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APPENDICES

1. REGIONAL BACKGROUND

APA GasNet Australia (Operations) Pty Ltd ('APA') is to looping (duplicating) part of the existing Wollert to Wodonga gas transmission pipeline (pipeline licence 101) between Longwood and Violet Town, Victoria (known as Looping 2).

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 257km. This pipeline occupies an easement of 35m in width. The proposed pipeline looping is to be installed within the previously disturbed current pipeline easement. With reference to the starting point of the existing pipeline at Wollert, this looping will commence at Kilometre Point (KP107.6) and finish at KP141.2, a total distance of 33.6km.

An overview of the section to be looped is provided in **Figure B1** whilst detailed pipeline maps are provided in **Appendix B1.**

Monarc Environmental Pty Ltd ('Monarc') was engaged by APA to undertake a flora and fauna assessment of the APA easement from near Longwood KP107.6 to Violet Town KP141.2. The purpose of the assessment is to identify any risks to significant flora and fauna values within the easement and provide the necessary information to enable management recommendations for flora and fauna affected by the construction ROW.

1.1 General

The topography of the Longwood to Violet Town route is relatively level, lying at about 170m AHD as it skirts the north-western edge of the Strathbogie Ranges which lie to the south of the Hume Freeway. The easement predominantly falls within the *Victorian Riverina Bioregion* which stretches to the north and east, through to the Murray River.

Within the local area this landform unit is roughly contiguous with the region known as the Victorian Riverina, characterised by flat to gently undulating land and floodplain areas associated with the eight river basin tributaries of the Murray River. Prior to European settlement, the vegetation of the *Victorian Riverina Bioregion* was a mixture of grasslands and low open woodland, dominated by box species Grey Box *Eucalyptus microcarpa* and Yellow Box *E. melliodora*, Red Gum *E. camaldulensis* and Murray Pine *Callitris sp.* with a sparse grassy understorey. A number of small freshwater wetlands of various types were also scattered across the region.

Today, over 90% of the local 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 *E. microcarpa* 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, especially on Seven Creeks, Pranjip and Castle Creeks while the networks of road reserves and associated vegetation not only provide critical habitat for native bird species but also for colonies of Squirrel Glider. Strathbogie Shire, for instance, is home to an estimated one third of the State's population of the endangered Grey-crowned Babbler (Shire of Strathbogie 2011). Other threatened fauna within the local area include Bush Stone-curlew, Swift Parrot, Tree Monitor and Brush-tailed Phascogale 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 easement lies wholly within the Shire of Strathbogie. The planning zones that apply to parcels of land traversed by the easement are summarised in **Table B1**.

Table B1: Summary of Planning Zones

Local Government Area	Zone	Location
Shire of Strathbogie	Farming Zone 1 (FZ)	
	Public Use Zone 7 (PUZ7)	Castle Creek Seven Creeks Faithful Creek
	Road Zone 1 (RDZ1)	Euroa Shepparton Road

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.

In addition to land associated with roads, the easement intersects a number of other areas of Crown Land being land associated with a number of major waterways classed as water frontage reserve (refer to land zoned as PUZ7 in **Table B1**).

1.2.2 Environmental 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 no Environmental overlays that apply to this looping within the Shire of Strathbogie.

However, the Shire of Strathbogie has prepared a roadside management plan that identifies and categorises roadside vegetation considered to have conservation significance.

In general, the plans cover all rural road reserves in the Shire of Strathbogie excluding any road reserves under the management of VicRoads (e.g. arterial roads or highways) or unused roads under the management of DEPI. While there is some variation in definition, roadsides have been generally assigned to one of three rankings, High, Medium or Low, as defined in Part A.

A number of roads intersected by this looping have been assigned a ranking of High Conservation value. Many of the roads considered to have special value (such as providing habitat for significant species like the Grey-crowned Babbler) have been identified by on-site signage to identify areas as a Significant Roadside Area.

The Shire of Strathbogie 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.

1.3 Waterways

Natural assets that have been identified along the project area include several perennial waterways as well as some ephemeral waterways and irrigation channels. In general, natural waterways and drainage lines (designated waterways under the Victorian *Water Act* 1989) are the responsibility of the Goulburn Broken Catchment Management Authority (GBCMA) while Goulburn Murray Water is responsible for water storage and associated delivery and drainage systems. In summary Longwood to Violet Town (Looping 2) intersects 24 designated waterways of which 8 are named including Seven Creeks near Euroa. Major named waterways intersected by Looping 2 are summarised in **Table B2**.

Table B2: Named Waterways Intersected by the Project

Looping	Name	Location	Flow status	Crossing Method	Land Type
Longwood to Violet Town	Pranjip Creek	109.7	Intermittent	Open cut	Crown Land
	Creighton's Creek	114	Perennial	HDD	Crown Land
	Castle Creek	122.5	Intermittent	Open cut	Crown Land
	Seven Creeks	125.5	Perennial	HDD	Crown Land
	Branch Creek	126.4	Ephemeral	Open cut	Private freehold
	Faithful Creek	130.1	Ephemeral	HDD	Crown Land
	Riggs Creek	131.2	Ephemeral	Open cut	Private freehold
	Lambing Gunyah Creek	139.35	Ephemeral	Open Cut	Private freehold

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 Creighton's Creek and Seven Creeks. All designated waterways intersected by the easement drain to the Goulburn River (approximately 20km from the easement at its closest point, near Longwood at the commencement of this looping).

All waterways will be crossed in accordance with relevant guidelines for creek and river crossings. Approval to traverse these assets will be sought through the submission of a Site Environment Management Plan to the GBCMA and will include construction plans and drawings along with appropriate methods of construction and rehabilitation. APA and GBCMA have undertaken inspections of critical waterways and have commenced the process for the protection and management of these assets during construction.

Most of the waterways intersected by the easement fall within private freehold land, however a number also 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 2014a). A permit may therefore be required prior to vegetation clearing on Crown Land throughout the construction ROW in these areas.

1.4 Previous Studies

A number of Conservation Management Plans have 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.

Two landscape zones identified by GBCMA apply to the local area – Longwood and Violet Town Landscape Zones. Key biodiversity assets identified in the plans include examples of Plains Grassy Woodland, waterways and their riparian margins, wetlands and roadside vegetation. While a number of examples of each of these assets are identified for management, roadsides in particular have been noted to be an important part of conservation planning as not only do they often contain elements of remnant vegetation that provide linkages across the landscape, they also often contain large old trees with hollows. One of the objectives of the management plan is to enhance roadsides by encouraging adjacent landowners to widen vegetated areas along roadsides to at least 40 metres.

2.0 FLORA ASSESSMENT

2.1 Ecological Vegetation Classes

DEPI modelled EVC mapping for the region shows that the easement and the immediate surrounds would have originally been dominated by EVC 55_61 Plains Grassy Woodland (95%) with smaller areas supporting other vegetation types summarised below in **Table B3** (DEPI 2014b). 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 still primarily Plains Grassy Woodland (DEPI 2014b).

Table B3: DEPI modelled pre-1750 Ecological Vegetation Classes within the Local Area

Bioregion	EVC Number and Name	Status	Occurrence
Victorian Riverina	55 Plains Grassy Woodland	Endangered	Common
	61 Box Ironbark Forest	Vulnerable	Minor
	68 Creekline Grassy Woodland	Endangered	Common

2.1.1 Existing Vegetation Condition

The current field assessments identified only isolated fragments of native vegetation remaining in the area and these often contained a mixture of native and exotic species (**Appendix B2**).

In general, extensive clearing for agriculture has left the majority of the easement and surrounding land largely devoid of remnant vegetation and does not support the extent of original vegetation type that once occurred. However, the easement 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 five EVC's summarised in **Table B4.**

Table B4: Ecological Vegetation Classes identified During the Field Assessments

Bioregion	EVC Number and Name	Status
Victorian Riverina	55_61 Plains Grassy Woodland	Endangered
	55_62 Riverina Plains Grassy Woodland	Endangered
	61 Box Ironbark Forest	Vulnerable
	68 Creekline Grassy Woodland	Endangered
	235 Plains Woodland / Herb-rich Gilgai Wetland Mosaic	Endangered

The presence of these EVC's was determined based on vegetation composition, soil types and location. Areas of remnant vegetation largely occurred within roadside vegetation and along creeklines and low lying areas. A number of indigenous scattered trees were also identified either on the easement, or near the edge of the easement. All remaining areas were largely dominated by introduced pasture grasses.

The condition of the native vegetation along the easement ranges from poor to good. The variation in vegetation condition is attributable to the species composition, the percentage of weed cover and the presence or absence of canopy trees. All EVC's identified during the assessments are described in section 2.1.2 below and includes examples of the vegetation condition. The overall condition of the vegetation is detailed in the habitat hectare tables presented in **Appendix B3**.

2.1.2 Vegetation Descriptions

Flora Species

A total of 151 flora species were recorded along the easement during the field survey. This included 103 indigenous species and 48 introduced species (including both Australian natives and exotics). A detailed list of all flora species recorded in the easement is provided in **Appendix B2.**

EVC 55_61: Plains Grassy Woodland is described as open, eucalypt woodland to 15 metres tall. It occupies well drained, fertile 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 characterised by summer-growing grasses (DEPI 2014c).

Plains Grassy Woodland was generally confined to road sides although some areas, of varying quality, occur on private land.

Patches of Plains Grassy Woodland supported by roadside reserves generally incorporated Large Old and Very Large Old Trees of various eucalypt species according to the EVC benchmark. These areas tended to have a relatively depauperate understorey and a high coverage of weedy exotic annuals. The relatively high cover of weedy exotics in these areas came from the flanking land utilised for agricultural purposes. In spring the understorey tended to be dominated by weedy exotic annual graminoids with the most abundant of these being Annual Veldt-grass *Ehrharta longiflora*.

Relatively high quality patches of Plains Grassy Woodland occur at KP117 and KP120.5 (**Appendix B3**).

Vegetation supported by land at KP117 appears to be subject to a low intensity grazing regime without any evidence of recent pasture improvement efforts. Coverage of weedy exotic graminoids was typical of grazed land with Brown-top Bent *Eragrostis capillaris* coverage around four percent. Indigenous graminoids were well represented with Small-flowered Wallaby-grass *Rytidosperma setaceum*, Brown-backed Wallaby-grass *R. duttonianum*, Copper-awned Wallaby-grass *R. fulvum*, Clustered Wallaby-grass *R. racemosum*, Wattle Mat-rush *Lomandra filiformis* ssp. *coriacea*, *Dianella admixta* ssp. *revoluta*, Rough Spear-grass *Austrostipa scabra* ssp. *falcata* and Finger Rush *Juncus subsecundus* accounting for 40% of projected foliage cover. Spreading Wattle *Acacia genistifolia,* Golden Wattle *A. pycnantha* and Gold Dust Wattle *A. acinacea* were all present. The understorey is largely weed free, with an absence of any High Threat environmental weeds listed in **Appendix B2**.

These patches were assessed as meeting the criteria for the threatened *EPBC Act* listed community of '*Grey Box Grassy Woodland and Derived Native Grassland of South-Eastern Australia*' (DSEWPaC 2012b). A description of this community can be found in **Part A.**

EVC 55_62: *Riverina* Plains Grassy Woodland is described as open, eucalypt woodland to 15 metres tall occurring on a number of geologies and soil types. In contrast to EVC55-61, it 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).

This vegetation community has close affinities to Plains Grassy Woodland EVC 55_61 and is also listed as endangered. *Riverina* Plains Grassy Woodland differs slightly in vegetation composition. It generally has less coverage of medium shrubs and a higher coverage of medium herbs. Canopy species may include those likely to be found in Plains Grassy Woodland 55_61 along with Buloke *Allocasuarina luehmannii,* Yellow Gum *E. leucoxylon* and Black Box *E. largiflorens.*

The Euroa Airstrip paddock between KP120.5 and KP121.05 supported the best example of this EVC. A relatively diverse understorey included observations of lesser seen forbs typical of this vegetation community including Fairy Aprons *Utricularia dichotoma,* Twining Fringe-lily *Thysanotus patersonii,* Blue Squills *Chamaescilla corymbosa,* Milkmaids *Burchardia umbellata,* Yellow Rush-lily *Tricoryne elatior,* Chocolate Lily *Arthropodium strictum,* Early Nancy *Wurmbea dioica,* Tiny Cudweed *Gnaphalium indutum* and Woolly Heads *Myriocephalus rhizocephalus*.

The understory is largely weed free, with an absence of any High Threat environmental weeds and qualifies as the threatened *EPBC Act* listed community of '*Grey Box Grassy Woodland and Derived Native Grassland of South-Eastern Australia*' (DSEWPaC 2012b).

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 20 metres 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).

Vegetation most attributable to the Box Ironbark Forest EVC benchmark was mapped around only two locations between Longwood to Violet Town at KP112.4 to KP112.55 and KP119.2.

The best example of this vegetation type between Longwood and Violet Town is supported by the Angle Road roadside reserve. Large Old Trees are around benchmark levels, weeds are below 25% coverage with greater than 50% of that due to High Threat species being Cocksfoot *Dactylis glomeratus* and Annual Veldt-grass. Over 50% of lifeform species described in the benchmark were present although over half of those are not representative of benchmark levels.

The roadside vegetation at Geodetic Road at approximately KP112.45 supports remnant vegetation most attributable to EVC 61 Box Ironbark Forest, with fewer Large Old Trees and a more depauperate understorey while an area also attributable to this EVC east of Geodetic Road around KP112.5 supports predominantly understorey graminoids only and appears to be subject to a grazing regime (**Appendix B3**).

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 was confined to Branch Creek KP126.4, Creighton's Creek KP114, Pranjip Creek KP109.7, Castle Creek KP122.5 and other unnamed watercourses (**Appendix B3**).

The best example of Creekline Grassy Woodland between Longwood and Violet Town was at Branch Creek KP126.4 with near benchmark levels of Large Old Trees. However, less than 50% of understorey lifeforms were present and the patch was relatively weedy with over 50% cover of Canary Grass *Phalaris aquatica,* Barley Grass *Hordeum* sp. and Rye Grass *Lolium* sp. recorded.

Another example of Creekline Grassy Woodland at Pranjip Creek around KP109.7 supported a more representative understorey with over 50% of understorey lifeforms present and less than half of those assessed as being substantially modified. Twelve graminoids were recorded with the majority of cover due to Common Wallaby-grass *Rytidosperma caespitosum,* Hill Wallaby-grass *R. erianthum,* Rough Spear-grass *Austrostipa scabra* and Soft Spear-grass *A. mollis.*

Banks of the creek were steep and dominated by weedy species. Indigenous aquatic and ephemerally aquatic species were poorly represented.

Projected foliage cover of weedy species was below 25% with the prevalent species recorded being Annual Veldt-grass, Annual Rye-grass *Lolium rigidum*, Onion Grass *Romulea rosea*. Cape Weed *Arctotheca calendula* and Storksbill *Erodium botrys* both had high coverage.

EVC 235: Plains Woodland / Herb-rich Gilgai Wetland Mosaic is described as open woodland to 15 metres 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 Woodland / Herb-rich Gilgai Wetland Mosaic was recorded at KP126.2 (**Appendix B3**) to the south-west of Branch Creek. This patch supported well below the benchmark number of Large Old Trees per hectare and a relatively depauperate understorey. The understorey of this patch was predominantly Rushes *Juncus* spp. with Small-flowered Wallaby-grass supported by the micro-topographical rises.

This patch supported a suite of weedy exotic species typical of land utilised for agricultural purposes with Canary Grass, Annual Rye-grass and Barley Grass. Weedy species accounted for over 50% of the projected foliage cover of this patch.

2.1.3 Scattered Indigenous Trees

The canopy component of remnant vegetation communities which the easement transects would have been comprised of Blakely's Red Gum *Eucalyptus blakelyi*, River Red Gum *E. camaldulensis*, Yellow Box, Grey Box, Red Box *E. polyanthemos*, White Box *E. albens*, Ironbark *E. tricarpa* and Yellow Gum.

Trees were supported by roadsides, creeklines and scattered throughout private land. A number of scattered trees were identified either on the easement, or near the edge of the easement.

2.1.4 Planted Vegetation

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

2.1.5 Weeds

A total of 13 species are considered High Threat weeds, including 11 listed as noxious weeds under the *CaLP Act* (**Appendix B2**). 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 EVC's 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 easement 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 B5.** Appropriate measures to manage the potential spread or introduction of weeds during construction are recommended and will be included in the Construction Environment Management Plan (CEMP) to be prepared for the project.

Table B5: Declared Noxious Weed Species

Species Name	Common Name	Catchment	Declared Noxious Weed Status
Echium plantagineum	Paterson's Curse	GBCMA	Regionally Controlled
Genista monspessulana	Montpellier Broom	GBCMA	Regionally Controlled
Marrubium vulgare	Horehound	GBCMA	Regionally Controlled
Physalis viscosa	Sticky Ground-cherry	GBCMA	Regionally Controlled
Rosa rubiginosa	Sweet Briar	GBCMA	Regionally Controlled
Rubus fruticosus	Blackberry	GBCMA	Regionally Controlled
Silybum marianum	Variegated Thistle	GBCMA	Regionally Controlled
Xanthium spinosum	Bathurst Burr	GBCMA	Regionally Controlled
Cirsium vulgare	Spear Thistle	GBCMA	Restricted
Nassella neesiana	Chilean Needle-grass	GBCMA	Restricted
Oxalis pes-caprae	Soursob	GBCMA	Restricted

Several weed species not listed under the *CaLP Act* were also recorded along the easement and are included in the flora lists contained in **Appendix B2**.

2.2 Permitted Clearing Assessment

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

2.2.1 Risk-based Pathway

Based on the DEPI modelling (DEPI 2014b), the location of the project and amount of native vegetation to be impacted (≥ 1 hectare), Looping 2 is likely to fall under the 'Moderate' risk-based pathway within location risk A. The risk-based pathway however will ultimately be determined by DEPI.

2.2.2 Habitat Hectare Assessment

The easement contains approximately 11.62 hectares (4.02 habitat hectares) of remnant vegetation within the *Victorian Riverina Bioregion* comprising three EVC's and 56 different quality habitat zones. The detailed results of the vegetation quality assessment and Habitat Hectare scores for each habitat zone and KP locations are provided in **Appendix B3**. A summary of the total area for each EVC is provided in **Table B6**

Measures have been undertaken to avoid and minimise impacts to remnant vegetation, due to this, a total of 7.87 hectares (2.71 habitat hectares) of remnant vegetation is to be removed. The total area of impact for each EVC and bioregion is summarised in **Table B6**.

Table B6: Summary of Habitat Hectare Vegetation Quality Assessment

Bioregion	Ecological Vegetation Class	Total Area (Ha)	Total (HabHa)	Total Losses (Ha)	Total Losses (HabHa)	Area (Ha) to be retained	HabHa to be retained
Victorian Riverina	EVC 55 Plains Grassy Woodland	8.31	2.93	5.74	2.02	5.8	0.91
	61 Box Ironbark Forest	0.92	0.27	0.64	0.19	0.65	0.08
	68 Creekline Grassy Woodland	1.41	0.49	0.79	0.26	0.65	0.23
	235 Plains Woodland / Herb-rich Gilgai Wetland Mosaic	0.98	0.33	0.7	0.24	0.7	0.09
	Totals	**11.62**	**4.02**	**7.87**	**2.71**	**7.8**	**1.31**

2.2.3 Tree Assessment

Scattered indigenous trees

Scattered indigenous trees were classified as Very Large Old Trees (VLOTs), Large Old Trees (LOTs), Medium Old Trees (MOTs) or Small Trees (STs) according to the relevant EVC Benchmark (DEPI 2014). A total of 101 scattered indigenous trees were recorded during the assessment. This total includes 29 VLOTs, 43 LOTs 15 MOTs, and 14 STs, as summarised in **Table B7**. A detailed list of scattered indigenous trees recorded during the assessment is presented in **Appendix B4**.

A preliminary assessment of impacts to trees has been undertaken by APA **(Appendix B4).** Four scattered trees including two VLOTs and two LOTs will be removed from the construction ROW **Appendix B4.**

Tree Protection Zones, as defined under the Australian Standard (AS 4970-2009 Protection of trees on development sites), may also impinge on the construction ROW in some areas and have also been taken into consideration. An arborist has therefore been contracted to undertake an arboricultural assessment to determine the impact of construction on trees identified for retention within or close to the 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 will also be provided. Protection measures will be included in the Construction Environmental Management Plan (CEMP) to be prepared for the project.

Table B7: Summary of Scattered Indigenous Trees per EVC

Bioregion	Relevant EVC	VLOT	LOT	MOT	ST	Total
Victorian Riverina	61 Box Ironbark Forest	1	2	4	-	**7**
	68 CreeklineGrassy Woodland	7	5	3	3	**18**
	55_61 Plains Grassy Woodland	18	32	8	4	**62**
	55_62 Plains Grassy Woodland	2	4	-	7	**13**
	235 Plains Woodland / Herb-rich Gilgai Wetland Mosaic	**1**	**-**	**-**	**-**	**1**
Totals		**29**	**43**	**15**	**14**	**101**

Indigenous trees in patches

Indigenous trees in patches were classified as Very Large Old Trees (VLOTs), Large Old Trees (LOTs) and Medium Old Trees (MOTs) according to the relevant EVC Benchmark (DEPI 2014). A total of 88 indigenous trees in patches were recorded during the assessment. This total includes 10 VLOTs, 53 LOTs and 25 MOTs as summarised in **Table B8.** A detailed list of indigenous trees recorded during the assessment is presented in **Appendix B4**.

A preliminary assessment of impacts to trees has been undertaken by APA **(Appendix B4).** A total of three indigenous trees all being MOTs, from within patches will be removed from the construction ROW.

Tree Protection Zones, as defined under the Australian Standard (AS 4970-2009 Protection of trees on development sites), may also impinge on the construction ROW in some areas and has also been taken into consideration. All impacts to indigenous trees will be subject to the qualified arborist assessment and discussions with APA.

Table B8 Summary of Indigenous Trees in patches per EVC

Bioregion	Relevant EVC	VLOT	LOT	MOT	Total
Victorian Riverina	61 Box Ironbark Forest	-	4	4	**8**
	Creekline Grassy Woodland 68	5	7	5	**17**
	55_61 Plains Grassy Woodland	3	39	10	**52**
	55_62 Plains Grassy Woodland	1	2	6	**9**
	235 Plains Woodland / Herb-rich Gilgai Wetland Mosaic	**1**	**1**	-	**2**
Totals		**10**	**53**	**25**	**88**

2.3 Targeted Surveys for Threatened Flora & Vegetation Communities

The easement has been subject to significant disturbance from rural development with there being minimal areas of undisturbed native groundcover present.

The majority of the easement 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 easement 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 easement (**Appendix B5** and **B6a)**. An assessment of threatened species and communities and presumed "Likelihood of Occurrence" in areas of the easement, and targeted survey results have been provided in **Appendix B6a**. A number of threatened species and vegetation communities were considered to have the potential to occur along the easement, due to the presence of suitable habitat.

2.3.1 Targeted Surveys for Threatened Flora

The easement 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 and therefore targeted surveys were undertaken.

A search of the VBA and the PMST was conducted of the local area surrounding the easement with a five kilometre buffer to obtain a species profile from existing records **Appendix B5 and B6a.**

Three *EPBC Act* and four *FFG Act* listed flora species have previously been recorded within the local area (within 5 kilometres of the easement) (DEPI 2014h), and are summarised in **Table B9**. An additional two nationally significant species, not previously documented within the local area, also have habitat potentially occurring within the vicinity of the easement (DSEWPaC 2013). Furthermore, due to the presence of suitable habitat, the *EPBC Act* listed Matted Flax-lily *Dianella amoena* (listed as endangered) was also considered during targeted surveys.

An additional ten species listed on the DSE Advisory List (DSE 2005a) have also have previously been recorded within the local area (within five kilometres of the easement) and are presented in **Table B9.**

The assessment of threatened species and their potential to occur within the ROW has been provided in **Appendix B6a**. A description for each listed flora species with the potential to occur, their habitat preference and specific flowering time is presented in **Appendix B7**.

Targeted surveys were undertaken during the optimal flowering time for each species focusing on habitat that had a moderate to high likelihood of occurrence.

Table B9: Summary of Threatened Flora Species Recorded within 5 kilometres of the Easement

Scientific Name	Common Name	Latest Year	*EPBC Act*	*FFG Act*	*DEPI Advisory List**
Acacia decora	Western Silver Wattle	2001			Vulnerable
Acacia penninervis var. penninervis	Hickory Wattle	1993			Rare
Acacia verniciflua (southern variant)	Southern Varnish Wattle	2004			Poorly known
Allocasuarina luehmannii	Buloke	1999		Listed	
Amyema linophylla subsp. orientale	Buloke Mistletoe	2003			Vulnerable
Desmodium varians	Slender Tick-trefoil	2004			Poorly known
Dianella tarda	Late-flower Flax-lily	1988			Vulnerable
Dodonaea boroniifolia	Hairy Hop-bush	1989			Rare
Goodenia macbarronii	Narrow Goodenia	2008	Vulnerable	Listed	Vulnerable
Hibbertia humifusa subsp. erigens	Euroa Guinea-flower	2008	Vulnerable	Listed	Rare
Hypoxis vaginata var. brevistigmata	Yellow Star	1991			Poorly known
Myriophyllum porcatum	Ridged Water-milfoil	2008	Vulnerable	Listed	Vulnerable
Pultenaea vrolandii	Cupped Bush-pea	1989			Rare
Tripogon loliiformis	Rye Beetle-grass	1939			Rare
Protected Matters Search Tool					
Glycine latrobeana	Clover Glycine	N/A	Vulnerable	Listed	Vulnerable
Amphibromus fluitans	River Swamp Wallaby-grass	N/A	Vulnerable		
Monarc Additions					
Dianella amoena	Matted flax-lily	N/A	Endangered	Listed	Endangered

* DSE 2005.

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

One state significant species was recorded during the current assessment; Buloke *Allocasuarina luehmannii* was recorded on private land at KP120.55 within Plains Grassy Woodland vegetation (refer to Appendix B1). The Buloke was recorded within the easement; however it does not occur within the construction ROW and will therefore be avoided.

One species listed on the DSE Advisory List was also recorded during the current assessment: Late-flower Flax-lily *Dianella tarda* was recorded on Crown Land at KP112.1 within Plains Grassy Woodland vegetation and also at KP119.2 within Box Ironbark Forest vegetation.

No other state significant flora species were recorded during the field assessment. However, a total of 18 flora species recorded are members of plant families and genera that are considered protected on Crown Land under the *FFG Act*. 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 current assessment:

- *Acacia* - Wattles - excluding *Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon, Acacia paradoxa*

- *Gompholobium* - Wedge-peas - all species
- *Grevillea* - Grevilleas - all species
- *Prostanthera* - Mint-bushes - all species
- *Stylidium* - Trigger-plants - all species
- *Thysanotus* - Fringe-lilies - all species

Species recorded on the construction ROW and protected under the *FFG Act* are highlighted in **Appendix B2.**

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 in the ROW and are listed in **Table B10** (DSEWPaC 2013).

Due to the quality of the vegetation identified during the assessments two of the listed communities were identified as occurring within the 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 B10: Threatened Communities along the Easement

Community	Status	Source	Recorded within construction ROW footprint	*Extent of community (Ha)	Total area of impact by construction ROW (Ha)
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	EPBC	No	N/A	N/A
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia	Endangered	EPBC	Yes	2291	2.49
Natural Grasslands of the Murray Valley Plains	Critically Endangered	EPBC	No	N/A	N/A
White Box - Yellow Box - Blakely's Red Gum grassy woodlands and derived native grasslands	Critically Endangered	EPBC	Yes	12	0.087

*Extent of the EPBC community = the estimated total area of remnant patches believed to be intersected by the construction ROW based on EVC 2005 mapping (DEPI 2014b). It is not an estimation of the total remaining extent of the whole community.

Based on the threatened vegetation community criteria thresholds we have identified the following locations as meeting the requirements for these communities.

'Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia'

The on-ground assessment of the easement has located several locations in the construction ROW where the communities are believed to occur, primarily as thin linear strips within roadside reserves.

A total of 2.49 ha was recorded within the construction ROW and occurs within eight patches located at:

- Government Road KP112.1
- Creighton's Siding Road KP116.886 to Drysdale Road KP117.336
- Government Road KP118.45
- Euroa airstrip KP120.5 – KP121.05
- Moglonemby Road KP127.27
- Lawrence Road KP128.1
- Government Road KP138.9
- Minahan Lane KP140.15

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 (DSEWPaC 2012b).

These patches are only portions of much larger patches of the community intersected by the construction ROW. Only small portions of each patch will be impacted and a number of measures have been taken to minimise impacts. In particular, management measures have focused on the retention of as many mature trees as possible. Grading of the topsoil prior to installation of the pipeline and its replacement following construction will also assist in maximising the retention of the existing seed bank and maximise the chances of restoration of the understorey.

'White Box-Yellow Box-Blakely's Red Gum grassy woodland and derived native grasslands'

The on-ground assessment of the ROW has located one location along the proposed construction ROW where the community is believed to occur.

A total of 0.087 ha was recorded within the ROW and occurs within the Longwood-Pranjip Rd roadside reserve. Vegetation at these locations qualified as the listed community largely due to Blakely's Red Gum being the dominant tree species, the understorey comprising more that 50% cover of indigenous perennial vegetation, the patch size and the number of indigenous mature trees per hectare or natural regeneration of the dominant overstorey species therefore meeting the recommended thresholds for the listed community (DEH 2006a).

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 DEPI modelling, and are listed in **Table B11** (DEPI 2014b).

Table B11: Threatened *FFG Act* Listed Communities along the easement

Community	Source	Associated EVC	Recorded within construction ROW footprint
Grey Box - Buloke Grassy Woodland Community	FFG	EVC 55_61 Plains Grassy Woodland	Yes
		EVC 55_62 Plains Grassy Woodland	
Northern Plains Grassland Community	FFG	EVC 55_61 Plains Grassy Woodland	No
		EVC 55_62 Plains Grassy Woodland	
Creekline Grassy Woodland (Goldfields) Community	FFG	EVC 68 Creekline Grassy Woodland	No

All remnant patches that qualify as EVC 55_61 Plains Grassy Woodland and EVC 55_62 Plains Grassy Woodland identified in **Appendix D3**, are synonymous with two *FFG Act* listed communities '*Grey Box - Buloke Grassy Woodland Community'* and *'Northern Plains Grassland Community'*, according to the DEPI modelling (DEPI 2014b). However, based on the description of the *Northern Plains*

Grassland Community in Part A, it is not expected that this community will occur within the construction ROW

Furthermore all remnant patches that qualify as EVC 68 Creekline Grassy Woodland also qualifies the *FFG Act* listed community '*Creekline Grassy Woodland (Goldfields)'Community*, according to the DEPI modelling (DEPI 2014b). Again based on the description of the *Creekline Grassy Woodland (Goldfields) Community* in Part A, it is not expected that this community will occur within the construction ROW

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

3.0 FAUNA ASSESSMENT

3.1 Fauna Profile

A search of the VBA was conducted of the local area surrounding the easement with a five kilometre buffer to obtain a species profile from existing records maintained by DEPI. The database has a total of 238 species registered for the local area comprised of: 3 invertebrate, 12 fish, 12 amphibian, 13 reptiles, 170 birds and 28 mammal species. Of these 19 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 easement utilising the PMST (DSEWPaC 2013) with a buffer of five kilometres[1]. The results of the search are provided in **Appendix B5**.

From these results, a total of thirteen listed species with Commonwealth or State significance have been reported in the local area while an additional 20 species listed under the *EPBC Act* are considered to be potentially present in the area. Fourteen species recorded in the local area have been listed under the DEPI Advisory List (DSE 2013) as Endangered, Vulnerable or Near Threatened in Victoria (DSE 2013)[2]. Refer to **Appendix B6b** for a summary of the significant fauna species that have been identified as either occurring or potentially occurring in the local area.

3.2 Habitat Types and Significance

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

3.2.1 Open Farmland

The easement 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. Logs and other potential surface habitats typical of the region were almost entirely absent from the easement. As a result, introduced grassland/pasture is generally considered of low habitat value for native fauna.

3.2.2 Woodland

Many areas of woodland were identified within the easement of this looping section. Remnants of the original Plains Grassy Woodland, Box-Ironbark Forest and Creekline Grassy Woodland were identified along roadsides or water courses respectively.

Generally the roadsides contained higher quality Plains Grassy Woodland vegetation than that found scattered through individual properties. An exception to this was Plains Grassy Woodland found on the Euroa airstrip (KP120.5 to KP121.05) which was of a very high quality. Many of the roadsides have been identified by the GBCMA 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.

3.2.3 Watercourses and Dams

The easement traverses one major creek (Seven Creeks) and another seven creeks along with a number of minor drainage lines. There are also a number of farm dams near the easement as well as a few ephemeral wetlands.

The riparian margins of the larger creeks in the vicinity of the easement 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

[1] Note that the EPBC database lists those species that may potentially occur within the area based on general distribution maps (with a broad buffer zone) while the VBA listing is based on records of individual sightings
[2] A list prepared by DEPI for use in a range of planning processes. It is not the same as the statutory list of threatened fauna established under the *FFG Act*: there are no legal requirements that flow from inclusion of a species on this list

exotic species within the easement. 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.

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.

3.3 Targeted Surveys for Threatened Fauna

Eighteen sites within the ROW and adjacent areas were surveyed by qualified and experienced zoologists and ecologists between October 2013 and January 2014. These 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 B9**).

Species targeted for surveys (excluding aquatic species) due to their moderate or high likelihood of occurrence in the local area are summarised in **Table B12** (refer to **Appendix B6b** for a complete listing of species assessed for their "Likelihood of Occurrence" in the area).

Table B12: Summary of Threatened Fauna Species

Common Name	Scientific Name	Status (DoE/FFG/DEPI)	Likelihood of Occurrence
Brown Toadlet#	*Pseudophryne bibronii*	-/Listed/Endangered	Low
Growling Grass Frog	*Litoria raniformis*	Vulnerable/Listed/ Endangered	Moderate
Common Bearded Dragon	*Pogona barbata*	-/-/Vulnerable	Moderate
Lace Monitor	*Varanus varius*	-/-/Endangered	Moderate
Bush Stone-curlew	*Burhinus grallarius*	-/Listed/Endangered	Moderate
Diamond Firetail	*Stagonopleura guttata*	-/Listed/Vulnerable	Moderate
Grey-crowned Babbler	*Pomatostomus t. temporalis*	-/Listed/Endangered	High
Hooded Robin	*Melanodryas c. cucullata*	-/Listed/Vulnerable	Moderate
Latham's Snipe	*Gallinago hardwickii*	C,J,R*/Nominated/Near Threatened	Moderate
Rainbow Bee-eater	*Merops ornatus*	Migratory/-/-	Moderate
Swift Parrot	*Lathamus discolor*	Endangered/Listed/Endangered	Moderate
Brush-tailed Phascogale	*Phascogale t. tapoatafa*	-/Listed/Vulnerable	Moderate
Squirrel Glider	*Petaurus norfolcensis*	-/Listed/Endangered	High

Brown Toadlet surveys were conducted in Autumn 2013. A separate report of these surveys can be found in **Appendix B11.**
*CAMBA/JAMBA/ROKAMBA international migratory bird treaties.

Threatened species descriptions including status, habitat and ecology and distribution for each of the above species can be found in **Appendix B8.**

Aquatic surveys are yet to be undertaken and then only on those waterways that are currently planned to be bored. After discussion with Hume DEPI staff regarding aquatic vertebrates and invertebrates, it was noted that known populations of threatened species occurred upstream, in

many cases several kilometres, of the easement (Smith 2013 *pers comm.*). It was decided that surveys would be done in Autumn 2014, as a contingency measure for the boring.

All surveys were based on guidelines prepared by DoE or those requirements found in the Biodiversity Precinct Structure Planning Kit ('BPSP') (DSE 2010b). 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 B13.**

Table B13: Summary of Locations and Fauna Surveys Undertaken

Location	KP	Survey Type		
		Diurnal	Nocturnal	GGF
Kirwan's Bridge-Longwood Road & Pranjip Creek	109.64-109.7	√	√	√
Longwood-Pranjip Road	110.37	√	√	
Government Road Reserve	112.1	√	√	
Geodetic Road	112.38		√	
Creighton's Creek	114.0	√	√	√
Government Road Reserve	114.4	√	√	
Creighton's Siding Road	116.88	√	√	
Drysdale Road	117.32	√	√	
Government Road Reserve	118.4	√	√	
Angle Road	119.2	√	√	
Euroa Airstrip (S3-64)	120.5 - 121.05	√	√	
Castle Creek	122.5-122.6	√	√	
Sullivans Lane	123.0		√	
Branch Creek	126.45	√	*	*
Moglonemby Road	127.27	√	√	
Lawrence Road	128.10	√	√	
Minahan Lane	140.15	√	√	
Alan McDiarmid Road	141.17		√	

* Nocturnal and GGF Surveys not undertaken at this location due to land owners concerns for his brood mares

3.4 Results of Targeted Surveys

Of the targeted species surveyed for, only two species were observed during the 68 separate surveys across the 18 sites. The locations that these species were recorded are summarised in **Table B14** below and a full species list of fauna recorded at each location can be found in **Appendix B9.**

Table B14: Findings of Fauna Surveys

Species	Survey findings
Brown Toadlet#	• None recorded
Growling Grass Frog	• None recorded
Common Bearded Dragon	• None recorded
Lace Monitor	• None recorded
Brown Treecreeper	• Two birds were observed at Castle Creek (KP122.5) • Two birds were observed on Sullivans Lane outside of the survey period (KP123.0)
Bush Stone-curlew	• None recorded
Diamond Firetail	• None recorded
Grey-crowned Babbler	• Nests of Grey-crowned Babbler were observed at Government Rd (KP112.1) and Geodetic Rd (KP112.38). • 2 birds observed at the Drysdale/Angle Rd intersection prior to surveys being undertaken. • A small group (3) were observed on Minahan Lane (KP140.15) along with up to 10 nests in this vicinity.
Hooded Robin	• None recorded
Latham's Snipe	• None recorded
Rainbow Bee-eater	• None recorded
Royal Spoonbill	• One individual observed flying over Castle Creek (KP122.5)
Swift Parrot	• None recorded
Brush-tailed Phascogale	• None recorded
Squirrel Glider	• An individual observed on both occasions on the Kirwan's Bridge-Longwood Rd, Pranjip Creek transect (KP109.64) • 2 individuals observed on Government Rd (KP112.1) • An individual observed on Drysdale Rd (KP117.32) • An individual observed on Angle Rd (KP119.2) • An individual observed on Minahan Lane (KP140.15) • An individual observed on Alan McDiarmid Rd (KP141.17)

Two other State significant species (listed on the DSE Advisory List) were also recorded being the Brown Treecreeper (*Climacteris picumnus victoriae*) and Royal Spoonbill (*Platalea regia*). As noted 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, Brown Treecreeper and Royal Spoonbill are not discussed in further detail in this report.

Growling Grass Frog

Four sites, within this looping, had been determined from the preliminary inspection as containing possible habitat for Growling Grass Frog based on their environmental characteristics. Three of the sites were assessed as unsuitable at the time of the survey in early December due to the limited, or no, water present. The one site remaining was Pranjip Creek KP109.7. No Growling Grass Frogs were recorded at this site during the two surveys. The bio-climatic data for this survey location can be found in **Appendix B10**.

Other more common species, Perons Tree Frog *Litoria peronii*, and Eastern Banjo Frog *L. dumerilii*, were recorded at this site during both surveys

Grey-crowned Babbler

The Grey-crowned Babbler is a state and regionally significant species and Strathbogie Shire is home to an estimated one third of the State's population of the endangered Grey-crowned Babbler (Shire of Strathbogie 2011). Many revegetation projects within the GBCMA have been designed to recreate habitat for this species and a number of roadsides have been identified as being Grey-crowned Babbler habitat and are signed as such. The Friends of the Grey-crowned Babbler also conduct regular surveys for this species throughout the area.

This species was recorded at three locations in two clusters, the first being the area around Geodetic Road/ Nelson Road intersection and the second being Minahan Lane south of Alan McDiarmid Road. The first cluster contained the birds' distinctive stick nests on the construction ROW at Government Rd KP112.1 and also at Geodetic Road KP112.38. It was not determined if these nests had been used for nesting or roosting only. While travelling between survey sites, birds were observed on Geodetic Road approximately 200m south of Nelson Road on one occasion and on another occasion approximately 100m from the corner of Geodetic Road on Nelson Road. It is possible that these birds were the same ones seen each time. This location appears to contain a long standing population as there are VBA records dating back to 2005. Babblers were also observed on the easement side of the intersection of Drysdale and Angle Roads prior to surveys being undertaken.

Squirrel Glider

The Squirrel Glider is also a State and regionally significant species, being listed on the *FFG Act* and identified by the GBCMA as one of five mammal species that are critically endangered or endangered in the Goulburn Broken Catchment (GBCMA 2014). The roadsides provide critical habitat for this species as they are generally the most-well vegetated and connected.

Squirrel Gliders were recorded at six locations across the expanse of this looping in three clusters of approximately two kilometres each. A total of at least seven individuals were recorded from these six sites.

The first cluster was at the southern end of this looping at KP109.64 and KP112.1. The first site was along Kirwan's Bridge - Longwood Road (Grimwades Road) and the adjacent Pranjip Creek where one glider was observed during both surveys. The second site in this cluster was Government Road KP112.1 where two individuals were observed during the second survey. The next cluster of sites was in the Drysdale/ Angle Road area to the west of Euroa (KP117.32 to KP119.2). An individual was sighted at each location during the initial surveys. The final cluster was in the vicinity of Minahan Lane KP140.15 and Alan McDiarmid Road KP141.17. One individual was observed on Minahan Lane during the initial survey and one observed on Alan McDiarmid Road during the follow up survey.

Although these were the only sightings in this looping, it is possible that Squirrel Gliders could be present on every roadside and watercourse irrespective of the tree canopy connectivity or the quality of the understorey (Van Der Ree 2013 *pers comm*).

4.0 LEGISLATIVE IMPLICATIONS

4.1 Environment Protection and Biodiversity Conservation Act 1999

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

Of the 23 species of listed fauna that may potentially occur in the local area, none were recorded during any of the fauna surveys conducted across this looping section. The easement is not considered 'important habitat' for any migratory or marine species and no wetlands of international significance within the local area of the easement.

The ROW does contain two vegetation communities that are to be impacted:

- *'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 two listed vegetation communities a referral to the Commonwealth Environment Minister will be required.

4.2 State Legislation

4.2.1 Flora and Fauna Guarantee Act 1988

One *FFG Act* listed flora species (Buloke) was identified during the field surveys within private land. No listed species were recorded within Crown Land and therefore the *FFG Act* does not apply. However, 53 species were identified that belong to plant families or genera that are protected on Crown Land under the *FFG Act*. Only one of the three *FFG Act* listed communities occur on Crown Land, within remnant areas, identified as EVC 55_61 Plains Grassy Woodland; and EVC 55_62 Plains Grassy Woodland.

Two *FFG Act* fauna species were identified during the field surveys, being Grey-crowned Babbler and Squirrel Glider.

Given the construction ROW intersects Crown Land on roadsides and several publicly managed watercourses, an *FFG Act* permit will be required for the construction activities.

4.2.2 Wildlife Act 1975

A Management Authorisation permit is 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 for the construction activities.

4.2.3 Catchment and Land Protection Act 1994

The construction ROW of this looping contains a number of noxious weeds such as Blackberry and Spear Thistle listed as regionally controlled within the Goulburn Broken Catchment. Appropriate weed control and hygiene measures should be implemented when removing vegetation in the construction ROW to ensure noxious weeds are not spread within, from, or to the area.

4.3 Permitted Clearing Regulations

When considering an application to remove native vegetation under the moderate or high risk pathways, the responsible authority (local council) and referral authority (DEPI) 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 previously disturbed 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 easement 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 2013 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;
- Reduction of construction ROW to the minimum width necessary in order to avoid impacts to scattered trees that do not lie 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 ROW passes;
- Shifting of the narrowed construction ROW (20m), in some cases, westwards over the existing pipeline ('reverse ROW') to avoid impacts on remnant vegetation in the 'eastern' area of the easement. 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, impacts can be reduced by shifting the narrowed ROW westwards over the old 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. Measures taken to avoid or minimise impacts are summarised in **Table B15**.

Table B15: Summary of Vegetation Clearance Measures

Vegetation Type	Strategy	Avoidance/Minimisation Measures	Property Ref	Map Ref (App B1)
Scattered Trees	Avoid	Scattered trees that qualify as LOTs to be avoided by HDD	S3-78 (KP126.6)	A-29
	Removal	Scattered trees that qualify as LOTs to be removed	Brodie Road (KP107.9) S3-54 (KP114.15) S3-61 (KP119.55)	A-1 A-12 A-19
Remnant Patches	Avoid	Impacts to waterway vegetation to be avoided by use of drilling techniques to pass under the waterway	Creightons Creek Seven Creeks Faithful Creek	A-12 A-28 A-35
	Minimise	Impacts to selected woodland areas to be minimised by narrowing of ROW to 20m	Brodie Road Kirwans Bridge-Longwood Road Longwood-Pranjip Road Government Rd (KP112.1) Geodetic Road S3-59 (KP112.5) Creightons Sidings Road S3-57 (KP116.9-117.3) Drysdale Road Government Rd (KP118.4) S3-61/2 (KP119.7) S3-64 (KP120.5-121) Airstrip Road Government Rd (KP123) S3-79 (KP126.2-126.4) Moglonemby Road S3-79 (KP127.5) S3-82 (KP129.2) Balmattum Siding Rd (KP131.5) Wadeson Road (KP134.1) Government Rd (KP135.3) S3-96 (KP136) Government Rd (KP138.9) S3-102 (KP139.4) S3-102 (KP139.8) MInahan Lane (KP140.1) S3-104 (KP140.5-141.2)	A-1 A-4 A-5 A-8 A-9 A-9 A-15 A-15/16 A-16 A-18 A-21 A-22 A-23 A-26 A-29 A-31 A-31 A-34 A-37 A-41 A-42 A-43 A-47 A-48 A-49 A-50 A-51/2
		Impacts to selected woodland areas to be minimised by narrowing of ROW to 20m and shifting of ROW by 7m over old pipeline (but remaining within existing easement)	S3-47 (KP110.8) Government Rd (KP114.4) Angle Road Castle Creek S3-79 (KP126.1) Lawrence Rd (KP128.1)	A-6 A-12 A-20 A-25 A-29 A-32

5.0 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.

Locations where the most significant issues have been identified are discussed below together with any specific mitigation measures applied.

5.1 Kirwan's Bridge – Longwood Road and Pranjip Creek KP109.64 – 109.67

One *FFG Act* listed fauna species, the Squirrel Glider, was recorded at this location. In addition, two species of flora protected on Crown Land (*Acacia mearnsii* and *A. pycnantha*) were also recorded within the construction ROW.

The construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area. Due to the nature of the road surface (bitumen), the road will be crossed via HDD. This will also allow for the preservation of habitat.

5.2 Longwood – Pranjip Road KP110.37

This roadside fits the criteria for being the *EPBC Act* listed community of *White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands*. In addition, two species of flora protected on Crown Land (*Acacia mearnsii* and *A. pycnantha*) were also recorded from the construction ROW.

Due to the nature of the road surface (bitumen), it is understood that the road will be subject to HDD. This will also allow for the preservation of this community.

5.3 Government Road KP112.1

A number of environmental issues have been identified at this location:

- Vegetation at this location qualifies as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*
- Two *FFG Act* listed fauna – Grey-crowned Babbler and Squirrel Glider – were recorded at this location. While Babblers were recorded within the general vicinity (less than half a km) of the construction ROW, their nests were observed in Golden Wattles within the construction ROW itself. Two Squirrel Gliders were observed during nocturnal surveys of this location in early December 2013.
- A population of the vulnerable (DEPI Advisory List (DSE 2005)) Late-flower Flax-lily *Dianella tarda* has been recorded within the construction ROW. In addition *A. pycnantha*, an *FFG Act* protected flora species, was also recorded within the construction ROW.

KP112.1 is an undeveloped road reserve with a rough track and the construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area. It is recommended that due to the factors highlighted above, the road reserve be excluded from use by construction traffic as an access point to the construction ROW. Consideration should also be given as to whether further measures to minimise impacts can be implemented such as:

- further reduction in the construction ROW;
- relocation of specimens of Late-flower Flax-lily *Dianella tarda* prior to preconstruction in accordance with DEPI regional guidelines.

5.4 Creighton's Siding Road KP116.88 to Drysdale Road KP117.2 and Government Road KP118.35

A number of environmental issues have been identified at these roadside reserves and adjacent private properties:

- Vegetation qualifies as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*.
- Drysdale Rd had one *FFG Act* listed fauna species, the Squirrel Glider, recorded at this location. In addition, two species of flora protected on Crown Land (*Acacia genistifolia*, and *A. pycnantha*) were also recorded on the construction ROW.
- species of flora protected on Crown Land were also recorded at Creighton's Siding Road *(A. pycnantha*) and Government Road *(A. pycnantha, Solenogyne dominii* and *Senecio quadridentatus)*.

Currently the construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area. Due to the bitumen nature of the Drysdale Rd, it is understood that the road will be subject to HDD. Consideration should also be given as to whether further measures to minimise impacts can be implemented such as:

- further reduction in the ROW to reduce native vegetation offsets and impact on threatened communities and species;
- relocation of flora species prior to preconstruction, in accordance with DEPI regional guidelines;
- increased HDD length to preserve vegetation.

5.5 Angle Road KP119.2

A number of environmental issues have been identified at this roadside:

- Two *FFG Act* listed fauna – Grey-crowned Babbler and Squirrel Glider were recorded at this location. While Babblers were recorded within the general vicinity (less than a km) of the construction ROW prior to the fauna surveys, Angle Rd is a designated Significant Roadside Area for Grey-crowned Babbler habitat.
- One Squirrel Glider was observed during nocturnal surveys of this location in early December 2013.
- A population of the vulnerable (DEPI Advisory List (DSE 2005)) Late-flower Flax-lily was recorded within the construction ROW. Another four flora species that are protected on Crown Land were also present within the construction ROW.

To minimise impacts to habitat within the area, the construction ROW at this location has been narrowed to 20m and shifted to the north-west over the existing pipeline (known as reverse ROW).

Angle Road is an undeveloped road reserve with a rough track. It is recommended that due to the factors highlighted above, the road reserve be excluded from use by construction traffic as an access point to the ROW. Consideration should also be given as to whether further measures to minimise impacts can be implemented such as:

- further reduction in the ROW;
- relocation of flora species prior to preconstruction, in accordance with DEPI regional guidelines.

5.6 Euroa Airstrip KP120.5 – 121.05

Vegetation on this private property qualifies for inclusion as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*. The entire construction ROW consists of native vegetation, being broken into six patches based on quality, totalling 1.2 hectares in area.

Modelling of native vegetation in the area by DEPI indicates that the patch intersected by the ROW covers approximately 42 hectares. Assuming that this entire patch qualifies as the EPBC listed community suggests that the area intersected by construction ROW is less than three percent.

The construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area. Overall impact to this patch of the community is therefore not considered significant.

5.7 Moglonemby Road KP127.27

Vegetation within this road reserve qualifies for inclusion as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*.

The construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area.

5.8 Lawrence Road KP128.1

Vegetation within this road reserve qualifies for inclusion as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*.

The construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area.

5.9 Government Road KP138.97

Vegetation within this road reserve qualifies for inclusion as the *EPBC Act* listed community of *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia*. In addition, three species of flora that are protected on Crown Land (*Solenogyne gunnii, Calocephalus lacteus* and *Gnaphalium sp.*, all protected daisies) were recorded at this location.

Currently the construction ROW at this location has been narrowed to 20m to minimise impacts to habitat within the area.

5.10 Minahan Lane (KP140.15) and Alan McDiarmid Road (KP141.17)

Two *FFG Act* listed fauna, Grey-crowned Babbler and Squirrel Glider were recorded at Minahan Lane, while Squirrel Glider was observed at Alan McDiarmid Road.

These two locations are treated together as it is believed that the actual construction work will have a minimal impact on these species due to the nature of the construction ROW in these roadsides. Currently the construction ROW at these locations has been narrowed to 20m to minimise impacts to habitat within the area.

5.11 Tree and Vegetation Removal

A number of trees have been identified for removal, whether within a patch or as scattered trees. As many of these contain hollows of some kind, they 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, provide nesting sites for Grey-crowned Babbler.

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

- 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.
- Tree collars to be installed on the hollow-bearing trees to be removed three days before scheduled removal to prevent fauna from re-entering hollows.
- An appropriately qualified and licenced zoologist/wildlife handler to carefully inspect all hollows for fauna using an endoscope prior to felling of hollow-bearing trees.
- 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.

- Where applicable and appropriate, restoration works should include the planting of shrubs, particularly Acacia species, within the ROW following construction.
- Lopping saplings and shrubs prior to the breeding season (June to October) in areas where babblers have been observed or nests recorded. In doing this it would eliminate the chance of nesting occurring in the construction ROW while breaking ground and construction activities are happening.