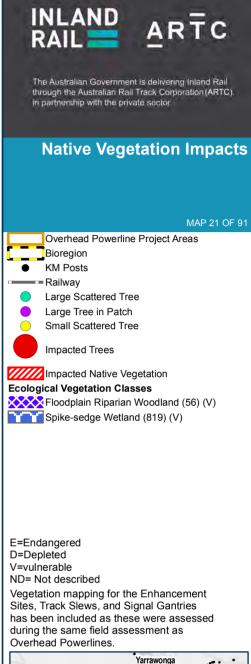




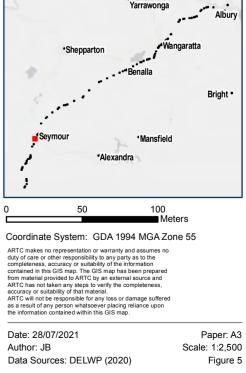
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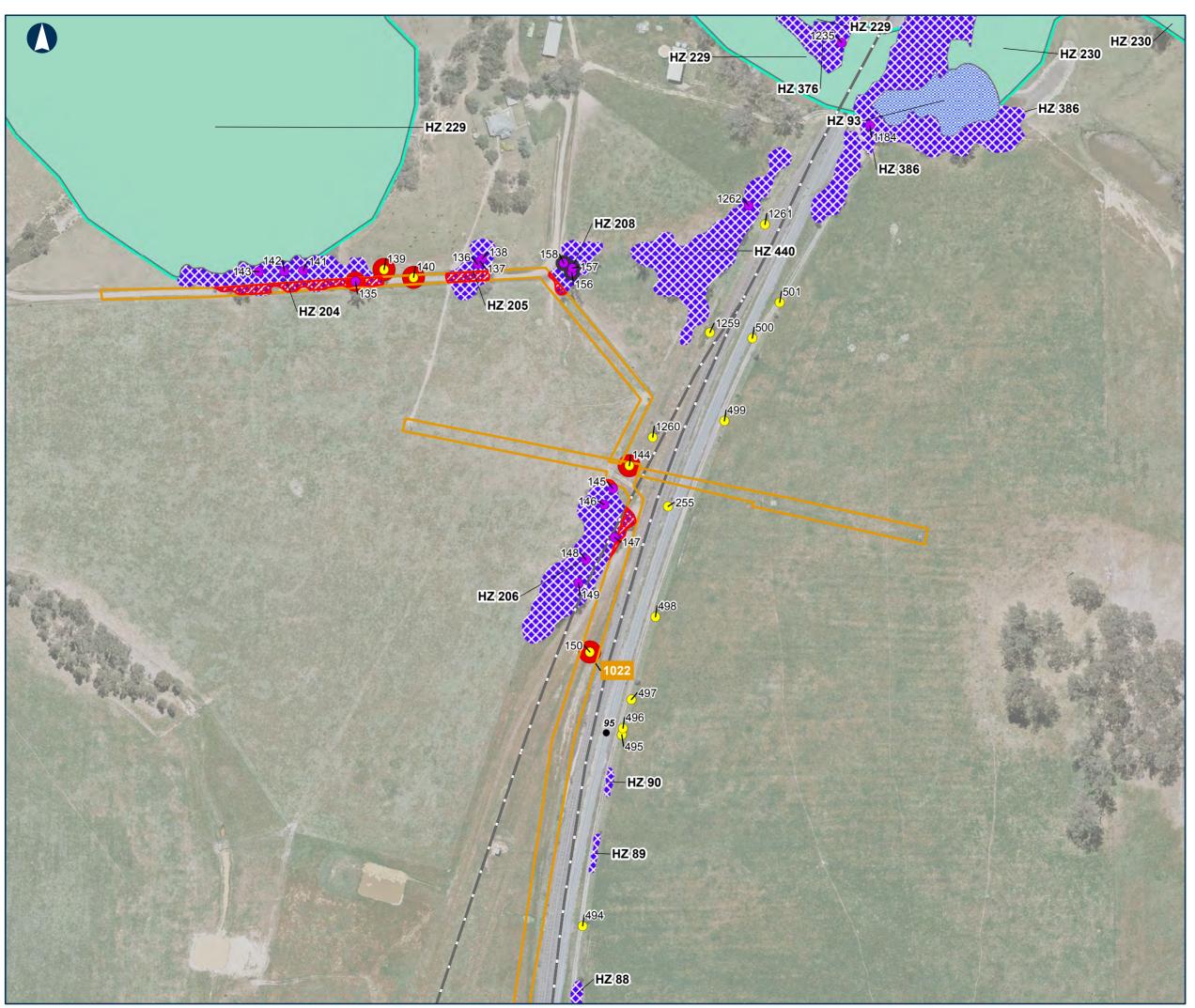


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MAP 21 OF 91







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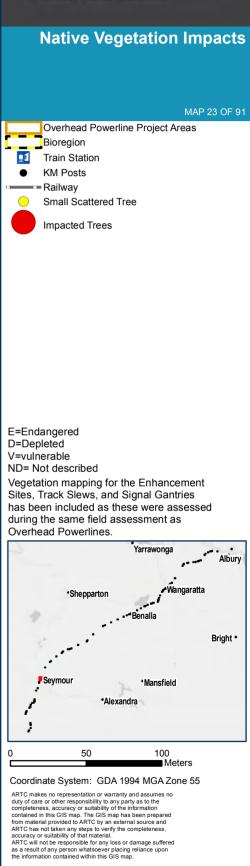
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Date: 28/07/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 5







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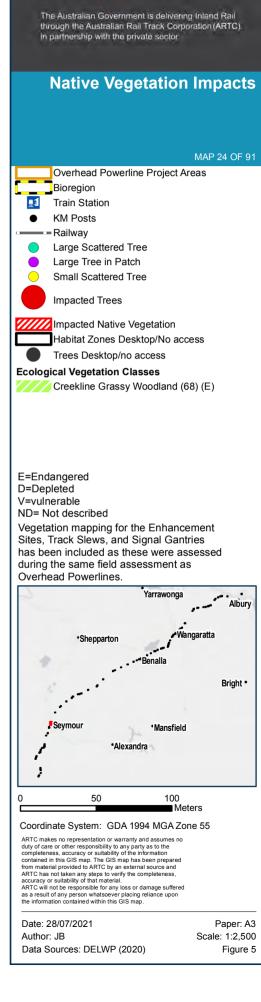
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Date: 28/07/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 5



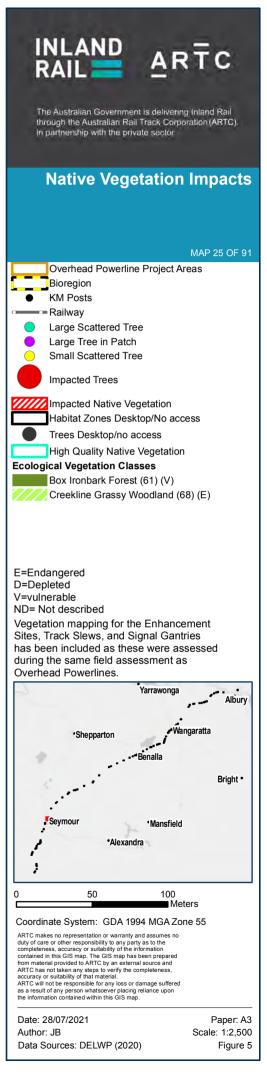


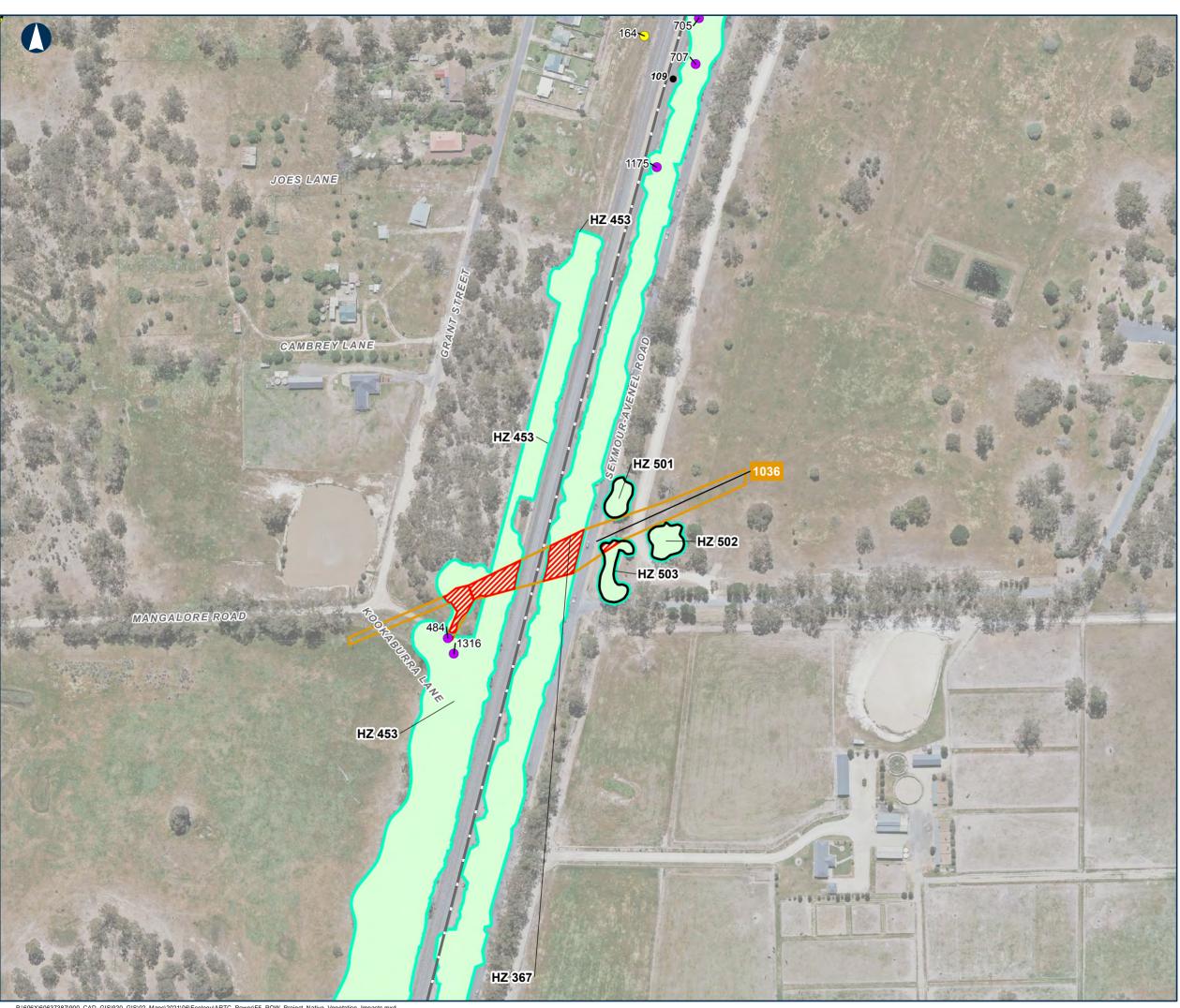


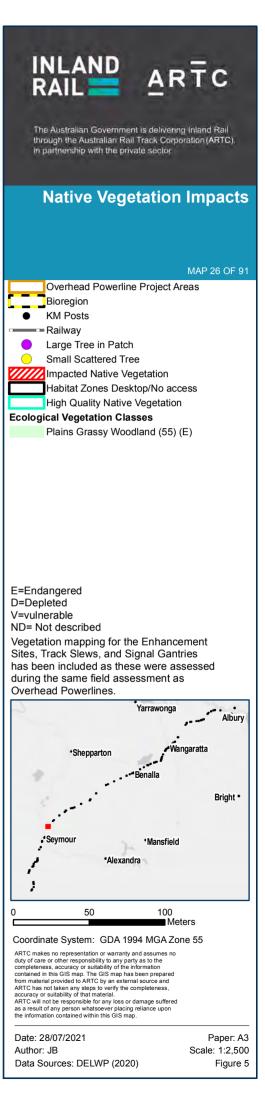
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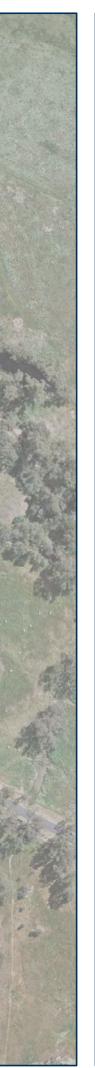
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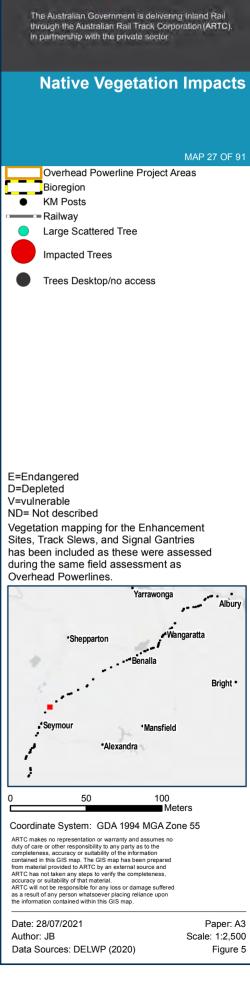




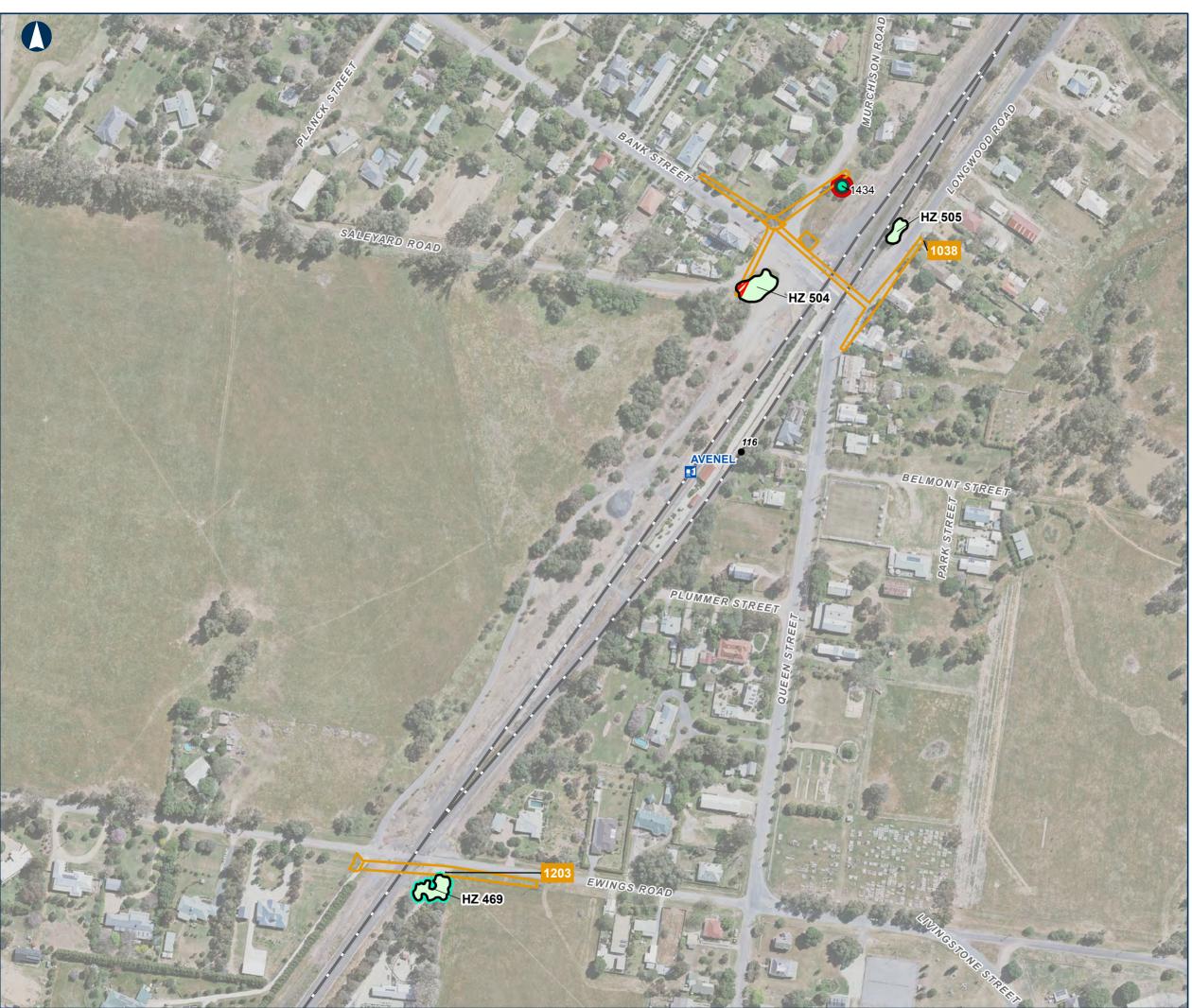


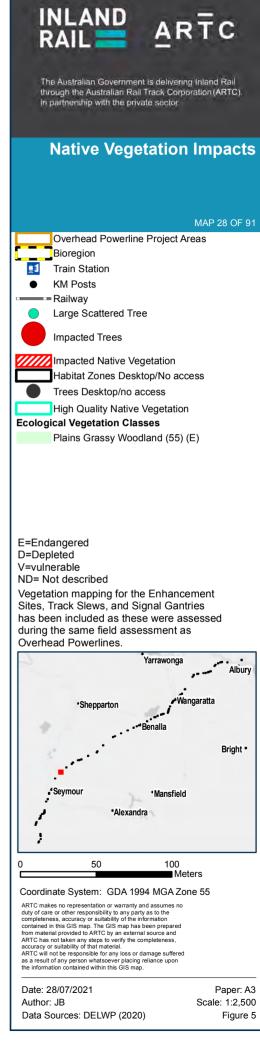


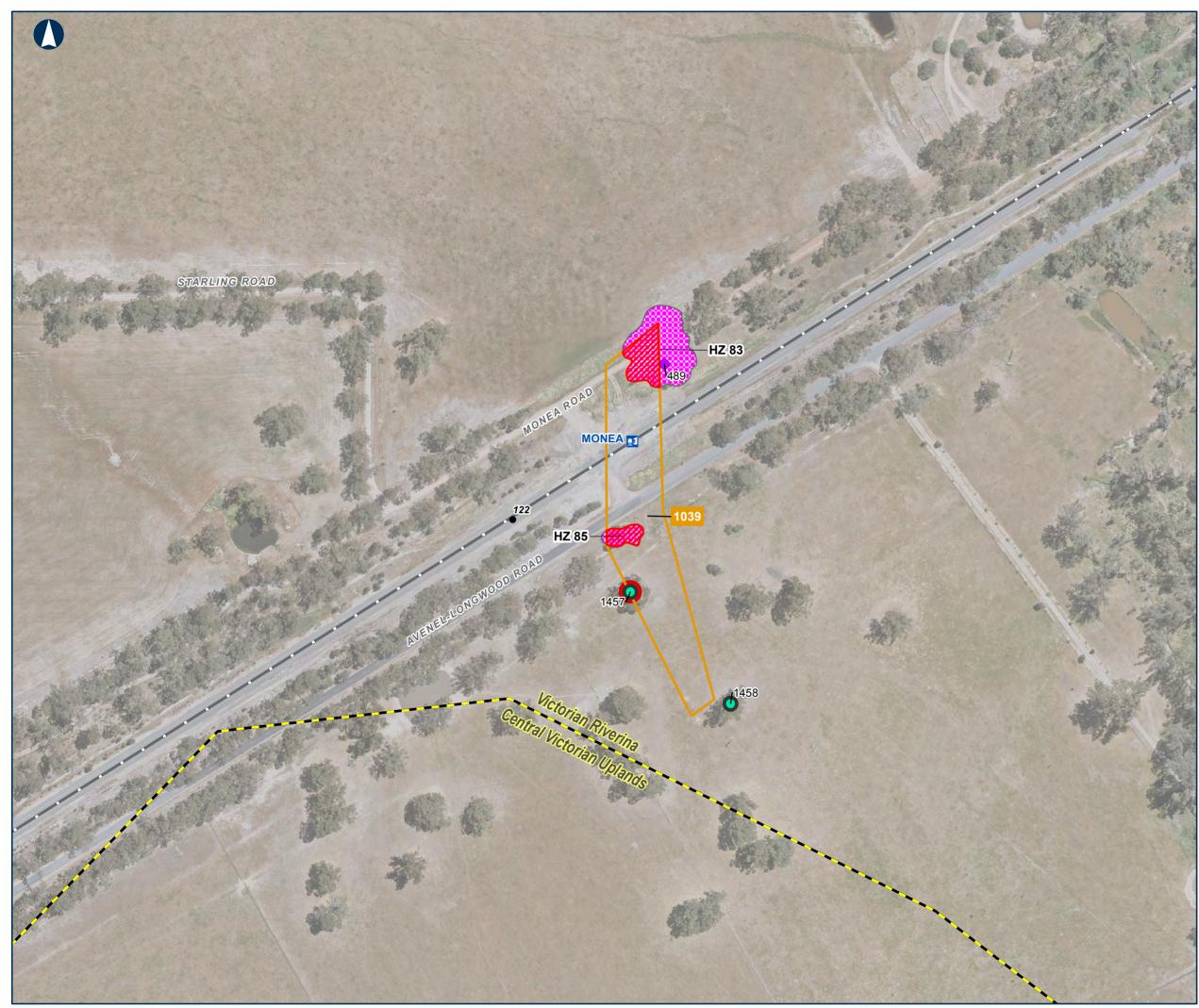


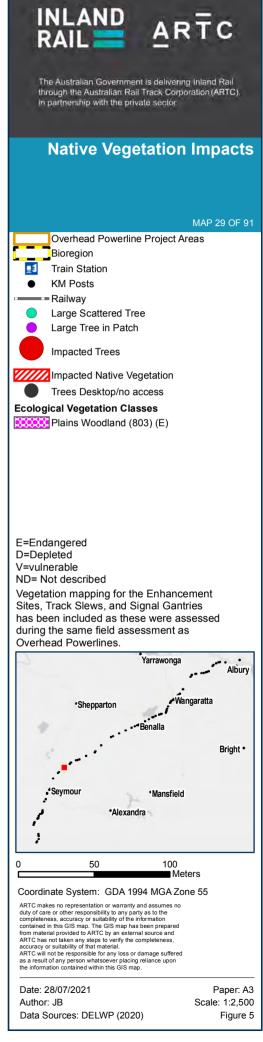


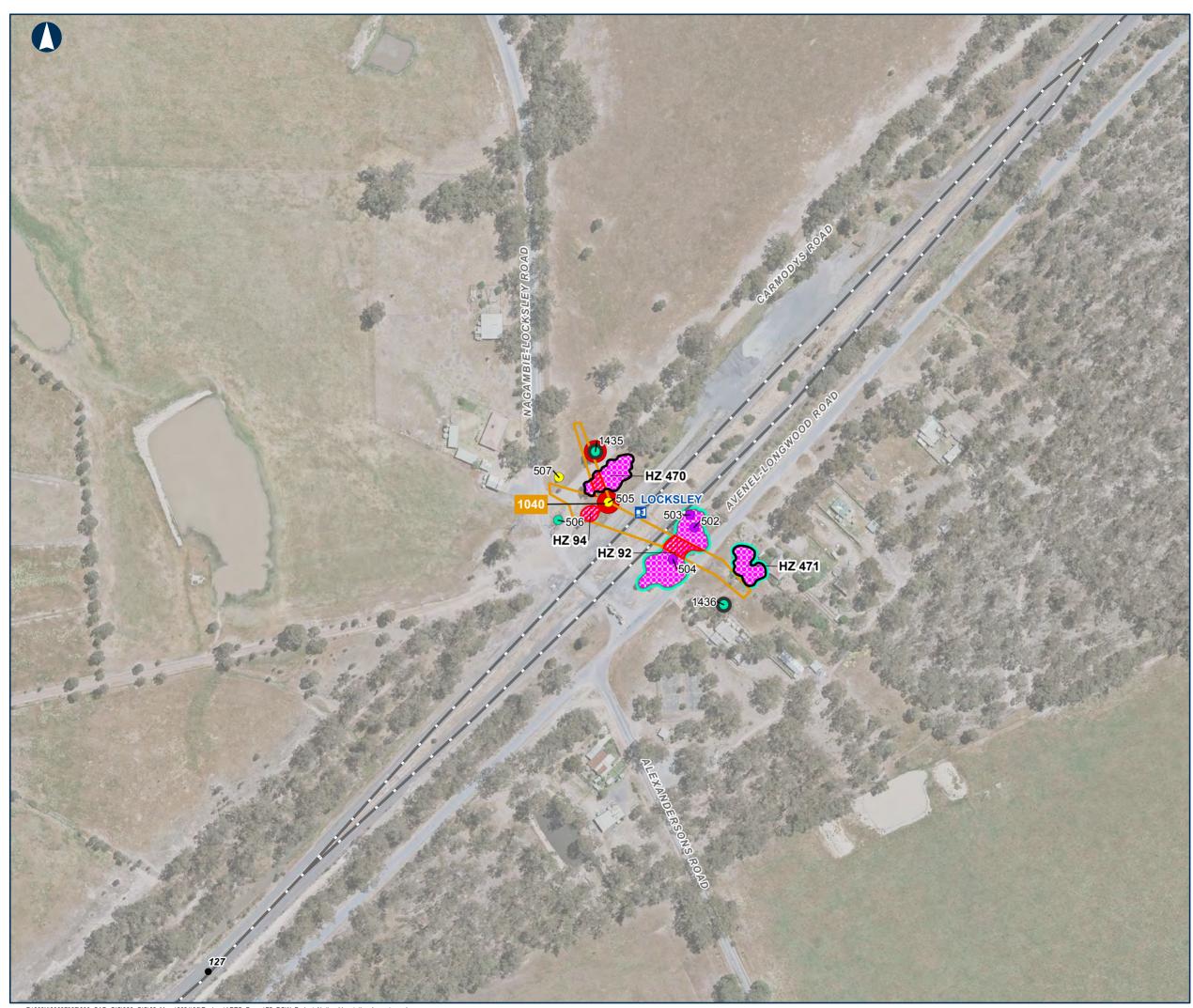
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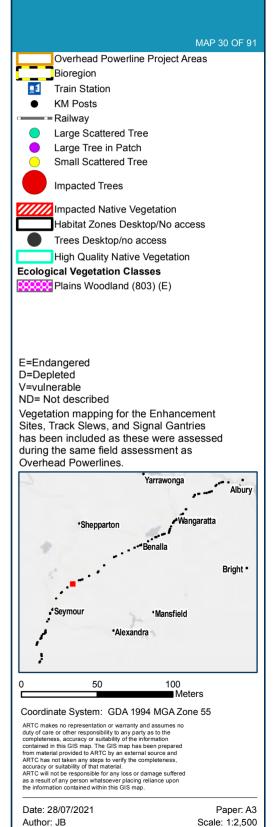






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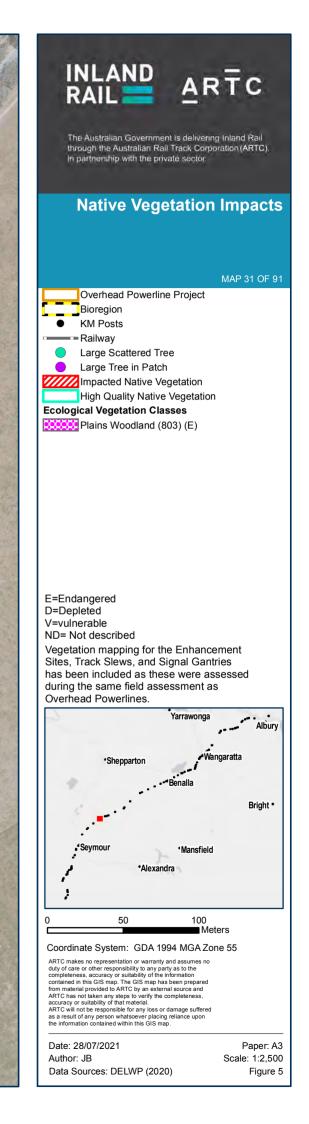
Native Vegetation Impacts

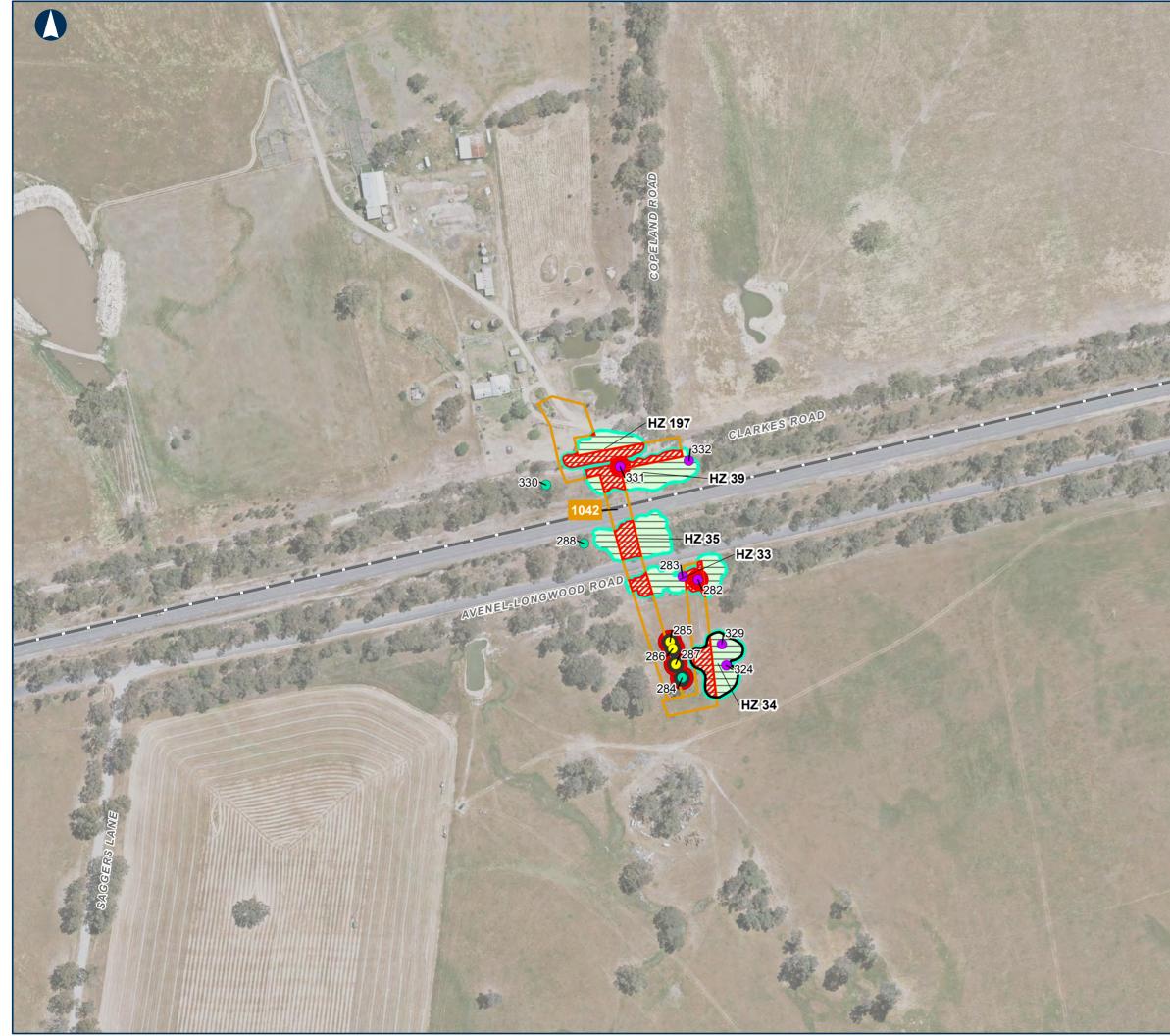


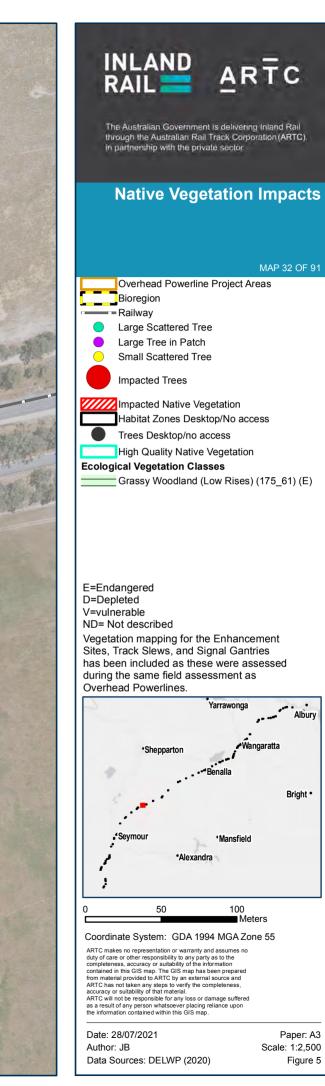
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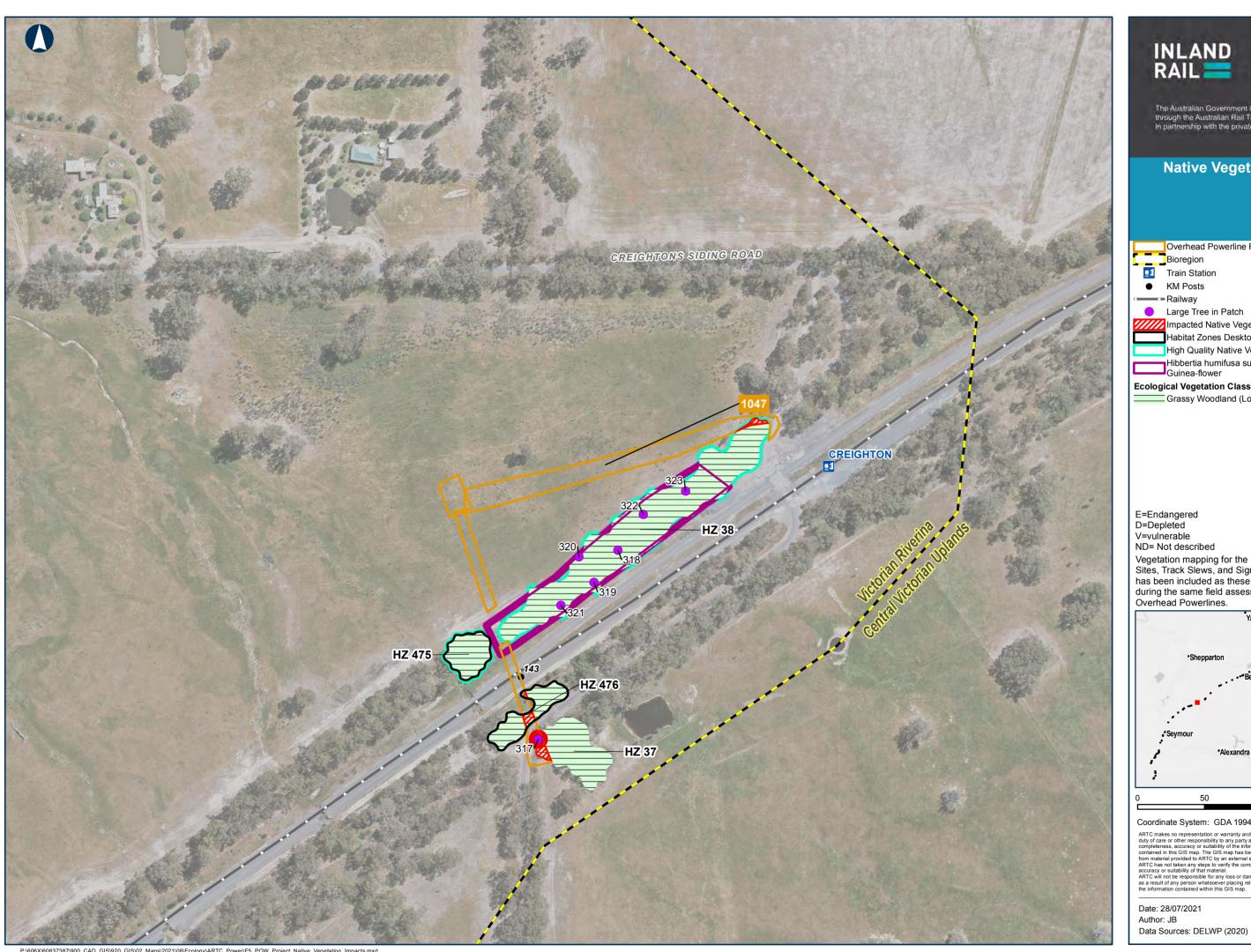


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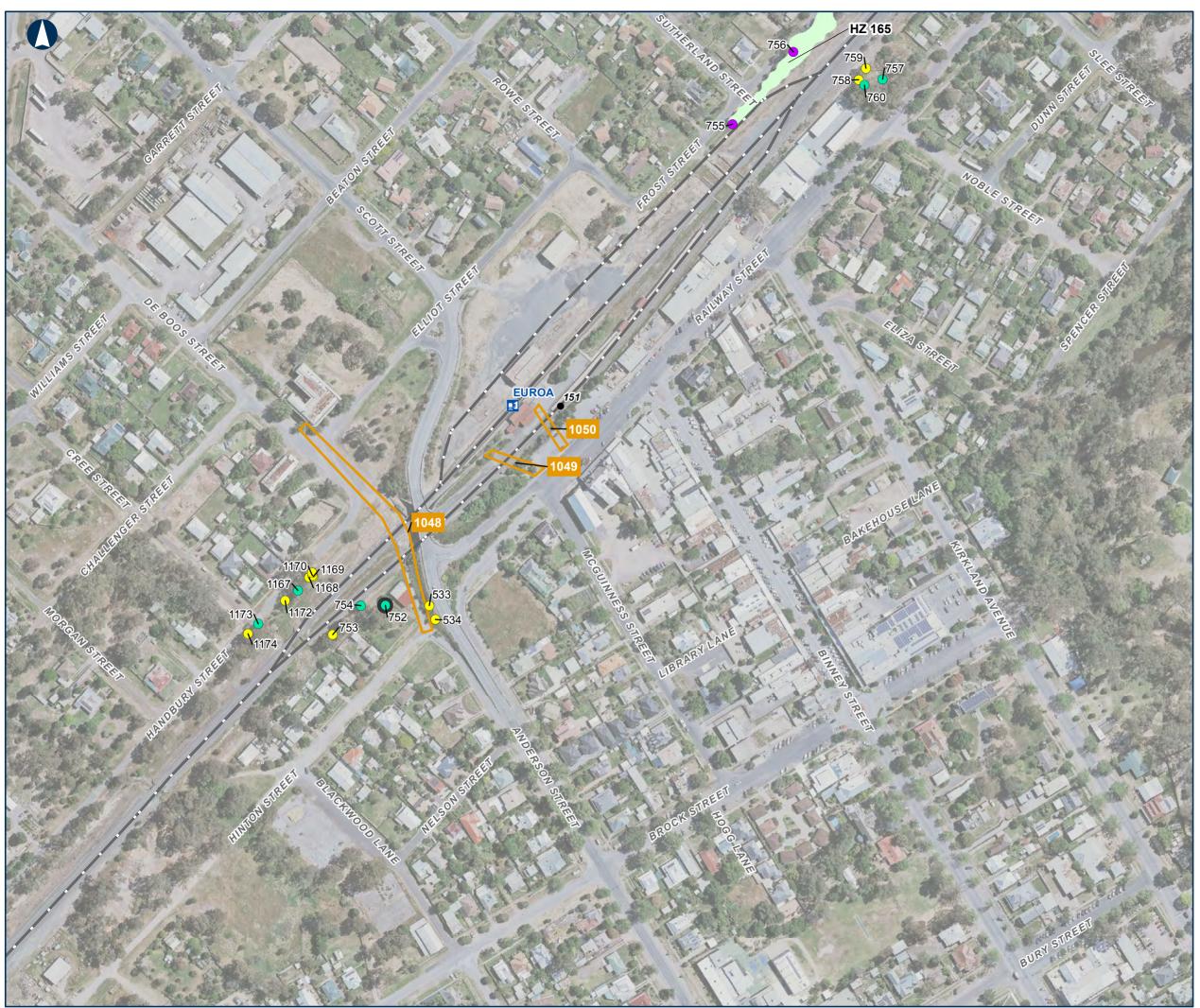


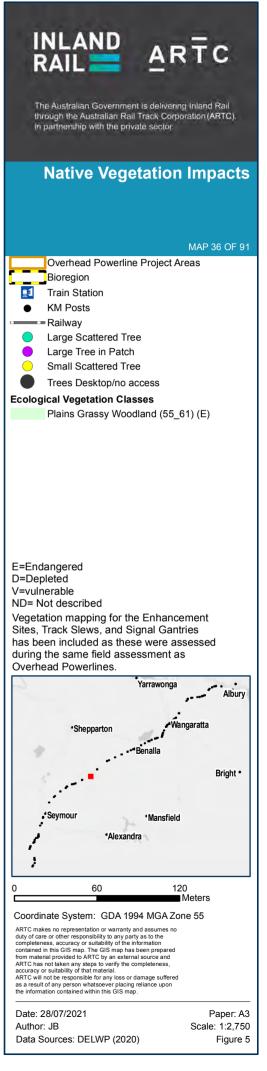


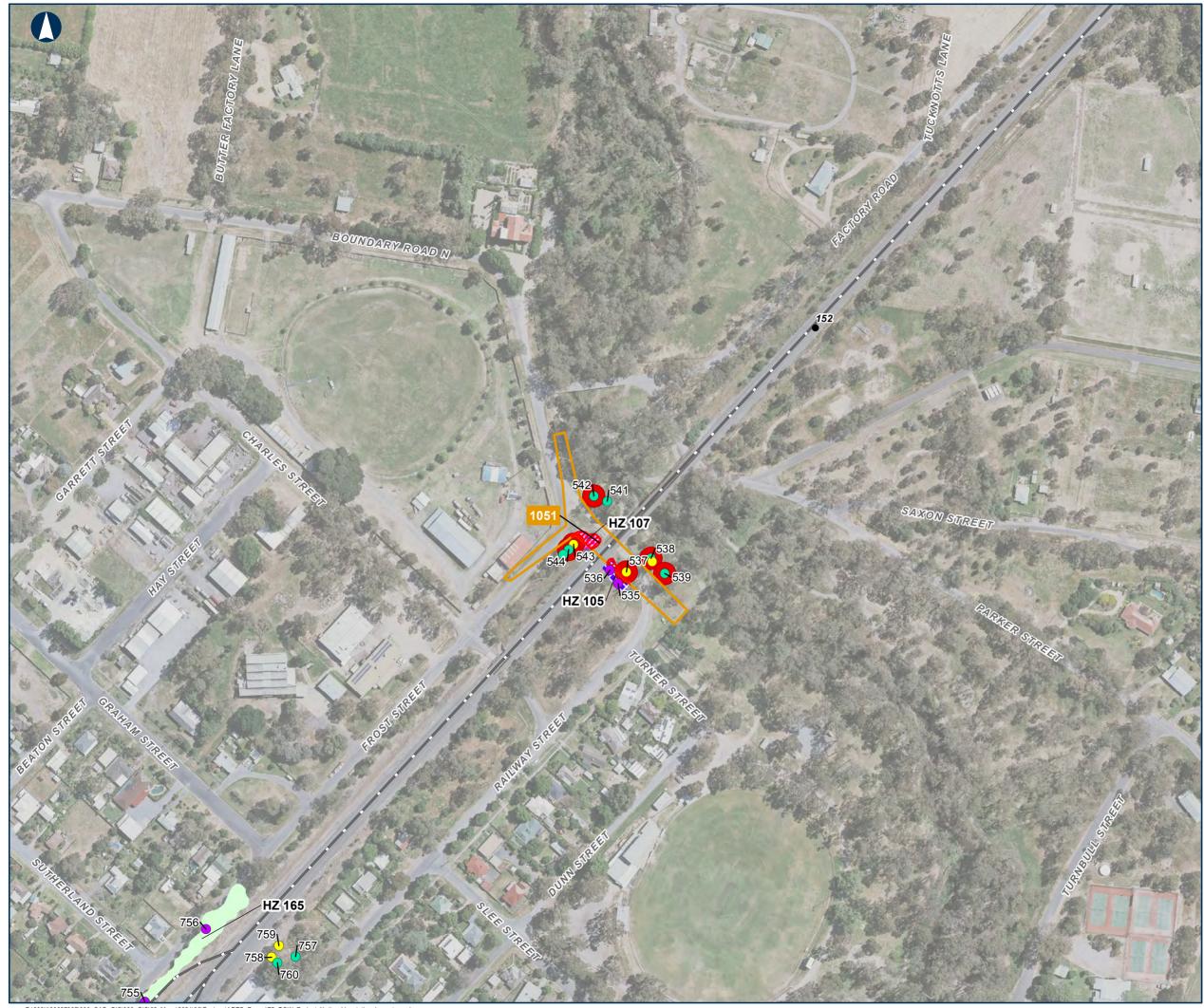




INLAND ARTC The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector. **Native Vegetation Impacts** MAP 35 OF 91 Overhead Powerline Project Bioregion I Train Station Large Tree in Patch Impacted Native Vegetation Habitat Zones Desktop/No access High Quality Native Vegetation Hibbertia humifusa subsp. erigens, Euroa Guinea-flower **Ecological Vegetation Classes** Grassy Woodland (Low Rises) (175_61) (E) Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Albury Yarrawonga Sheppartor Bright • Alexand 100 Meters Coordinate System: GDA 1994 MGA Zone 55 ARTC makes no representation or warrany and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material. ARTC will not be responsible for any loss or damage suffered as a result of any person whatsoever placing reliance upon the information contained within this GIS map. Paper: A3 Scale: 1:2,500 Figure 5







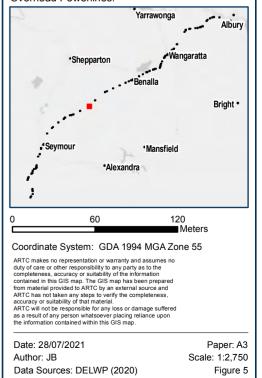


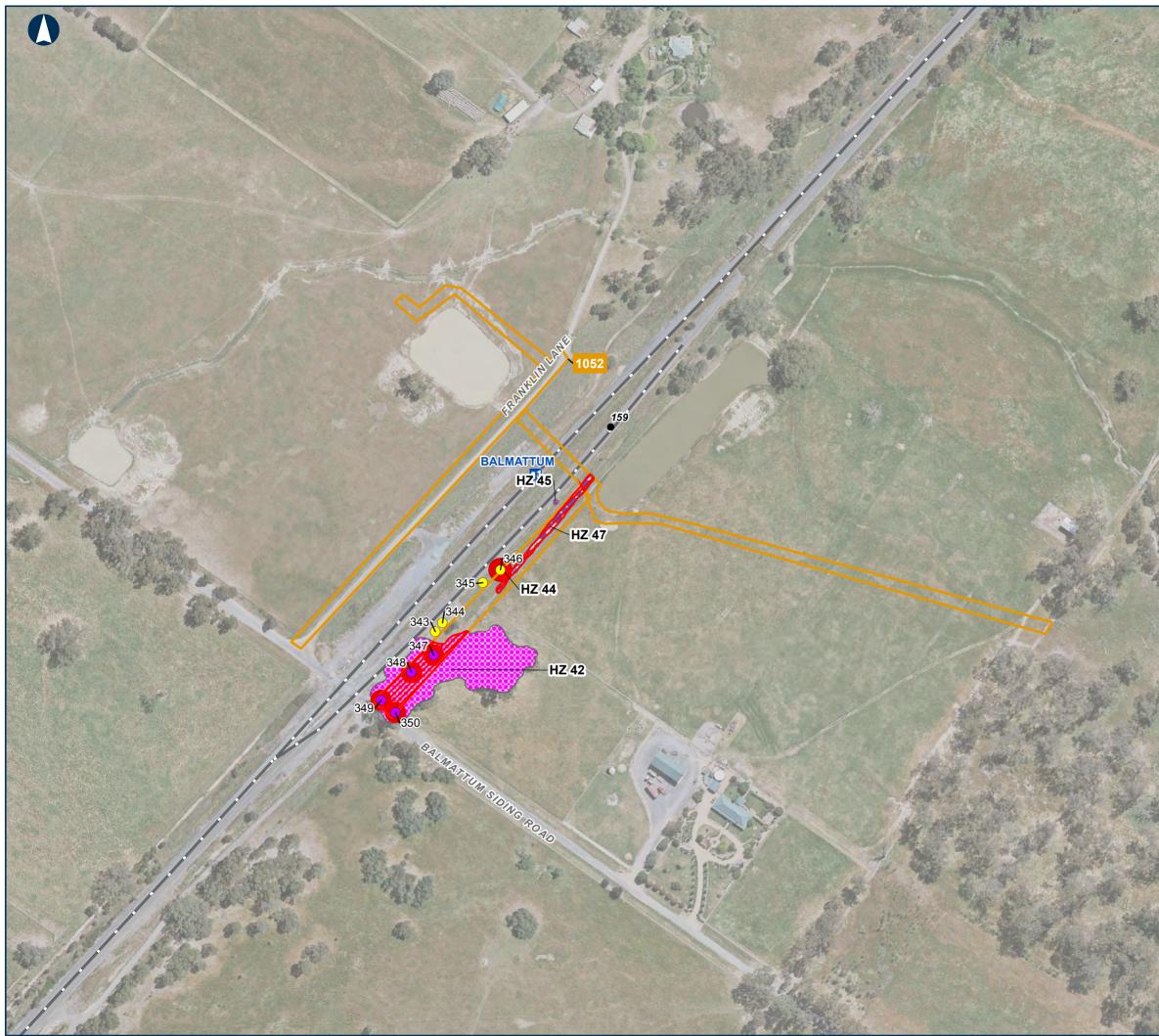
The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.

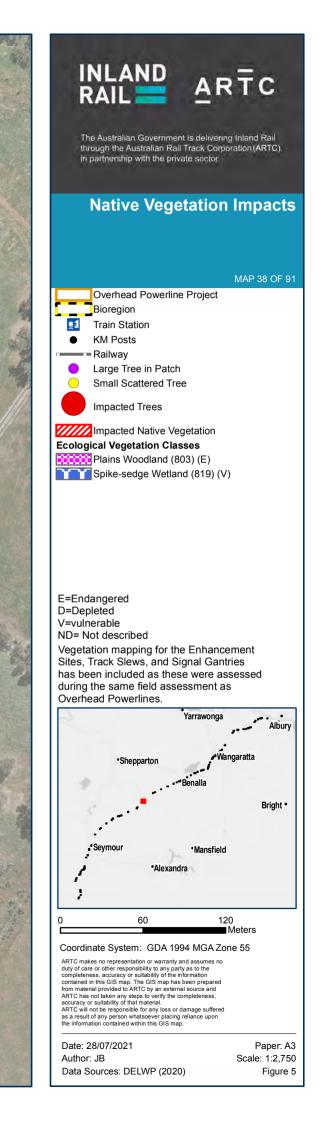
Native Vegetation Impacts

		MAP 37 C
	Overhead Powerline Project Are	eas
	Bioregion	
•	KM Posts	
	Railway	
\bigcirc	Large Scattered Tree	
•	Large Tree in Patch	
\bigcirc	Small Scattered Tree	
	Impacted Trees	
	Impacted Native Vegetation	
Ecological Vegetation Classes		

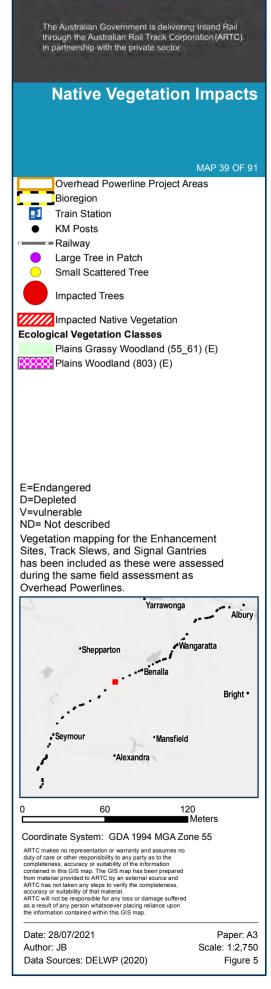
Floodplain Riparian Woodland (56) (V) Plains Grassy Woodland (55_61) (E)





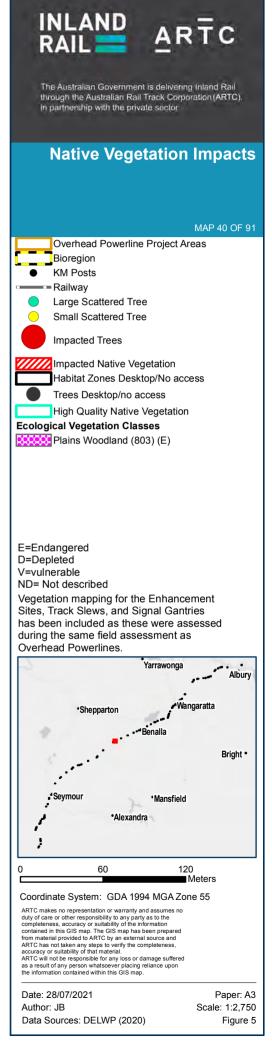




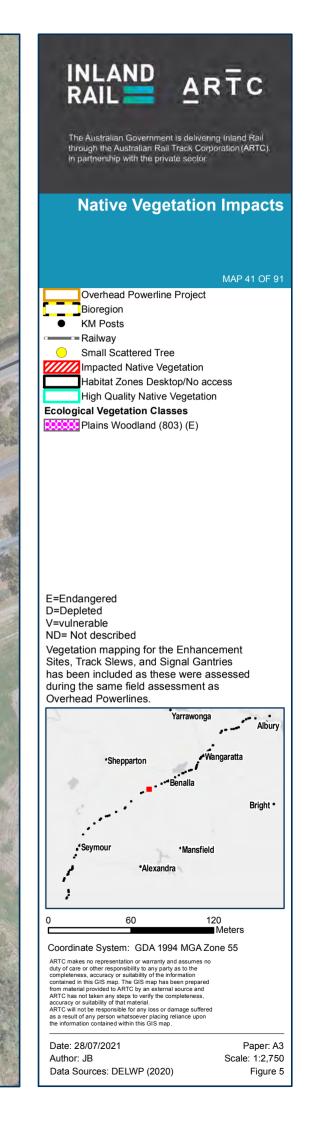


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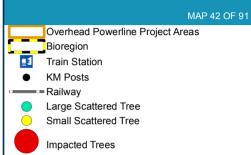


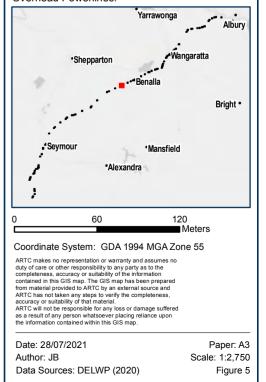






Native Vegetation Impacts

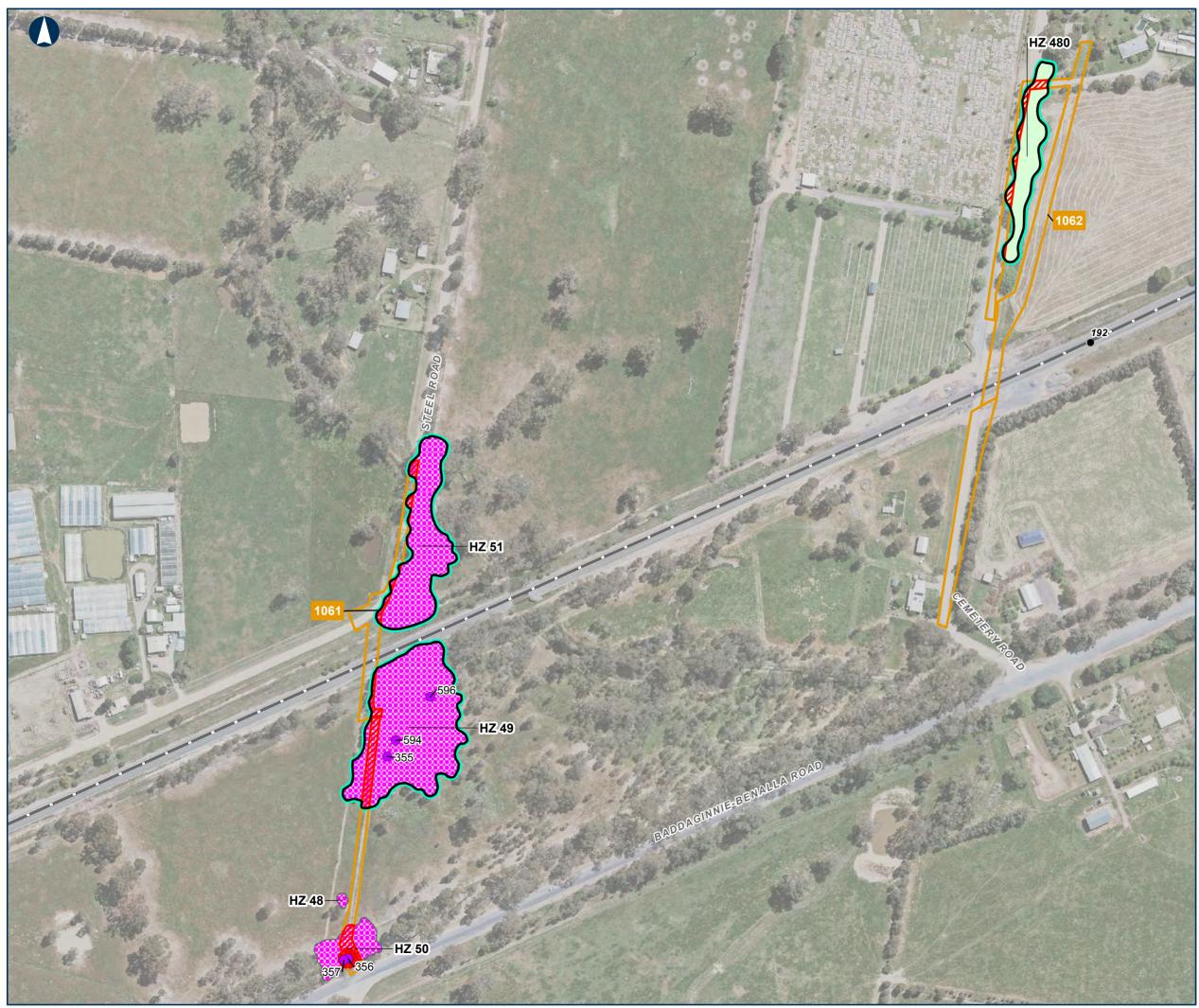




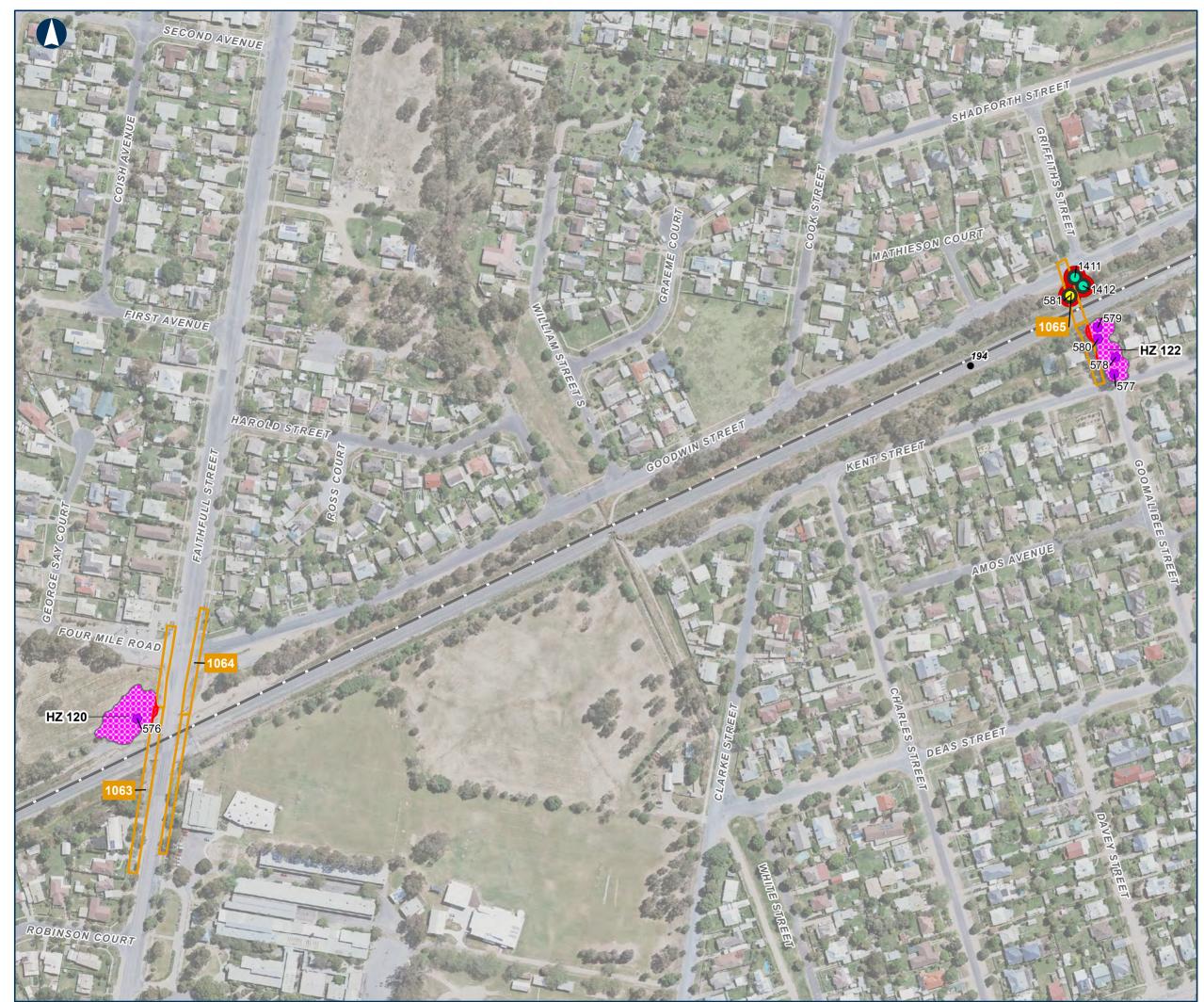


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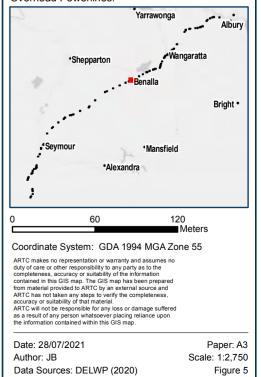
ARTC

45 OF 91

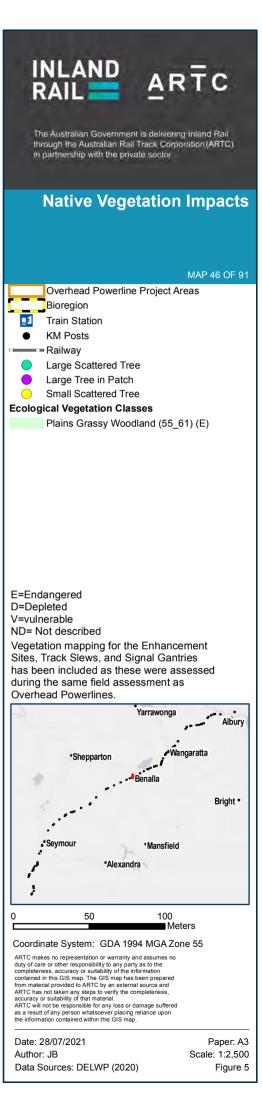
Native Vegetation Impacts

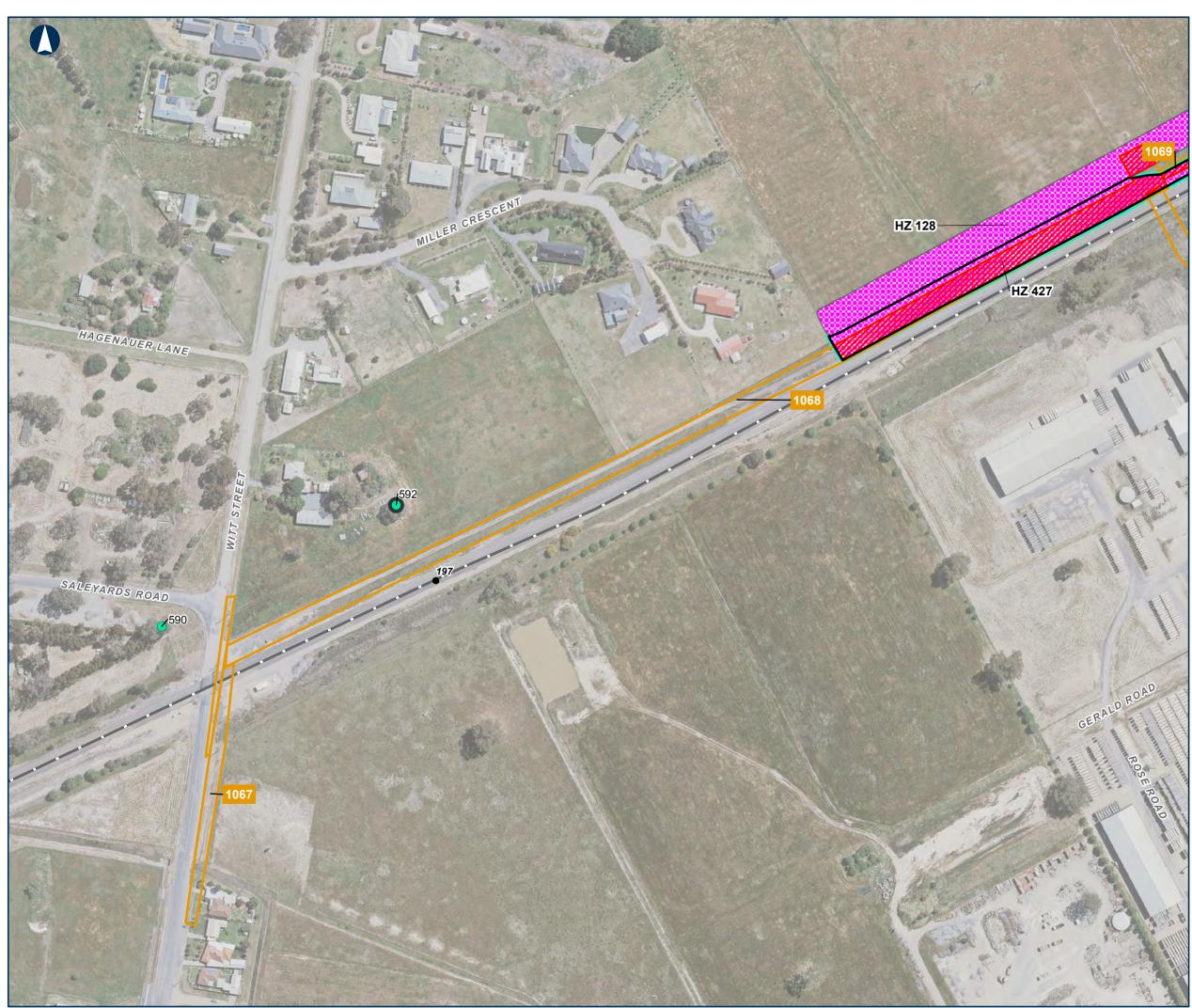
	MAP 4	
	Overhead Powerline Project Areas	
	Bioregion	
•	KM Posts	
•	Railway	
	Large Scattered Tree	
•	Large Tree in Patch	
\bigcirc	Small Scattered Tree	
	Impacted Trees	
//////	Impacted Native Vegetation	
	Trees Desktop/no access	
Ecological Vegetation Classes		

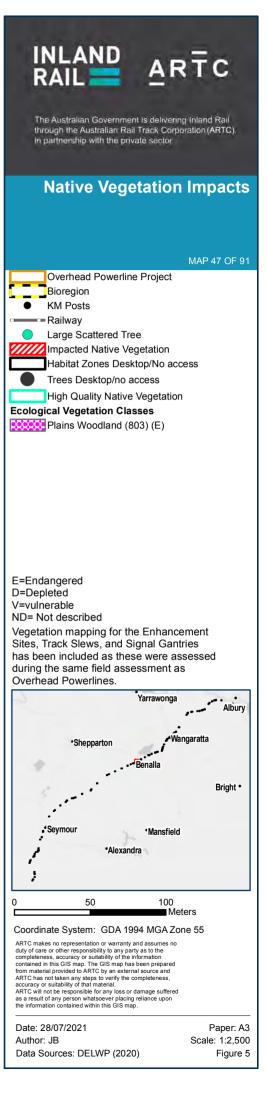
Ecological Vegetation Classes

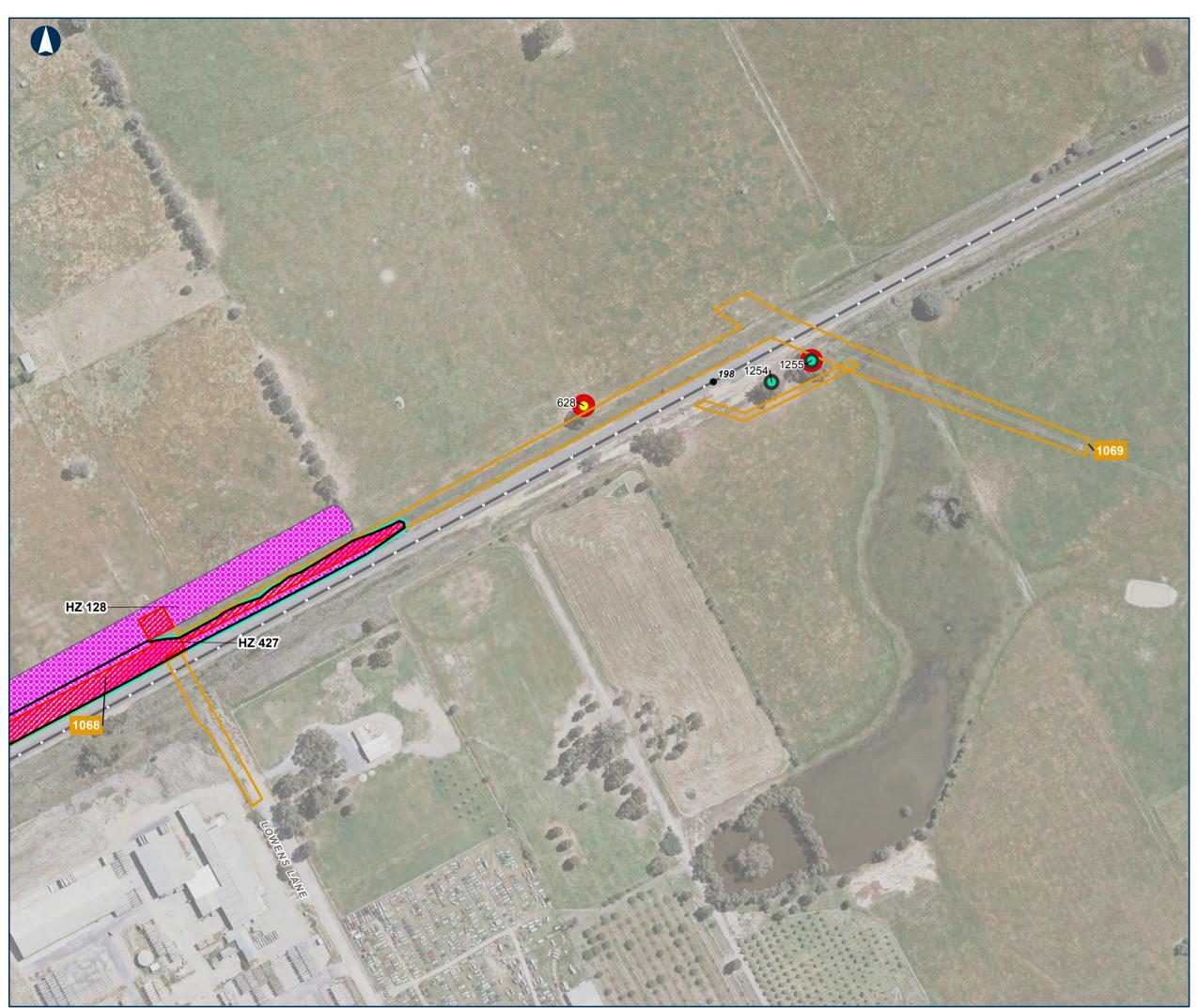


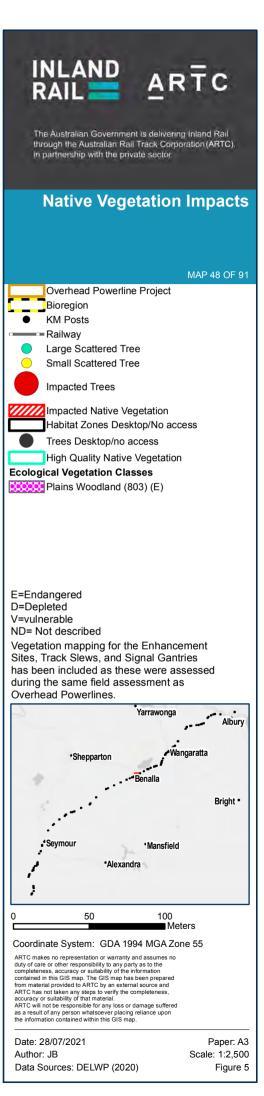




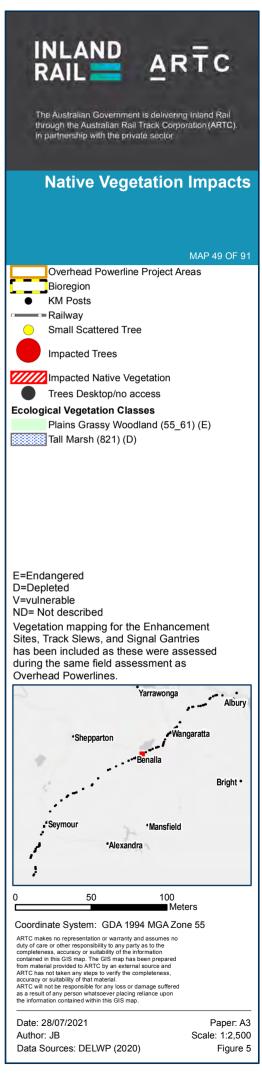


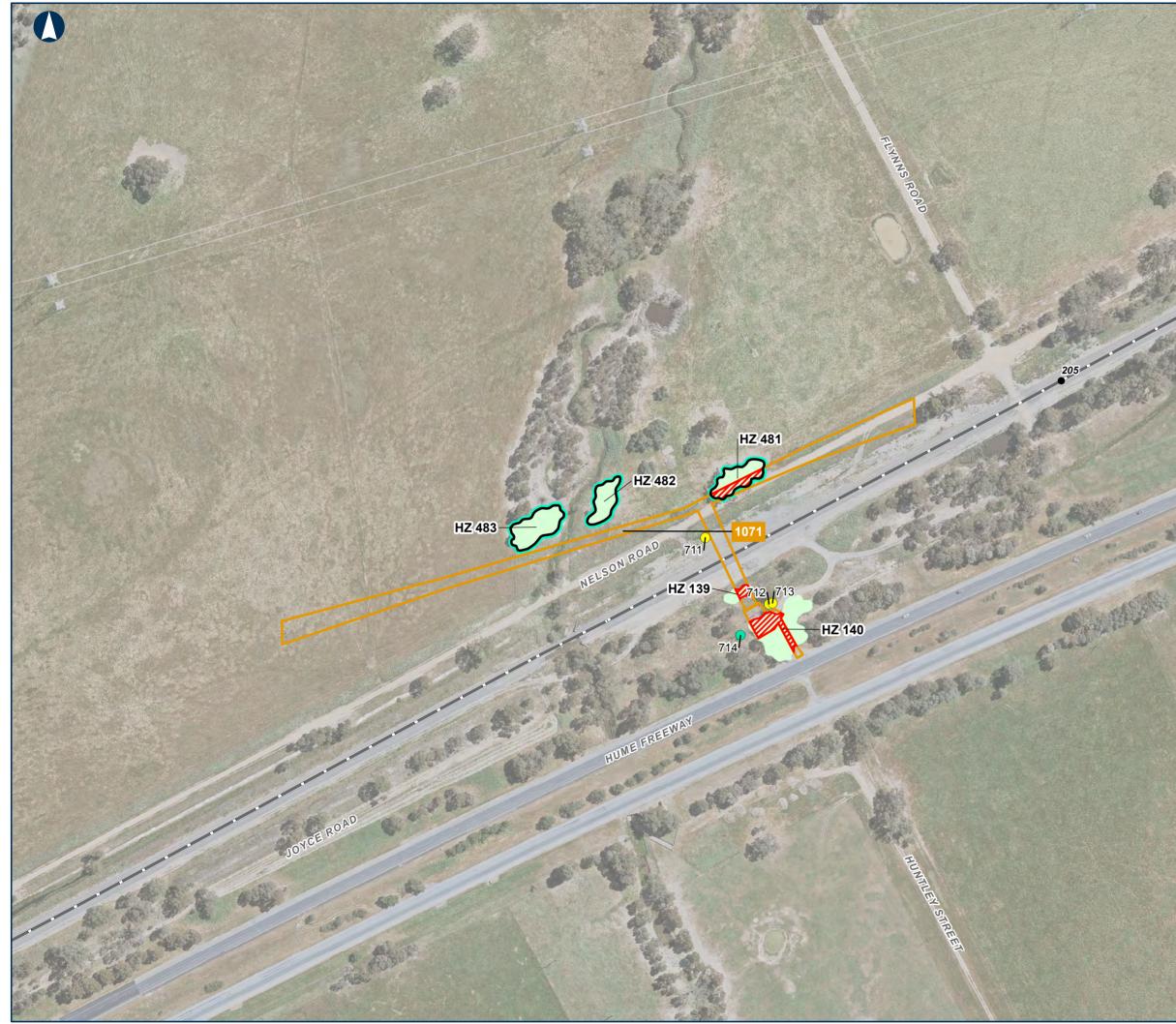


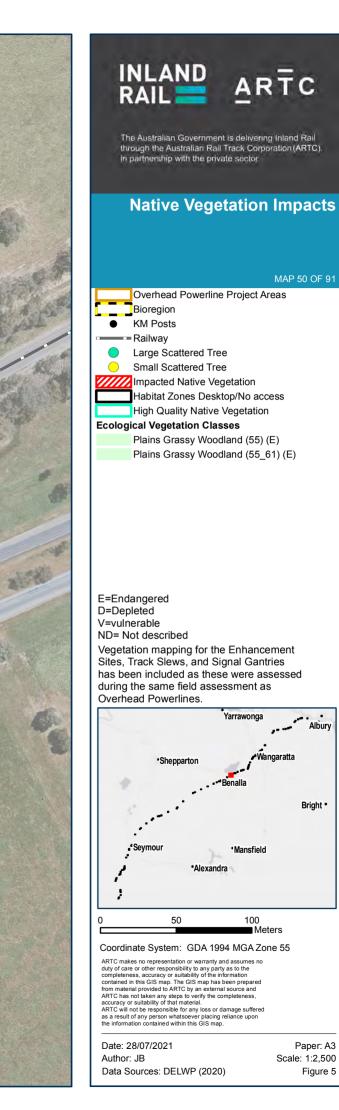








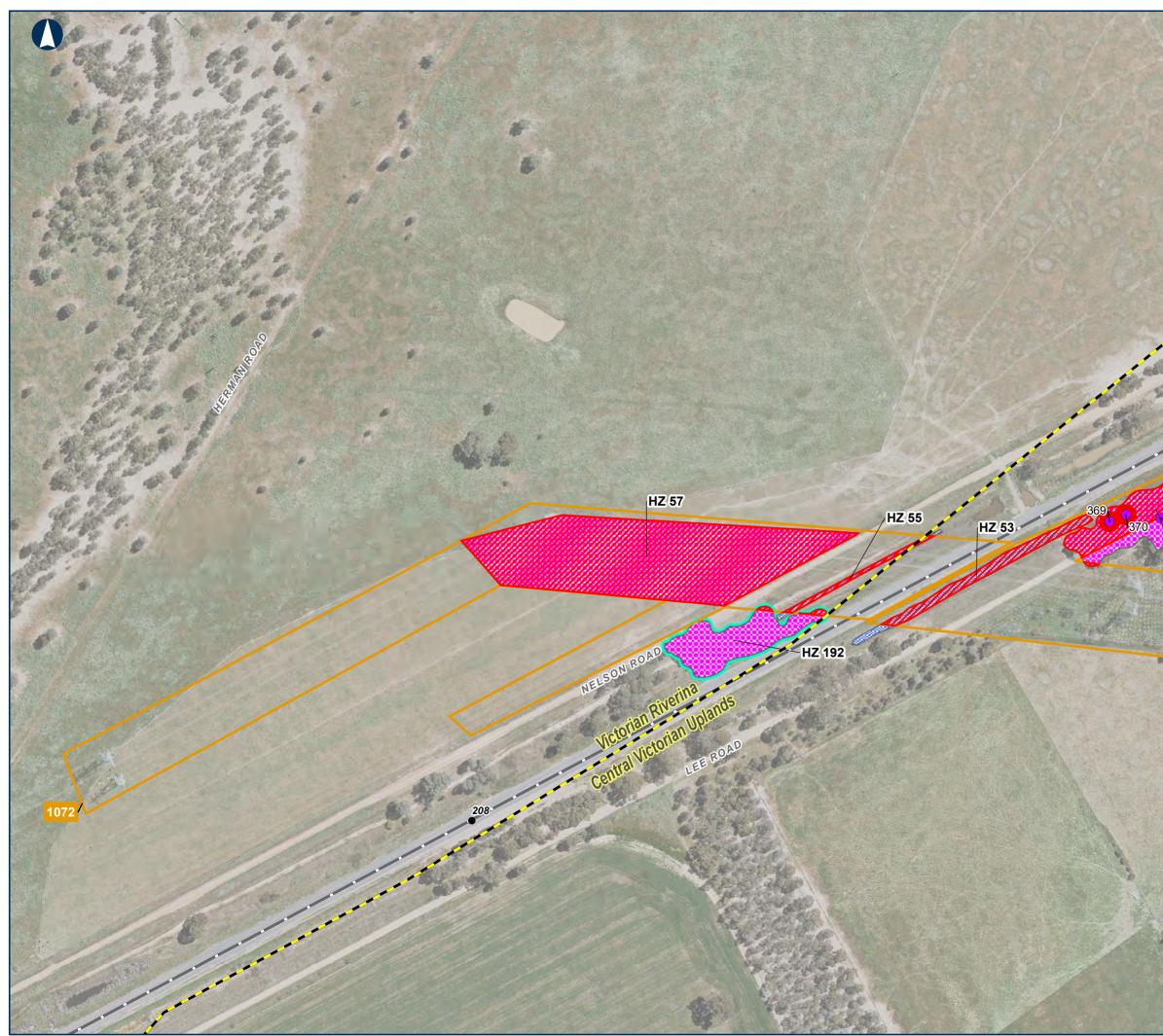


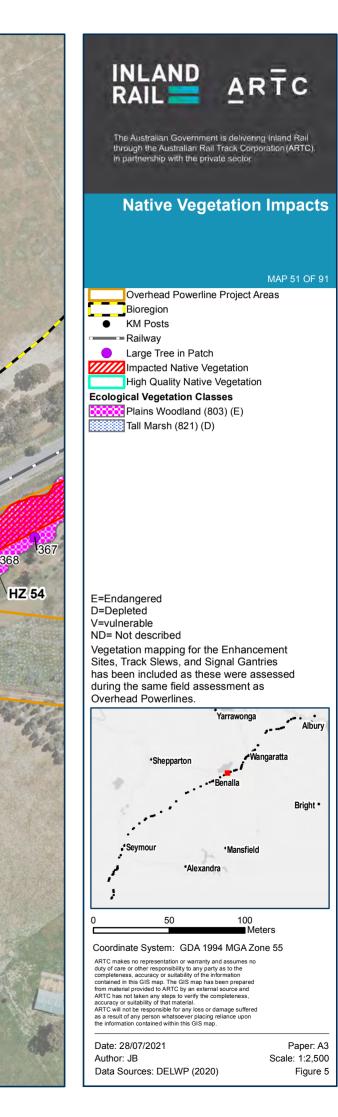


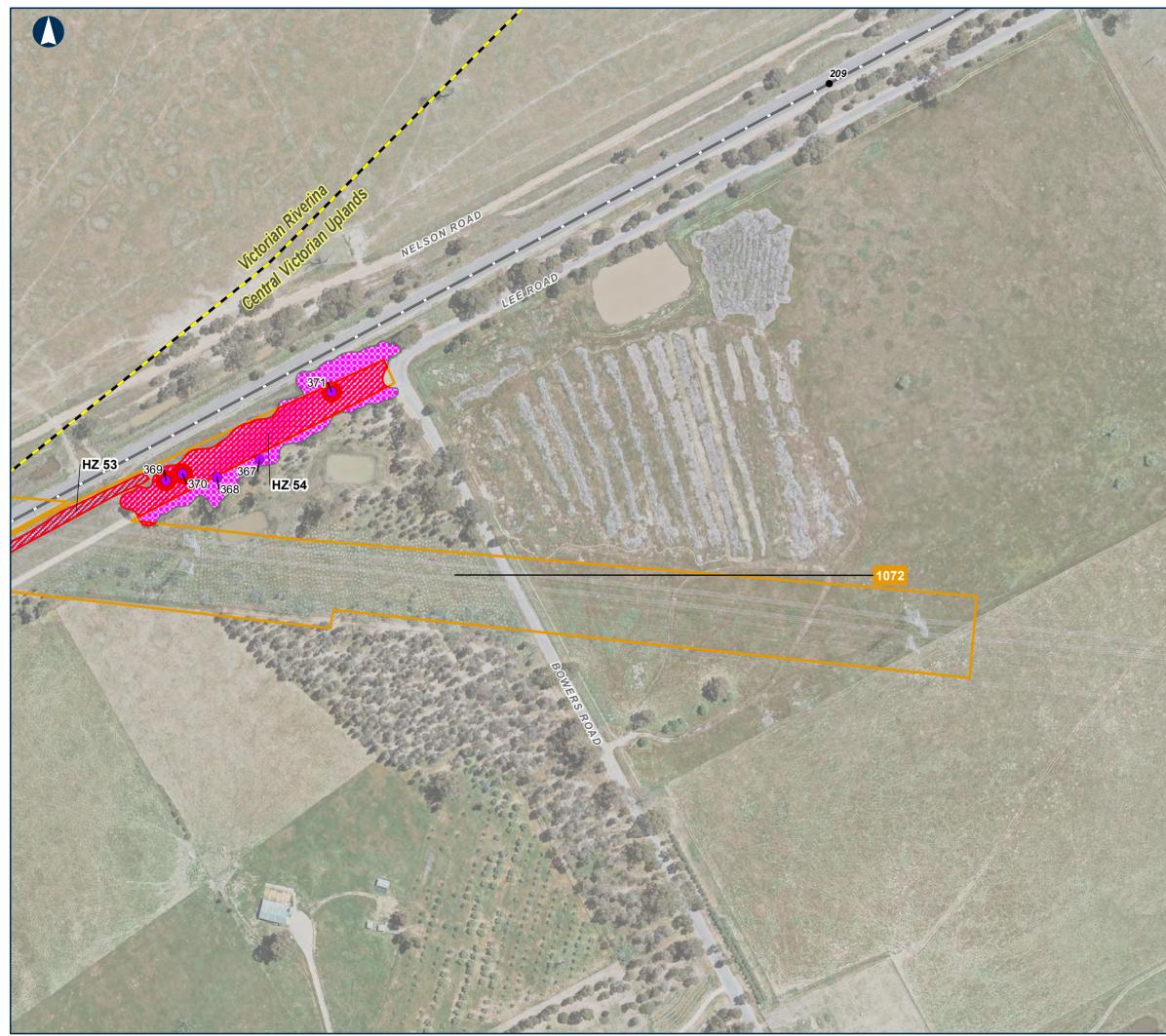
Paper: A3 Scale: 1:2,500 Figure 5

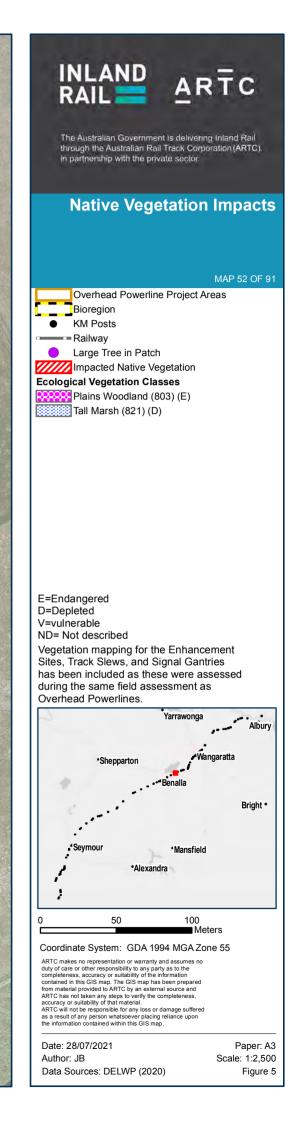
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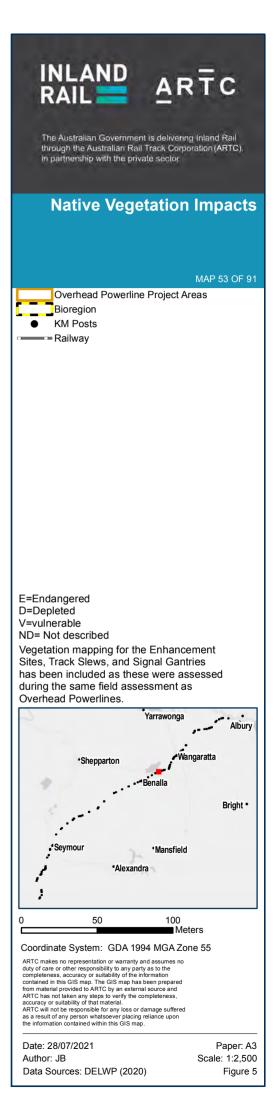


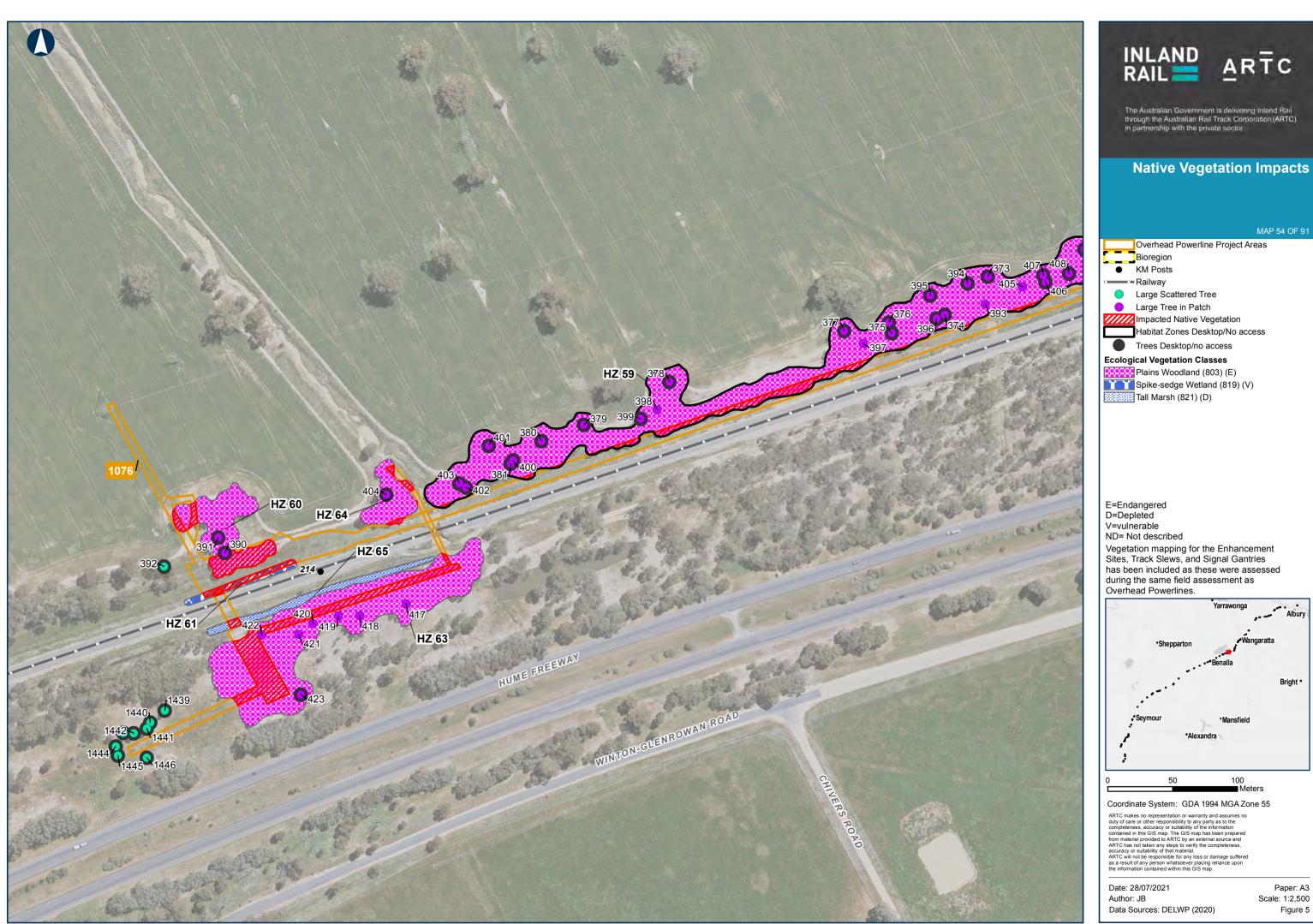


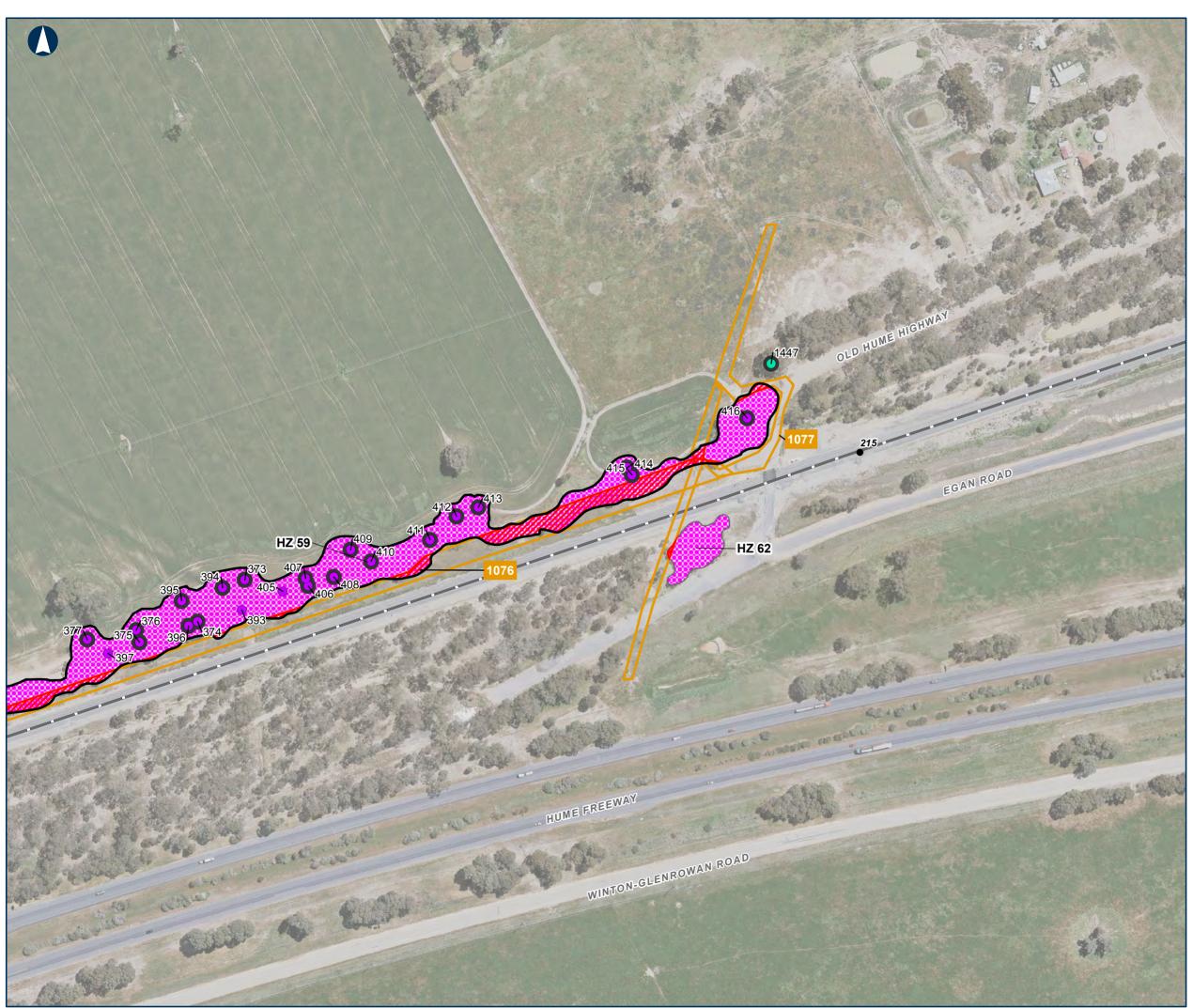




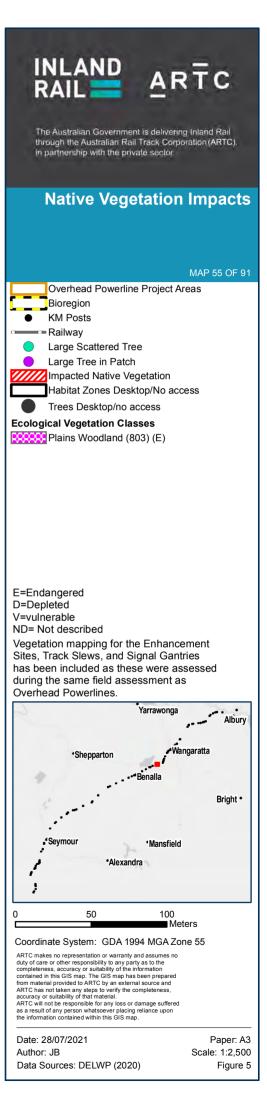


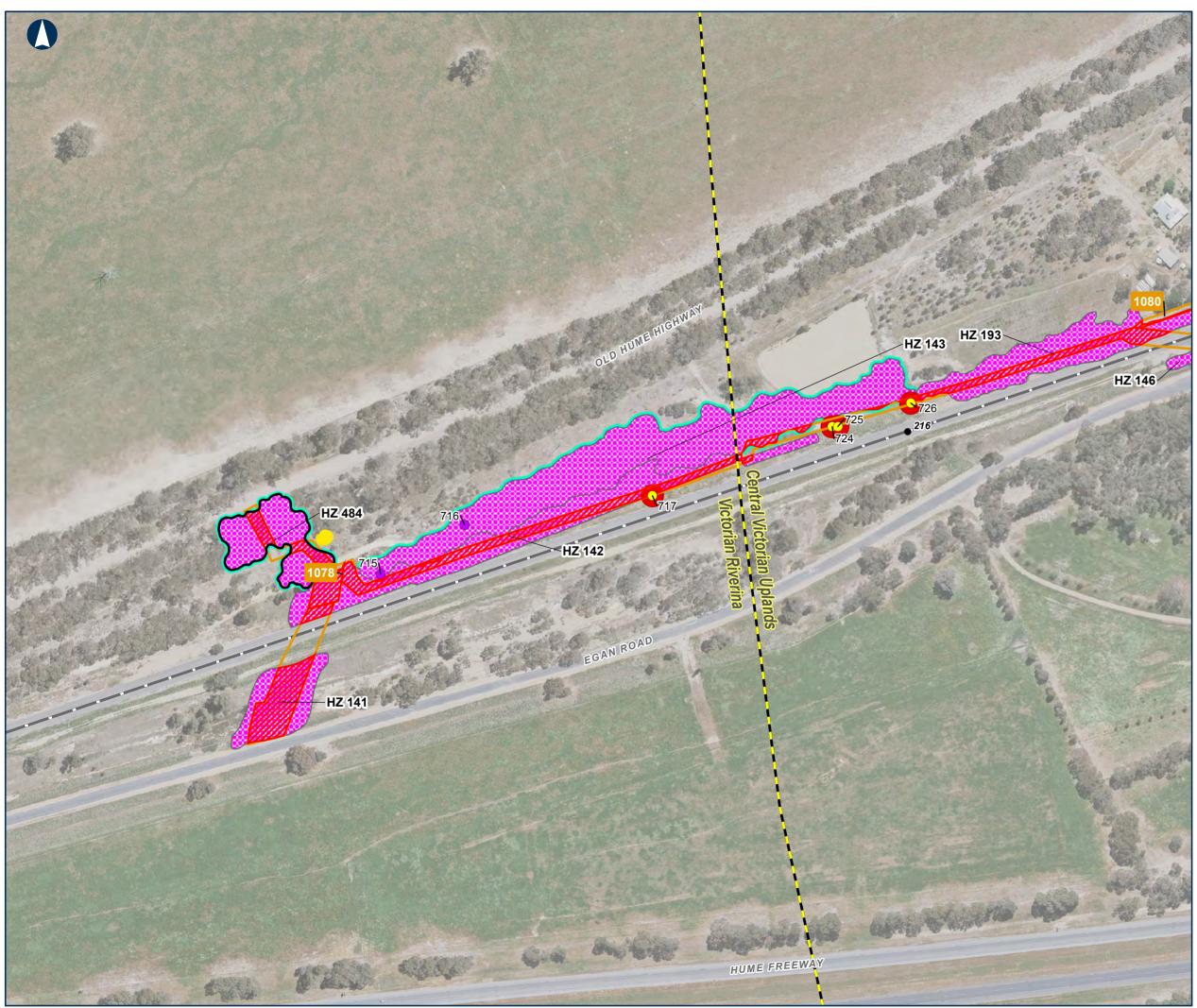






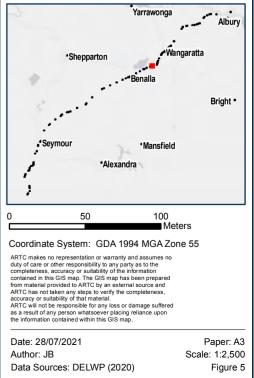
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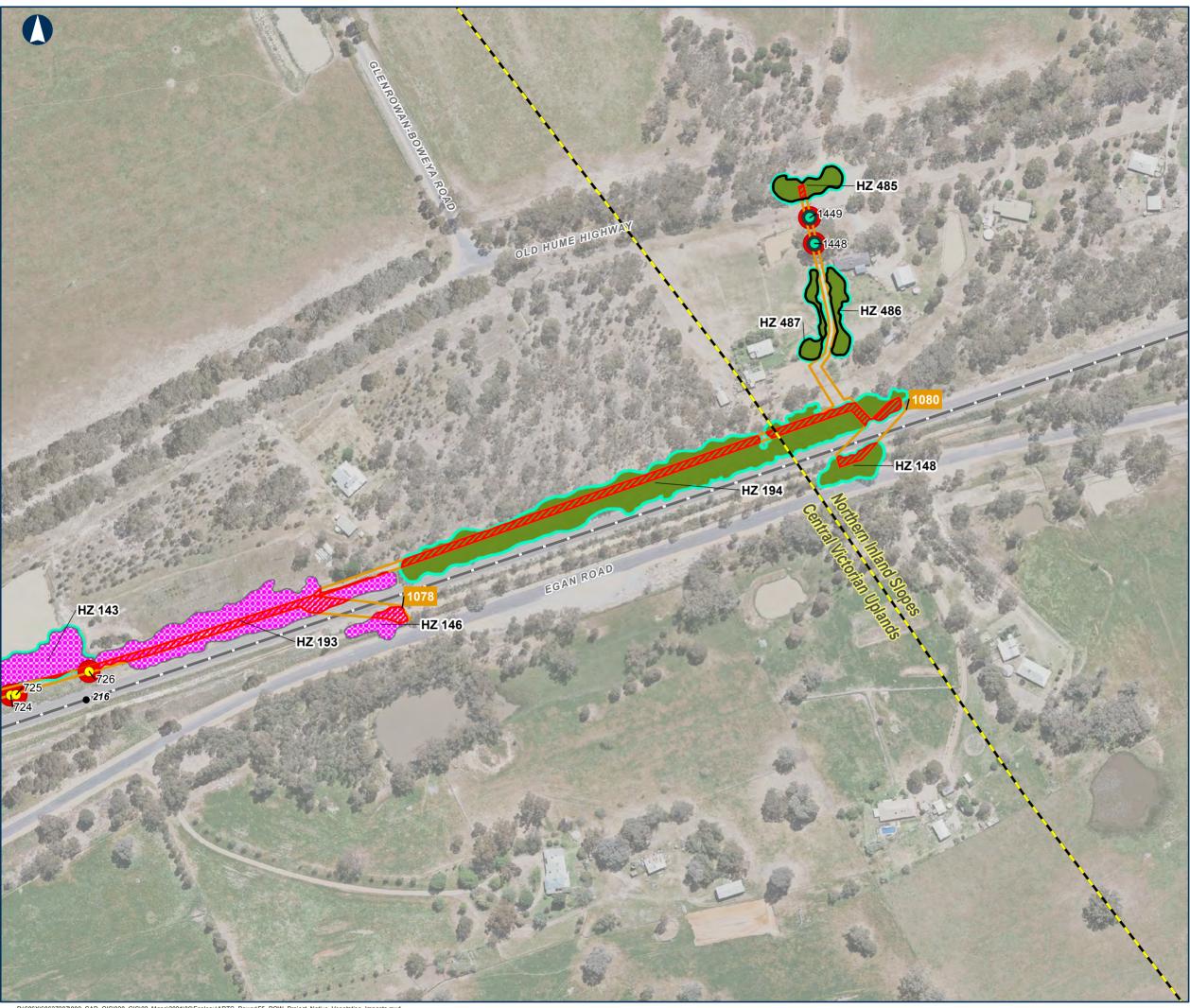


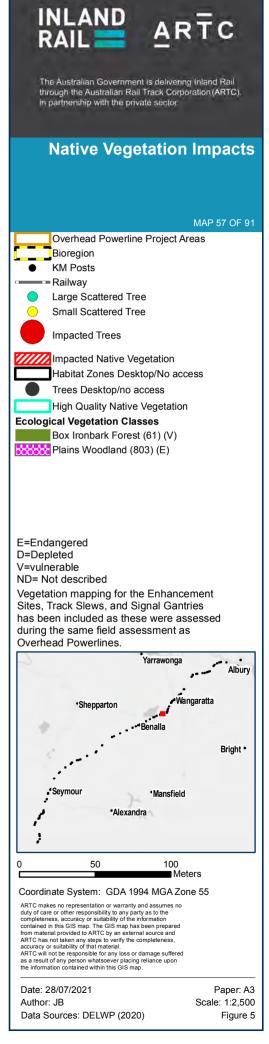


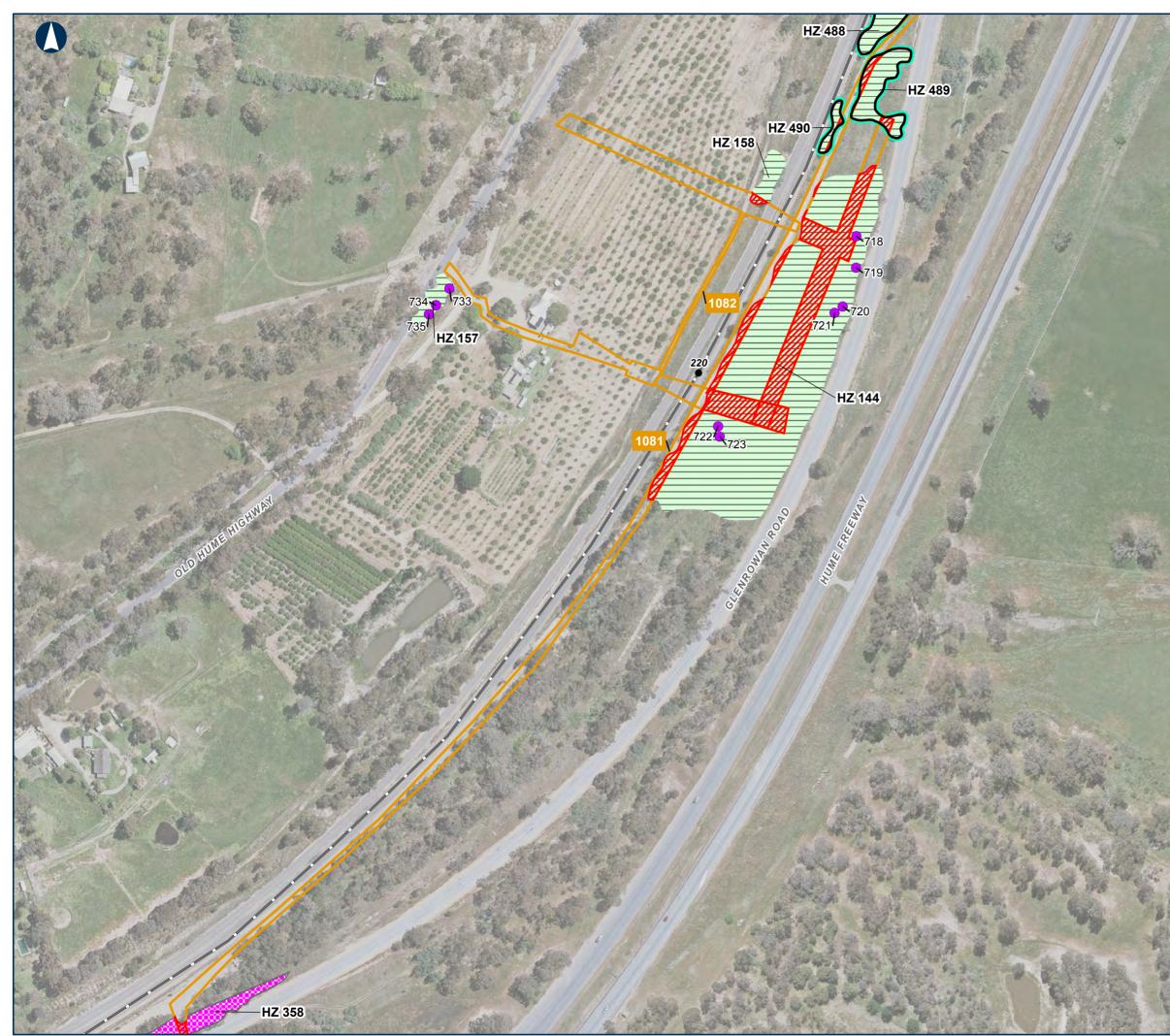


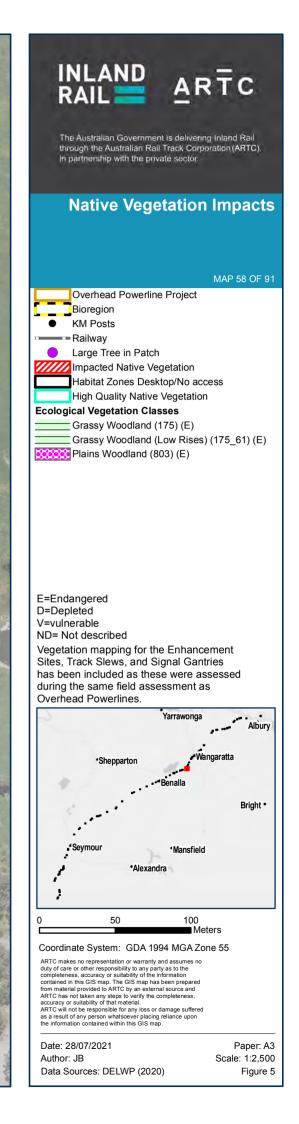


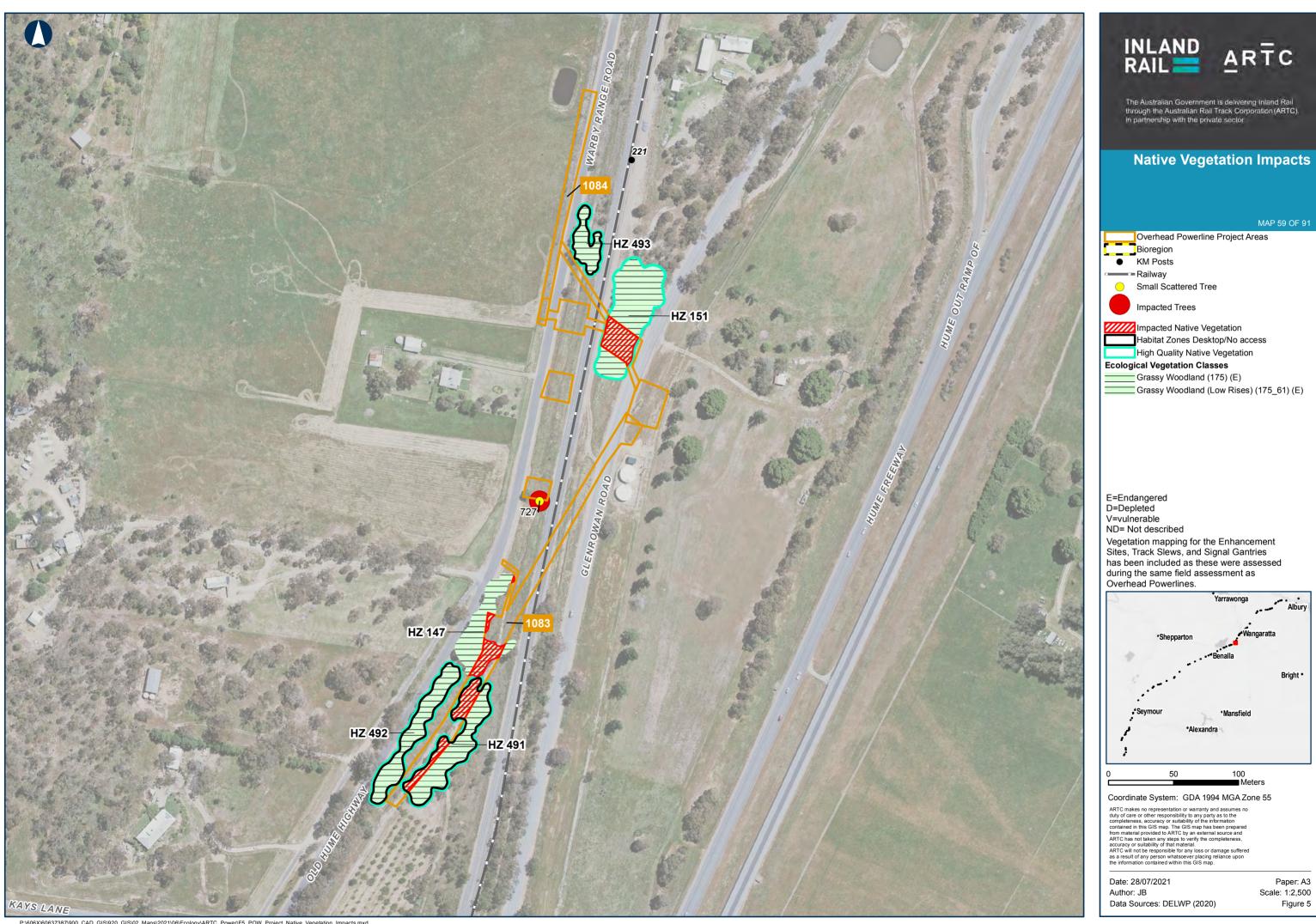






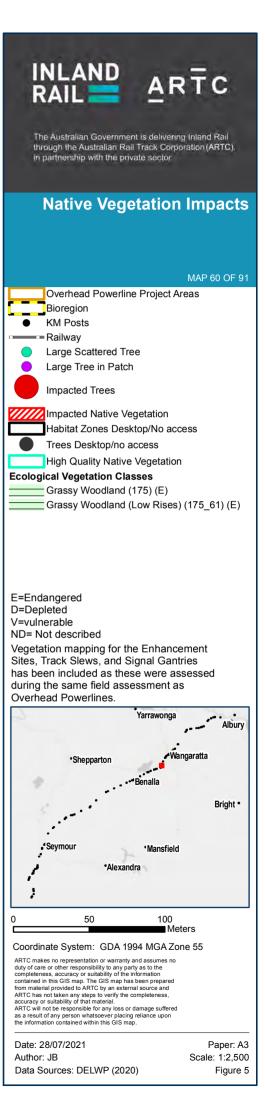


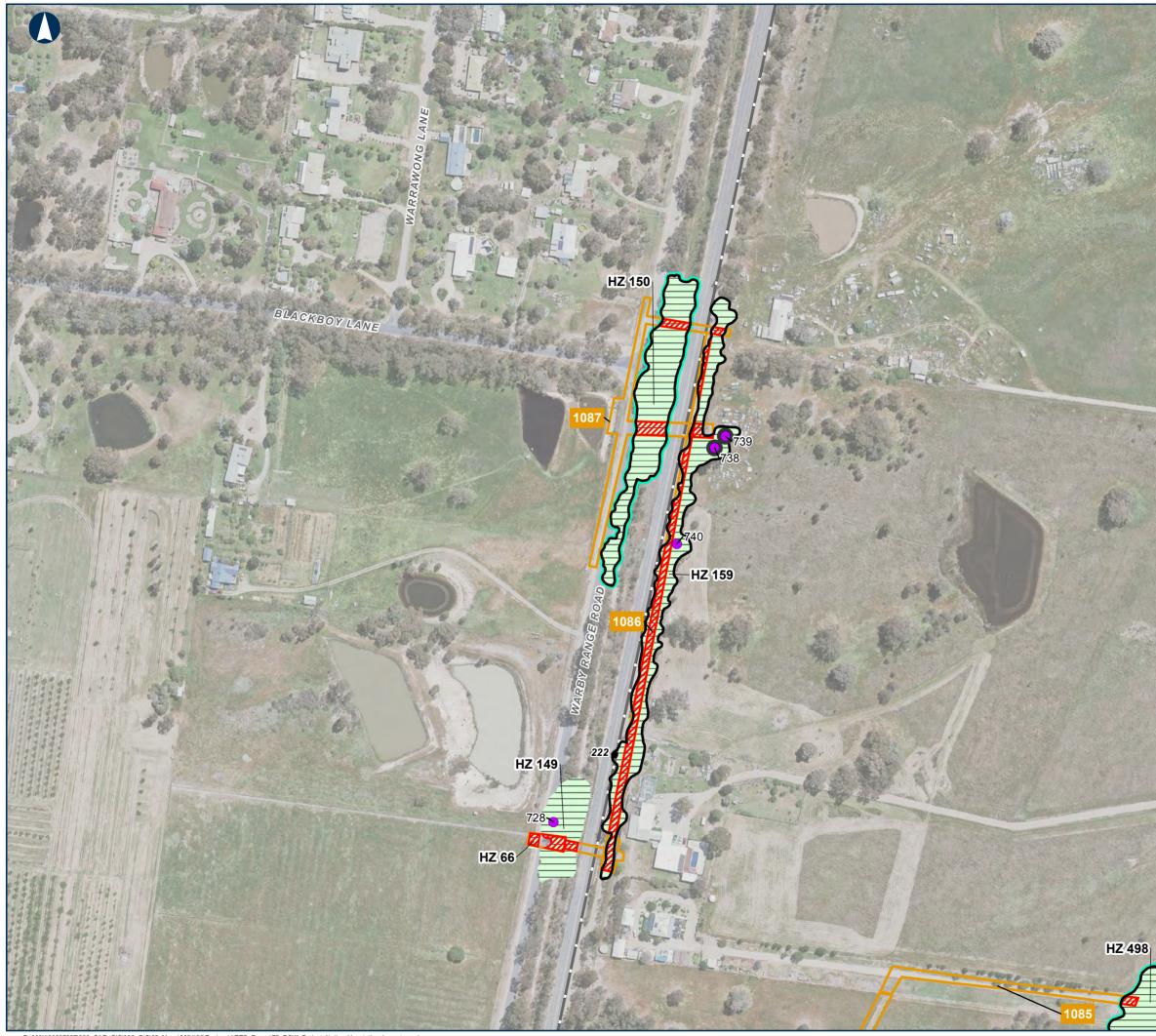




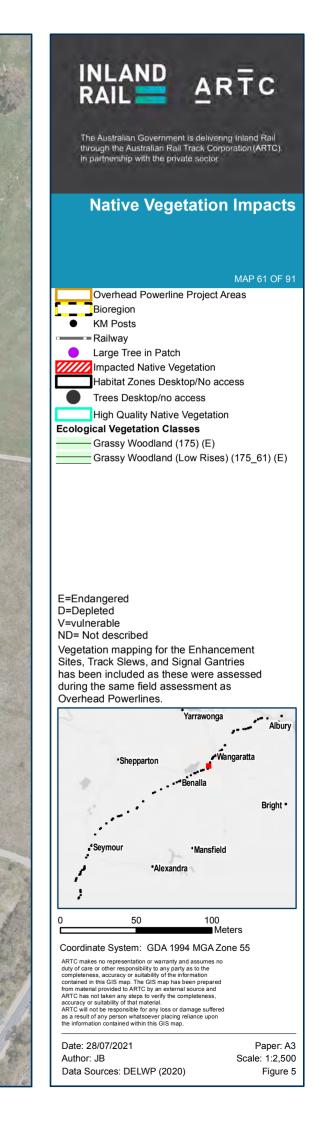
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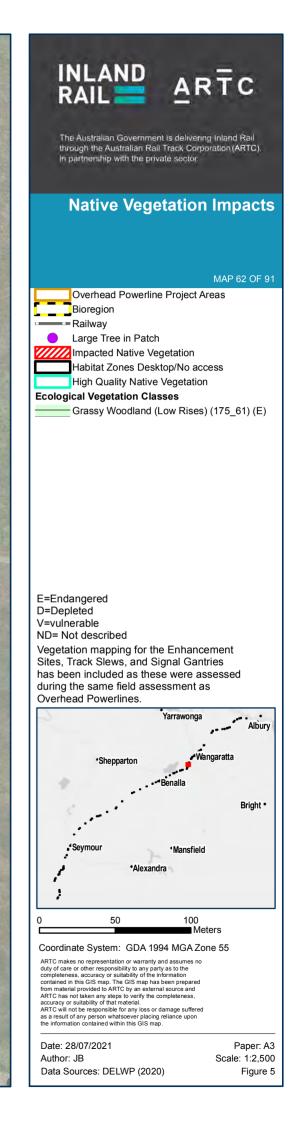




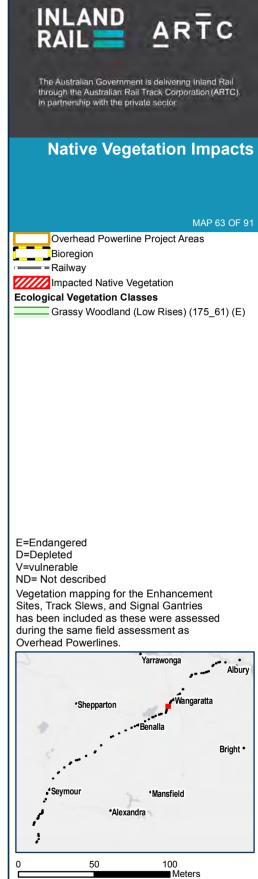
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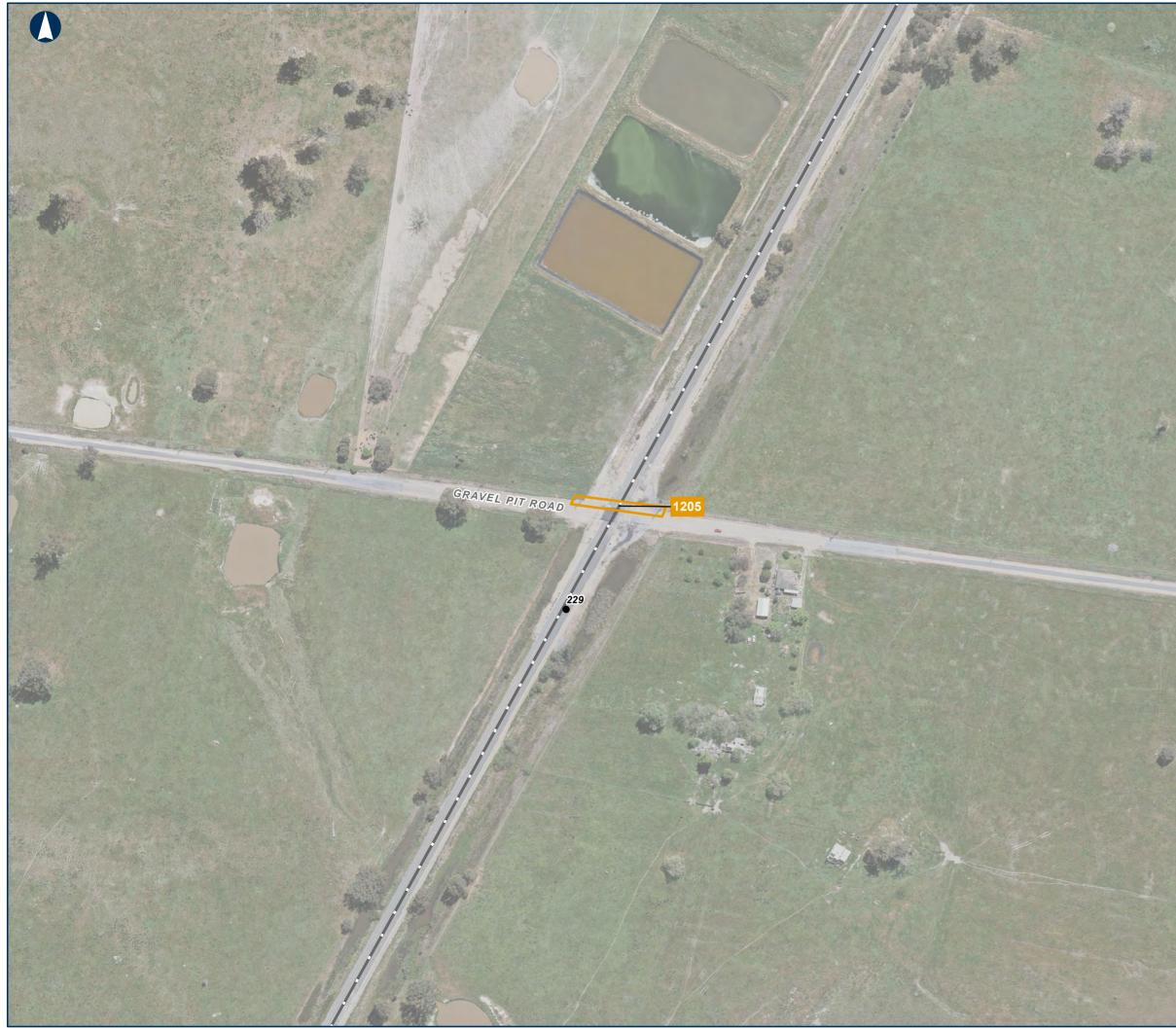


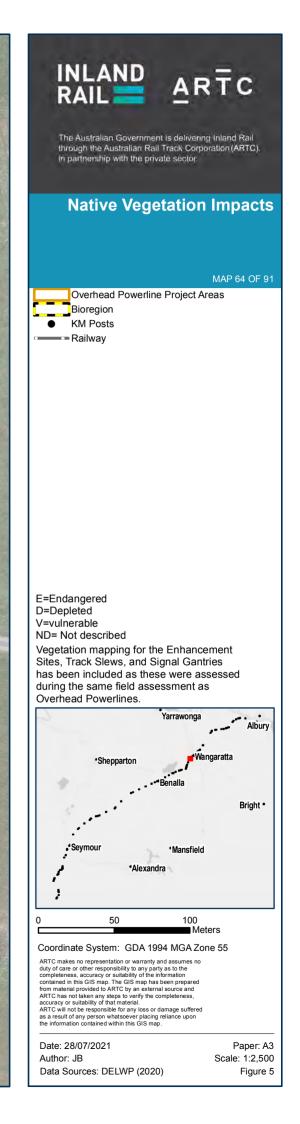
Coordinate System: GDA 1994 MGA Zone 55

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Date: 28/07/2021 Author: JB Data Sources: DELWP (2020)

Paper: A3 Scale: 1:2,500 Figure 5

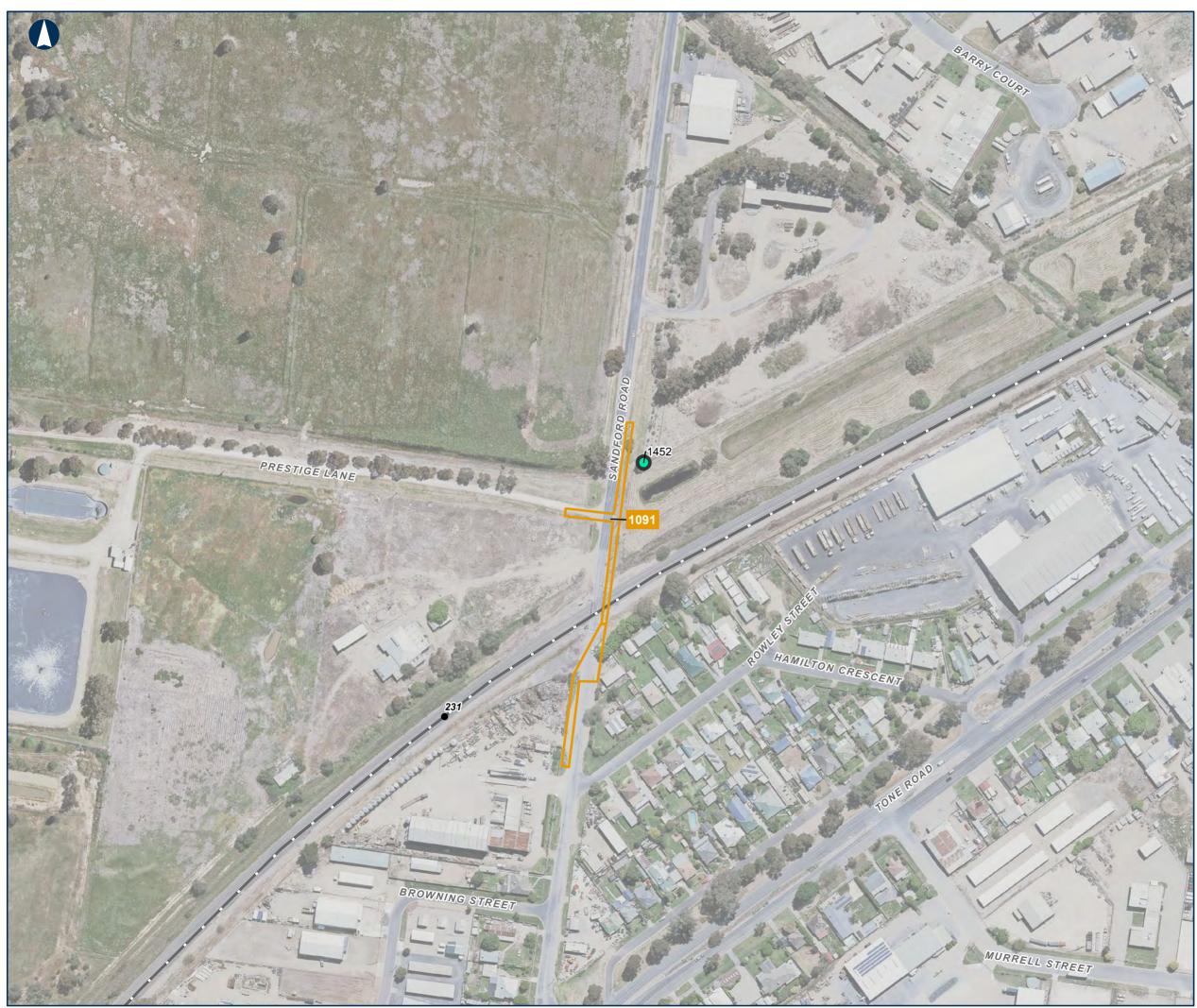




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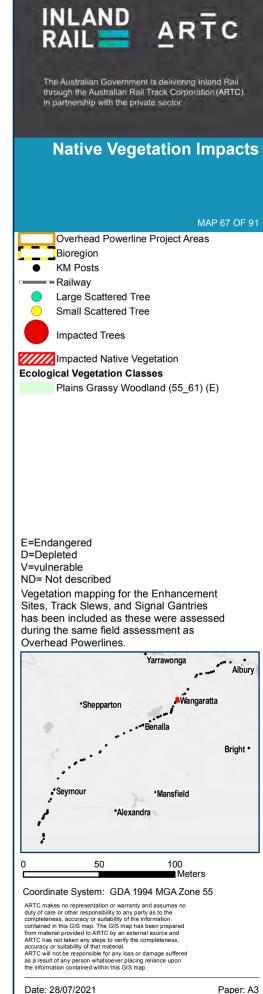




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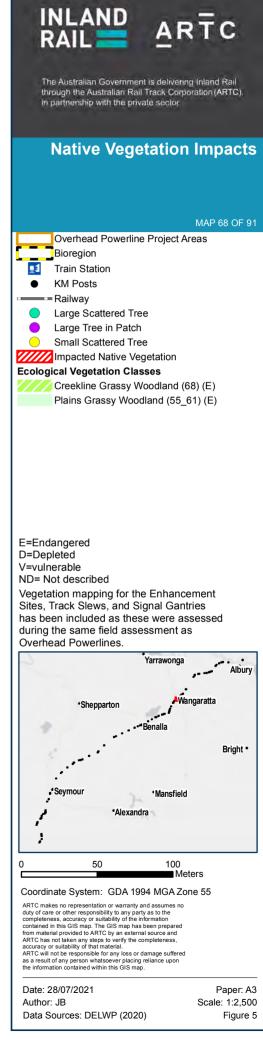
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Data Sources: DELWP (2020)

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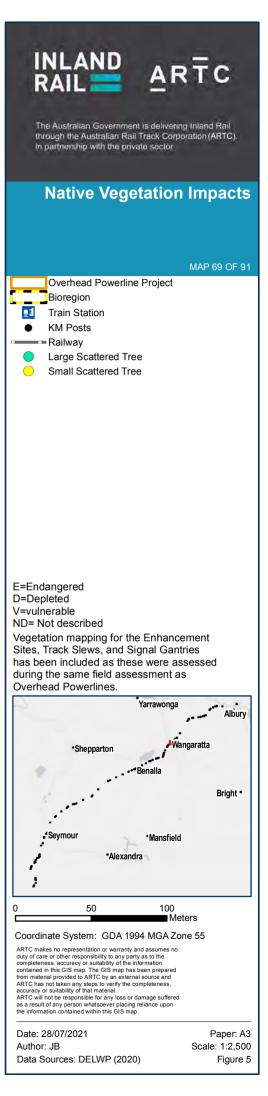


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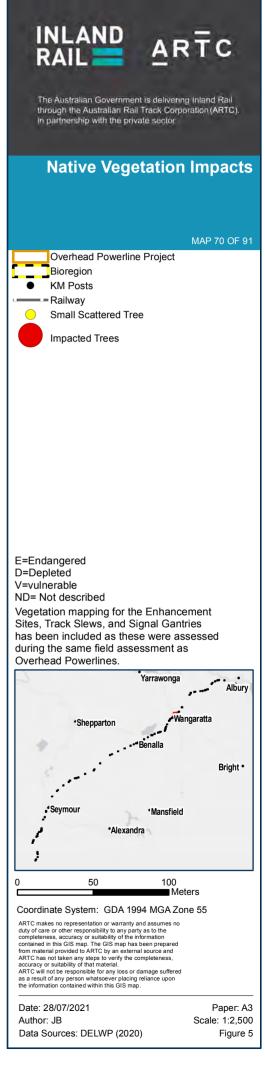




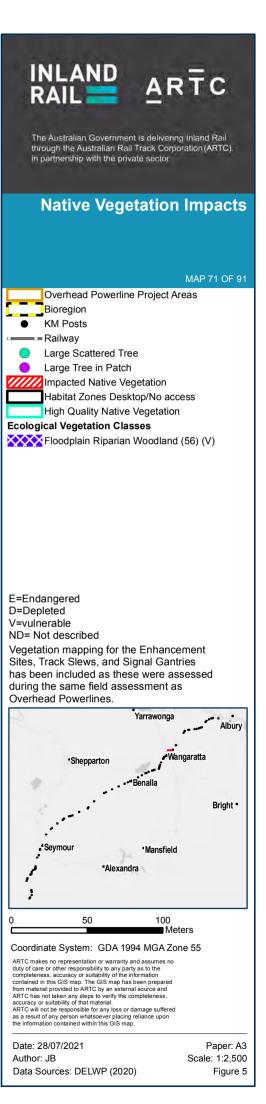
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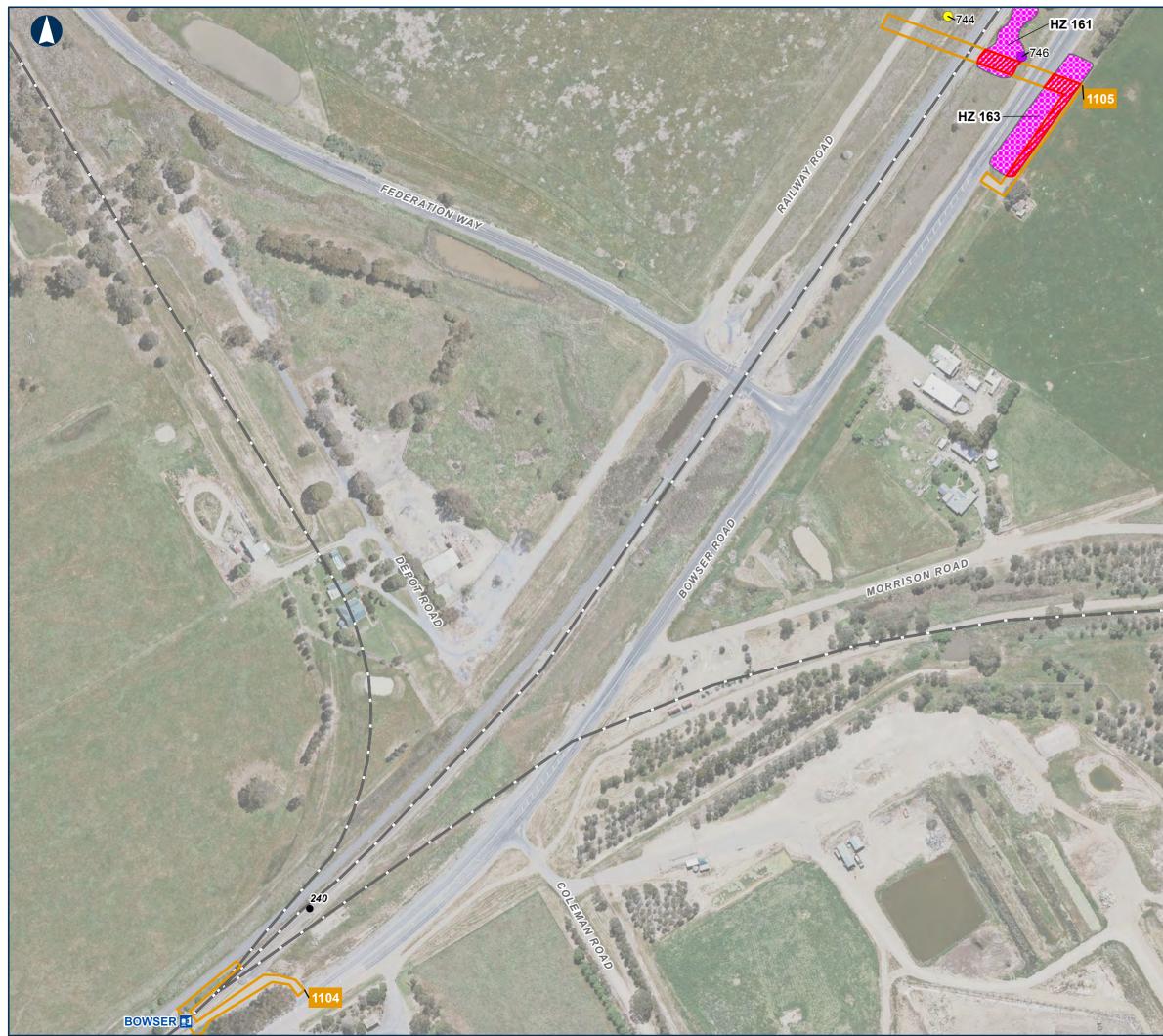


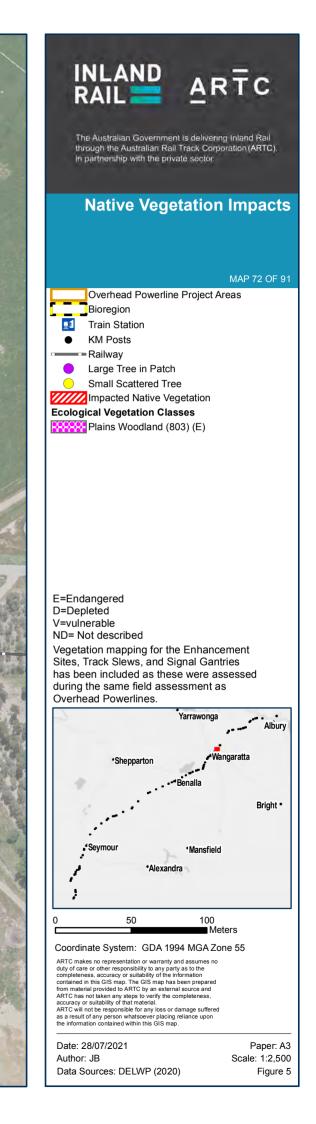




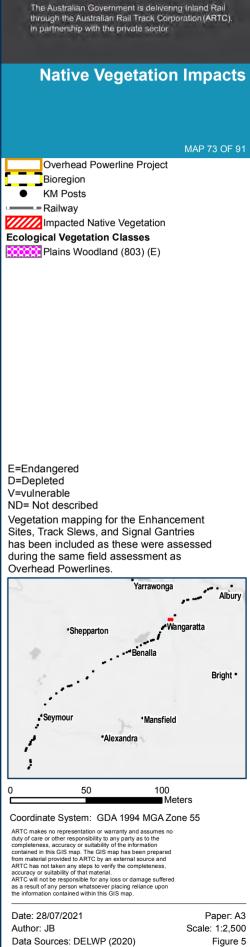








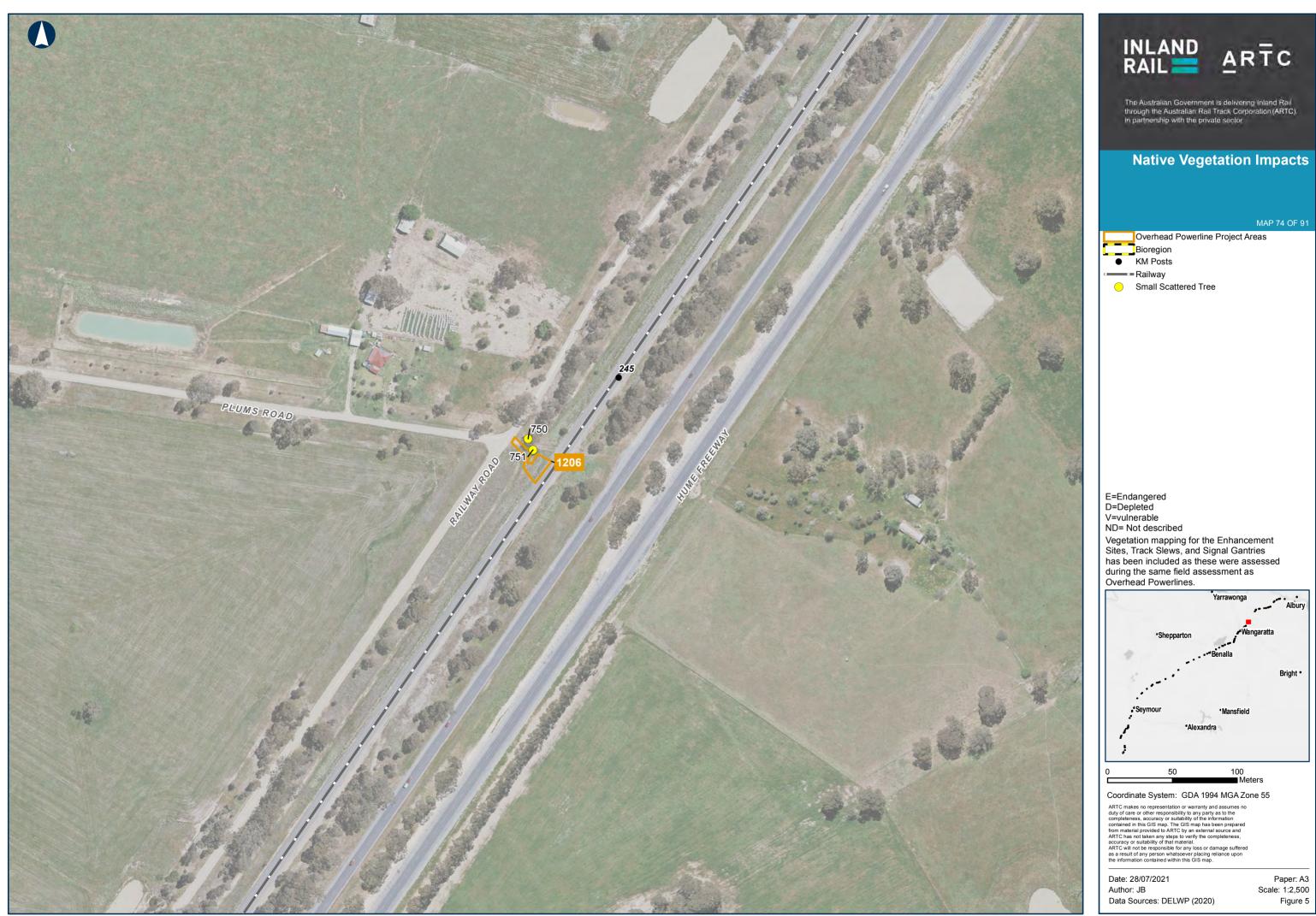




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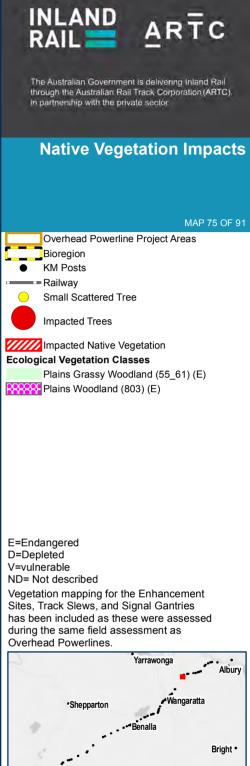
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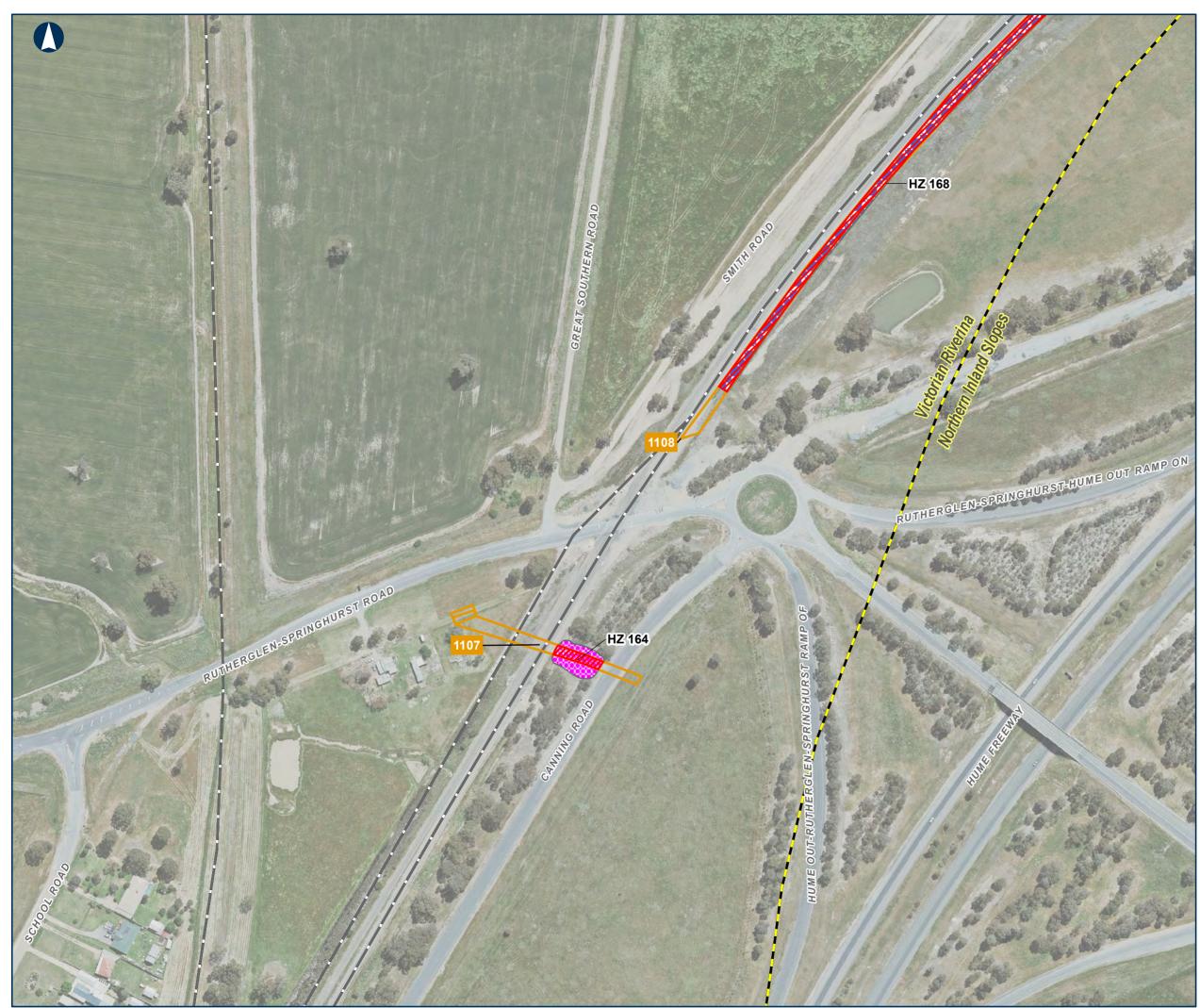
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Data Sources: DELWP (2020)

Figure 5

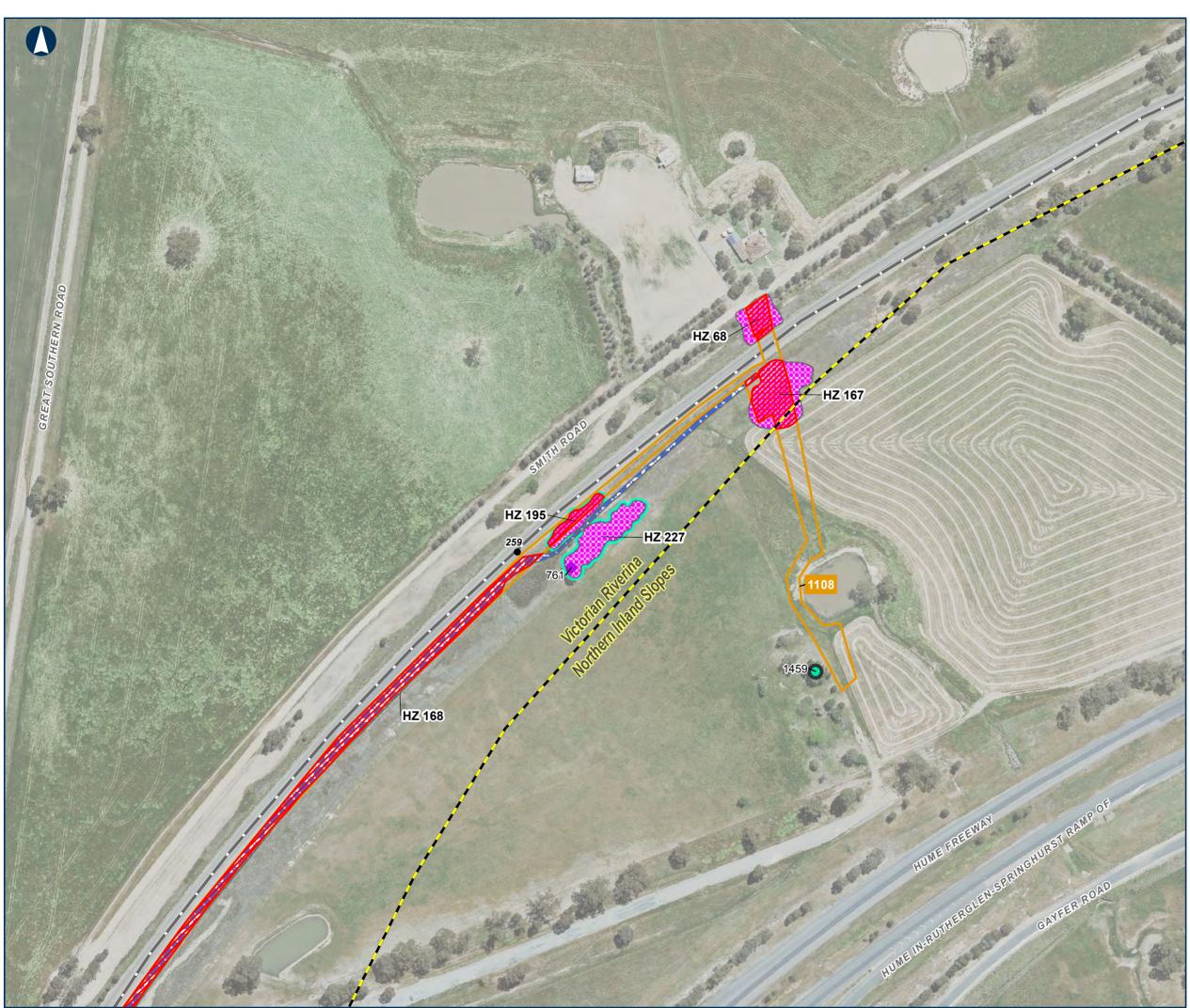
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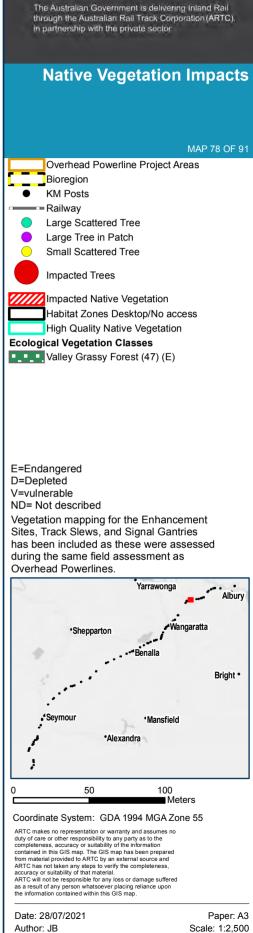
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Figure 5









Data Sources: DELWP (2020)

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Paper: A3 Scale: 1:2,500 Figure 5

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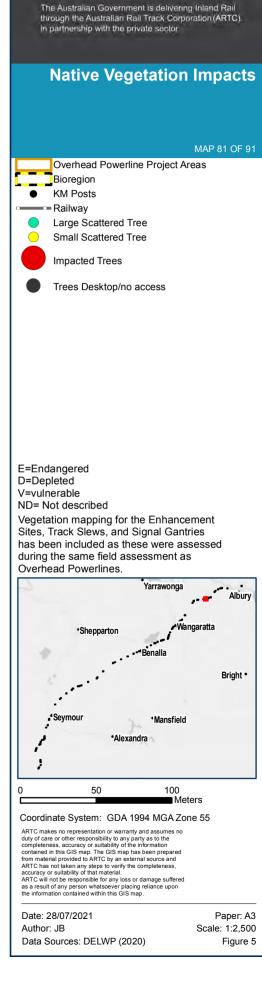






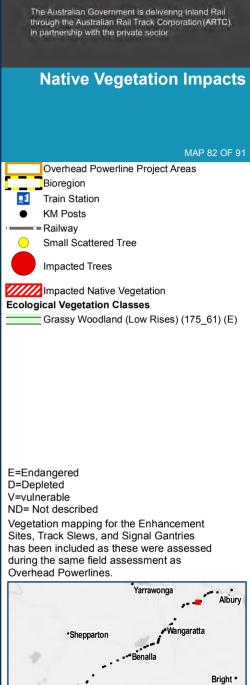




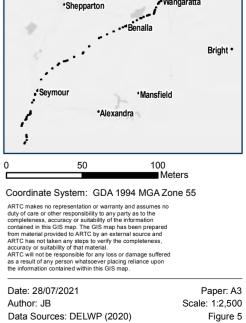


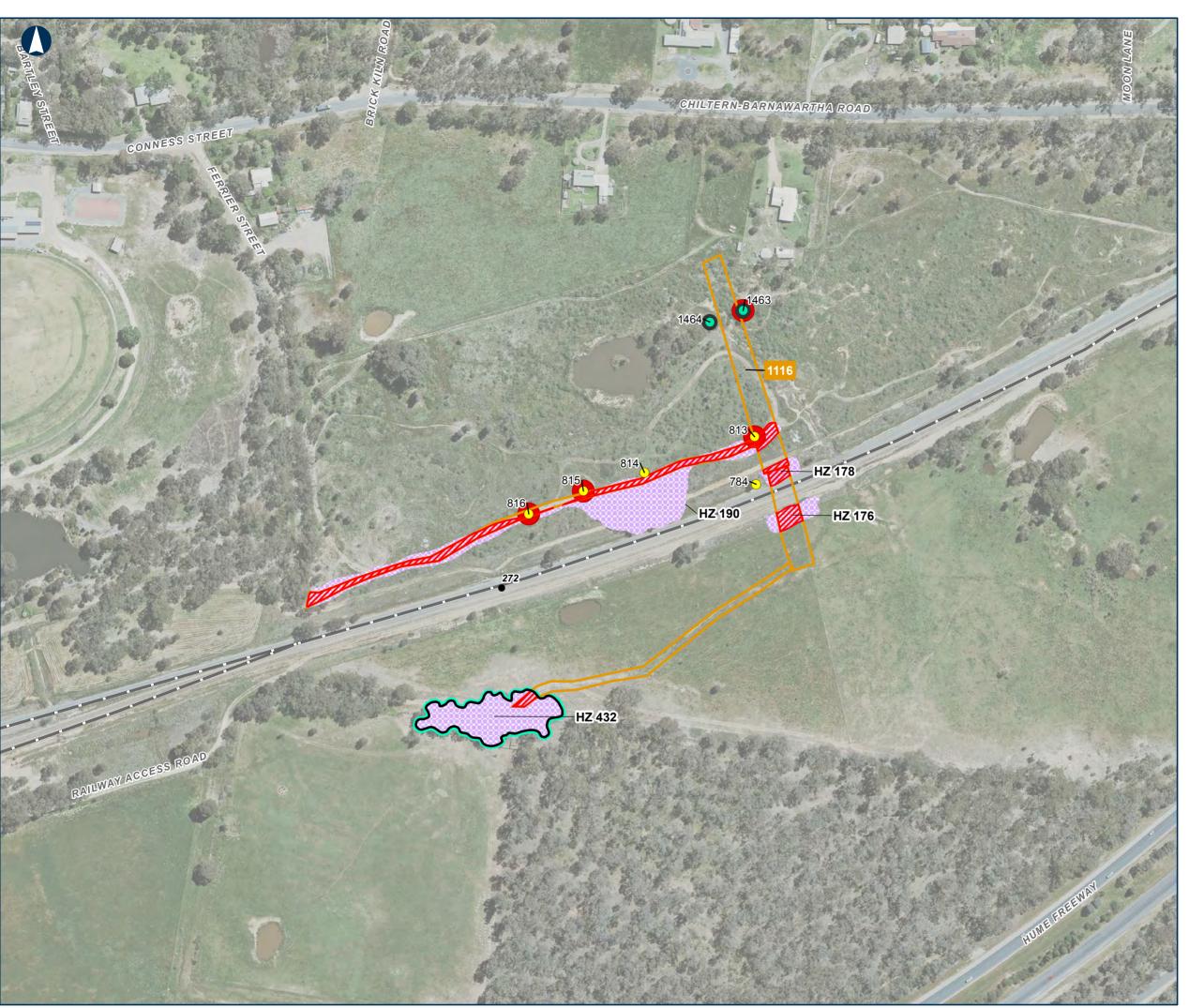
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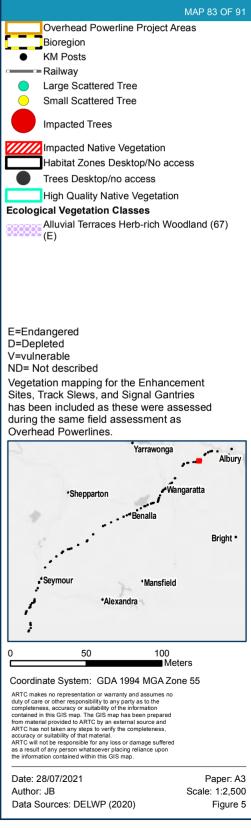


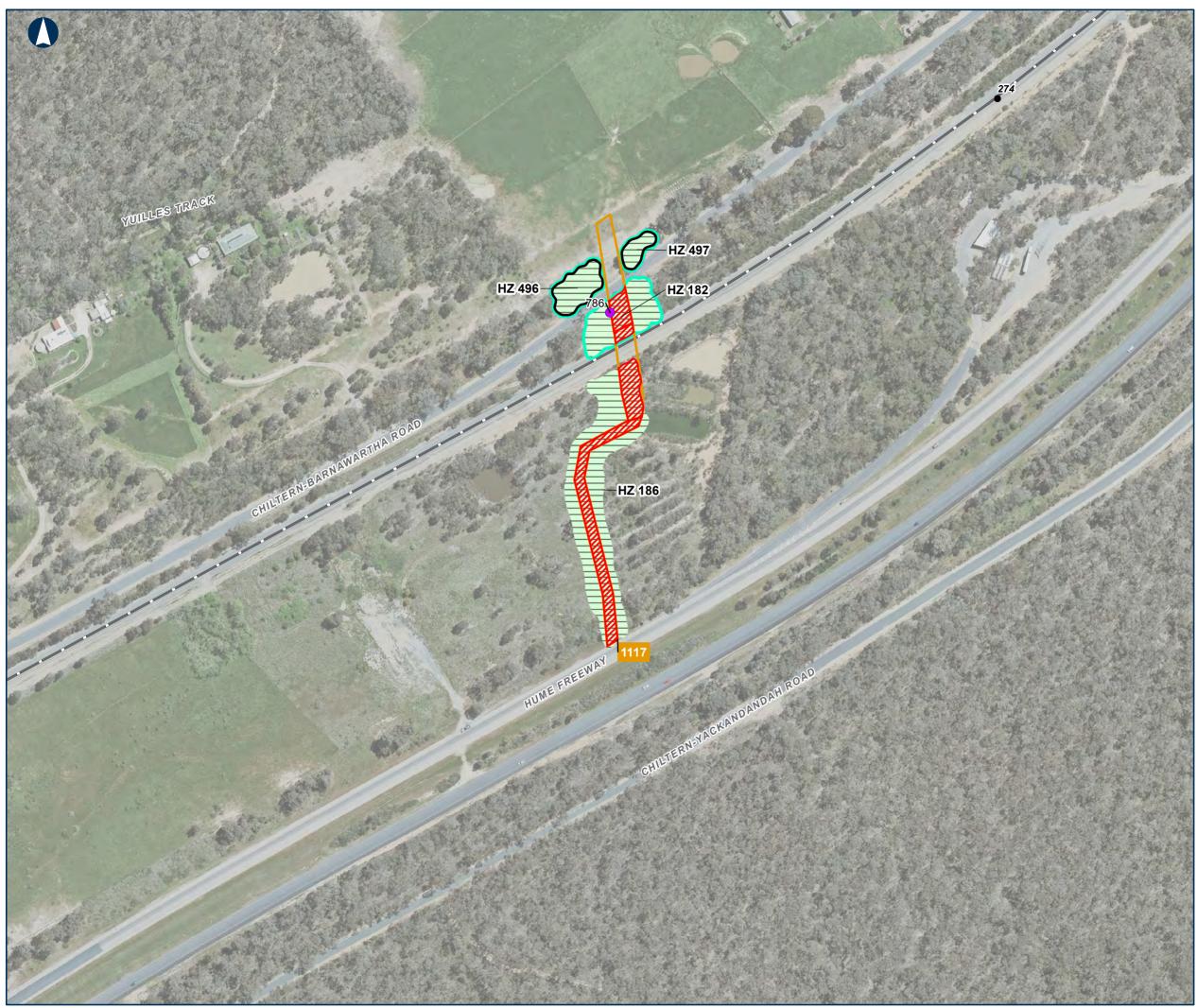


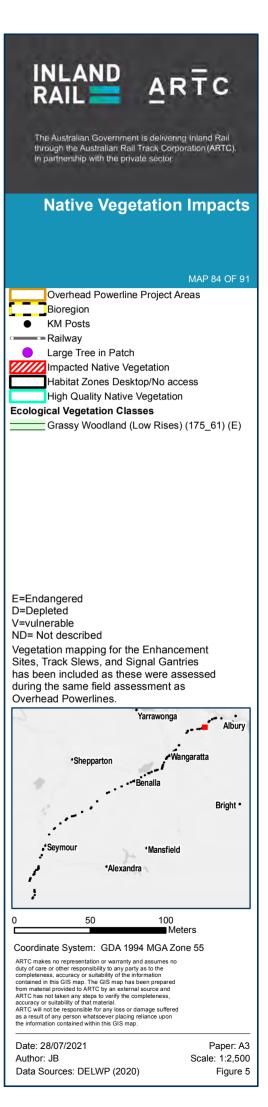


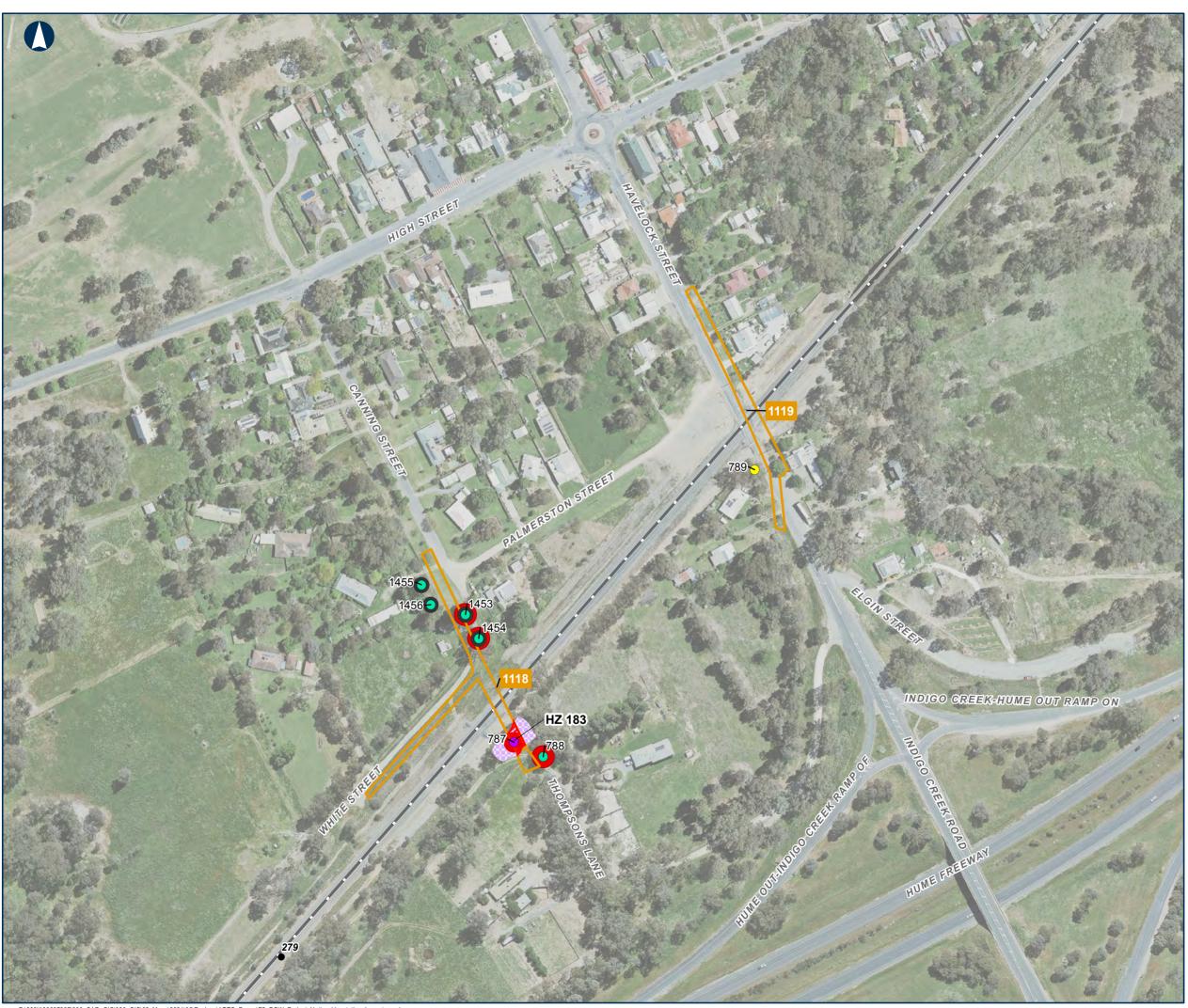
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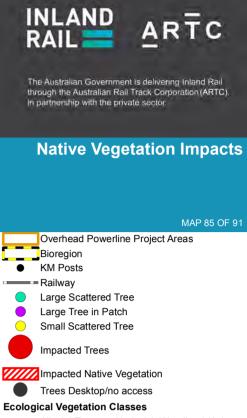
Native Vegetation Impacts







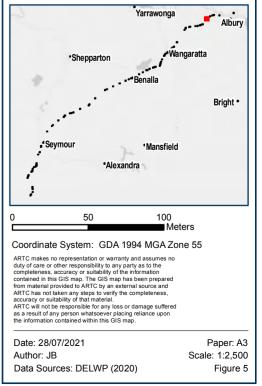




MAP 85 OF 91

Alluvial Terraces Herb-rich Woodland (67) (V)

E=Endangered D=Depleted . V=vulnerable ND= Not described Vegetation mapping for the Enhancement Sites, Track Slews, and Signal Gantries has been included as these were assessed during the same field assessment as Overhead Powerlines.

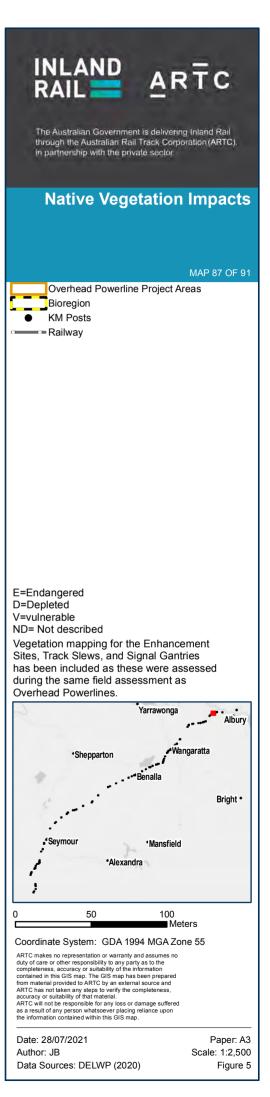


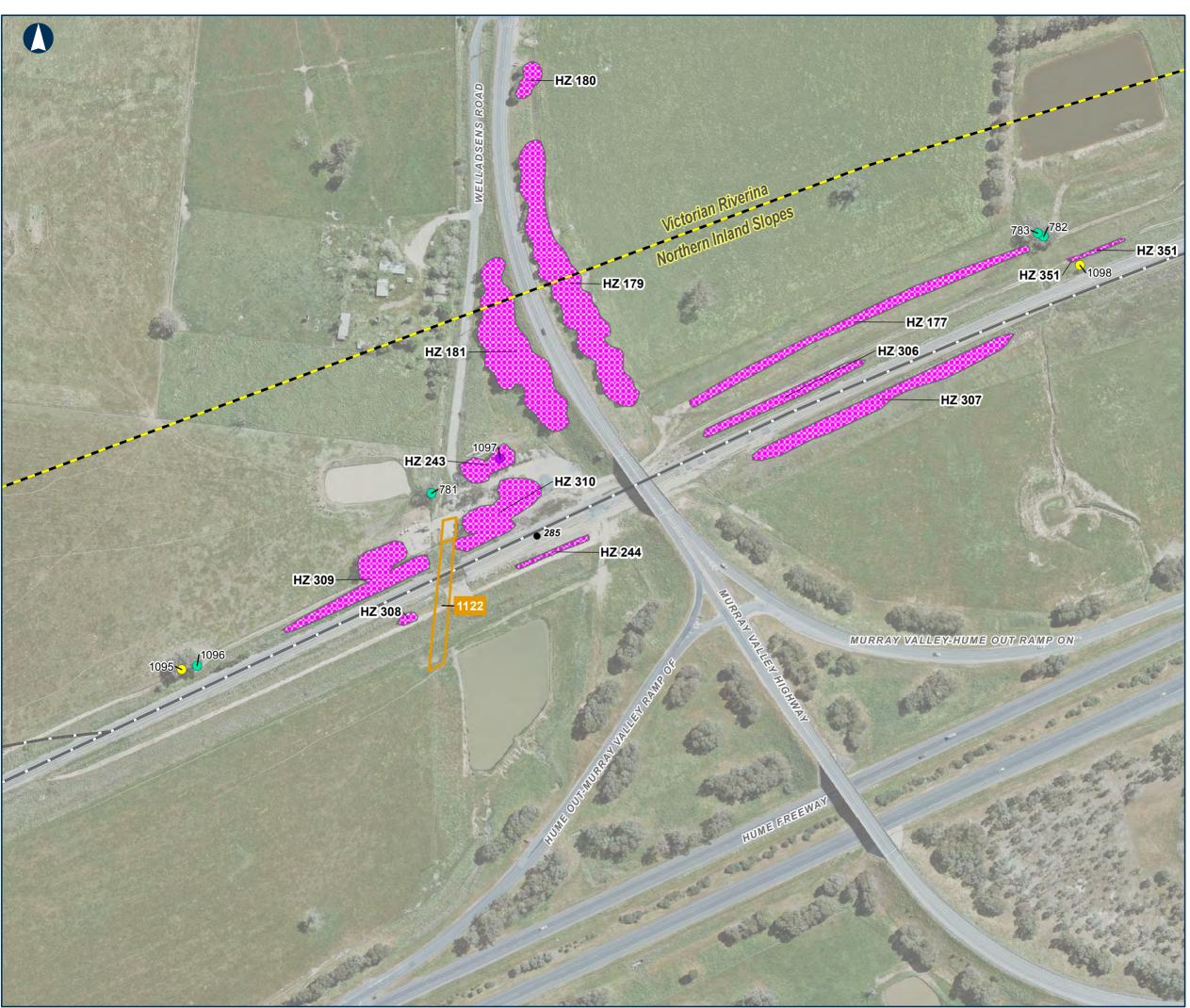


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Date: 28/07/2021 Author: JB Data Sources: DELWP (2020)

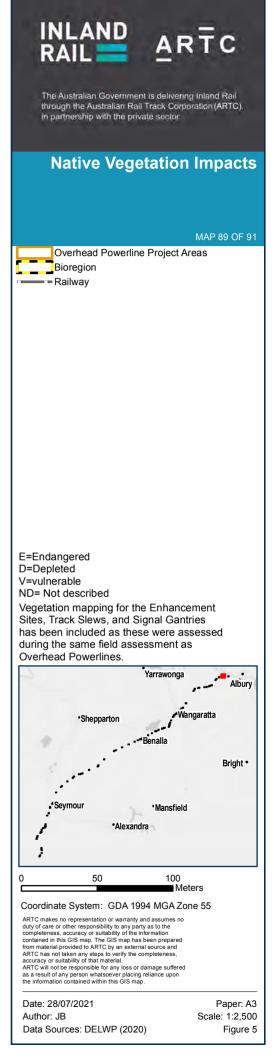
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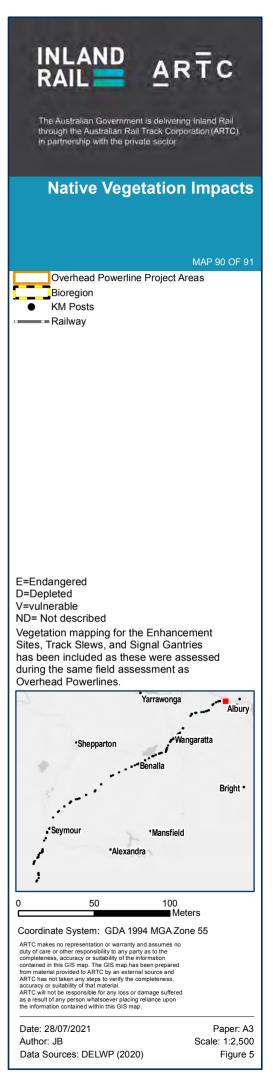
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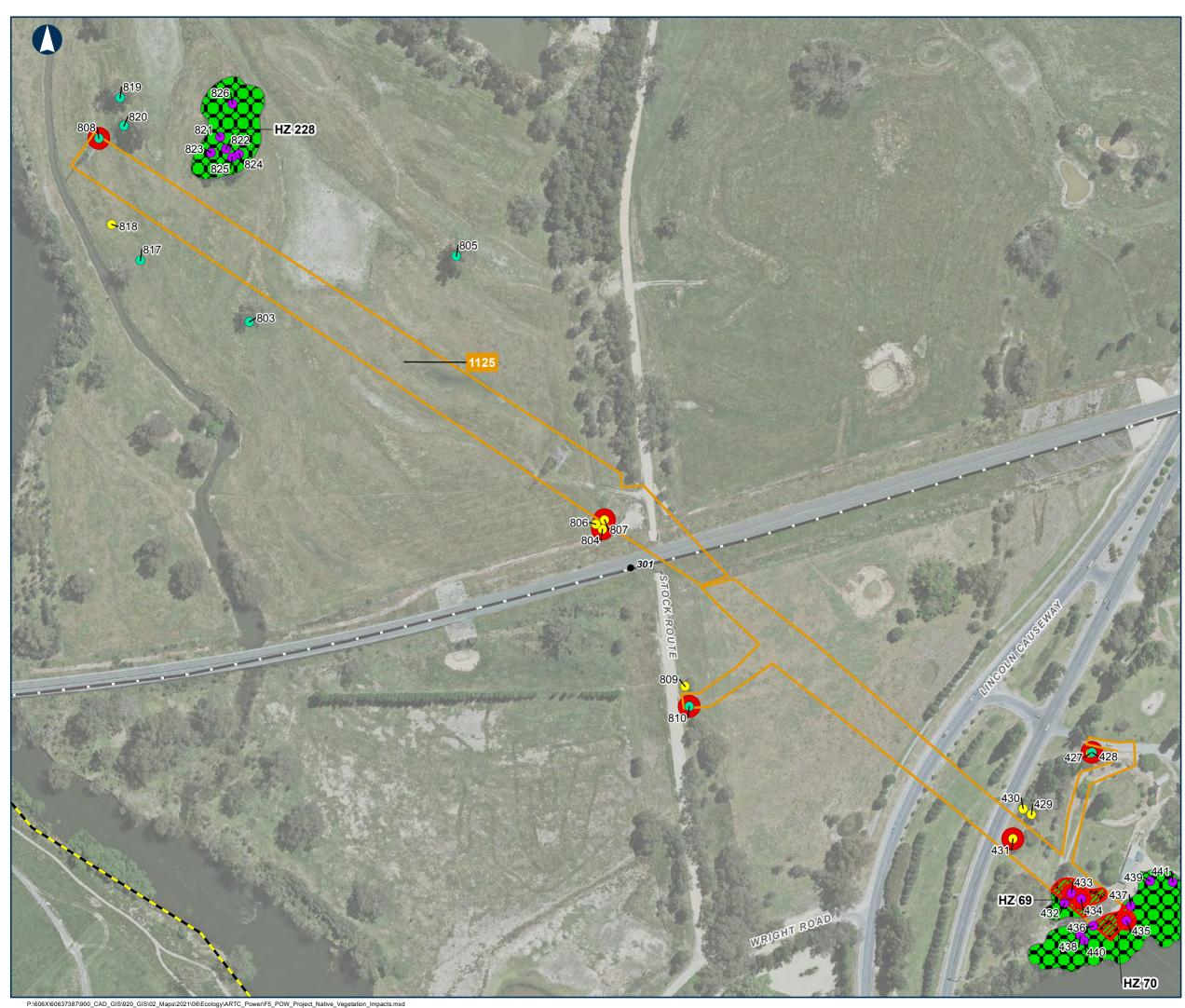


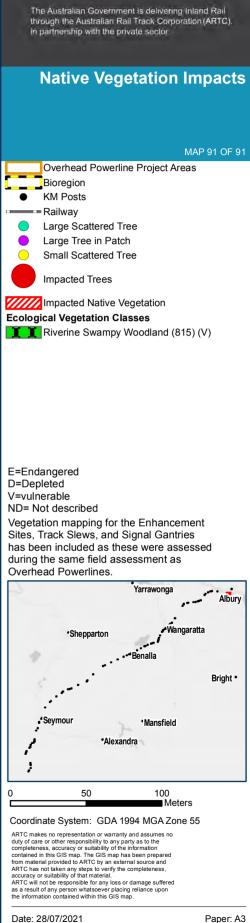




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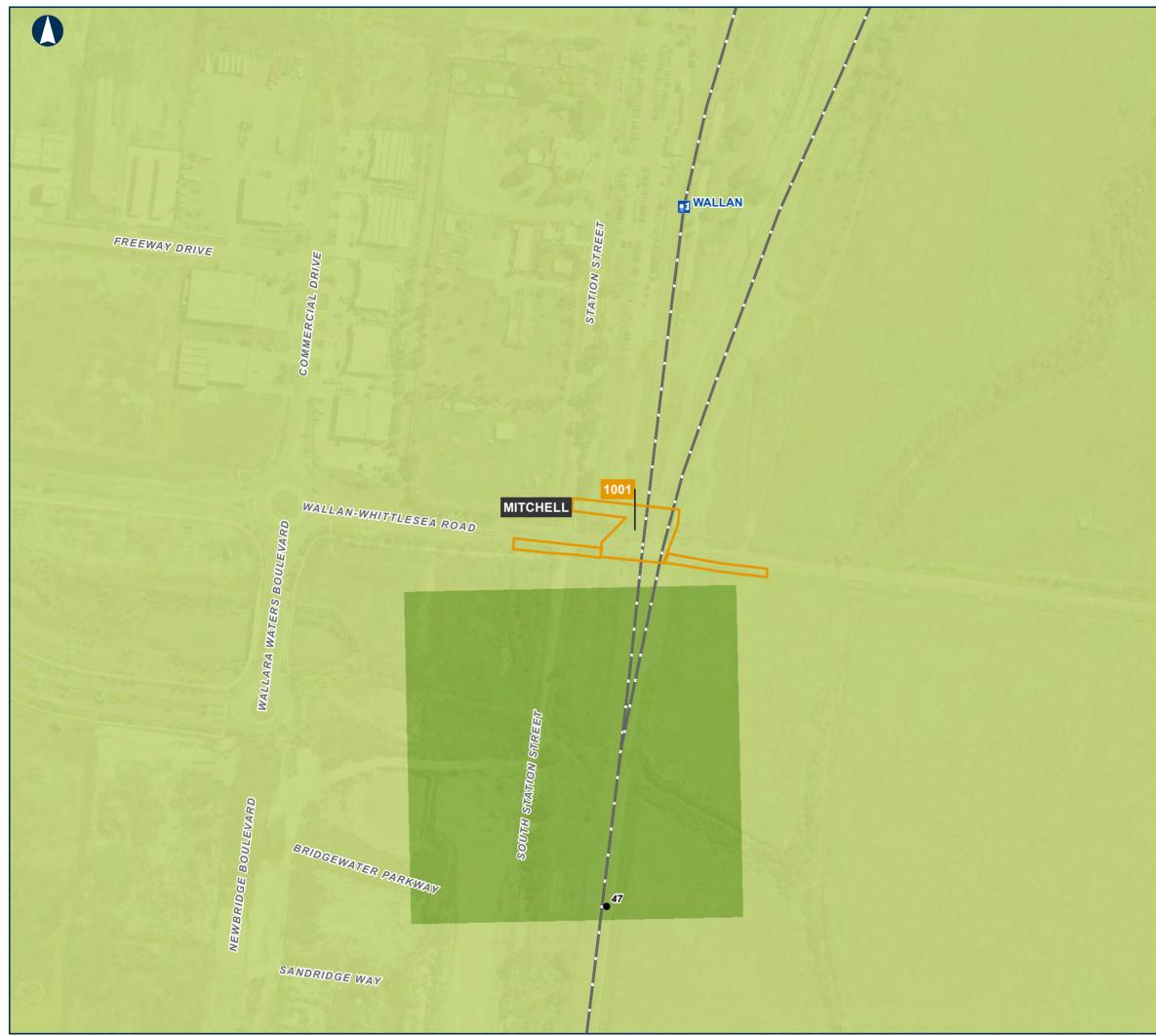
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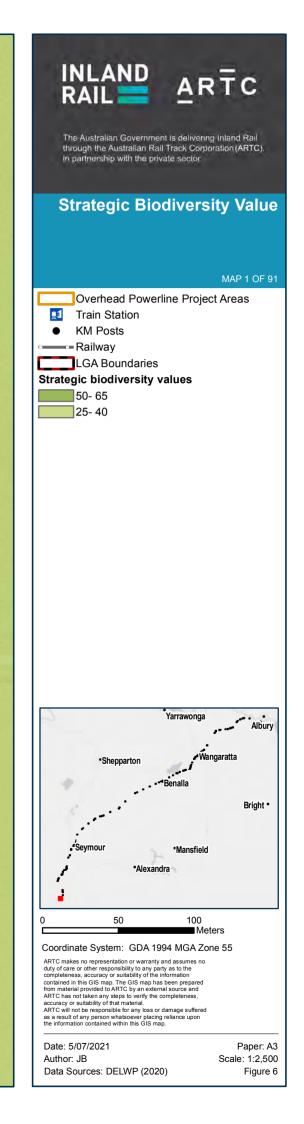
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Appendix A – Figures

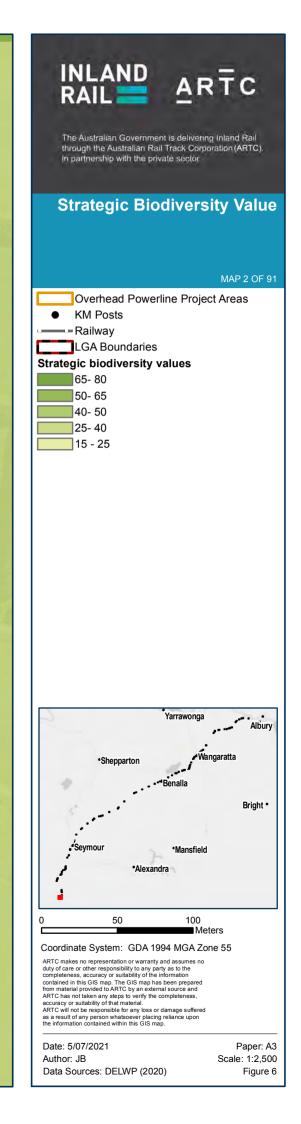
Figure 6 Strategic biodiversity value



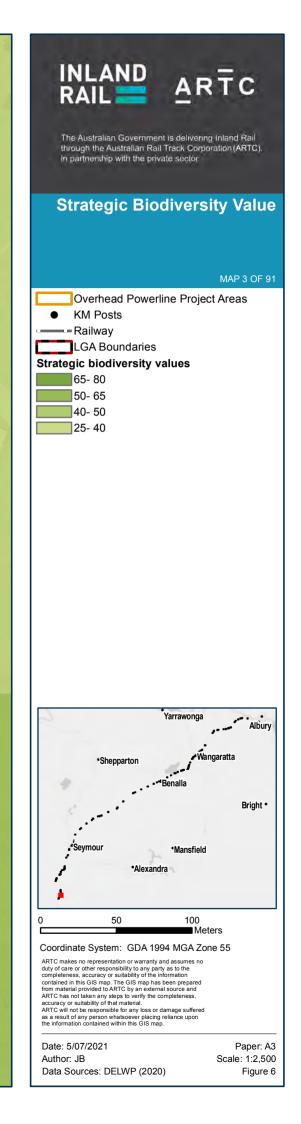
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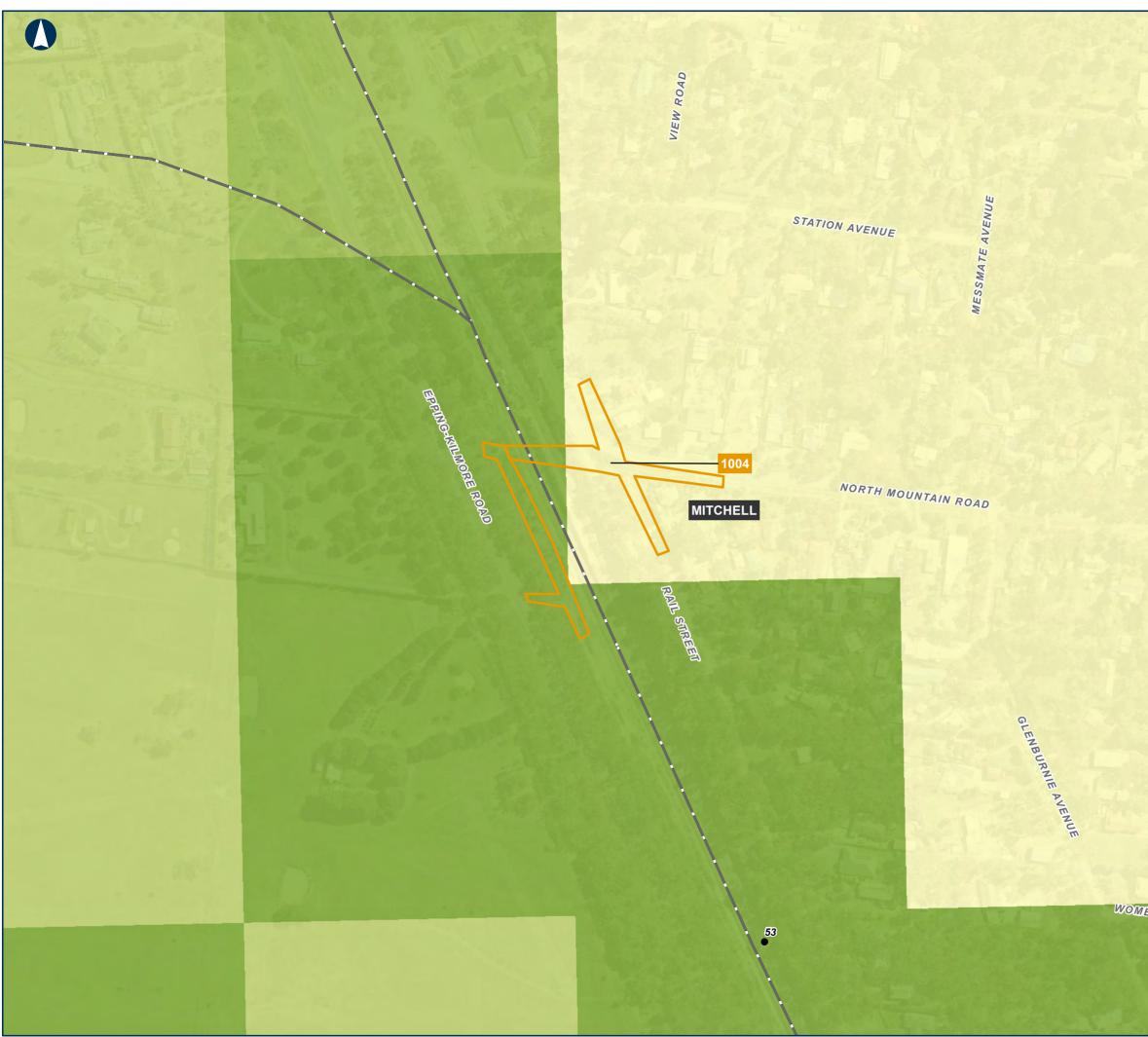




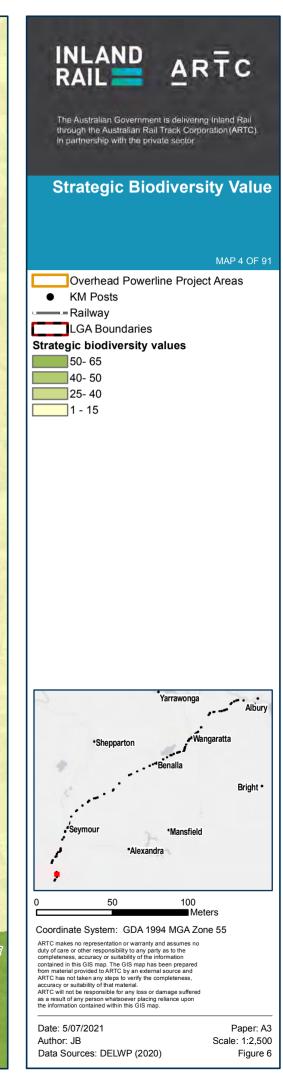




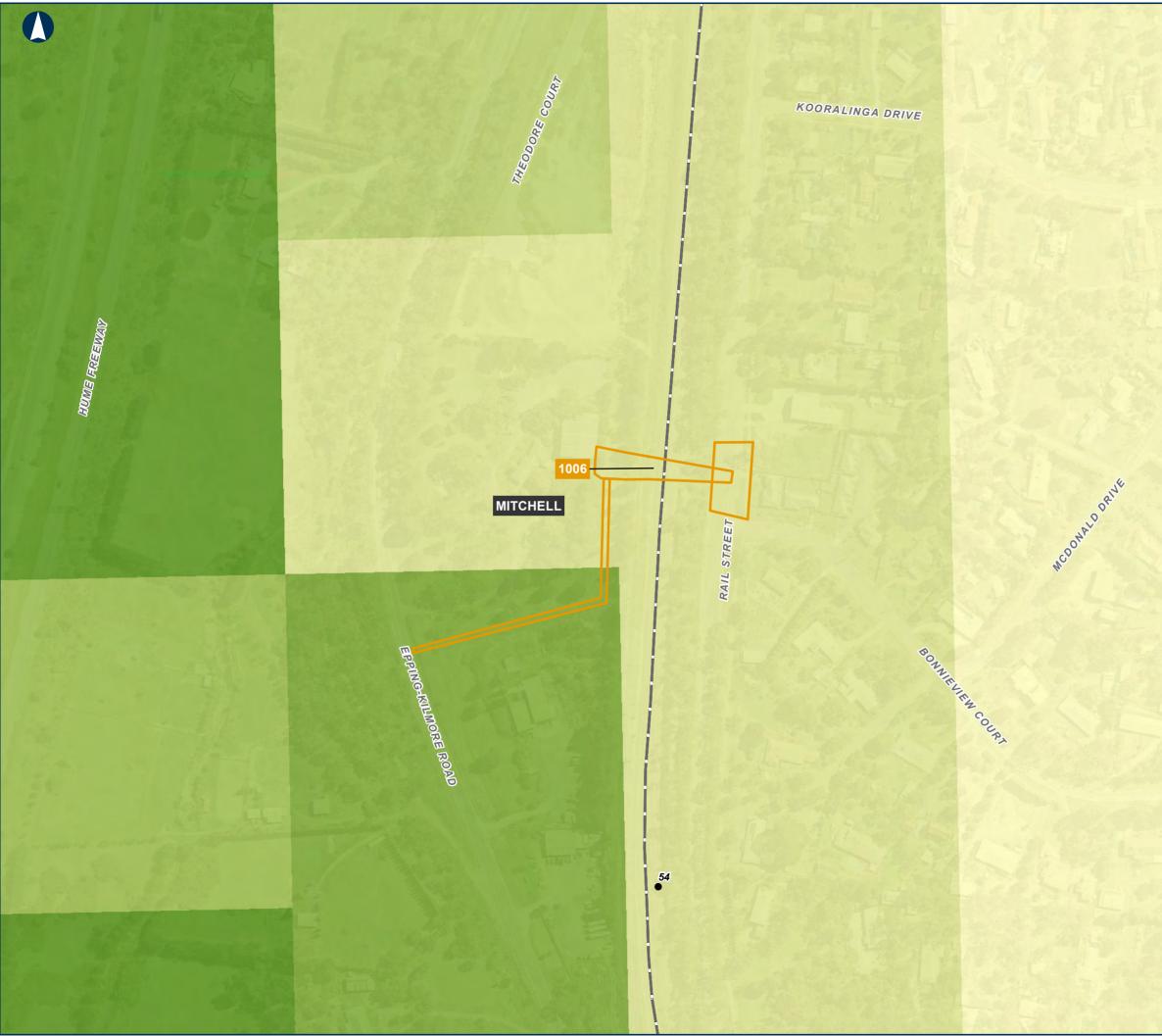




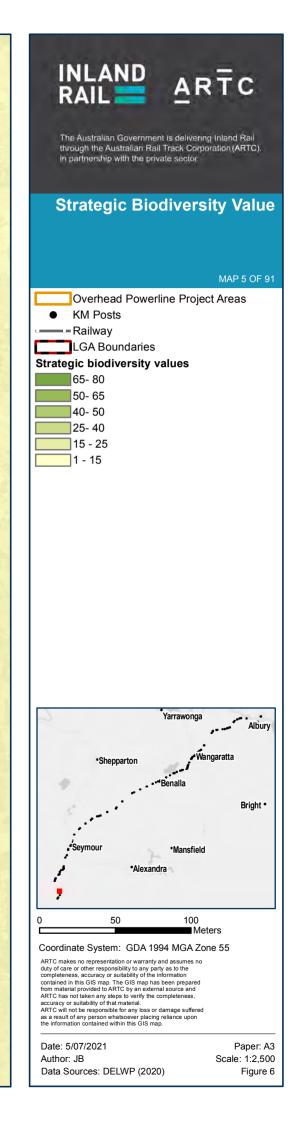
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WOMBAT AVENUE

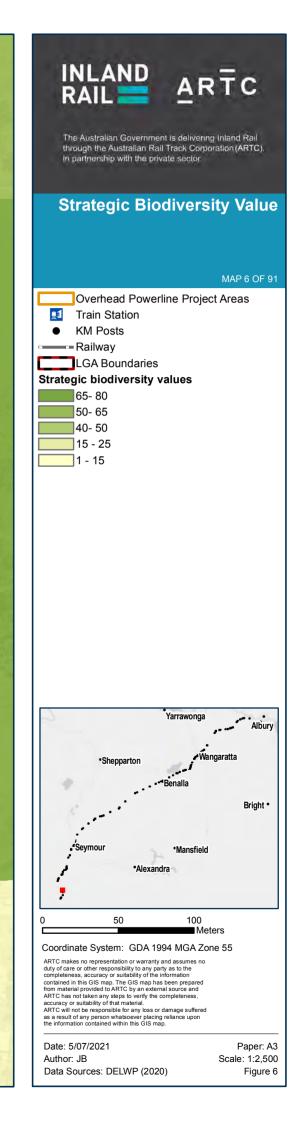


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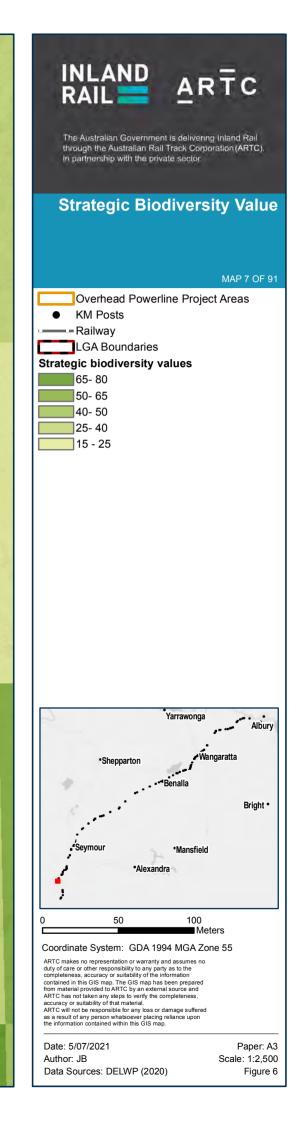


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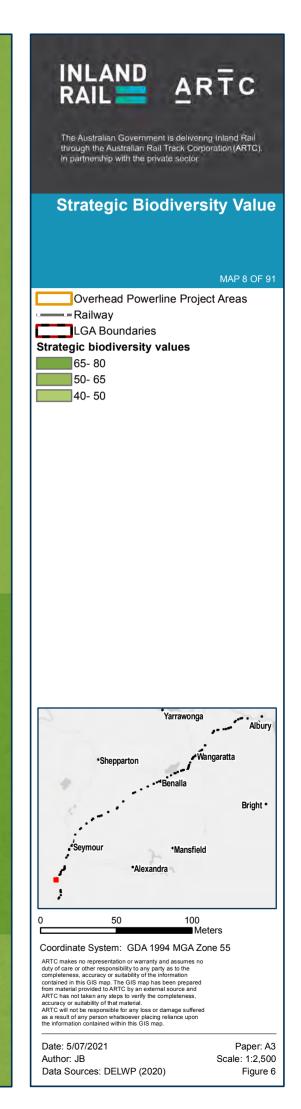


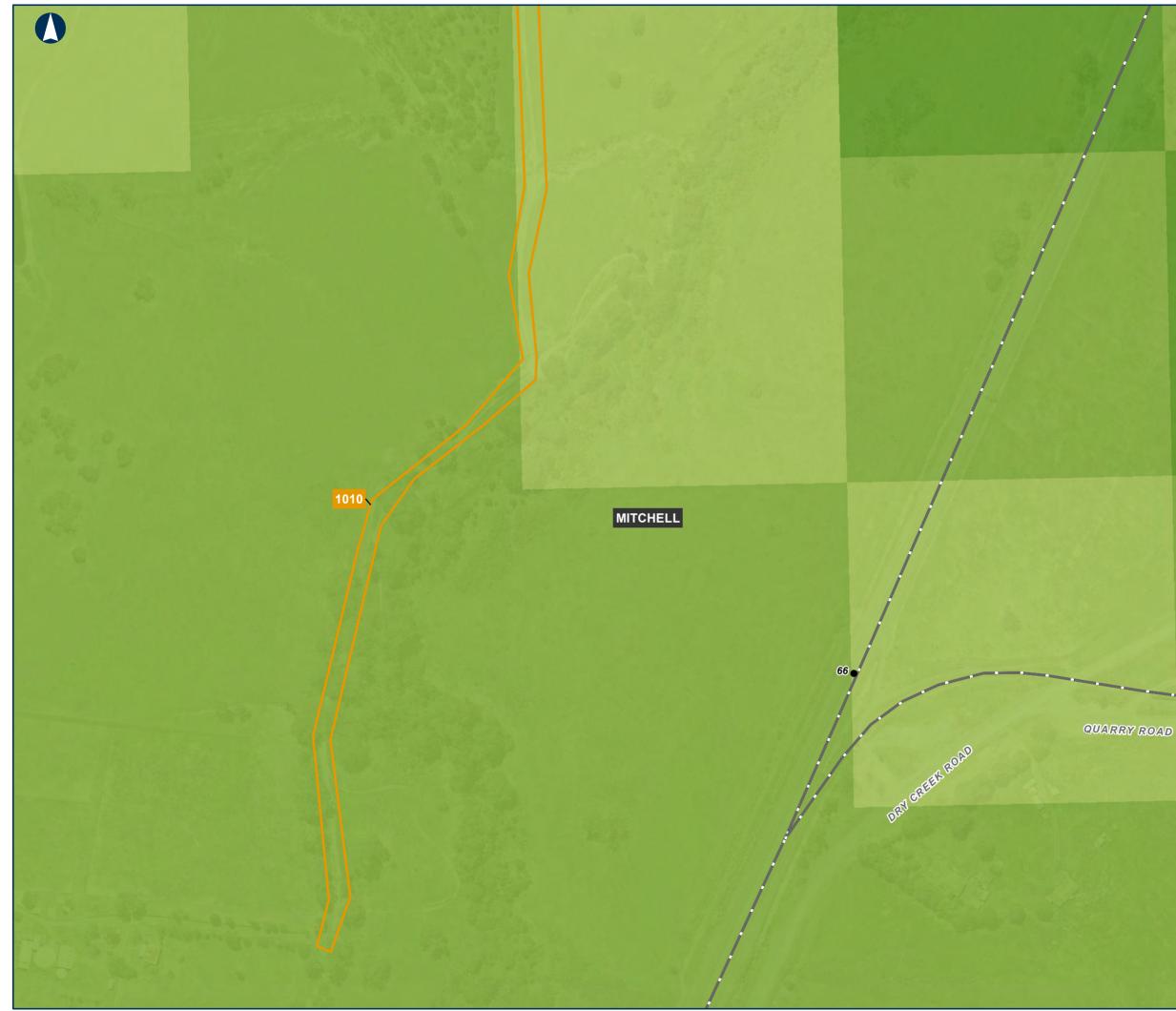


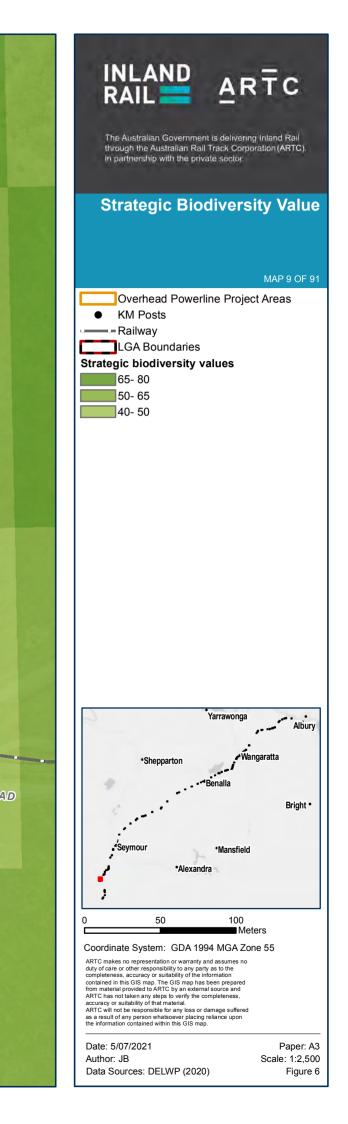
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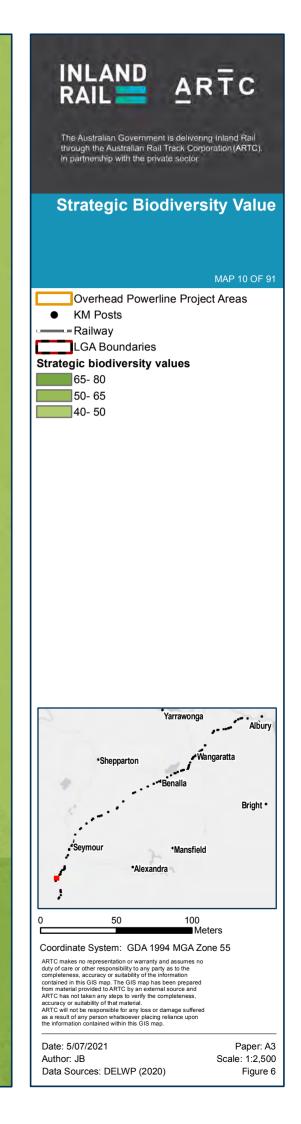


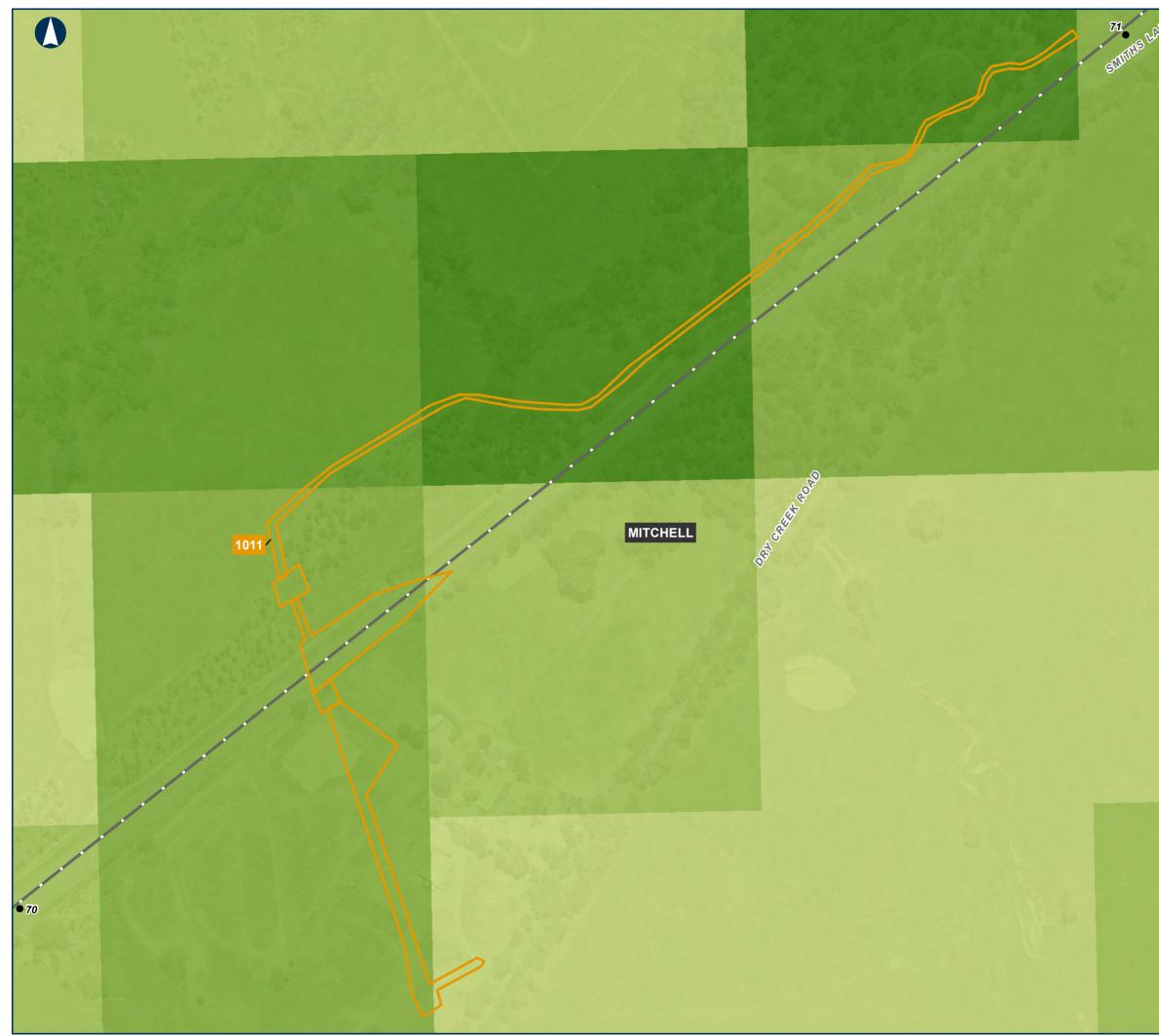


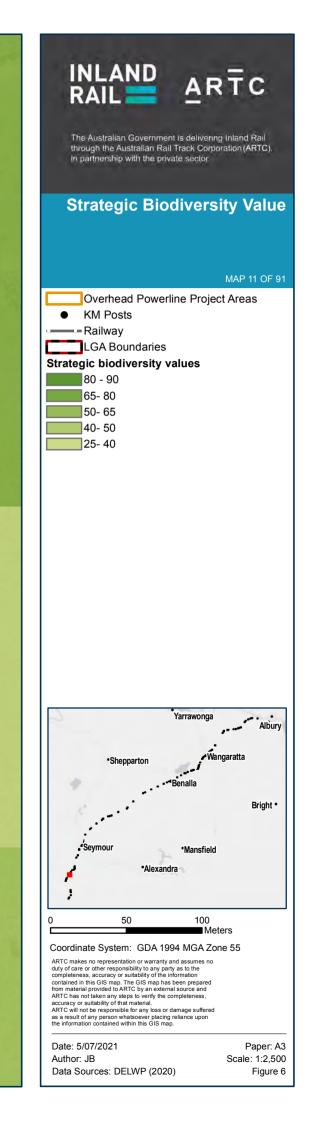




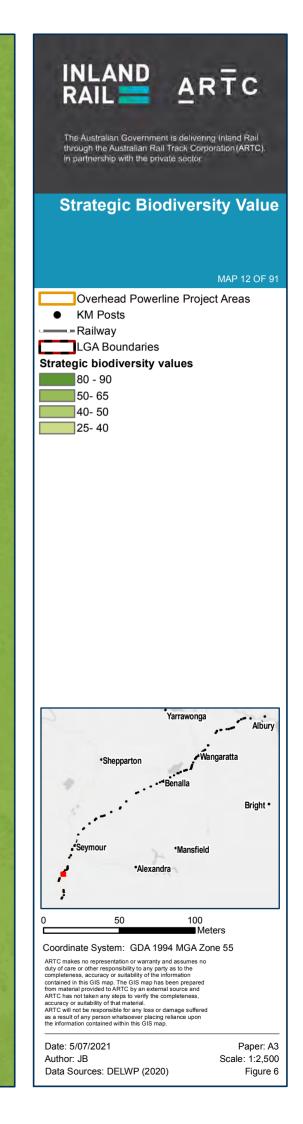
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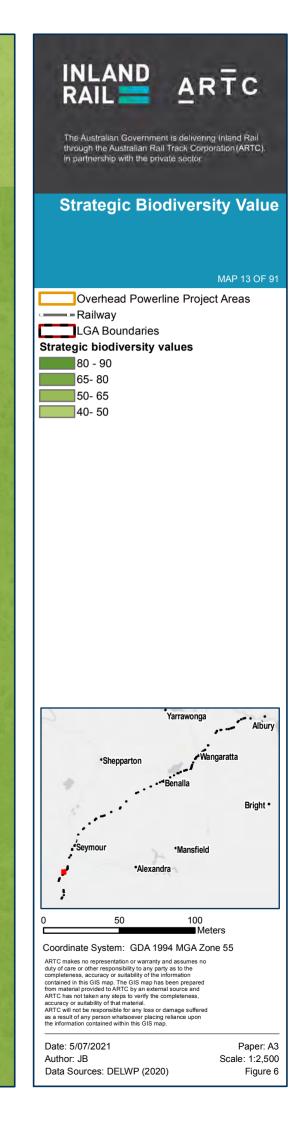




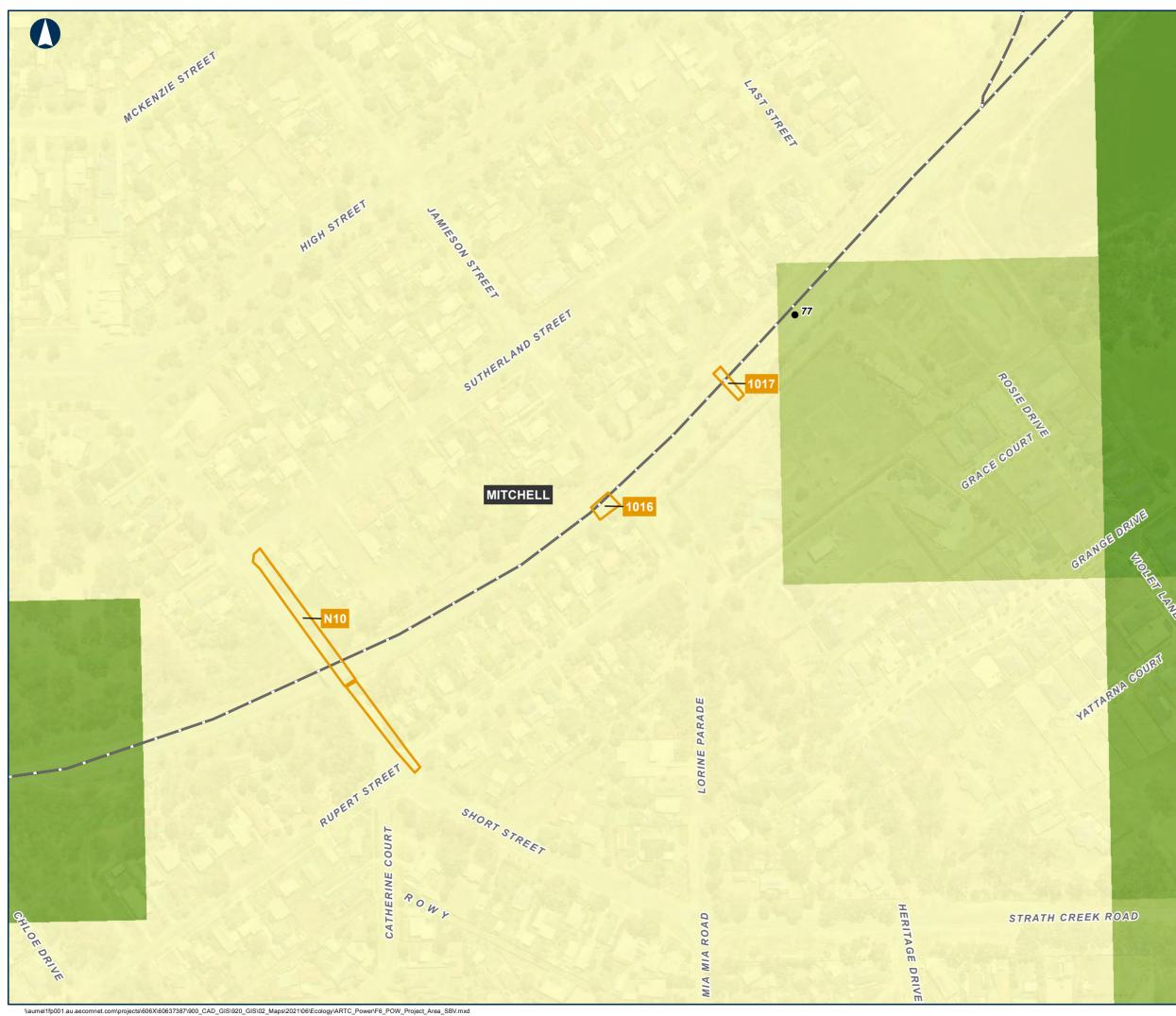


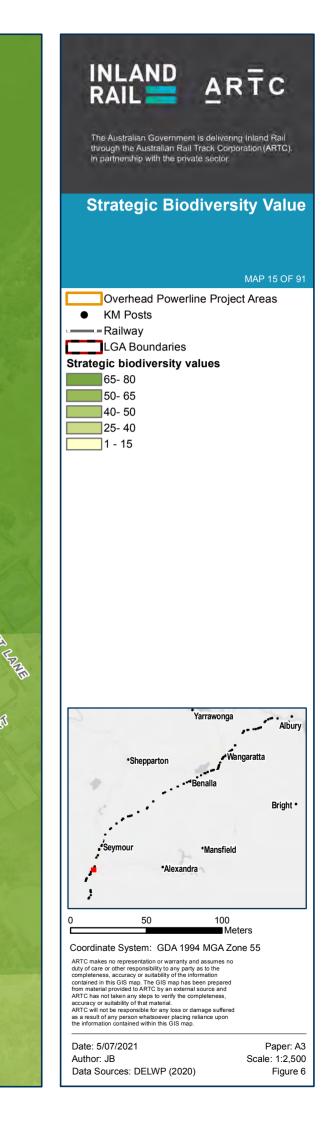


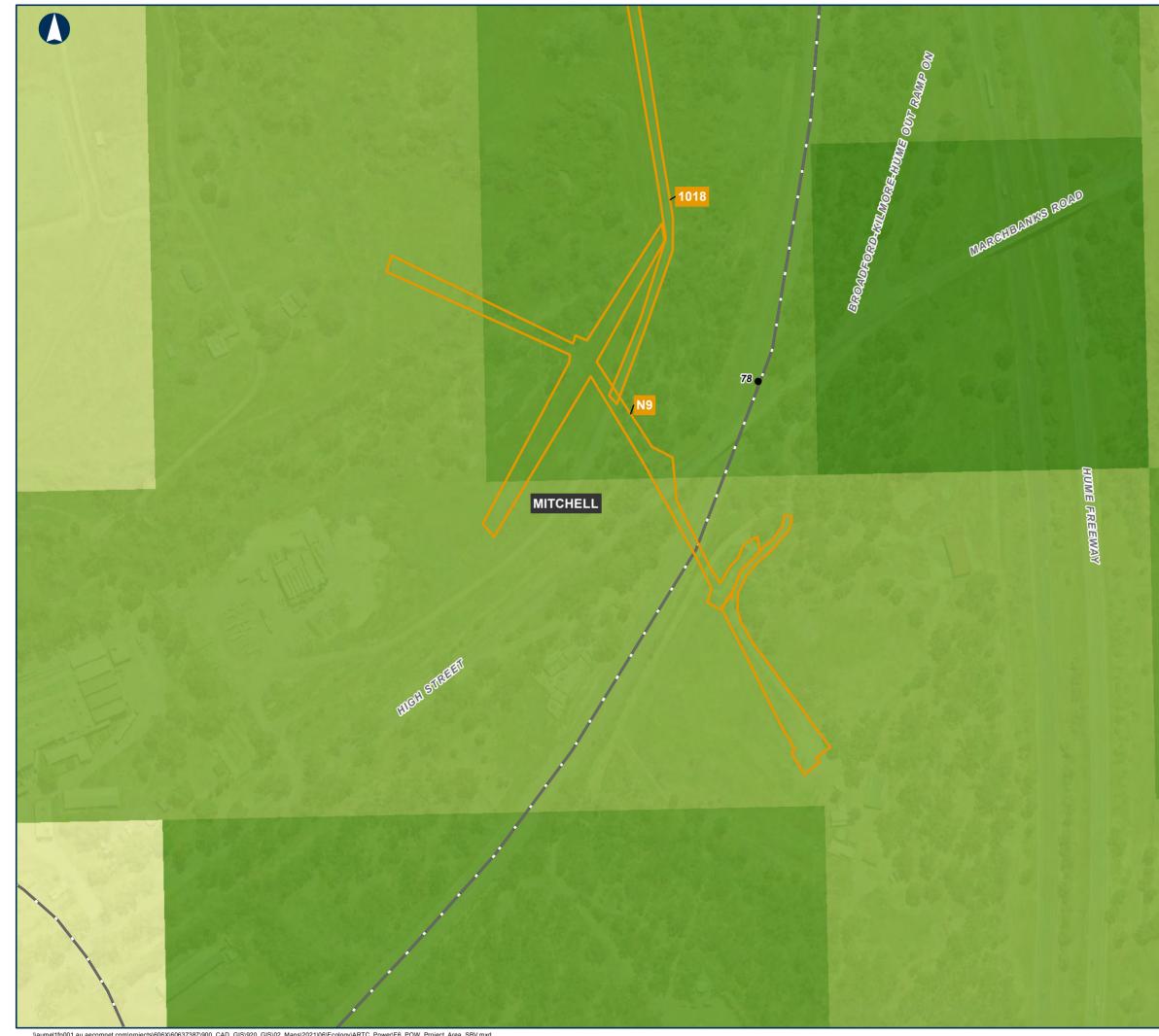


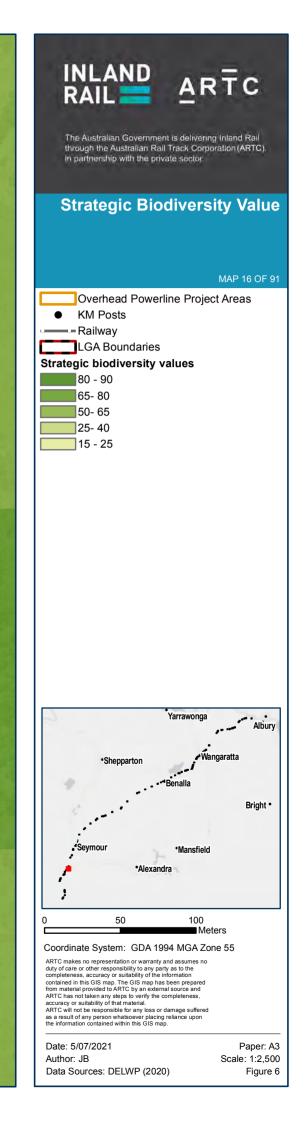




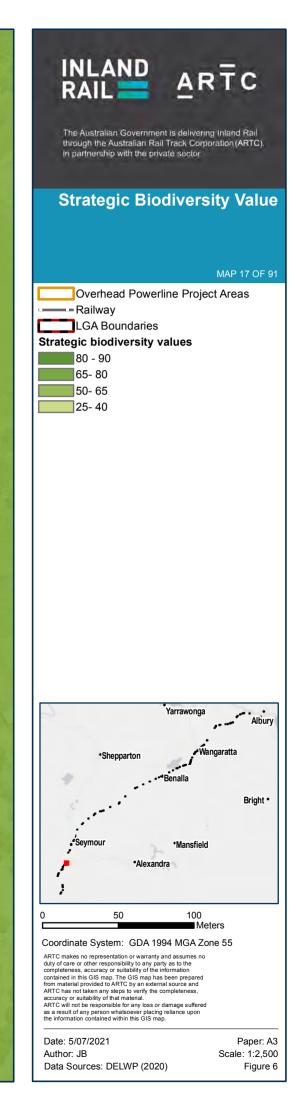




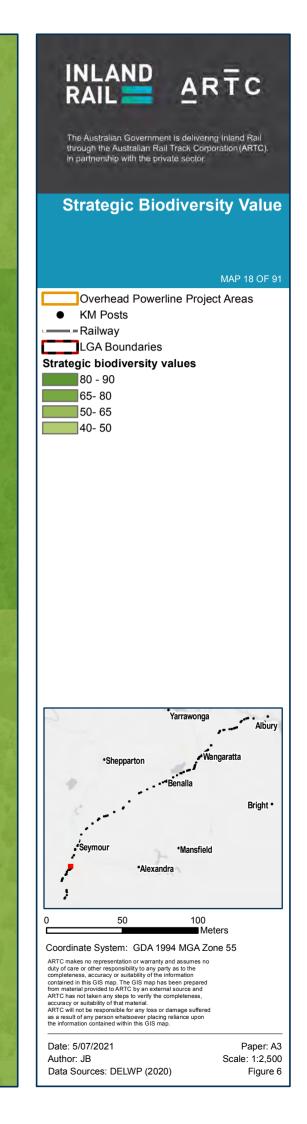


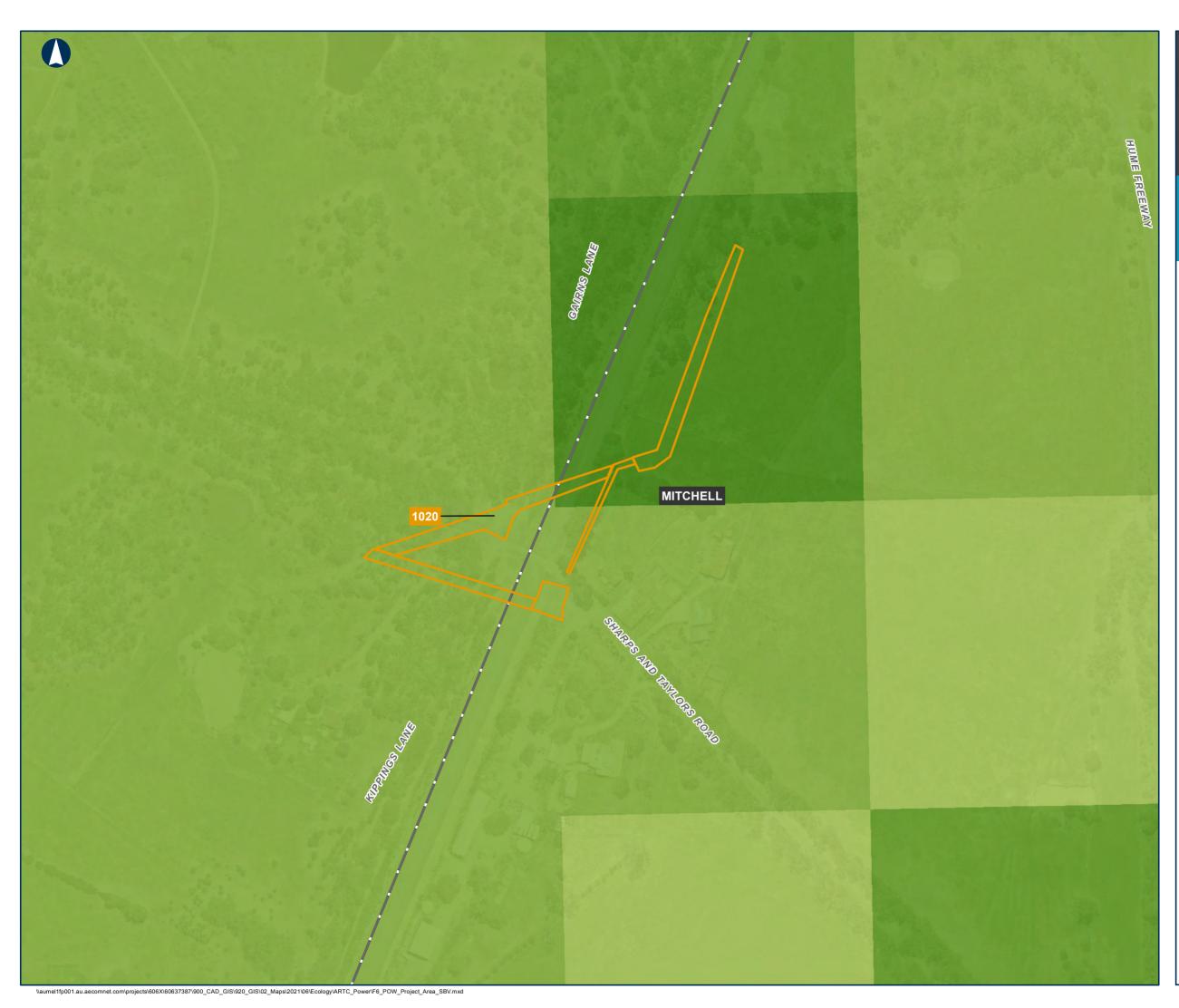


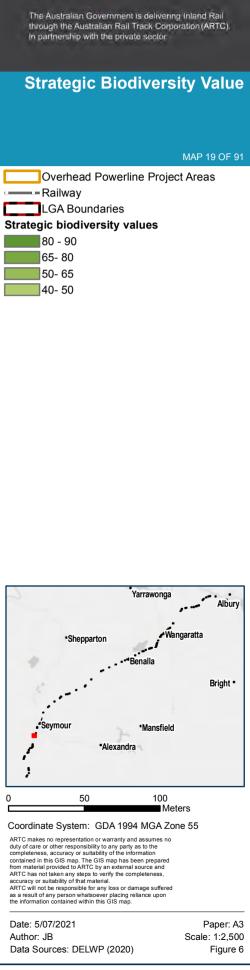






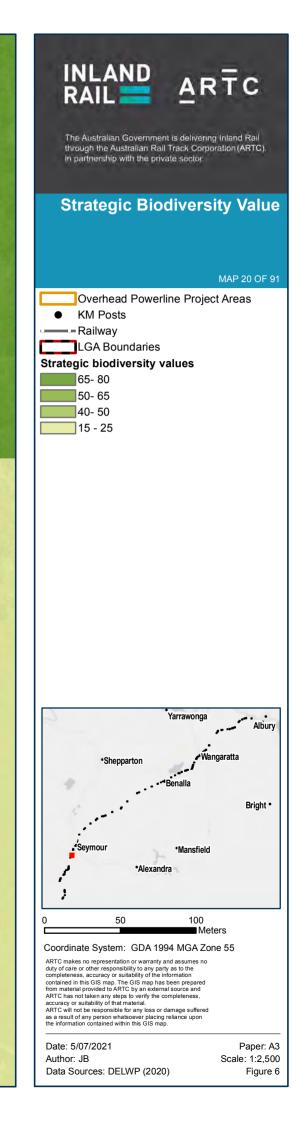




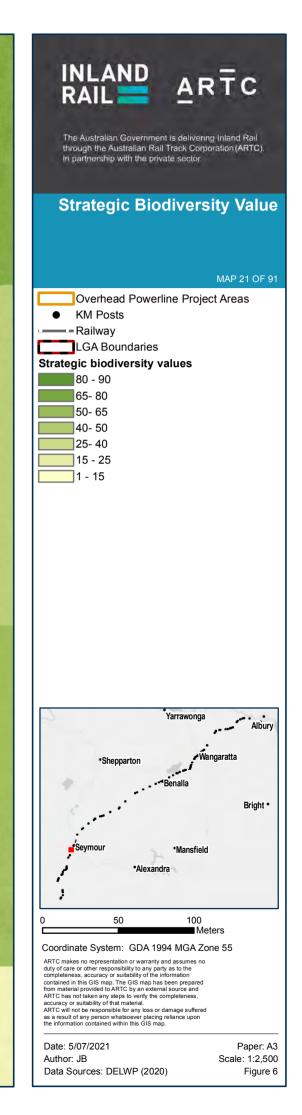


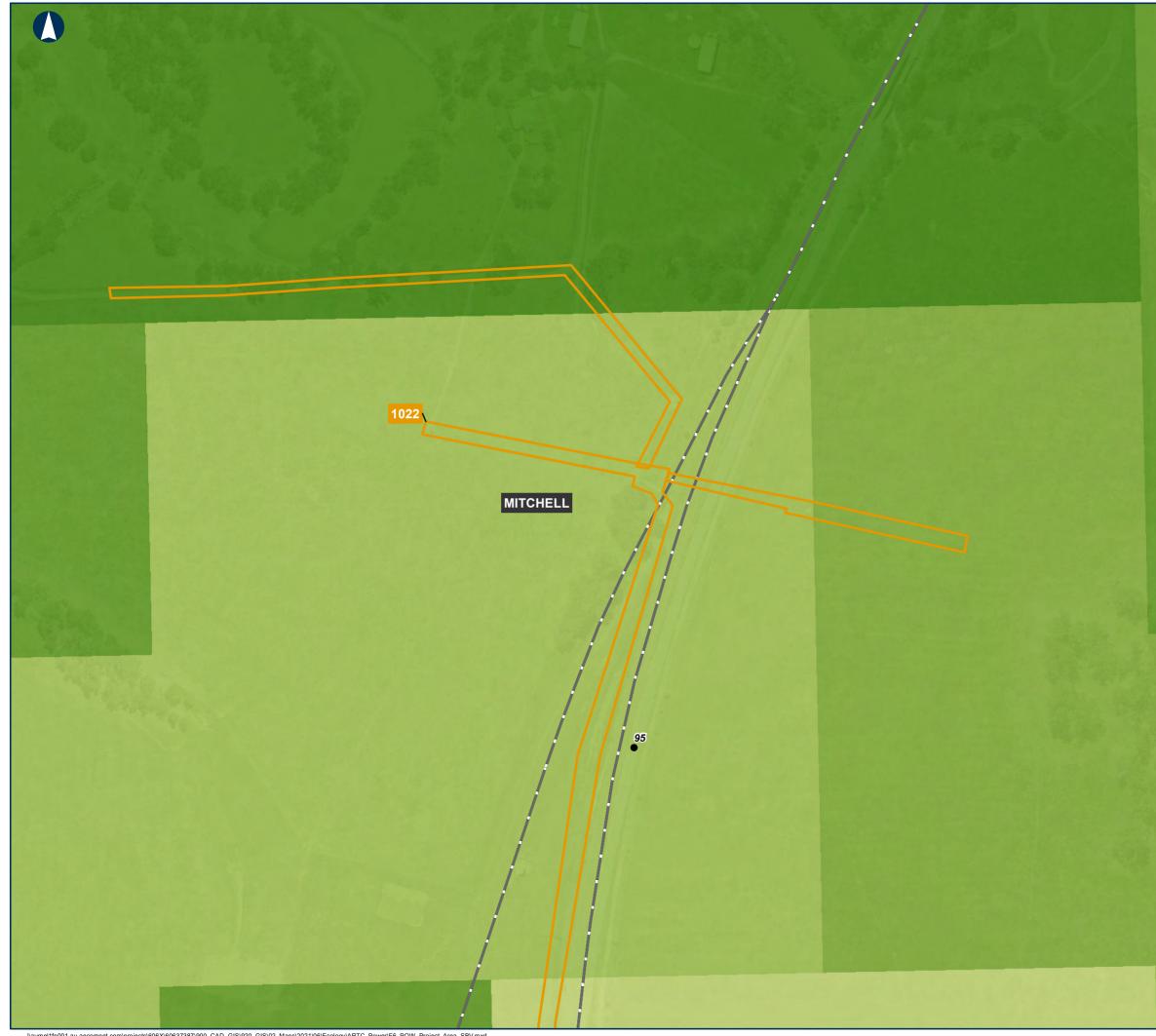
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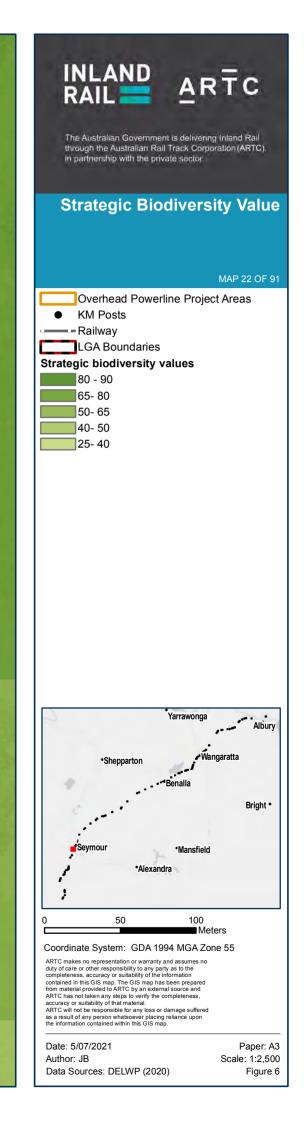






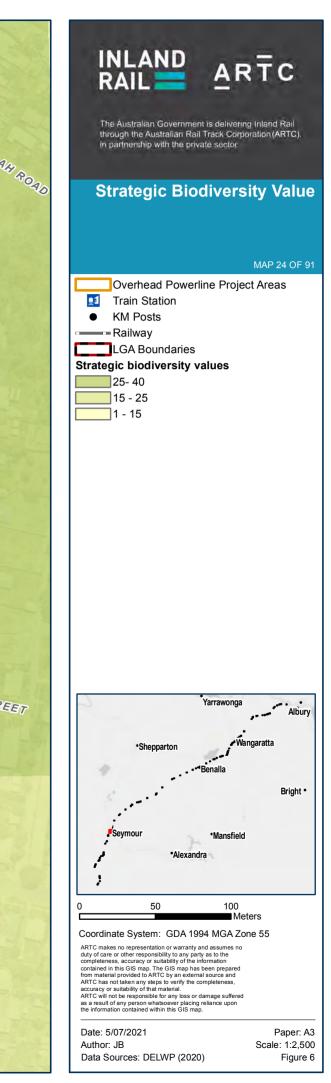




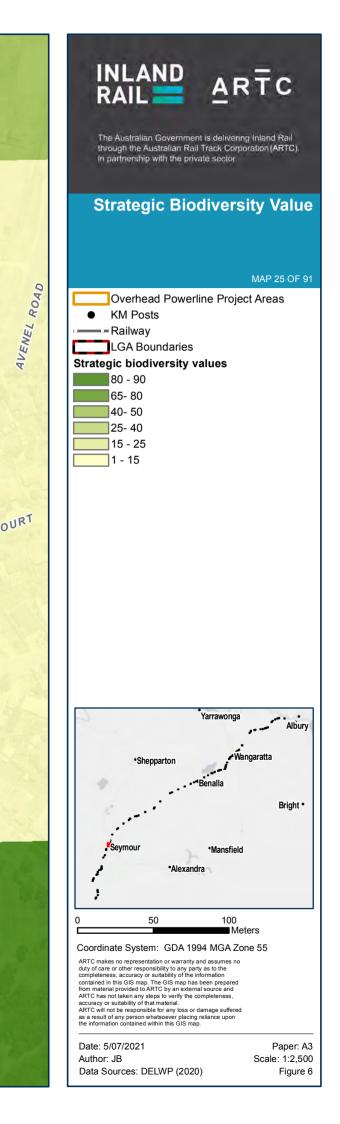




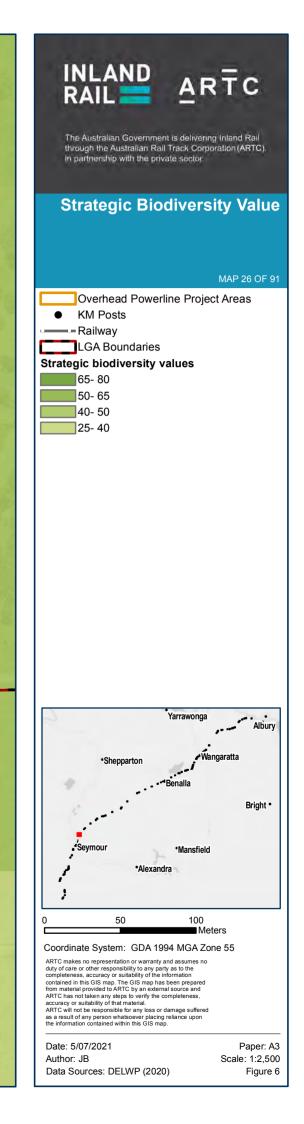




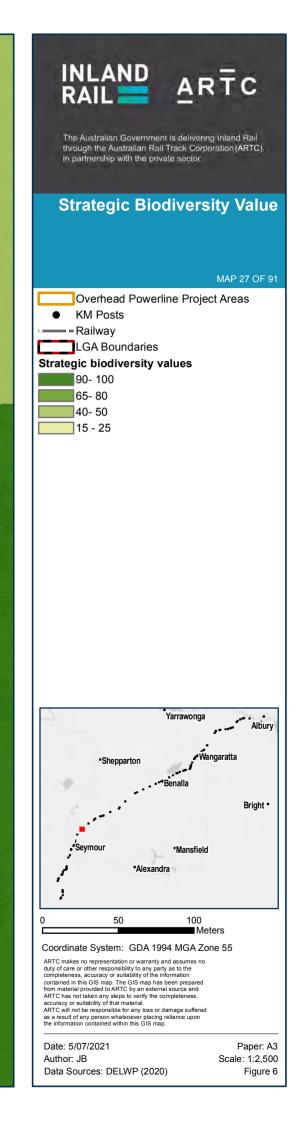


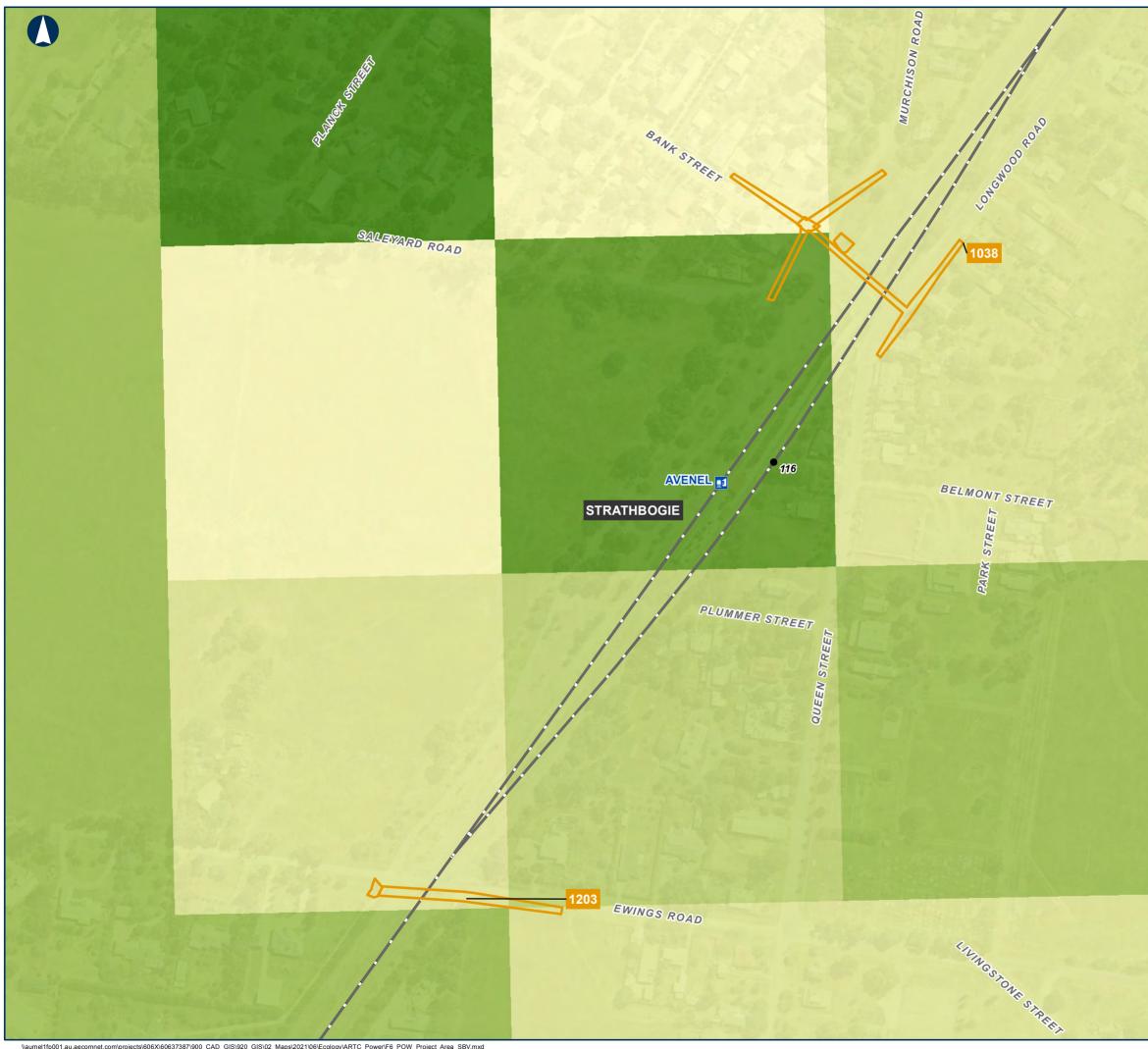




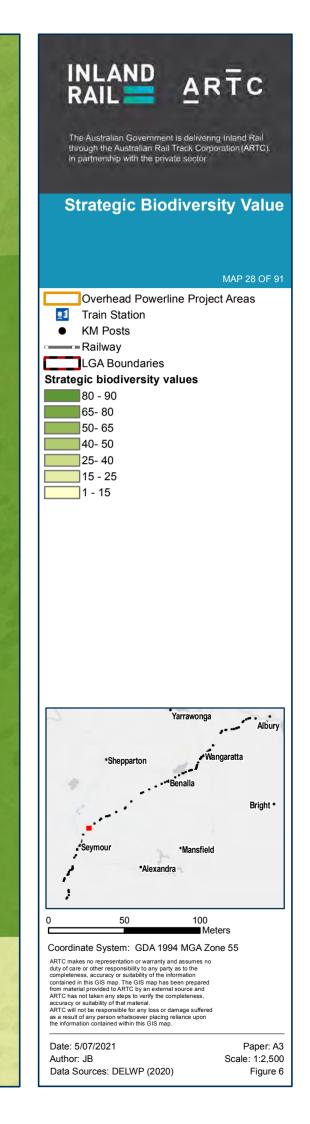




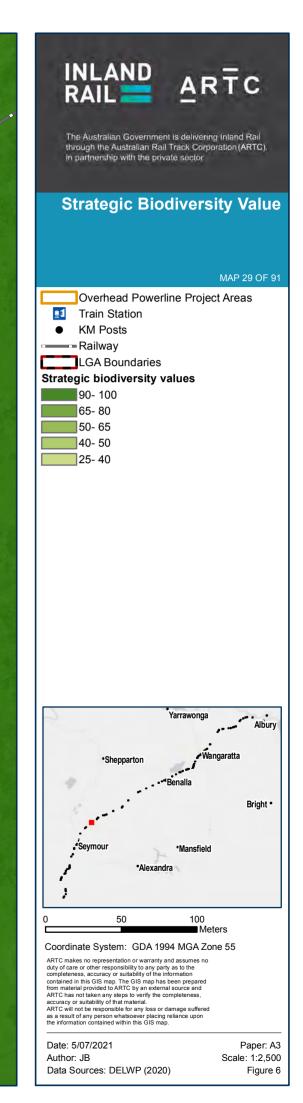




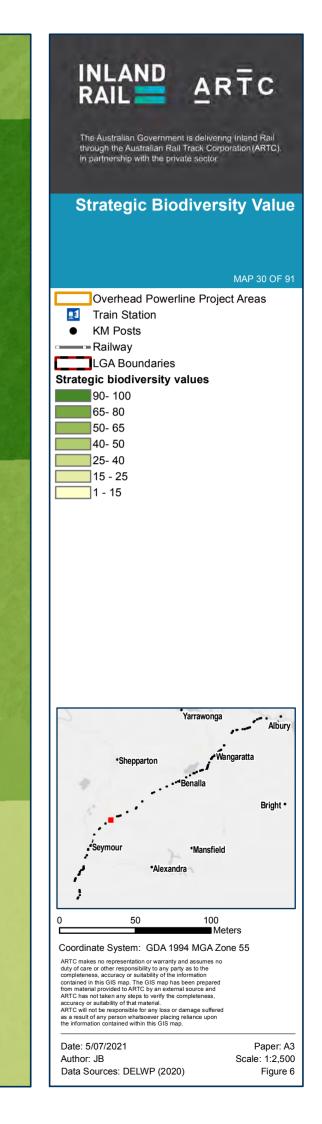
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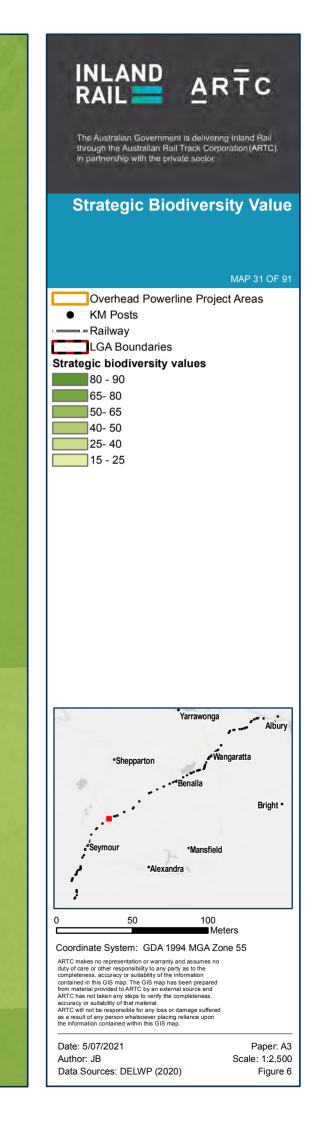




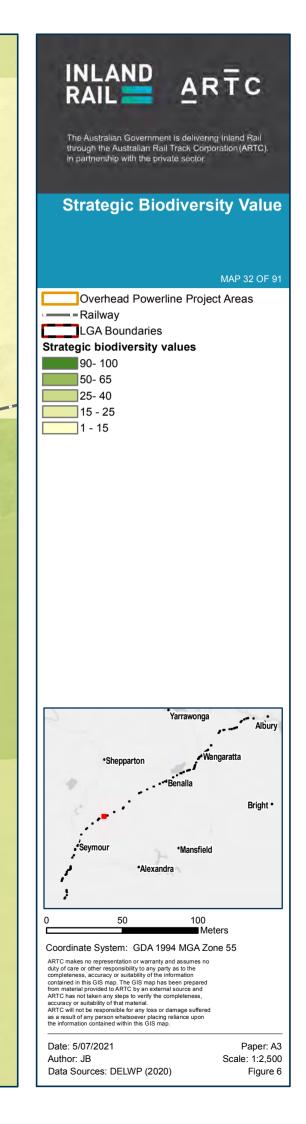




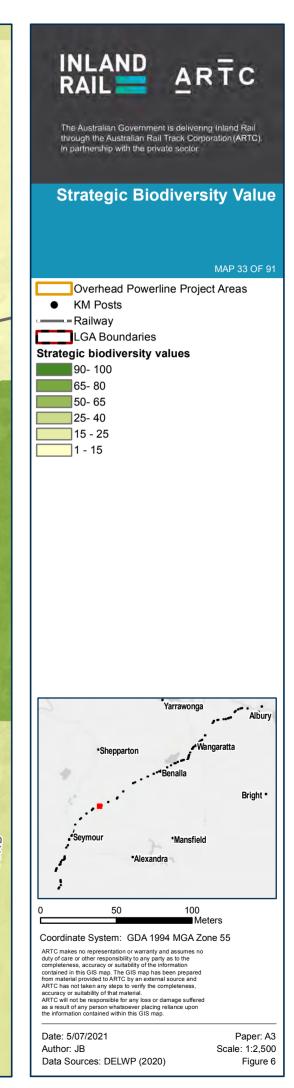




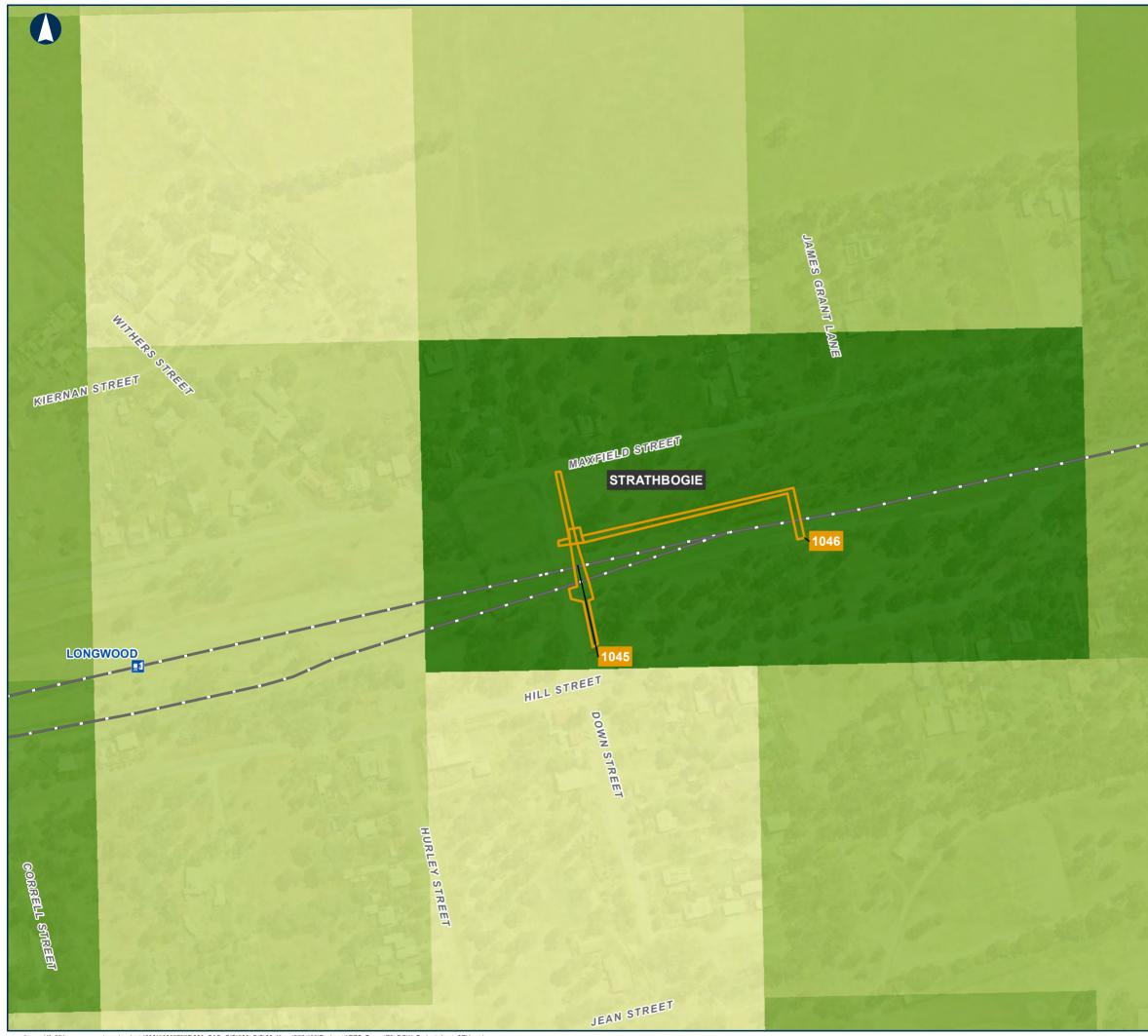




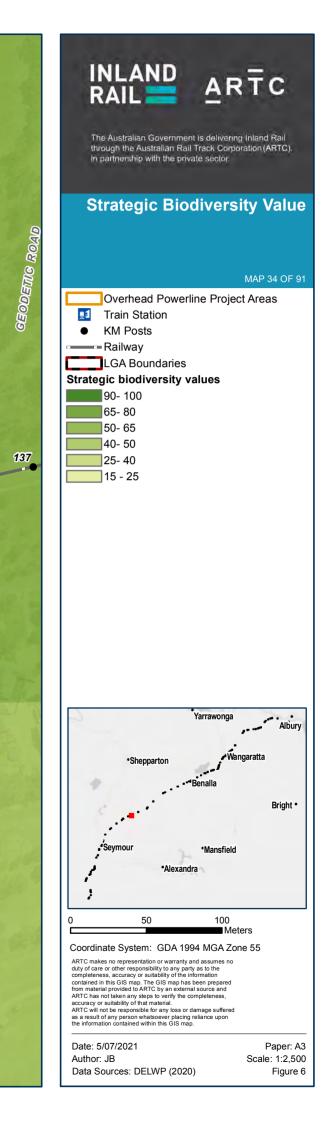




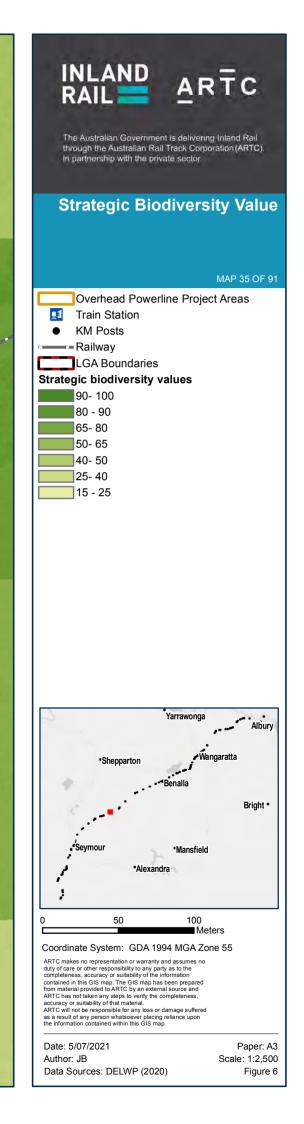
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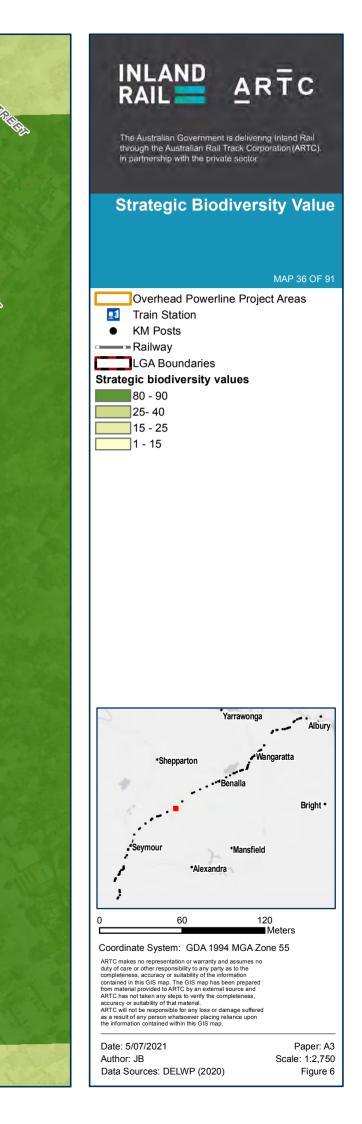
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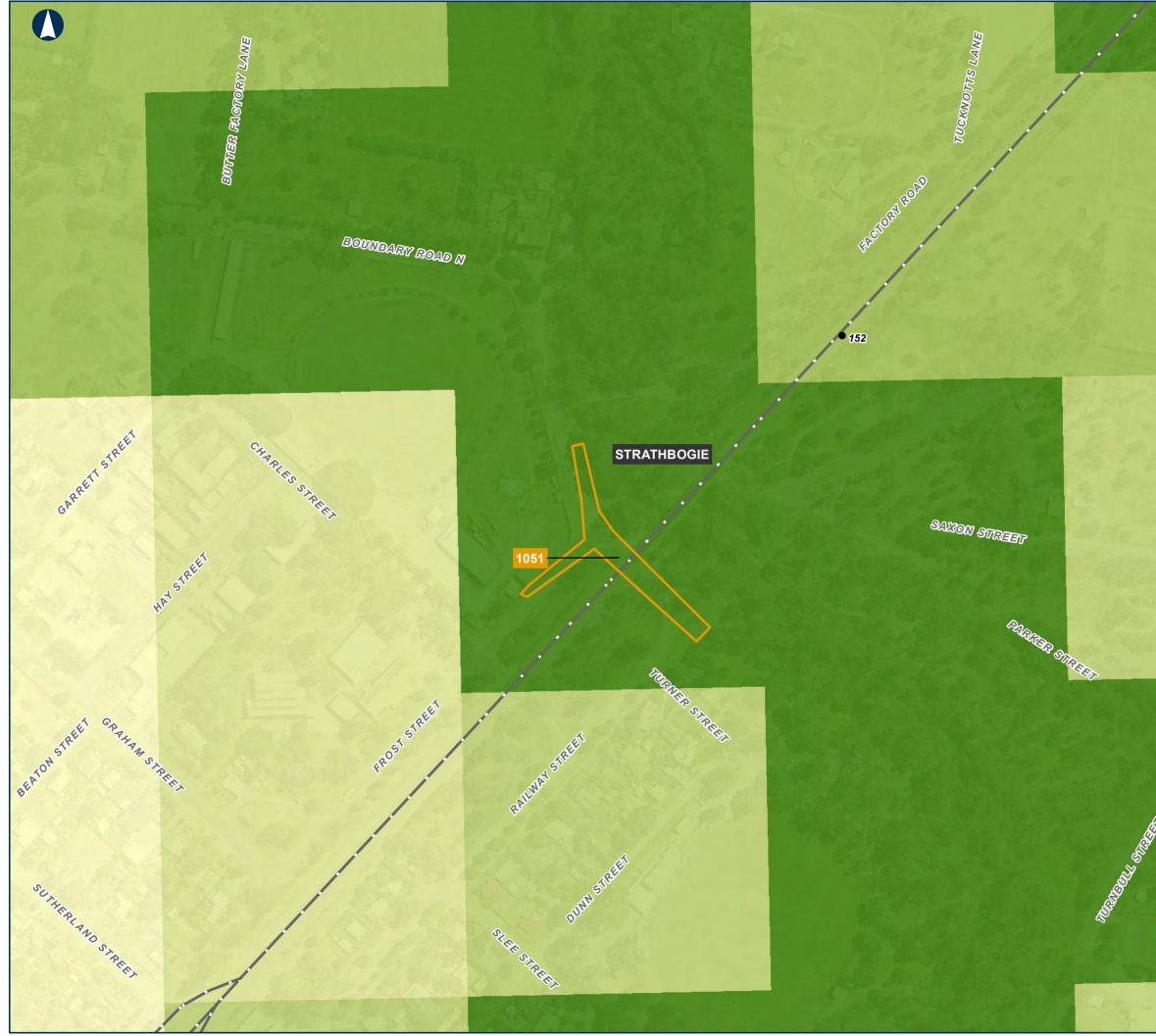




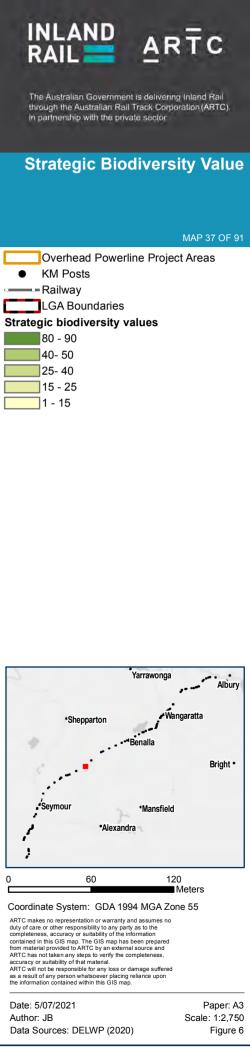




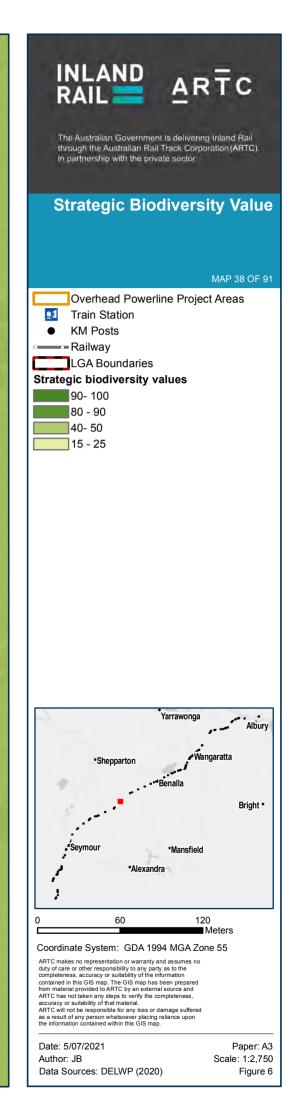


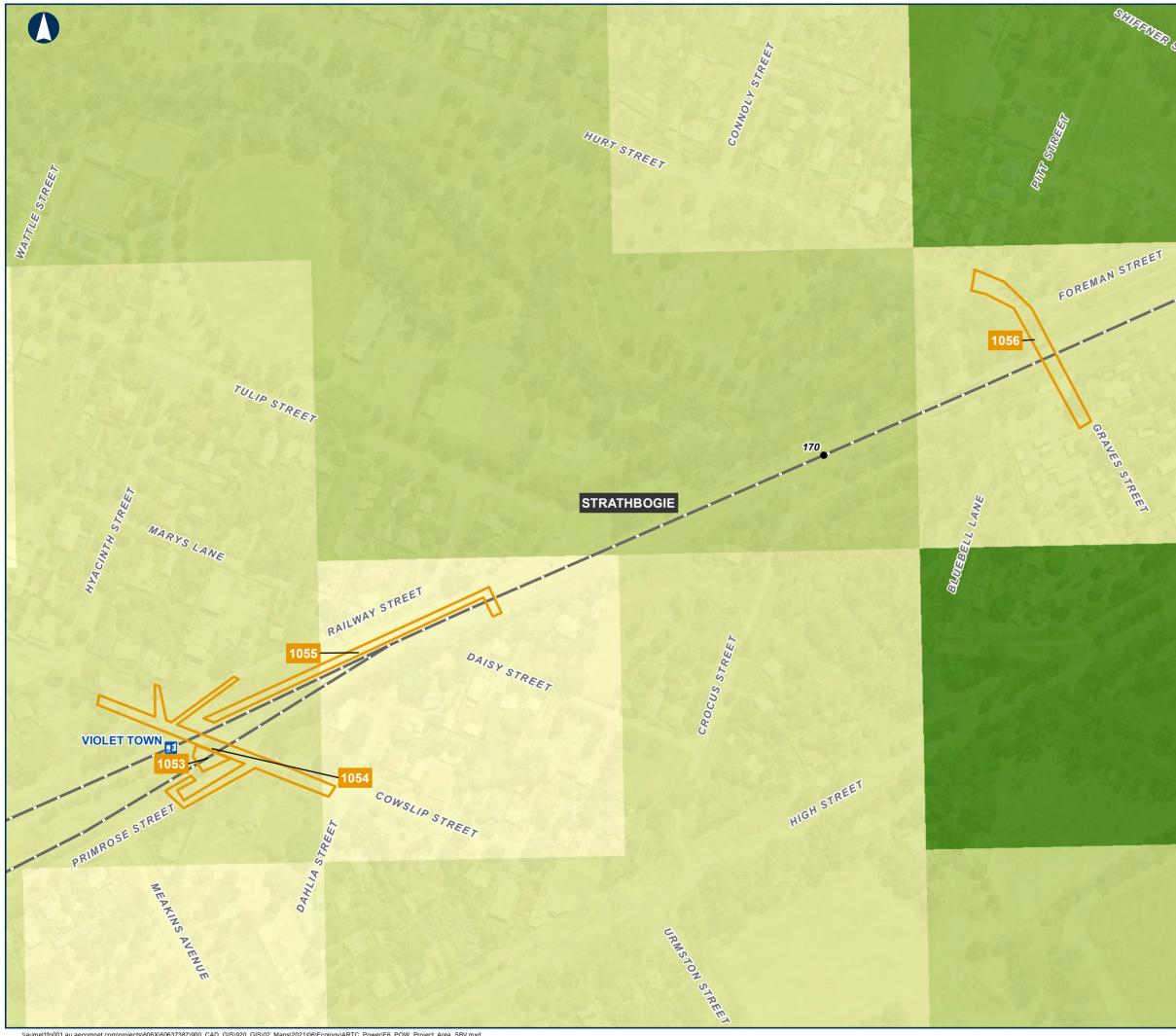


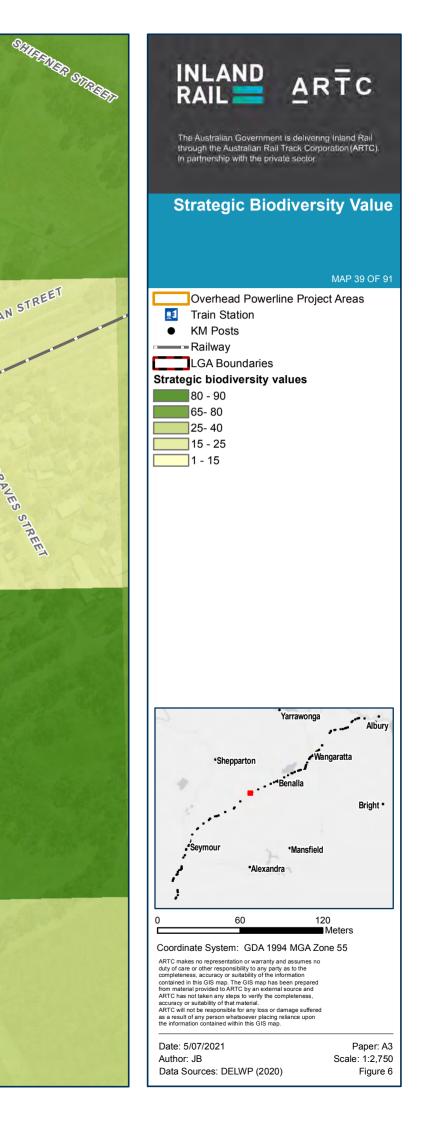


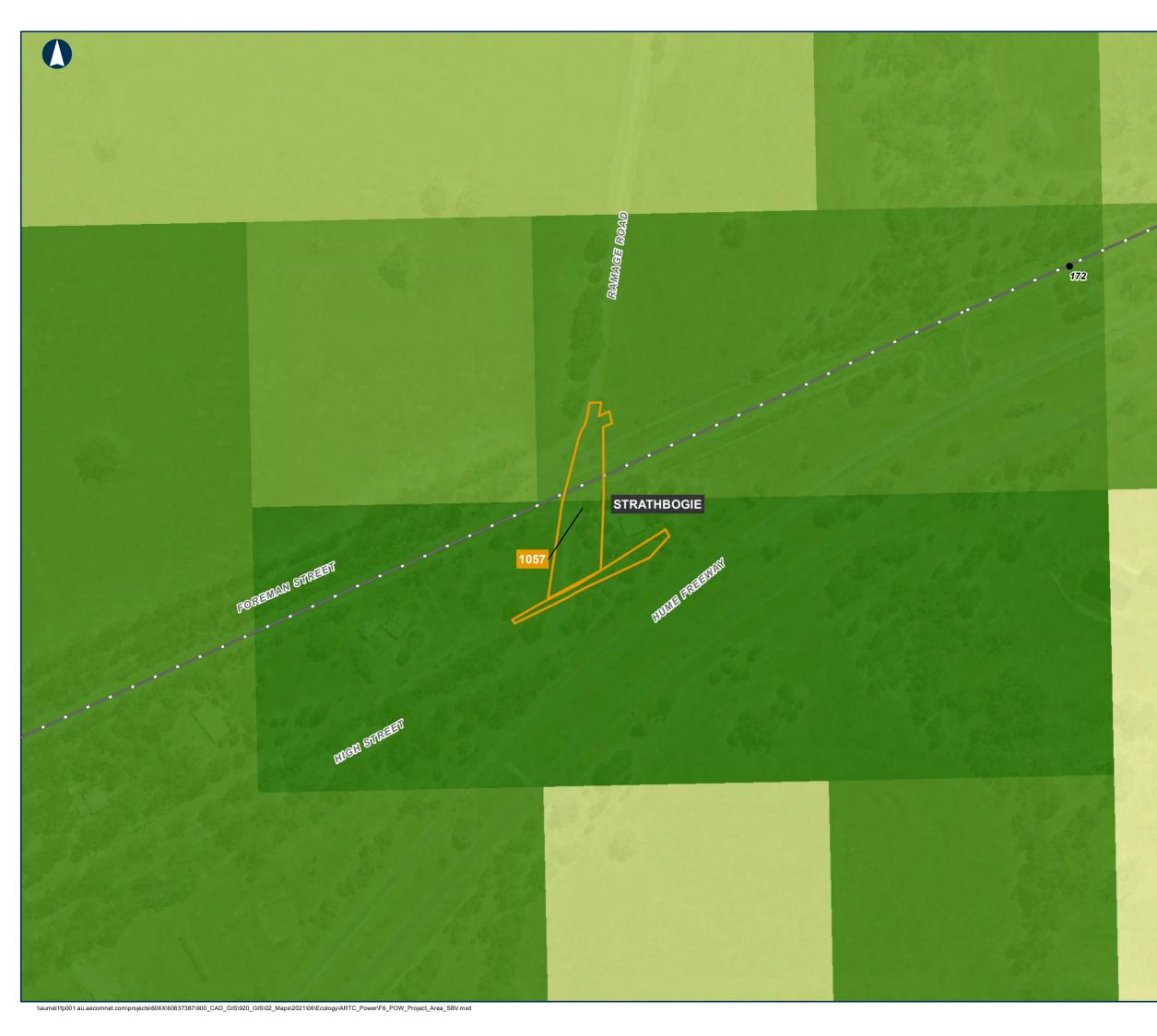


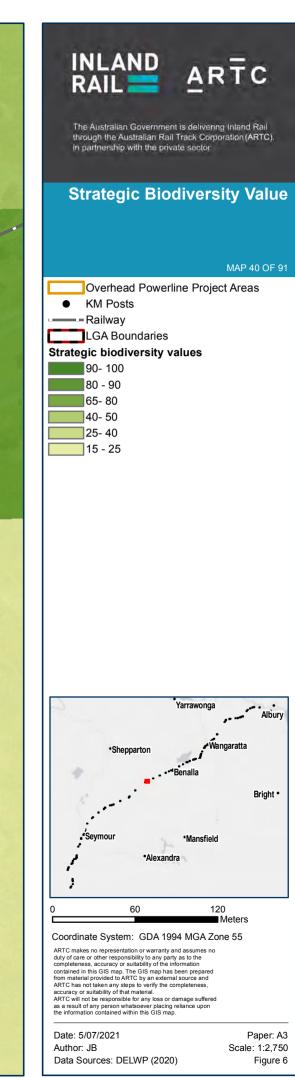




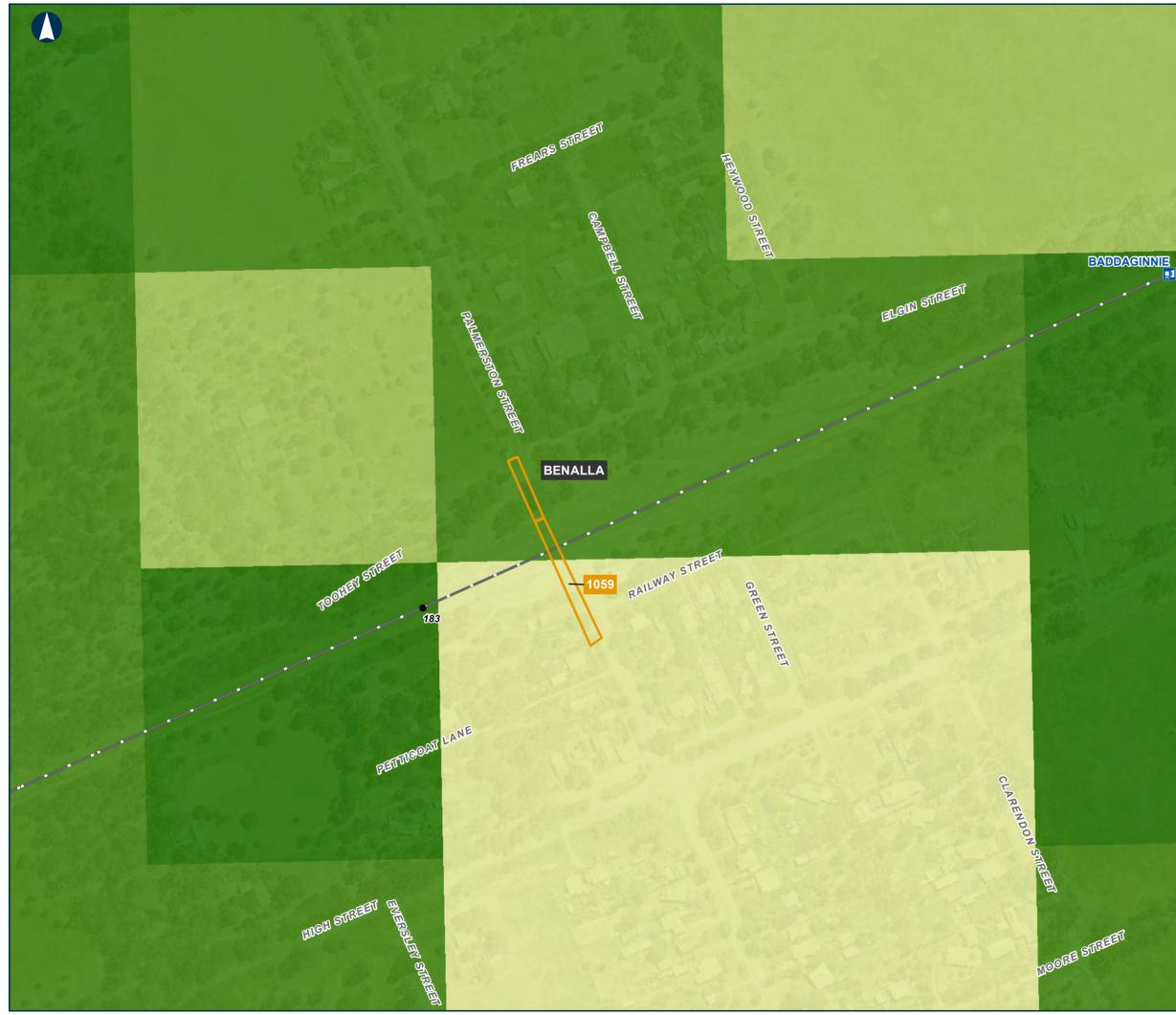


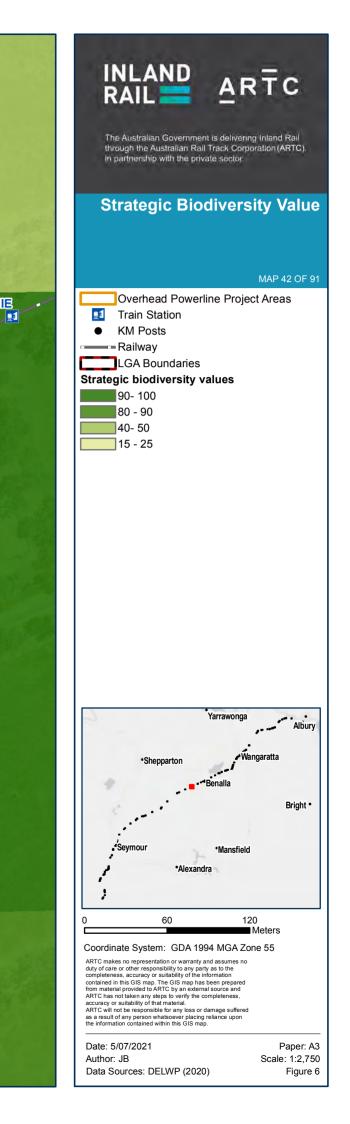




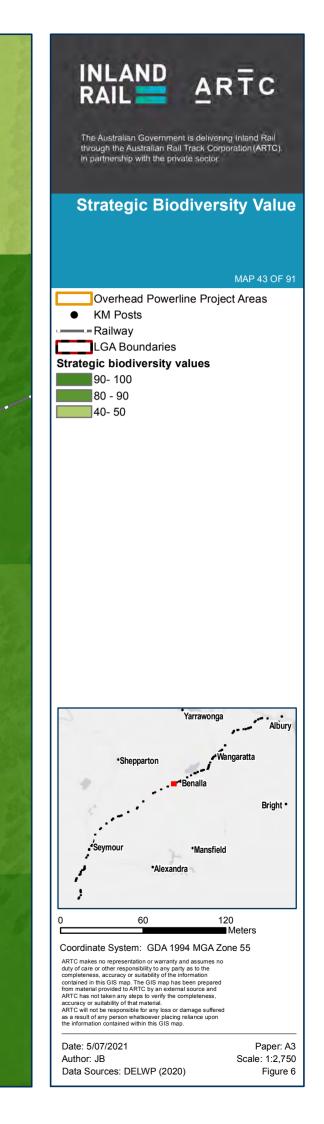




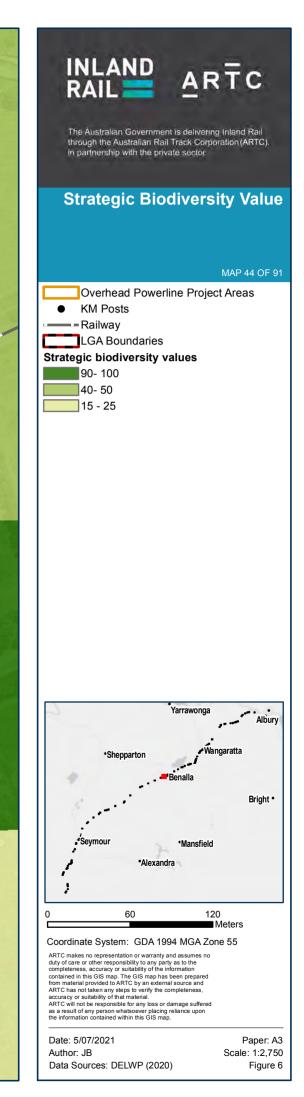




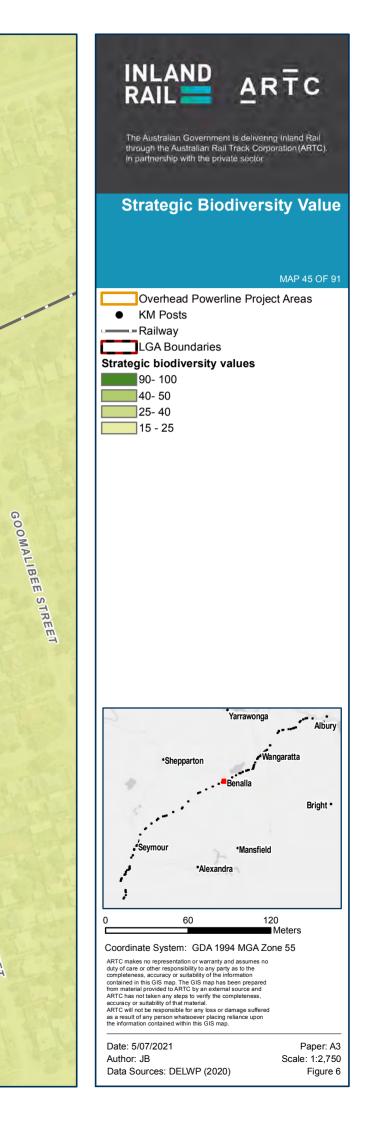


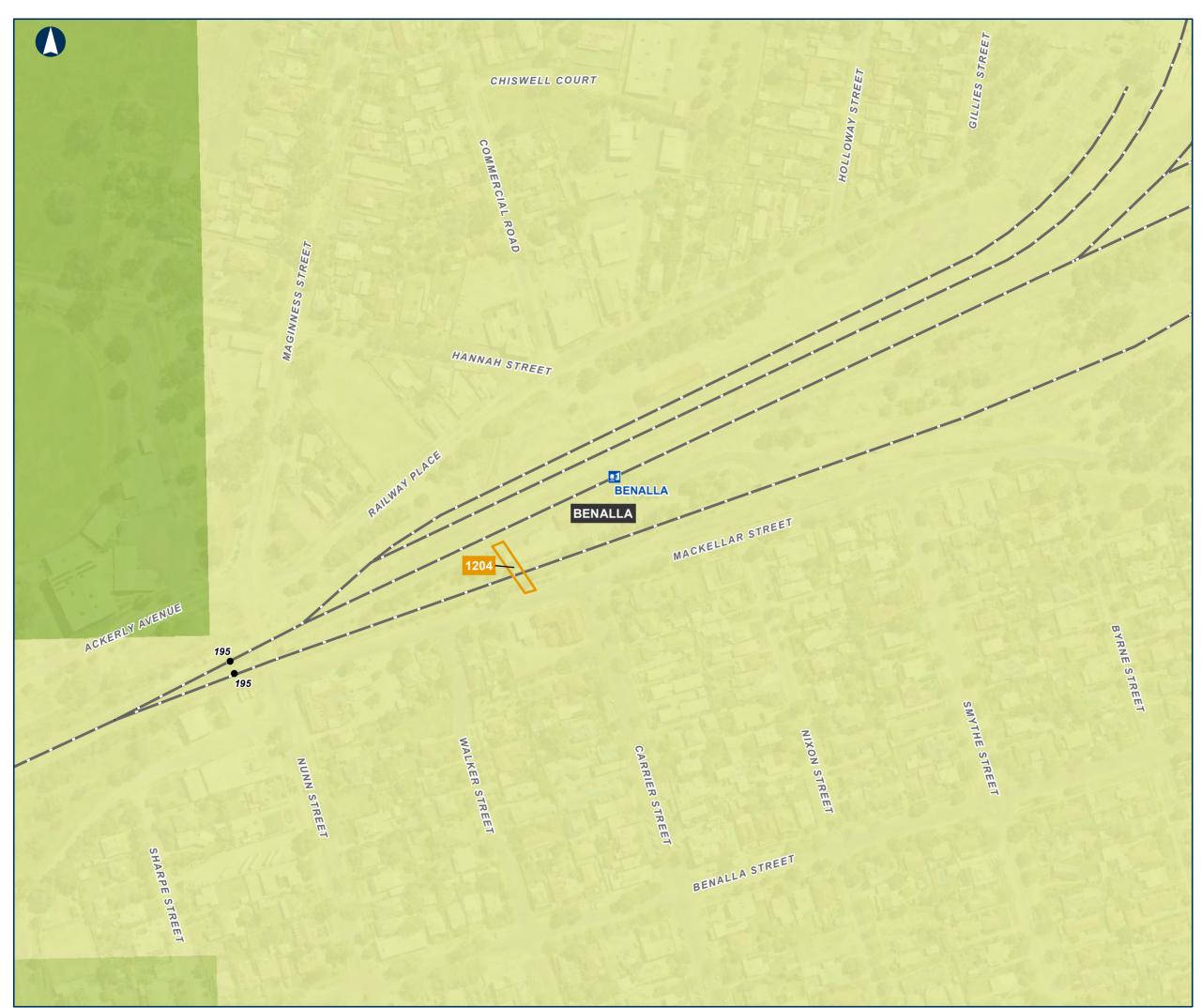




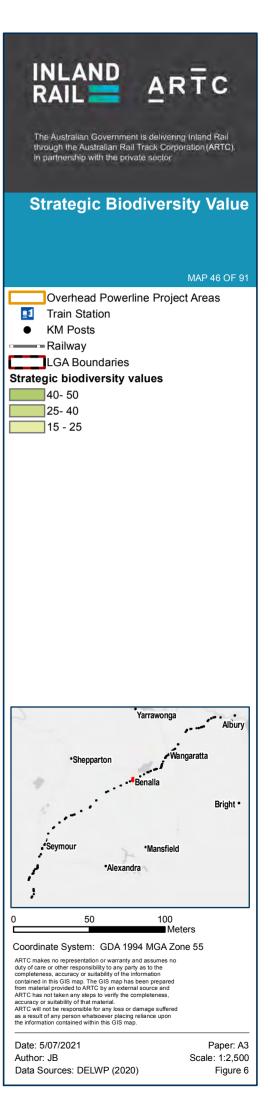




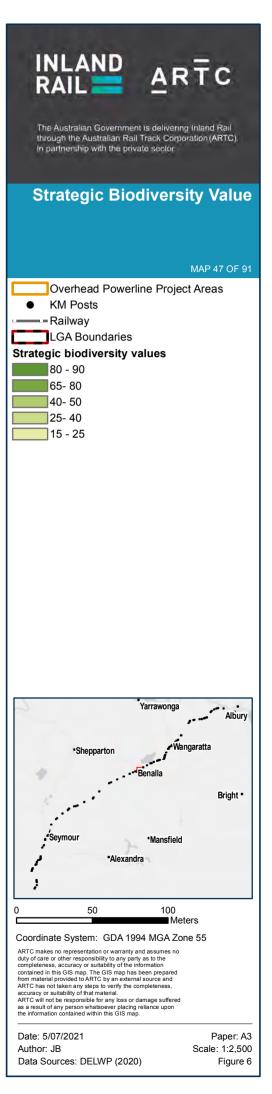




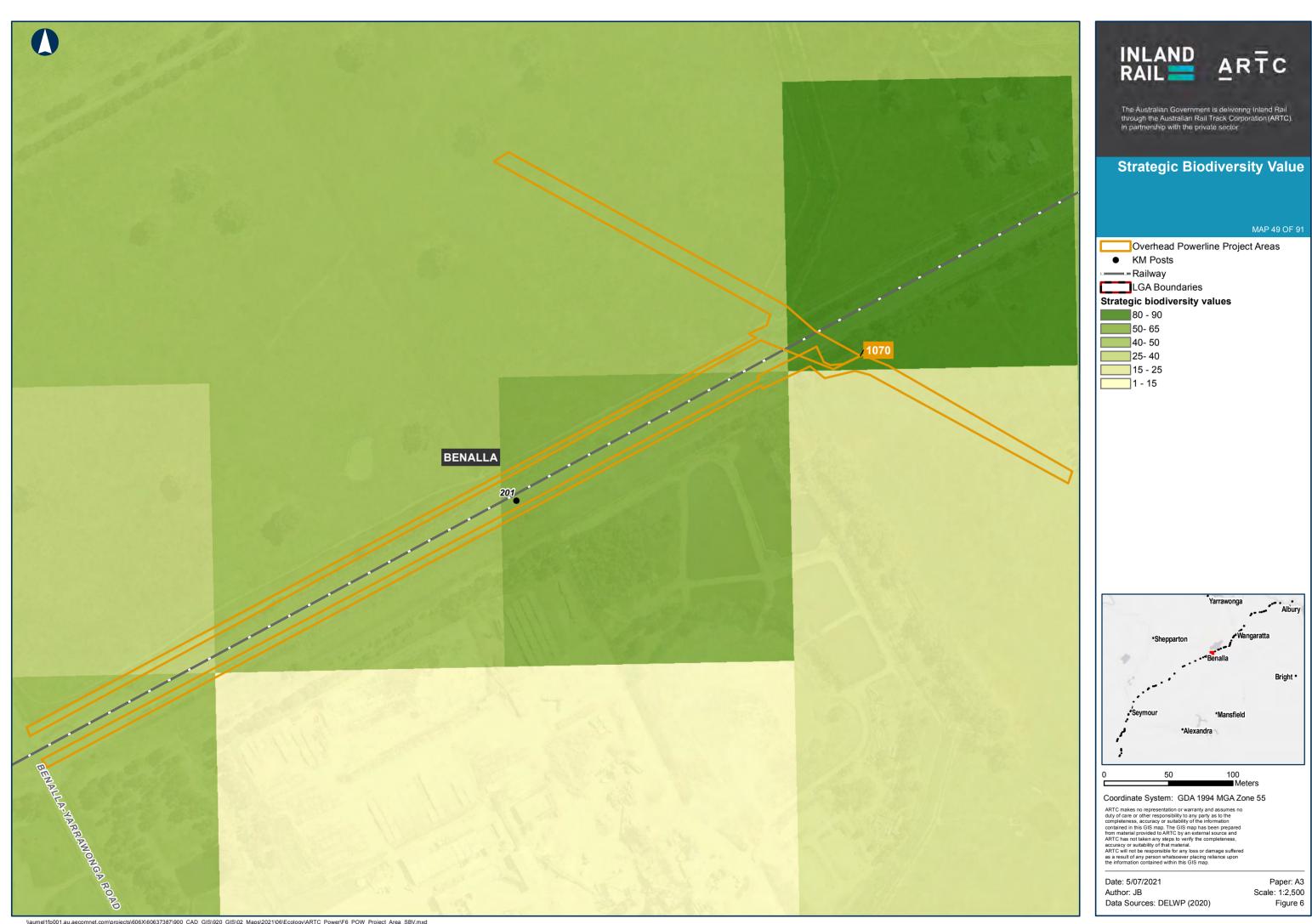
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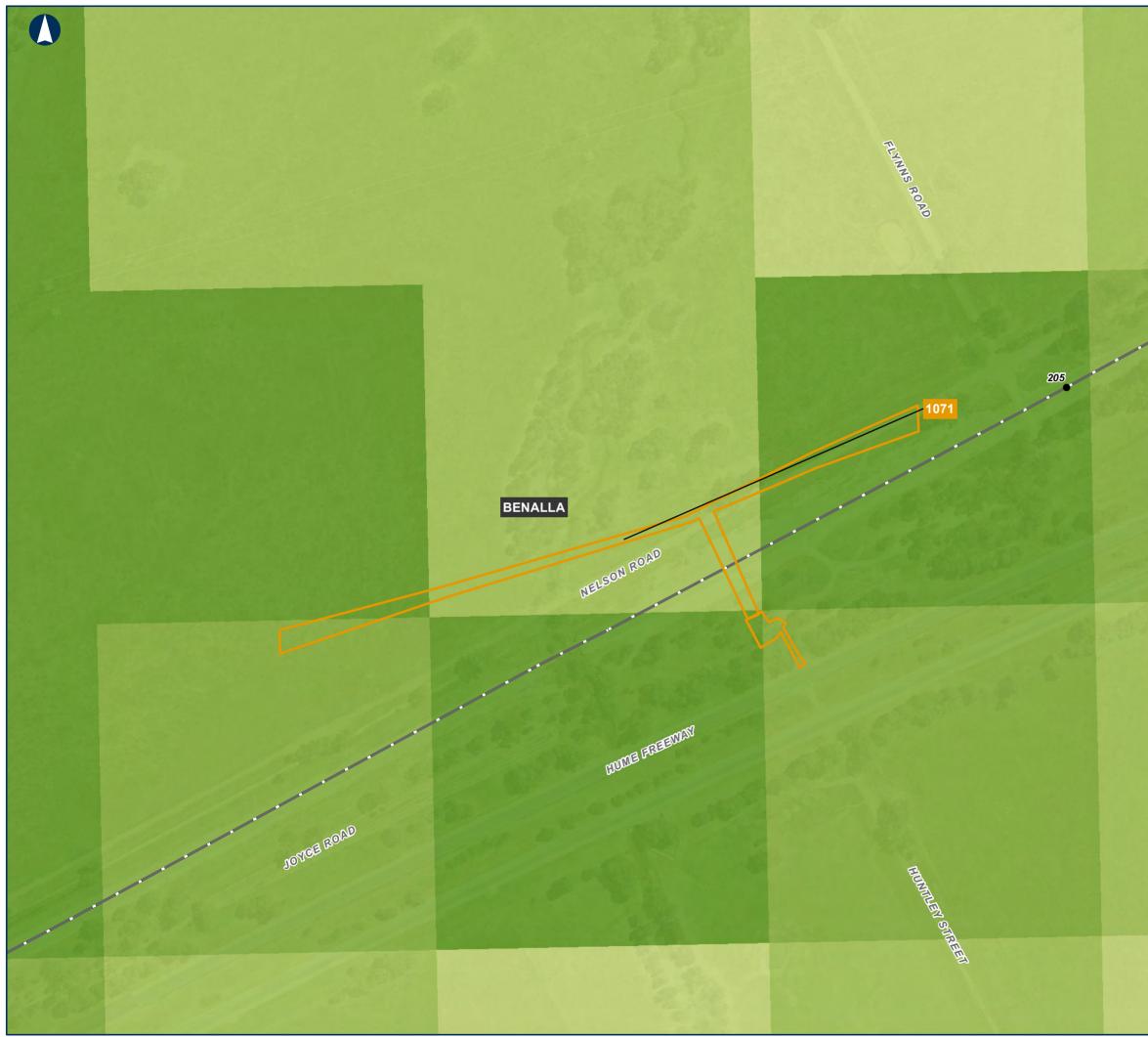


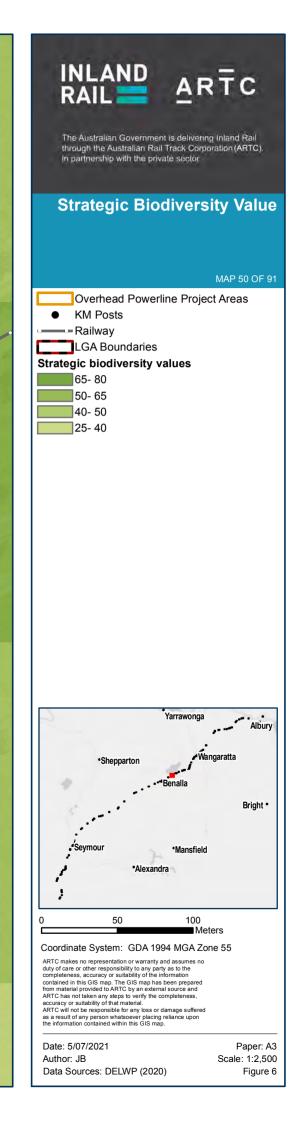


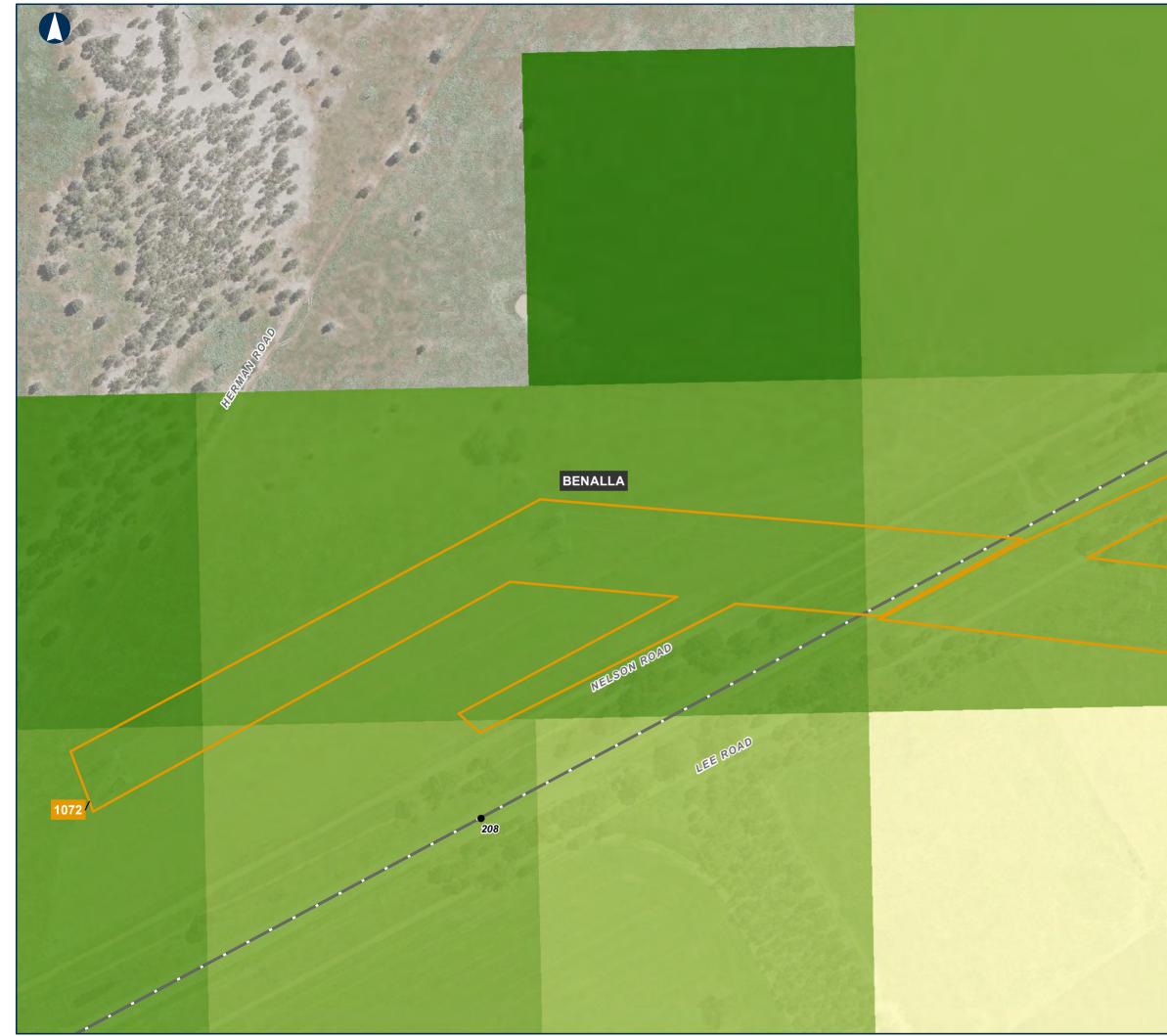


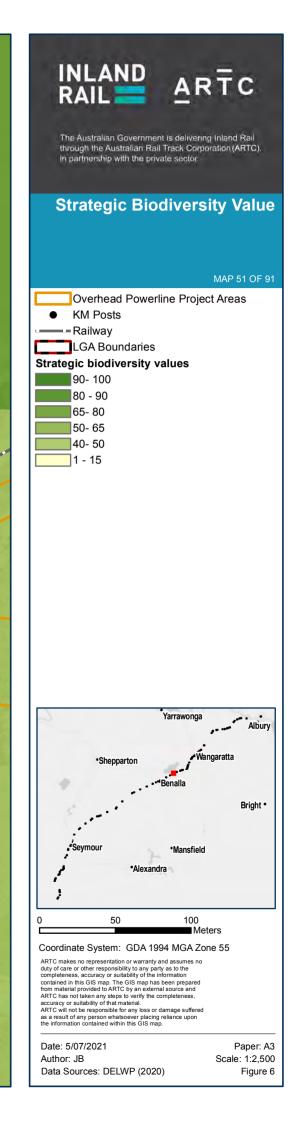


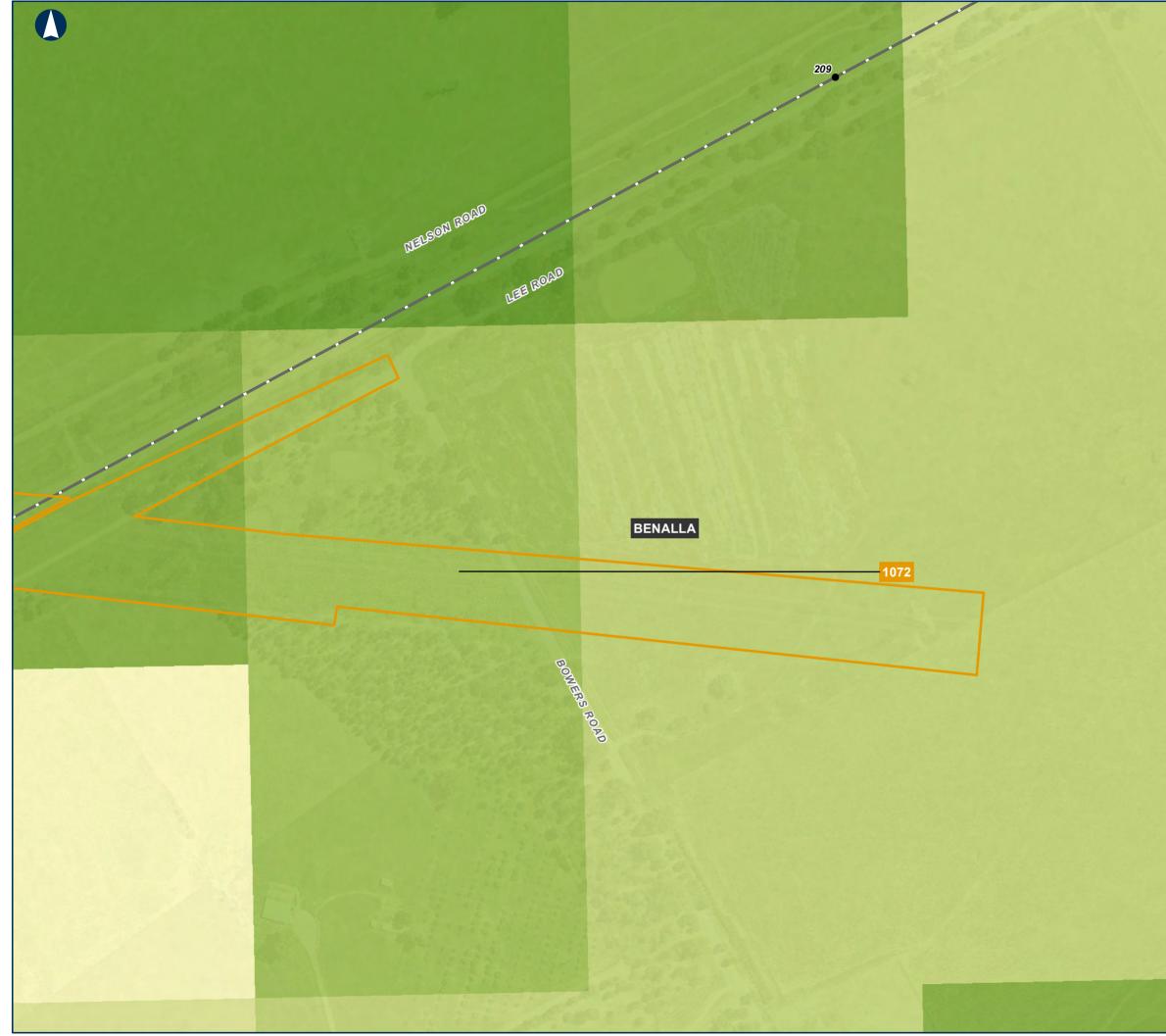


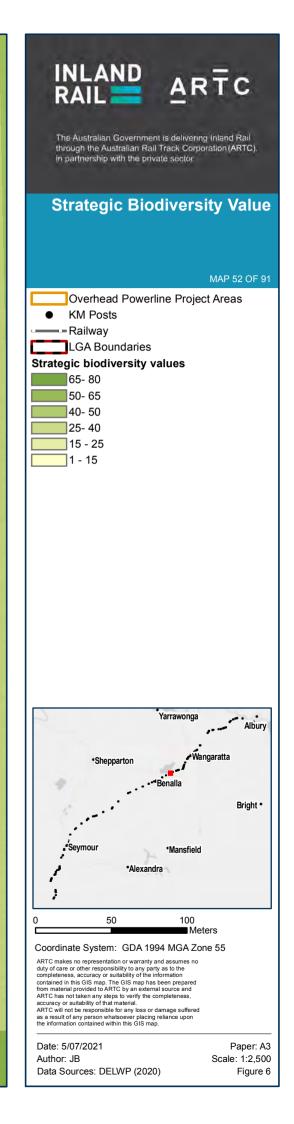






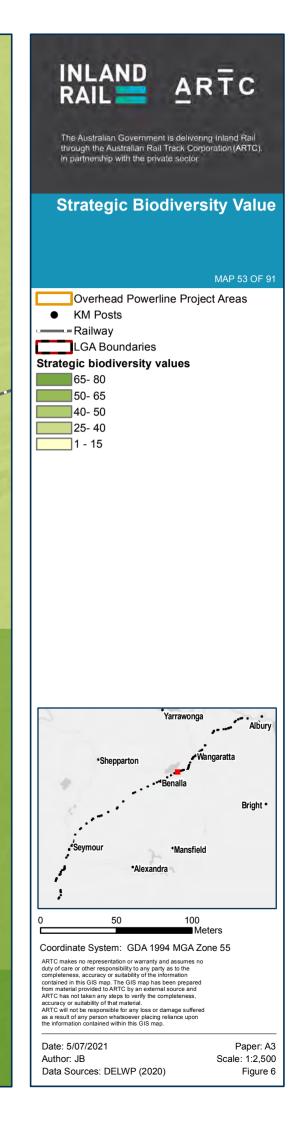


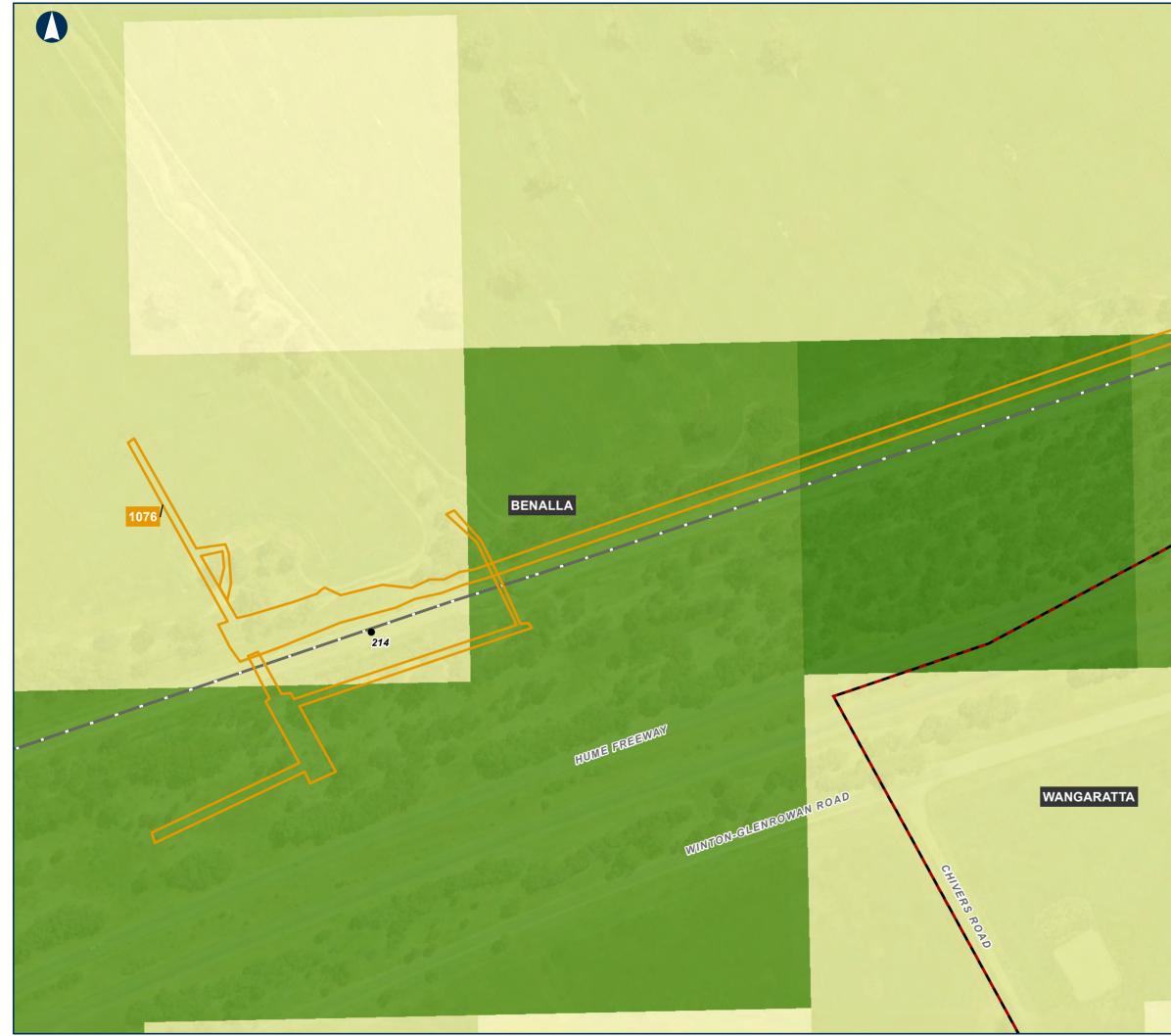




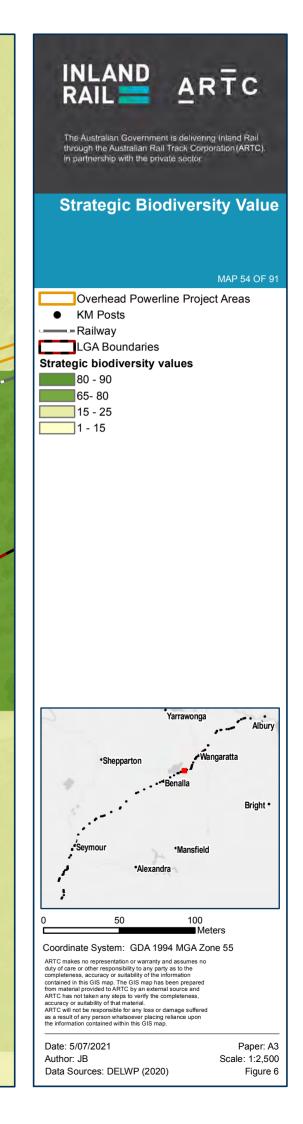


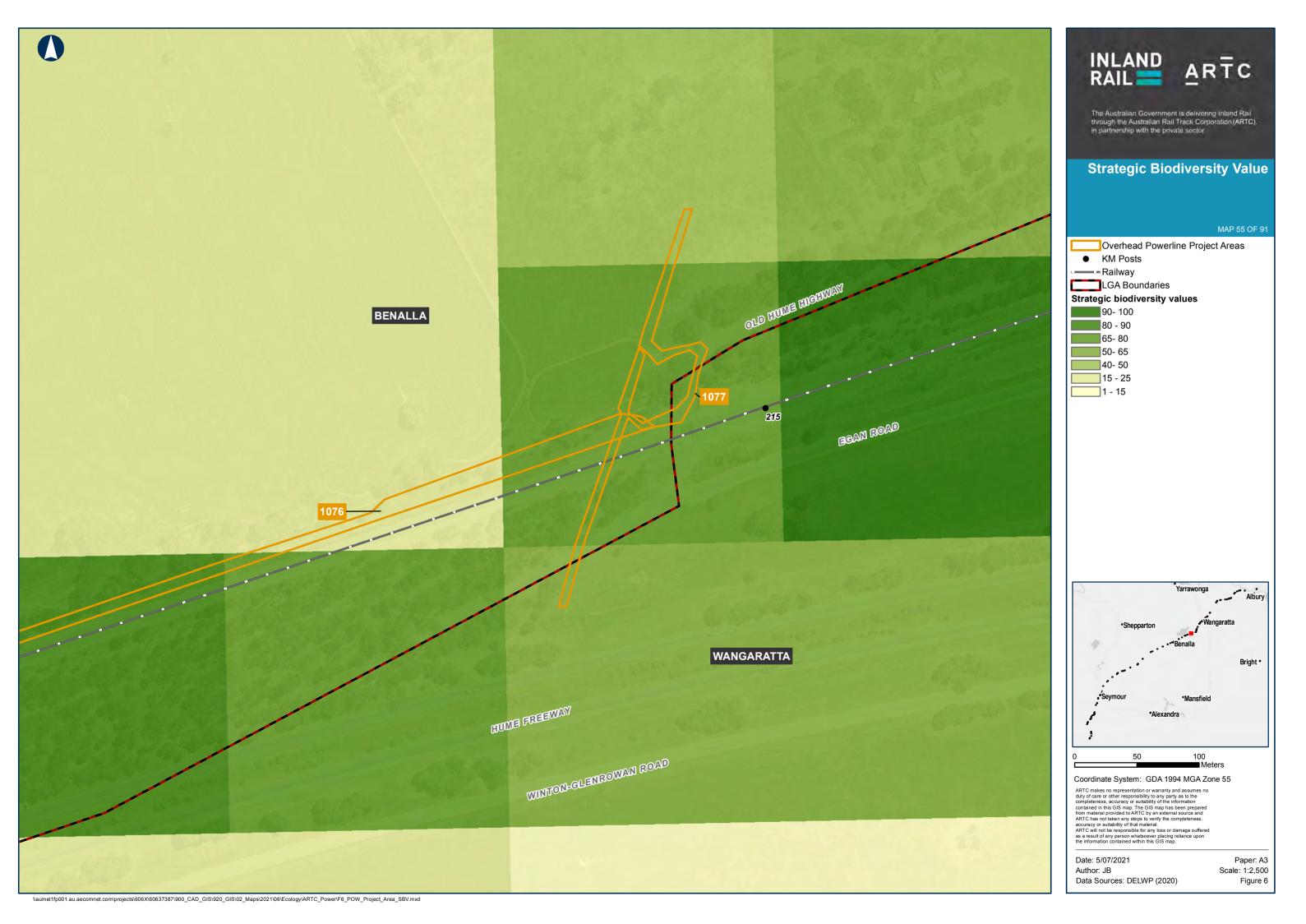
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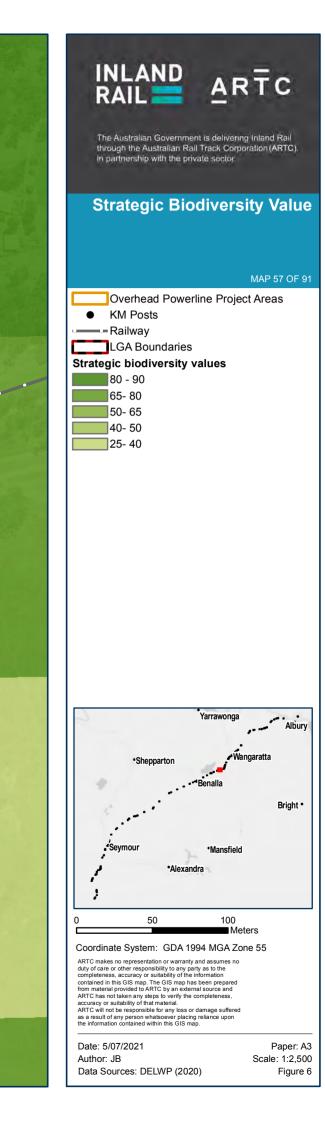
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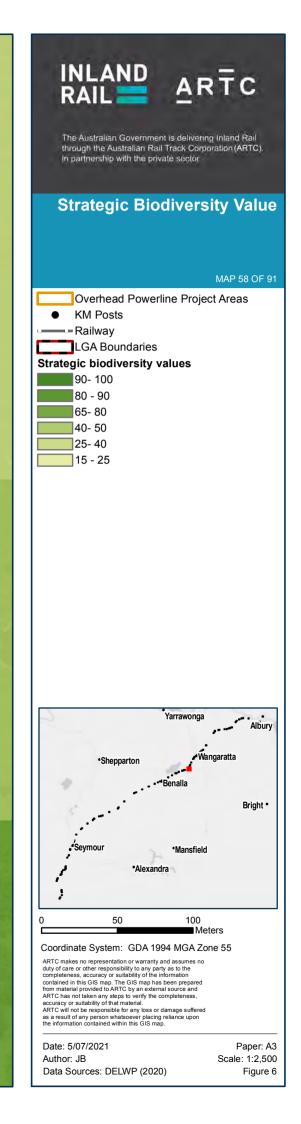




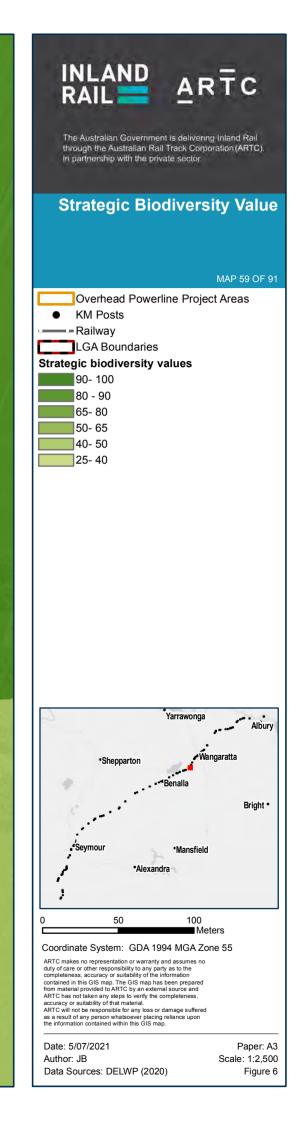




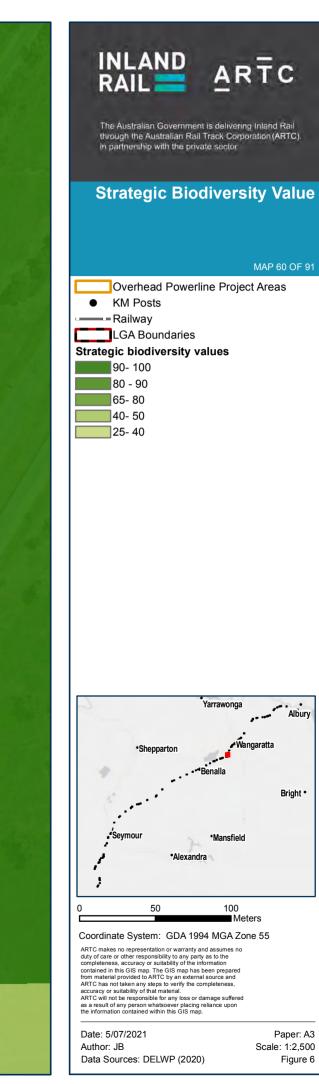








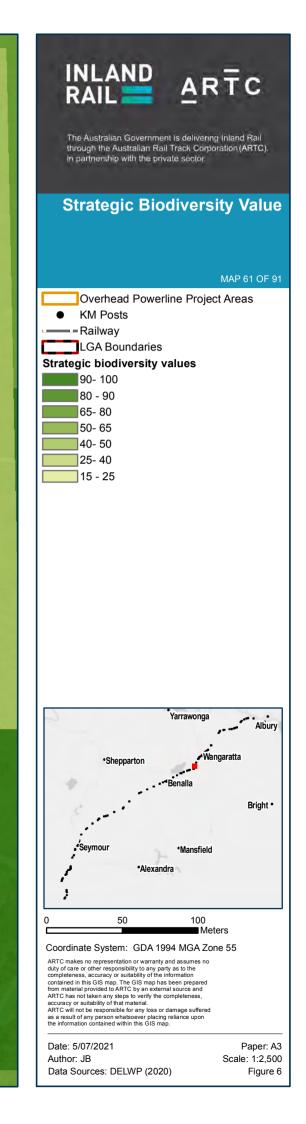




Paper: A3 Scale: 1:2,500 Figure 6

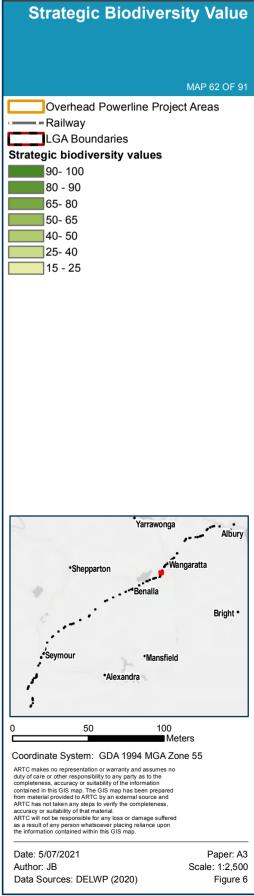
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INLAND ARTC

The Australian Government is delivening Inland Rail through the Australian Rail Track Corporation (ARTC). In partnership with the private sector.



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

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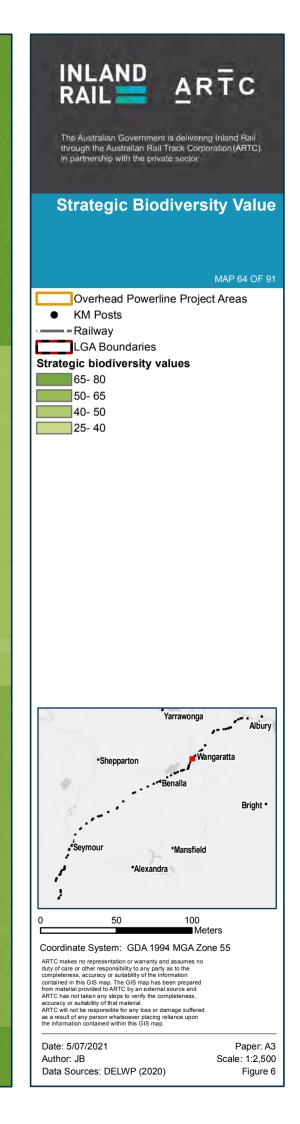
Mansfield

100 Meters

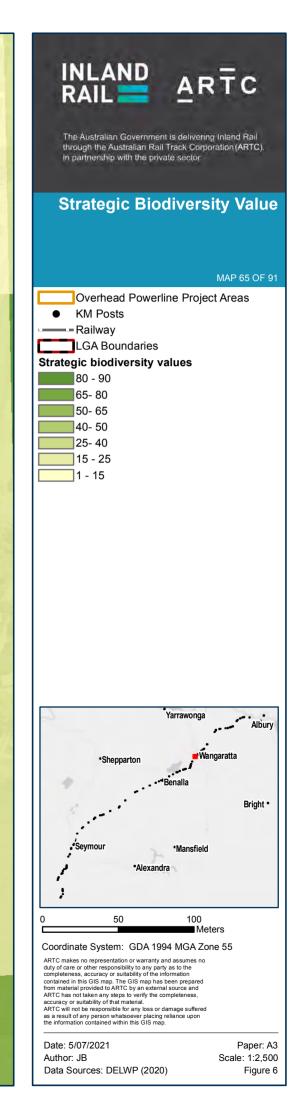
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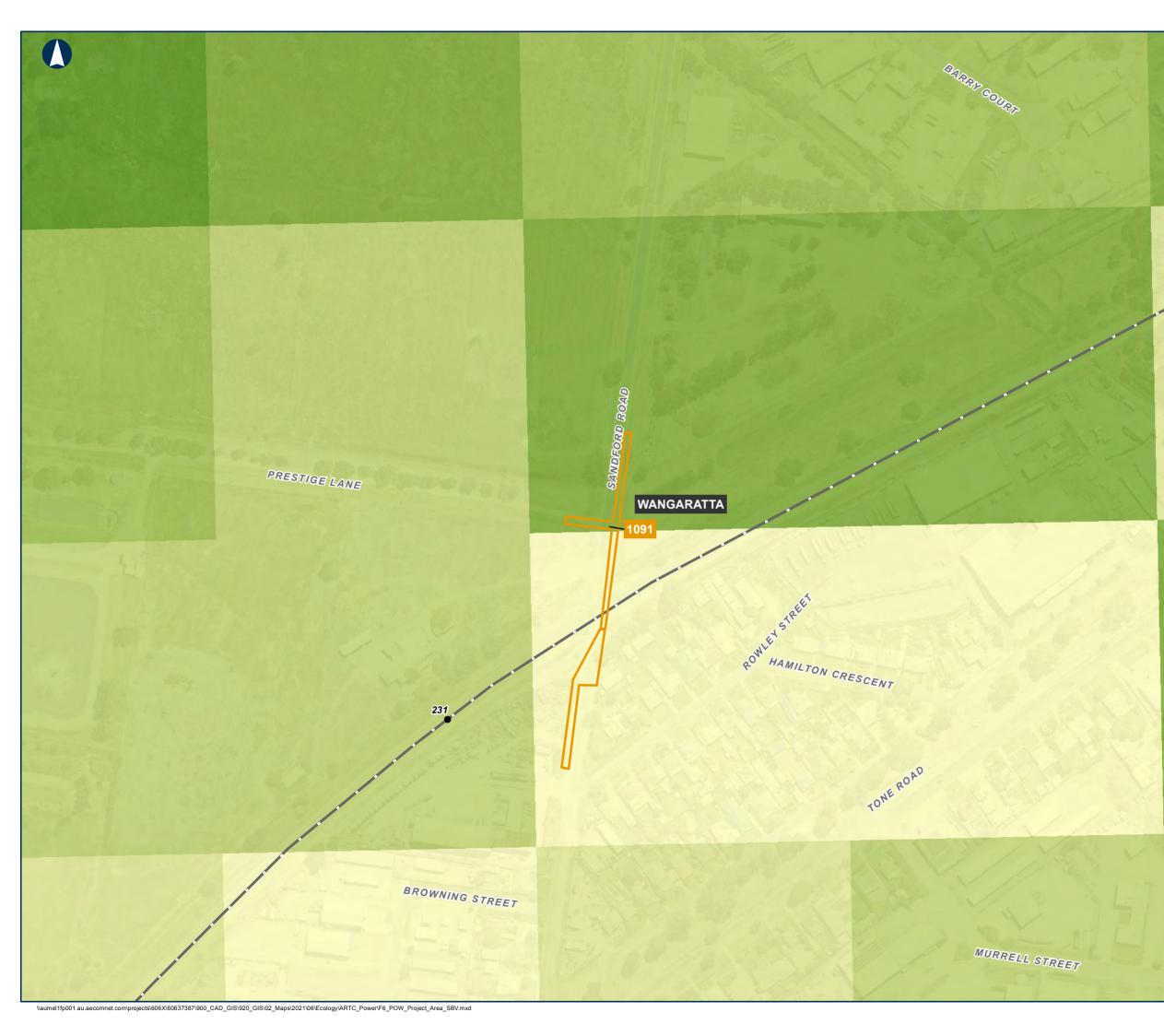
MAP 63 OF 91

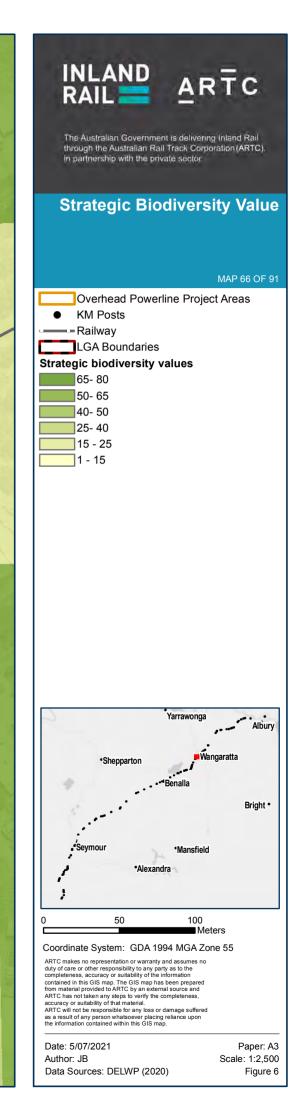




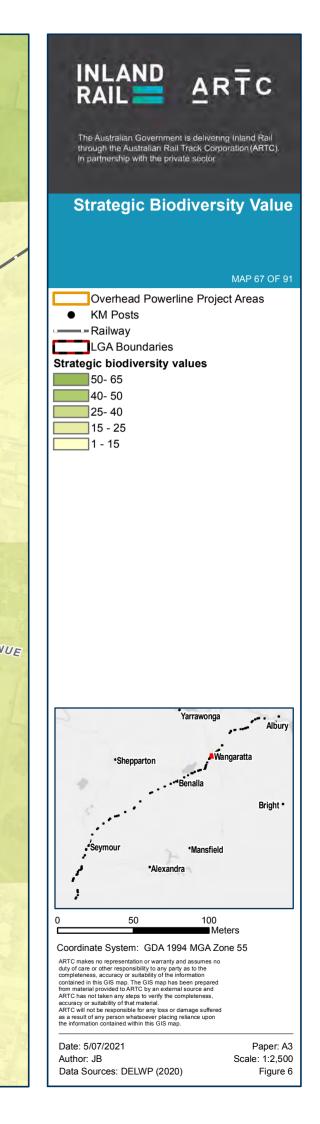


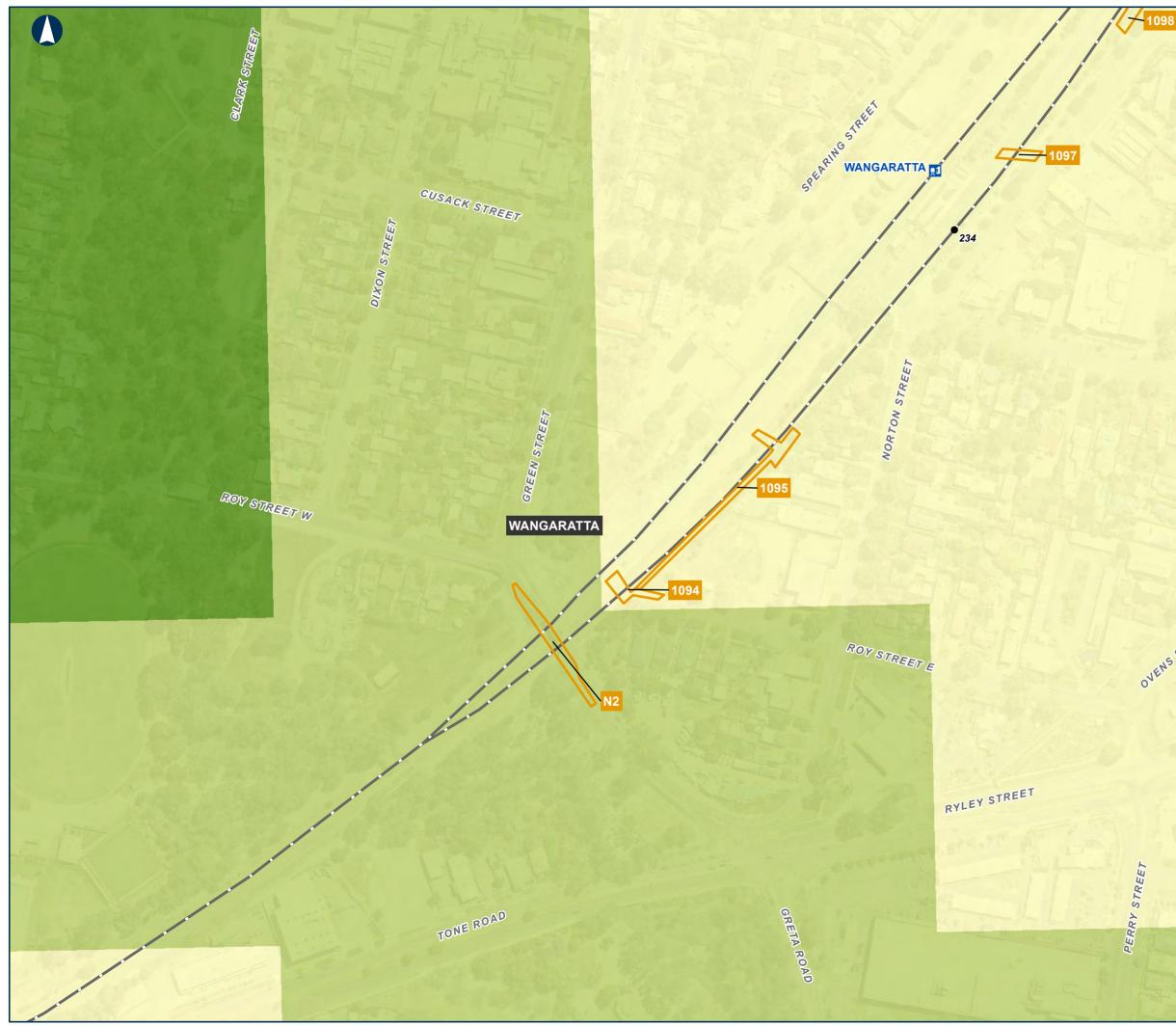


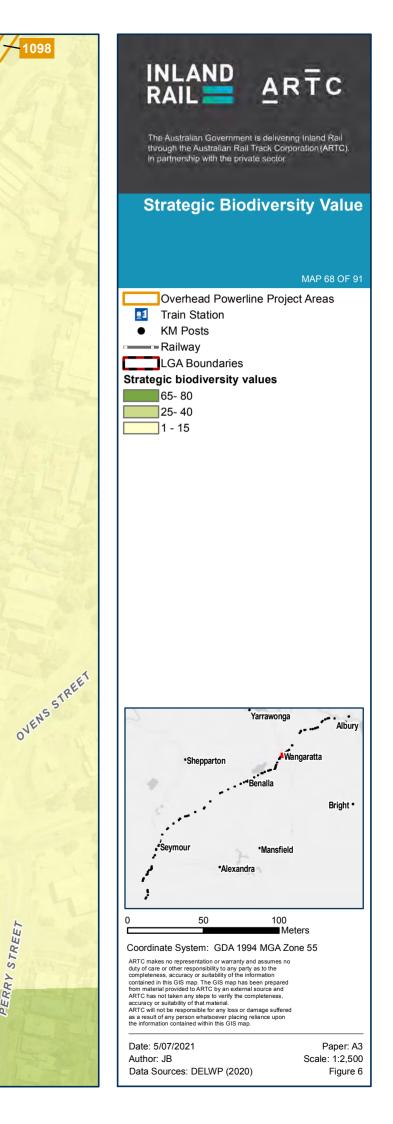


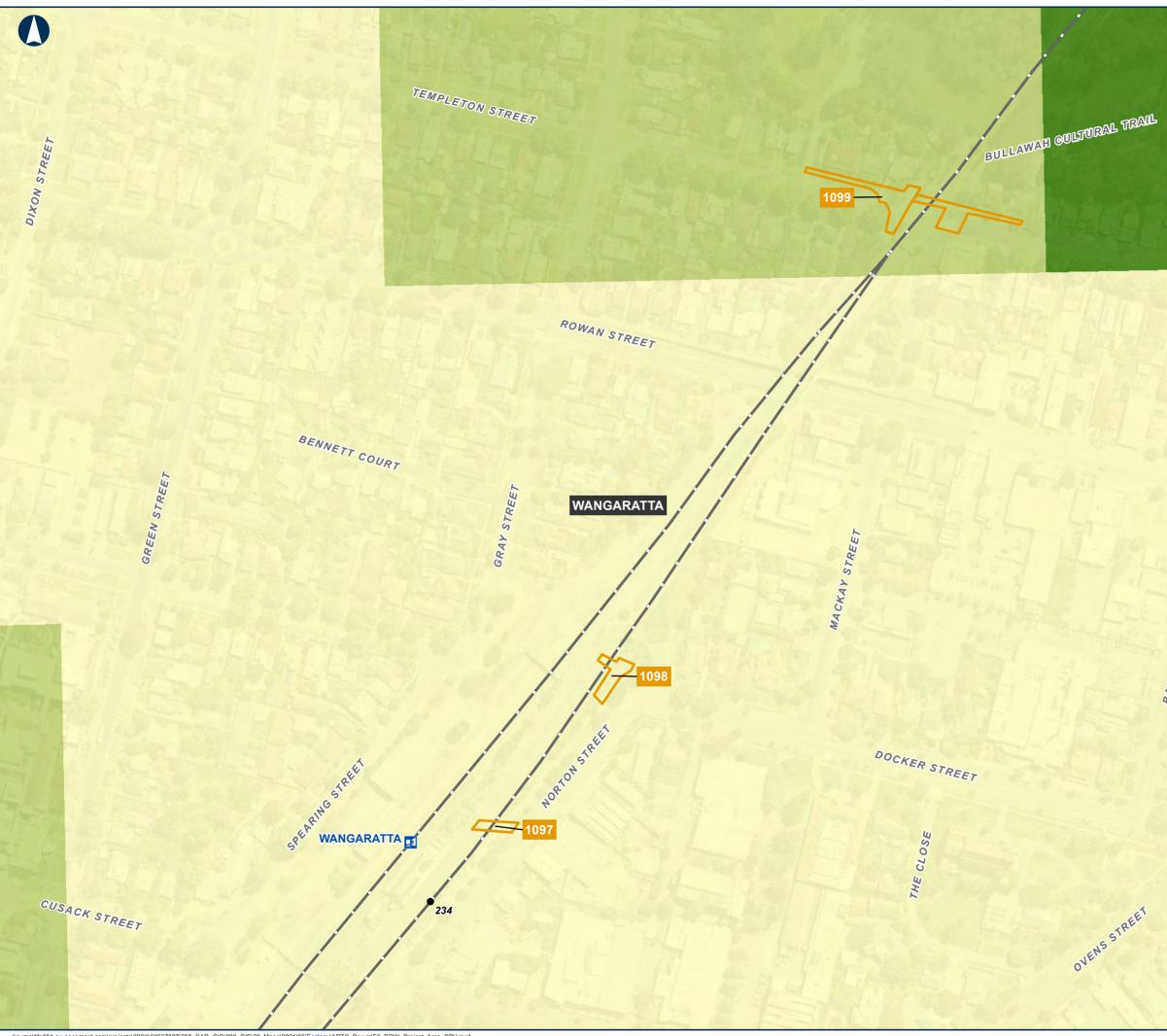


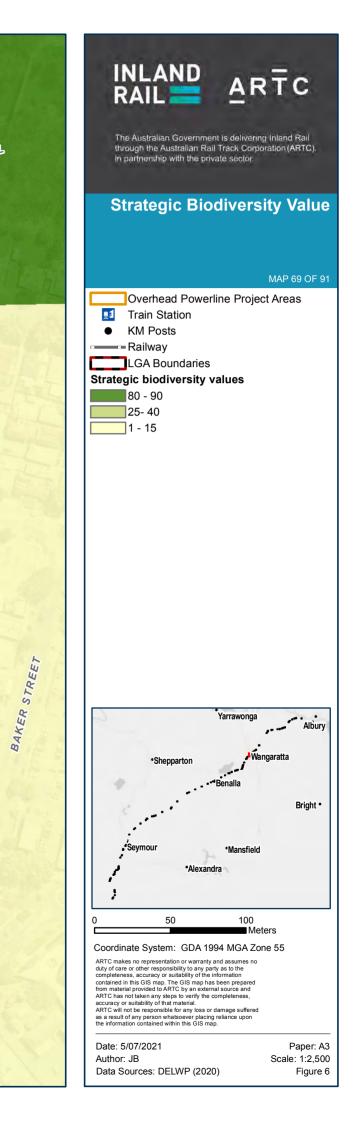




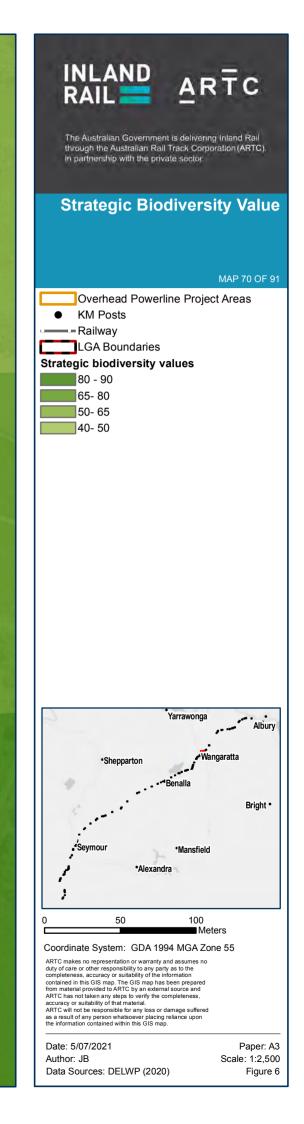




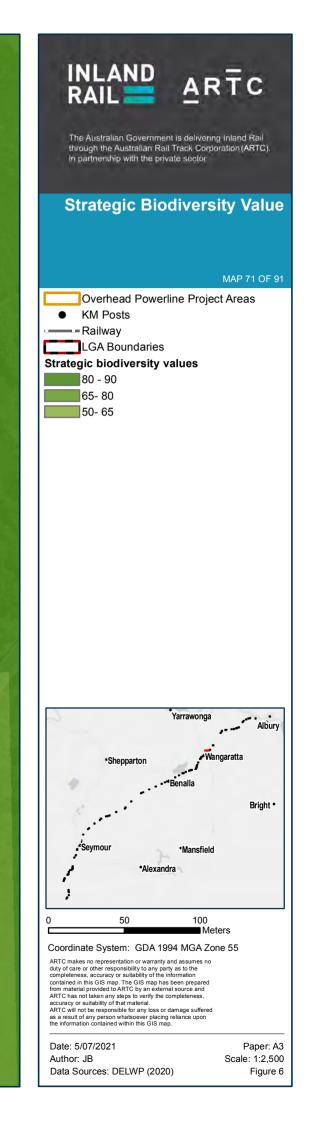


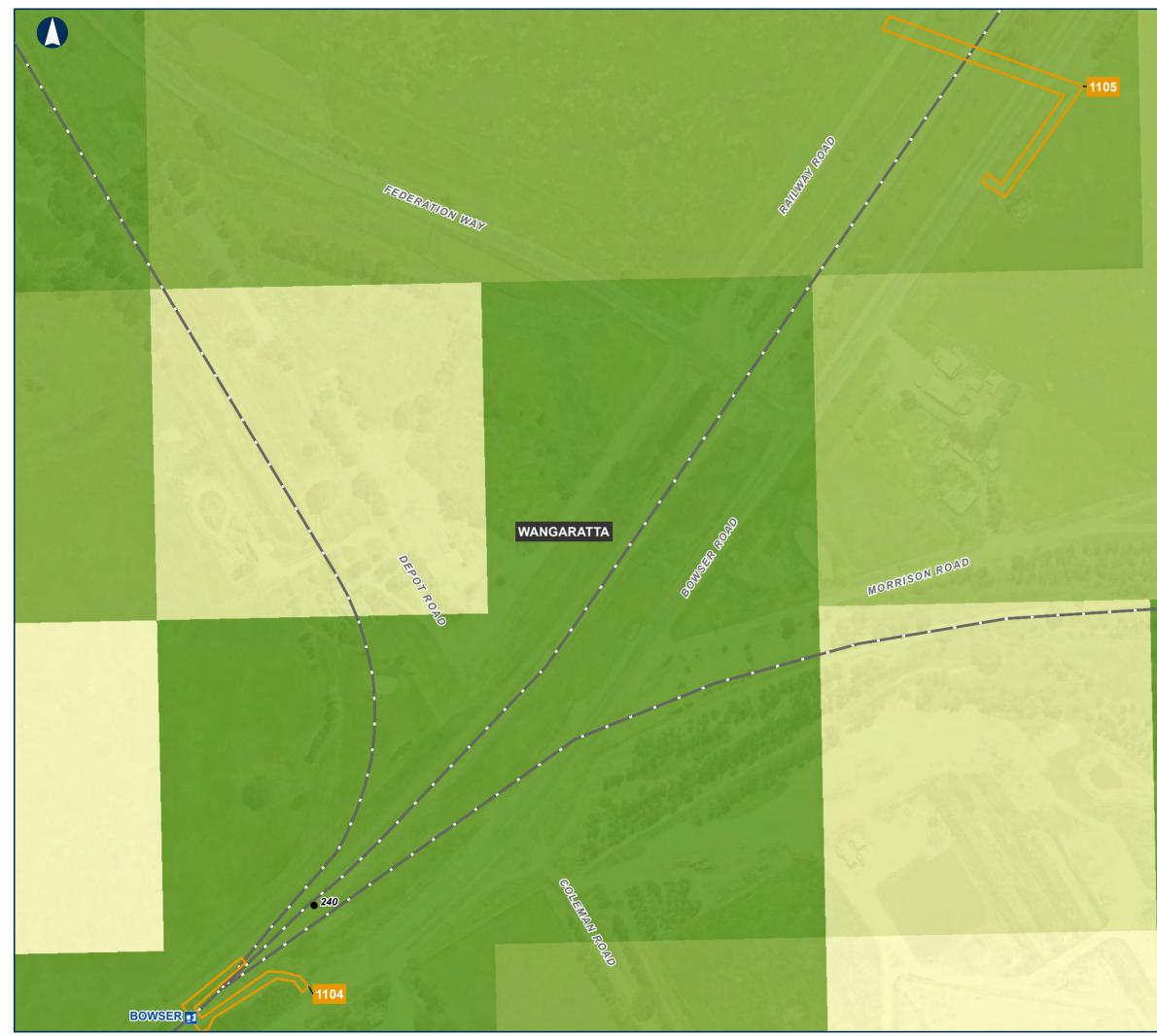


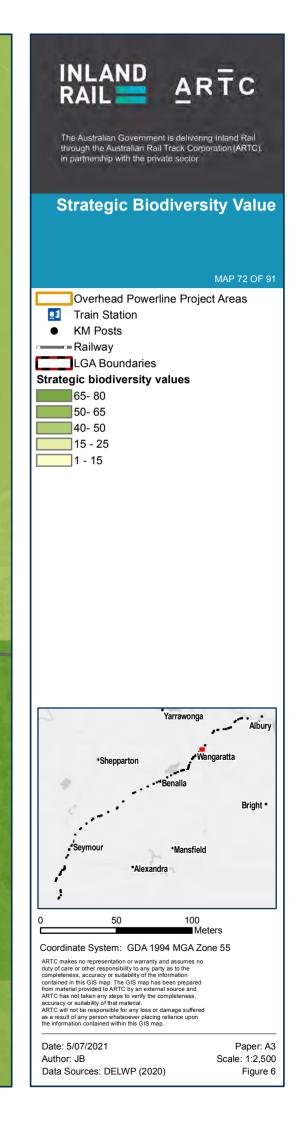




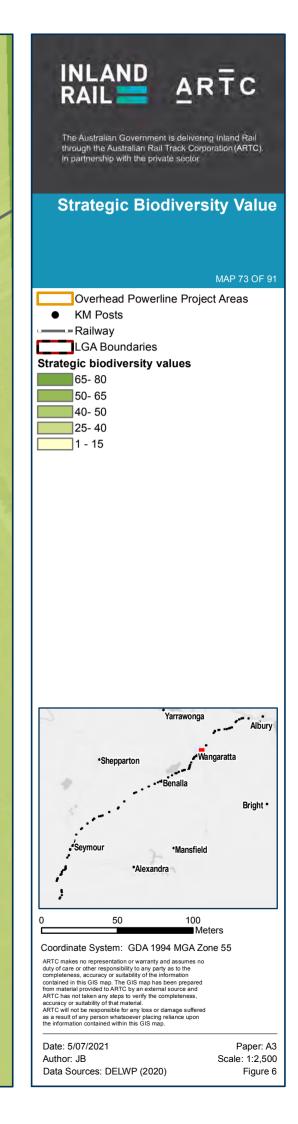






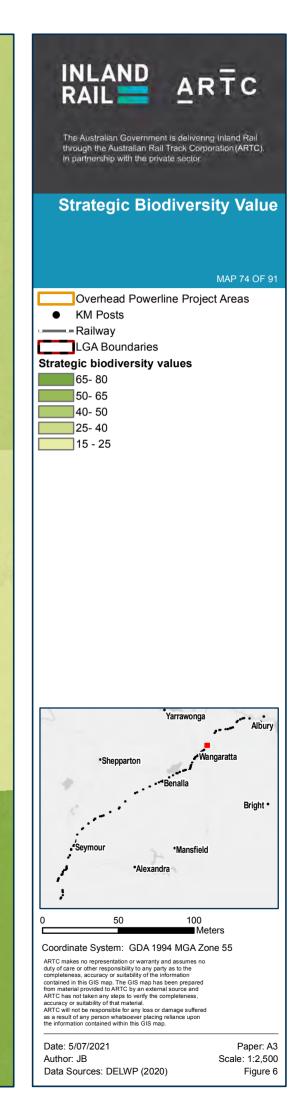




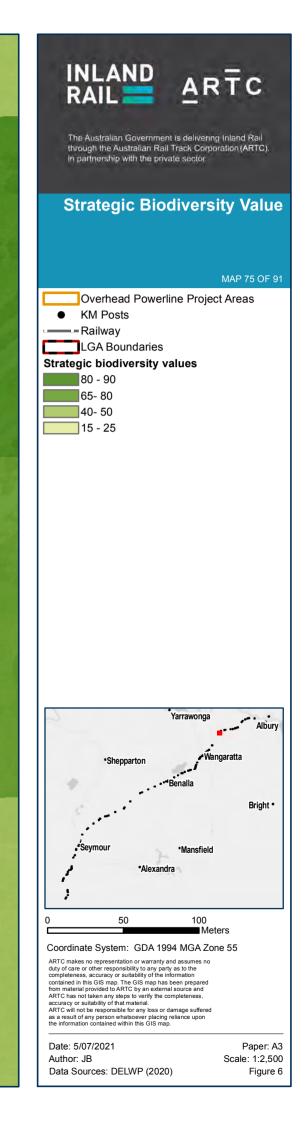


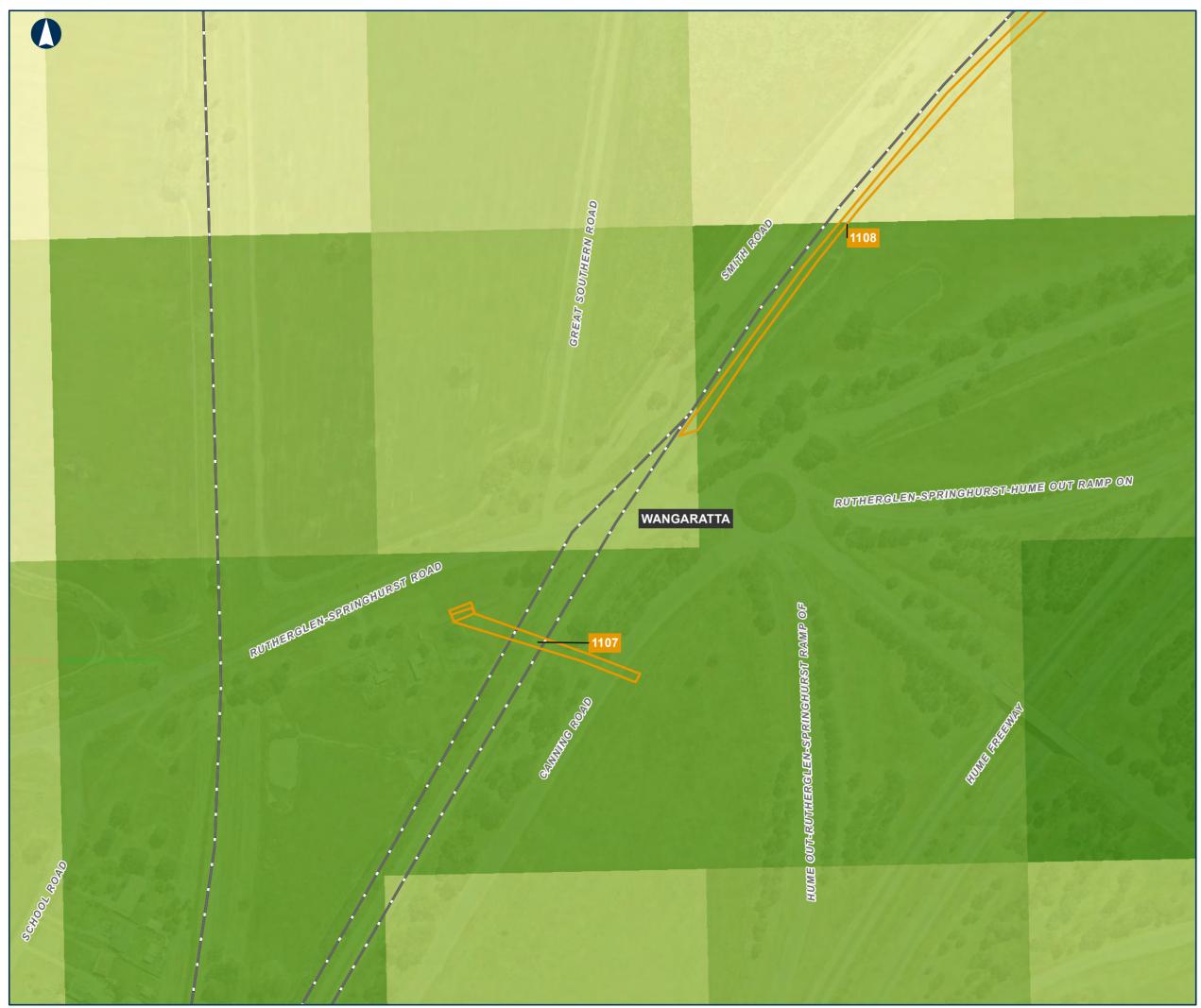
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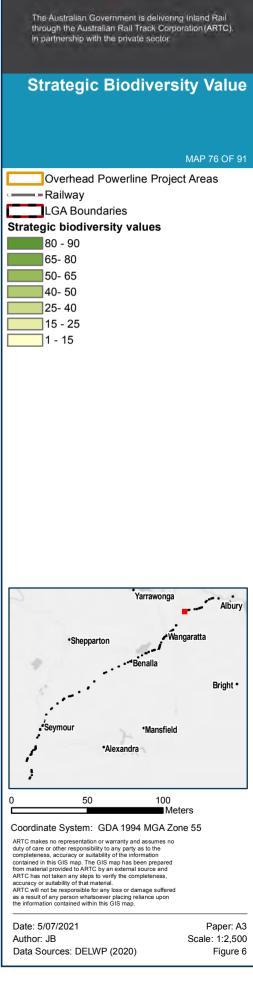




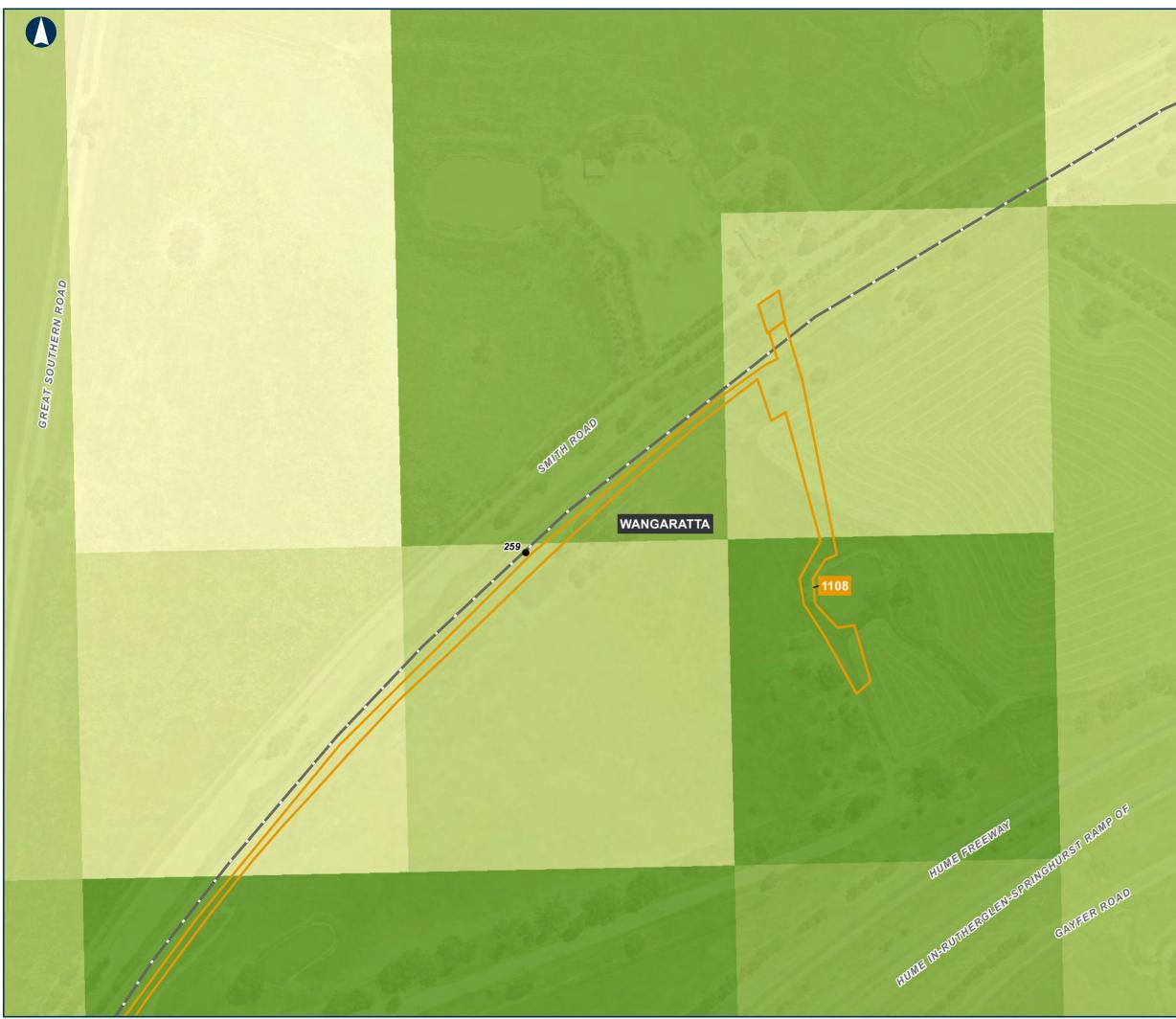


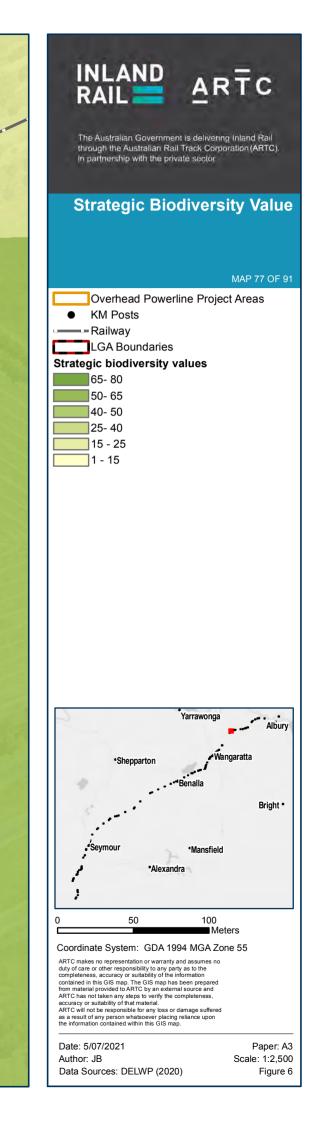




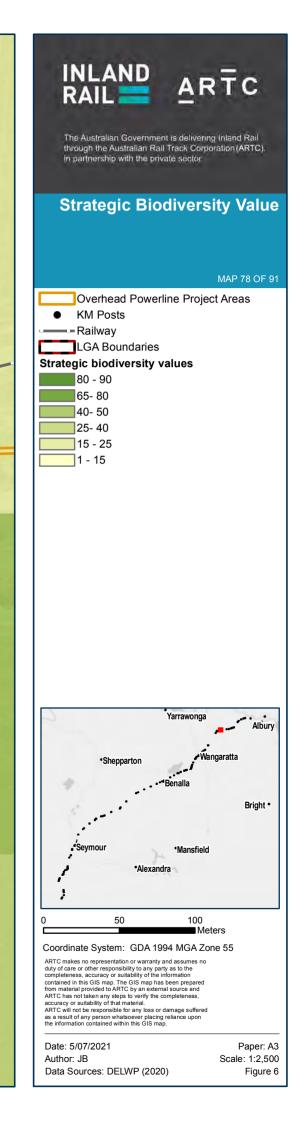


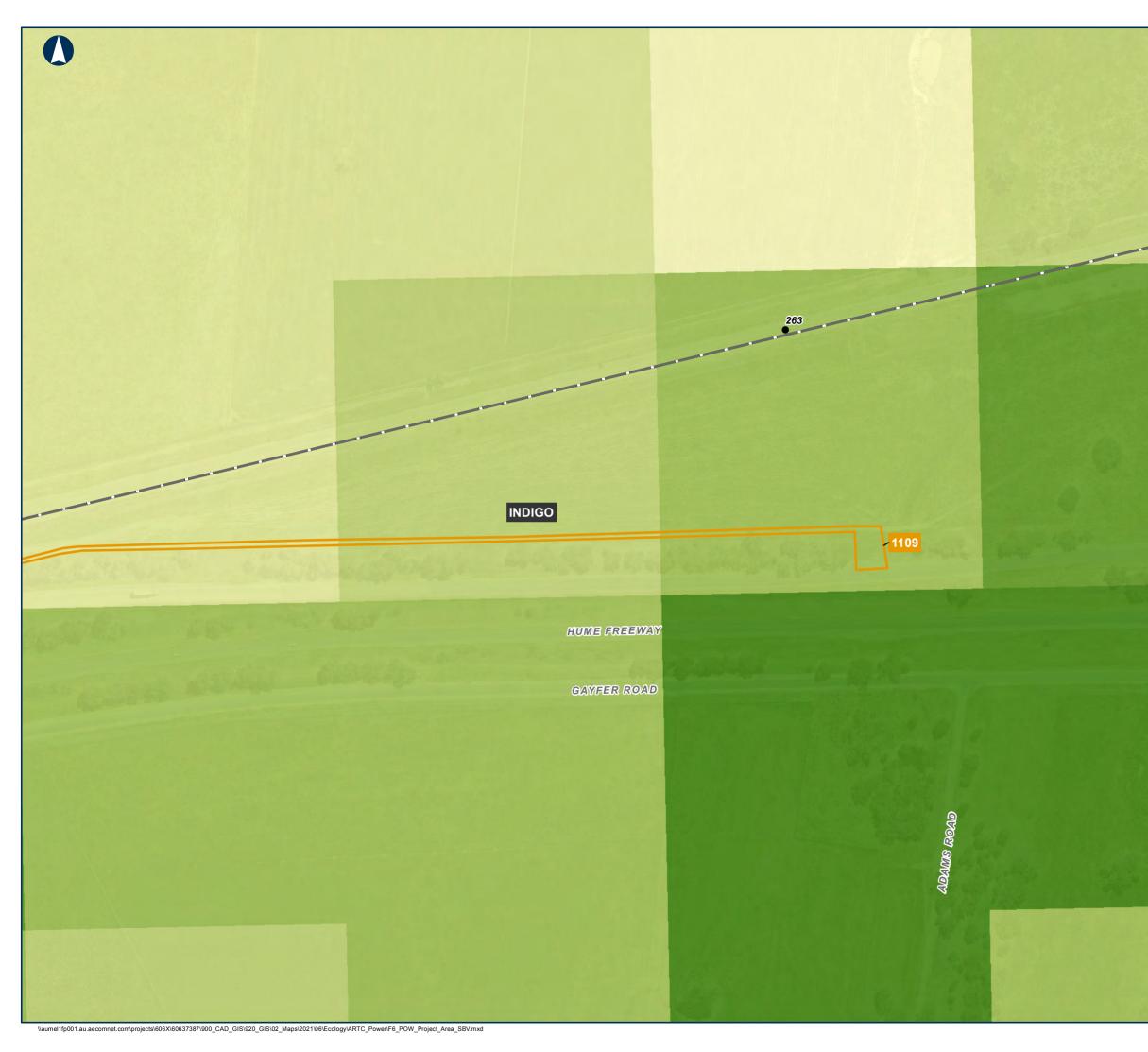
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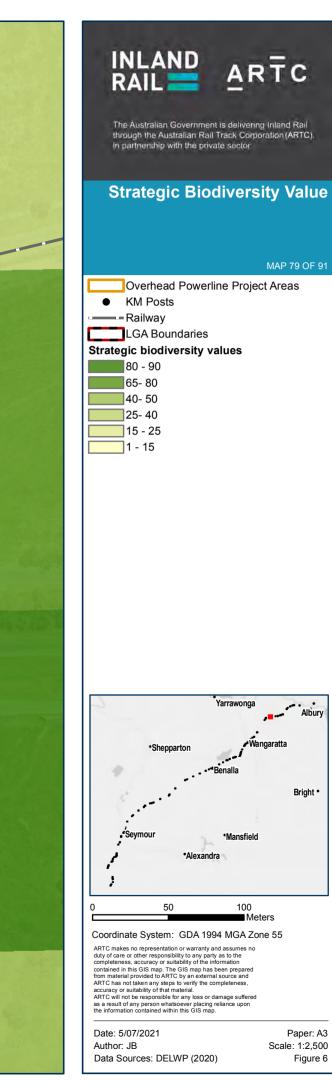










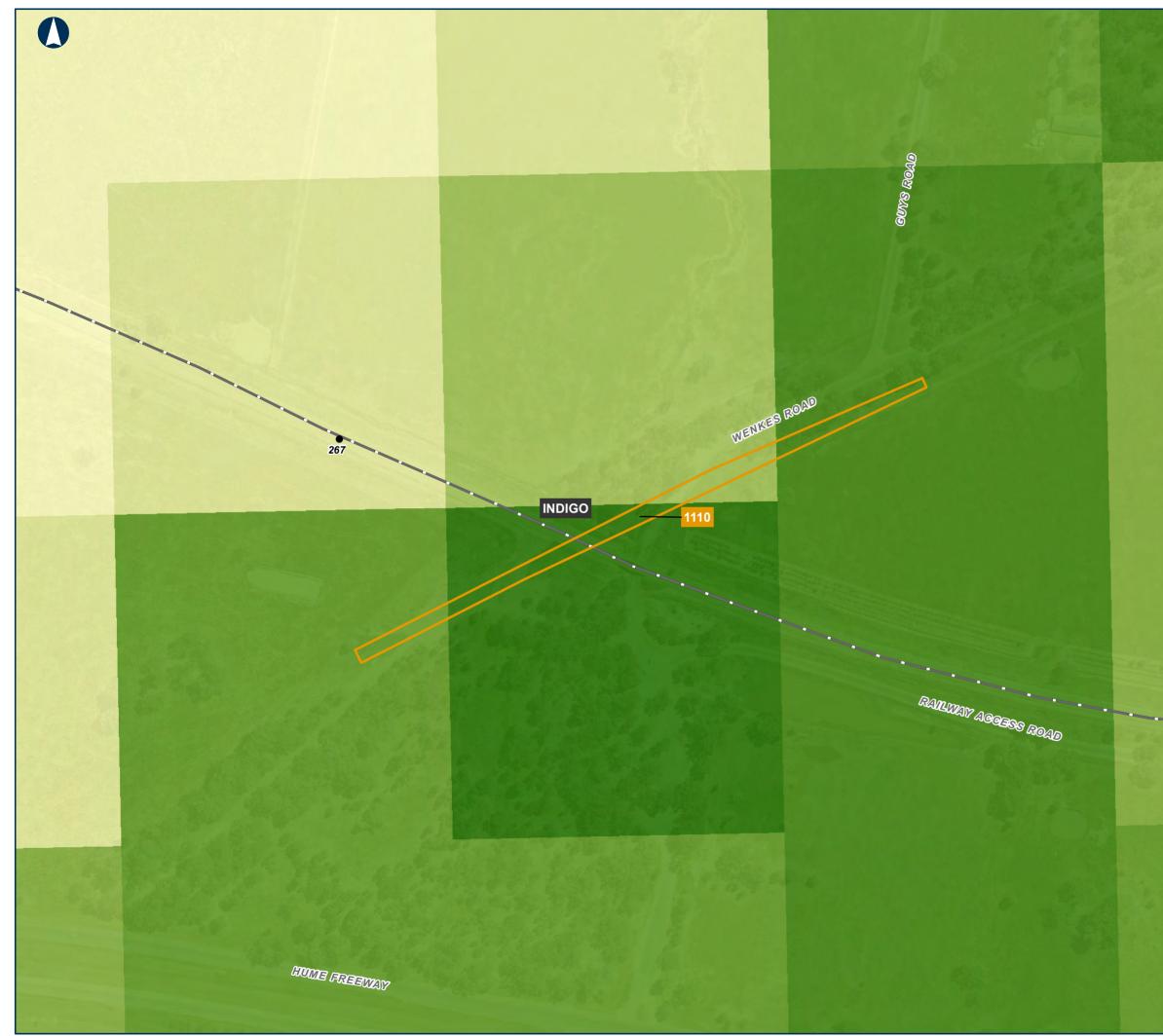


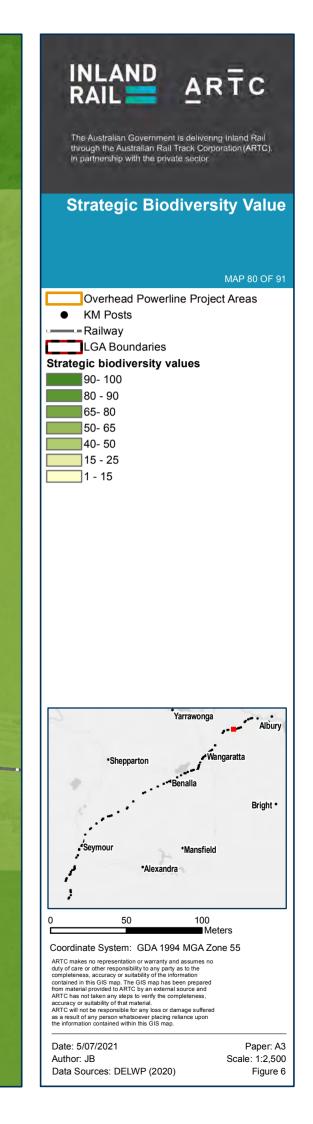
Paper: A3 Scale: 1:2,500 Figure 6

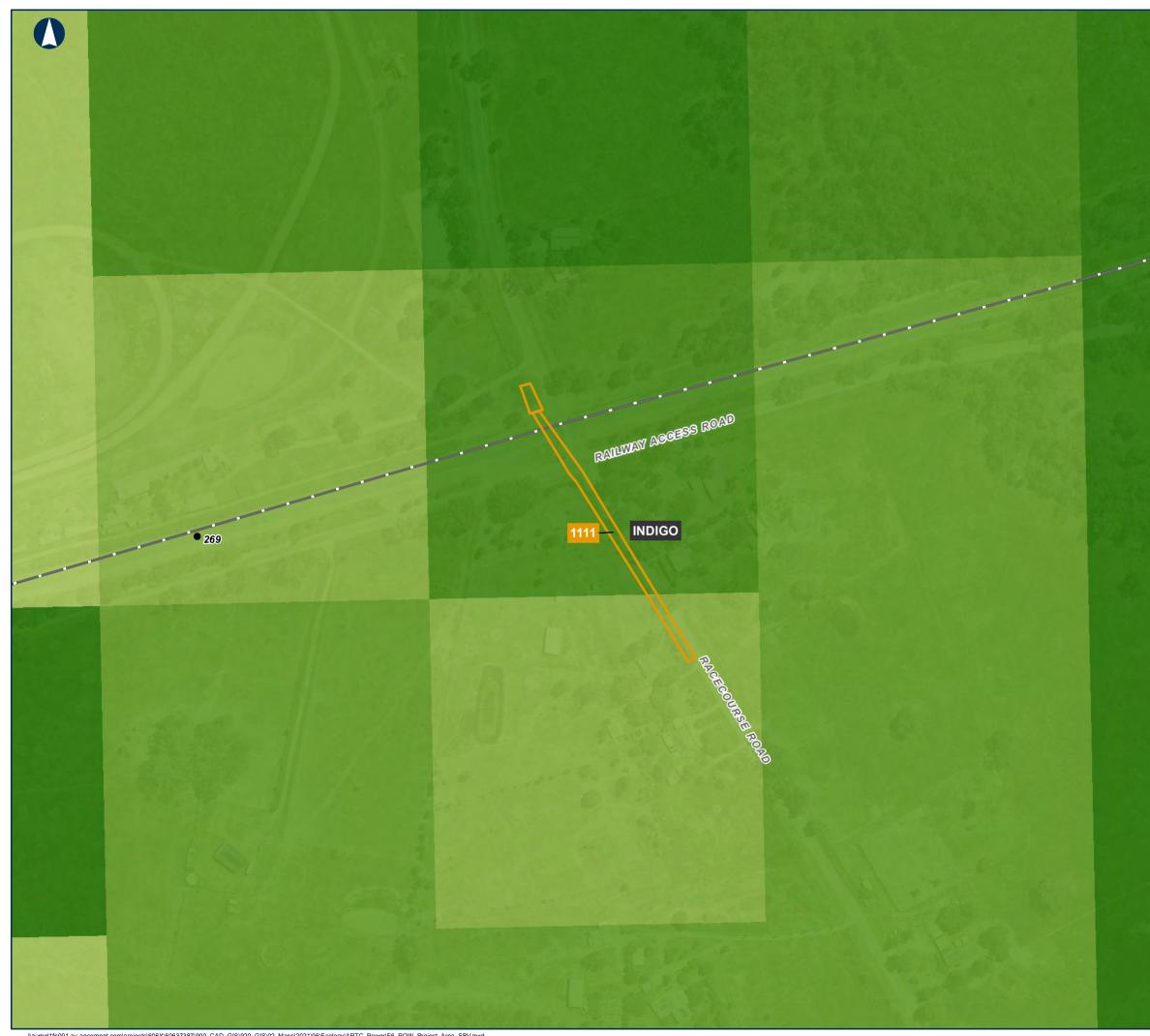
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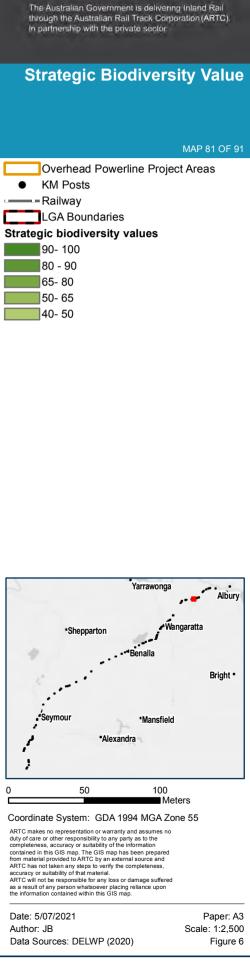
MAP 79 OF 91





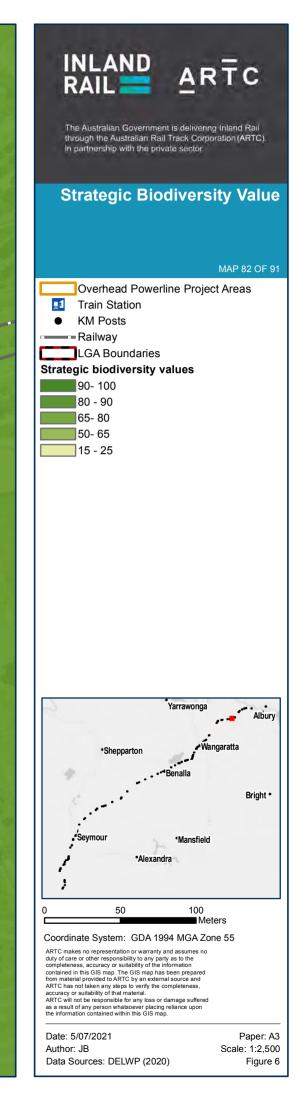






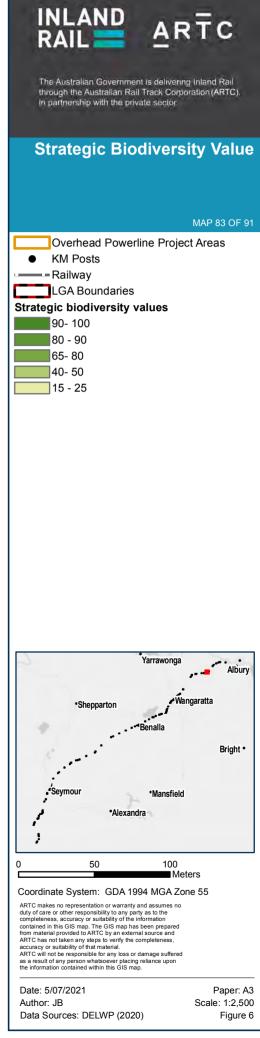
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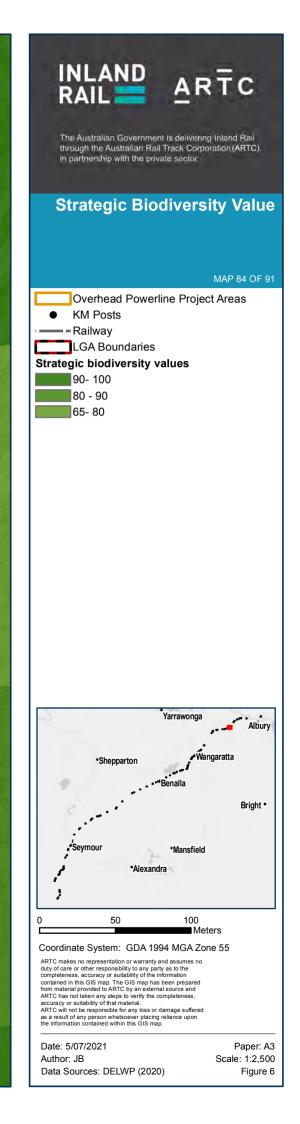


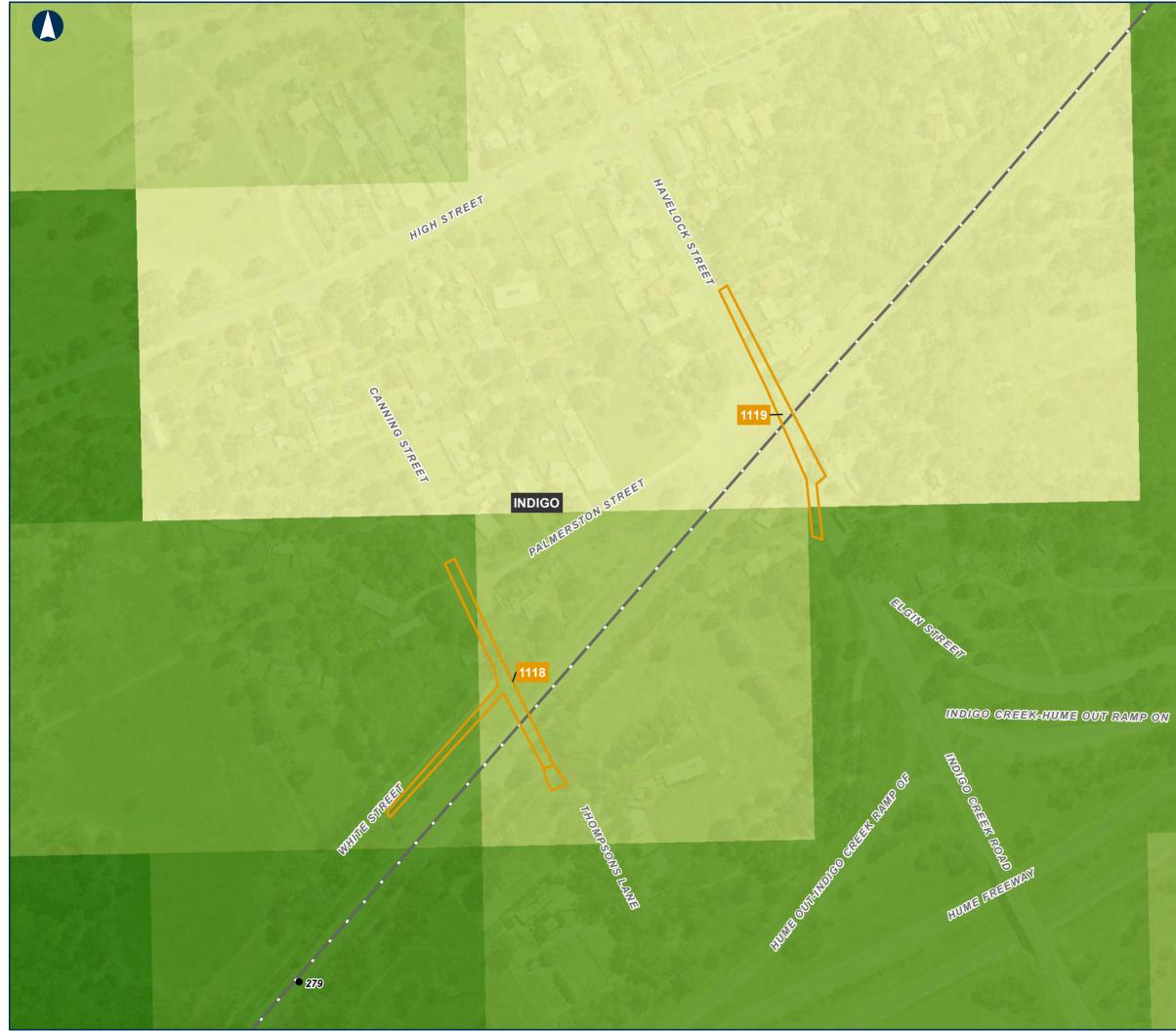


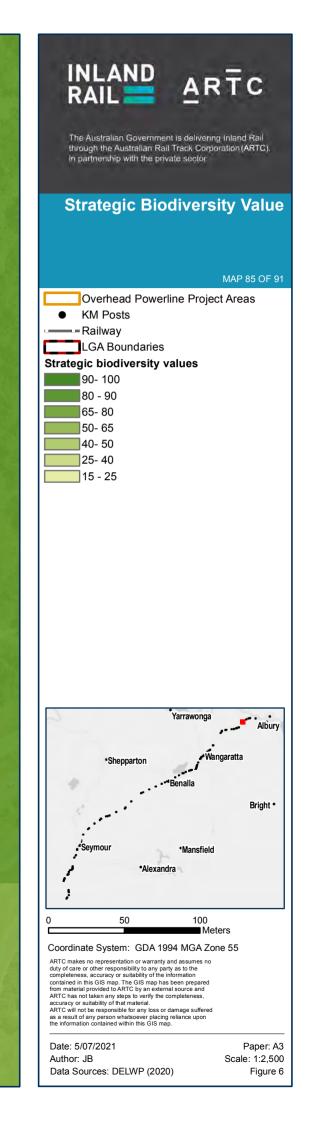


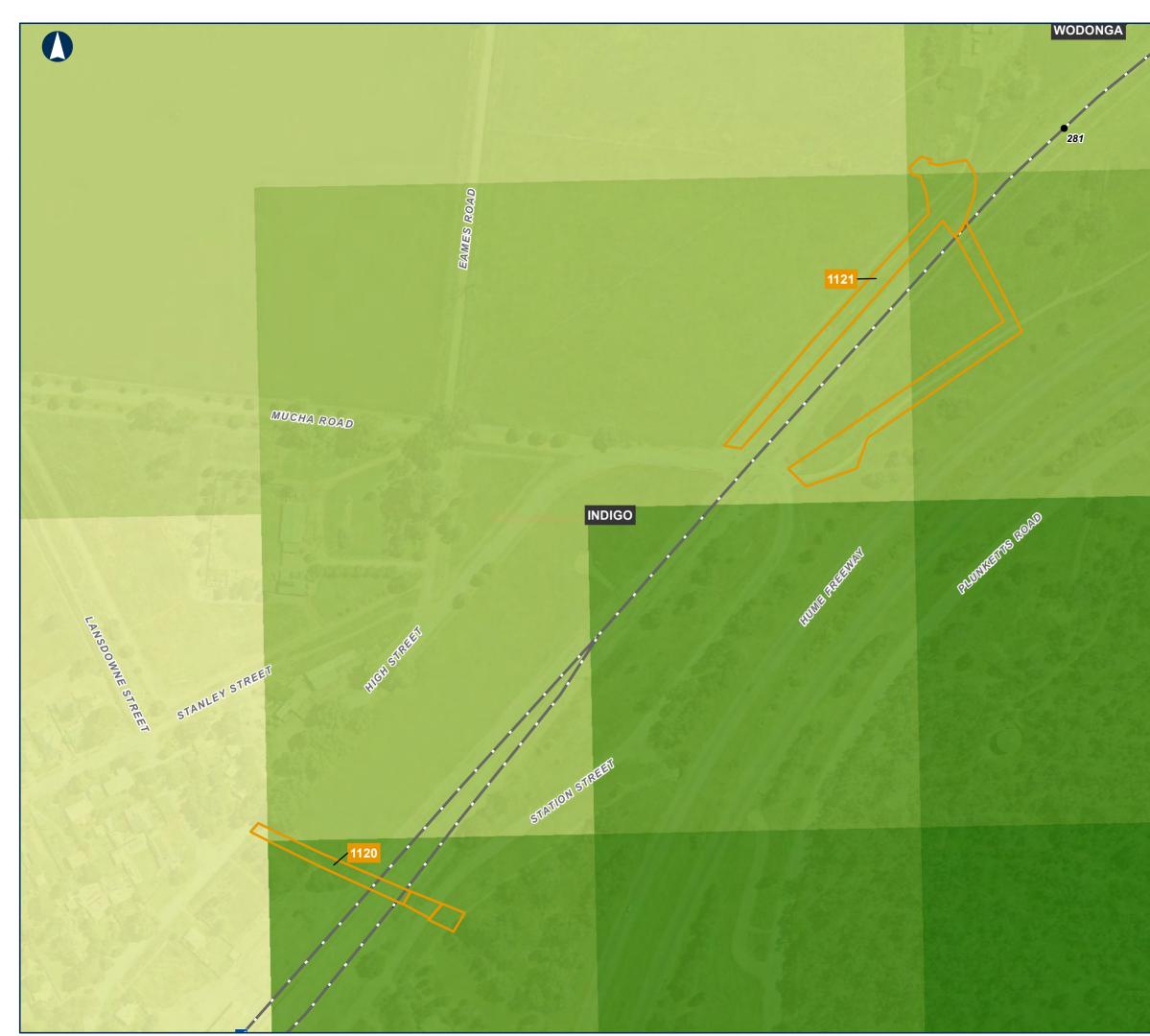


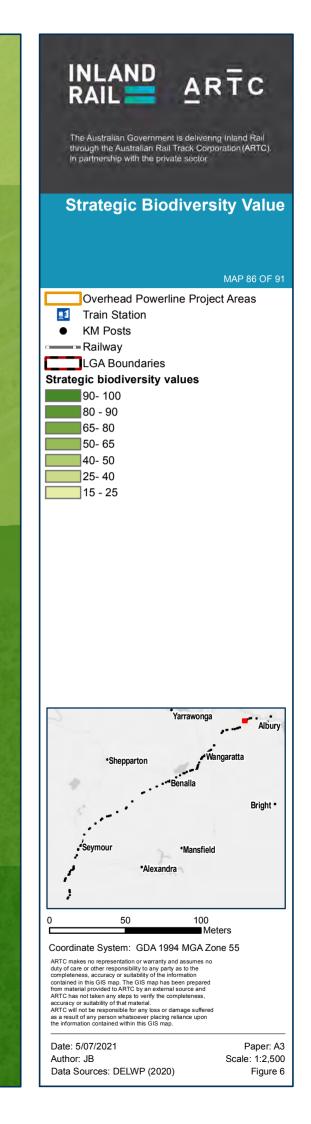


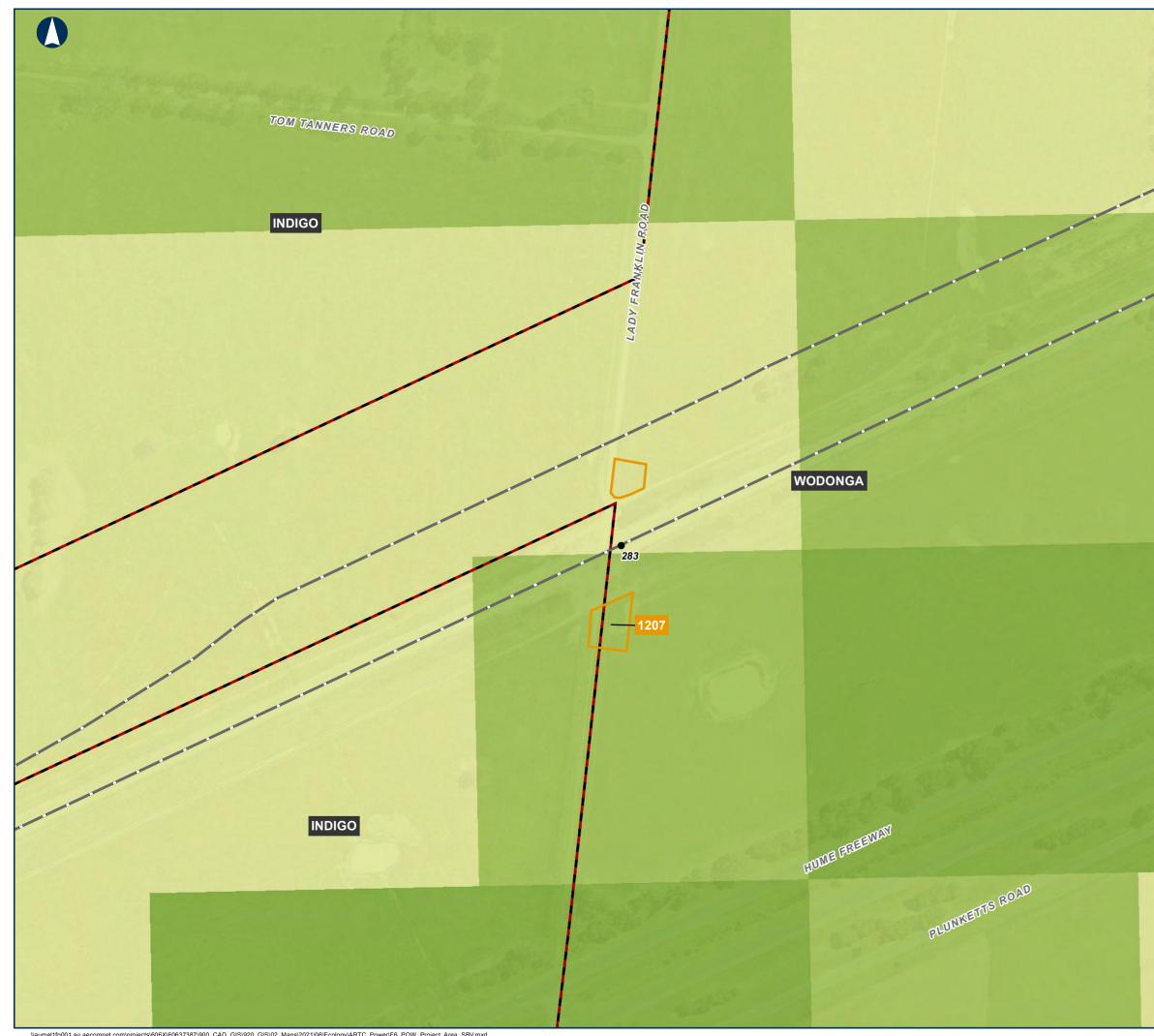


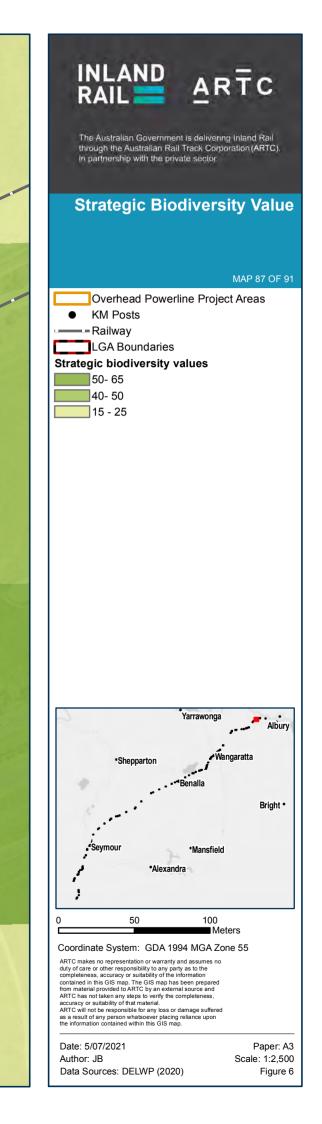


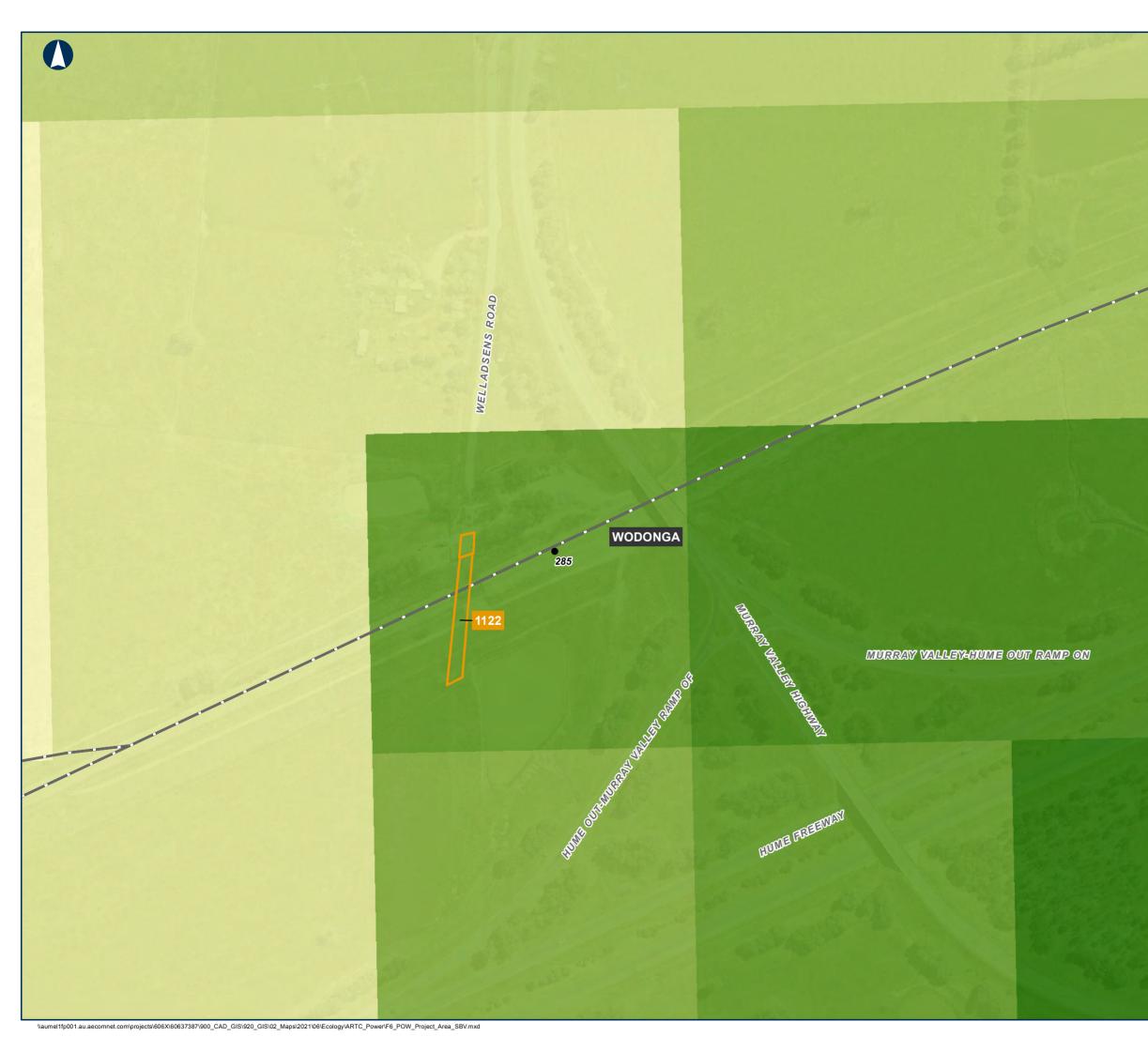


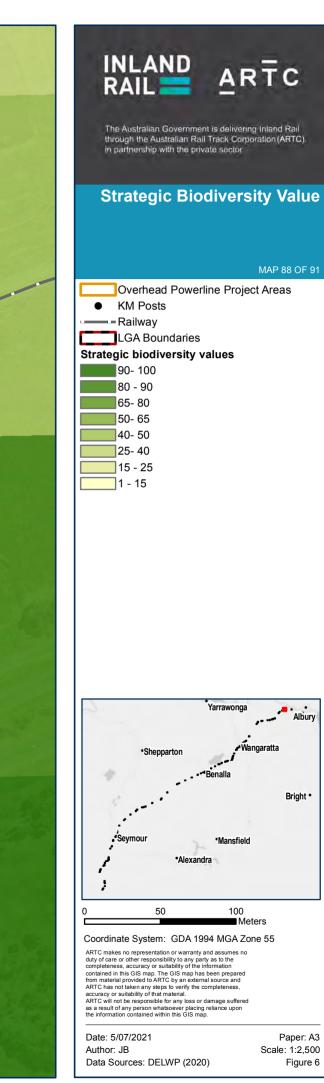












Paper: A3 Scale: 1:2,500 Figure 6

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