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Flora and terrestrial fauna assessment of the proposed Tarrone Gas Pipeline; North-South and East-West Investigation Options, Tarrone, Victoria

July 2009

Biosis Research

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Report to URS Australia Pty Ltd

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Final REPORT

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ABBREVIATIONS

AVW	Atlas of Victorian Wildlife (DSE 2007)
BA	Birds Australia
CAMBA	China – Australia Migratory Bird Agreement
DEWHA	Department of the Environment, Water, Heritage and the Arts
DSE	Department of Sustainability & Environment
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological vegetation class
FFG	*Flora and Fauna Guarantee Act 1988* (Vic.)
FIS	Flora Information System (DSE 2007)
IUCN	International Union for Conservation of Nature
JAMBA	Japan – Australia Migratory Bird Agreement
ROKAMBA	Republic of Korea – Australia Migratory Bird Agreement
sp.	Species (one species)
spp.	Species (more than one species)

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SUMMARY

Biosis Research Pty. Ltd. was commissioned by URS Australia Pty Ltd to undertake a flora and terrestrial fauna assessment of two alternate proposed gas feeder pipeline route investigation corridors (***North-South Option and East-West Option***) associated with the proposed site of a gas-fired power station in the rural locality of Tarrone, north of Port Fairy, in Western Victoria.

Flora and Fauna

The original vegetation over much of the study area has been almost entirely cleared, however modified remnants of three Ecological Vegetation Classes (EVCs) – Stony Knoll Shrubland, Plains Grassy Wetland and Basalt Shrubby Woodland – are present.

The fauna habitat types which occur within the study area include cleared exotic grasslands; rocky rises; planted trees and shrubs; watercourses (drainage lines), farm dams and grassy wetlands.

No flora or fauna species of national or state conservation significance were recorded from the study area.

Numerous small modified patches of Stony Knoll Shrubland and Plains Grassy Wetland within the North-South Option have ecological significance. Two small highly modified patches of Basalt Shrubby Woodland within the East-West Option have ecological significance. The remainder of the study area is highly modified and of low ecological value.

Government legislation and policy

Construction of either pipeline investigation corridor options is unlikely to trigger the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

A permit will be required from DSE under the Victorian *Flora and Fauna Guarantee Act 1988* to remove protected flora from the study area for both pipeline investigation corridor options. A permit will be required from Moyne Shire under the Victorian *Planning and Environment Act 1987* to remove native vegetation.

Removal of native vegetation is subject to state and local planning controls including the Native Vegetation Framework (Net Gain policy). Numerous patches of native vegetation are present within the study area for the North-South Option, whereas the East-West Option has only two highly modified patches of native vegetation in the current investigation corridor. Any proposed development of the site should demonstrate adherence to the three-step process

of the Native Vegetation Management Framework.

Further assessment

- Net Gain offsets should be located and a management plan prepared documenting how vegetation gains will be generated if the removal of native vegetation cannot be avoided.

1.0 INTRODUCTION

1.1 Project Background

Biosis Research Pty. Ltd. was commissioned by URS Australia Pty Ltd to undertake a flora and terrestrial fauna assessment of two proposed gas feeder pipeline investigation corridor options associated with the proposed site of a gas-fired power station in the rural locality of Tarrone, north of Port Fairy, in Western Victoria. This report details the results of field assessments conducted on seven private properties and associated road reserve crossings for the North-South Option and six private properties and associated road reserve crossings for East-West Option.

1.2 Objectives

The objectives of this investigation are to:

- Describe the vascular flora, terrestrial vertebrate fauna and habitat values of the land.
- Undertake a Net Gain assessment of any areas of native vegetation that are likely to be impacted by the proposal.
- Map any ecologically significant flora and terrestrial fauna habitats.
- Assess the likelihood of significant species to occur within the study area.
- Evaluate the conservation significance of the study area.
- Assess the implications of relevant biodiversity legislation and policy.
- Assess any potential impacts of the proposed development on the terrestrial environment.
- Identify any potential mitigation measures.
- Recommend any further assessments of the site that may be required (such as targeted searches for significant species).

1.3 Study Area

The study area is located approximately 23 kilometres north east of Port Fairy and includes two pipeline route investigation corridor options (Figure 1).

North-South Option

The North-South Option consists of an 800 m wide investigation corridor that traverses seven farming properties and is aligned north-south (Figures 2a – 2g). The investigation corridor commences north of the proposed gas-fired power

station site at Landers Lane, crosses over Woolsthorpe-Heywood Road, and terminates just north of Kangertong Road. It is approximately 10,000 m long and traverses numerous stony basalt knolls, drainage lines and low lying areas prone to seasonal inundation.

East-West Option

The East-West Option consists of an 800 m wide investigation corridor that traverses five farming properties and is aligned more or less east-west (Figures 4a – 4d). It commences east of the proposed gas-fired power station site at Tarrone North Road, crosses over Coomete Road, and terminates just east of Willatook-Warrong Road. It is approximately 7000 m long and traverses mostly improved pasture dominated by exotic grasses, but also includes two stony basalt knolls, several drainage lines and low lying areas prone to seasonal inundation.

The study area is within the Victorian Volcanic Plain Bioregion (Department of Primary Industries, Victorian Resources online: www.dpi.vic.gov.au/dpi/vro/).

2.0 METHODS

2.1 Classification

Common and scientific names for flora and fauna follow the Flora Information System (FIS 2007 version) and the Atlas of Victorian Wildlife (AVW 2007 version) of the Department of Sustainability and Environment (DSE).

Classification of native vegetation follows DSE typology which is based on ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments (www.dse.vic.gov.au/DSE/nrence.nsf/LinkView/DED128E11A362A51CA256FFF001CAB6C544ABC860B2506F7CA257004002550CC).

2.2 Literature and Database Review

Information in the FIS 2007 Version and AVW 2007 Version databases was reviewed and a search of the Birds Australia database (1998–2008) was undertaken. The Department of the Environment, Water, Heritage and the Arts (DEWHA) online database for the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act Protected Matters Search Tool, hereafter referred to as the DEWHA database) was searched. The 1750 and 2005 EVCs present within the study area and their bioregional conservation status was reviewed (DSE web site: http://www.dpi.vic.gov.au/dse/nrence.nsf/).

Existing reports including Biosis Research (2008; 2009) were reviewed.

2.3 Site Visit

2.3.1 Flora and terrestrial fauna assessment

The flora and terrestrial fauna assessment was undertaken in two stages. The western portion of the East-West Option was undertaken on 30 October 2008 and the whole of the North-South Option and the eastern section of the East-West Option was undertaken from 25 to 28 May 2009.

The whole of the study area was assessed, but effort was concentrated in areas that support native vegetation remnants and other areas with potential to support threatened species. Detailed assessment and data collection was not undertaken in highly altered sections of the subject land that contain few native species.

General observations were made on the vegetation and fauna habitat of the study area. Lists of flora and incidental terrestrial fauna observations were compiled.

The overall site condition and conservation significance of the study area was also documented.

One plant species list was collected (FIS list S1416500) and will be submitted to the Flora Information System (FIS). Fauna records will be submitted to the Atlas of Victorian Wildlife (AVW).

2.3.2 Vegetation Quality Assessment for Net Gain

Vegetation quality is assessed using a standard method contained in a manual published by the Department of Sustainability and Environment (DSE 2004). A summary of this method is provided in Appendix 1. Vegetation quality assessments contribute to the assessment of a development project against the Net Gain policy, as contained in Victoria's Native Vegetation Framework (NRE 2002).

A habitat hectare assessment was conducted and habitat score calculated for 127 patches of native vegetation (Appendix 4, Figures 2a-g, 4a). These were assigned to eight quality zones (Table 1).

2.4 Qualifications

The study effort, combined with information available from other sources, is considered suitable to assess the terrestrial ecological values of the site. As a result, there is no significant limitation to the study. However, the following qualifications apply:

- The present assessment includes only vascular flora (ferns, conifers, flowering plants) and terrestrial vertebrate fauna (birds, mammals, reptiles, frogs,). Non-vascular flora (e.g. mosses, liverworts) were not recorded apart from their cover in net gain assessment of 'patch' vegetation.
- Aquatic habitats and fauna located within and/or in proximity to the study area are not included in this assessment. No search of the Victorian Aquatic Fauna (VAF) database was conducted. The implications of relevant biodiversity legislation (e.g. EPBC Act) cannot be fully assessed without an assessment of aquatic habitat and fauna.
- Ecological surveys and assessments provide a sampling of the flora and fauna at a given time and season and some additional species that we did not detect may occur on the site.
- The Flora Information System (FIS) and the Atlas of Victorian Wildlife (AVW) databases currently provide data recorded up to June 2007. Data submitted since that time is not available.

- The study area is located within an area which is generally under-surveyed for flora and fauna. Therefore, the FIS and AVW database searches which usually include a buffer area of 5 km were increased to a buffer of 10 km to obtain a list of species that is more representative of the local area.
- Mapping is conducted using hand-held (uncorrected) GPS units and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration. As such, these points should not be relied on for design purposes.
- The flora and fauna assessment was conducted in late autumn, which is not an optimal time for survey. Some plant species are dormant and/or lack flowering or fruiting material in autumn, making detection and/or identification difficult. Some fauna species, particularly reptiles and frogs, are less active during the cooler months. In addition, migratory fauna may be seasonally absent.
- The study area was heavily grazed at the time of assessment, making identification of some flora species difficult due to lack of material for identification. The intensive grazing, however, indicates that the majority of unidentifiable species are likely to introduced.

2.5 Defining Significant Species and Communities

A number of categories and criteria are formally applied to assess the ecological significance of flora and fauna and sites supporting flora and fauna. The definition and application of the criteria are detailed in Appendix 2.

3.0 RESULTS

3.1 Flora

3.1.1 Species

Records during present assessment

North-South Option

A total of 48 indigenous and 40 introduced plant species was recorded from the study area (Appendix 3). Planted species have not been recorded unless they are spreading (naturalised).

East-West Option

A total of 18 indigenous and 30 introduced plant species was recorded from the study area (Appendix 3). Planted species have not been recorded unless they are spreading (naturalised).

Database records

North-South and East-West Options

The FIS database contains a number of recent records within the study area (FIS lists S1357200, S1357300 and S1357400) from the flora and fauna assessment of the proposed power station site (Biosis Research 2008).

The DSE Flora Information System contains records of 233 flora species from within 10 km of the study area, including a record of the nationally significant Basalt Peppercress *Lepidium hyssopifolium*. The DEWHA database predicts the occurrence of, or suitable habitat for, an additional seven listed flora species within 10 km of the study area.

3.1.2 Ecological Vegetation Classes

North-South Option

DSE mapping of 1750 vegetation models the entire study area as previously supporting a mosaic of Stony Knoll Shrubland EVC, Plains Grassy Woodland EVC and Plains Grassy Wetland EVC. Discrete patches of Plains Grassy Wetland EVC are also mapped along with Basalt Shrubby Woodland EVC, Creekline Grassy Woodland EVC and Plains Sedgy Wetland EVC. The DSE 2005 EVC vegetation mapping indicates the majority of the study area no longer

supports an EVC.

The current study, however, confirms that the study area supports two ecological vegetation classes as well as predominantly introduced vegetation (Figure 2a-g), as follows:

Stony Knoll Shrubland EVC 649

Stony Knoll Shrubland within the study area is dominated by Austral Bracken *Pteridium esculentum* and Weeping Grass *Microlaena stipoides* var. *stipoides*. The shrub layer is very sparse, and limited to occasional occurrences of heavily browsed Tree Violet *Melicytus dentatus* and Sweet Bursaria *Bursaria spinosa*.

The herb layer contains Kidney-weed *Dichondra repens*, Grassland Crane's-bill *Geranium retrorsum*, Sheep's Burr *Acaena echinata* and common Grassland Wood-sorrel *Oxalis perennans*. Common Maidenhair *Adiantum aethiopicum* occurs in the more sheltered rocky rises where it is protected from grazing.

Introduced plants are common to abundant, especially on the margins of the knolls where they dominate the ground layer. They include Sheep Sorrel *Acetosella vulgaris*, Cape Weed *Arctotheca calendula*, Rough Dog's-tail *Cynosurus echinatus*, Common Heron's-bill *Erodium cicutarium*, Flatweed *Hypochoeris radicata*, Perennial Rye-grass *Lolium perenne*, Great Brome *Bromus diandrus*, Clover *Trifolium* spp. and Onion Grass *Romulea rosea*.

Stony Knoll Shrubland occurs on rocky rises throughout the study area and 99 patches were mapped. These patches were classified into two Quality Zones (Table 1, Figures 3a-g). The better quality example of Stony Knoll Shrubland EVC is confined to Patch 12 which occurs on Kangertong Road reserve (Figure 3a).

Plains Grassy Wetland EVC 125

Areas of Plains Grassy Wetland within the investigation corridor of the North-South Option are dominated by Basalt Tussock-grass *Poa labillardierei* var. (Volcanic Plains) and a number large sedges and rushes.

The better quality examples of Plains Grassy Wetland (Patches 82, 89, 97, 98, 99 and 112) support a diversity of native species dominated by Basalt Tussock-grass *Poa labillardierei* var. (Volcanic Plains), Tall Sedge *Carex appressa* and Poong'ort *Carex tereticaulis*. Other species include Pale Rush *Juncus pallidus*, River Buttercup *Ranunculus inundatus*, Common Spike-sedge *Eleocharis acuta*, Grassland Crane's-bill, Star Cudweed *Euchiton involucratus*, White Purslane *Neopaxia australasica*, Swamp Starwort *Stellaria angustifolia*, Willow Herb *Epilobium* spp., Common Water-ribbons *Triglochin procera* and Water-milfoil

Myriophyllum spp.

The remainder of the wetlands are of poor to fair quality and support a lower cover of native species. Basalt Tussock-grass dominates these wetlands with other scattered native species including Tall Sedge, Finger Rush *Juncus subsecundus*, River Buttercup, Grassland Crane's-bill, Small Loosestrife *Lythrum hyssopifolia* and Common Spike-sedge. Introduced species are common and include Sheep Sorrel, Toowoomba Canary-grass *Phalaris aquatica*, Yorkshire Fog *Holcus lanatus*, Fiddle Dock and Spear Thistle *Cirsium vulgare*.

Predominantly introduced vegetation

This exotic grassland is dominated by introduced grasses such as Perennial Rye-grass, Wimmera Rye-grass *Lolium rigidum*, Brown-top Bent *Agrostis capillaris* var. *capillaris*, Barley Grass *Hordeum* spp., Rough Dog's-tail, Annual Meadow-grass *Poa annua* and Great Brome.

East-West Option

DSE mapping of 1750 vegetation models the entire study area as previously supporting a mosaic of Stony Knoll Shrubland EVC, Plains Grassy Woodland EVC and Plains Grassy Wetland EVC as well as a mosaic of Swamp Scrub EVC, Plains Sedgy Wetland EVC and Aquatic Herbland EVC. Discrete patches of Swampy Riparian Woodland EVC and Basalt Shrubby Woodland are also mapped. The DSE 2005 EVC vegetation mapping indicates the majority of the study area no longer supports an EVC.

The current assessment confirms that the majority of the study area consists of predominantly introduced vegetation with only one modified ecological vegetation class being supported along Tarrone North Road Reserve (Figure 4a-d), as follows:

Basalt Shrubby Woodland EVC 642

Basalt Shrubby Woodland within the study area is highly modified and is dominated by an overstorey of Black Wattle *Acacia mearnsii* and Blackwood *Acacia melanoxylon* to 8m in height. The understorey component is highly modified and consists of predominantly exotic species including Brown-top Bent, Cocksfoot *Dactylis glomerata*, Prairie Grass *Bromus catharticus* var. *catharticus*, Toowoomba Canary-grass and Carrot *Daucus carota*.

Predominantly introduced vegetation

This exotic grassland is dominated by introduced grasses such as Perennial Rye-grass, Wimmera Rye-grass *Lolium rigidum*, Brown-top Bent , Barley Grass *Hordeum* spp., Rough Dog's-tail, Annual Meadow-grass and Great Brome.

Rocky areas contain scattered native species including Austral Bracken, Weeping Grass, Tree Violet, Kidney-weed, Grassland Crane's-bill, Sheep's Burr and common Grassland Wood-sorrel but the combined cover of the native species is well below the 25% threshold for any areas to be considered as an EVC.

A patch of native vegetation on the west side of Coomete Road reserve within the pipeline investigation corridor has been mapped (Figure 4c). This area is dominated by a suite of native flora species including Kangaroo Grass *Themeda triandra* and Pale Flax-lily *Dianella longifolia*. This patch was not assessed for quality, but should be avoided if construction of the East-West Option was to proceed.

3.1.3 Condition of Native Vegetation

The majority of the site has been modified by a history of cultivation and grazing. The patches of Basalt Shrubby Woodland along Tarrone North Road within pipeline investigation corridor of the East-West Option are in poor condition, no other patches of native vegetation occur along the East-West Option investigation corridor.

The majority of the wetland and shrubland remnants within the East-West Option investigation corridor are in poor to fair condition. Stony Knoll Shrubland EVC Patch 12 is in good condition and Plains Grassy Wetland EVC patches 82, 89, 97, 98, 99 and 112 are in good condition.

3.2 Vegetation Quality Assessment for Net Gain

The EVC benchmarks for Stony Knoll Shrubland, Plains Grassy Wetland and Basalt Shrubby Woodland are provided in Appendix 5.

3.2.1 Vegetation in Patches

Eight vegetation quality zones are identified (Figure 3a-g, 4a). Assessment criteria and scores, and the overall habitat score, are shown in Table 1.

Because Stony Knoll Shrubland and Plains Grassy Wetland are naturally treeless, the site condition scores are standardised to maintain the relative weighting of site condition and landscape scores (DSE 2004).

North-South Option

The study area contains a total of 167.5 hectares of native (patch) vegetation, which comprises **34.8 habitat hectares.**

East-West Option

The study area contains a total of 1.2 hectares of native (patch) vegetation, which comprises **0.1 habitat hectares.**

Conservation significance

Conservation significance is assessed for each vegetation quality zone using the assessment criteria in the Framework (NRE 2002, p 53) and is given in Table 1.

North-South Option

As both Stony Knoll Shrubland EVC and Plains Grassy Wetland EVCs are endangered in the bioregion, the vegetation is defined as either high (if the quality score is < 0.4) or very high (if the quality score is ≥ 0.4). The presence of threatened species or habitat for such species is also a factor that may result in very high conservation significance. The threatened species rating is applicable to the remnants of Plains Grassy Wetland EVC. Although no threatened species were recorded during this survey, Wavy Swamp Wallaby-grass *Amphibromus sinuatus* has been previously recorded from patches of Plains Grassy Wetland during previous surveys for the Gas-fired Power Station plant site which adjoins both pipeline routes options (Biosis Research 2008). It is considered that all remnant patches of Plains Grassy Wetland EVC within the study area have potential to support Wavy Swamp Wallaby-grass.

As a result, Quality Zones 2 and 3 are of 'high' conservation significance and Quality Zones 4, 5, 6, 7 and 8 are of 'very high' conservation significance.

The Responsible Authority response to an application to clear for vegetation of 'high' and 'very high' conservation significance is 'clearing generally not permitted' and for vegetation of 'very high' conservation significance, Ministerial approval is required.

East-West Option

As Basalt Shrubby Woodland EVC is endangered in the bioregion, the vegetation is defined as either high (if the quality score is < 0.4) or very high (if the quality score is ≥ 0.4). Quality Zone 1 is of 'high' conservation significance and no other criteria apply that would elevate the significance to 'very high'. The Responsible Authority response to an application to clear high conservation significance vegetation is 'clearing generally not permitted' (NRE 2002).

Table 1: Quantification of native vegetation within the study area.

Quality Zone		Score out of	1	2	3	4	5	6	7	8
EVC name			**BSW**	**SKS**	**SKS**	**PGW**	**PGW**	**PGW**	**PGW**	**PGW**
EVC number			**642**	**649**	**649**	**125**	**125**	**125**	**125**	**125**
Site Condition	**Large Old Trees**	**10**	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Canopy Cover	**5**	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Lack of Weeds	**15**	2	4	4	0	7	7	0	7
	Understorey	**25**	5	5	15	10	15	15	10	15
	Recruitment	**10**	0	0	0	0	0	0	0	0
	Organic Matter	**5**	2	2	4	4	3	3	2	3
	Logs	**5**	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Landscape	**Patch Size**	**10**	1	1	1	1	1	2	1	2
	Neighbourhood	**10**	0	0	0	0	0	0	0	0
	Distance to Core	**5**	0	0	0	0	0	0	0	0
Site Condition Score			9	11	23	14	25	25	12	25
Standardiser			1	1.36	1.36	1.36	1.36	1.36	1.36	1.36
Site Condition Score (standardised)			9	14.96	31.28	19.04	34	34	16.32	34
Landscape Score			1	1	1	1	1	2	1	2
HABITAT SCORE (/100)			**0.10**	**0.16**	**0.32**	**0.20**	**0.35**	**0.36**	**0.17**	**0.36**
Area of the Quality Zone (Hectares)			1.20	113.42	0.09	9.71	16.23	9.32	6.05	12.64
HABITAT HECTARES			0.12	18.10	0.03	1.95	5.68	3.36	1.05	4.55
Bioregion			VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP
EVC Conservation Status			E	E	E	E	E	E	E	E
Conservation Significance	Conservation Status x Hab Score		High	High	High	High	High	High	High	High
	Threatened Species Rating		n/a	n/a	n/a	Very High	Very High	Very High	Very High	Very High
	Other Site Attribute Rating		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Overall Conservation Significance		High	High	High	Very High	Very High	Very High	Very High	Very High
Net Outcome Ratio			1	1	1	2	2	2	2	2

BSW = Basalt Shrubby Woodland

PGW = Plains Grassy Wetland

SKS = Stony Knoll Shrubland

E = Endangered

VVP=Victorian Volcanic Plain

^ Threatened Species Rating is determined as per the table on the following page which addresses the question: does the site provide 'the best 50%' of habitat?

The answer is used in Framework Table 5 (NRE 2002) to determine Conservation Significance.

Source: DSE (2007, habitat assessment for threatened species, p 13)

A	Is the species, or has the species been recorded as 'resident' on site?, or If the species is not 'resident' has it been recorded regularly (eg. annually) on site?	Yes – go to B No – go to D
B	Is it possible to discriminate between the importance of different populations of the species? For example, can numbers be reasonably estimated and is there available knowledge on what are typical population sizes?	Yes – go to C No – go to E
C	Does the site contain a population that is above average size or importance for the bioregion?	Yes – Best 50% of habitat No – remaining 50% of habitat
D	Does the habitat on site clearly meet one or more of the habitat requirements of the species? Is it reasonable to expect that the species is present or would make significant use of the site in the medium term (e.g. within the next 10 years)?	Yes to both – go to F No to either – no further consideration required for that species
E	Has some form of habitat modelling been undertaken for the species in the bioregion?	Yes – use this information to determine Best 50% of habitat or Remaining 50% of habitat No – go to F
F	Does the site represent above-average condition and landscape context for the relevant EVC or habitat type in the bioregion?	Yes – best 50% of habitat No – remaining 50% of habitat

Note: For species known from only one or a few sites within the bioregion, a precautionary approach to the link between occurrences and likely habitat should be applied, and all currently-known occurrences should be assigned 'best 50%' of habitat for the species.

North-South Option

The standardised habitat score for the vegetation ranges from 16 to 36. Zones 6 and 8 represent the most intact areas of native vegetation.

East-West Option

The standardised habitat score of 10 for the vegetation patch within the East-West Option investigation corridor indicates that it is a highly modified example of the original EVC that would have previously existed.

3.3 Terrestrial Fauna

3.3.1 Species

Records from the study area

North-South Option

A total of 27 indigenous terrestrial fauna species (one mammal, 22 birds, two reptiles and two frogs) and seven introduced fauna species (four mammals and three birds) were recorded from the study area during the present assessment (Appendix 6).

East-West Option

A total of 14 indigenous terrestrial fauna species (12 birds and two frogs) and three introduced fauna species (all birds) were recorded from the study area during the present assessment (Appendix 6).

Database records

North-South & East-West Options

There are no records of terrestrial fauna species from the study area in the DSE Atlas of Victorian Wildlife.

The AVW contains records of 77 vertebrate terrestrial fauna species from within 10 km of the study area: 56 birds (52 native), eight mammals (six native), eight native reptiles and five native frogs. The Birds Australia database contains records of 75 species of birds (69 native) within 10 km of the study area.

The DEWHA database lists 18 terrestrial fauna species whose geographic range includes the study area. Of these species, eight (five mammals, two birds and one frog) are listed as threatened and ten bird species are listed under the migratory provisions of the EPBC Act, as discussed in Section 5.1.

Some of the species listed on the databases may inhabit, or visit the study area from time to time. However, the study area is highly modified and does not have suitable habitat for many of the species listed on these databases (Appendix 6).

3.3.2 Terrestrial Habitats

North-South Option

The terrestrial fauna habitats traversed by the North-South investigation corridor

are consistent along the length of the study area. The habitats characteristic of this landscape result from the undulating topography comprised of basalt rocky rises and low-lying grassy seasonally inundated wetland areas. Numerous shallow drainage lines are present and farm dams and rows of planted trees also occur throughout.

Agricultural practices, particularly grazing of stock and the removal of surface basalt rocks, has modified much of the landscape and reduced its quality as habitat for native fauna. As a result, species common to these habitats are those adapted to open, altered environments and include Australian Magpie *Gymnorhina tibicen*, Willy Wagtail *Rhipidura leucophrys*, ravens and corellas. Introduced mammals, such as Red Fox *Vulpes vulpes*, European Rabbit *Oryctolagus cuniculus* and European Hare *Lepus europeaus* are also common and widespread.

The rocky rises contain a high density of embedded and surface basalt boulders and are mostly vegetated with bracken and introduced grasses. These areas provide good habitat for reptiles, including snakes (e.g. Lowland Copperhead *Austrelaps superbus* and Tiger Snake *Notechis scutatus)* and skinks (e.g. White's Skink *Egernia whitii*), and potential habitat for Fat-tailed Dunnarts *Sminthopsis crassicaudata*.

The low-lying seasonally inundated grassy wetland areas are dominated by sedges and tussock grasses. Where grazing is less intensive these areas provide good cover and habitat resources for a number of native fauna, including Stubble Quail *Coturnix pectoralis*, Swamp Rat *Rattus lutreolus*, frogs and waterbirds.

The drainage lines and farm dams within the North-South Option have been degraded by stock access and now have a reduced habitat value for native species. Scattered planted trees within this investigation corridor option offer perching, nesting and limited foraging resources for common birds.

East-West Option

The area of land traversed by the East-West Option investigation corridor is dominated by farm land that has been significantly modified for agricultural purposes. The majority of the investigation corridor now consists of exotic grassland with small areas of planted trees and shrubs, rocky rises and several seasonal drainage lines.

The planted trees and shrubs and cleared paddocks of improved pasture provide limited habitat for native fauna. Species such as Australian Magpie, Willy Wagtail, and Magpie-lark *Grallina cyanoleuca* were mostly recorded from these areas.

The rocky rises at the eastern end of the T. Brian property (Figure 4b) contain embedded basalt rock and are dominated with introduced grasses. Stock access has degraded the habitat qualities of these rises, although they are still likely to be inhabited by reptiles.

Four watercourses occur within the East-West Option pipeline investigation corridor. During the assessment, two of the watercourses were dry while the other two contained low water levels. Several have been revegetated with a mixture of exotic and native trees and shrubs and at least two have been degraded by stock. In their current state, these watercourses provide habitat and dispersal routes for common frogs. Those that are vegetated also provide cover and foraging resources for a variety of bird species. Common Froglet *Crinia signifera* and Southern Brown Tree Frog *Litoria ewingii* were heard calling at the time of the assessment and one Latham's Snipe *Gallinago hardwickii*, a regionally significant migratory species, was flushed from the reeds of the drainage line in T. Brian's property.

4.0 ECOLOGICAL SIGNIFICANCE

The following section discusses the terrestrial ecological significance of the site and species within a local, regional, state and national context. The criteria for these significance levels are outlined in Appendix 2. Note that this assessment is independent from 'conservation significance' as defined in the Native Vegetation Management Framework (Section 3.2). The Framework assessment (low, medium, high, very high) applies at the bioregional level.

4.1 Significance of the study area

North-South Option

The majority of the North-South Option supports predominantly introduced vegetation and has negligible significance for nature conservation due to the substantial modification of the original vegetation and habitats.

On the basis of the available flora and terrestrial fauna information, the study area has **regional** significance for biodiversity. It makes a contribution to biodiversity in the in the Victorian Volcanic Plain Bioregion (Appendix 2).

Reasons for the significance ratings are as follows:

- Presence of many remnants of the endangered Stony Knoll Shrubland EVC and Plains Grassy Wetland EVC.
- Presence of 21 flora species of regional significance.
- Habitat for a diversity of wetland flora and fauna species, including potential habitat for national and state significant species.

Known biodiversity values of the study area are mapped in Figures 2a-g and discussed further below.

The areas of predominantly introduced vegetation within the study area have negligible significance for biodiversity conservation.

East-West Option

The majority of the study area supports predominantly introduced vegetation and has negligible significance for nature conservation due to the substantial modification of the original vegetation and habitats.

On the basis of the available flora and terrestrial fauna information, the study area has **local** significance for biodiversity. It makes a contribution to biodiversity in the Tarrone North area (Appendix 2).

Reasons for the significance ratings are as follows:

- Presence of modified remnants of the endangered Basalt Shrubby Woodland EVC.
- Presence of five flora species of regional significance.
- Habitat for terrestrial fauna species, including potential habitat for state significant species.
- Presence of one species, Latham's Snipe, of regional significance.

Known biodiversity values of the study area are mapped in Figures 4a-d and discussed further below.

The areas of predominantly introduced vegetation within the study area have negligible significance for biodiversity conservation.

4.2 Previous assessments of significance

North-South & East West Options

There appear to have been no previous environmental assessments of the study area.

4.3 Significant Flora Species

Significant flora species recorded during the present assessment, recorded in the local area (FIS) or predicted to occur in the local area (DEWHA database) are discussed in the following section and listed in Appendix 3. Significant species are defined in Appendix 2.

4.3.1 National significance

North-South & East West Options

No species of national significance are recorded from the study area.

Database records

North-South & East West Options

The FIS database contains a record of Basalt Peppercress *Lepidium hyssopifolium* from within 10 km (Appendix 3). The closest record is an old record (undated but presumably pre-1950) from just south of Hawkesdale approximately 10km from the current study area. It is unlikely that this species would occur within the study area.

The DEWHA database predicts the occurrence of, or suitable habitat for, seven additional species listed under the EPBC Act. It is unlikely that any of the

predicted species would occur within the study area due to it being highly modified and the lack of suitable habitat (Appendix 3).

4.3.2 State significance

North-South & East West Options

No species of state significance are recorded from the study area.

Database records

North-South Option

The FIS database contains recent records (within the last 20 years) of three species of state significance from within 10km of the study area. Wavy Swamp Wallaby-grass has been recorded from the proposed Gas-fired Power Station plant site during the previous assessment (Biosis Research 2008) and therefore is likely to occur in small numbers within areas of Plains Grassy Wetland within the study area. Purple Blown-grass *Lachnagrostis punicea* (subsp. *filifolia* and subsp. *punicea*), also are considered likely to occur in the areas of Plains Grassy Wetland within the study area. All three of these species are predicted to occur in small numbers only due to the extensive modification of Plains Grassy Wetland areas and therefore a significant impact on any of the species populations if present would not be likely.

East-West Option

The FIS database contains recent records (within the last 20 years) of three species of state significance from within 10km of the study area. None of these species are likely to occur within the study area due to past and current land use and the lack of suitable habitat (Appendix 3).

4.3.3 Regional significance

North-South Option

Twenty-one recorded species have regional significance within the Victorian Volcanic Plain Bioregion (Appendix 3).

East-West Option

Five recorded species have regional significance within the Victorian Volcanic Plain Bioregion (Appendix 3).

4.4 Significant Vegetation Communities

North-South Option

Stony Knoll Shrubland and Plains Grassy Wetland EVCs have state significance for biodiversity conservation due to their high level of depletion in Victoria. Little of these ecosystems remain despite their original distribution, mainly due to agricultural development. Vegetation clearance is continuing and many remnants are degrading due to inappropriate management practices.

Stony Knoll Shrubland EVC occurs within two bioregions in the state and is classed as endangered within the Victorian Volcanic Plain Bioregion and vulnerable in the Dundas Tablelands Bioregion. Plains Grassy Wetland EVC is endangered in all 15 bioregions in which it occurs.

High quality examples of Stony Knoll Shrubland and Plains Grassy Wetland would have state significance, but all remnant patches within the study area are modified and are considered to be of regional significance.

East-West Option

Basalt Shrubby Woodland EVC has state significance for biodiversity conservation due its high level of depletion in Victoria. Little of this ecosystem remains despite its original distribution, mainly due to agricultural development and grazing. Vegetation clearance is continuing and many remnants are further degrading due to current management practices.

Basalt Shrubby Woodland EVC is endangered in all 5 bioregions in which it occurs..

Patches of Basalt Shrubby Woodland within the study area are highly modified and are considered to be of local significance.

4.5 Significant Terrestrial Fauna Species

Significant terrestrial fauna species recorded during the present assessment, recorded in the local area (AVW and/or BA database) or predicted to occur in the local area (DEWHA database) are discussed in the following section and listed in Appendix 6. Species listed under migratory provisions of the EPBC Act are addressed in Section 5.

4.5.1 National significance

Species of national significance are discussed in this section. Those species listed under the EPBC Act are further summarised in Section 5 and the status of

all nationally significant species is given in Table A.6.2 in Appendix 6.

Records from the study area

North-South & East West Options

No fauna species of national significance were recorded within the study area during the present assessment.

Database records

North-South & East West Options

No fauna species of national significance are recorded from the local area in the AVW and/or BA database.

Eight threatened fauna species listed under the EPBC Act on the DEWHA database are predicted to occur, or their habitat is predicted to occur, within five kilometres of the study area (Appendix 6).

Both options contain potential habitat for two of these species:

- **Australian Painted Snipe** *Rostratula australis* occurs in shallow terrestrial freshwater wetlands, including lakes and swamps, waterlogged grassland or saltmarsh. The species also uses modified habitats such as pasture, sewage farm dams and irrigation schemes. They remain hidden when roosting during the day, loafing on the ground under clumps of lignum or dense bushes. There is a medium likelihood for this species to occur within the low-lying grassy wetlands which are well represented throughout ***North-South Option***. Habitat within ***East-West Option*** is less represented and therefore there is a lower likelihood of Australian Painted Snipe occurring for this option.
- **Growling Grass Frog** *Litoria raniformis* prefers wetlands or flooded waterways, which contain abundant emergent vegetation. Individuals will disperse long distances, often through seemingly inhospitable habitats, in search of new wetland habitats. During the wet seasons, the wetlands within ***both investigation corridor options*** provide some potential habitat for this species but the likelihood of occurrence is low. Furthermore, the extent of available and suitable habitat within the local area is unknown and this may further reduce the likelihood of this species occurring within the study area.

4.5.2 State significance

The status of all state significant species is given in Table A.6.2 in Appendix 6.

Records from the study area

North-South & East West Options

No state significant fauna species were recorded in the study area during the present assessment.

Database records

North-South & East West Options

Six species of state conservation significance are recorded from the local area in the AVW and/or BA database (Appendix 6). Two of these species have potential to occur within both investigation corridor options. These are:

- **Brolga** *Grus rubicunda* inhabits grasslands, terrestrial wetlands and woodlands. In Victoria the species is most commonly found in the south-west, the Northern Plans and associated parts of the Murray River. Brolga predominantly feed on wetland plants, but also forage in grain and potato crops and improved pasture. During the wet seasons, the grassy wetland areas of ***North-South Option,*** and the pasture areas of ***East-West Option*** provide potential foraging habitat for Brolga and the species may visit the site on occasions.

- **Eastern Great Egret** *Ardea alba* is usually found in terrestrial wetland, estuarine and moist grassland habitats. They prefer permanent well-vegetated waterbodies but also use freshwater meadows, channels and farm dams. On occasions, this species may utilise the grassy wetland areas of the ***North-South Option*** and the low-lying wetland areas and vegetation drainage lines of ***East-West Option*** to forage.

In addition, two state significant species, Magpie Goose *Anseranas semipalmata* and White-bellied Sea-Eagle *Haliaeetus leucogaster*, or their habitat, are predicted to occur within 5km of the study area by the DEWHA database. However, it is considered unlikely these species would occur in within any sections of the study area.

4.5.3 Regional Significance

Species of regional significance include those species that are:

- listed as near threatened in the *Advisory List of the Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007b).

Records from the study area

North-South Option

No regionally significant fauna species were recorded in the pipeline investigation corridor of the North-South Option during the present assessment.

East-West Option

One regionally significant fauna species, Latham's Snipe, was recorded in the pipeline investigation corridor of the East-West Option during the present assessment.

Database records

North-South & East West Options

Six species of regional conservation significance are recorded from the local area in the AVW Database (Appendix 6).

5.0 BIODIVERSITY LEGISLATION AND GOVERNMENT POLICY

Biodiversity legislation and government policy that is potentially relevant to the pipeline investigation corridors of the North-South and East-West options associated with the Tarrone Gas-fired Power Station is discussed below.

5.1 Commonwealth

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to developments and associated activities that have the potential to significantly impact on matters protected under the Act.

Under the Act, unless exempt, actions require approval from the Australian Government Minister for Environment, Heritage and the Arts (the Minister) if they are likely to significantly impact on a 'matter of national environmental significance'. There are currently seven matters of national environmental significance (NES):

- World Heritage properties;
- National Heritage places;
- nationally listed threatened species and ecological communities;
- listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine areas; and
- nuclear actions (including uranium mining).

The EPBC Act also applies to the environment in general if actions are taken on Commonwealth land, or if actions that are taken outside Commonwealth land will impact on the environment on Commonwealth land.

Any person proposing to take an action that may, or will, have a significant impact on a matter of national environmental significance must refer the action to the Minister for determination as to whether the action is a 'controlled action' or is not approved. 'Significant impacts' are defined in *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (DEH 2006).

NES matters relevant to the proposed investigation corridor options

North-South & East West Options

There are two matters of national significance that are of relevance to the proposed development:

- listed threatened species and ecological communities; and
- listed migratory species.

These are summarised below.

Listed threatened species and/or ecological communities

Ecological communities: No listed ecological communities occur within the study area.

Listed flora species: Flora species listed under the Act are discussed in Section 4.3.1 and listed in Appendix 3. In summary, no listed species were recorded in the study area. It is unlikely any species would occur due to a lack of suitable habitat.

Listed fauna species: Fauna species listed under the Act are discussed in Section 4.3 and listed in Appendix 6. In summary, Australian Painted Snipe has a medium likelihood to occur in the investigation corridor of the North-South Option; however, it is unlikely that construction of the proposed pipeline will have a significant impact on this species.

Listed migratory species

North-South & East West Options

The list of migratory species under the EPBC Act is a compilation of species listed under four international conventions: China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Species listed under the 'migratory' provisions of the EPBC Act are listed in Appendix 5 and summarised below:

- One species, Latham's Snipe, was recorded during the present assessment in ***East-West Option*** investigation corridor.
- Three species are recorded from the local area (AVW and/or BA database).
- Eight additional species are predicted to occur, or their habitat is predicted to

occur, within 5 km of the study area (DEWHA database).

Latham's Snipe, along with some of the other migratory species listed in Appendix 6 are expected to use the study area on occasions; however, it does not provide important habitat for an ecologically significant proportion of any of these species.

Implications for the proposed investigation corridor options

North-South & East West Options

The proposed development is considered unlikely to significantly impact on any terrestrial matters of national environmental significance.

Although there is habitat within the study area for Australian Painted Snipe, and there is potential for this species to utilise the ***North-South Option*** on occasions, it is unlikely that development of the site will have a significant impact on the species or its habitat.

5.2 State

5.2.1 Flora and Fauna Guarantee Act 1988

The *Flora and Fauna Guarantee Act 1988* (FFG Act) is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes.

A permit is required from DSE to 'take' protected flora species from public land. Taking protected flora from private land requires the permission of the landowner and not DSE unless the land is declared 'critical habitat'.
Most native vegetation contains some protected flora species.

Protected flora are native plants or communities of native plants that have legal protection under the FFG Act. The protected flora list has three sources:

- plant taxa (species, subspecies or varieties) listed as threatened under the Flora and Fauna Guarantee Act 1988;
- plant taxa belonging to communities listed as threatened under the Flora and Fauna Guarantee Act 1988;
- plant taxa which are not threatened but require protection for other reasons.

Some species which are attractive or highly sought after, such as orchids and grass-trees, are protected so that removal of these species from the wild can be controlled. Not all of these species are rare in the wild or highly significant. Protection includes living (e.g. flowers, seeds, shoots, roots) and non-living

(e.g. bark, leaves, other litter) plant material (DSE website).

A permit is also required for the taking, trading or keeping of fish that are members of taxa or communities of flora and fauna on the Threatened List. The controls mean that authorisation under the FFG Act is required to catch, possess, keep or sell listed fish (DSE website).

Implications for the proposed investigation corridor options

North-South Option

The North-South Option consists of both public and private land. Kangertong Road Reserve, an area of public land, contains a patch of Stony Knoll Shrubland, a component of the FFG listed community Western (Basalt) Plains Grasslands Community. It also contains scattered occurrences of Common Maidenhair, Black Wattle (*Acacia* genus) and various common daisies (*Asteraceae* family) all of which are FFG protected species. Therefore an FFG permit from DSE is required.

The proposed development should have regard to the Action Statement prepared under the FFG Act for Western (Basalt) Plains Grassland.

East-West Option

The East-West Option consists of both public and private land. Coomete Road Reserve, an area of public land, contains scattered occurrences of native species which are a component of the FFG listed community Western (Basalt) Plains Grasslands Community and the protected species Black Wattle (*Acacia* genus). Therefore an FFG permit from DSE is required.

The proposed development should have regard to the Action Statement prepared under the FFG Act for Western (Basalt) Plains Grassland.

5.2.2 Planning and Environment Act 1987

A planning permit is required under the *Planning and Environment Act 1987* to remove, destroy or lop native vegetation on a property of more than 0.4 hectares with exceptions given in Clause 52.17 of the local planning scheme.

The Department of Sustainability and Environment (DSE) is a mandatory referral authority in some circumstances involving native vegetation removal. Under Clause 66.02 of the planning scheme, the removal of more than 0.5 hectares of an endangered vegetation type must be referred to the Department. DSE is also a referral authority if the removal of more than 5 trees of greater than 40 cm DBH OR more than 15 trees of less than 40 cm DBH is proposed. DSE is also a mandatory referral authority where there is likely to be a loss of native vegetation

on public land (eg. road reserves).

Implications for the proposed investigation corridor options

North-South & East West Options

A planning permit is required from Moyne Shire to remove, destroy or lop native vegetation unless the proposal is exempt as set out in Clause 52.17, and/or within any other provision of the planning scheme that requires a permit to remove or destroy the vegetation (DSE 2007a).

If the proposed pipeline investigation corridor options require the removal of more than 0.5 hectares of endangered native vegetation, the planning permit application would need to be referred by the Responsible Authority (Moyne Shire) to DSE. Referral to DSE would also be required if there is likely to be a loss of native vegetation on public land.

5.2.3 Native Vegetation Management Framework

The Native Vegetation Management Framework (the Framework) is State Government policy for the protection, enhancement and revegetation of native vegetation in Victoria (NRE 2002). Native vegetation provisions were introduced to all planning schemes in 1989 and the Framework was incorporated into the Victoria Planning Provisions in 2003. The primary goal of the Framework is:

> *a reversal, across the whole landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain* (NRE 2002).

In association with the regional Native Vegetation Plans, the Framework provides decision-making tools for native vegetation management.

Where an application is made to remove native vegetation, a proponent for a development must explain the steps that have been taken to:

- Avoid the removal of native vegetation, where possible.
- Minimise the removal of native vegetation.
- Appropriately offset the loss of native vegetation, if required.

A proponent for a development must demonstrate that the option to avoid and minimise vegetation clearance has been fully explored before considering offsets.

An offset may be achieved by improvements in the quality or extent of native vegetation in a selected 'offset area', either within a project area or off-site. An area that is revegetated and protected or set aside for natural regeneration may provide some, or all of the required offset. The conservation significance of

vegetation to be removed is also taken into account when offsets are determined.

In the event that a permit is granted for removal of either Basalt Shrubby Woodland EVC (***East-West Option***) or Stony Knoll Shrubland EVC (***North-South Option***), all of which is 'high' conservation significance) a multiplier of 1.5 times the habitat hectare loss would apply when calculating offset requirements. If a permit was granted for removal of any Plains Grassy Wetland EVC (***North-South Option***), (all of which is 'very high' conservation significance), a multiplier of two times the habitat hectare loss would apply when calculating offset requirements.

Managing an area of remnant vegetation on private land as an offset will generally yield a gain in habitat score of 20 % (approximately) over the nominated 10 years.

Implications for the proposed investigation corridor options

A proponent must demonstrate that the option to avoid vegetation clearance has been fully explored. If a property were bought post-1989 for development in the knowledge that native vegetation is present, the proponent could be expected to allow for retention of that vegetation in the design process, as the native vegetation controls have been in place since 1989.

North-South Option

Native vegetation remnants within the study area would meet the definition of 'high' and 'very high' conservation value under the Framework, in which case clearing is generally not permitted unless exceptional circumstances apply, with Ministerial approval in the case of 'very high' conservation value vegetation.

East-West Option

Native vegetation remnants within the study area would meet the definition of 'high' conservation value under the Framework, in which case clearing is generally not permitted unless exceptional circumstances apply.

At the time of planning application, the net gain assessment for the project will need to identify any offset obligations, and identify how these will be met, to a level of detail that satisfies Moyne Shire.

5.2.4 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. For the purposes of the Act, wildlife means indigenous vertebrate species (except those declared as pest animals),

invertebrate species listed under the FFG Act, and some introduced game species.

The Wildlife Regulations 2002 of the Act prescribe penalties for the purposes of the Wildlife Act. These include penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation (Section 9 of the Wildlife Regulations 2002). Authorisation for habitat removal may be obtained under the Wildlife Act; through a licence granted under the *Forests Act* 1958; or under any other Act.

Authorisation to destroy or possess wildlife may be required under Sections 41– 47 of the *Wildlife Act 1975*. Permits under the Act may be needed where it is expected that wildlife will need to be destroyed or relocated.

Implications for the proposed investigation corridor options

North-South & East West Options

A permit will be required for removal of habitat at the site (either investigation corridor options). It may be that removal of habitat will be covered by a permit to remove native vegetation, therefore a separate permit under the Wildlife Act would not be required.

If construction activities are likely to result in the death of wildlife or the need to move it short distances, permits will be required.

5.2.5 Glenelg Hopkins CMA Draft Native Vegetation Plan

This document (GHCMA 2000) has been prepared to develop a strategic and co-ordinated approach to the management of native vegetation within the region. The plan is designed to complement the Native Vegetation Management Framework and contains specific information and objectives relating to the region.

The information in the plan is centred on four strategic directions:

- Retain the quantity of native vegetation by minimising clearing;
- Protect native vegetation with reservation and management agreements;
- Maintain and improve the quality of native vegetation; and
- Increase the quantity of native vegetation.

Responses and offset requirements for clearing native vegetation are outlined in Appendix 3.4 of the document (page 52).

Implications for the proposed investigation corridor options

North-South & East West Options

The objectives of the Native Vegetation Plan are similar to those of the Native Vegetation Management Framework and should be met if the three step approach to achieving a Net Gain outcome is followed.

5.2.6 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

This policy provides a legal framework for state and local government agencies, businesses and communities to work together to protect and rehabilitate Victoria's surface water environments.

Beneficial uses of this channel need to be protected. Uses to be protected include:

- Maintenance of natural aquatic ecosystems and aquatic wildlife.
- Passage of indigenous fish.
- Maintenance of indigenous riparian vegetation.
- Water based recreation.
- Commercial and recreational use of edible fish and crustacea.
- Agricultural water supply.
- Other commercial purposes.

Impacts to surface water quality must not exceed water quality objectives specified to protect beneficial uses. Relevant clauses must be adhered to. Of particular relevance are:

- 43 - surface water management and works.
- 53 - vegetation protection and rehabilitation.
- 56 - construction activities.

Implications for the proposed investigation corridor options

North-South & East West Options

Construction managers need to monitor affected surface waters to assess if beneficial uses are being protected. URS Australia may need to consult with EPA and Glenelg Hopkins CMA with regard to establishing appropriate water quality objectives and monitoring requirements.

5.3 Local

5.3.1 Local Government Planning Scheme (Moyne Shire)

There are no Environmental Significance Overlays or Significant Landscape Overlays (http://www.dse.vic.gov.au/planningschemes/) covering the study area.

The study area is within the Farming Zone (FZ).

Implications for the proposed investigation corridor options

North-South & East West Options

There are no further permit requirements under the local planning scheme. However, a permit to remove native vegetation is still required under the Planning and Environment Act 1987 (Section 5.2.2).

6.0 POTENTIAL IMPACTS AND MITIGATION

6.1 Potential impacts

North-South Option

Development of the study area is likely to have ecological impacts on flora and fauna values. Depending on final alignment and construction footprint width of the proposed gas pipeline, the level and type of impacts cannot be determined. The areas of greatest value are patches of Stony Knoll Shrubland and Plains Grassy Wetland.

East-West Option

The proposed development will have a localised direct impact through the removal of the ecological values identified within the study area, including patches of modified Basalt Shrubby Woodland.

6.1.1 Direct Impacts

The primary source of direct impacts to flora and fauna would occur as a result of vegetation and habitat removal required by the proposed pipeline and associated development footprint.

Whilst these direct impacts cannot be quantified until the design is finalised and the whole of the proposed pipeline route is assessed, it is intended that this report be used to guide design of the proposed development so as to minimise direct impacts to flora and fauna.

The primary source of direct impacts to flora and fauna would occur as a result of vegetation and habitat removal required by the proposed development footprint. These potentially include:

North-South Option

- Removal or reduction in the extent of native vegetation.
- Removal of wetland and rocky areas that provide habitat for a range of native fauna.
- Removal of Stony Knoll Shrubland EVC and Plains Grassy Wetland EVC.
- Reductions in population size of regionally significant flora species.

East-West Option

- Removal or reduction in the extent of native vegetation.
- Removal of wetland, woodland and rocky areas, that provide habitat for a

range of native fauna.

- Removal of Basalt Shrubby Woodland EVC.
- Reductions in population size of regionally significant flora species.

6.1.2 Indirect Impacts

Indirect impacts of development typically involve the modification and degradation of adjacent vegetation and habitat (terrestrial and aquatic) not removed by the development footprint. They include the following:

North-South & East West Options

- Loss of any vegetation that survives construction process as a result of changed environmental conditions.
- Displacement of some fauna species from the site.
- Accidental loss of or damage to retained vegetation during the construction phase.
- Degradation of habitat values in the local area due to incremental loss of remnant vegetation.

6.2 Potential Mitigation Measures

There may be opportunities to reduce (mitigate) potential impacts through alterations to the design or management following review of this assessment.

North-South Option

The vegetation, especially the areas of Plains Grassy Wetland and Stony Knoll Shrubland, indicated in the current survey should be considered during the detailed design phase of the project. Impacts on vegetation and habitats should be avoided and minimised as far as possible, in accordance with Net Gain policy.

East-West Option

The area of Basalt Shrubby Woodland which occurs along Tarrone North Road Reserve should be considered during the detailed design phase of the project. Impacts on vegetation and habitats should be avoided and minimised, in accordance with Net Gain policy.

There may be opportunities to reduce (mitigate) potential impacts through alterations to the design or management following review of this assessment. The vegetation indicated in the current survey should be considered during the detailed design phase of the project. Impacts on vegetation and habitats should be avoided and minimised as far as possible, in accordance with Net Gain policy.

6.2.1 Net Gain

The primary mechanism for mitigating ecological impacts is through adherence to Net Gain policy.

The 3-step process to achieving Net Gain should be followed: (1) first attempt to avoid any native vegetation loss, (2) minimise any unavoidable loss of native vegetation, and (3) offset any native vegetation losses.

North-South Option

Step 1: Avoid

Native vegetation along the pipeline investigation corridor could be avoided by restricting development to the highly modified and cleared areas that support no native vegetation as well as altering the route of the pipeline to avoid areas of native vegetation. This will be difficult if not impossible for the North-South Option where areas of Stony Knoll Shrubland and Plains Grassy Wetland are scattered throughout the study area.

Step 2: Minimise

If removal of native vegetation cannot be avoided, it should be minimised so that areas of lower quality and lower conservation significance are impacted in preference to higher conservation significance or better quality vegetation.

Step 3: Offset

Any native vegetation losses should be offset as per *Victoria's Native Vegetation Management – A Framework for Action* or Net Gain policy (NRE 2002).

A full Net Gain assessment will be required for any unavoidable vegetation losses once the final alignment is known.

East-West Option

Step 1: Avoid

Native vegetation along Tarrone North Road Reserve could be avoided by altering the current route of the pipeline to avoid areas of native vegetation along the roadside.

Step 2: Minimise

If removal of native vegetation cannot be avoided, it should be minimised so that larger patches of native vegetation along the roadside are avoided.

Step 3: Offset

Any native vegetation losses should be offset as per *Victoria's Native Vegetation Management – A Framework for Action* or Net Gain policy (NRE 2002).

Development footprint and final pipeline option alignments have not been

decided upon. A full Net Gain assessment should be conducted for unavoidable vegetation loss once a final design is agreed upon.

6.2.2 Other Mitigation Measures

There are a number of options to mitigate potential ecological impacts of the proposed development. Potential measures to minimise the ecological impact of development of the land are as follows:

Further survey

- If required, Net Gain offsets should be located and an offset management plan prepared documenting how vegetation gains will be generated.

Pre-construction

- All areas of retained native vegetation adjacent to the final pipeline route should be protected by temporary fencing during construction.
- A Construction Environmental Management Plan should be developed prior to commencement of construction, and environmental management issues should be incorporated into the workforce induction program.
- Signage, induction and careful supervision of contractors should be implemented.

Construction

- Disturbance of native vegetation should be kept to a minimum.
- Any trees which are removed or lopped as part of the proposed development should be incorporated into areas of existing vegetation, where they can continue to provide fauna habitats.
- Ensure equipment storage, and stockpiles of waste materials are not located in areas of remnant vegetation.
- Follow appropriate hygiene measures for all machinery to ensure removal of weed seeds before entering the site.
- Control all noxious and woody environmental weeds arising from the proposed works.

Post-construction

- Use of site indigenous native species for landscape plantings will enhance the natural values of the study site. Plantings should contain species of local

provenance and appropriate for Stony Knoll Shrubland EVC, Plains Grassy Wetland EVC and Basalt Shrubby Woodland EVC in the Victorian Volcanic Plain Bioregion. If native vegetation is to be removed, seeds could be collected from these plants in advance and propagated for use in site rehabilitation.

The current assessment indicates that ***East-West Option*** would have the least impact on native flora and fauna.

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APPENDICES

APPENDIX 1
DSE Vegetation Assessment Methodology

A1.1 Habitat hectares

Habitat hectares are calculated where indigenous understorey plant cover is at least 25% of total understorey plant cover, or where a group of trees (at least 3 trees) has a tree canopy cover of at least 20% (DSE 2007a, p 10). Such sites are termed 'patches'.

Each vegetation patch has one or more habitat quality zones. Each habitat zone consists of one ecological vegetation class (EVC) and has uniform quality within limits.

The assessment process compares the vegetation of the habitat zone against a DSE 'benchmark' description of the EVC, using methods described in the DSE assessment manual (DSE 2004). A habitat score for the habitat zone is calculated by this method.

Each habitat zone has a habitat score of between 0 and 100, with extensive intact vegetation having a theoretical score of 100. Habitat score is calculated using ten components: large trees, tree canopy cover, understorey, weediness, recruitment, organic litter, logs, patch size, neighbourhood context and distance to core area. In naturally treeless vegetation, or vegetation that can exist in different structural forms, the score is standardised to account for the absence of some or all 'woody' criteria.

The habitat hectare value of a habitat zone is given by its habitat score (expressed as a decimal between 0 and 1) multiplied by its land area in hectares. For example, 4 hectares of vegetation with a habitat score of 50 contain 2.0 habitat hectares.

Habitat hectares are used to measure losses arising from clearing, and also gains obtained through protection measures and active management of existing vegetation.

A1.2 Indigenous canopy trees

The following information on indigenous canopy trees does not apply if the subject land contains only treeless vegetation types.

Large Old Trees within patches

'Large Old Trees' within native vegetation patches are subject to offset requirements, as outlined in the Native Vegetation Management Framework (NRE 2002: Table 6, p 55). Large Old Trees have a minimum stem diameter specified in the relevant EVC benchmark. Trees smaller than this benchmark size within patches are not included in this assessment, as they are addressed in the habitat hectare analysis.

Scattered trees outside patches

Trees over predominantly introduced understoreys are offset through tree protection/replacement ratios.

Trees in areas where less than 25% of the understorey cover is indigenous are assessed as 'scattered old trees'. Trees are offset by the protection of other old trees and/or recruitment of new trees.

For land parcels (usually a title boundary) where tree density is greater than eight per hectare, the offset ratios are outlined in the Native Vegetation Management Framework (NRE 2002, p 55). For areas where tree density is less, the offset ratios are specified in the regional Native Vegetation Plan. Offsets for small trees are also included in the Native Vegetation Plan.

APPENDIX 2
Significance Assessment

The common language meaning of significance is 'importance; consequence' (Macquarie Dictionary). While the general meaning of this is clear, in natural resource assessment and management this meaning needs to be defined in scientific terms.

A2.1 Significant Species and Communities

Species and community conservation significance is defined as follows:

A taxon or community is significant at a particular geographic level (national, state, regional, local) when it is considered to be rare or threatened at that level.

A taxon is an officially recognised species, subspecies or variety of a species.
The significance of a taxon or community is a function of its rarity within a specified geographic context: nation, state, region, local area. In each context a taxon or community has a conservation status: not rare, rare, vulnerable, endangered, extinct. 'Threatened' is a combination of the 'vulnerable' and 'endangered' categories.

The significance of the taxon or community is the largest geographic context in which it is at least rare. For example, if a species is uncommon in a state and rare within a region of that state, it has regional significance within that region.

Species listed as 'poorly known' are not considered rare or threatened at present and are assigned an intermediate rating. For example, a species listed as poorly known in a state list has potential state significance and is assigned 'regional/state' significance.

A2.2 Sites

Site conservation significance is defined as follows:

A site is significant at a particular geographic level (national, state, regional, local) when it is considered to make a substantial contribution to biodiversity at that level.

As a guideline, one per cent of the total extant population of a significant species within a specified geographic area or of the total extant area of a significant ecological community within a specified geographic area is a threshold for 'substantial contribution'. Comprehensive data are not always available for such assessments and interpretation of available data and information is usually required.

In some cases a site may be small when viewed in isolation but it forms an integral and functional part of a larger site of significance. If there is no ecological reason to divide the larger site, then the rating that applies to the larger site applies to the smaller site.

Sites with a particularly high level of local or regional significance are assigned 'high local' or 'high regional' significance, respectively. These terms are not applied to state and national levels of significance or to species and communities.

Sites documented in state government databases, such as the Victorian biosite database, are accepted along with their significance ratings by Biosis Research.

To determine whether a site makes a 'substantial contribution' to biological conservation, it is assessed against the following criteria:

- Size – overall size of site or habitats/vegetation communities within the site.
- Significant species and populations – number of significant species or populations known or likely to occur on the site.
- Significant habitat or vegetation communities – presence and extensiveness of significant habitats and vegetation communities on the site.
- Ecological integrity – degree of intactness, level of past disturbance (such as weed invasion) and overall condition of vegetation communities on the site.
- Richness and diversity – quantity of species, vegetation communities and habitats.
- Connectivity – Quality and quantity of linkages between site and adjacent areas of native vegetation/habitat (wildlife corridor value).
- Viability – level of existing and/or future disturbances, degree of existing and/or future fragmentation.
- Distribution – proximity of the site to known distribution limits for significant species, populations, habitats and/or vegetation communities.
- Level of conservation – representation of site attributes in conservation reserves.

As a guideline, *one per cent* of the total extant population of a significant species within a specified geographic area or of the total extant area of a significant ecological community within a specified geographic area is a threshold for 'substantial contribution'. Comprehensive data are seldom available and interpretation of limited available data and information is usually required.

A2.3 Scale: Geographic Context

Significance is determined within specified geographic contexts:

- Australia
- State Victoria
- Region Victorian Volcanic Plain Bioregion (DSE Flora Information System)
- Local area Tarrone area (within 10 km of the study area)

A2.4 Conservation Status: Degree of Threat

Official government lists define species and communities that are rare or threatened (and thus significant) at *national* and/or *state* levels. Most of these lists appear as schedules under legislation and are followed unless further evidence is available.

Species and communities that are rare or threatened at *regional* and *local* levels are determined from the available literature, data and information, and consultation with relevant individuals where relevant reports and government listings are not available.

National Significance

Species

Species of national significance are either:

- Flora or fauna listed as extinct, extinct in the wild, critically endangered, endangered or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

- Flora listed as rare in Australia in *A Census of the Vascular Plants of Victoria* (Walsh and Stajsic 2007).
- Species considered to be rare or threatened in Australia by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of national significance are either:

- Listed as critically endangered, endangered or vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.
- Considered to be rare or threatened in Australia by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Ecological communities include flora and/or fauna communities.

State Significance

Species

Species of state significance in Victoria are either:

- Flora or fauna listed as threatened under the *Flora and Fauna Guarantee Act 1988.*
- Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System 2007 Version.
- Flora listed as poorly known in Australia in *Census of the Vascular Plants of Victoria* (Walsh and Stajsic 2007).
- Fauna listed as extinct, critically endangered, endangered or vulnerable in the *Advisory List of Threatened Vertebrate Fauna in Victoria, 2007* (DSE 2007b) or fauna listed as conservation dependent under the *Environment Protection and* Biodiversity Conservation Act 1999.
- Species considered to be rare or threatened in Victoria by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of state significance in Victoria are either:

- Listed as threatened under the *Flora and Fauna Guarantee Act 1988.*
- Considered to be rare or threatened in Victoria by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Regional Significance

Species

Species of regional significance are:

- Flora recorded from less than 5% of documented sites (quadrats/defined area lists) from the Victorian Volcanic Plain Bioregion in the DSE Flora Information System unless there is reason to believe they are undersampled in the available data.
- Fauna considered to be rare or threatened at the bioregional level by Biosis Research using IUCN criteria where applicable (IUCN 2001) or fauna considered to be near-threatened in the *Advisory List of Threatened Vertebrate Fauna in Victoria, 2007* (DSE 2007b).

Communities

Ecological communities of regional significance in Victoria are:

- Listed as an endangered, vulnerable or depleted ecological vegetation class within a particular bioregion in a Native Vegetation Plan.
- Considered to be rare or threatened at the bioregional level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Local Significance

Species

Species of local significance are:

- Flora or fauna considered to be rare or threatened at the local level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

Communities

Ecological communities of local significance are:

- Considered to be rare or threatened at the local level by Biosis Research using IUCN criteria where applicable (IUCN 2001).

No Significance

Species and ecological communities are not significant when they are considered not to be rare or threatened at any geographic level by Biosis Research using IUCN criteria where applicable (IUCN 2001). Species that are not indigenous to a given study area are not significant. Plantings are generally not significant.

APPENDIX 3
Flora Results

A3.1 Flora species recorded from study area

Table A3.1. Flora species recorded from the study area (FIS list S14165).

P Protected flora under FFG Act (public land only)

Species of regional significance are highlighted in **bold**

All indigenous species have at least local significance

Status	Scientific name	Common name	Investigation Corridor	
			N-S Option	E-W Option
Indigenous species:				
P	*Acacia mearnsii*	Black Wattle	+	+
	Acacia melanoxylon	Blackwood	+	+
	Acaena echinata	Sheep's Burr	+	+
	Acaena novae-zelandiae	Bidgee-widgee	+	
P	***Adiantum aethiopicum***	**Common Maidenhair**	+	
	Austrodanthonia pilosa	**Velvet Wallaby-grass**	+	
	Austrodanthonia spp.	Wallaby Grass	+	+
	Austrostipa spp.	Spear Grass	+	
	Bursaria spinosa	**Sweet Bursaria**	+	+
	Carex appressa	Tall Sedge	+	
	Carex tereticaulis	**Poong'ort**	+	
	Craspedia spp.	Billy Buttons	+	
	Crassula helmsii	**Swamp Crassula**	+	
	***Crassula sieberiana* s.s.**	**Sieber Crassula**	+	
	Cynoglossum suaveolens	**Sweet Hound's-tongue**	+	
	***Dianella longifolia* s.l.**	**Pale Flax-lily**		+
	Dichondra repens	Kidney-weed	+	+
	Eleocharis acuta	Common Spike-sedge	+	
	Epilobium spp.	Willow Herb	+	
	Eragrostis brownii	**Common Love-grass**		+
P	***Euchiton involucratus* s.s.**	**Star Cudweed**	+	
	***Geranium retrorsum* s.s.**	**Grassland Crane's-bill**	+	
	Geranium spp.	Crane's Bill	+	
	Glycine clandestina	**Twining Glycine**	+	
	Hydrocotyle foveolata	**Yellow Pennywort**	+	
	Juncus homalocaulis	**Wiry Rush**		+
	Juncus pallidus	**Pale Rush**	+	
	Juncus pauciflorus	**Loose-flower Rush**	+	
	Juncus subsecundus	Finger Rush	+	+
	Lachnagrostis filiformis	Common Blown-grass		
P	*Leptorhynchos* spp.	Buttons	+	
	Lobelia spp.	Lobelia	+	
	Lythrum hyssopifolia	Small Loosestrife	+	+
	***Melicytus dentatus* s.s.**	**Tree Violet**	+	+
	Microlaena stipoides var. *stipoides*	Weeping Grass	+	+

Status	Scientific name	Common name	Investigation Corridor	
			N-S Option	E-W Option
	Myriophyllum spp.	Water-milfoil	+	
	Neopaxia australasica	**White Purslane**	+	
	Oxalis perennans	Grassland Wood-sorrel	+	+
	Phragmites australis	Common Reed		+
	***Poa labillardierei* var. (Volcanic Plains)**	**Basalt Tussock-grass**	+	
	Polygonum spp.	Hogweed	+	
	***Potamogeton* tricarinatus**	**Floating Pondweed**	+	
	Pteridium esculentum	Austral Bracken	+	+
	Ranunculus amphitrichus	**Small River Buttercup**	+	
	Ranunculus spp.	Buttercup	+	
	Schoenus apogon	Common Bog-sedge	+	+
P	***Senecio glomeratus***	**Annual Fireweed**	+	
	Senecio spp.	Groundsel	+	
P	*Solenogyne dominii*	Smooth Solenogyne	+	
	Stellaria angustifolia	**Swamp Starwort**	+	
	Themeda triandra	Kangaroo Grass	+	+
	***Triglochin procera* s.s.**	**Common Water-ribbons**	+	
Introduced species:				
	Acetosella vulgaris	Sheep Sorrel	+	+
	Agrostis capillaris	Brown-top Bent	+	+
	Anthemis spp.	Chamomile		+
	Arctotheca calendula	Cape Weed	+	+
	Bromus catharticus var. *catharticus*	Prairie Grass	+	+
	Bromus diandrus	Great Brome	+	+
	Centaurium erythraea	Common Centaury	+	+
	Cerastium glomeratum s.s.	Sticky Mouse-ear Chickweed	+	
	Cirsium vulgare	Spear Thistle	+	+
	Cynosurus echinatus	Rough Dog's-tail	+	+
	Dactylis glomerata	Cocksfoot	+	+
	Daucus carota	Carrot	+	
	Erodium botrys	Big Heron's-bill	+	+
	Erodium cicutarium	Common Heron's-bill	+	+
	Freesia spp.	Freesia		+
	Helminthotheca echioides	Ox-tongue	+	
	Holcus lanatus	Yorkshire Fog	+	
	Hordeum leporinum	Barley-grass	+	
	Hordeum spp.	Barley Grass	+	
	Hypochoeris radicata	Flatweed	+	+
	Leontodon taraxacoides subsp. *taraxacoides*	Hairy Hawkbit	+	+
	Lolium perenne	Perennial Rye-grass	+	+
	Lolium rigidum	Wimmera Rye-grass	+	+
	Lycium ferocissimum	African Box-thorn	+	
	Malva spp.	Mallow	+	
	Paspalum dilatatum	Paspalum	+	+
	Phalaris aquatica	Toowoomba Canary-grass	+	+
	Pinus radiata	Radiata Pine	+	+
	Plantago coronopus	Buck's-horn Plantain	+	+
	Plantago lanceolata	Ribwort	+	+
	Poa annua	Annual Meadow-grass	+	+

Status	Scientific name	Common name	Investigation Corridor	
			N-S Option	E-W Option
	Romulea rosea	Onion Grass	+	+
	Rosa rubiginosa	Sweet Briar	+	+
	Rumex pulcher subsp. *pulcher*	Fiddle Dock	+	+
	Setaria spp. (naturalised)	Pigeon Grass		+
	Silybum marianum	Variegated Thistle	+	+
	Solanum nigrum s.s.	Black Nightshade	+	
	Soliva sessilis	Jo Jo	+	
	Sonchus asper s.s.	Rough Sow-thistle	+	
	Sporobolus africanus	Rat-tail Grass	+	
	Trifolium repens var. *repens*	White Clover	+	+
	Trifolium spp.	Clover	+	
	Trifolium subterraneum	Subterranean Clover	+	+

A3.2 Significant flora species

Table A3.2 Flora of national or state significance recorded or predicted to occur within 5 km of the study area

Australian status:

- E Listed under EPBC Act as endangered
- V Listed under EPBC Act as vulnerable
- R Rare (Walsh & Stajsic 2007)

Victorian status (DSE Flora Information System, 2007 Version):

- e Endangered
- v Vulnerable
- r Rare
- f Listed as threatened under FFG Act

Source of record:

- FIS: Recorded within 5 km of centre of study area, DSE Flora Information System
- DEWHA: Predicted to occur in local area, EPBC Act Protected Matters Search Tool

Likelihood scale:

	No habitat present	Habitat poorly represented	Habitat moderately well represented	Habitat well represented
No records from bioregion (terrestrial) or neighbouring basin (aquatic)	Negligible	Negligible	Low	Medium
Records from bioregion (terrestrial) or basin/neighbouring basin (aquatic)	Negligible	Low	Medium	High
Records from within 5 km (terrestrial) or from catchment (aquatic)	Negligible	Medium	High	High

Scientific Name	Common Name	Source	Status	Likelihood of occurrence	
				Investigation Corridor	
				N-S Option	E-W Option
National Significance					
Carex tasmanica	Curly Sedge	DEWHA	Vvf	Low	Low
Senecio psilocarpus	Swamp Fireweed	DEWHA	Vv	Medium	Low
Taraxacum cygnorum	Coast Dandelion	DEWHA	Vef	Negligible	Negligible
Thelymitra matthewsii	Spiral Sun-orchid	DEWHA	Vvf	Low	Negligible
Glycine latrobeana	Clover Glycine	DEWHA	Vvf	Low	Low
Thelymitra epipactoides	Metallic Sun-orchid	DEWHA	Eef	Negligible	Negligible
Lepidium hyssopifolium	Basalt Peppercress	FIS	Eef	Low	Low
Prasophyllum frenchii	Maroon Leek-orchid	DEWHA	Eef	Low	Low
State Significance					
Amphibromus sinuatus	Wavy Swamp Wallaby-grass	FIS	v	High	Low
Lachnagrostis punicea subsp. *filifolia*	Purple Blown-grass	FIS	Rrf	High	Low
Lachnagrostis punicea subsp. *punicea*	Purple Blown-grass	FIS	Rr	High	Low

APPENDIX 4
Native vegetation in patches

A4.1 Native vegetation in patches

Table A4.1 Patches of native vegetation recorded within the study area

Patch Number	Ecological Vegetation Class	Quality Zone	Area (Ha)
1	Plains Grassy Wetland	4	0.37
2	Plains Grassy Wetland	4	3.30
3	Stony Knoll Shrubland	2	0.52
4	Plains Grassy Wetland	4	1.87
5	Stony Knoll Shrubland	2	0.22
6	Plains Grassy Wetland	4	0.49
7	Plains Grassy Wetland	4	0.15
8	Stony Knoll Shrubland	2	4.97
9	Stony Knoll Shrubland	2	2.04
10	Stony Knoll Shrubland	2	0.76
11	Plains Grassy Wetland	4	0.70
12	Stony Knoll Shrubland	2	0.09
13	Stony Knoll Shrubland	2	0.92
14	Stony Knoll Shrubland	2	0.37
15	Stony Knoll Shrubland	2	0.32
16	Stony Knoll Shrubland	2	1.58
17	Stony Knoll Shrubland	2	0.71
18	Stony Knoll Shrubland	2	0.19
19	Plains Grassy Wetland	4	0.51
20	Stony Knoll Shrubland	2	0.92
21	Stony Knoll Shrubland	2	1.61
22	Stony Knoll Shrubland	2	0.91
23	Stony Knoll Shrubland	2	0.63
24	Stony Knoll Shrubland	2	1.14
25	Stony Knoll Shrubland	2	0.06
26	Stony Knoll Shrubland	2	0.32
27	Stony Knoll Shrubland	2	0.56
28	Stony Knoll Shrubland	2	0.46
29	Stony Knoll Shrubland	2	0.30
30	Stony Knoll Shrubland	2	1.15
31	Stony Knoll Shrubland	2	0.88
32	Stony Knoll Shrubland	2	1.47
33	Stony Knoll Shrubland	2	1.58
34	Stony Knoll Shrubland	2	0.09
35	Stony Knoll Shrubland	2	0.57
36	Stony Knoll Shrubland	2	0.28
37	Stony Knoll Shrubland	2	0.70
38	Stony Knoll Shrubland	2	2.41
39	Stony Knoll Shrubland	2	0.19
40	Stony Knoll Shrubland	2	0.30
41	Stony Knoll Shrubland	2	0.16
42	Stony Knoll Shrubland	2	0.55
43	Stony Knoll Shrubland	2	0.11
44	Stony Knoll Shrubland	2	1.34

Patch Number	Ecological Vegetation Class	Quality Zone	Area (Ha)
45	Stony Knoll Shrubland	2	0.61
46	Stony Knoll Shrubland	2	0.13
47	Plains Grassy Wetland	4	1.17
48	Stony Knoll Shrubland	2	0.34
49	Stony Knoll Shrubland	2	0.28
50	Plains Grassy Wetland	4	0.77
51	Plains Grassy Wetland	4	0.08
52	Stony Knoll Shrubland	2	0.12
53	Stony Knoll Shrubland	2	0.20
54	Stony Knoll Shrubland	2	0.14
55	Stony Knoll Shrubland	2	0.35
56	Stony Knoll Shrubland	2	0.39
57	Stony Knoll Shrubland	2	0.39
58	Stony Knoll Shrubland	2	0.26
59	Stony Knoll Shrubland	2	0.10
60	Stony Knoll Shrubland	2	0.20
61	Stony Knoll Shrubland	2	0.35
62	Stony Knoll Shrubland	2	3.41
63	Stony Knoll Shrubland	2	0.60
64	Plains Grassy Wetland	4	0.11
65	Plains Grassy Wetland	4	0.21
66	Stony Knoll Shrubland	2	0.65
67	Stony Knoll Shrubland	2	0.12
68	Stony Knoll Shrubland	2	0.19
69	Stony Knoll Shrubland	2	0.11
70	Stony Knoll Shrubland	2	0.17
71	Stony Knoll Shrubland	2	0.16
72	Stony Knoll Shrubland	2	0.14
73	Stony Knoll Shrubland	2	0.66
74	Stony Knoll Shrubland	2	0.22
75	Stony Knoll Shrubland	2	0.28
76	Stony Knoll Shrubland	2	0.50
77	Stony Knoll Shrubland	2	0.18
78	Stony Knoll Shrubland	2	0.05
79	Stony Knoll Shrubland	2	0.13
80	Stony Knoll Shrubland	2	0.05
81	Stony Knoll Shrubland	2	0.48
82	Plains Grassy Wetland	5	2.08
83	Stony Knoll Shrubland	2	0.46
84	Stony Knoll Shrubland	2	0.32
85	Stony Knoll Shrubland	2	0.43
86	Stony Knoll Shrubland	2	0.11
87	Stony Knoll Shrubland	2	0.38
88	Stony Knoll Shrubland	2	0.12
89	Plains Grassy Wetland	5	3.33
90	Stony Knoll Shrubland	2	0.23
91	Stony Knoll Shrubland	2	0.72
92	Stony Knoll Shrubland	2	0.17
93	Stony Knoll Shrubland	2	3.08
94	Stony Knoll Shrubland	2	0.81
95	Stony Knoll Shrubland	2	1.54
96	Stony Knoll Shrubland	2	0.47
97	Plains Grassy Wetland	6	9.32

Patch Number	Ecological Vegetation Class	Quality Zone	Area (Ha)
98	Plains Grassy Wetland	5	2.17
99	Plains Grassy Wetland	5	7.48
100	Stony Knoll Shrubland	2	0.50
101	Plains Grassy Wetland	5	1.18
102	Stony Knoll Shrubland	2	1.02
103	Stony Knoll Shrubland	2	0.19
104	Stony Knoll Shrubland	2	0.12
105	Stony Knoll Shrubland	2	0.11
106	Stony Knoll Shrubland	2	0.95
107	Stony Knoll Shrubland	2	0.41
108	Stony Knoll Shrubland	2	0.05
109	Stony Knoll Shrubland	2	0.05
110	Stony Knoll Shrubland	2	0.09
111	Plains Grassy Wetland	7	2.29
112	Plains Grassy Wetland	8	12.64
113	Stony Knoll Shrubland	2	24.30
114	Plains Grassy Wetland	7	0.32
115	Plains Grassy Wetland	7	0.66
116	Plains Grassy Wetland	7	0.46
117	Plains Grassy Wetland	7	0.81
118	Plains Grassy Wetland	7	0.28
119	Stony Knoll Shrubland	2	23.45
120	Stony Knoll Shrubland	2	0.33
121	Stony Knoll Shrubland	2	3.98
122	Basalt Shrubby Woodland	1	0.91
123	Basalt Shrubby Woodland	1	0.29
124	Stony Knoll Shrubland	2	3.01
125	Stony Knoll Shrubland	2	2.61
126	Stony Knoll Shrubland	2	0.17
127	Plains Grassy Wetland	7	1.22

APPENDIX 5
EVC Benchmarks
(http://www.dse.vic.gov.au/dse/nrence.nsf/)

Plains Grassy Wetland - EVC 125

Basalt Shrubby Woodland - EVC 642

Stony Knoll Shrubland - EVC 649

APPENDIX 6
Fauna Results

A6.1 Fauna species recorded from study area

Table A6.1. Vertebrate fauna recorded from the study area during the present assessment

Key:
* introduced species

Scientific name	Common name	Investigation Corridor	
		N-S Option	E-W Option
Birds			
Vanellus miles	Masked Lapwing	4	
Gallinago hardwickii	Latham's Snipe		4
Threskiornis molucca	Australian White Ibis		4
Anas superciliosa	Pacific Black Duck		4
Falco berigora	Brown Falcon	4	
Falco cenchroides	Nankeen Kestrel	4	
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo		4
Cacatua galerita	Sulphur-crested Cockatoo	4	
Cacatua tenuirostris	Long-billed Corella	4	
Eolophus roseicapilla	Galah	4	
Platycercus elegans elegans	Crimson Rosella	4	
Psephotus haematonotus	Red-rumped Parrot		4
Hirundo neoxena	Welcome Swallow	4	4
Rhipidura leucophrys	Willie Wagtail	4	4
Petroica phoenicea	Flame Robin	4	
Colluricincla harmonica	Grey Shrike-thrush		4
Grallina cyanoleuca	Magpie-lark	4	4
Coracina novaehollandiae	Black-faced Cuckoo-shrike	4	
Epthianura albifrons	White-fronted Chat	4	
Acanthiza pusilla	Brown Thornbill	4	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	4	
Cisticola exilis	Golden-headed Cisticola	4	
Malurus cyaneus	Superb Fairy-wren	4	
Anthochaera carunculata	Red Wattlebird	4	
Anthus novaeseelandiae	Australasian Pipit	4	4
Gymnorhina tibicen	Australian Magpie	4	4
Corvus coronoides	Australian Raven	4	4
Corvus mellori	Little Raven	4	
Alauda arvensis	European Skylark*	4	4

Scientific name	Common name	Investigation Corridor	
		N-S Option	E-W Option
Passer domesticus	House Sparrow*		4
Carduelis carduelis	European Goldfinch*	4	4
Sturnus vulgaris	Common Starling*	4	
Mammals			
Rattus lutreolus	Swamp Rat	4	
Mus musculus	House Mouse*	4	
Oryctolagus cuniculus	European Rabbit*	4	
Lepus europeaus	European Hare*	4	
Vulpes vulpes	Red Fox*	4	
Reptiles			
Egernia whitii (group)	White's Skink	4	
Pseudemoia entrecasteauxii	Southern Grass Skink	4	
Frogs			
Crinia signifera	Common Froglet	4	4
Litoria ewingii	Southern Brown Tree Frog	4	4

A6.2 Significant fauna species

Table A6.2. Fauna of national or state significance recorded, or predicted to occur, within the local area

Source: DSE Atlas of Victorian Wildlife 2007 Version, BA database (1998–2008), DEWHA database

- AVW data search encompassed a 10 km radius (fish removed)
- DEWHA and BA data search encompassed a 10 km radius

- **Status of species:**

CR critically endangered
EN endangered
VU vulnerable
CD conservation dependent
NT near threatened
DD data deficient (insufficient known)
R rare or insufficient known
L listed under Flora and Fauna Guarantee Act

Sources used to derive species status:
EPBC *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
DSE Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2007b)
FFG *Flora and Fauna Guarantee Act 1988* (Vic.)

# denotes species predicted to occur or with habitat predicted to occur in the local area (DEWHA database)

Likelihood scale:

	No habitat present	Habitat poorly represented	Habitat moderately well represented	Habitat well represented
No records from bioregion (terrestrial) or neighbouring basin (aquatic)	Negligible	Negligible	Low	Medium
Records from bioregion (terrestrial) or basin/neighbouring basin (aquatic)	Negligible	Low	Medium	High
Records from within 5 km (terrestrial) or from catchment (aquatic)	Negligible	Medium	High	High

Scientific name	Common name	Last record	EPBC Act	DSE 2007	FFG Act	Occurrence in study area	
						N-S Option	E-W Option
National significance:							
Rostratula australis	Australian Painted Snipe	#	VU	CR	L	Medium	Low
Lathamus discolor	Swift Parrot	#	EN	EN	L	Negligible	Negligible
Dasyurus maculatus	Spot-tailed Quoll	#	EN	EN	L	Negligible	Negligible
Potorous tridactylus	Long-nosed Potoroo	#	VU	EN	L	Negligible	Negligible
Pteropus poliocephalus	Grey-headed Flying-fox	#	VU	VU	L	Negligible	Negligible

Scientific name	Common name	Last record	EPBC Act	DSE 2007	FFG Act	Occurrence in study area	
						N-S Option	E-W Option
Miniopterus schreibersii bassanii	Common Bent-wing Bat (southern subspecies)	#	CR	EN	L	Negligible	Negligible
Pseudomys fumeus	Smoky Mouse	#	EN	CR	L	Negligible	Negligible
Litoria raniformis	Growling Grass Frog	#	VU	EN	L	Low	Low
Prototroctes maraena	Australian Grayling	#	VU	VU	L	Not assessed	Not assessed
Galaxiella pusilla	Dwarf Galaxias	#	VU	VU	L	Not assessed	Not assessed
State significance:							
Grus rubicunda	Brolga	1995		VU	L	Medium	Medium
Ardea modesta	Eastern Great Egret	2000/#		VU	L	Medium	Medium
Anseranas semipalmata	Magpie Goose	#		NT	L	Negligible	Negligible
Anas rhynchotis	Australasian Shoveler	2000		VU		Negligible	Negligible
Aythya australis	Hardhead	2000		VU		Negligible	Negligible
Biziura lobata	Musk Duck	2000		VU		Negligible	Negligible
Haliaeetus leucogaster	White-bellied Sea-Eagle	#		VU	L	Negligible	Negligible
Pseudophryne bibronii	Brown Toadlet	1976		EN	L	Negligible	Negligible
Regional significance:							
Phalacrocorax fuscescens	Black-faced Cormorant	1960		NT		Negligible	Negligible
Phalacrocorax varius	Pied Cormorant	2006		NT		Negligible	Negligible
Chlidonias hybridus	Whiskered Tern	2000		NT		Medium	Medium
Gallinago hardwickii	Latham's Snipe	2003/#		NT		High	Recorded
Nycticorax caledonicus	Nankeen Night Heron	2000		NT		Negligible	Negligible
Sminthopsis crassicaudata	Fat-tailed Dunnart	2003		NT		High	Medium

A6.3. Migratory species

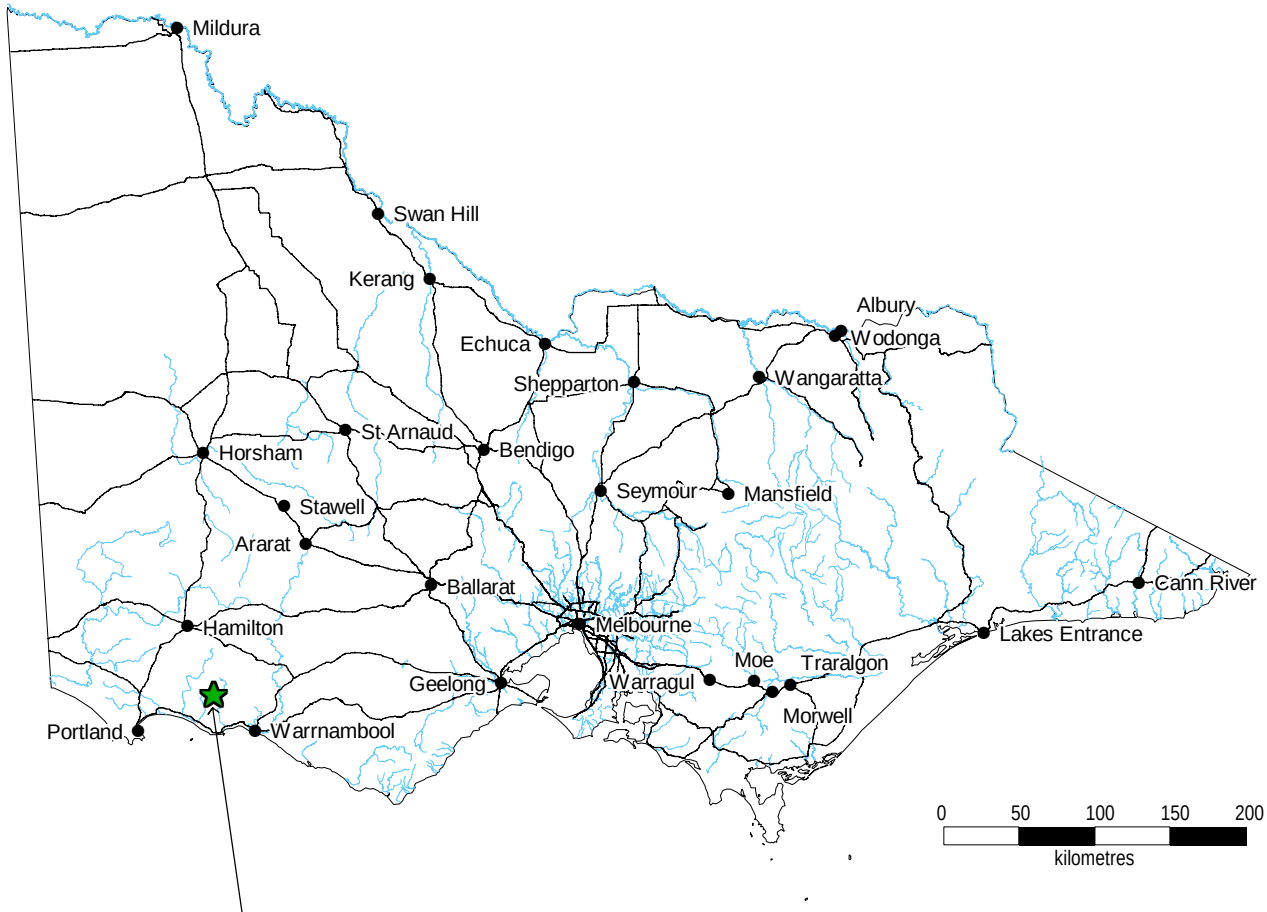
Table A6.3. Migratory fauna species recorded, or predicted to occur, within 10 kilometres of the study area

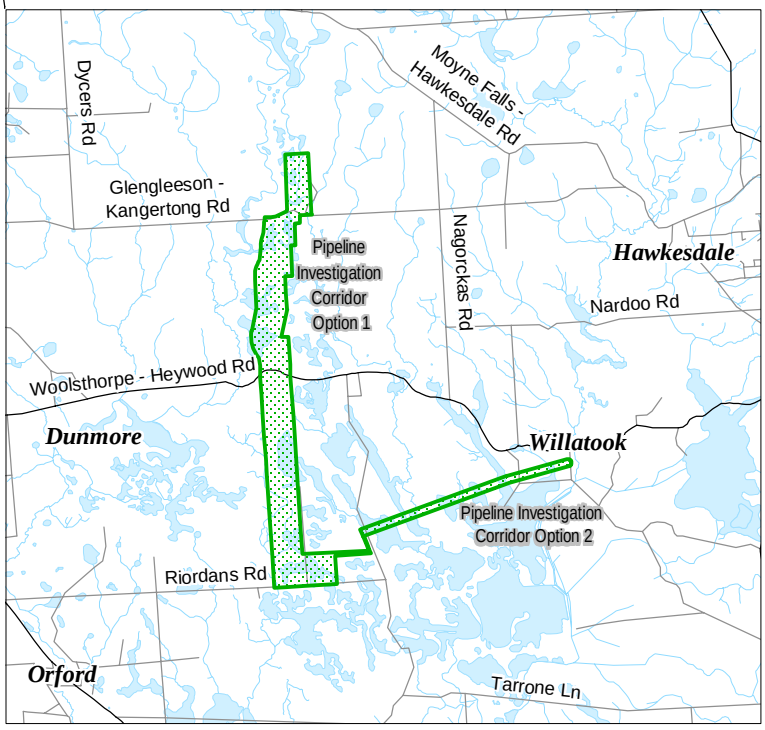
Source: DSE Atlas of Victorian Wildlife, DEWHA database, BA database (1998–2008)

Note:
Species in bold were recorded in the study area during the present assessment.
# denotes species predicted to occur or with habitat predicted to occur in the local area (DEWHA database)

Scientific name	Common name	Last record
Ardenna tenuirostris	Short-tailed Shearwater	1960
Merops ornatus	Rainbow Bee-eater	#
Hirundapus caudacutus	White-throated Needletail	#
Apus pacificus	Fork-tailed Swift	#
Rhipidura rufifrons	Rufous Fantail	#
Myiagra cyanoleuca	Satin Flycatcher	#
Acrocephalus stentoreus	Clamorous Reed Warbler	1999
Ardea ibis	Cattle Egret	#
Rostratula australis	Australian Painted Snipe	#
Gallinago hardwickii	**Latham's Snipe**	**2003/#**
Ardea modesta	Eastern Great Egret	2000/#
Haliaeetus leucogaster	White-bellied Sea-Eagle	#

FIGURES





Acknowledgement: VicRoads

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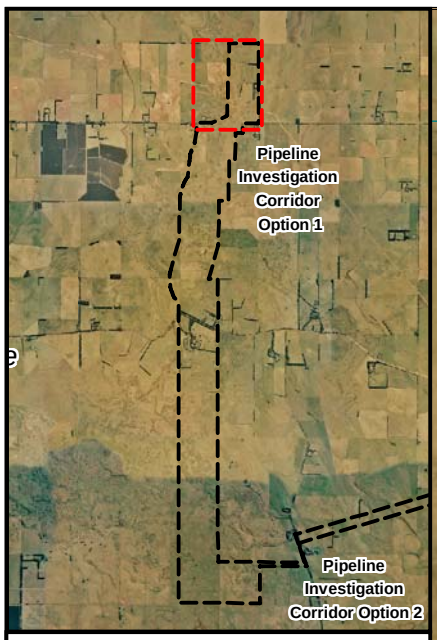
Figure 1: Location of the study area, Tarrone, Victoria

DATE: 10 September 2009
Checked by: SG | Drawn by: PJY | File number: 7864
Location: P:\MRG 7800s\7864\Mapping\7864 Figure 1.wor

Scale: 0 2 4 6 8 kilometres

MGA Zone 54



Legend

- Pipeline Investigation Corridor

Ecological Vegetation Class

- Plains Grassy Wetland
- Stony Knoll Shrubland
- Black Wattle
- Blackwood
- Red Gum
- Scattered Black Wattles and Blackwoods
- Plant site
- Dam
- Property boundary

Blohm

Blohm

North

Kangertong Rd

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 25

Figure 2a: Patches of Native Vegetation within the Pipeline Investigation Corridor North -South Option, Tarrone

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Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

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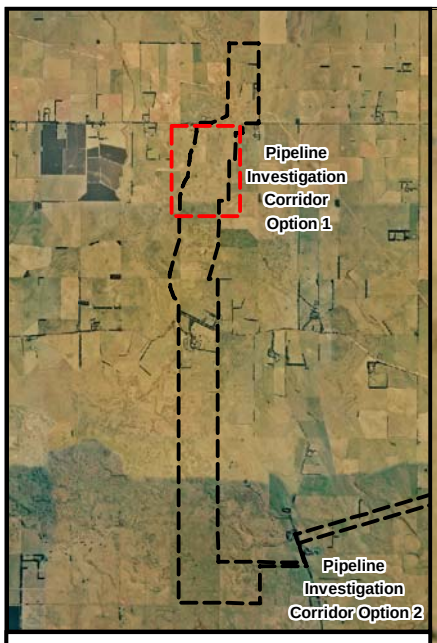

Legend

- Pipeline Investigation Corridor

Ecological Vegetation Class

- Plains Grassy Wetland
- Stony Knoll Shrubland
- Black Wattle
- Blackwood
- Red Gum
- Scattered Black Wattles and Blackwoods
- Plant site
- Dam
- Property boundary

Blohm

North

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Figure 2b: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009
Checked by: SG | Drawn by: PJY | File number: 7864
Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

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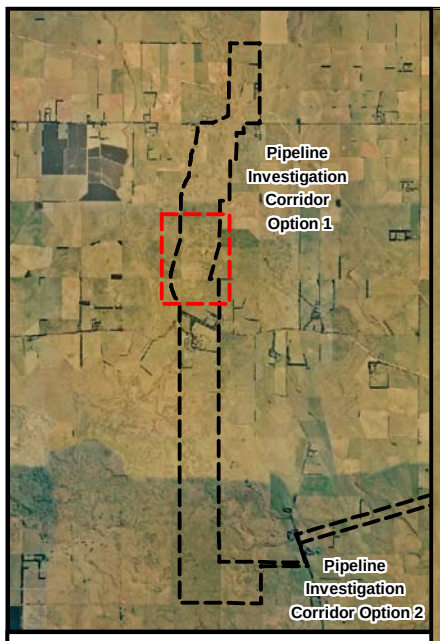

57

60

North

Morrison

Legend

- Pipeline Investigation Corridor

Ecological Vegetation Class

- Plains Grassy Wetland
- Stony Knoll Shrubland
- Black Wattle
- Blackwood
- Red Gum
- Scattered Black Wattles and Blackwoods
- Plant site
- Dam
- Property boundary

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Figure 2c: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

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Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

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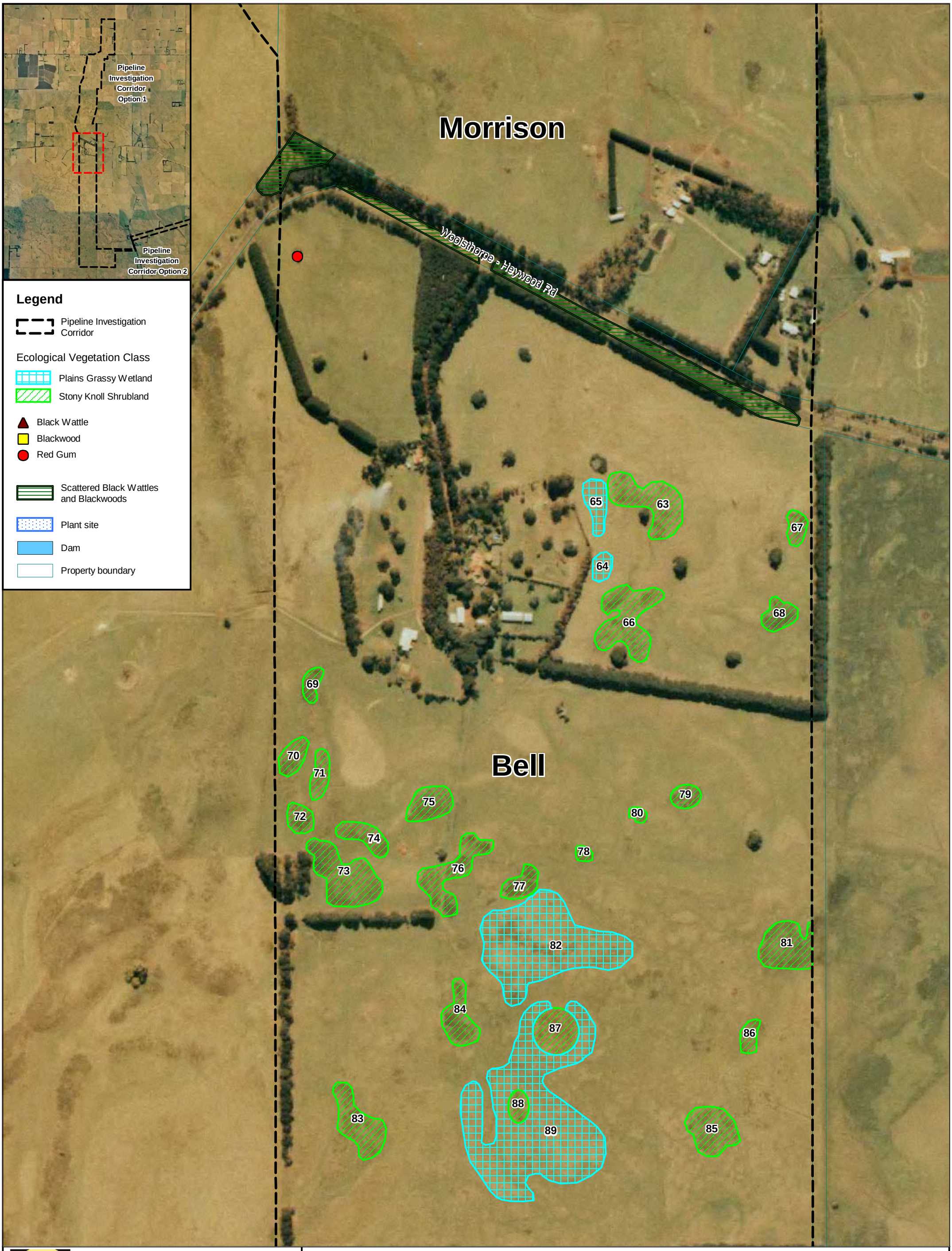

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Figure 2d: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

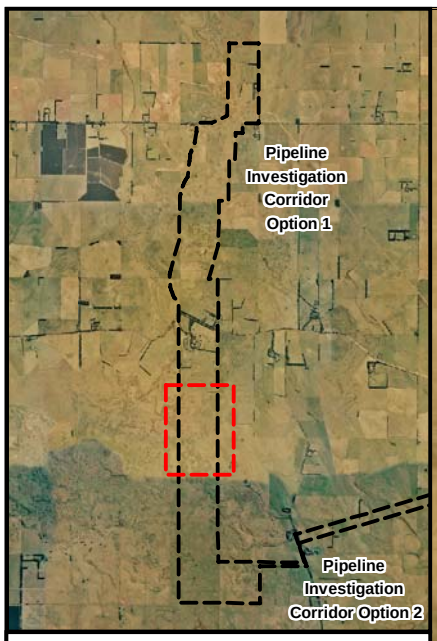
DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

N W E S



Legend

Pipeline Investigation Corridor

Ecological Vegetation Class

Plains Grassy Wetland

Stony Knoll Shrubland

Black Wattle

Blackwood

Red Gum

Scattered Black Wattles and Blackwoods

Plant site

Dam

Property boundary

Bell

Taylor

90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 124 125 126 127

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Figure 2e: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

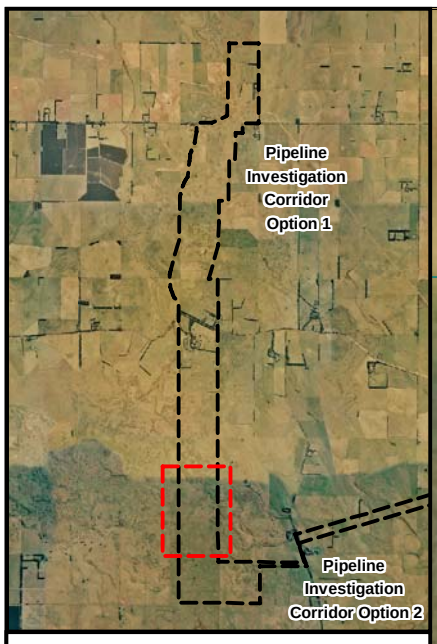
DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

N W E S



Legend

- Pipeline Investigation Corridor

Ecological Vegetation Class

- Plains Grassy Wetland
- Stony Knoll Shrubland
- Black Wattle
- Blackwood
- Red Gum
- Scattered Black Wattles and Blackwoods
- Plant site
- Dam
- Property boundary

Taylor

Bligh

McLaren

117 113 127 126 120 119 121

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Figure 2f: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

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Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

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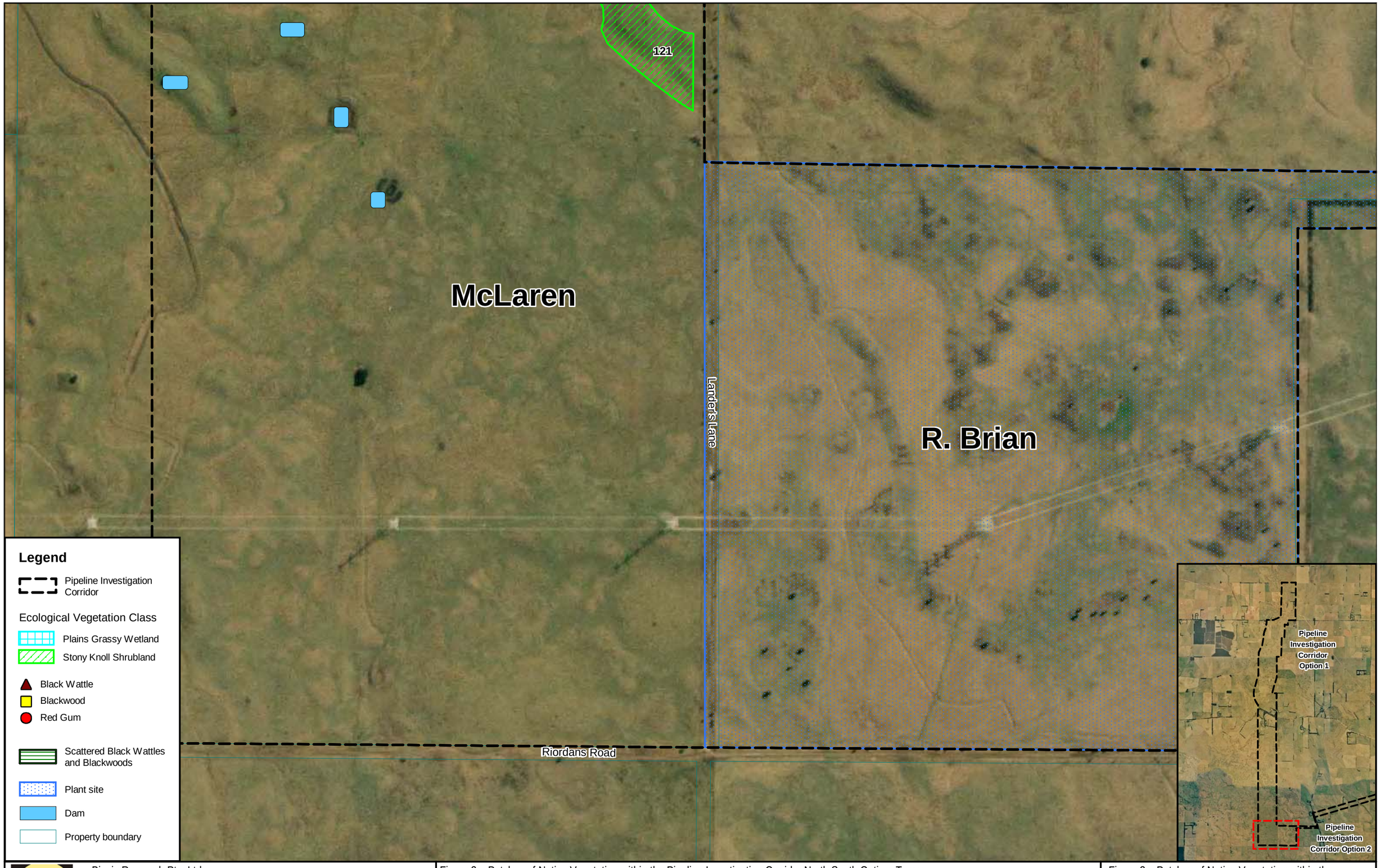

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Figure 2g: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

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Location: P:\MRG 7800s\7864\Mapping\7864 Figure 2.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 2g: Patches of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

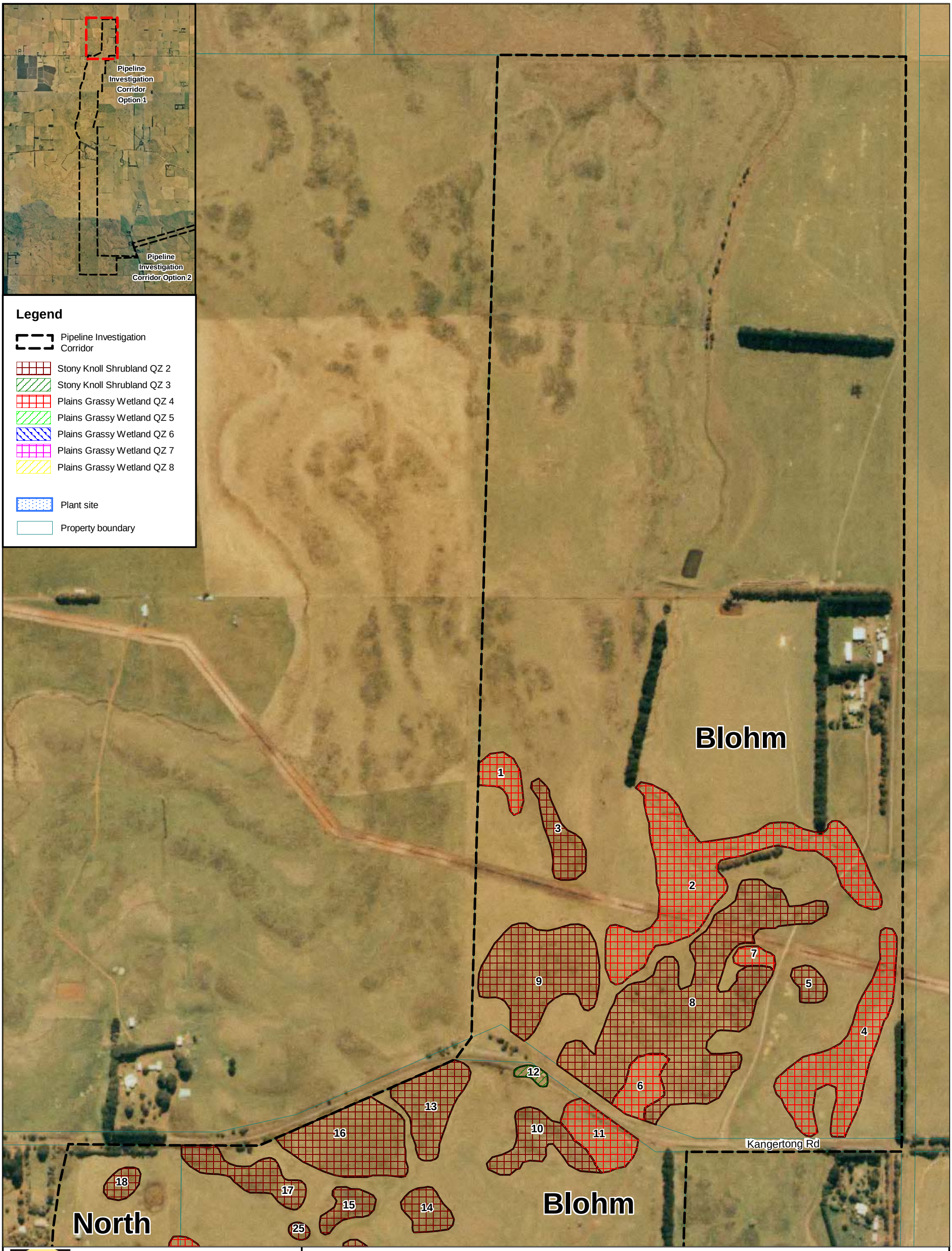

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Figure 3a: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

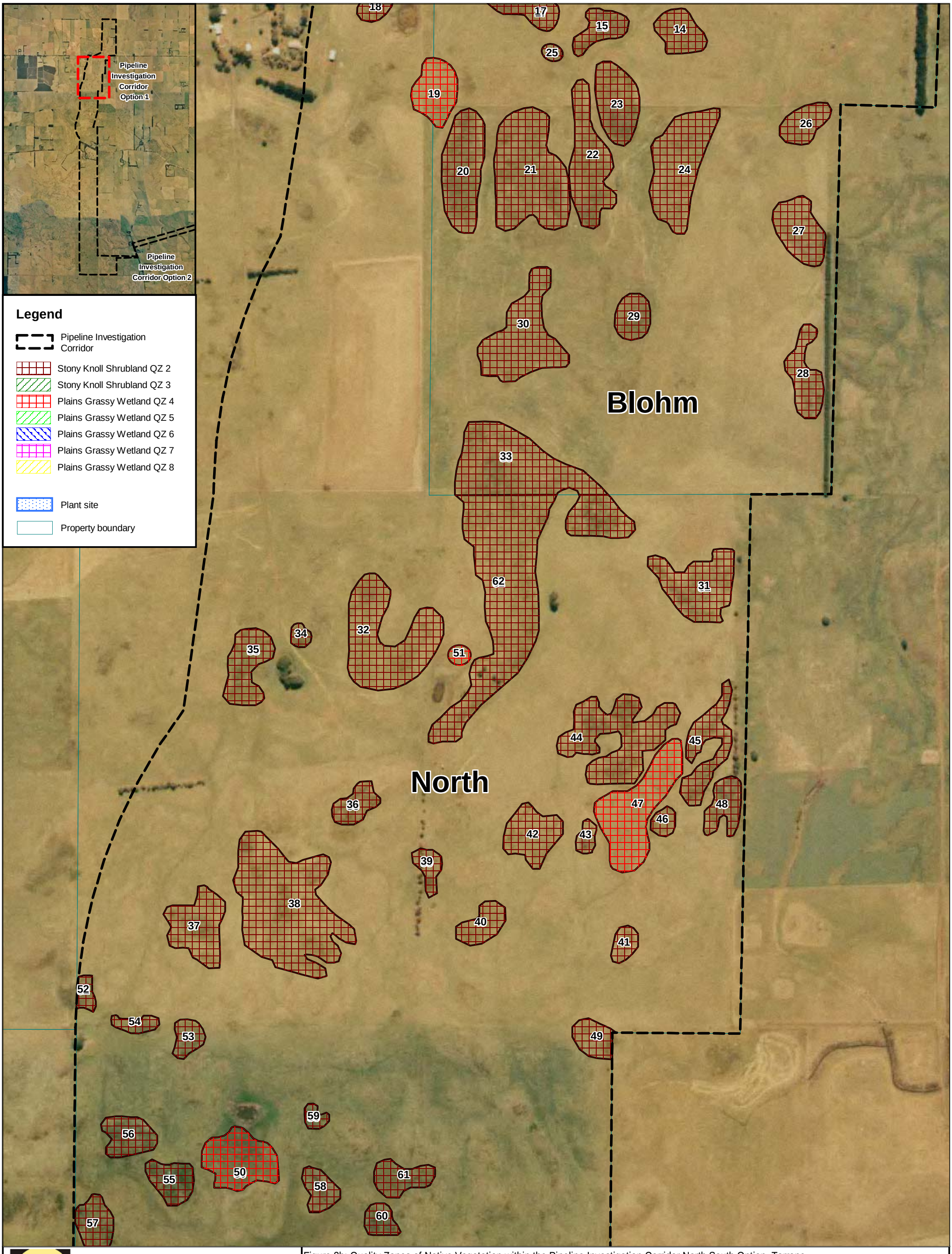

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Figure 3b: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

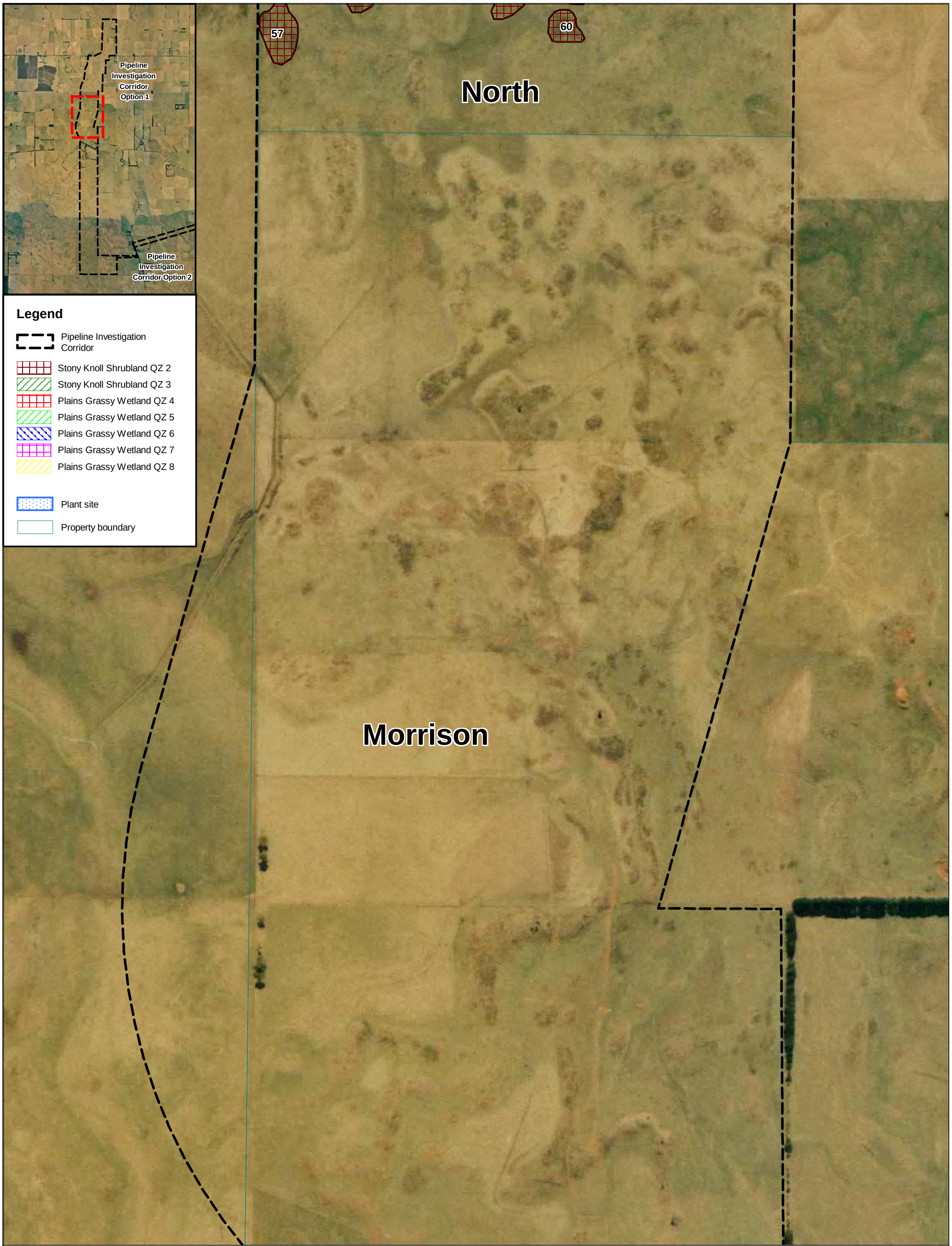

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Figure 3c: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

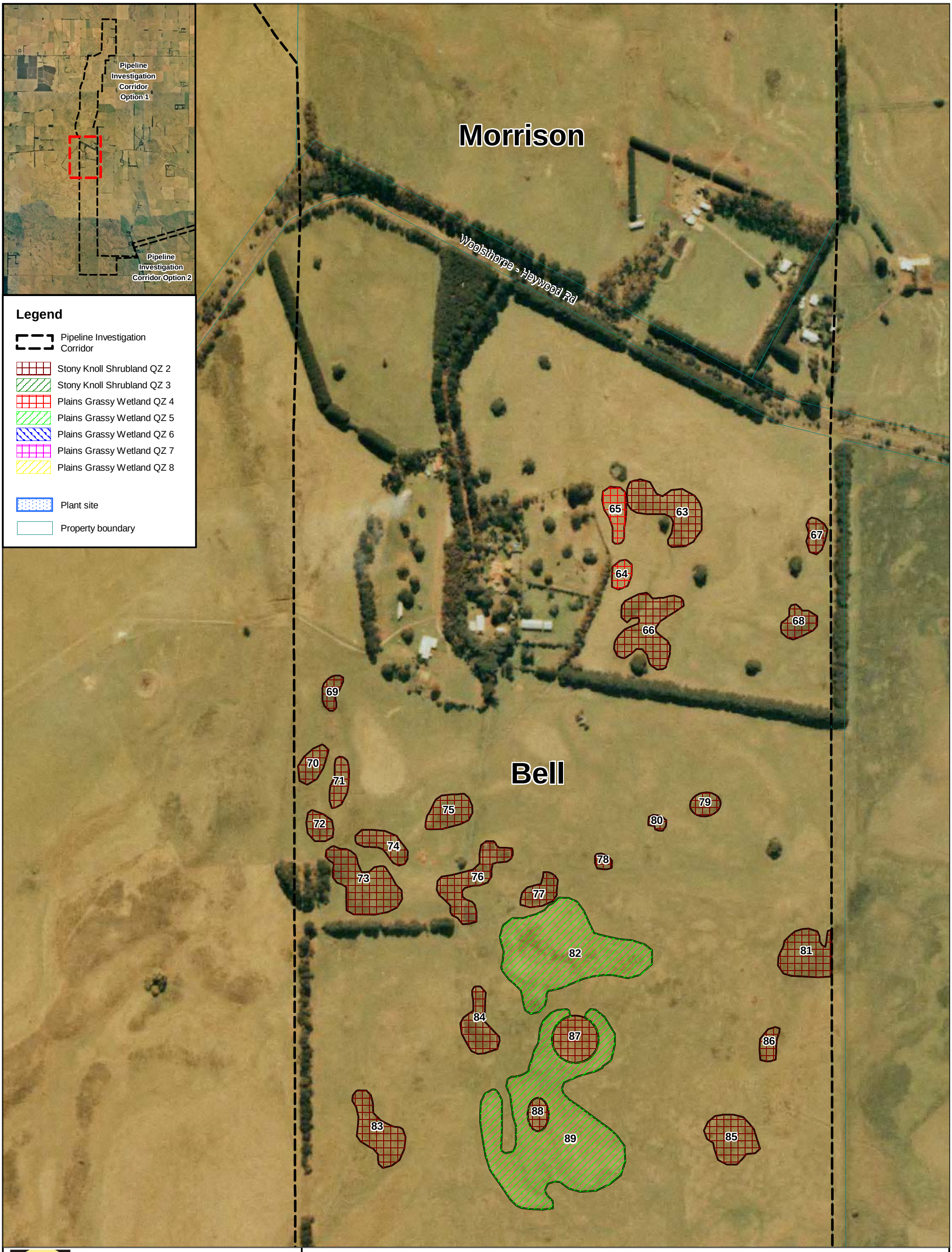

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Figure 3d: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

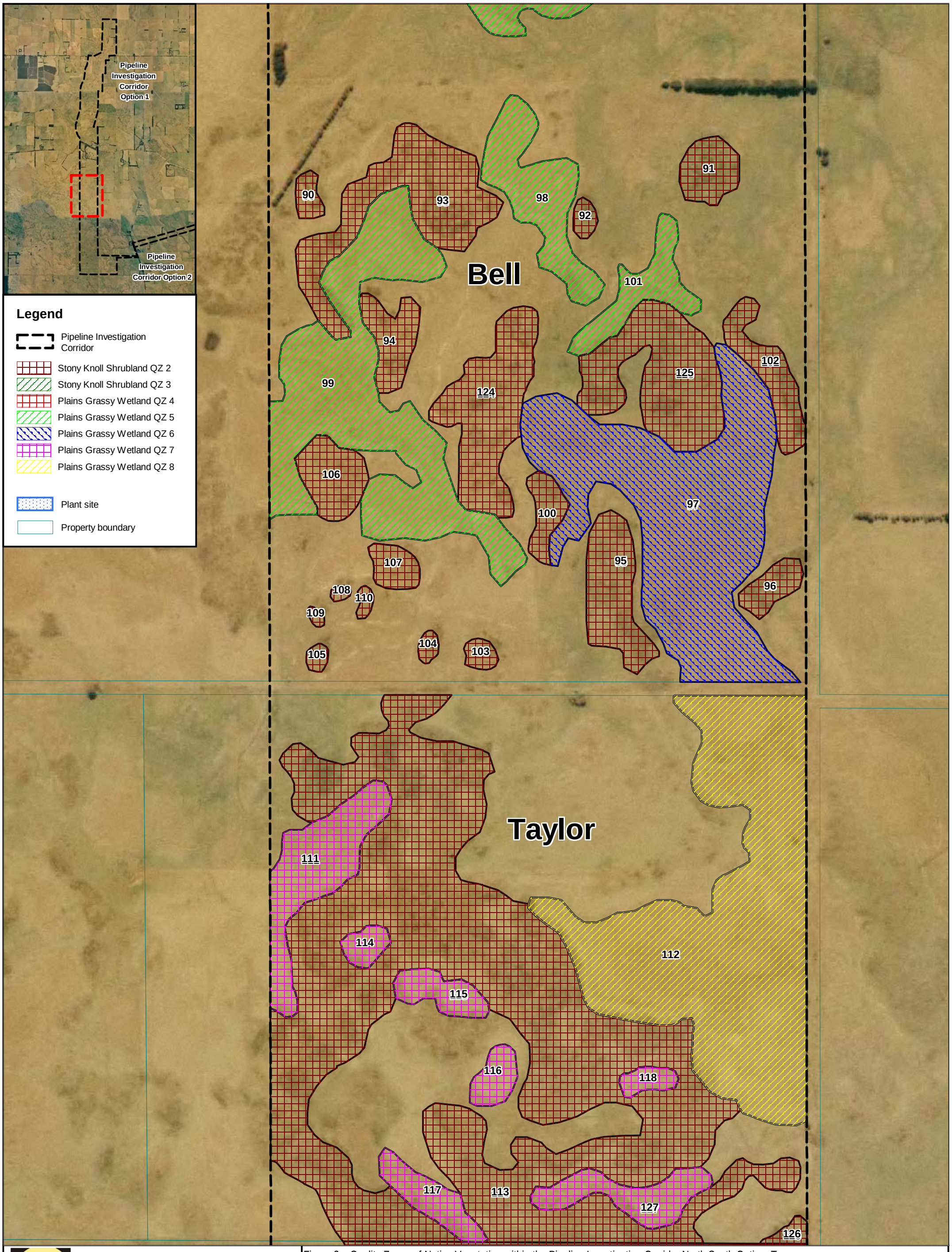

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Figure 3e: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

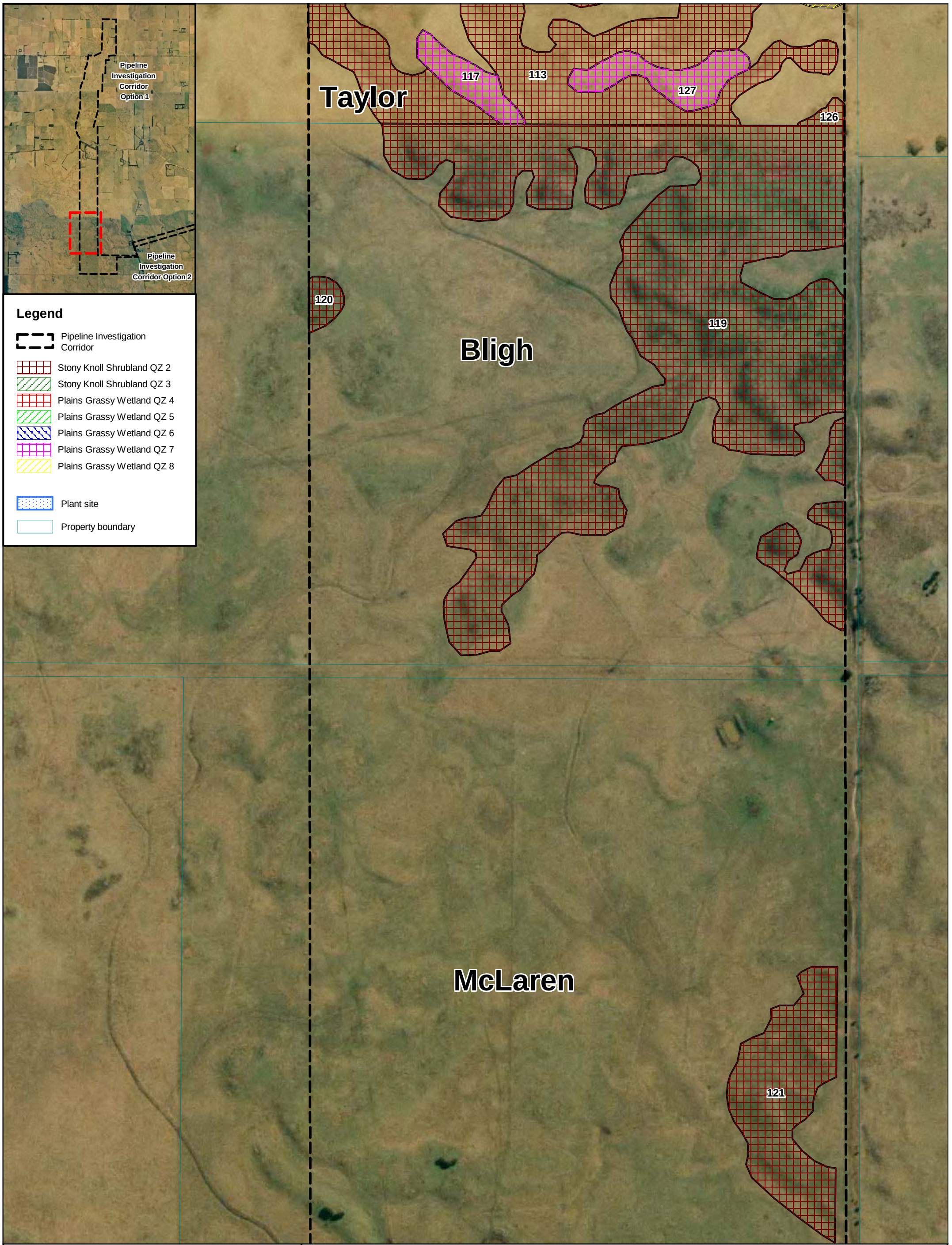

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Figure 3f: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

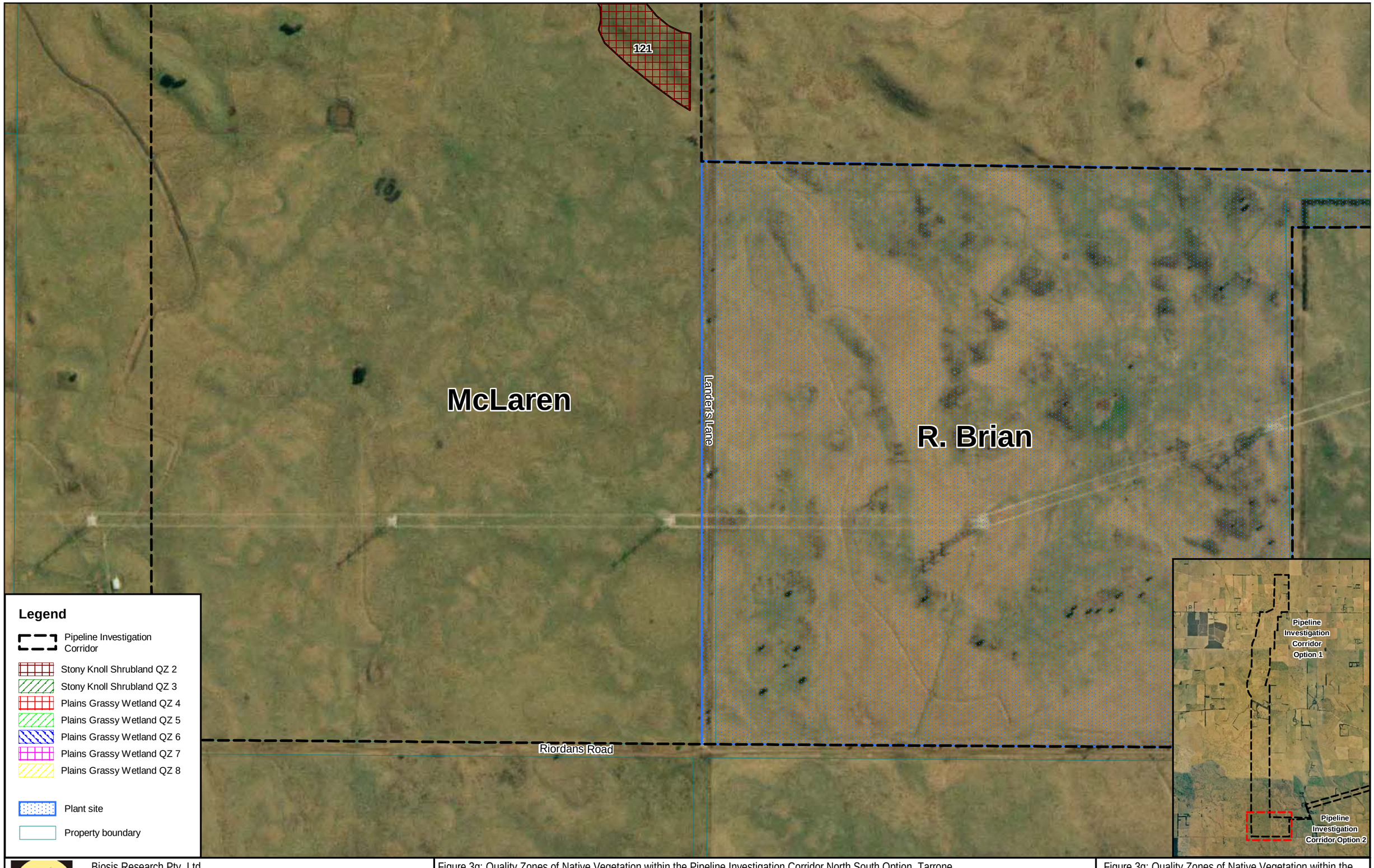

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Figure 3g: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 3.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 3g: Quality Zones of Native Vegetation within the Pipeline Investigation Corridor North South Option, Tarrone

Legend

- Pipeline Investigation Corridor
- Plant site
- Property boundary
- Patch of Native Vegetation
- Basalt Shrubby Woodland QZ 1

123

122

T. Brian

R. Brian

Willatook

Pipeline Investigation Corridor Option 2

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Figure 4a: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 4.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 4a: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option Tarrone

Legend

- Pipeline Investigation Corridor
- Plant site
- Property boundary
- Patch of Native Vegetation
- Basalt Shrubby Woodland QZ 1

T. Brian

Pern

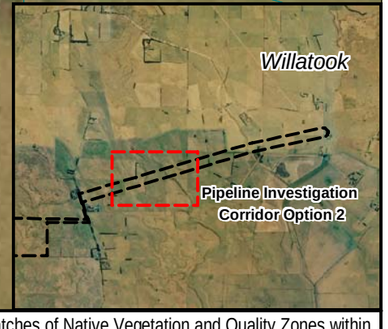

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Figure 4b: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 4.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 4b: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

Legend

- Pipeline Investigation Corridor
- Plant site
- Property boundary
- Patch of Native Vegetation
- Basalt Shrubby Woodland QZ 1

Guthrie

Habel

Pern

Coomete Road

Coomete Road

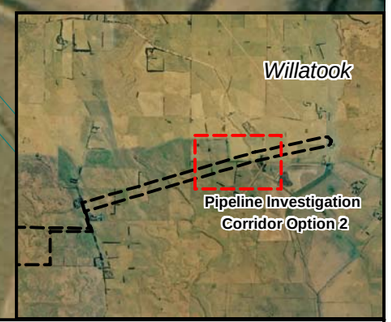

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Figure 4c: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 4.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 4c: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

Legend

- Pipeline Investigation Corridor
- Plant site
- Property boundary
- Patch of Native Vegetation
- Basalt Shrubby Woodland QZ 1

Woolsthorpe - Heywood Road

Willatook - Warrong Road

Thomas

Thomas

Habel

Poyntons Road

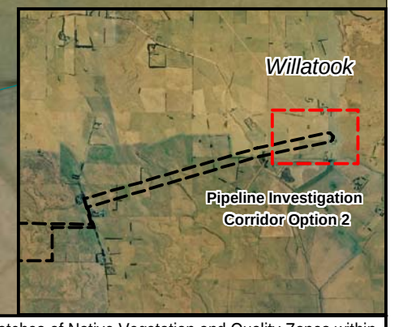

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Figure 4d: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone

DATE: 10 September 2009

Checked by: SG | Drawn by: PJY | File number: 7864

Location: P:\MRG 7800s\7864\Mapping\7864 Figure 4.wor

Scale: 0 50 100 150 200 250 metres

N W E S

Figure 4d: Patches of Native Vegetation and Quality Zones within the Pipeline Investigation Corridor East west Option, Tarrone