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APPENDICES

1 REGIONAL BACKGROUND

APA GasNet Australia (Operations) Pty Ltd (APA) is looping (duplicating) part of the existing Wollert to Wodonga gas transmission pipeline (pipeline licence PL101) between Glenrowan to Barnawartha, Victoria (known as Looping 7).

The Wollert to Wodonga gas transmission pipeline was constructed in 1975 and runs in an approximately north easterly direction from Wollert on the northern outskirts of Melbourne through to Wodonga, a total distance of approximately 280km. This pipeline occupies an easement of 35m in width. The proposed pipeline looping is to be installed within the existing easement. With reference to the starting point of the existing pipeline at Glenrowan, this looping will commence at KP118.2 and finish at Barnawartha KP184.6, a total distance of 66.4km.

Looping 7 passes through three municipalities (Benalla Rural City, Wangaratta Rural City and Indigo Shire) and is located within the vicinity of regional townships including Glenrowan, Wangaratta, Chiltern and Barnawartha.

- Land traversed by the project is made up of a mixture of land uses included residential, semi-rural residential, farming and nature conservation land uses.
- The project is located across two catchment management regions being Goulburn Broken Catchment Management Authority (GBCMA) at the very beginning and the remainder, the North East Catchment Management Authority (NECMA).
- Looping 7 traverses major infrastructural assets including the North Eastern Railway at two locations (KP122.52 and 169.31), Hume Highway at four locations (KP123.07, KP131.83, KP142.45 and KP168.1) and the Murray to Mountains Rail Trail.
- In addition to land associated with roads, the construction ROW intersects major natural assets such as the King River (KP135.1) and Ovens River (KP138.03) and a number of other areas of Crown Land being land associated with Chiltern - Mt. Pilot National Park (KP175.08 – KP175.2, KP175.42 - KP175.65, KP176.32 - KP176.95, KP177.35 – KP178.8).

An overview of the section to be looped is provided in **Figure C1** whilst detailed pipeline route maps are provided in **Appendix C1.**

Monarc Environmental (Monarc) was engaged by APA to undertake a flora and fauna assessment of the APA construction ROW from near Glenrowan (KP118.2) to Barnawartha (KP184.6). The purpose of the assessment is to identify any risks to significant flora and fauna values within the construction ROW and provide the necessary information to enable management recommendations for flora and fauna affected by the construction ROW.

1.1 General

Looping 7 commences just south of Glenrowan on the plains to the north of Benalla at approximately 180m AHD. The construction ROW then rises slightly to approximately 250m as it passes around the south-western perimeter of the Warby Range on the northern edge of the Glenrowan township. As the construction ROW heads in a north-easterly direction it drops to an elevation of approximately 150m on the floodplain to the east of Wangaratta before entering rolling hills just south of Springhurst. Here it rises to approximately 270m before dropping back to approximately 200m near the fourth Hume Freeway crossing. The construction ROW then rises again to a maximum of approximately 270m as it passes through the national park to the north of Chiltern before dropping back again to approximately 170m at Barnawartha.

This region contains two bioregions, the *Victorian Riverina* and the *Northern Inland Slopes.* The *Victorian Riverina* consists of a flat to gently sloping riverine plain formed from Quaternary alluvial deposits associated with the eight river basin tributaries of the Murray River. Prior to European settlement, the vegetation of the Victorian Riverina was a mixture of grasslands and low open woodland, dominated by box species (Grey Box *Eucalyptus microcarpa* and Yellow Box *E. melliodora)*, River Red Gum *E. camaldulensis* and Murray-pine (*Callitris* spp.), with a sparse grassy understorey. A number of small freshwater wetlands of various types were also scattered across the region with concentrations of large and shallow wetlands adjacent to the major rivers in a few locations, such as around Wangaratta.

The *Northern Inland Slopes* are comprised of the lower foothills north of the Great Dividing Range with minor ranges separated by river valleys. The pre-European vegetation primarily consisted of box ironbark forest (though notably lacking ironbark species) in the hills, with grassy woodland on the lower slopes and areas of gilgai plain woodland/wetland mosaic fringing the riverine plain (GBCMA 2003). The remaining hills vegetation was dominated by Grey Box, Red Box *E. polyanthemos* and White Box *E. albens*, with an understorey frequently dominated by wattles, and a sparse ground layer.

Today, over 90% of the area is cleared, mainly for dryland farming involving grazing and mixed cropping. As a result, the once-extensive woodlands are largely cleared, the remnants containing predominantly Grey Box with grassy understorey and scattered shrubs. Networks of vegetated roadsides and creeklines now play an important role in sustaining biodiversity across this highly modified landscape (GBCMA 2003). Creekline vegetation remnants can retain good connectivity, while the networks of road reserves and associated vegetation can provide important habitat for native bird species as well as colonies of Squirrel Gliders *Petaurus norfolcensis* and other mammals. Other threatened fauna in the area includes Bush Stone-curlew *Burhinus grallarius*, Swift Parrot *Lathamus discolor*, Tree Goanna *Varanus varius* and Brush-tailed Phascogale *Phascogale tapoatafa tapoatafa* which are often found along connected creeklines and roadsides with large, old, hollow-bearing trees.

1.2 Land Use

1.2.1 Planning Zones

The construction ROW lies within the Rural City of Benalla, Rural City of Wangaratta and the Indigo Shire Council. The planning zones that apply to parcels of land traversed by the construction ROW are summarised in Table C1 (DELWP 2015a).

Table C1: Summary of Planning Zones

Local Government Area	Zone	Location (KP)
Rural City of Benalla	Farming Zone (FZ)	All of LGA that construction ROW traverses
Rural City of Wangaratta	Farming Zone 1 (FZ)	Most of the rural areas which the construction ROW traverses
	Industrial 1 (IN1Z)	Wangaratta (140.5-140.8; 140.9-141.65)
	Public Conservation and Resource Zone (PCRZ)	Ovens River (138.03)
	Public Use- Service and Utilities (PUZ1)	Bourke Rd, Wangaratta (141.7 – 142.35)

Local Government Area	Zone	Location (KP)
	Public Use- Transport (PUZ4)	North East Rail line (122.52) Murray to Mountains Rail Trail (Bowser-Londrigan Lane) (144.45)
	Road Zone 1 (RDZ1)	Hume Freeway (123.0 - 123.15; 131.83 - 131.93; 142.35 – 142.5) Glenrowan-Myrtleford Road (126.8) Greta Road (130.3) Wangaratta-Whitfield Road (134.8) Great Alpine Road (139.0)
	Road Zone 2 (RDZ 2)	Glenrowan Boweya Road (118.2) Oxley Flats Road (137.84 – 137.9) Detour Road (140.8) Wangaratta-Eldorado Road (143.25)
	Rural Living Zone 2 (RLZ2)	Glenrowan (120.55 - 122.45)
Indigo Shire	Farming Zone 1 (FZ)	Most of the rural areas which the construction ROW traverses
	Road Category 1 (RDZ1)	Hume Freeway (168.1 – 168.18) Chiltern - Rutherglen Road (174.1) Chiltern - Howlong Road (176.05)
	Public Use- Transport (PUZ4)	North East Rail line (169.31)
	Public Conservation and Resource Zone (PCRZ)	Black Dog Creek (172.7 - 172.8) Chiltern - Mt. Pilot NP (175.08 - 175.3; 175.5 - 175.7; 176.4 - 177.0; 177.4 - 178.9) Indigo Creek (183.4 – 183.45)
	Rural Living Zone (RLZ)	Chiltern - Howlong Road (175.7 - 176.0) Barnawartha (181.5 - 183.4)
	Low Density Residential (LDRZ)	Bill Tanners Road (183.45 - 184.0)

Land usage in the area is predominantly rural with the majority of the land classed as a Farming Zone. The greater part of the region retains an open aspect typical of grazing land and much of this land is subject to either sheep or cattle grazing. While much of the private land has been cleared for agricultural purposes, many areas, particularly within central Victoria, have retained a number of the larger old trees as part of the landscape.

1.2.2 Environmental and Landscape Overlays

Environmental issues of local or regional importance or concern may be recognised under local government planning schemes by the application of environmental overlays or local management requirements regarding vegetation management. There are environmental overlays in each of the three local government areas that this project passes through; these include Vegetation Protection, Environmental Significance and Significant Landscape Overlays. These overlays and their descriptions can be found in **Table C2**.

The three LGAs have prepared roadside management plans or strategies that identify and categorise roadsides considered to have conservation significance based on existing vegetation (Benalla Rural City 2006, 2012; Indigo Shire Council 2010; Rural City of Wangaratta 2000, 2014). In general, the

plans cover all rural road reserves in these LGA's excluding any road reserves under the management of VicRoads (e.g. arterial roads or highways) or unused roads under the management of Department of Environment, Lands, Water and Planning (DELWP). While there is some variation in definition, roadsides have been generally assigned to one of three rankings, High, Medium or Low conservation value, as described in Part A.

A number of roads intersected by this looping have been assigned a High Conservation ranking by the LGAs. Many of the roads considered to have special value have been identified by on-site signage that identifies these areas as Significant Roadside Areas.

Each LGA has also been consulted for any planning controls applied to non-native vegetation such as Heritage Overlays or significant tree status. No such controls apply to the area intersected by the construction ROW.

Table C2: Summary of Environmental and Landscape Overlays

Local Government Area	Overlay	Name	Location (KP approx)	Description
Rural City of Benalla	VPO3	Vegetation Protection Overlay 3	118.2 – 118.6 east of Glenrowan - Boweya Road	This area provides one of the limited habitat areas remaining of the Regent Honeyeater which is listed as an endangered species under the *Fauna and Flora Guarantee Act* (sic). The area also provides habitat for Squirrel Gliders, Brush-tailed Phascogales (Tuan), Grey-crowned Babblers, Bush Stone-curlews and Quolls, which are listed as rare or endangered under the Fauna and Flora Guarantee Act. The area maintains vegetative links between the Warby Range and the Great Dividing Range used as habitat and migratory routes by the indigenous fauna species.
Rural City of Wangaratta	VPO1	Vegetation Protection Overlay 1	118.6 - 119.35 119.37 – 119.9 121.4 – 121.69	The township of Glenrowan contains a mixture of indigenous vegetation communities including Grassy Woodland, Shrubby Granitic-outwash Grassy Woodland/Valley Grassy Forest, Valley Grassy Forest, Spring Soak Woodland and Granitic Hills Woodland. These vegetation communities are of local significance and, in some cases likely to have high local or regional botanical significance. The remnant woodlands provide the basis from which to create a distinctive and enhanced bushland environment.
	VPO2	Vegetation Protection Overlay 2	119.35 – 119.37 – Upper Taminick Road 122.42 – 122.49 – Old Hume Highway 123.65 – Dundas Road	The municipality has several distinct biogeographical regions (bioregions) that contain more than 20 different vegetation types or communities: known as Ecological Vegetation Classes (EVCs). In

Local Government Area	Overlay	Name	Location (KP approx)	Description
			124.61 – 124.68 – Greens Road 138.8 – Oxley Flats Road 144.45 – 144.49– Bowser-Londrigan Lane (Murray to Mountains Rail Trail) 145.1 – Clear Creek Road 145.6 – Byawatha Road 145.9 – Ellen Lane 160.4 – Vipond Road 163.8 – Sanderson Road	particular, several EVCs are listed as 'high priority for protection and management' by the North East Catchment Management Authority and the Department of Sustainability and Environment (sic). Some of these areas are located along roadsides (used or unused), and may also be important habitat for rare, threatened or endangered fauna species. Roadside vegetation also contributes to the quality of travel and tourism experiences and towards the appeal of the visual and natural environment of the area.
	SLO	Significant Landscape Overlay	121.31 – 121.4, 121.7 – 122.4 Old Hume Highway	The Warby Ranges are a prominent and significant feature in the northwest of the municipality and form a major part of the area's landscape character. The ranges dominate the landscape to the north of the Hume Freeway and from Wangaratta, and can be seen from many parts of the municipality. The area is used for multiple purposes and is value for agriculture, biodiversity, recreation and tourism. Inappropriately sited and designed development or building materials could compromise the visual amenity and tourism values of the Warby Ranges. It is important to protect the landscape and biodiversity values of elevated, vegetated private land in the Warby Ranges.
Indigo Shire	ESO3	Environmental Significance Overlay 3	168.2 – 183.4, 184.0 – 184.65 From Hume Highway, through Chiltern - Mt. Pilot National Park to Barnawartha -Howlong Road	The North Eastern section of the Ovens River Basin includes a number of smaller water courses which drain directly to the Murray upstream of Lake Mulwala including the Black Dog Creek. The Black Dog Creek Waterway Management District displays a number of significant drainage problems.

1.3 Waterways

Natural assets that have been identified along the project area include several perennial waterways as well as numerous ephemeral waterways. In general, natural waterways and drainage lines (designated waterways under the Victorian *Water Act 1989*) are the responsibility of the GBCMA and NECMA while Goulburn Murray Water and North East Water are responsible for water storage and associated delivery and drainage systems. In summary Glenrowan to Barnawartha (Looping 7)

intersects 48 designated waterways of which 14 are named including Yanko Creek, Ovens and King Rivers near Wangaratta. Waterways intersected by Looping 7 are summarised in **Table C3.**

Table C3: Designated Waterways Intersected by the Project

Name	Location (KP approx)	Flow status	Land Type
Fifteen Mile Creek	125.7	Intermittent	Crown Land
Unnamed Creek	129	Ephemeral	Private Freehold
Three Mile Creek	129.7	Ephemeral	Private Freehold
Unnamed Creek	131.45	Ephemeral	Private Freehold
Drainage Line	131.5	Ephemeral	Private Freehold
Unnamed Creek	131.7	Ephemeral	Private Freehold
One Mile Creek	132.2	Ephemeral	Private Freehold
King River	135.1	Perennial	Crown Land
Yanko Creek (Maloney's Creek)	137.3	Intermittent	Private Freehold
Ovens River	138.03	Perennial	Crown Land
Yellow Creek	138.37	Ephemeral	Private Freehold
Wetland Meadow	139.2	Ephemeral	Private Freehold
Wetland Meadow	139.9	Ephemeral	Private Freehold
Reedy Creek	140.15	Ephemeral	Crown Land
Drainage Channel	149.1	Ephemeral	Private Freehold
Drainage Line	153.25	Ephemeral	Private Freehold
Unnamed Creek	154.6	Ephemeral	Private Freehold
Drainage Line	155.75	Ephemeral	Private Freehold
Drainage Line	156.25	Ephemeral	Private Freehold
Unnamed Creek	156.75	Ephemeral	Private Freehold
Unnamed Creek	159	Ephemeral	Private Freehold
Unnamed Creek	159.78	Ephemeral	Private Freehold
Drainage Line	160.2	Ephemeral	Private Freehold
Diddah Diddah Creek	162.2	Ephemeral	Private Freehold
Drainage Line	163.1	Ephemeral	Private Freehold
Drainage Line	164.15	Ephemeral	Private Freehold
Rocky Waterholes Creek	164.52	Ephemeral	Private Freehold
Drainage Line	165.43	Ephemeral	Private Freehold
Drainage Line	165.6	Ephemeral	Private Freehold
Unnamed Creek	167.52	Ephemeral	Private Freehold
Unnamed Creek	168.48	Ephemeral	Private Freehold
Drainage Line	170.6	Ephemeral	Private Freehold
Wetland Meadow	171	Ephemeral	Private Freehold
Black Dog Creek	172.7	Intermittent	Crown Land

Name	Location (KP approx)	Flow status	Land Type
Drainage Line	174	Ephemeral	Private Freehold
Drainage Line	174.75	Ephemeral	Private Freehold
Drainage Line	174.95	Ephemeral	Private Freehold
Drainage Line	175.45	Ephemeral	Private Freehold
Unnamed Creek	175.82	Ephemeral	Private Freehold
Unnamed Creek	176.3	Ephemeral	Private Freehold
Unnamed Creek	176.81	Ephemeral	Crown Land
Unnamed Creek	178.2	Ephemeral	Crown Land
Unnamed Creek	179.1	Ephemeral	Private Freehold
Unnamed Creek	179.45	Ephemeral	Private Freehold
Stockyard Creek	180.42	Ephemeral	Private Freehold
Drainage Line	180.67	Ephemeral	Private Freehold
Frying Pan Creek	183.03	Ephemeral	Private Freehold
Indigo Creek	183.38	Intermittent	Crown Land

Many of these waterways are ephemeral and generally flow only when rainfall conditions are sufficient. Water flow within these waterways may therefore vary from a few hours or days following a storm event (ephemeral) to a few weeks or months (intermittent). Perennial waterways include the King and Ovens Rivers.

All waterways will be crossed in accordance with relevant guidelines for creek and river crossings. Approval to traverse these assets will be sought through permits from GBCMA and the submission of a Site Environmental Management Plan to NECMA which will include construction plans and drawings along with appropriate methods of construction and rehabilitation. GBCMA/NECMA may undertake inspections of critical waterways during construction to ensure the protection and management of these assets.

Most of the waterways intersected by the construction ROW fall within private freehold land. However six fall within Crown Land. Under the *Flora and Fauna Guarantee Act 1988*, a permit is required to remove threatened species from Crown Land as well as a number of additional species identified as protected flora on Crown Land (DEPI 2014i). A permit may therefore be required prior to vegetation clearing on Crown Land throughout the construction ROW in these areas.

1.4 Previous Studies

The Chesney Landscape Zone Conservation Plan has been prepared by the GBCMA to identify priorities for native biodiversity conservation in the region managed by them. These have been prepared in accordance with DSE Biodiversity Action Planning objectives as part of the Victorian State biodiversity strategy and have identified a number of priority sites likely to have conservation values.

NECMA has also renewed their North East Regional Catchment Strategy (North East CMA 2013) which sets out 20 year high level objectives based around conserving the environment and ensuring land, water and biodiversity resources are maintained.

2 FLORA ASSESSMENT

2.1 Ecological Vegetation Classes

DELWP modelled EVC mapping for the region shows that the construction ROW and the immediate surrounds would have originally been dominated by EVC 55 Plains Grassy Woodland, 803 Plains Woodland, 175 Grassy Woodland and 61 Box Ironbark Forest. Smaller areas supporting other vegetation types were also present and are summarised below in **Table C4** (DEPI 2014c).

However, due to extensive clearing, historic EVC classes have been vastly reduced in size, distribution and quality, resulting in habitat fragmentation and loss of biodiversity. Extant (2005) EVC mapping shows the majority of native vegetation remaining in the local area is restricted to minor occurrences of EVCs with a large area of EVC 61 Box Ironbark Forest within the Chiltern - Mt. Pilot National Park (DEPI 2014c).

Table C4: DELWP modelled pre-1750 Ecological Vegetation Classes within the Local Area

Bioregion	EVC Number and Name	Status	Occurrence
Northern Inland Slopes	20 Heathy Dry Forest	Least Concern	Minor
	22 Grassy Dry Forest	Depleted	Minor
	47 Valley Grassy Forest	Endangered	Minor
	61 Box Ironbark Forest	Vulnerable	Common
	68 Creekline Grassy Woodland	Endangered	Minor
	72 Granitic Hills Woodland	Least Concern	Minor
	153 Alluvial Terraces Herb-rich Woodland	Endangered	Minor
	175 Grassy Woodland	Endangered	Common
Victorian Riverina	55 Plains Grassy Woodland	Endangered	Common
	56 Floodplain Riparian Woodland	Vulnerable	Minor
	67 Alluvial Terraces Herb-rich Woodland	Vulnerable	Minor
	68 Creekline Grassy Woodland	Endangered	Minor
	74 Wetland Formation	Endangered	Minor
	240 Plains Grassy Woodland/Creekline Grassy Woodland / Wetland	Endangered	Minor
	803 Plains Woodland	Endangered	Common
	1040 Riverine Grassy Woodland/Riverine Swampy Woodland Mosaic	Endangered	Minor

2.1.1 Existing Vegetation Condition

The recent field assessments identified mainly isolated fragments of native vegetation remaining in the area and these often contained a mixture of native and exotic species. However, areas where the construction ROW intersects the Chiltern - Mt. Pilot National Park still support good quality vegetation. A full list of flora species recorded is found in **Appendix C2**.

In general, extensive clearing for agriculture has left the majority of the construction ROW and surrounding land largely devoid of remnant vegetation and it therefore does not support the extent of original vegetation type that once occurred. However, the construction ROW was found to

intersect several areas of 'intact' remnant vegetation, as identified during the field surveys in accordance with the *Guide for assessment of referred planning permit applications* (DSE 2007a). Intact remnant vegetation was characteristic of fourteen EVCs as summarised in **Table C5.**

Table C5: Ecological Vegetation Classes identified during the Field Assessments

Bioregion	Ecological Vegetation Class	Status
Northern Inland Slopes	20 Heathy Dry Forest	Least Concern
	22 Grassy Dry Forest	Depleted
	47 Valley Grassy Forest	Endangered
	61 Box Ironbark Forest	Vulnerable
	68 Creekline Grassy Woodland	Endangered
	80 Spring Soak Woodland	Endangered
	175 Grassy Woodland	Endangered
	803 Plains Woodland	Endangered
Victorian Riverina	55_61 Plains Grassy Woodland	Endangered
	55_62 Riverine Plains Grassy Woodland	Endangered
	56 Floodplain Riparian Woodland	Vulnerable
	67 Alluvial Terraces Herb-rich Woodland	Endangered
	68 Creekline Grassy Woodland	Depleted
	175_61 Grassy Woodland (Low Rises)	Endangered
	235 Plains Woodland/Herb-rich Gilgai Wetland Mosaic	Endangered
	295 Riverine Grassy Woodland	Endangered
	803 Plains Woodland	Endangered
	813 Intermittent Swampy Woodland	Depleted

The presence of these EVCs was determined based on vegetation composition, soil types and location. Areas of remnant vegetation largely occurred within the Chiltern - Mt. Pilot National Park, roadside vegetation and along creeklines and low lying areas. A number of indigenous scattered trees were also identified either on the construction ROW or near the edge of the construction ROW. All remaining areas were largely dominated by introduced pasture grasses.

The condition of the native vegetation along the construction ROW ranged from poor to very good quality. The variation in vegetation condition was attributable to the species composition, the percentage of weed cover and the presence or absence of canopy trees. All EVCs identified during the assessments are described in section 2.1.2 below and include examples of the vegetation condition. The overall condition of the vegetation is detailed in the habitat hectare tables presented in **Appendix C3**.

2.1.2 Vegetation Descriptions

Flora Species

A total of 256 flora species were recorded within the proposed construction ROW during the field survey. This included 186 indigenous species and 70 introduced species (including both Australian natives and exotics). A detailed list of all flora species recorded in the construction ROW is provided in **Appendix C2**.

EVC 20: Heathy Dry Forest is described as an open eucalypt forest to 20m tall. It grows on shallow, rocky skeletal soils on a variety of geologies and on a range of landforms from gently undulating hills to exposed aspects on ridge tops and steep slopes at a range of elevations. The understorey is dominated by a low, sparse to dense layer of ericoid-leaved shrubs including heaths and peas. Graminoids and grasses are frequently present in the ground layer, but do not provide much cover (DEPI 2014c).

Areas representative of Heathy Dry Forest vegetation were identified within the Chiltern - Mt. Pilot National Park. Extensive areas occurred on a ridge located at KP177.8 within Habitat Zones L7_78 - 81 (**Appendix C3).** The canopy component was dominated by Red Ironbark *Eucalyptus sideroxylon,* Red Box*,* Red Stringybark and Grey Box. However most of the area has been previously cleared since the 1800s up until 1993 (Parks Victoria 2008) and therefore Large Old Trees were absent. Weeds were generally absent with only a few low threat species observed.

The shrub layer comprised Blue Finger-flower *Cheiranthera cyanea*, Urn Heath *Melichrus urceolatus*, Grey Parrot-pea *Dillwynia cinerascens*, Cat's Claw Grevillea *Grevillea alpina*, Pale Wedge Pea *Gompholobium huegelii*, Honey-pots *Acrotriche serrulata* and the state listed Small- leaf Bush-pea *Pultenaea foliolosa*.

Indigenous graminoids comprised Dense Spear-grass *Austrostipa densiflora*, Rough Spear-grass *Austrostipa scabra ssp. falcata*, Red Anther Wallaby Grass *Rytidosperma pallidum*, Small Flower Wallaby Grass *Rytidosperma setaceum*, Hill Wallaby Grass *Rytidosperma erianthum*, Kangaroo Grass, Dwarf Greenhood *Pterostylis nana* and Purple Beard Orchid *Calochilus robertsonii*. Herbs included Common Sunray *Triptilodiscus pygmaeus*, Slender Groundsel *Senecio tenuiflorus*, Hairy Stinkweed *Opercularia hispida* and Sticky Everlasting *Xerochrysum viscosum*.

EVC 22: Grassy Dry Forest is described as occurring on a variety of gradients and altitudes and on a range of geologies. The overstorey is dominated by a low to medium height forest of eucalypts to 20m tall, sometimes resembling open woodland with a secondary, smaller tree layer including a number of Acacia species. The understorey usually consists of a sparse shrub layer of medium height. Grassy Dry Forest is characterised by a ground layer dominated by a high diversity of drought-tolerant grasses and herbs, often including a suite of fern species (DEPI 2014c).

Grassy Dry Forest vegetation was identified within Habitat Zone L7_4 located at KP121.5 near Glenrowan (**Appendix C3).** The vegetation was in moderate condition comprising a canopy dominated by Bundy *Eucalyptus goniocalyx*. The shrub layer was primarily Lightwood *Acacia implexa* and the understorey comprised a moderate array of indigenous species including Rough Spear-grass, Sheep's Burr *Acaena echinata,* Common Wheat-grass *Anthosachne scabra,* Black-anther Flax-lily *Dianella revoluta* and Common Raspwort *Gonocarpus tetragynus.* A typical suite of weedy exotic graminoids were present including Toowoomba Canary-grass *Phalaris aquatic* and Annual Veldt Grass *Ehrharta longiflora*. Noxious weeds were also present comprising Paterson's Curse *Echium plantagineum* and St. John's Wort *Hypericum perforatum.*

EVC 47: Valley Grassy Forest is described as occurring under moderate rainfall regimes of 700 - 800mm per annum on fertile well-drained colluvial or alluvial soils on gently undulating lower slopes and valley floors. It occurs as an open forest to 20 m tall that may contain a variety of eucalypts, usually species which prefer more moist or more fertile conditions over a sparse shrub cover. In season, a rich array of herbs, lilies, grasses and sedges dominate the ground layer but at the drier end of the spectrum the ground layer may be sparse and slightly less diverse but with the moisture-loving species still remaining. (DEPI 2014c).

Valley Grassy Forest was poorly represented in Looping 7. All patches identified occurred between Vipond Road and Sanderson Road (**Appendix C3)**. Moderate to good quality vegetation was identified within habitat zone L7_58 at Sanderson Road (KP163.8). The canopy component at this

location was dominated by Blakely's Red Gum *Eucalyptus blakelyi* and the shrub layer was largely absent, represented by only a few individuals of Lightwood. The understorey was largely absent however indigenous species recorded include the state vulnerable Late-flower Flax-lily *Dianella tarda,* Black-anther Flax-lily *D. admixta,* Kangaroo Grass *Themeda triandra* and Tall Raspwort *Gonocarpus elatius.* Vegetation within this area supported a relatively high cover of weeds consisting mainly of exotic graminoids.

The vegetation at this location also qualifies as the Critically Endangered *EPBC Act* community: *White Box - Yellow Box - Blakeley's Red Gum Grassy Woodland and Derived Native Grassland*.

EVC 55_61: Plains Grassy Woodland is described as open, eucalypt woodland to 15m tall occurring on a number of geologies and soil types. It occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with <600mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present (DEPI 2014c).

Plains Grassy Woodland was poorly represented within Looping 7 with only two areas identified during the assessment. Moderate to good quality vegetation was recorded within Habitat Zone L7_19, KP134.24 (**Appendix C3**). The vegetation at this location supported all components of the EVC and was dominated by Grey Box. Indigenous species within the understorey included Rush *Juncus* spp., Common Swamp Wallaby-grass *Amphibromus nervosus,* Common Spike-sedge and Wallaby-grass *Rytidosperma* spp. Weed cover was low with none of these observed to be High threat.

EVC 56: Floodplain Riparian Woodland is described as an open eucalypt woodland or open forest to 20m tall over a medium to tall shrub layer with a ground layer consisting of amphibious and aquatic herbs and sedges. It occurs along the banks and floodplains of the larger meandering rivers and major creeks, often in conjunction with one or more floodplain wetland communities. Elevation and rainfall are relatively low and soils are fertile alluviums subject to periodic flooding and inundation (DEPI 2014c).

Good quality Floodplain Riparian Woodland vegetation was identified on the north side of the Ovens River (KP138.03) in Habitat Zone L7_36 (**Appendix C3**). The quality of vegetation was largely due to the connectivity within the landscape and a high cover of indigenous species comprising: Common Tussock Grass *Poa labillardieri,* Rushes, Swamp Dock *Rumex brownii,* Plains Sedge *Carex bichenoviana* and Water Ribbons *Triglochin procera.* A high cover of weeds was also present.

EVC 61: Box Ironbark Forest is described as occurring on gently undulating rises, low hills and peneplains on infertile, often stony soils derived from a range of geologies. The open overstorey to 20m tall consists of a variety of eucalypts, often including one of the Ironbark species. The mid storey often forms a dense to open small tree or shrub layer over an open ground layer ranging from a sparse to well-developed suite of herbs and grasses (DEPI 2014c).

Known occurrences of Box Ironbark Forest vegetation occur within the Chiltern - Mt Pilot National Park (DEPI 2014b). During the recent survey good quality vegetation occurred in and around the mid slopes where relatively large areas were identified. The extent of the vegetation covered the majority of the construction ROW area and was approximately 1km in length.

Vegetation which best represents good quality Box Ironbark Forest vegetation was located between KP175.5 and KP176.41 with Habitat Zone L7_76 scoring the highest (**Appendix C3**).

The vegetation was dominated by Red Ironbark, Yellow Box and Red Stringybark along with some scattered occurrences of Red Box and White Box. The shrub layer was diverse and high in cover comprising medium shrubs species such as Lightwood and other *Acacia* spp., Cherry Ballart *Exocarpos cupressiformis,* Black Cypress Pine *Callitris endlicheri.* Other medium and small shrubs

species included *Grevillea* spp., *Dillwynia* spp. and *Hibbertia* spp. Common herbs and forbs were also present throughout such as Sticky Everlasting, Cut-leaf Goodenia *Goodenia pinnatifida*, Tiger Orchid *Diuris sulphurea,* Red Beaks *Pyrorchis nigricans,* Dwarf Greenhood and Great Sun-orchid *Thelymitra aristata.* Tufted graminoids were also high in cover comprising Kangaroo Grass, Red-anther Wallaby grass, Grey Tussock Grass *Poa sieberiana* and Grass Trigger-plant *Stylidium graminifolium.*

Significant flora species observed included the state-vulnerable Late-Flower Flax-lily and the state rare species Western Golden-tip *Goodia medicaginea* and Small-leaf Bush-pea. Weed cover was generally low with low threat species only being recorded. High levels of litter and skeletal soils are likely to influence the generally low coverage of weedy exotic annual grasses. All vegetation associated with the Chiltern - Mt. Pilot National Park had a fittingly high Landscape Context Score. As previously mentioned LOTs were absent in most cases due to previous historical clearing.

EVC 67: Alluvial Terraces Herb-rich Woodland is described as open woodland to 15m tall on broad alluvial plains and along ephemeral drainage lines. Soils are generally poorly drained duplex soils with sandy loam overlying heavier clay subsoil. Understorey consists of few, if any shrubs, with the striking feature of this EVC being the high species-richness of the ground-layer and the low biomass of this cover, particularly in summer (DEPI 2014c).

Alluvial Terraces Herb-rich Woodland vegetation was identified at two locations near Indigo Creek (KP183 and KP183.45) (**Appendix C3)**. Both these patches were largely due to the overstorey and presence of LOTs dominated by Grey Box. All other components of the vegetation and lifeforms were practically absent.

EVC 68: Creekline Grassy Woodland is described as Eucalypt-dominated woodland to 15 metres tall with an occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. It occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds (DEPI 2014c).

Creekline Grassy Woodland vegetation was identified at a number of locations between KP118.2 and KP180 (**Appendix C3**). In most cases the remnants of this EVC was typically degraded within this looping. Good quality vegetation was identified within a drainage line within Habitat Zone L7_59 located at KP165.3. LOTs were comprised of Red Box and Blakely's Red Gum. The understorey was dominated by Tall Sedge *Carex appressa* accompanied by other common indigenous species including: Chocolate Lily *Arthropodium strictum,* Rough Spear Grass, Wallaby Grasses and Rushes.

EVC 80: Spring Soak Woodland is described as woodland with a predominantly herbaceous understorey incorporating occasional shrubs and a canopy to 10m tall. For the most part this vegetation attributable to this EVC occurs on granitic outwash soils and reliant on a perennial water supply (DEPI 2014c).

Spring Soak Woodland was identified at Habitat Zone L7_3 (KP120.5) (**Appendix C3)**. The vegetation within this area was good quality dominated by an indigenous canopy of Blakely's Red Gum. Understorey species included Rush Sedge *Carex tereticaulis,* Common Spike-sedge *Eleocharis acuta* and Cumbungi *Typha* spp.

EVC 175_61: Low Rises Grassy Woodland is described as a variable open eucalypt woodland to 15m tall or occasionally Sheoak woodland to 10m tall on more skeletal soils. The understorey includes a diverse ground layer of grasses and herbs while t\he shrub component is usually sparse. It

occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies (DEPI 2014c).

Low Rises Grassy Woodland vegetation was identified at six locations with the most representative occurring at Habitat Zone L7_6 (KP122.6) (**Appendix C3**). The canopy component was dominated by Red Stringybark *Eucalyptus macrorhyncha* and Blakely's Red Gum while Yellow Box and Grey Box were also present. The shrub layer was dominated Lightwood. The understorey supported a diverse array of herbs, forbs and indigenous grasses comprising Weeping Grass *Microlaena stipoides* var. *stipoides,* Yellow Rush-lily *Tricoryne elatior,* Austral Bluebell *Wahlenbergia stricta,* Common Woodruff *Asperula conferta* and Sun-orchids *Thelymitra* spp. All remaining areas were poor to low quality.

EVC 235: Plains Woodland / Herb-rich Gilgai Wetland Mosaic is described as an open woodland to 15 m tall on broad alluvial plains and along ephemeral drainage lines. Soils are generally poorly drained heavy clays which form distinctive "gilgai" crests and troughs in a fine-scale mosaic. The understorey consists of few, if any shrubs while the ground layer is made up of a combination of "dryland" herbs/grasses and amphibious herbs/grasses tolerant of seasonal inundation (DEPI 2014c).

Plains Grassy Woodland / Herb-rich Gilgai Wetland Mosaic was represented by areas supported by archetypal gilgai formations and the presence of species adapted to both wet and dry conditions, like Habitat Zones L7_11 (KP125) and L7_13 (KP125.8) (**Appendix C3**). Good quality vegetation and extent was well represented within Habitat Zone L7_11. The canopy component was dominated by River Red Gums. Indigenous understorey species comprised Bog Sedge *Schoenus apogon,* Common Spike-sedge, Knob Sedge *Carex inversa*, Common Blown-grass *Lachnagrostis filiformis,* Water Ribbons and Brown-backed Wallaby-grass in the wetter areas. The gilgai rises supported Chocolate Lily, Blue Devils *Eryngium ovinum* and Wallaby-grasses *Rytidosperma* spp.

EVC 295: Riverine Grassy Woodland is described as a occurring on the floodplain of major rivers, in a slightly elevated position where floods are infrequent, on deposited silts and sands, forming fertile alluvial soils. River Red Gum woodland to 20m tall with a groundlayer dominated by graminoids. Occasional tall shrubs present (DEPI 2014c).

Good quality Riverine Grassy Woodland vegetation was recorded within a small area associated with a tributary of the King River, Habitat Zone L7_28 located at KP135.75 (**Appendix C3)**. Only understorey species were present at this location and comprised Water-pepper *Persicaria hydropiper,* Small Loosestrife *Lythrum hyssopifolia,* Rush Sedge, Common Spike-sedge and Water Ribbons.

EVC 803: Plains Woodland is described as open eucalypt woodland to 15m tall occurring on a number of geologies and soil types. Occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with <600 mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present (DEPI 2014c).

All areas of Plains Woodland vegetation identified were consistent with the DELWP modelling. Small areas of Plains Woodland vegetation were located between KP144 and KP152 within roadsides. In most cases the understorey was not representative of the benchmark for Plains Woodland, however good quality vegetation was located at Habitat Zone L7_43 (KP146.7) near Ellen Lane (**Appendix C3)**.

EVC 813: Intermittent Swampy Woodland is described as eucalypt woodland to 15m tall with a variously shrubby and rhizomatous sedgy - turf grass understorey, at best development dominated by flood stimulated species in association with flora tolerant of inundation. Flooding is unreliable but extensive when it happens. It occupies low elevation areas on river terraces (mostly at the rear

of point-bar deposits or adjacent to major floodways) and lacustrine verges (where sometimes localised to narrow transitional bands). Soils often have a shallow sand layer over heavy and frequently slightly brackish soils (DEPI 2014c).

Intermittent Swampy Woodland was identified at only one location: Habitat Zone L7_61 (KP171.0) (**Appendix C3)**. Vegetation within this area was depauperate only supporting understorey species and a typical suite of weedy exotic grasses. Indigenous understorey species were sparse, dominated by Common Spike-sedge, along with Short-crown Spear-grass *Austrostipa curticoma* and Tall Sedge.

2.1.3 Scattered Indigenous Trees

Scattered indigenous trees would have once formed the canopy component of intact remnant vegetation but are now fragmented throughout the landscape as a result of clearing and intensive farming practices. Scattered trees present on the construction ROW were comprised Blakely's Red Gum, River Red Gum, Yellow Box, Grey Box, Red Box, Red Ironbark, Yellow Gum and Red Stringybark.

Scattered trees were supported by roadsides, creeklines and scattered throughout private land. A number of scattered trees were identified either on the construction ROW or near the edge of the construction ROW. These are discussed further in Section 2.2.3 below.

2.1.4 Planted Vegetation

Much of the construction ROW transects paddocks sown and/or colonised with exotic pasture and exotic weedy grasses utilised for cropping and grazing purposes.

Some areas support planted vegetation in the form of wind rows. Seven locations supported planted native vegetation and were assessed in accordance with the Framework comprising Box-Ironbark Forest (KP157.81, KP158.4 and KP158.7); Creekline Grassy Woodland (KP154.7) and Plains Woodland (KP151.4, KP151.9). These areas have been publicly funded requiring them to be offset for any vegetation losses (under Clause 52.17 of Victorian Planning Provisions).

2.1.5 Weeds

A total of twenty-four (24) species are considered High Threat weeds, including 18 listed as noxious weeds under the *CaLP Act* (**Appendix C2)** (DEPI 2014g). High Threat weed species are defined as those introduced species (including non-indigenous 'natives') with the ability to out-compete and substantially reduce one or more indigenous life forms in the longer term assuming on-going current site characteristics and disturbance regime (DSE 2004a).

The EVC benchmarks list typical weed species for the EVCs in the bioregion and provides an estimate of their 'invasiveness' and 'impact'. In general, those weed species considered to have a high impact are considered high threat regardless of their invasiveness (DSE 2004a).

Under the *CaLP Act*, landholders have a duty to prevent the growth and spread of regionally controlled weeds on their property and on adjoining roadsides and to eradicate regionally prohibited weeds. Declaration and management of weed issues within the catchment is undertaken by the relevant CMA.

The field surveys noted the prevalence of opportunistic weed infestations throughout the construction ROW and surrounding areas, particularly in agricultural properties and along creeklines. Some properties displayed a relatively high prevalence of weeds.

The list of declared noxious weeds are summarised in **Table C6.** Appropriate measures to manage the potential spread or introduction of weeds during construction will be included in the Construction Environment Management Plan (CEMP) to be prepared for the project.

Table C6: Declared Noxious Weed Species

Species Name	Common Name	Catchment	Declared Noxious Weed Status
Asparagus asparagoides	Bridal Creeper	NECMA	Restricted
Cirsium vulgare	Spear Thistle	NECMA	Regionally Controlled
Crataegus monogyna	Hawthorn	NECMA	Regionally Controlled
Echium plantagineum	Paterson's Curse	NECMA	Regionally Controlled
Genista monspessulana	Cape Broom	NECMA	Regionally Controlled
Hypericum perforatum	St. John's Wort	NECMA	Regionally Controlled
Juncus acutus	Spiny Rush	NECMA	Regionally Controlled
Marrubium vulgare	Horehound	NECMA	Regionally Controlled
Nassella neesiana	Chilean Needle Grass	NECMA	Restricted
Onopordum acanthium	Scotch Thistle	NECMA	Regionally Controlled
Opuntia spp	Prickly Pear	NECMA	Regionally Controlled
Oxalis pes-caprae	Soursob	NECMA	Restricted
Rosa rubiginosa	Sweet Briar	NECMA	Regionally Controlled
Rubus fruticosus	Blackberry	NECMA	Regionally Controlled
Salpichroa origanifolia	Pampas Lily of the Valley	NECMA	Regionally Controlled
Silybum marianum	Variegated Thistle	NECMA	Regionally Controlled
Verbascum thapsus	Great Mullein	NECMA	Regionally Controlled
Xanthium spinosa	Bathurst Burr	NECMA	Regionally Controlled

Many weed species not listed under the *CaLP Act* were also recorded along the construction ROW and are included in the flora lists contained in **Appendix C2**.

2.2 Permitted Clearing Assessment

The assessment to determine the implications along the construction ROW is based on the '*Permitted Clearing of Native Vegetation – Biodiversity assessment guidelines'* (DEPI 2013a). This involved an in-field habitat hectare and scattered tree assessment and, based on this data and the risk modelling undertaken by DELWP, the calculation of the risk based pathway and biodiversity equivalence score is used to inform implications should vegetation be removed (e.g. offsets). The risk-based pathway and the results of the habitat hectare and scattered tree assessment is summarised below.

2.2.1 Risk-based Pathway

Based on the DELWP modelling (DEPI 2014c), the location of the project and the amount of native vegetation that is likely to be impacted (≥ 1 hectare), Looping 7 is likely to fall under the 'High' risk-based pathway with the majority of the construction ROW within Location Risk A and some sections of the Chiltern - Mt. Pilot National Park Location Risk C. The risk-based pathway however will ultimately be determined by DELWP.

2.2.2 Habitat Hectare Assessment

Areas where the construction ROW intersects a remnant patch were reduced from 28m to generally 20m, except in Chiltern-Mt Pilot National Park where it has been reduced to 16.5m. This was undertaken to avoid and minimise impacts to native vegetation. A further seven patches are to be avoided completely due to HDD of infrastructure and waterways, totalling 0.56ha.

Following this reduction, the construction ROW supports approximately 11.5 hectares (5.1 Habitat hectares) of native vegetation within the *Victorian Riverina* and *Northern Inland Slopes* Bioregions, attributable to 15 EVCs.

Based on the discussion between the pipeline regulator and DELWP, as discussed in Section 4.2.6 of Part A, the habitat hectare assessments were filtered by the mentioned exemption to arrive at the final habitat hectare figures summarized in **Tables C7** and **C8** below.

The detailed results of the vegetation quality assessment and Habitat Hectare scores for each habitat zone and their KP locations are provided in **Appendix C3**.

Measures to avoid and minimise the impact on areas of remnant vegetation are outlined in **Section 5**.

Table C7: Summary of Habitat Hectare Assessments to be Offset

Bioregion	Ecological Vegetation Class (EVC)	Total Area (Ha)	Total Area (HabHa)
Northern Inland Slopes	20 Heathy Dry Forest	0.279	0.179
	22 Grassy Dry Forest	0.255	0.123
	47 Valley Grassy Forest	0.061	0.019
	61 Box Ironbark Forest	1.441	0.641
	68 Creekline Grassy Woodland	0.111	0.048
	175_61 Low-rises Grassy Woodland	0.048	0.022
	803 Plains Woodland	0.022	0.01
Victorian Riverina	67 Alluvial Terraces Herb-rich Woodland	0.02	0.07
	235 Plains Grassy Woodland Herb-rich Gilgai Wetland Mosaic	0.032	0.01
Total		**2.269**	**1.059**

Table C8: Summary of Habitat Hectare Assessments exempt from Offset

Bioregion	Ecological Vegetation Class (EVC)	Total Area (Ha)	Total Area (HabHa)
Northern Inland Slopes	47 Valley Grassy Forest	0.009	0.003
	803 Plains Woodland	0.039	0.017
	20 Heathy Dry Forest	0.979	0.589
	68 Creekline Grassy Woodland	0.400	0.124
	80 Spring Soak Woodland	0.048	0.031
	175_61 Low-rises Grassy Woodland	0.188	0.046
	61 Box Ironbark Forest	2.318	1.406
Victorian Riverina	68 Creekline Grassy Woodland	0.011	0.004
	55_61 Plains Grassy Woodland	0.094	0.034
	55_62 *Riverina* Plains Grassy Woodland	0.292	0.058
	56 Floodplain Riparian Woodland	0.853	0.238
	175_61 Low-rises Grassy Woodland	0.069	0.026
	235 Plains Grassy Woodland Herb-rich Gilgai Wetland Mosaic	2.565	1.015
	295 Riverine Grassy Woodland	0.345	0.098
	803 Plains Woodland	0.349	0.147
	67 Alluvial Terraces Herb-rich Woodland	0.051	0.019
	813 Intermittent Swampy Woodland	0.630	0.170
Total		**9.24**	**4.025**

2.2.3 Tree Assessment

As part of the Arborists assessment of Looping 7, all trees with a DBH of 40cm or more were tagged including scattered indigenous trees and those that occurred in patches. Trees less than 40cm DBH were considered as tree groups. In total there were 881 trees tagged, with a further 153 identified as having been planted, stags, undersized or outside the construction ROW along with 97 tree groups (Tree Logic, 2015b).

A total of 18 scattered indigenous trees have been initially identified as being impacted by construction works. The summary of these trees per modelled EVC is found in **Table C9.** A detailed tree summary can be found in the Arborist Assessment report (Tree Logic 2015b).

An assessment of impacts to the scattered indigenous trees was also undertaken with the arborist report outlining recommendations to avoid or minimise impacts to these trees. Indigenous trees that occur within a remnant patch of vegetation were also included in this report. Recommendations to avoid or minimise are summarised in **Section 5.**

Table C9: Summary of Scattered Indigenous Trees to be Impacted per EVC

Bioregion	Relevant EVC	VLOT	LOT	MT	ST	Total
Northern Inland Slopes	61 Box Ironbark Forest		1		1	**2**
	67 Alluvial Terraces Herb-rich Woodland				4	**4**
	72 Granitic Hills Woodland			1		**1**
	175_61 Low Rises Grassy Woodland		2	2	2	**6**
	803 Plains Woodland				1	**1**
Victorian Riverina	55 Plains Grassy Woodland			1		**1**
	240 Plains Grassy Woodland / Creekline Grassy Woodland/Wetland Formation Mosaic	1		1		**2**
	1040 Riverine Grassy Woodland/Riverine Swampy Woodland Mosaic				1	**1**
Totals						**18**

2.3 Targeted Surveys for Threatened Flora & Vegetation Communities

The construction ROW has been subject to significant disturbance from rural development with there being minimal areas of undisturbed native groundcover present, except within the boundaries of Chiltern - Mt. Pilot National Park.

The majority of the construction ROW represents limited colonisation opportunity for native flora. Weed colonisation is likely to continue to be problematic due to current land use practices in direct competition with native plant species.

However, remnant native vegetation has been identified within the construction ROW at a number of locations and a number of threatened flora species and vegetation communities are considered to have the potential to occur in some areas along the construction ROW (**Appendix C4** and **C6a**). An assessment of threatened species and communities and their "Likelihood of Occurrence" is found in **Appendix C5a**.

2.3.1 Targeted Surveys for Threatened Flora

The majority of the construction ROW is located within a region that is heavily disturbed. The local flora has therefore been significantly impacted by previous development and the few remnants may form important refuges for once widespread species. Moderate to good quality habitat, however, does occur for some listed species, in particular within areas that intersect the Chiltern - Mt. Pilot National Park.

A search of the PMST and the VBA was conducted for the local area surrounding the construction ROW with a five kilometre buffer to obtain a species profile from modelling or existing records (**Appendix C4** and **C5a** respectively).

Seven EPBC Act and nine FFG Act listed flora species have previously been recorded within the local area (within 5 kilometres of the construction ROW) (DEPI 2014h), and are summarised in **Table C10**. An additional 31 species listed on the DELWP *Advisory List of Rare or Threatened Plants in Victoria* (DEPI 2014d) ('DELWP Flora Advisory List') have also have previously been recorded within the local area (within five kilometres of the construction ROW). Two nationally significant species, not previously documented within the local area, also have habitat potentially occurring within the vicinity of the construction ROW (DoE 2015a).

A description for each listed flora species with the potential to occur, their habitat preference and specific flowering time is presented in **Appendix C6**.

Table C10: Summary of Threatened Flora Species Recorded within 5km of the Construction ROW

Scientific Name	Common Name	Most Recent Year (VBA)	Status (DoE/FFG/DELWP)
Acacia deanei subsp. *deanei*	Deane's wattle	2006	-/Listed/Endangered
Acianthus collinus	Hooded Mosquito-orchid	2005	-/Listed/Vulnerable
Allocasuarina luehmannii	Buloke	1981	-/Listed/-
Austrodanthonia richardsonii	Straw Wallaby-grass	1935	-/-/Vulnerable
Brachyscome aff. *formosa* entity 2	Narrow-wing Daisy	1987	-/-/Poorly known
Brachyscome gracilis	Dookie Daisy	2000	-/Listed/Vulnerable
Caesia parviflora var. *vittata*	Pale Grass-lily	1994	-/-/Poorly known
Caladenia concolor	Crimson Spider-orchid	2006	Vulnerable/Listed/Endangered
Cassinia ozothamnoides	Cottony Cassinia	1992	-/-/Vulnerable
Chloris ventricosa	Plump Windmill Grass	1925	-/-/Vulnerable
Convolvulus angustissimus subsp. *omnigracilis*	Slender Bindweed	2003	-/-/Poorly known
Desmodium varians	Slender Tick-trefoil	2007	-/-/Poorly known
Digitaria divaricatissima	Umbrella Grass	1995	-/-/Vulnerable
Dipodium hamiltonianum	Yellow Hyacinth-orchid	2004	-/Listed/Endangered
Diuris punctata var. *punctata*	Purple Diuris	2009	-/Listed/Vulnerable
Eucalyptus cadens	Warby Range Swamp-gum	2007	Vulnerable/Listed/Vulnerable
Eucalyptus sideroxylon s.s.	Mugga	2008	-/-/Rare
Fimbristylis aestivalis	Summer Fringe-sedge	1964	-/-/Poorly known
Fimbristylis dichotoma	Common Fringe-sedge	1992	-/-/Vulnerable
Gonocarpus micranthus subsp. *ramosissimus*	Branching Raspwort	2001	-/-/Poorly known
Goodenia macbarronii	Narrow Goodenia	2007	Vulnerable/Listed/Vulnerable
Indigofera adesmiifolia	Tick Indigo	2005	-/-/Vulnerable
Isoetes pusilla	Small Quillwort	1979	-/Listed/Endangered
Isolepis congrua	Slender Club-sedge	1996	-/Listed/Vulnerable
Lipocarpha microcephala	Button Rush	1994	-/-/Vulnerable
Pterostylis bicolor	Black-tip Greenhood	2006	-/-/Poorly known
Pultenaea foliolosa	Small-leaf Bush-pea	2004	-/-/Rare
Santalum leptocladum	Southern Sandalwood	2001	-/Listed/Endangered
Senecio garlandii	Woolly Ragwort	2005	Vulnerable/Listed/Endangered
Swainsona murrayana	Slender Darling-pea	1897	Vulnerable/Listed/Endangered
Swainsona recta	Mountain Swainson-pea	2001	Vulnerable/Listed/Endangered

Scientific Name	Common Name	Most Recent Year (VBA)	Status (DoE/FFG/DELWP)
Protected Matters Search Tool			
Amphibromus fluitans	River Swamp Wallaby-grass	2006	Vulnerable /-/-
Caladenia cremna	Don's Spider Orchid	n/a	Critically Endangered / Listed / Endangered
Glycine latrobeana	Clover Glycine	n/a	Vulnerable/Listed/Vulnerable

Targeted surveys were undertaken during the optimal flowering time in spring 2013 and winter 2014 for each species focusing on Chiltern - Mt. Pilot National Park and all other remaining areas that support moderate to good quality habitat and a moderate to high likelihood of occurrence.

No nationally significant flora species were recorded during any of the targeted surveys and therefore any nationally listed flora species are unlikely that occur within the construction ROW.

One State listed species was recorded, from a plantation, during the recent assessment and three species listed on the DELWP Flora Advisory List were also recorded during the recent assessment. Species recorded and location descriptions and threatened species status is listed in **Table C11**.

Table C11: Threatened flora species recorded during surveys

Scientific Name	Common Name	Survey Findings (and approx KP)
Allocasuarina luehmannii	Buloke	Plantation - 250m north of Moores Bridge Road (154.61)
Dianella tarda	Late-flower Flax-lily	A few individual plants at Murray to Mountains Rail Trail/Bowser-Londrigan Lane (144.45 – 144.49)
		A few individual plants at Byawatha Rd (145.54)
		Six plants at Ellen Lane (146.87)
		Several plants at Sandersons Road (163.8)
		Chiltern - Mt. Pilot NP (176.3)
		Chiltern - Mt. Pilot NP (60m w Pipeline Track) (176.6)
		Chiltern - Mt. Pilot NP (178.2)
Goodia medicaginea	Western Golden-tip	Approximately 8 plants at Chiltern - Mt. Pilot NP (177.0)
Pultenaea foliolosa	Small-leaf Bush-pea	Populations in Chiltern - Mt. Pilot NP (175.1, 175.3, 175.5)
		Large population in Chiltern - Mt. Pilot NP (177.95)
		Individuals in Chiltern - Mt. Pilot NP (178.2)

No other state significant flora species were recorded during the field assessment. However, a total of 33 flora species recorded are members of plant families and genera that are considered protected on Crown Land under the FFG Act (DEPI 2014i). They include members of the following plant families:

- Asteraceae - Daisies - all species
- Epacridaceae - Heaths - all species
- Orchidaceae - Orchids - all species
- Pteridophyta - All clubmosses, ferns and fern allies, excluding *Pteridium esculentum* - Austral Bracken

Members of the following genera are protected and were also recorded during the recent assessment:

- *Acacia* - Wattles - excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon, Acacia paradoxa*
- *Gompholobium* - Wedge-peas - all species
- *Grevillea* - Grevilleas - all species
- *Stylidium* - Trigger-plants - all species
- *Xanthorrhoea* - Grass-trees - all species

Species recorded within the construction ROW and protected under the FFG Act are highlighted in **Appendix C2.**

2.3.2 Targeted Surveys for Threatened Vegetation Communities

EPBC Act listed Communities

Four vegetation communities listed under the EPBC Act have the potential to occur within the construction ROW and are listed in **Table C12** (DoE 2015a).

Due to the quality of the vegetation identified during the assessments two of the listed communities were identified as occurring within the construction ROW. These are *'Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia'* (listed as Endangered) and *'White Box - Yellow Box - Blakely's Red Gum Grassy Woodlands and derived native grasslands'* (listed as Critically Endangered). Detailed descriptions of these listed vegetation communities are presented in Part A.

Table C12: Threatened EPBC Act Communities potentially occurring along the Construction ROW

Community	Status	Recorded within ROW	Total area within ROW (Ha)	Location (KP)	Habitat Zone
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	No	N/A		N/A
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Yes	0.094	123.6	L7_8
				124.6	L7_9
Natural Grasslands of the Murray Valley Plains	Critically Endangered	No	N/A		N/A
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Yes	0.11	163.8	L7_58
				165.3	L7_59

Vegetation at these locations qualified as the listed community largely due to comprising more than 10% cover indigenous perennial grass species, the patch size and the number of indigenous trees per hectare thereby meeting the recommended thresholds for the listed community (TSSC 2010).

These patches are only portions of much larger patches of the community intersected by the construction ROW. Only small portions of each patch are likely to be impacted and a number of measures will be taken to minimise impacts further. In particular, management measures are likely to focus on the retention of as many mature trees as possible.

FFG Act listed Communities

Three vegetation communities listed under the FFG Act also have the potential to occur, on Crown Land, within the construction ROW according to the DELWP modelling, and are listed in (DEPI 2014c).

Table C13: Threatened FFG Act Listed Communities along the Construction ROW

Community	Associated EVC	Recorded within ROW
Grey Box - Buloke Grassy Woodland Community	55_61 Plains Grassy Woodland 55_62 *Riverina* Plains Grassy Woodland	No
Northern Plains Grassland Community	55_61 Plains Grassy Woodland 55_62 *Riverina* Plains Grassy Woodland	No
Creekline Grassy Woodland (Goldfields) Community	68 Creekline Grassy Woodland	No

It must be noted that implications in terms of the FFG Act only apply to areas located on Crown Land i.e. roadsides, reserves and designated waterways.

No remnant patches of EVC 55_61 Plains Grassy Woodland and EVC 55_62 *Riverina* Plains Grassy Woodland identified in **Appendix C3**, qualify as the FFG Act Listed '*Grey Box - Buloke Grassy Woodland Community'*. This is largely due to the absence of Buloke which is described in the listing advice as the lower stratum for this community (DEPI 2013b). The only vegetation where Buloke was recorded was located at KP154.61 (see **Table C11**) and was identified as occurring within a planted patch of vegetation and therefore does not qualify as '*Grey Box - Buloke Grassy Woodland Community'* in this instance.

'Northern Plains Grassland Community', as described in the listing advice for the community extends from extends from Echuca in the east to the Patho Plains near the Loddon River in the west (DEPI 2013b). This occurrence is approximately 200km north-west of Looping 7 and therefore considered not occur.

No areas of vegetation qualify as the FFG Act Listed *'Creekline Grassy Woodland (Goldfields) Community'* due to lack of representative species as described in the listing advice for the community (DEPI 2013b).

3 FAUNA ASSESSMENT

A total of 109 terrestrial fauna species comprising seven mammals (five native and two introduced), 94 birds (92 native and two introduced), four reptiles and four frogs were recorded along the entire project construction ROW (**Appendix C8**) and adjacent land. There were also 12 aquatic species recorded, being ten species of fish of which six species were native, and two species of crustacean including the Murray Spiny Crayfish from these waterways (**Appendix B11**).

The majority of the species recorded are common species in Victoria. However, a total of 16 species that are listed on the EPBC Act, FFG Act, the DELWP *Advisory List of Threatened Invertebrate Fauna in Victoria* ('DELWP Invertebrate Advisory List') (DSE 2009) or the DELWP *Advisory List of Threatened Vertebrate Fauna in Victoria* ('DELWP Fauna Advisory List') (DSE 2013), were identified within or adjacent to the construction ROW. A summary of the results are given below and detailed results are presented in **Appendix C8**.

3.1 Habitat Types and Significance

The local area is considered to currently support four broad habitat types: introduced grassland/pasture with occasional remnant native species, remnant patches of native woodland and scattered trees, substantial native forest and aquatic/riparian habitats provided by watercourses and farm dams.

3.1.1 Open Farmland

The construction ROW is located in a region dominated by open pasture subject to heavy grazing. The vegetation in these areas contains very little middle canopy cover and groundcover is mostly made up of introduced grass species that are either grazed or cropped while other parts were also ploughed. Large trees are often left in these areas to provide shade for stock. These trees are largely scattered throughout the landscape and may provide roosting and nesting sites for some hollow-dependent fauna. Logs and other potential surface habitats typical of the region were almost entirely absent from the construction ROW. As a result, introduced grassland/pasture is generally considered of low habitat value for most native fauna, especially in the absence of large trees.

3.1.2 Woodland

Many areas of woodland were identified within the construction ROW of this looping section. Remnants of the original Plains Woodland, Grassy Woodland, Floodplain Riparian Woodland and Creekline Grassy Woodland, amongst others, were identified mostly along roadsides or water courses respectively.

Generally, the roadsides contained higher quality woodland vegetation than that found scattered through individual properties.

Roadsides within the GBCMA and the Rural City of Wangaratta have been identified as having a level of conservation significance as they provide corridors of remnant woodland that connect to larger areas of native woodland in the area. These woodland corridors have been identified as important habitat for native fauna such as the Grey-crowned Babbler and Squirrel Glider (Rural City of Wangaratta 2000). Within the NECMA, remnant native vegetation along roadsides is also identified as playing an important role in the movement and migration of native fauna (North East CMA 2013).

3.1.3 Native Forests

A substantial amount of native forest, primarily Box Ironbark and Heathy Dry Forests, occur around Chiltern, at the upper end of the construction ROW. Most of this forest is preserved in the Chiltern - Mt. Pilot National Park, while small amounts occur on properties adjoining the national park. Over half of all threatened species recorded within 5km of the construction ROW have been recorded from the national park, making it a very significant area.

3.1.4 Watercourses and Dams

The construction ROW traverses two major rivers (King and Ovens Rivers), a number of significant creeks (including 15 Mile and Indigo Creeks) and another ten creeks along with many minor drainage lines. There are also a number of farm dams near the construction ROW as well as a few permanent and ephemeral wetlands.

The riparian margins of the larger creeks in the vicinity of the construction ROW include River Red Gums representative of the overstorey vegetation that originally occupied the area. The understorey vegetation ranged from good quality native vegetation to one almost completely dominated by exotic species within the construction ROW. These waterways have been identified as important corridors for habitat and dispersal of native fauna.

The minor creeks and drainage lines are generally ephemeral watercourses that lack significant water for most of the year but were often holding water at the time of the inspection due to good rainfall in the preceding months. Habitat elements such as surface cover, overhanging riparian vegetation (indigenous or otherwise), indigenous embankment vegetation and in-stream snags are absent within some drainage lines on the plains. These areas are considered to be of low to moderate habitat value but may provide dispersal opportunities for smaller fauna such as amphibians into other habitat areas.

Most of the dams and wetlands identified during the surveys are similarly subject to climatic factors and may therefore provide only limited habitat value within the warmer months. Those dams that are on the construction ROW and are influenced by overland river and creek flow can be important refuges for aquatic fauna that are normally found in creeks and rivers, yet because of overland flow can be trapped in a dam when waters recede, including those dams that have very little native riparian vegetation. A case in point was a dam in Looping 2 which contained native fish.

In forming conclusions on the likelihood of a species occurrence in the area and the potential impact from construction, the following general considerations were taken into account (other species specific considerations may apply): areas devoid of remnant native vegetation, such as agricultural paddocks, are generally considered to have few if any ecological values and are usually of negligible significance for threatened native fauna. Species richness or diversity is relatively limited within these areas.

3.2 Targeted Surveys for Threatened Fauna and Fauna Communities

A search of the VBA was conducted of the local area surrounding the construction ROW with a five kilometre buffer to obtain a species profile from existing records maintained by DELWP (DEPI 2014b). The database has a total of 335 species recorded for the local area comprised of: seven fish, ten amphibians, 26 reptiles, 258 birds and 34 mammal species. Of these, 24 introduced species were listed for the search area.

A search was also conducted in relation to EPBC Act listed species that may occur in the local area of the construction ROW utilising the PMST (DoE 2015a) with a buffer of five kilometres. The results of the search are provided in **Appendix C4**.

From these results, a total of 55 listed species with Commonwealth or State significance have been reported in the local area while another nine species listed under the EPBC Act are considered to be potentially present in the area. An additional 21 species recorded in the local area have been listed under the DELWP Fauna Advisory List (DSE 2013) as Endangered or Vulnerable in Victoria. Refer to **Appendix C5b** for a summary of the significant fauna species that have been identified as either occurring or potentially occurring in the local area.

A combined total of 37 sites within the construction ROW and adjacent areas were surveyed by qualified and experienced zoologists and ecologists from October 2013 to January 2014. Winter surveys for Regent Honeyeater and Swift Parrot were undertaken in late June and early July 2014, while surveys for Brown Toadlet *Pseudophryne bibronii* were conducted in autumn 2015. These fauna surveys took the form of diurnal surveys for birds and reptiles, nocturnal surveys for mammals, birds and frogs. All species observed or heard were recorded **Appendix C8**. Opportunistic sightings of threatened species during other fieldwork were also recorded. Chiltern - Mt. Pilot National Park was not surveyed for fauna as threatened species presence has been assumed based on existing information sources for the park including data gathered for Park Management, VBA and personal records, sightings from Birding-Aus, Birdline Victoria and other sources.

The threatened species targeted for surveys due to their moderate or high likelihood of occurrence in the local area are summarised in **Table C14** (refer to **Appendix C5b** for a complete listing of species assessed for their "Likelihood of Occurrence" in the area).

Table C14: Summary of Threatened Fauna Species Likely to Occur

Common Name	Scientific Name	Status (DoE / FFG / DELWP)	Likelihood of Occurrence
Murray Spiny Crayfish	*Euastacus armatus*	-/Listed/Near Threatened	High
Murray Cod	*Maccullochella peelii peelii*	Vulnerable/Listed/Vulnerable	High
Brown Toadlet	*Pseudophryne bibronii*	-/Listed/Endangered	Moderate
Growling Grass Frog	*Litoria raniformis*	Vulnerable/Listed/Endangered	Low
Carpet Python	*Morelia spilota metcalfei*	-/Listed/Endangered	Moderate
Common Bearded Dragon	*Pogona barbata*	-/-/Vulnerable	High
Lace Monitor	*Varanus varius*	-/-/Endangered	High
Barking Owl	*Ninox connivens connivens*	-/Listed/Endangered	High
Black Falcon	*Falco subniger*	-/-/Vulnerable	Moderate
Blue-billed Duck	*Oxyura australis*	-/Listed/Endangered	High
Brolga	*Grus rubicunda*	-/Listed/Vulnerable	High
Bush Stone-curlew	*Burhinus grallarius*	-/Listed/Endangered	Moderate
Cattle Egret	*Ardea ibis*	C,J*/-/-	High
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	-/Listed/Vulnerable	High
Diamond Firetail	*Stagonopleura guttata*	-/Listed/Near threatened	High
Eastern Great Egret	*Ardea modesta*	J*/Listed/Vulnerable	High
Glossy Ibis	*Plegadis falcinellus*	A2S*/-/Near Threatened	Moderate
Grey Goshawk	*Accipiter n. novaehollandiae*	-/Listed/Vulnerable	Moderate
Grey-crowned Babbler	*Pomatostomus t. temporalis*	-/Listed/Endangered	High

Common Name	Scientific Name	Status (DoE / FFG / DELWP)	Likelihood of Occurrence
Hardhead	*Aythya australis*	-/-/Vulnerable	High
Hooded Robin	*Melanodryas cucullata cucullata*	-/Listed/Near threatened	Moderate
Intermediate Egret	*Ardea intermedia*	-/Listed/Endangered	Moderate
Latham's Snipe	*Gallinago hardwickii*	A2H, J,R*/Nominated/Near Threatened	High
Little Egret	*Egretta garzetta nigripes*	-/Listed/Endangered	Moderate
Painted Honeyeater	*Grantiella picta*	Vulnerable/Listed/Vulnerable	High
Rainbow Bee-eater	*Merops ornatus*	JAMBA/-/-	Moderate
Regent Honeyeater	*Anthochaera phrygia*	Critically Endangered / Listed / Critically Endangered	High"
Satin Flycatcher	*Myiagra cyanoleuca*	A2H*/-/-	Moderate
Speckled Warbler	*Chthonicola sagittatus*	-/Listed/Vulnerable	High
Square-tailed Kite	*Lophoictinia isura*	-/Listed/Vulnerable	High
Swift Parrot	*Lathamus discolor*	Endangered/Listed/Endangered	High"
Turquoise Parrot	*Neophema pulchella*	-/Listed/Near threatened	High
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	marine/Listed/Vulnerable	High
White-throated Needletail	*Hirundapus caudacutus*	C,J,R*/-/Vulnerable	High
Brush-tailed Phascogale	*Phascogale t. tapoatafa*	-/Listed/Vulnerable	High
Squirrel Glider	*Petaurus norfolcensis*	-/Listed/Endangered	High

* - CAMBA/JAMBA/ROKAMBA/A2H/A2S - international migratory bird treaties.
" - Only "High" if work is undertaken during autumn, winter otherwise "Negligible".

Aquatic surveys were also undertaken on the larger waterways that are currently planned to be crossed. After discussion with Hume DEPI staff regarding fish and aquatic invertebrates, it was noted that known populations of threatened species occurred upstream, in some cases several kilometres, of the construction ROW (Smith 2013 pers.comm). These six site surveys were undertaken November 2014 by qualified aquatic ecologists. The aquatic assessment report is provided in Appendix B11.

Threatened species descriptions including status, habitat and ecology and distribution for each of the above species can be found in **Appendix C7.**

All surveys were based on guidelines prepared by DoE or those requirements found in the Biodiversity Precinct Structure Planning Kit ('BPSP') (DSE 2010) and Survey guidelines for Australia's threatened birds (DEWHA 2010). Although the BPSP is directed at the urban growth area of Melbourne, it provides a clear set of survey methodologies for threatened fauna including a number of species targeted by Monarc's surveys. These were undertaken in the season appropriate to the subject species. The survey locations for threatened fauna are summarised below in **Table C15.**

Table C15: Summary of Locations and Fauna Surveys Undertaken

Location	KP	Survey Type				
		Diurnal	Nocturnal	Aquatic	Toadlet	GGF
Upper Taminick Road	119.31	√&	√			
Farm Dam (property T119-7-384)	119.87					√
Old Hume Highway, Glenrowan	121.4 – 122.0	√&	√			
Dundas Road	123.6	√&	√			
Greens Road	124.58	√&	√			
15 Mile Creek	125.7	√	√	√	√	√
One Mile Creek	132.15	√	√			√
Laceby-Targoora Road	134.25	√	√			
King River	135.1			√		
King River to Yanko Creek (properties T119-7-440 to T119-7-445)	135.1 – 137.3	√				√
Yanko Creek	137.3			√		
Ovens River	138.03			√		
Reedy Creek	140.1	√	√		√	√
Bowser-Londrigan Lane (Murray to Mountains Rail Trail)	144.45 - 144.49	√&	√			
Clear Creek Road	145.1	√	√			
Bells Lane	145.4	√&	√			
Byawatha Road	145.6	√&	√			
Ellen Lane	146.9	√&	√			
Morrison Road	148.0	√	√			
T-119-7-483 (Red Gum plantation)	149.45 – 150.2	√	√			
Daddah Daddah Creek	158.91	√	√		√	
Vipond Road	160.39	√	√			
Diddah Diddah Creek tributary	163.4	√&	√		√	
Sandersons Road	163.77	√&	√			
Chiltern Valley Road	170.7	√	√			
Government Road	171.2	√	√			
Black Dog Creek	172.7		√	√	√	
Box Tree Lane	173.15	√&				
Chiltern – Rutherglen Road	174.07		√			
Chiltern - Mt. Pilot NP	175.0 -175.7	&				
Dooley Property (T119-7-537)	175.7 – 176.0	√&				
Chiltern – Howlong Road	176.0		√			
Chiltern - Mt. Pilot NP	176.4 – 178.85	&				
Stockyard Creek	180.4	√&	√		√	

Location	KP	Survey Type				
		Diurnal	Nocturnal	Aquatic	Toadlet	GGF
Rileys Road	180.8	✓&	✓			✓
Fryingpan Creek	183.05	✓	✓			
Indigo Creek	183.45		✓	✓	✓	

✓& represents both spring-summer and winter bird surveys, respectively

FFG Act listed Communities

Two fauna communities listed under the FFG Act also have the potential to occur, on Crown Land, within the construction ROW according to the FFG Act – Characteristics of Threatened Communities (DEPI 2013b), and are listed in **Table C16**.

Table C16: Summary of Threatened Fauna Communities Likely to Occur

Community	Associated Areas	Recorded within ROW
Lowland Riverine Fish Community of the southern Murray-Darling Basin	Ovens and Goulburn Rivers and associated floodplains	Yes
Victorian Temperate Woodland Bird Community	Chiltern - Mt. Pilot National Park and adjacent wooded private property	Yes

It must be noted that implications in terms of the FFG Act only apply to areas located on Crown Land i.e. roadsides, reserves and designated waterways.

The *Lowland Riverine Fish Community of the southern Murray-Darling Basin* is characteristic of the geographical area that defines its distribution - the lowland river reaches and associated floodplains of the Murray River tributaries in Victoria that drain the northern slopes of the Great Dividing Range and by a selected suite of native fish taxa that is typical of and largely restricted to the area. It specifically mentions both the Goulburn and Ovens Rivers as major streams (sic) of this threatened community (DEPI 2013b).

Due to the suite of birds listed as part of the *Victorian Temperate Woodland Bird Community*, Chiltern - Mt. Pilot National Park is believed to fit this FFG Act listed community. While there are no set criteria as such, this determination has been based on the list of species identified in the park Management Plan (Parks Victoria 2008).

3.3 Results of Targeted Surveys

Of the targeted species surveyed for, 18 species were observed during the 205 separate surveys across the 37 sites surveyed. The locations that these species were recorded are summarised in **Table C17** below and a full species list of fauna recorded at each location can be found in **Appendix C8**. Targeted surveys for Growling Grass Frog were undertaken in December 2013. Whilst no individuals of the species were recorded during the surveys, bioclimatic data are included in **Appendix C9.**

Note that as discussed in Part A, species that are listed as near threatened are not considered to be at the same level of risk as higher categories of threat (vulnerable, endangered or critically endangered). Therefore, these species are not discussed in this report.

Table C17: Findings of Fauna Surveys

Species	Survey findings (and approx KP)
Murray Spiny Crayfish	• Two individuals caught during aquatic surveys of the Ovens River (138.03)
Murray Cod	• Three individuals caught during aquatic surveys of Yanko Creek (137.3) • Two individuals caught during aquatic surveys of the Ovens River (138.03)
Lace Monitor	• There was one sighting of a Lace Monitor on the construction ROW at Sanderson Road (163.77)
Black-chinned Honeyeater	• Birds were recorded at 15 Mile Creek (125.7) on one occasion • Birds were recorded in shelter belts just north of Cluggs Road (KP157.8) • Both surveys at Box Tree Lane (173.15) recorded at least one individual
Diamond Firetail	• Individuals were recorded in the red gum plantation (property number T-119-7-483) on Carraragarmungee Estate Road (149.45 - 150.2) • Birds were also recorded on fences at Stockyard Creek (180.4) and Riley's Road (180.8).
Eastern Great Egret	• One bird was recorded from billabongs between King River and Yanko Creek (135.52 approx)
Grey-crowned Babbler	• 5 babblers actively nest building were observed at Reedy Creek (140.1) • Nests of Grey-crowned Babbler were observed at Morrison Road (148.0).
Latham's Snipe	• Six birds were flushed from a drying billabong between King River and Yanko Creek (135.45 approx).
Painted Honeyeater	• Birds were recorded between the Chiltern - Mt. Pilot NP (KP175.6) and property (T-119-7-537) (176.0).
Rainbow Bee-eater	• Laceby-Targoora Road (134.25), • Diddah Diddah Creek tributary (163.4), • Stockyard Creek (180.4).
Regent Honeyeater	• One bird was observed 2.5km from the construction ROW, on Rileys Road, within Chiltern - Mt. Pilot NP (Ryans Road). This site was used as a reference site for the Regent Honeyeater surveys being carried out at the time.
Speckled Warbler	• One bird was observed adjacent to the ROW (121.2) on Glengarry Lane, Glenrowan
White-throated Needletail	• Needletails were observed flying over Riley's Road (180.8).
Squirrel Glider	• Three individuals observed during the two nocturnal surveys at Upper Taminick Road (119.31) • One individual observed 15 Mile Creek (125.7) • A glider was observed at Reedy Creek (140.1) • An individual observed on Government Road (171.2) • An individual observed on Chiltern - Rutherglen Road (174.07), on both occasions. • Three individuals observed during the two nocturnal surveys at Chiltern - Howlong Road (176.0) • One glider was observed at Stockyard Creek (180.4) • Two gliders were observed on Rileys Road (180.8) • An individual observed on Frying Pan Creek (183.4)

These species are discussed below.

Murray Spiny Crayfish

Two individuals were recorded during the aquatic surveys of this looping. Both were recorded from the Ovens River (KP138.03), south-east of Wangaratta. The Ovens River is a major part of a network of waterways and billabongs that includes the King Rivers (KP135.1) and Yanko Creek that converge at Wangaratta. The presence of these crayfish in the Ovens River could also indicate their possible distribution in these other waterways that the construction ROW traverses.

Murray Cod

Murray Cod were caught in both the Yanko Creek (KP137.3) and Ovens River (KP138.03) during the aquatic surveys. The presence of these Murray Cod in these waterways could also indicate their possible distribution in other waterways and billabongs that the construction ROW traverses in this area near Wangaratta, given that they all flow into the Ovens, downstream of the construction ROW.

Lace Monitor

There was only one Lace Monitor recorded on the construction ROW, where the construction ROW crosses Sanderson Road (KP163.77), near the corner of Rocky Creek Road. Another sighting was west of this record, on Sanderson Road towards Vipond Road, approximately 800m north of the construction ROW, at its closest point.

Diamond Firetail

Diamond Firetails were recorded at three sites, one at a red gum plantation on Carraragarmungee Estate Road (KP149.45 to KP150.2) and the others at Stockyard Creek (KP180.4) and Riley's Road (KP180.8) on the eastern side of Chiltern - Mt. Pilot National Park.

Diamond Firetails have been recorded from the Red Gum plantation in the past (DELWP 2015). The two sightings at Stockyard Creek and Riley's Road are presumed to be the same population as these sites are adjacent. Young birds were also observed along Riley's Road during flora surveys in early November of the same year (2013).

Eastern Great Egret

A single bird was observed during the flora surveys feeding in a billabong next to the construction ROW, between the King River and Yanko Creek at approximately KP135.52.

As the construction ROW does not pass through any habitat of significance for this species, the impact of this project on this species will be negligible, especially if the billabongs are dry at the time of construction.

Grey-crowned Babbler

This species was recorded at two locations in separate areas, the first being around Reedy Creek (KP140.1) on the northern outskirts of Wangaratta and the second being along Morrison Road (KP148.0).

At the first site, birds were observed actively nest-building. It was presumed that these nests would be used for roosting given the time of year. While at Morrison Road their distinctive stick nests were found in saplings on the planned construction ROW.

Morrison Road is recognised as a roadside with "High Conservation Value" for Grey-crowned Babblers (Rural City of Wangaratta 2000).

Latham's Snipe

Six bird species were observed during the flora surveys feeding in a drying billabong next to the construction ROW, between the King River and Yanko Creek at approximately KP135.3.

As the construction ROW does not pass through any habitat of significance for this species, and these birds are nomadic searching out suitable muddy habitats, the impact of this project on this species will be negligible especially if the billabongs are dry at the time of construction.

Painted Honeyeater

Male honeyeaters were observed during the flora surveys in November 2013 within the Chiltern - Mt. Pilot National Park (KP175.6) and on private property (T-119-7-537, KP176.0) adjacent to park.

It is most likely that Painted Honeyeaters will occur in other parts of the national park during spring and summer wherever mistletoes are fruiting.

Rainbow Bee-eater

Rainbow Bee-eaters, an EPBC Act listed migratory species, were seen in three locations Laceby-Targoora Road (KP134.25), Diddah Diddah Creek (KP163.4) and Stockyard Creek (KP180.4). The creeks may provide suitable habitat for these birds to nest as they excavate their nest in creek banks. There were no nest cavities observed in the construction ROW during the surveys but it seemed likely that they were nesting somewhere nearby.

Based on personal observations from Loopings 2 and 4, Rainbow Bee-eaters may also excavate burrows into topsoil piles following the clear and grade operations.

Regent Honeyeater

No Regent Honeyeaters were observed during the targeted winter surveys of the construction ROW in 2014 in this looping. Following the reporting of a Regent Honeyeater in Chiltern - Mt. Pilot National Park, on various internet sources, the opportunity was taken to observe this bird as a "reference". The location of this bird, on Ryan's Road, was approximately 2.5km from the construction ROW at its nearest point.

Due to the possibility of Regent Honeyeaters nesting anywhere in the national park between August and October (Ingwersen 2015, *pers. comm.*) mitigation measures will be recommended in section 5.

Speckled Warbler

One bird was observed feeding in the road reserve, adjacent to KP121.2, between the construction ROW and Glengarry Lane, Glenrowan. The road reserve has more suitable habitat as the ROW in this location is a cleared paddock.

White-throated Needletail

Birds were observed flying over Riley's Road (KP180.8) during the late afternoon survey.

Given that these birds are aerial specialists, the construction ROW does not pass through any habitat of significance for this species therefore the impact of this project on this species will be negligible.

Squirrel Glider

Squirrel Gliders were recorded at nine locations across the entire looping, however there was a gap in observations between Glenrowan and Chiltern, except around Wangaratta itself. This gap in observations is consistent with records from the VBA (DELWP 2015), as there are only two sightings

within 3km of the construction ROW in this section of the pipeline; one at Kaluna Park, Wangaratta in 2012, and the other from 1982 on Gilmore Road, south of the Hume Highway.

The first site was almost at the beginning of the looping on Upper Taminick Road (KP119.31) where three individuals were observed over the two survey nights. The second site was approximately 4.5km north-east of Glenrowan at 15 Mile Creek (KP125.7) where one individual was sighted.

During the Brown Toadlet surveys in autumn 2015, a Squirrel Glider was observed at Reedy Creek (KP140.1). This site is 3.5km from the Kaluna Park sighting from 2012.

The next group of sightings were around Chiltern, in close proximity to the national park. Individuals were observed on Government Road (KP171.2), Chiltern - Rutherglen Road (KP174.07), on both occasions and Chiltern - Howlong Road (KP176.0) had three individuals sighted over the two nights of surveying.

The final three locations were at Stockyard Creek (KP180.4) with one seen feeding in the River Red Gums and on Riley's Road (KP180.8) nearby, where two individuals were sighted gliding up the roadside together. Both of these sites are adjacent to the eastern boundary of the national park. The third site, Frying Pan Creek (KP183.4) is north-west of Barnawartha, where one was observed feeding in a River Red Gum.

In most areas where the Squirrel Glider was observed, the roadsides and creeklines provide critical habitat for this species as they are generally the most-well vegetated and connected. The exception in this looping is of course Chiltern - Mt. Pilot National Park.

Although these were the only sightings in this looping, it is possible that Squirrel Gliders could be present on other roadsides and watercourses irrespective of the tree canopy connectivity or the quality of the understorey (van der Ree 2013, *pers. comm.*). With this in mind, mitigation measures for roadsides and watercourses will be included in section 5.

Turtles

Turtle eggs of an unknown species were observed in the construction ROW on the floodplain east of the King River during field assessments in November 2013. The most likely species was Common Long-necked Turtle *Chelodina longicollis* with the other possible species being Murray River Turtle *Emydura macquarii.* In the DELWP *Fauna Advisory List* (DEPI 2013), these turtles are listed as data deficient and vulnerable respectively.

4 LEGISLATIVE IMPLICATIONS

4.1 Environment Protection and Biodiversity Conservation Act 1999

No nationally significant flora species were recorded within the construction ROW during any of the targeted surveys.

Of the 30 species of listed fauna that may potentially occur in the local area, six were recorded during the fauna, aquatic and other field surveys conducted across this looping section. These were Murray Cod, Eastern Great Egret, Latham's Snipe, Painted Honeyeater, Rainbow Bee-eater and White-throated Needletail.

Regent Honeyeater was also recorded approximately 2.5km from the construction ROW in Chiltern - Mt. Pilot National Park. This national park is important as state and national habitat for this EPBC Act endangered species.

The construction ROW is not considered 'important habitat' for any migratory or marine species and no wetlands of international significance within the local area of the construction ROW.

The construction ROW does contain two vegetation communities:

- *'Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia'* (listed as Endangered)
- *'White Box - Yellow Box - Blakely's Red Gum grassy woodlands and derived native grasslands*' (listed as Critically Endangered)

Due to the presence of the named species above and the two listed vegetation communities, as well as the assumed presence of threatened species in Chiltern - Mt. Pilot National Park, a referral to the Commonwealth Environment Minister will be required if these areas cannot be avoided.

4.2 State Legislation

4.2.1 Catchment and Land Protection Act 1994

The construction ROW of Looping 7 contains a number of noxious weeds such as Blackberry, Paterson's Curse and Bridal Creeper listed as regionally controlled within the GBCMA and NECMA. Appropriate weed control and hygiene measures should be implemented when removing vegetation, or traversing areas where noxious weeds are present. This also includes travel along roadsides and government roadsides, to ensure noxious weeds are not spread within, from, or to these areas.

4.2.2 Environment Effects Act 1978

A total of 2.269ha of native vegetation occurs within Looping 7 which is under the trigger for an Environment Effects Statement ('EES') referral.

4.2.3 Fisheries Act 1995

Due to the presence of FFG Act listed aquatic species in this looping, it would be prudent to undertake salvaging for both the threatened species, such as Murray Cod and Murray Spiny Crayfish, and common aquatic species that may be present in the waterways and billabongs (dams may also hold threatened aquatic species if located on the floodplains of the major rivers). A permit will be required under the *Fisheries Act* for these salvage activities requiring the handling of threatened and common fish species.

4.2.4 Flora and Fauna Guarantee Act 1988

One FFG Act listed flora species (Buloke) was identified during the field surveys, however this was from a plantation within private land where the FFG Act is not applicable. No FFG Act listed species or communities were recorded within Crown Land and therefore the FFG Act does not apply for listed flora. However, 33 species were identified that belong to plant families or genera that are protected on Crown Land under the FFG Act. These species are identified in **Appendix C2.**

Eight FFG Act fauna species were identified during the field surveys. These species were Murray Spiny Crayfish, Murray Cod, Diamond Firetail, Eastern Great Egret, Grey-crowned Babbler, Latham's Snipe (nominated), Painted Honeyeater and Squirrel Glider. Four of these species were previously discussed above under section 4.1.

Given the construction ROW intersects Crown Land in the Chiltern - Mt. Pilot National Park, on roadsides and several publicly managed watercourses, an FFG Act permit will be required for the construction activities for protected species.

Two FFG Act fauna communities, the *Victorian Temperate Woodland Bird Community* and *Lowland Riverine Fish Community of the southern Murray-Darling Basin,* are also considered to occur along the construction ROW, being within Chiltern - Mt. Pilot National Park and adjacent wooded private property and in the vicinity of the Ovens River and associated floodplain, respectively.

4.2.5 National Parks Act 1975

Consent for the pipeline corridor within Crown Land, including the portion that lies within the boundaries of the Park, is covered by a Governor-in-Council order. The existing pipeline and license area operates under a Crown Land agreement between the State Government and the predecessor to APA (GPU Gasnet Pty Ltd) which was put in place in 2001. Under this agreement, approval is required from the Minister for works upon Crown land.

4.2.6 Wildlife Act 1975

A Management Authorisation permit will be required under the *Wildlife Act* if salvage and relocation of fauna is to be undertaken as part of any mitigation measures for the project. Given that there is the possibility of suitable fauna habitat being impacted, salvage and relocation may be required prior and during the construction phases.

4.3 Permitted Clearing Regulations

When considering an application to remove native vegetation under the moderate or high risk pathways, the referral authority (DELWP) will consider whether the applicant has taken reasonable steps to avoid and minimise impacts prior to securing the required offset. This consists of the following:

- Avoidance of adverse impacts.
- Minimisation of impacts through appropriate considerations implemented during planning processes and project design or management.
- Identification of appropriate offset options.

Emphasis is placed on the consideration of measures to avoid or minimise impacts on native vegetation where possible. Offsets for vegetation permitted for removal are only considered once it can be demonstrated that these steps have been taken into account.

The design of the route is constrained by the use of the existing easement. All construction is proposed to be within the existing easement created in 1975, for the initial pipeline construction. Measures to avoid or minimise impacts can therefore only be confined to techniques to be implemented within the construction ROW generally either through the narrowing of the construction ROW or, if feasible, other construction techniques such as drilling or boring.

Subsequent to the assessment of the original proposal for the construction ROW (covering the 28m of the easement that lies east of the existing pipeline), the easement was therefore inspected with APA in August 2015 to determine where impacts to native vegetation could be avoided or minimised. As a result, APA has proposed the following measures to minimise impacts to vegetation:

- Reduction of construction ROW to 20m width where it intersects a remnant patch in order to minimise impacts to native vegetation. However in Chiltern–Mt Pilot National Park the ROW is reduced to 16.5m;
- Reduction of construction ROW to the minimum width necessary in order to avoid impacts to scattered trees that do not grow over, or near, the alignment of the proposed pipeline. This is generally possible in most areas of the construction ROW due to the open nature of the countryside through which the construction ROW passes.
- Shifting of the narrowed construction ROW, in some cases, westwards over the existing pipeline ('reverse ROW') to further avoid impacts on remnant vegetation in the 'eastern' area of the construction ROW. In general, the construction process will avoid work or movement of heavy construction traffic over the existing pipeline. In some cases, however, in areas where a specialist crew is proposed, such as at waterway crossings (or, in the case of Looping 7, within the National Park), impacts can be reduced by shifting the narrowed ROW westwards over the existing pipeline. Note that, due to safety risks, this is only proposed in areas where a reduction in impacts can be demonstrated (in some properties, vegetation that has grown west of the existing pipeline is of similar quality to vegetation located east of the proposed pipeline).
- HDD of selected locations, generally waterways, to pass under significant vegetation as well as the waterway.

As a result, every effort has been made to minimise impacts on Large Old Trees whether within remnant patches or as trees scattered through the project area.

These measures have been applied to selected locations based on an on-site inspection of the construction ROW to determine the practicability of avoidance measures at each location.

5 RECOMMENDATIONS

A CEMP is required to be prepared for the project to ensure environmental issues are appropriately managed during construction and that regulatory obligations are met. Environmental controls will be documented within the CEMP.

A number of general measures to minimise impacts to flora and fauna values identified within the construction ROW have been recommended for the project and are included in PART A of this report.

5.1 Avoid and minimise

As part of Victoria's *Permitted Clearing of Native Vegetation: Biodiversity Assessment Guidelines*, DELWP has produced models for Victoria describing the extent of habitat for each listed rare or threatened species. These models are called 'habitat importance models' and they assign a 'habitat importance score' to a location based on the importance of that location in the landscape as habitat for a particular rare or threatened species (DEPI 2013a).

Under the Guidelines, these models form the basis for determining the impact of potential native vegetation clearing on rare and threatened species. The habitat importance scores are used to calculate the type and extent of biodiversity offsets required for native vegetation removal that impacts on individual rare or threatened species habitat.

Preliminary information was submitted to DELWP to determine offset obligations for this looping (as discussed in section 2.2. Those areas that generate an offset were targeted during the 'avoid and minimise' inspection. An application was then made to DELWP to determine final offset obligations.

Tree Protection Zones, as defined under the *AS 4970-2009 Protection of trees on development sites* (Standards Australia 2010), may also impinge on the construction ROW in some areas and this has been taken into consideration. An arborist was contracted to undertake an arboricultural assessment to determine the impact of construction on trees to be retained within or close to the construction ROW and the appropriate means to protect these trees during construction Recommendations regarding the future management of trees identified for retention and details of tree protection distances and construction controls required to minimise impacts to trees during the works have been provided in the subsequent arboricultural report (Tree Logic 2015a). Protection measures will be included in the Construction Environment Management Plan (CEMP) to be prepared for the project.

5.2 Threatened Flora and Vegetation Communities Mitigation Measures

It is recommended that the width of the construction ROW be pegged with coloured stakes and no vehicles and personnel be allowed outside the bounds of the construction ROW for areas that support an EPBC Act Listed community.

It is further recommended that a Flora Management Plan be prepared for approval by DELWP for any threatened species that are to be impacted. This should include the following:

- If threatened flora is to be impacted then salvage will be implemented, to an approved Management Plan, prior to construction.
- All individual threatened flora adjacent to / outside the construction ROW but within the easement should be tagged prior to construction.

5.3 Fauna Mitigation Measures

5.3.1 Fauna Mitigation Measures

It is recommended that a Fauna Management Plan be prepared for approval by DELWP for any native species that are to be impacted. This plan will include measures discussed below.

Aquatic Species

Two threatened (EPBC Act and FFG Act) aquatic species were recorded (Murray Cod and Murray Spiny Crayfish) during the aquatic surveys of waterways in this looping (**Appendix B11).** A number of other Commonwealth and State threatened fish species have been previously recorded or have the potential to be found in waterways through this looping.`

It is prudent to undertake fish salvaging prior to the open-cut crossing of waterways that have the potential to contain such species. Obviously if the waterway is dry at the time of crossing, then salvaging will not be required.

Any dam containing water that is found on the construction ROW and requires removal will also require salvage for listed aquatic species, especially if they have overland connection to creeks and rivers. Recent salvage from dams in Looping 4 has confirmed that the dams can provide sanctuary for fish such as *Galaxias* spp, Gudgeon species and *Macquaria* spp as well as turtles when the nearby creek or river may have no water.

Any woody debris removed from the waterways as part of the construction work is to be replaced back into the waterway after the works are completed. The removal of woody debris in Victorian rivers and streams is listed as a potentially threatening process under the FFG Act as discussed in the Flora and Fauna Guarantee Act 1988 Action Statement No. 194 (DSE 2003a).

It is also recommended that prior to the required felling of large trees, that NECMA be contacted to see if they would like to salvage the trunks etc. for the re-snagging of waterways within the CMA.

General Fauna

Any trees to be removed, whether within a patch or as scattered trees may contain hollows that provide roosting or nesting sites for birds, possums and gliders, phascogales, microbats and reptiles. Remnant patches with shrubs and saplings, within the construction ROW, especially on the roadsides, could provide nesting sites for native birds.

Consideration should be given to the following measures to reduce the impact on local hollow-dependant fauna:

- Where hollow bearing trees are to be removed, nest boxes should be installed in adjacent non-impacted vegetation at least several days prior to tree removal.
- An appropriately qualified and licenced zoologist/wildlife handler to carefully inspect accessible hollows using an elevated work platform (e.g. mobile tower) prior to felling of hollow-bearing trees. The actual inspection of each hollow should be undertaken using suitable equipment such as an endoscope.
- Hollow-bearing trees to be removed carefully by qualified arborists under the direction of an appropriately licenced zoologist/wildlife handler.
- An appropriately qualified and licenced zoologist/wildlife handler to carefully inspect all hollows for fauna using an endoscope after felling of hollow-bearing trees.

Other threatened and common native fauna may also use understorey vegetation and fallen timber, rock etc for nesting or shelter. The checking of this vegetation and removal of shelter from the construction ROW is also recommended before construction begins.

Chiltern - Mt. Pilot National Park

Overall the park contains 43 threatened fauna species, of which 21 are listed under the *Flora and Fauna Guarantee Act* (Parks Victoria 2008). A large number of threatened fauna have been recorded from within Chiltern - Mt. Pilot National Park in recent times.

The national park is recognised as the most important site in Victoria for the conservation of the threatened Squirrel Glider, Regent Honeyeater, Swift Parrot, Painted Honeyeater, Barking Owl and Turquoise Parrot (Parks Victoria 2008). Three of these species were observed during surveys from within the park or adjacent roadsides and watercourses. Other significant species found within the park include the Brown Toadlet and Woodland Blind Snake (Parks Victoria 2008).

Given the sensitivities of Chiltern - Mt. Pilot National Park and the construction methods required due to the geology of the construction ROW, it is strongly recommended that any construction either within or adjacent to the park (KP172.7 to KP181.2) be undertaken in late summer – early autumn (February - March) to avoid the breeding seasons of the above threatened species. The noise generated from construction activities could lead to fauna leaving nesting sites, to the detriment of their young. Other fauna mitigation measures for the park are similar to those outlined above.