SOUTH EAST SOUTH AUSTRALIA GAS PIPELINE (PL16)

Environmental Impact Report (Operations)

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1. Introduction

1.1 Background

APA Group (APA) is a leading energy transmission business in Australia and is Australia's largest natural gas infrastructure business, owning or operating in excess of $19billion of energy assets. APA's gas transmission pipelines span every state and territory in mainland Australia, delivering approximately half of the nation's gas usage.

APA Group owns and operates the South East South Australia (SESA), underground natural gas pipeline, running from SEA Gas Pipeline near Poolaijelo in Victoria to Ladbroke Grove near Penola in South Australia. The SESA is 45 kilometre in length and links the Ladbroke Grove and Katnook gas fields in South Australia with customers including the Ladbroke Grove Power Station and those on the South East Pipeline System.

The first 22 kilometres of the Pipeline is located in Victoria and is operated under Pipeline Licence 225 (PL225), issued by the Energy Safe Victoria (ESV), in March 2005. The last 23 kilometres of the Pipeline is located in South Australia and is operated under Pipeline Licence 16 (PL16), issued by the Department of State Development (DSD), in February 2005.

The pipeline route is shown in Figure 1.1.1.

1.2 Purpose of this Document

This Environmental Impact Report (EIR) has been prepared in regard to the operation of the South Australian (SA) section of the Pipeline. This document:

- Outlines legislative approvals required for operations (Section 2);
- Provides a description of the Pipeline and associated pipeline infrastructure (Section 3);
- Describes the natural environment which the Pipeline intercepts (Section 4);
- Describes the specific features of the environment that are reasonably expected to be affected by pipeline operation and the management strategies to mitigate potential aspects and impacts (Section 5).

A Statement of Environmental Objectives (SEO) has also been developed in conjunction with this EIR. It outlines the environmental objectives that will be achieved and the criteria upon which APA's performance is to be measured. The SEO has been developed on the basis of the information provided in this EIR.

The Victorian section of the SESA is managed under the APA National Operations Environmental Management Plan (OEMP) which has been approved for use by ESV. Both the SEO and OEMP have been developed on the same risk assessment and outline similar approaches to mitigation while allowing for variations in legislative requirement between states.

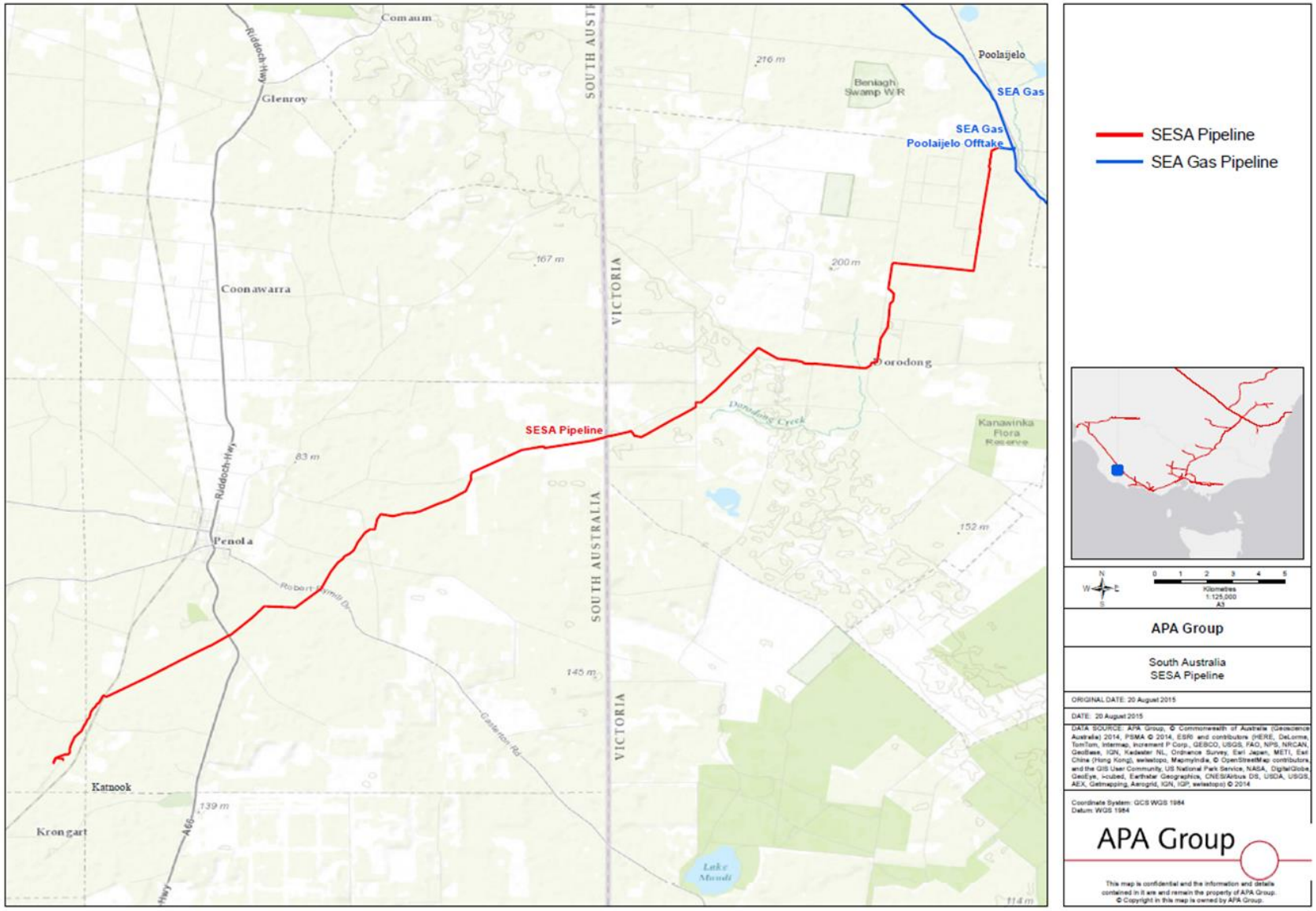

Figure 1-1: South Australia, SESA Pipeline

1.3 Environmental Commitment

APA is committed to responsible environmental management during the operation of the Pipeline and believes that any potential adverse environmental effects can be effectively managed in a manner that complies with the control measures identified in this document, as well as:

- All relevant State and Commonwealth laws and regulations;
- APA Group's Health, Safety and Environment Policy (see Appendix 1);
- APA Group's Cultural Heritage Policy (see Appendix 2);
- APA Group's Native Title Policy (see Appendix 3);
- Relevant industry standards (e.g. Australian Standard AS2885: Pipelines – Gas and Liquid Petroleum); and
- The Australian Pipeline and Gas Association (APGA) Code of Environmental Practice – Onshore Pipelines (formerly Australian Pipeline Industry Association).

2. Legislative Framework

2.1 Petroleum and Geothermal Energy Act

The *Petroleum and Geothermal Energy Act 2000* requires all regulated activities, carried out under the Act, to be covered by an approved EIR and SEO. The requirements are set out in the following sections of the Act and the *Petroleum and Geothermal Energy Regulations 2013*:

- The EIR must be prepared in accordance with:
  - Section 97 of the Act, which requires the EIR to take into account cultural, amenity and other values relevant to the assessment, risks to public health and safety of regulated activities, and to contain sufficient information to make an informed assessment of the likely environmental impact of the activities possible.
  - Regulation 10 of the Regulations, which requires the EIR to include descriptions of activities and environmental features which may be affected, assessment of possible effects on cultural values and public health and safety, identification and assessment of consequences of potential environmental hazards, and details of consultation.
- The SEO must be prepared in accordance with Sections 99 and 100 of the Act and Regulations 12 and 13.

2.2 Environmental Legislation

A range of other South Australian legislation is relevant to the operation of the Pipeline, including the legislation outlined in Table 2-1 and policies in Table 2-2.

Table 2-1: Key Additional Legislation

Legislation	
Aboriginal Heritage Act 1988	• Provides for the protection and preservation of Aboriginal heritage. • Should works be required outside the existing easement they will be assessed under the Act. • The discovery of new Aboriginal Heritage sites will dealt with as per the requirements under the Act.
Crown Land Management Act 2009	• Makes provision for the disposal, management and conservation of Crown land, however, the pipeline does not traverse Crown land.
Environment Protection Act 1993	• Outlines the general duty to to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment while having regard to the principles of ecologically sustainable development • Disposal of waste water (i.e. trench or hydro-test water) to inland waters may require approval under the Act. • Protects water quality and waterways as per the Environment Protection (Water Quality) Policy 2015.

Legislation	
Environment Protection and Biodiversity and Conservation Act 1999	• Protects "Matters of National Environmental Significance" (MNES) including World Heritage properties, National Heritage places, Ramsar wetlands of international importance, listed threatened species and ecological communities and migratory species. • Act is unlikely to be triggered during operations as there will be no impact to MNES.
Heritage Places Act 1993	• Allows for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance. • Should works be required outside the existing easement they will be assessed under the Act. • The discovery of new Heritage sites will be dealt with as per the requirements under the Act.
National Parks and Wildlife Act 1972	• Provides for the conservation of wildlife in a natural environment. • In the unlikely event that protected fauna are required to be handled a permit will be sort under the Act.
Native Title (South Australia) Act 1994	• Act relating to the Native Title of Traditional Owners (TOs). • Native Title holders or TOs will be managed as landholders on all tenure types (other than freehold). • New works (and some maintenance activities) may require formal notification under the Act.
Native Vegetation Act 1991	• Controls the clearance of native vegetation. • Vegetation disturbance incidental to the repair or maintenance of infrastructure is exempt under *Native Vegetation* Regulation 5(1)(g). • New infrastructure may require assessment under the Act.
Natural Resources Management Act 2004	• Promotes the sustainable and integrated management and protection of the State's natural resources. • The Act outlines the requirement to manage Pest Plants and Animals on the easement. • Water Affecting Activities (i.e. excavation in a water course, riparian vegetation clearing, disposing of waste water into a waterway) undertaken during operations may require a Permit.
Work Health and Safety Act 2012	• Provides for the health, safety and welfare of persons at work. • All works will comply with the requirements of a safe work place to ensure health and safety standards are met. • Workplace safety breaches or incidents will be report to SafeWork SA.

Table 2-2: Key Additional Policies

Policies	
Environment Protection (Air Quality) Policy 2016	• Sets maximum pollutant levels for air. • Operational sites must comply with air quality standards.
Environment Protection (Noise) Policy 2007	• Outlines the assessment of noise producing activities and sets limits for noise production. • Operations and operational sites must comply with noise standards. • Application of construction noise restrictions.
Environment Protection (Water Quality) Policy 2015	• Declares environmental values for the protection of streams, rivers, oceans and groundwater. • Operations will manage wastewater by: o avoiding its production o eliminating, or reducing it o recycling and re-using it o treating it to reduce potential harm to the environment
Environment Protection (Movement of Controlled Waste) Policy 2014	• Outlines o Requirements for tracking of controlled waste, and any associated reporting o Categories and characteristics of controlled waste o Consignment and record keeping requirements
Environment Protection(Waste to Resources) Policy 2010	• Outlines o Waste management objectives and obligations o Waste transport requirements o Restrictions related to various types of waste o Requirements around waste disposal facilities
Environment Protection (National Pollution Inventory) Policy 2008	• Outlines o Types of substances o Record and reporting requirements

3. Description of Pipeline and Facilities

3.1 Pipeline Alignment

The Pipeline was constructed in 2005 and is 45 kilometres in length.

The Pipeline begins adjacent to the intersection of Sharams Road and Casterton-Apsley Road and runs in a south-westerly direction until it reaches the Ladbroke Grove Power Station approximately 10 kilometres south-west of Penola. The first 22 kilometres of the Pipeline is located in Victoria and the last 23 kilometres of the Pipeline is located in South Australia and is operated under PL16.

The pipeline easement is situated within both Crown Land and private property and has a nominal width of 25 metres. All necessary land associated with the Pipeline has been acquired.

3.2 Pipeline Customers

The Pipeline supplies natural gas from the SEA Gas Pipeline to the Ladbroke Grove Power Station and to industrial and domestic customers within the south-east region of South Australia via the South East Gas Pipeline System.

3.3 Design and Engineering

The Pipeline is operated in accordance with AS2885 and is subject to the provisions of the South Australian Petroleum and Geothermal Energy Act 2000 and the Victorian Pipelines Act 2005.

The Pipeline has a Maximum Allowable Operating Pressure (MAOP) of 10,200kPag, a main outside diameter of 219.1mm (8 inches) and a nominal wall thickness of 4.01mm. An increased wall thickness (6.77mm) has been applied to areas identified as 'high risk' in the preliminary Safety Management Study (SMS) which are typically road crossings along the pipeline route. A summary of the design parameters are provided in Table 3.3.1. The Pipeline is buried to a nominal depth of 750mm; however, a depth of cover of 1200mm is reached in high risk areas.

There are two Stations first being the Inlet Metering Station is located at the SEA Gas Pipeline near Poolaijelo, Victoria, and the second being the Outlet Metering Station at Ladbroke Grove Power Station. The meter stations include flow measurement, emergency isolation and pigging facilities. All stations are surrounded by security fencing and are monitored remotely 24 hours a day via a satellite communication system known as SCADA (Supervisory Control and Data Acquisition).

Gas within the Pipeline is odorized as the gas comes from an already odorized source. No odourant facilities are required for the Pipeline.

A cathodic protection system is incorporated into the pipeline design to protect the Pipeline from corrosion. This involves the use of buried anode beds, which are connected to the Pipeline via cabling. The above ground test points are required to allow for monitoring of the effectiveness of the corrosion protection system.

Pipeline marker signs are located at intervals along the pipeline easement in accordance with location class, as outlined in AS 2885, so that a person can clearly

see a marker sign in either direction (i.e. line of sight). The maker signs are placed closer at bends, on either side of road and watercourse crossings and at fence lines.

Table 3-1: Pipeline engineering and design features

Design Element	SESA Pipeline
Date Constructed	2005
Date Commissioned	2005
Length	45 km (23 km in SA)
Diameter (OD)	219.1 mm
Minimum Depth of Cover	In accordance with AS 2885.1, typically: • Cross country sections – 750 mm • Beneath roads and watercourses – 1200 mm
Pipeline Coating	High density polyethylene (HDPE)
Design capacity	40 TJ/day

3.4 Pipeline Operations

The day-to-day operations of the Pipeline are considered non-intrusive with the Pipeline operated remotely through the Integrated Operations Centre (IOC) which is location in Brisbane. Field operators undertake regular route inspections, maintain ongoing liaison with landholders, respond to maintenance requirements such as erosion control and undertake weed control on the easement as necessary. Pipeline operations may include the repair or replacement of faulty pipe or other equipment, use of in-line inspection gauges (commonly referred to as pigging) for pipeline integrity data and for cleaning of the Pipeline, corrosion monitoring and remediation however, such activities do not occur frequently. Aerial and ground inspections are undertaken regularly to monitor general easement condition (i.e. pipeline markers, erosion, vegetation) and unauthorised third party activity.

3.4.1 Pipeline Management System

The Pipeline is operated under a Pipeline Management System which ensures compliance with all aspects of AS2885 and regulatory requirements. The implementation of the System ensures the Pipeline is operated and maintained to industry standards. The System requirements that are detailed in the Pipeline Management Plan are outlined in Table 3.-2.

Table 3-2: Pipeline Management System Components

Component	Description
Emergency Management Plan	Sets out the procedures and resources to be deployed by personnel in the event of an emergency incident to the Pipelines. The Plan establishes the structure of emergency management teams, the communication processes and the resources that may be required to manage an emergency.
Records Management Plan	Details the requirement for storage of information from design and construction records through to current day operational records.
Operations Environment Management Plan	Details operational hazards to the environment and mitigation measures required to manage the risk.
Land Management Plan	Addresses AS2885.3 -2012 Section 7. Details the management external third party interference/s including management of the land, landholders and third party works.
Pipeline Integrity Management Plan (PIMP) including:	Addresses AS2885.3 Section 5. Carries relevant details of the assets and a detailed summary of the integrity challenges and mitigation. Specifies the maintenance requirements and operational guidelines for both normal operations and specific mitigation activities and is the basis of the Maintenance Plan.
○ Remaining Life Review	Addresses AS2885.3 Section 10.3. Carried out at a maximum of 10 years.
○ Safety Management Study	The SMS is formally reviewed at least 5 yearly. During the period between formal reviews various specific risk aspects may occur requiring a Study.
○ Location Class Review	Formally reviewed at least 5 yearly as part of the Safety Management Study.
○ Integrity Review	Outlines process for assessing and managing the integrity of the asset.
○ Maintenance Plan	Determined by the PIMP and is programmed into a computerised maintenance system.

3.4.2 Filter Inspection and Replacement

Filter inspections and replacements are carried out within secure compounds at Inlet and Outlet Metering Stations. The filter is removed, washed down with water and put into a secure container for discarding. Water for wash down of filters and degreaser is captured and disposed of offsite. Minimal natural gas is released during this work and, although odourised, it is not likely to be noticeable outside of Station perimeters.

3.4.3 Valve Maintenance

Valve checks are carried out within secure compounds at Inlet and Outlet Metering Stations. The valve is turned on and off to check the integrity of the seal. A small amount of degreaser may be used and is captured and disposed of offsite. Minimal

natural gas is released during this work and, although odourised, it is not likely to be noticeable outside of Station perimeters.

3.4.4 Cathodic Protection

Cathodic protection maintains the condition of the Pipeline by polarising the steel to reverse the corrosion process (see Section 3.2). Surveys are undertaken regularly to monitor electrical currents and the resulting level of cathodic protection. The general process involves connecting a meter to cathodic protection test post to check for any indication of corrosion or pipeline coating damage. Should additional cathodic protection be required then a cathodic protection unit will be installed. A unit consists of a ground bed, built from coke, which is buried away from the pipeline in a suitable soil type, above ground control equipment and marker posts.

3.4.5 Pipeline Integrity Assessment

A Pipeline Integrity Gauge (pig) is used for cleaning, gauging and measuring the general integrity of the pipeline wall. The use of a pig is usually, within the industry, termed "pigging". A pig is placed in the Pipeline via a launch bay with the pig travelling along inside the Pipeline at a set pace as determined by gas flow and pressure before being removed at a pig receiving site. Launch bays and receiver traps are located at Inlet and Outlet Stations. Removal of pigs from the Pipeline results in minor venting of gas into the atmosphere and the collection of some sludge and debris. Any sludge or debris that may come out of the receiver trap with the pig is captured in the pig barrel and removed from site for appropriate disposal. Small amounts of general purpose grease and degreaser may be used during pigging.

3.4.6 Easement Surveillance

Inspections of the easement are undertaken via ground and aerial patrols to identify potential issues or threats to the Pipeline including:

- Unauthorised third party encroachment;
- Erosion and subsidence;
- Vegetation growth;
- Presence of weeds and pests; and
- Condition of pipeline markers.

Aerial surveillance is undertaken by low flying aircraft, usually a fixed wing plane, and ground patrols are completed via vehicle and in some instances by foot if access if difficult.

The frequency of inspections is determined based on specific risks posed to the pipeline and is regularly confirmed during the SMS. Generally, aerial surveillance is completed monthly and ground patrols are completed at least annually. Additional inspections may be scheduled in response to aerial sightings, landowner concerns or extreme weather events such as flooding or fire.

3.4.6.1 *Summary of Activities*

As per audit findings, easement surveillance (most sections monthly – dependent on conditions) has been undertaken in line with scheduled activities. Monthly aerial patrols have also undertaken as scheduled, as a part of the national program. Any sightings are converted into work orders for the applicable area manager, and rectified.

3.4.7 Vegetation Management

The Pipeline is clearly marked with pipeline markers and both upstream and downstream markers are visible by line of sight. In some areas, plant regrowth could obscure line of sight between pipeline markers and inhibit vehicle access for maintenance purposes and emergency response. Root to pipeline contact is avoided to ensure that no damage is caused to the Pipeline. In these instances vegetation maintenance is necessary and may involve mechanical removal; rolling, slashing or felling depending on what method is most appropriate. In this region, any vegetation management to be carried out would be undertaken by contractors.

Significant trees that were identified prior to the construction of the Pipeline will not be impacted by vegetation management activities.

Low vegetation cover on the easement will be restored to a condition consistent with surrounding areas. This assists with ground stability and reduces the development of erosion from wind and water, sediment runoff to downslope lands or waterways and provides habitat for fauna.

3.4.7.1 *Summary of Activities*

No vegetation management has been required over the last few years due to the pipeline being located predominantly within cleared fire break and agricultural areas.

3.4.8 Pipeline Excavation and Repair

Pipeline excavations are generally only undertaken for the inspection of the pipeline coating, and integrity digs to check on data from pig inspections. Excavations of this kind are managed under the specific work instructions which outline the requirements for soil and water management, backfilling and site rehabilitation.

In an emergency event, such as pipeline failure or due to suspected damage from unauthorised third party activities, a section of the Pipeline may need to be replaced. To complete this venting of that section of the Pipeline will be required so that hot work can be undertaken.

Hydro-testing of any replacement pipeline section/s may be required. Water would likely be sourced from potable water sources and waste water will be disposed of appropriately onsite.

3.4.8.1 *Summary of Activities*

Pipeline pigging has been undertaken this year. Two minor defects were identified but have not yet been excavated due to wet conditions. Excavation is being scheduled for when the area is dry.

3.4.9 Integrated Operations Centre

The Pipeline is operated remotely via the Integrated Operations Centre which can operate and monitor the Pipeline via telemetry monitoring. The telemetry monitoring live feeds data onto the Supervisory Control and Data Acquisition (SCADA) control system. SCADA is used to identify any issues with pipeline operation such as a drop in pressure, changes to valves or emergency shut-down mechanisms.

3.4.10 Decommissioning

Decommissioning of the Pipeline may occur for a number of reasons including exhaustion of supply, safety reasons, reduced market demand for gas or change to facility operations. Decommissioning can include:

- Suspension: pipeline is not depressurised but is physically isolated from the pipeline system. The pipeline is maintained as per an operating pipeline.
- Abandonment in place: pipeline is physically disconnected from the pipe system, purged and cleaned with water or inert material and sealed (capped) at the ends. The pipeline is not pressurised and is not maintained, and cathodic protection systems disconnected, with the pipeline left to corrode and biodegrade in situ. All above ground structures are removed, including marker signs, and the easement rehabilitated. Maintenance of the easement is discontinued after an agreed monitoring period and the easement is relinquished.
- Removal: pipeline is entirely removed from the pipeline easement (typically only applicable to above ground pipelines due to potential environmental disturbance with underground pipelines). All above ground and below ground structures are removed and the pipeline easement is relinquished.

The determination of suspension, abandonment, removal is dependent on licence conditions, environmental considerations, future and potential development and stakeholders.

Decommissioning and associated site remediation will be undertaken in accordance with prevailing regulatory requirements and best practices of the day.

4. Description of the Environment

This section provides an overview of the existing environment along the Pipeline located within South Australia.

4.1 Climate

The region is typified by hot, dry summers and cool, wet winters. In Penola the annual rainfall is 708mm which is recorded, on average, over 107 rainfall days. May to October is the wettest period with January to March the driest (BOM 2015). In summer, the average maximum and minimum temperatures are approximately 27°C and 12°C and in winter 14°C and 4°C, respectively.

A summary of climate records for Penola State Forest (Station 026036; BoM 2015) is provided in Figure 4.1.

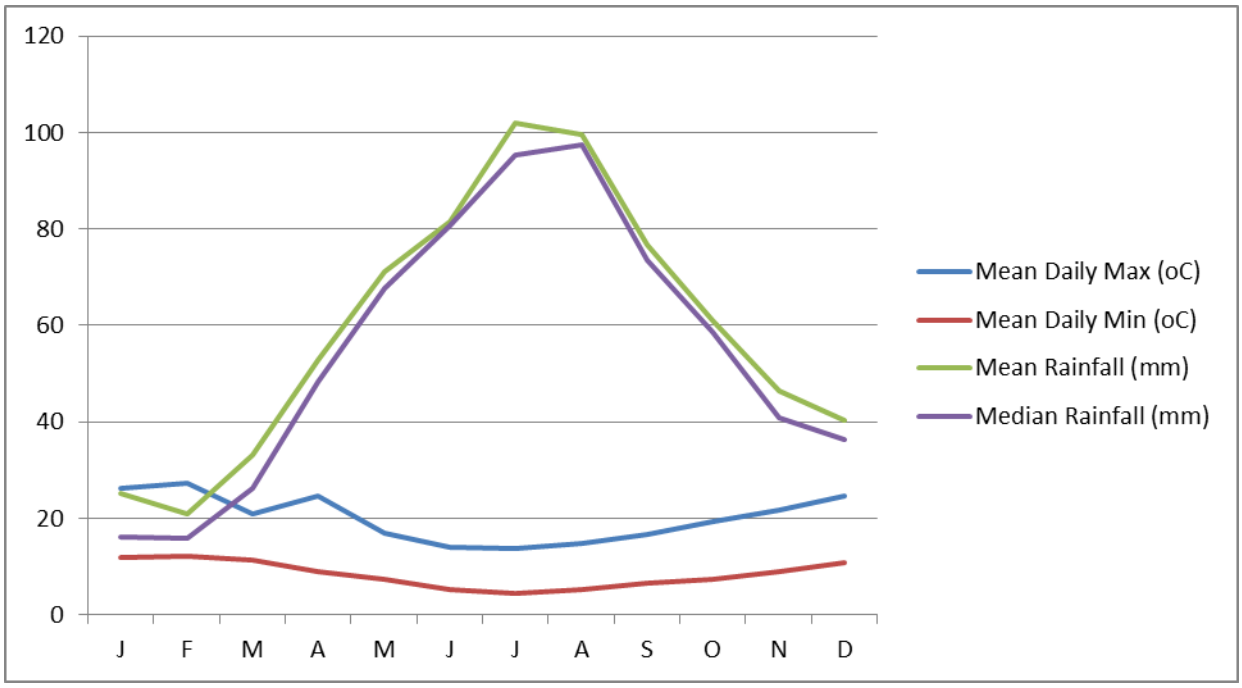

Figure 4-1: Temperature and Rainfall Records for Penola State Forest

4.2 Bioregional Environment

4.2.1 Soils and Landform

The vast majority of the Pipeline traverses one Interim Biogeographic Regionalisation for Australia (IBRA) bioregions, the Naracoorte Coastal Plain Bioregion (Figure 4.2). The Bioregion is predominantly flat and low lying, ranging from sea level to less than 200 metres above sea level and includes a series of north-north-westerly trending low ridges and intervening plains. The landscape is a system of parallel coastal dunes stranded during successive phases of retreat of the sea, the dunes becoming progressively older inland. Locally, the calcerenite dune ridges are overlain by younger sands. Well-drained deep and shallow sands are typical of the dune ridges.

Contrasted markedly with the dune ridges are areas characterized by impermeable soils derived from marl, clay and silt. This impermeability and the lack of organized natural drainage network results in seasonal flooding. Ephemeral lakes and swamps are also common features across the landscape.

In many areas of the south-east of South Australia, including the Penola region, karst topography is evident, where depressions have been formed by groundwater dissolving the underlying limestone (Twidale et al. 1983). These dissolution processes have led to the formation of caverns along the Kanawinka escarpment and have resulted in the distinctive landscape of circular shallow depressions seen to the east and south of Penola (Twidale et al 1983). Landholders south of Millers Road, in the vicinity of the Ladbroke Grove and Katnook gas plants, have reported the presence of subsurface caverns that may be susceptible to collapse. Broad scale mapping of these karst landforms indicates that karst is present from between KP27 to KP 44.

Acid sulphate soils form when sulphate rich soils are exposed to oxygen resulting in the production of sulphuric acid. This can significantly alter pH and mobilise heavy metals in the soil. Soil mapping (ASRIS 2016) indicates that there are areas in the vicinity of the Pipeline that may be susceptible to developing into Acid Sulphate Soils or ASS (i.e. Potential Acid Sulphate Soils or PASS). These areas are closely associated with areas that are seasonally inundated (Figure 4.3). The Pipeline traverses over areas that are considered to be low or extremely low probability risk of ASS.

4.2.2 Hydrology

There is no organized natural drainage network in which the South Australian portion of the Pipeline intercepts. The Pipeline passes close to a number of seasonally inundated depressions but not in such close proximity to impact on surface waters (Figure 4.4). The water table in low lying areas can be as close as 1 metre to the surface, thus forming shallow wetlands that are unconnected by waterways. Data from groundwater observation wells near the Pipeline indicate that the water table generally varies from 1.5 to 5 metres below the ground surface and exhibits strong seasonal fluctuation, with depths to the water table increasing over summer and autumn (WaterConnect 2015).

Salinities reported from these wells in the surround area are generally fresh to brackish, within the range of 1190 to 1600uS/cm (760 to 1020mg/L). Water quality data was collected from the wells between the years of 1984 and 1990.

An extensive network of man-made surface drains have been constructed throughout South Australia's south-east to assist in regional drainage, and drains are present in the vicinity of the proposed alignment at KP37 to KP42.

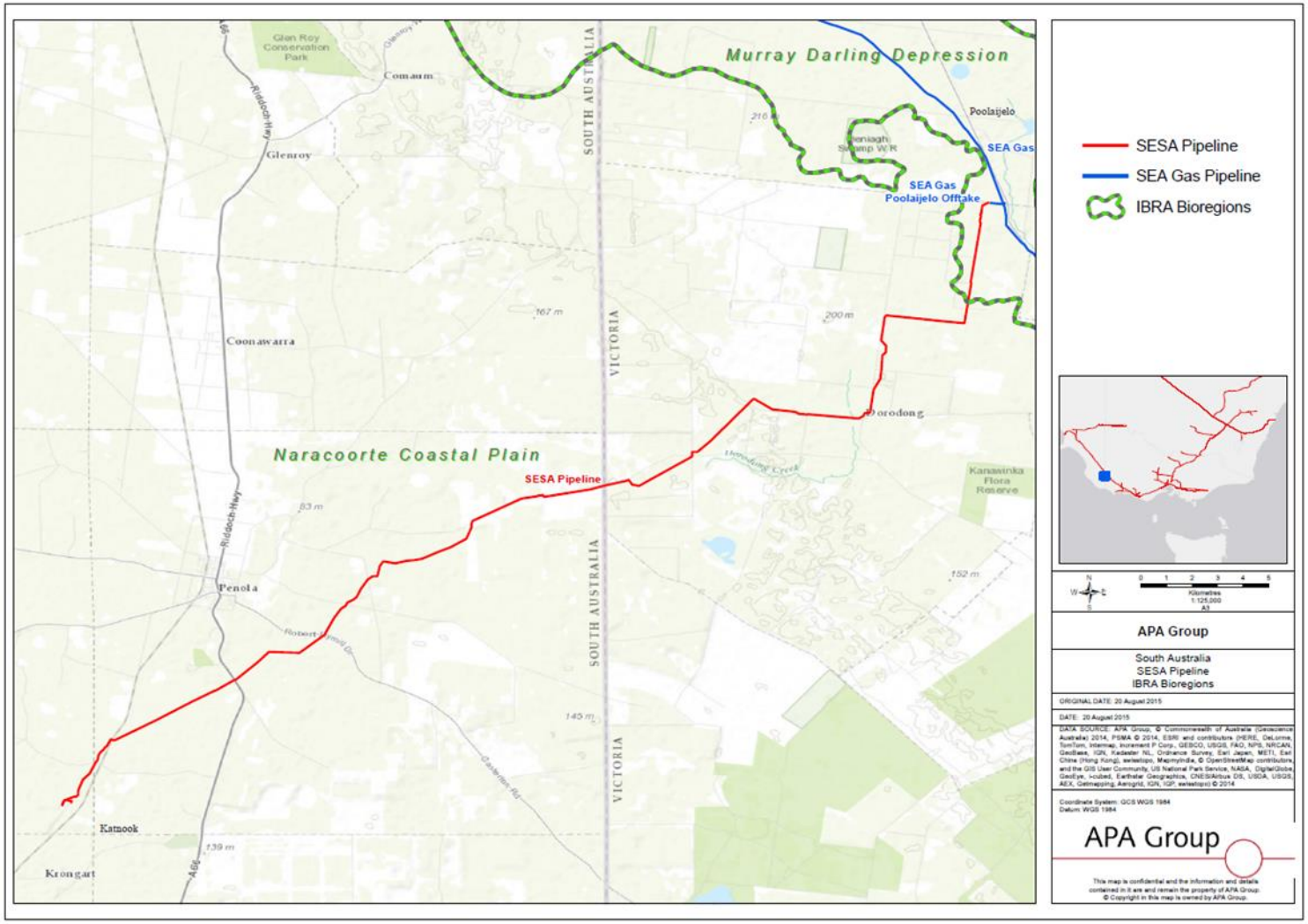

Figure 4-2: IBRA regions across the Pipeline

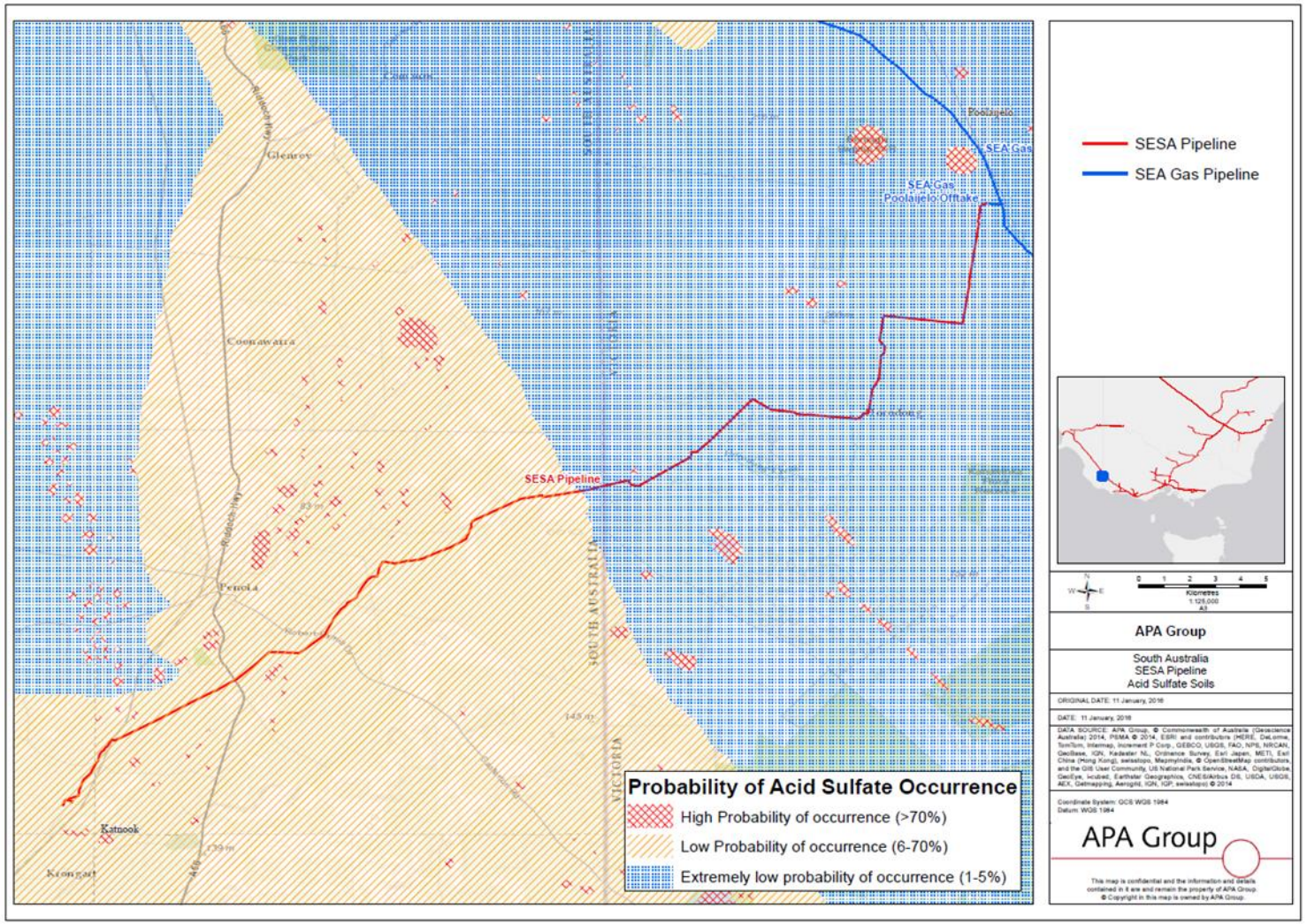

Figure 4-3: Probability of acid sulphate soils surrounding the Pipeline.

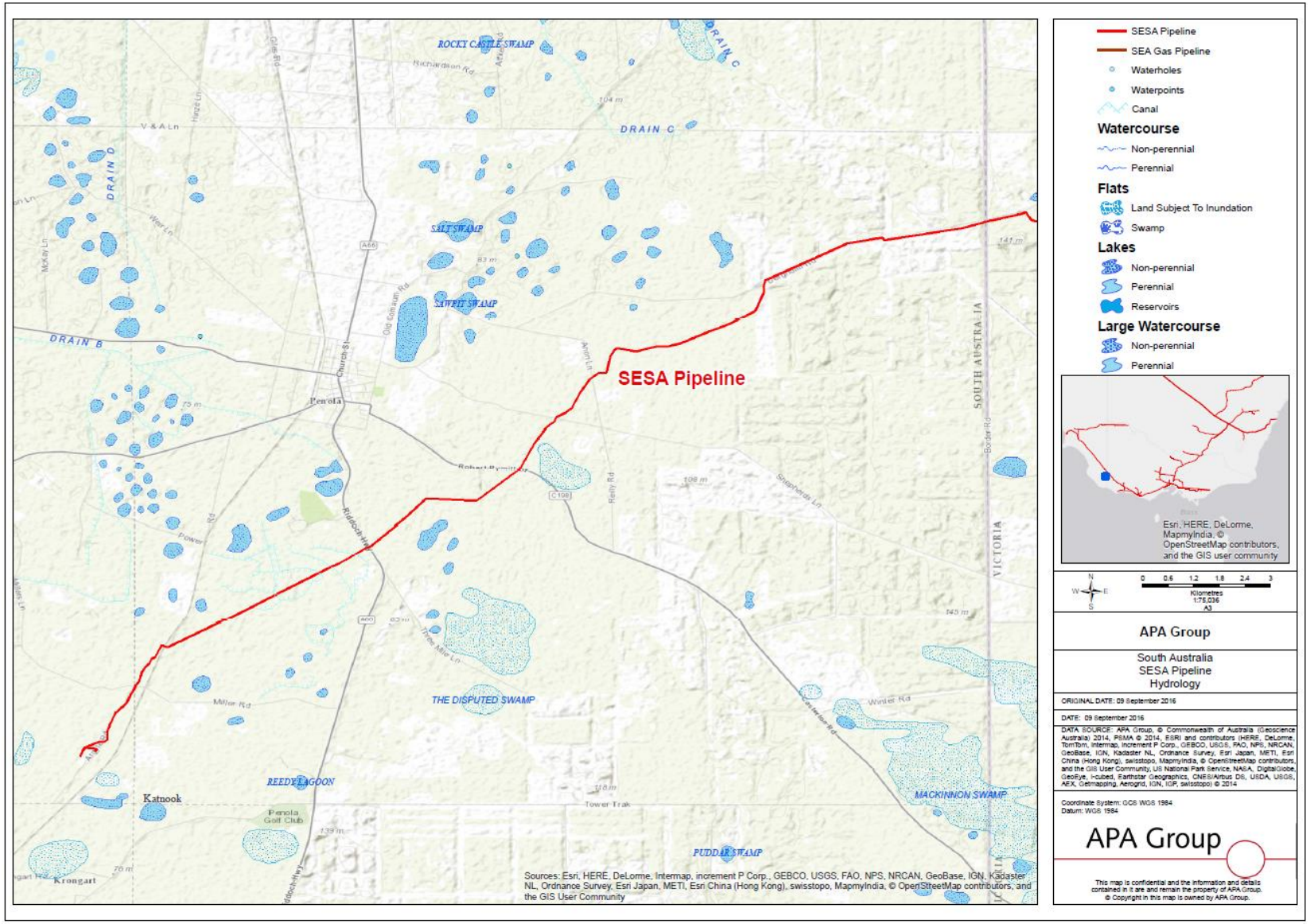

Figure 4-4: Surrounding Hydrology of the Pipeline

4.2.3 Flora

A field survey was completed prior to the construction of the Pipeline in late 2004 to assess the presence and condition of existing flora along the pipeline route. A large proportion of the native vegetation in the region has been cleared or heavily modified for agriculture and forestry; however, some large blocks of remnant vegetation remain in forest reserves neighboring the Pipeline. Along the pipeline route native vegetation is largely restricted to small or linear remnants along road reserves or creek lines and scattered trees in paddocks.

Woodlands dominated by Brown Stringybark (Eucalyptus baxteri) or Red River Gum (Eucalyptus camaldulensis) are the most common native vegetation communities throughout the region. Other vegetation communities located along the alignment of the Pipeline are outlined in Table 4.1.

Table 4-1: Native vegetation communities in the vicinity of the Pipeline

Vegetation Community	Location (KP)	Condition*	Comment
Plains Grassy Woodland	0.8	3	Copse of Red River Gum
Red Gum Swamp	8.3	4	Alignment diverts around swamp.
Limestone Woodland / Heathy Herb-rich Woodland	10 – 13.7	4 - 5	Open paddock with scattered Pink Gums
Creek-line Herb-rich Woodland	12	4	Dorodong Creek
Damp-sands Herb-rich Woodland	20.5	4	Large Manna Gums avoided.
Swamp Gum *Eucalyptus ovatam, E. viminalis* spp. Woodland	21.4 - 23.5	3	Present adjacent to the route where alignment is in a firebreak.
Eucalyptus arenacea / baxteri +/- *E. oblqua* +/- *E. viminalos spp cygnetensis* Open Forest to Woodland	21.4 – 23.5	2	Pipeline in track and in heavily degraded area to avoid Condition 2 vegetation.
Eucalyptus camaldulensis Woodland	-	4-5	Scattered trees in paddocks and linear remnants with no significant understorey.
Baumea juncea, Chorizandra enodis Sedgeland	40.3	3	Present adjacent to pipeline where pipeline diverts around wetland.
Buloke *Allocasuarina luehmannii* Woodland / *Themeda triandra, Austrostipa* spp Tussock Grassland	40.8	4-5	4-5 Buloke and numerous *Acacia melanxylon* (Blackwood) present adjacent to pipeline inside fence rail reserve.
Floating water plants, Herbland	43.5	4	Present adjacent to pipeline where pipeline diverts around wetland.

*Ecology Australia Vegetation Quality Ratings.

A total of 135 species of plants (110 indigenous and 25 introduced) have been identified in the vicinity of the Pipeline but a large proportion is considered to be outside the operational area of the asset (i.e. located outside the easement boundaries).

Six species of conservation significance were located in the vicinity of the Pipeline but only Pink Gum (Eucalyptus fasciculosa) and Yucca (Xanthorrhoea caespitosa) were located within the pipeline corridor. All species of conservation significance , under the National Parks and Wildlife Act, are listed in Table 4.2.

Table 4-2: Flora of conservation significance in the vicinity of the Pipeline.

Common Name	Scientific Name	Conservation Status	Comment
Hop Wattle	*Acacia stricta*	R	Recorded off the alignment.
Sweet Wattle	*Acacia suavelens*	R	Recorded off the alignment.
Swamp Billy-Buttons	*Craspedia paludicola*	V	Recorded in wetland adjacent to pipeline.
Scented Sundew	*Drosera whittiakeri spp. aberrans*	R	Recorded off the alignment.
Pink Gum	*Eucalyptus fasciculosa*	-	Extensive remnant adjacent to alignment.
Yucca	*Xanthorrhoea caespitosa*	-	Was present on alignment at two locations; now recorded off the alignment.

The Pink Gum-dominant vegetation community occurs at several locations between KP 21.3 to 23.5. These communities provide suitable habitat for fauna species regarded as threatened at a regional, state and national scale such as the Sugar Glider (Petaurus breviceps) (see Section 4.2.5).

Yucca is regarded as being rare in Victoria on the basis of a relatively small distribution in the state, however, within the Bioregion it is considered to be locally abundant. Yucca is associated with vegetation communities containing Brown Stringybark (Euc. baxteri) and Pink Gum.

The alignment does not intersect any intact remnants of Manna Gum (Euc. viminalis) Woodlands, however, the community type is commonly found in the Bioregion. The Woodland community, particularly where there are large hollow-bearing trees, provide suitable habitat for the Sugar Glider.

The alignment does not intersect any intact remnants of Swamp Gum Woodland (Euc. ovata). The community type is suitable habitat for fauna threatened at a state or regional level including the Sugar Glider, Little Lorikeet (Glossopitta pusilla) and Black-chinned Honeyeater.

The Pipeline passes through Red River Gum (Euc. camaldulensis) Woodland from KP 26 onwards.

The section of rail reserve that the Pipeline intercepts, as 41.6KP, is recognised as a rail-side significant site (Site ID 225) for rare flora (grass herb, shrub or tree) (Department of Planning, Transport and Infrastructure 2014). No species of conservation significance were identified during the survey and therefore flora species associated with the status of the site are likely to be located elsewhere in the rail-side.

There are three Threatened Ecological Communities (TEC) within the wider region surrounding the Pipeline which includes:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions located to the north;
- Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia located to the north; and
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains located in the surrounds of the Pipeline.

4.2.4 Weeds, Pests and Disease

Most weeds located along the Pipeline are associated with exotic pasture in agricultural areas (Table 4.3). The occurrence of Pampas Grass and Sweet Pittosporum, during the flora survey in 2004, was isolated to one incidence which were both located outside the operational area of the asset. Annual easement patrols, undertaken since the survey, confirm that Pampas Grass and Sweet Pittosporum are not located on or in close vicinity to the Pipeline.

Table 4-3: Weeds species in the vicinity of the Pipeline

Common Name	Scientific Name	Declared Weed Status	WoNS	NRM Strategy
Canary Grass	*Phalaris aquatic*	-	No	Manage
Cape Weed	*Arctotheca calendula*	-	No	Limited Action
Cocksfoot	*Dactylis glomeratus*	-	No	-
Couch	*Cynodon dactylon var. dactylon*	-	No	Protect Sites
Broom	*Genista ssp*	Cat. 2	Yes	Protect Sites
Veldt Grass	*Ehrharta ssp*	-	No	Manage Weed
Pampas Grass	*Cortaderia selloana*	Cat. 2	No	Destroy Infestations
Sweet Pittosporum	*Pittosporum undulatum*	Cat. 3	No	Manage Sites

Evidence of plant diseases (e.g. Phytophthora dieback and Mundulla Yellows) have not been recorded along the Pipeline route.

The South East Pest Management Plan (2009) identifies several pest species as occurring in the region of the Pipeline. All species are particularly transient and none are confined solely to the easement (Table 4.4).

Table 4-4: Pest species in the vicinity of the Pipeline

Common Name	Scientific Name	Declared Animal Status	NRM Strategy
Feral Deer	*Axis spp.*	Cat. 3	Destroy Infestations
	Cervus spp.	Cat. 3	Destroy Infestations / Contain Spread
	Dama spp.	Cat. 3	Destroy Infestations
Feral Goat	*Capra hircus*	Cat. 3	Eradicate
Rabbit	*Oryctolagus cuniculus*	Cat. 3	Contain Spread
Wild Dog	*Canis lupus familiaris*	Cat. 3	Eradicate

4.2.5 Significant Fauna

Fifteen nationally threatened fauna species has been predicted as occurring in the region and thirty state listed fauna species have been recorded close to the pipeline corridor (Origin 2004). Details on the occurrence of these species are provided in Table 4. 5.

The main habitats present in the region include:

- Woodlands and heathy woodland, which support birds, mammals and reptiles
- Wetlands and swamps, which support waterbirds and frogs
- Plantations and agricultural land, which generally supports a limited range of fauna.

Table 4-5:Listed species likely to occur in the vicinity of the Pipeline.

Common Name	Species	Conservation Status	
		Aust.	SA
Birds			
Australian Shoveler	*Anas rhychotis*	M	R
Great Egret	*Ardea alba*	M	-
Hardhead	*Aythya australis*	M	-
Musk Duck	*Biziura lobate*	EN	R
Red-tailed Black-Cockatoo	*Calyptohynchus banksia graptogyne*	-	E

Common Name	Species	Conservation Status	
		Aust.	SA
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	M	V
Shining Bronze-Cuckoo	*Chalcites lucidus*	-	R
Golden-headed Cisticola	*Cisticola exilis*	-	R
Brown Treecreeper	*Climacteris picumnus victoriae*	-	-
White-bellied Cuckoo-strike	*Coracina papuensis*	-	R
Brown Quail	*Coturnix ypsilophora*	-	V
Peregrine Falcon	*Falco peregrinus*	M	R
Crested Strike-tit	*Falcunculus frontatus*	-	V
Latham's Snipe	*Gallinago hardwickii*	M	V
Brolga	*Grus rubicunda*	M	V
Chestnut-rumped Heathwren	*Hylacola pyrrhopygia*	-	V
Hooded Robin	*Melanodryas cucullata*	-	-
Black-chinned Honeyeater	*Melithreptus gularis gularis*	-	V
Blue-winged Parrot	*Neophema chrysostoma*	M	V
Barking Owl	*Ninox connivens*	-	R
Olice Whistler (Glenelg)	*Pachycephala olivacea Hesperus*	-	V
Flame Robin	*Petroica phoenicea*	M	R
Royal Spoonbill	*Platelea regia*	M	-
Baillon's Crake	*Porzana pusilla*	M	R
Australia Painted Snipe	*Rostratula australis*	VU	R
Southern Emu-wren	*Stpitirus malachurua*	-	R
Painted Button-Quail	*Turnix varia*	-	V
Masked Owl	*Tyto novaehollandiae*	-	E
Mammals, Amphibians and Reptiles			

Common Name	Species	Conservation Status	
		Aust.	SA
Red-necked Wallaby	*Macropus rufogriseus*	-	R
Sugar Glider	*Petaurus breviceps*	-	R
Koala	*Phascolarctos cinereus*	-	R
Common Wombat	*Vombatus ursinus*	-	R
Southern Smoth Froglet	*Geocrinia laevis*	-	R
Growling Grass Frog	*Litoria raniformiis*	VU	V
Jacky Lizard	*Amphibolurus muricatus*	-	R

4.3 Heritage

4.3.1 Aboriginal Heritage

According to Clark (1990, Tivendale 1974), the region incorporates the traditional lands of the western clans of the Jardwadjali and the eastern Buandik or Bunganditj. The clans and bands of the Jardwadjali practiced a traditional hunting and gathering economy with population movement being associated with seasonal resource distribution and abundance. Watercourse, lakes and swamps provided not only drinking water but also habitat for a wide range of food resources and, as such, would have provided an important focus for Aboriginal occupation in the area.

Recent studies in the broader Penola region (Gara 1988, Luebbers 1990a abd 1990b, Wood, 1994, 1995 and 1996) have reported a limited number of sites.

An Aboriginal heritage survey was completed in 2004 in conjunction with the Tattyara Aboriginal Heritage Consultancy and the Kungari Aboriginal Cultural Heritage Association (Wood 2004). The entire alignment was driven with 15 kilometres (33%) being subjected to an additional detailed pedestrian survey. Ground surface visibility for approximately 80% of the alignment was generally moderate to good (i.e. within the forestry areas). Thick grass cover on pastoral land resulted in low ground surface visibility. All mature trees were checked for evidence of scarring.

No Aboriginal heritage sites, objects or remains were noted and the Pipeline corridor was considered to be of generally low archaeological sensitivity due to the highly disturbed nature of the landscape.

4.3.2 European Heritage

The region was settled by Europeans in the late 1830's with the main land use being gold exploration, logging and grazing. Archaeological evidence of these activities includes timber structures, saw pits, log yards, coach changing stations, schools and halls.

A search of the Heritages Registers identified no sites along the alignment. A survey completed in 2004 (in conjunction with the Aboriginal Heritage survey) confirmed that there are no sites identified within the vicinity of the Pipeline.

4.4 Existing Land Use

The Pipeline intercepts twenty properties located over 45 individual parcels of land.

4.4.1 Plantations

The Pipeline is located within the Green Triangle Forest Region of south-east South Australia. The Region is made up from government and privately owned plantations. These plantations continually rotate between planting and harvesting activities. The Pipeline is located within firebreaks within privately owned plantations between 22 – 27KP.

4.4.2 Agriculture

The most extensive form of land-use is the region is pastoralism which is mainly in the form of dryland grazing. Cattle and sheep are the most commonly stocked species.

A small section of the Pipeline, between KP 40 – 41, intercepts an area of irrigated cropping.

4.4.3 Infrastructure

The Pipeline crosses a number of major public roads, unsealed public roads and private access roads. These roads and tracks are used for access to the pipeline corridor by vehicles associated with pipeline operations activities. The main public road crossings on the Pipeline are listed in Table 4-6.

Table 4-6: Public Road and Rail Crossings on the Pipeline

Road Name	KP	Comments
Penola - Dorodong Road	21 - 26	Crosses under the Road in two locations.
Shepards Lane	31.8	
Penola – Castorton Road	33	
Access Road	35.8	Private access to quarry.
Riddoch Highway	36.8	
Wolseley – Mount Gambier Railway	41.6	Railway is not in use.
Miller Road	42.8	
Argyle Road	44.3	

Other minor third party crossings include the gathering lines from the Katnook gas wells to the Katnook gas plant in the vicinity of the gas plant and common underground infrastructure including telecommunications cables and residential water pipelines are crossed frequently.

4.5 Noise and Air Quality

The existing noise environment in the region is typical of rural areas, with generally low levels of background noise dominated by natural sources (e.g. wind, animals and insects) and intermittent noise from vehicular traffic, agriculture and forestry activities. The area is not densely settled, with only two residences within 80 – 120 metres of the Pipeline and six residences between 300 – 600 metres from the Pipeline.

The air quality in the vicinity of the Pipeline is typical of a rural environment and is influenced by a range of activities such as:

- Dust from forestry and agricultural activities including ploughing, harvesting, stock and vehicle movements;
- Seed, pollen and smoke from forestry, farm and domestic activities; and
- Vehicle and equipment exhaust fumes.

5. ENVIRONMENT ASPECTS, IMPACTS AND MITIGATION

Operation of the Pipeline and associated facilities involves a range of activities undertaken by qualified technical operations personnel and service companies to protect the safety and integrity of the asset. The activities include but are not limited to:

- routine and emergency maintenance of above ground facilities;
- easement access for:
  - general patrols of easement;
  - repairing, replacement of pipeline markers for maintaining line of sight;
  - erosion remediation and ground stability checks;
  - vegetation management and weed control;
- undertaking earthworks associated with maintenance of pipeline and facilities;
- construction of associated pipeline infrastructure (i.e. Cathodic protection);
- protection of land-use or Pipeline in light of land-use changes;
- bush fire prevention; and
- monitoring and auditing of environmental conditions.

This section reviews the potential aspects and impacts on the environment from operations Pipeline, facilities and easement.

A risk assessment of pipeline operations was undertaken with thirteen experienced pipeline staff from all Australian operational units in early 2013 and the summary of results is included here in the below tables under residual risk i.e. once controls are implemented.

DSD also requires consideration of public safety and security of supply in the EIR and SEO. A risk assessment of pipeline operations, in relation to these factors, was completed in early 2016 by four experienced pipeline staff.

Should new aspects come to light and or new control measures be implemented, a follow-on risk assessment would be undertaken and the following tables updated.

Aspects and impacts of operations and maintenance are likely to be repeated for many of the items raised, where they are, reference will be made to where it is first mentioned in this section, but not repeated verbatim.

5.1 Risk Assessment Methodology

Risk assessment is the primary mechanism of the risk management process that aims to control the hazard. The concept of risk assessment has two main elements, the likelihood of an event happening and the consequences if it happens.

Once a hazard has been identified the procedure involves an assessment of the potential frequency or likelihood (Table 5.1) of occurrence and evaluation of severity of consequences (Table 5. 2) if the event was likely to occur. By using this approach it allows for the systematic evaluation of the hazard, based on a matrix. It therefore provides in a semi-quantitative manner the significance of a risk situation (Table 5. 3).

The objective is to then apply the necessary management actions (Table 5.1.4) to reduce the level of risk to As Low As Reasonably Practicable (ALARP) where any additional effort involved in reducing the risk further would be grossly disproportionate to the benefit gained.

Table 5-1: Risk likelihood descriptions

Likelihood Rating	Description
Frequent	Is currently occurring or will most definitely occur
Occasional	Can be expected to occur in certain circumstances
Unlikely	Not expected to occur but may occur in abnormal circumstances
Remote	Conceivable, but only in exceptional circumstances
Hypothetical	Theoretically possible but has never occurred.

Table 5-2: Risk consequence ratings

Impact Consequence (Impact) Rating	Description
Trivial	Minor on-site effects rectified immediately with negligible residual effect.
	No restriction of gas supply.
	Minimal impact on health and safety.
Minor	Very localised area (<0.1ha) and short term (< 2 years) effects.
	Short term (< 2 weeks) interruption to supply but shortfall met from other sources.
	Injuries requiring first aid treatment.
Severe	Localised (< 1 ha) and short term (< 2 years) effects.
	Prolonged (< 3 months) interruption to supply.
	Injuries requiring hospital treatment.
Major	Major off-site impact, long effects or difficult rectification.
	Prolonged (>12 months) interruption to supply.
	A fatality or several people with life threatening fatalities.
Catastrophic	Wide spread effects and/or permanent major changes.
	Long term loss of supply.
	Multiple fatalities.

Table 5-3: Risk measurement matrix

Likelihood	Consequences				
	Trivial	Minor	Severe	Major	Catastrophic
Frequent	Low	Intermediate	High	Extreme	Extreme
Occasional	Low	Low	Intermediate	High	Extreme
Unlikely	Negligible	Low	Intermediate	High	High
Remote	Negligible	Negligible	Low	Intermediate	High
Hypothetical	Negligible	Negligible	Negligible	Low	Intermediate

Table 5-4: Risk matrix management actions

Risk Rating	Description	Key Actions
Extreme	Extreme risk	Immediate action required and risk monitored at Board level.
High	High risk	Executive management attention needed and risk monitored.
Intermediate	Moderate risk	Management instructions must be specified.
Low	Low risk	Manage by routine plans and procedures. Monitor changes which could affect the risk classification. Review at the next review interval.
Negligible	Negligible risk	Review periodically to ensure risk has not increased.

5.2 Soil

Permanent access along the easement is required for the operation of the Pipeline. Formal access tracks to the easement will be used to reduce the need to traverse large lengths across private property. There are some instances where the easement will be travelled the entire length, for example, when completing ground patrols and cathodic protection surveys. All vehicle movement is confined to the easement and existing access tracks unless prior approval from landholders has been sort. Should an access track exist on the easement then vehicles will remain on the track whenever practicable to reduce the instance of soil compaction.

Occasionally, earthworks will be required to complete operational activities. This may include, for example, pipeline integrity digs, coating refurbishment work, installation of new anode beds and projects requiring new tie in facilities. This is occurs infrequently, however, it is likely to increase as the Pipeline ages. Excavations usually occur on the pipeline easement or in designated compounds and are a short term, temporary event. All excavations will be undertaken while maintaining soil integrity and ensuring appropriate rehabilitation of the site post-works.

Potential acid sulphate soils or actual acid sulphate soils (ASS) may potentially exist in low lying and inundated areas. Although mapping indicates a low likelihood of ASS any works in potential areas will be accessed prior to works being. Should ASS be confirmed and the works cannot be located then mitigation controls will be implemented such as avoiding working at depth, applying lime or appropriate soil profile management.

A variety of hydrocarbons and chemicals are used for maintenance activities (e.g. diesel fuel, lubricants for machinery, degreasing agents, paints, etc.), however, only in minor amounts. A minimal amount of waste hydrocarbons may be produced from maintenance activities on machinery and vehicles and no waste hydrocarbons are expected to be generated by the Pipeline. Any waste hydrocarbons produced are collected and removed for disposal at a licensed waste facility. All maintenance activities are undertaken in accordance with APA procedures which include spill prevention measures.

A spill of either chemicals or wastes has the potential to result in soil contamination. All staff must be trained and competent in the use and management of chemicals. Chemicals and other wastes are stored in container or storage areas as per the requirements detailed in the MSD, AS 1940 and the EPA guideline Bunding and Spill Management (i.e. weather protection, signage, bund capacity). Spill kits are located at each site that has a chemical storage area. Spill kits may also be required on work sites should it be identified in the risk assessment completed for the work.

The condition of soil and terrain will be monitored through regular ground and aerial surveillance programs. These programs will seek to identify areas of erosion, soil inversion, poor vegetation cover and suspected areas of soil contamination. Should an issue be identified then it will be reported so that rectification works can be determined and scheduled.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to soil refer to Table 5.5.

Table 5-5: Aspects and Impact Register for Soil

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Permanent access to and along easement	Vehicular movement, maintenance of access tracks to and along the easement.	Soil compaction, erosion or release of sediment to land and water, loss of topsoil.	Restricting operational activities to formal access tracks and the easement.	Unlikely	Trivial	Negligible
			Inspections undertaken as part of regular patrols (ground and aerial) to identify soil movement.			
Operational and maintenance activities at above ground facilities or on easement.	Integrity digs / dig-ups, trenching and excavation for infrastructure installation.	Major disturbance to soil in specific small area resulting in inversion, erosion, loss of topsoil or disturbance of ASS.	Planning and monitoring of disturbances (i.e. dig-ups) to ensure that top soil/subsoil are stockpiled separately and soil profiles appropriately reinstated following the re-instatement of works/excavations.	Occasional	Minor	Low
			Minimise the area cleared during excavations, in particular, minimise the disturbance of vegetation on erodible soils.			
			Minimise the time period between clearing and restoration.			
			Avoid completing works in known ASS areas unless unavoidable in which case pH remediation (lime application) may be required.			
Operational and maintenance activities at above ground facilities or on easement *cont.*	Disposal of waste created during operational activities.	Contamination of soil.	Conduct all activities associated with pipeline operation in a manner that reduces the production of waste (implementing the waste management hierarchy).	Unlikely	Minor	Low
			Waste material is contained and then disposed of in accordance with APA procedures and disposed of at an EPA licenced facility or via an approved process under the Environment Protection Act.			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
			Appropriately licensed contractors used for any hazardous waste disposal and records are maintained for all hazardous waste disposal.			
			Map any known contaminated soils areas on company GIS system.			
			Manage contaminated soils as per NEPM and EPA guidelines/requirements specific to the site. Training for operational staff.			
Natural changes to terrain and landforms	Wind and water.	Loss of cover over pipeline.	Vegetation clearing within the easement is limited to previously disturbed areas.	Remote	Minor	Negligible
			Preventative measures, such as whoa boys, battering or rip-rap, installed in susceptible areas and maintained in good repair.			
			Regular ground and aerial surveillance to monitor loss of cover. Pipeline depths taken at waterway crossing points.			
Poor level of vegetative ground cover	Wind and water, lack of vegetation cover on easement, earthworks associated with pipeline maintenance and repairs.	Soil compaction, release of sediment to land and water, loss of topsoil, disturbance and mobilisation of contaminated soils.	Encourage regrowth of native grasses and low growing shrubs along the right-of-way, within 3m of the pipeline centreline, where appropriate (i.e. not in farmland used for cropping or pasture).	Remote	Severe	Low
			Reapply topsoil if lost through erosion.			
			Prompt reinstatement of easement post works and follow-up rehabilitation undertaken where natural regeneration is inadequate and not consistent with surrounding areas.			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Storage, use, collection and transport of hydrocarbons and chemicals.	Spill.	Contamination of soil.	Prevention program including pigging, intelligent pigging and pipe maintenance as per the Pipeline Management System. All chemicals utilised for operations require: • Chemical register • Chemical storage • Spill response equipment Use of spill protection methods where work is completed within or adjacent to environmentally sensitive areas. Spill response/clean-up procedures, requiring spills to be: • reported • contained • cleaned-up in consultation with regulatory agencies and landholder (as required) • cause investigated and corrective and/or preventative action implemented. Ensure personnel are trained in chemical management and spill response procedures. Compliance with waste, fuel and hazardous waste standards (e.g. AS 1940).Bunded areas in accordance with EPA guidelines *080/07 Bunding and Spill Management*. Inspections undertaken as part of regular patrols (ground and aerial) and following significant storm events to identify waste, spills and potential contamination sources.	Unlikely	Minor	Low

5.3 Water

Preventive measures will be applied to protect water resources from soil movement through the installation of erosion control measures such as whoa-boys or berms. These will be installed where required (i.e. based on erosion potential on the site) and vegetative ground cover will be maintained at a level consistent with surrounding areas to protect topsoil. The condition of these control measures will be monitored through regular ground and aerial surveillance programs. Should an issue be identified then it will be reported so that rectification works can be scheduled.

Riparian vegetation will be trimmed to maintain line of sight rather than cleared by other means so not to disturb water and soil in riparian zones.

Occasionally, excavations associated with operational activities have the potential to impact on surface water flows if not managed correctly. All excavations will be rehabilitated so that landforms and drainage patterns are restored. Works in areas of shallow ground water will ideally be scheduled over the summer months to reduce the likelihood of excavating below the water table and resulting in trench water.

Works in riparian areas will be avoided unless absolutely unavoidable and, in the rare event that the works are not avoidable, rehabilitation of the site will occur immediately after the works. Very minimal quantities of water will be required for pipeline operations and larger amounts, which would be likely sourced from potable water supplies, would only be required should hydro-testing of a section of pipeline be undertaken. The source of water will be accessed on a case by case basis and will be dependent on the availability and location of surrounding sources.

All efforts will be made to avoid discharge of wastewater, such as trench and hydro-test water, into waters, and it will be disposed of in a manner that minimises runoff to environmentally sensitive areas. Should discharge potentially result in runoff to watercourses then all reasonable and practical measures (i.e. water testing) will be taken to ensure that the water quality guidelines associated with that waterway are met.

If a water affecting activity is required (i.e. bank protection, vegetation management, crossing) for operations then a permit from the NRM Board will be sought.

Vehicle access through and across waterways will be required for easement patrols and Cathodic Protection surveys. These will be planned for completion in the drier seasons so to limit disturbance. All waterway crossings along the pipeline route are dry throughout the summer months and access is planned in consideration of this timeframe.

A minimal amount of chemical usage and/or the production of small amounts of wastes are likely to occur during pipeline operations. A spill of either chemicals or wastes may result in water contamination of both surface and groundwater. All chemicals, wastes and spills will be managed as per Section 5.2.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to water refer to Table 5.6.

Table 5-6: Aspects and Impact Register for Water Resources

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Surface and groundwater quality, and drainage pattern or flow modifications.	Above ground facility operations. Vehicle or heavy machinery movements. Vegetation control activities. Integrity digs and earthworks.	Impacts on surface and groundwater quality Altered drainage patterns or flow regimes to surface water and groundwater, riparian, aquatic and water dependent flora and fauna damage.	Restricting operational activities to formal access tracks and the easement.	Remote	Severe	Low
			Minimising period of disturbance for any excavation or land disturbance and prompt reinstatement of easement in sections of easement intersecting or adjacent to water bodies. Ensuring that drainage lines and surface profiles are reinstated.			
			Ensure all water effecting activities, as defined under the NRM Act, have prior approval before being undertaken.			
			Erosion and sediment controls installed in accordance with best practice, and routinely checked to ensure they are stable, effective and in good repair.			
			Routine aerial surveillance and on ground patrols are undertaken to identify and monitor any changes to drainage patterns.			
			Avoid completing works in riparian areas unless absolutely necessary.			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
			Use of photo points before, during and after earthworks in riparian zones to monitor changes.			
			Prompt removal of appropriate temporary watercourse/water body protection measures to prevent flow interruptions.			
Operational and maintenance activities at above ground facilities or on easement.	Disposal of wastewater created during operational activities (i.e. hydro-testing)	Contamination of ground and surface water.	Investigation of water quality prior to release/disposal of trench water and waste water. Testing of hydro-test water if potentially harmful chemicals added. Discharge water meets appropriate ANZECC and EPA criteria for point of disposal.	Remote	Severe	Low
			Hydro-test/trench water meets appropriate ANZECC criteria at point of discharge and is disposed onto land, well away from any place from which it is reasonably likely to enter any waters.			
			Water disposed of in a manner that prevents discharge or runoff to watercourses or environmentally sensitive areas.			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Storage, use, collection and transport of hydrocarbons and chemicals.	Spill.	Contamination of ground and surface water.	As per Section 5.2			

5.4 Vegetation

Permanent access along the easement is required for the operation and maintenance of the Pipeline. However, access along the entire length of the easement is only required when completing ground patrols or cathodic protection surveys. Should access tracks exist on the easement then vehicle activity will be confined to those tracks whenever practicable so as not to damage surrounding vegetation.

Under pipeline licence regulations, warning signs denoting the approximate location of buried high pressure pipelines must be installed and line of sight between these marker signs must be maintained. Therefore, vegetation on the easement must be maintained at low levels to enable line of sight. Ground cover and low lying vegetation (approximately < 300mm) will be encouraged as it assists with ground stability and reduces the development of erosion from wind and water and provides habitat for fauna. The level of ground cover should be consistent with surrounding areas.

Occasionally, earthworks will be required to complete operational activities, such as pipeline integrity digs or the installation of cathodic protection infrastructure. Clearing of the low lying vegetation on the easement is isolated to the immediate project area and the site will be rehabilitated so that ground cover is restored to a condition consistent with surrounding areas. The loss of vegetation as a result of these activities is likely to be short-term and restricted to the existing easements that have previously been used for pipeline construction and maintenance activities.

Significant trees and sensitive areas that were identified during construction or the approvals process have been recorded on the GIS system to ensure that activities do not impact these areas. Impacts to recognised significant trees and sensitive areas will be avoided unless specific approval has been granted by the appropriate authority. All clearing outside of the existing easement will require assessment and approval under the Native Vegetation Act.

Bushfires caused by operational activities are expected to be very rare. Fire Bans will be adhered to unless specific approval for the activity has been acquired from the relevant authorities. All hot work activities, such as welding, require appropriate site preparation to remove potential ignition sources and the use of a fire-spotter. A job specific SWMS will assess the level of risk the activity poses in the planning stage and should additional control measures be required they will be implemented. This may include having fire-fighting equipment on-site or postponing the work to a period of lower fire risk.

Routine aerial or ground surveillance is used to monitor for excessive or poor vegetation growth.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to vegetation refer to Table 5.7.

Table 5-7: Aspects and Impact Register for Vegetation

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Permanent access to and along easement	Vehicular movement, maintenance of access tracks to and along the easement.	Disturbance or damage to native vegetation.	Restricting operational activities to formal access tracks and the easement.	Occasional	Minor	Low
	Weed and disease transported on vehicles and machinery.	Weed spread, poor pasture, change of species composition in native habitats.	See Section 5.5 Weeds, Pests and Disease.			
Maintaining line of sight between pipeline markers	Above average rainfalls, deliberate plantings by landholders on the easement.	Ongoing vegetation clearing required to manage excessive vegetation growth - more frequent use of vegetation clearing methods (slasher, grader, etc.)	Where practical, removing vegetation without disturbing the soil to preserve root and seed-stock along the easement.	Frequent	Minor	Intermediate
			Trimming vegetation rather than clearing in sensitive areas, particularly at watercourses.			
	Reduced vegetation cover, below average rainfalls, third party access and/ or soil disturbance on easement, overgrazing of ground cover.	Poor vegetation cover that may lead to: • erosion or sedimentation ; • loss of agricultural production capacity; • loss of visual amenity	Maintain a level of ground cover consistent with surrounding land.	Occasional	Minor	Low
			Reapply topsoil if lost through erosion.			
			Rehabilitate area through seeding, pasture improvement, etc.			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
Earthworks for maintenance and minor construction activities	Integrity digs / dig-ups, trenching and excavation for infrastructure installation.	Major disturbance to vegetation cover in specific small area, reliance on successful rehabilitation of site.	Disturbance of native vegetation is avoided during excavation activities wherever practicable. Keeping topsoil stockpiled separate from subsoils during excavation and respreading. Respreading of cleared vegetation on the easement where it does not impede vehicles, stock or wildlife. Re-contouring the land surface consistent with the surrounding area to ensure localised habitats/niches are maintained. Minimising the time between clearing and rehabilitating the easement when excavations are required.	Occasional	Minor	Low
Bushfire caused from hot work activities (i.e. welding) and / or dry conditions.	Patrol vehicles on easement, operation of plant and equipment, welding activities.	Bushfire and damage or loss of flora and habitat, possible damage to agricultural production.	Any slashing, welding, grinding or cutting works are undertaken following SWMS analysis which includes Ignition sources, fire, and explosion review, under the Permit to Work system. No hot work permitted during Fire Bans unless under approval from the emergency service authority. Restrict potential ignition sources and welding activities during periods of high fire risk.	Hypothetical	Major	Low
Bushfire caused from hot	Patrol vehicles on	Bushfire and damage or loss	All equipment used complies with relevant fire safety standards to ensure that explosion, ignition of gas or other			

Aspect	Source of Risk	Potential Impact	Control Measures	Residual Risk		
				Likelihood	Consequence	Risk Rating
work activities (i.e. welding) and / or dry conditions (cont.)	easement, operation of plant and equipment, welding activities (cont.)	of flora and habitat, possible damage to agricultural production (cont.)	substances does not occur, (e.g. use of spark arrestors).			
			Use of a fire-spotter and having fire-fighting equipment of site during welding activities.			
			Vehicles are regularly checked to ensure that combustible materials such as grass and debris do not build up in critical areas where ignition could occur.			
			Where flammable or combustible chemicals are required to be stored, appropriate fire-fighting equipment is available and they are stored in accordance with AS 1940: Storage and handling of flammable and combustible liquids and as per SDS.			

5.5 Weeds, Pests and Diseases

Disturbed soil has the potential to encourage weed growth as many weeds are considered to be emergent species. Post-work rehabilitation will include the respreading of stockpiled topsoil and ongoing monitoring of the site for weeds until ground cover has re-established. Revegetation may take place if deemed necessary in sensitive areas.

Existing weed infestations have the potential to spread along the easement via vehicle traffic on the easement. Routine ground patrols are used to monitor the easement for the location of infestations and the extent of infestations. All infestations will be recorded on the GIS system which will trigger the appropriate hygiene procedures. The hygiene procedures include clean-in and clean-out requirements for known infested and non-infested areas. Areas of existing infestations will be avoided where possible and all vehicle movement will remain on the easement. Vehicles accessing the easement will be kept clean of debris and soil and washed down on an as needs or periodic basis to prevent the introduction of new weed, pest and diseases. Machinery and other earth moving equipment brought to site must be certified as being clean, particularly, if sourced from a third party.

Declared or WoNS weeds that are located exclusively on the easement will be eradicated and such weeds that are located on easement and on the surrounding land will be managed in conjunction with the landholder. Advice issued by the NRM Board regarding weed, pest and/or disease management for landholders will be implemented.

If control measures are enforced over a declared quarantine area, which includes the easement, discussion and ongoing liaison will be undertaken with regulatory authorities and landholders to develop appropriate access practices.

For further information of the potential impacts and control measures that will be applied to manage the risk posed by weeds, pests and diseases refer to Table 5.8.

Table 5-8: Aspects and Impact Register for Weed, Pest and Diseases

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Weeds, pathogens or diseases on adjacent land.	Introduction of weeds from outside the easement or from the easement onto other lands by vehicular movement. Disturbed soil / vegetation prone to weed colonisation.	Weed infestations. Reduced agricultural production and quality. Reduction in diversity of native plant species due to competition and potential destruction of natural habitat.	Identify and clearly mark known infestations of weeds adjacent and along the easement.	Occasional	Severe	Intermediate
			Implement procedures to define access routes to the easement, and where necessary avoid areas of known infestation.			
			Minimise soil transport along the easement and prevention of soil transport out of areas of known weed infestation.			
			Where access to areas infested by weeds is required, wash vehicles and equipment down thoroughly (i.e. prior to accessing to weed free areas).			
			Where required, implementation of targeted weed eradication programs in conjunction with landholders and NRM Board.			
			Follow guidance from Government / NRM regarding control or avoidance measures.			
Import of pathogens, diseases, pests or weeds to the easement.	Movement of operations and maintenance vehicles and equipment or personnel	Reduction in agricultural productivity and or adverse effects on livestock health. Damage to native vegetation and habitats. Loss of biodiversity.	Ensure that excavating machinery and other equipment is received on-site free of a build-up of soil and organic matter.	Unlikely	Severe	Intermediate
			Equipment is to be inspected prior to unloading at site.			

5.6 Fauna

Remnant or retained vegetation at the edges of the easement is left in-situ where it does not interfere with line of sight or the Pipeline. This provides habitat and movement pathways for fauna, while low growing ground cover along the easement provides cover and interconnection for fauna movement.

Integrity digs usually occur in the line of sight area of the easement and all efforts are made not to disturb remnant or retained vegetation. Excavations are fenced if left open overnight and ramps are constructed to allow fauna to exit the trench should they enter it. The National Parks and Wildlife Act may be triggered should protected fauna need to be removed from trenches.

Fauna movement along and across the easement is in no way restricted except where existing agricultural or residential fencing is already in place.

Vehicle movement and pipeline facilities (line valves, end of line stations etc.) may cause noise or lighting disturbance to fauna. These impacts would be particularly isolated or infrequent. Prolonged works will rarely occur, however they have the potential to disturb nesting sites and feeding areas. The management of significant fauna species will be incorporated into the risk assessment completed prior to the work to ensure appropriate management controls are identified.

For further information of the potential impacts and control measures that will be applied to manage the risks posed to fauna refer to Table 5.9.

Table 5-9: Aspects and Impact Register for Fauna Management

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Maintaining line of sight and access along the easement.	Vegetation clearing (mechanical; slashing, grading, etc.).	Disturbance or injury to fauna, very localised reduction in biodiversity, fragmentation of habitat.	Maintain low vegetation cover on easement to provide cover and interconnection for fauna movement, along and across easement.	Remote	Trivial	Negligible
			Vehicles remain on existing roads/tracks or within designated areas at all times.			
			Disturbance of native vegetation is avoided during excavation activities wherever practicable.			
			Any fauna found during these activities either relocated to sides of easement or relocated by specialist trained wildlife rescuers.			
			Significant fauna incorporated into risk assessment of prolonged works.			
Above ground facilities.	Noise, compound lighting, equipment vibrations, increased human traffic.	Potential for noise, lighting and vibrations to create disturbance to fauna and alter fauna movements outside the compound. Increased human traffic increasing human / fauna interactions.	Movement of fauna across and along the easement is in no way restricted, apart from existing agricultural or residential fencing already in place.	Occasional	Severe	Intermediate

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Earthworks for maintenance and minor construction activities.	Integrity digs / dig-ups, trenching and excavation for infrastructure installation.	Major disturbance to vegetation cover in specific small area, fauna falling into excavations.	Sides of excavations left battered or ramps placed into the excavation when unattended to prevent the entrapment of animals. Erect barrier fencing, hazard netting, barricading around excavations to prevent the entry of humans or animals. Minimising the time between clearing and rehabilitating the easement when excavations are required.	Occasional	Minor	Low
Aerial surveillance of the easement.	Noise from fixed wing air craft.	Disturbance or injury to birds, potential for noise to frighten fauna.	Fly to aviation standards.	Hypothetical	Trivial	Negligible

5.7 Cultural Heritage

Cultural heritage includes both Aboriginal and European heritage sites and artifacts. Sites of cultural heritage may comprise areas or items of archaeological, anthropological, ethnological, scientific or environmental significance. Prior to the construction of the Pipeline a cultural heritage assessment was undertaken and identified no heritage sites on the easement.

Routine maintenance activities are unlikely to disturb unknown cultural heritage as the easement was heavy disturbed during construction. However, non-routine maintenance activities such as integrity digs, have a higher likelihood of uncovering and /or damaging heritage items due to the level of intrusiveness. Such works are required infrequently and occur within the easement. Activities that take place off-easement for instance Cathodic Protection unit installations have a greater potential to impact upon cultural heritage. These activities are rarely required and will be reviewed by an archaeologist prior to any excavation outside the easement. All appropriate approvals under the Aboriginal Heritage Act (i.e. authorization under S23) will be obtained prior to any activity that is likely to disturb or has the potential to disturb cultural heritage.

Pipeline personnel are aware that they may uncover areas of unknown cultural heritage within the easement. If during the process of pipeline operations, any evidence of artefacts or a burial site are uncovered, then work is to stop immediately and an exclusion barrier is installed. Police will be contacted by the senior company personnel in the event that a burial site is uncovered and Aboriginal Affairs and Reconciliation will be notified in the event that a suspected heritage site is undercovered.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to Aboriginal and European heritage refer to Table 5.10.

Table 5-10: Aspects and Impact Register for Aboriginal and European Cultural Heritage

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Operational and maintenance activities on easement.	Vehicle movements. Vegetation management. Earthworks for integrity digs, erosion control.	Disturbance or destruction of Aboriginal or European heritage items or sites.	Restricting operational activities to formal access tracks and the easement.	Remote	Severe	Low
			Information on known heritage sites is maintained during operations on the company wide database and/ or GIS system.			
			All approvals under the Aboriginal Heritage Act are obtained prior to any activity that is likely to disturb or has the potential to disturb cultural heritage items or sites.			
			Pipeline technicians, engineers and project staff are trained in heritage and cultural issues and management.			
			Where maintenance work or other operations have the potential to impact upon known heritage items, a heritage consultant is used to undertake investigation prior to the work commencing and provide suitable management measures.			
			If during any activities artefacts or evidence of other heritage items/objects are uncovered/disturbed, all works in the area will cease immediately and the relevant state departments are notified.			

5.8 Noise and Air Quality

Air emissions from the Pipeline and facility operations are usually of limited duration and quantity. Emissions that may impact on air quality include the release of natural gas during pipeline venting or purging to allow certain maintenance activities, vehicle and machinery exhausts and dust emissions from vehicle and equipment movement.

The operation of the Pipeline has the potential to generate noise both on the easement and at facilities. Noise emissions during normal operations are generated due to, vehicles and machinery travelling along access tracks and the easement, activities such as earthworks, vegetation management and infrequently gas venting from pressurised vessels or pipes. Non-routine corrective and preventative maintenance, such as venting, pigging, purging or excavations may generate elevated noise levels, however these activities occur very infrequently and only on an as needed basis. Aerial surveillance may have a brief impact, however the disturbance is brief and the reason for surveillance is explained to all landholders in information packs provided.

All plant and facilities are designed and operated to comply with the EPA Guidelines for the Environment Protection (Noise) Policy and the Australian Standard 1055: Acoustics. Additional noise mitigation measures may be employed when noise emissions exhibit tonality, modulation or impulsiveness, however, this has not been required on the Pipeline.

For further information of the potential impacts and control measures that will be applied to manage the risk posed by noise and air emissions refer to Table 5.11.

Table 5-11: Aspects and Impact Register for Noise and Air Quality

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Maintenance of above ground facilities. Emergency response.	Routine, non-routine venting of gas.	Noise disturbance to local residents, other land users, stock and wildlife. Venting to atmosphere of greenhouse gases.	Adjacent residents and local authorities are advised of pending major venting operations prior to undertaking the activity.	Occasional	Minor	Low
			Venting or purging activities are undertaken on as needed basis.			
			Periodic leakage surveys are undertaken to detect fugitive gas releases from the pipeline or facilities per AS2885.3 requirements.			
			Particular emissions and combustion emissions are reported to the National Pollutant Inventory (NPI).			
			Greenhouse Gas emissions reporting is undertaken for venting and other gas emissions.			
Operational and maintenance activities at above ground facilities or on easement.	Traffic to and from sites producing dust. Integrity digs or other earth movements	Dust impacts on neighbours.	Minimising the time between clearing and rehabilitating the easement when excavations are required.	Unlikely	Trivial	Negligible
			Revegetate using existing species (where appropriate) and prevent access until vegetation has established.			
			Stripping of surface and installation of a firm base, e.g. gravel or compacted clay within Compounds			
			Use water sprays if available and relevant.			
			Speed limits set to minimise the production of dust.			

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Operational and maintenance activities at above ground facilities or on easement.	Vehicles, machinery accessing and on easement, working at site. Aerial surveillance.	Noise disturbance to landholders, local residents and/or other land uses. Loss of amenity. Disturbance to stock or wildlife	Vehicles, machinery and stationery plant and equipment are fitted with appropriate noise abatement devices such as mufflers, silencers, and screens which are maintained at regular intervals. Activities likely to produce elevated noise levels are scheduled for time periods less likely to result in noise nuisance to landholders and local residents following liaison and consultation, except in the case of emergencies. Notification of routine noise-generating events to neighbours e.g. venting that is likely to generate above normal noise levels. Noise monitoring is conducted on an as needed basis as directed by the appropriate authority. Aerial surveillance is undertaken with due regard to disturbance of livestock, with higher altitude flight path used if specifically requested by landholder.	Occasional	Trivial	LoW

5.9 Land-use

Ongoing vehicle access will likely have the greatest impact on land-users. Existing access tracks to the easement will be used to reduce the need to traverse large lengths across private property. All vehicle movement is confined to the easement and formal access tracks unless prior approval from landholders has been sort.

No specific notification of ground or aerial patrols will be provided to landholders; however, landholders will be provided written notification of all non-routine works. All efforts will be made to incorporate a landholder request for a change in access, timing or location whenever possible. Should any damage be caused by the works to third party infrastructure, crops or pasture then this will be repaired to a standard the same or better than current condition.

In the rare event that an emergency situation transpires then it is possible that substantial damage (i.e. cut fence lines, unauthorised access, large excavations) may be required. Landholders will be kept informed of the management of the situation through the event and rehabilitation activities will take place post-event.

Each easement agreement details the permitted land-use over the easement. The majority of activities associated with grazing and cropping (shallow rooted species) activities are likely to be permitted, however, an engineering assessment may need to be completed prior to the activity taking place directly over the easement to ensure the integrity of the Pipeline.

The Pipeline has been designed (see Section 3.2) for the existing land-use and any changes to the land-use may require increased physical protection of the Pipeline. The protection measures required would be identified in the SMS completed for that land-use change.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to current land-use refer to Table 5.12.

Table 5-12: Aspects and Impact Register for Land-use

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Permanent access to and along easement	Vehicular movement, track clearing and/ or repairs	Temporary disturbance or nuisance to residents, landholders and third parties	Regular annual contact with landholders is maintained and all relevant pipeline and easement management issues discussed.	Unlikely	Minor	Low
			New landholders (identified through a real estate database) are contacted and briefed regarding approved and prohibited land uses on the pipeline easement, as well as safety, emergency and operational considerations.			
			Easement agreements to detail appropriate land-use.			
Operational and maintenance activities at above ground facilities or on easement.	Integrity digs / dig-ups, trenching and excavation for Third party and/or company infrastructure installation.	Damage to crops and pasture, disturbance to stock.	Landholders, residents within proximity and any relevant third parties are notified in advance of any non-routine activities likely to cause disruption.			
			Where practicable operations and maintenance activities are scheduled during appropriate seasons in relation to land use activities including cropping regimes, livestock cycles in order to reduce potential adverse effects.			
			Rehabilitating work areas as soon as possible.			

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
	Vegetation clearing, above ground infrastructure, lighting at compounds	Reduction of visual amenity	See Flora and Noise and Air Quality.			
Responding to an emergency situation	Immediate and direct access required to site.	Damage to infrastructure (i.e. cutting fences for access)	Addressing any damage caused to third party infrastructure. Ongoing communication with landholders in an emergency situation as soon as practicable.	Remote	Severe	Low

5.10 Public Safety

Impacts to public safety as a result of general pipeline operations will be rare and would likely be a result of bushfire, vehicle traffic, earthworks or pipeline rupture. All operational activities are managed through the implementation of a risk assessment or Safe Work Method Statement which details the controls measures required to mitigate any risk factors. The control measures identified supplement existing internal procedures that outline how specific job or work are to be completed to ensure that the risk is ALARP.

All potentially hazardous areas, such as the Inlet and Outlet Stations, are fenced with security fencing to prevent unauthorised access.

Unauthorised third party activity around the Pipeline poses the greatest risk with the potential to result in full-bore pipeline rupture. The Pipeline is buried at depth and physical protection controls, such as concrete slabbing, are installed at high risk areas (i.e. within a road reserve). Pipeline markers are installed in accordance with AS2885 requirements to identify the presence of a gas pipeline and warn of the dangers of excavations. The DBYD logo as well as the APA emergency contact number is included on the marker so to encourage third parties to call before they attempt works. Frequent aerial and ground patrols are undertaken to identify unauthorised works in the vicinity of the Pipeline. Regular pipeline awareness and contact is maintained with landholders, stakeholders (utilities, local government) and DBYD enquirers to promote the key messages of working safely around gas pipelines.

All vehicles must drive in a manner appropriate to the weather and road conditions and not exceed a maximum of 80km/h on the easement.

All earthworks will be rehabilitated to a condition the same or better than current condition. Should an excavation need to be left open overnight then the landholder will be notified and a barrier may need to be installed.

APA Group also has in place a range of advanced monitoring and control techniques to ensure the safety and security of the pipeline and facilities. These measures include:

- A 24 hour Integrated Operations Centre incorporating monitoring and control systems that continuously receive and analyse pipeline operating reports;
- Gas leak detection initiatives;
- Pigging operations, in which detection equipment travels inside the pipeline checking for abnormalities and corrosion; and
- A system of remote controlled valves which allow a pipeline controller to shut off gas flow and isolate any portion of the pipeline.

Any near miss or incident must be reported through the internal reporting system. This ensures that the appropriate senior personnel are advised of its occurrence and allows for an investigation into the cause of the incident to be completed. Any improvements identified in the investigation will be tracked and implemented in the same system. Should incidents need to be reported to an authority it will be identified through this process.

Emergency management is implemented as detailed in Section 5.11.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to public safety refer to Table 5.13.

Table 5-13: Aspects and Impact Register for Public Safety

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Fire due to company activities	Uncontrolled bushfire.	Injury to public or personnel.	See Section 5.4 Vegetation.	Remote	Severe	Low
Operational and maintenance activities at above ground facilities or on easement.	Fuel and chemical use. Open excavations. Patrol vehicles on easement, operation of plant and equipment.	Injury to public or personnel.	Landholders, residents within proximity and any relevant third parties are notified in advance of any non-routine activities likely to cause hazard. Safe Work Method Statement to include hazards to third parties and outline mitigation. All work sites compliant with SafeWork requirements. See Section 5.2 Soil.	Remote	Severe	Low
Pipeline rupture	Third Party or External Interference to the pipeline e.g. excavation, trenching, boring and drilling and failure of other pipelines (rupture)	Injury to public or personnel.	Regular ground and aerial patrols to identify third party activity. Implement pipeline awareness program with all land owners, occupiers and stakeholders (LGA, utilities). Provision of 24 hour 'Dial Before You Dig' contact number and free pipeline location service.	Remote	Major	Intermediate

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
			Installation and maintenance of pipeline warning signs along the pipeline route.			
			Safety Management Study and location class review to identify and manage external threats,.			
			Install physical protection measures and buried markers as per AS2885 and location class (i.e. slabbing, depth of cover, marker tape).			
	Pipeline corrosion, design defects, construction defects, over-pressure.	Injury to public or personnel.	24 hour Integrated Operations Centre incorporating monitoring and control systems that continuously receives and analyse pipeline operating reports.	Remote	Major	Intermediate
			'Intelligent pigging' operations, in which detection equipment travels inside the pipeline checking for abnormalities and corrosion.			
			Cathodic protection survey and system to further mitigate corrosion – as per AS 2832.1.			
			Compliance with operational requirements of AS2885 - as detailed in Section 3.3.1, including the management of as-built information.			
			Compliance with design requirements of AS2885 including isolation points, wall thickness, depth of cover.			

5.11 Security of Gas Supply

The Pipeline is operated through a Pipeline Management System which ensures compliance with all aspects of AS2885 and regulatory requirements to maintain pipeline integrity (see Section 3.3.1). The implementation of the System will ensure the Pipeline is operated and maintained to industry standards.

Emergencies are expected to be very rare, however, emergency preparedness is taken very seriously and all incidents and situations likely to develop into incidents are reported to the Integrated Operations Centre immediately for further investigation. An emergency is defined as an incident so serious that site resources are not able to cope and specialised resources and management plans are required to effectively combat the incident. Emergencies, such as full-bore rupture, are likely to impact on gas supplies.

The Emergency Response and Security Plan incorporates the following;

- framework to provide an efficient, coordinated response to deal with an emergency;
- define the criteria for the assessment of incidents and define incremental action phases of an incident;
- define the composition of the Emergency management team and their roles and responsibilities;
- identify key external stakeholders who may or may not be affected by an incident;
- limit the effect that the emergency may have on people, property and environment;
- outline a protocol for internal communications and for communication to all external stakeholders including the media;
- provide a sound basis for the training and assessment of emergency responses; and
- provide a means by which the plan can be reviewed and revised.

All incidents and situations likely to develop into incidents are reported to the Integrated Operations Centre initially. An emergency is defined as an incident so serious that site resources are not able to cope and specialised resources and management plans are required to effectively combat the incident.

Simulation exercises are undertaken at a minimum of one per year. Simulation exercises are a key resource in the emergency training of all staff. In South Australia, a report is required by DSD on the outcomes of the emergency simulation with the debrief plan outlining lessons learnt and actions taken, this also forms part of external audit reviews. The training outcomes for an individual/team from a simulation exercise are;

- initiation of emergency response and how emergency teams are activated;
- individual response to an emergency, reporting, escalation of emergency through levels;
- individual roles and responsibilities of emergency team members;
- review of personal protective equipment required, condition and evacuation techniques, and any special emergency response equipment required;
- Integrated Operations Centre actions and response, communications and notifications;
- command, control and communication arrangements between company personnel and stakeholders, external response agencies and statutory authorities;

- team work and response to emergency, implementation of control procedures;
- resolution of emergency, reinstatement of normal supply/operations; and
- debrief of items of concern, barriers to response, lessons learnt.

For further information of the potential impacts and control measures that will be applied to manage the risk posed to gas supply refer to Table 5.14.

Table 5-14: Aspects and Impact Register for Security of Gas Supply

Aspect	Source of risk	Potential Impact	Control Measures and Mitigation	Residual Risk		
				Likelihood	Consequence	Risk Rating
Pipeline rupture	Third Party or External Interference to the pipeline e.g. excavation, trenching, boring and drilling and failure of other pipelines (rupture)	Loss of gas supply.	See Section 5.10 Public Safety.	Rare	Major	Moderate
	Pipeline corrosion, design defects, construction defects.	Loss of gas supply.	24 hour Integrated Operations Centre incorporating monitoring and control systems that continuously receive and analyse pipeline operating reports 'intelligent pigging' operations, in which detection equipment travels inside the pipeline checking for abnormalities and corrosion	Rare	Major	Moderate
			Compliance with design and operations requirements of AS2885 - Pipeline Integrity Management Plan, Emergency Response Procedure.			
			Annual Emergency Response training (alternating desktop and field training)			
			Ensure emergency preparedness (equipment, machinery, pressure tested pipe)			

5.12 ENVIRONMENTAL MANAGEMENT SYSTEM

APA has developed and implemented an Environment Management System (EMS) which applies to all APA Group activities. The EMS is a key tool in managing the environmental responsibilities, issues and risks associated with operational activities. It provides a framework for the management of environmental issues through the:

- **Health, Safety and Environment Policy**

This Policy provides an overall framework for the management of health, safety and the environment across APA Group. It outlines the requirement to develop a system that ensures hazards are identified, risks are reduced and legislative requirements are met.

- **Cultural Heritage Policy**

This Policy provides an overall framework for the management of indigenous and non-indigenous cultural heritage, across APA Group. This includes cultural heritage management plans, assessments, surveys and community consultation. The Policy provides a controlled and consistent platform to identify, assess and avoid potential harm to cultural heritage where possible.

- **Native Title Policy**

This Policy provides an overall framework for the management of native title issues in respect of native title claims and requirements under Australian law, including the Native Title Act 1993. APA Group is affected by Native Title, both in respect of involvement in Native Title claims where there are APA Group assets, and where future access is required to land where Native Title exists.

- **Operating Environmental Management Plan (or equivalent)**

This Plan incorporates a risk assessment that outlines all environmental hazards associated with operational activities across APA Group. It details the environmental control measures that must be applied for the operation of the Pipelines and ancillary facilities. These control measures are largely based on the APGA Code of Environmental Practice and captures all legislative requirements for environmental management. This Plan includes all mitigation measures described in Section 5. Supporting procedures have been developed to assist with the implementation of the Plan.

- **SafeGuard+**

This is the HSE system APA Group utilises to manage health, safety and the environment. It outlines the targets that need to be met to guarantee successful environmental management. It includes a reporting requirement to ensure that all incidents and near misses are investigated and appropriate actions are taken to prevent reoccurrence. SafeGuard+ includes standards, management plans, procedures and a training, induction and auditing program.

- **Permit to Work System**

All work activities on the pipeline, easement or facilities are undertaken under the company Permit to Work system. This System covers specific types of work, including general maintenance, minor and major excavations, hot and cold work, vegetation management and confined space entry. A Safe Work Method Statement (SWMS) and a Job Hazard Analysis is undertaken by a trained Permit Issuing Officer (PIO) prior to issuing of the Permit. Environmental risks and impacts are considered in this analysis and job specific environmental instructions are developed that are specific to the task being completed. The environmental risks, potential impacts and mitigation or control measures are communicated to all personnel who for, smaller jobs sign onto the Permit in the toolbox talk concerning the job, or for larger projects in Health Safety and Environment meetings.

5.12.1 Monitoring

Regular audits are undertaken to ensure compliance with the pipeline license, AS2885 and SEO requirements, and adequate environmental management along the pipeline.

The last audit was completed in January 2015. Findings concluded all Objectives / assessment requirements compliant, excepting Item 9. Which found some pipeline marker signs required update to ensure information compete and accurate, and legible to the public.

6. STAKEHOLDER CONSULTATION

APA maintains regular contact with the landholders and other directly affected stakeholders (e.g. utility companies, LGAs) as a standard part of the pipeline operations.

Consultation with relevant stakeholders regarding environmental objectives for operations was carried out by DSD during the initial SEO approvals process for the construction and operation of the Pipeline. APA considers the DSD consultation process to be adequate for the on-going operation of the Pipeline as operational activity is considered to be of low environmental impact and very few stakeholders are directly affected by operational activities.

Key stakeholders for the pipelines include:

- Department of State Development (DSD),
- Department of Environment, Water and Natural Resources,
- Environment Protection Authority (EPA),
- Department of Planning, Transport and Infrastructure, and
- Landholders.

APA aims to continue to engage stakeholders for the duration of its pipeline operation activities to ensure that any potential environmental concerns are identified and appropriately addressed as they arise.

The comments received from stakeholders during the development and review of the EIR and SEO are outlined in Table 6.1.

6.1 2016 SEO / EIR Consultation Update

The EIR and SEO, have been revised and submitted to the Department of State Development, Energy Resources Division and consultation was sought from relevant government agencies. Comments were received from varous angencies.

The consultation comments received and the APA responses are provided in Appendix 1.

Table 6-1: Stakeholder Comments on the Environmental Impact Report

Doc.	Stakeholder	Comment	APA Response
Environmental Impact Report			
EIR 2005	**Department for Aboriginal Affairs and Reconciliation**	... it is possible that there are sites of significance to Aboriginal heritage, which have not yet been discovered in the area of interest. Under Section 20 of the *Aboriginal Heritage Act 1988* (the Act), an owner or occupier of private land, or an employee or agent of such an owner or agent, must report the discovery on the land of any Aboriginal sites, objects and remains to the Minister for Aboriginal Affairs, as soon as practicable, giving the particulars of the nature and location of the Aboriginal sites, objects or remains. Penalties apply for failure to comply with the Act.	Noted. An Aboriginal heritage survey of the proposed alignment has been carried out by archaeologist Vivienne Wood with representatives from the Tattyara Aboriginal Heritage Consultancy and the Kungari Aboriginal Cultural Heritage Association. No Aboriginal sites, objects or remains were noted and the proposed pipeline alignment was considered to be of generally low archaeological sensitivity. Consequently, the likelihood of Aboriginal sites, objects or remains being discovered during construction is very low. Although this likelihood is very low, construction crews will be trained in the recognition and protection of Aboriginal heritage sites and the Construction Environmental Management Plan and Cultural Heritage Management Plan include procedures for protection and reporting of Aboriginal sites, objects or remains discovered during construction. The relevant SEO Assessment Criteria (6.1 and 16.1) also require that new sites are "reported to the appropriate authority" The SEO has been amended to explicitly mention the *Aboriginal Heritage Act 1988* (refer to response 12 below).
	Lower South East Soil Conservation Board	Whilst we feel the objects and assessment criteria have been addressed well in the reports, our main concern is that ground staff and contractors carrying out the works are fully aware of the objectives. If all work is undertaken as detailed, particularly through sandy soil types and water courses, then our Board feels there should be minimal environmental impact.	Construction crew will undergo induction and training to ensure they are aware of the objectives and the required environmental management. These requirements are set out in the Construction Environmental Management Plan. Origin will maintain a high level of on-site supervision to ensure ground staff and contractors meet the requirements.

Doc.	Stakeholder	Comment	APA Response
	PIRSA Petroleum Group	Further details regarding horizontal directional drilling and boring (P20) would assist stakeholder understanding. i.e. what does it involve. If possible include a layout drawing showing scale of the activity.	Provided in Section 3 of this document.
Statement of Environmental Objectives			
SEO 2005	**Department of State Development (formerly PIRSA Petroleum Group)**	Section 4.1 - Regarding dot point 3 in reportable incident definition - remove as a reportable incident and insert as a note to the serious incident definition of "interruption or imminent risk of interruption of the natural gas supply". Note: As administrative policy, PIRSA interprets this as follows: after taking into account relevant factors on a day and its rights and obligations under contracts, a significant curtailment of firm service to a shipper that may be necessary and may detrimentally impact upon the security of electricity supply to the South East of South Australia, or gas supply to a significant number of gas users in the South East of South Australia.	Changed.
		General comment - ensure consistent tense for criteria, i.e. use "is" not "was".	Corrections made.
		Consider adding a note that "approval" refers to approval under the relevant legislation listed in Table 2.3 of the EIR, and include this table in the SEO.	Where "approval" is used in the SEO, a reference to the relevant legislation has been added, as follows: • Criteria for goals 6.1 and 16.1 – added "under the *Aboriginal Heritage* *Act 1998* or the *Heritage Act 1993*" • Criteria for goal 14.2 – added "under the *Native Vegetation Act 1991"* following "...unless prior regulatory approval obtained" "Approval" has been added to the "Definitions" section and is

Doc.	Stakeholder	Comment	APA Response
			defined as: *Refers to approval under the relevant legislation.*
		Criteria for goals 1.3 & 11.3 - Provide examples of visual evidence in brackets, eg. hard soil, local water pooling.	Added "(e.g. hard soil, local water pooling)".
		Criteria 1 for goal 2.1 - Need to specify adverse impacts – examples include impacts to downstream ecology and land use.	Added "(for example to downstream ecology or land use)". Also added "following reinstatement" to clarify the second criteria "No evidence of altered watercourse flows" as discussed with PIRSA
		Criteria 1 for goal 2.2 - Suggest that the first criteria is applied to situations "where EPA guidelines do not apply". Origin to check when EPA policy applies.	The EPA Environment Protection (Water Quality) Policy applies to all surface waters and underground waters; therefore this first criterion is redundant and has been deleted.
		Criteria 2 for goals 3.3 & 13.3 - Replace i.e. with eg.; include soil salinity as evidence in brackets.	Replaced. Included "soil salinity".
		Criteria for goal 4.1 - Replace current criteria with "All areas of remnant vegetation avoided, and where clearance required, significant environmental benefit approved by the Native Vegetation Council" or similar.	Replaced criterion with "All areas of remnant vegetation avoided, or where clearance required, significant environmental benefit approved by the Native Vegetation Council". Also replaced corresponding criterion for goal 14.2.
		Criteria 1 for goal 4.3 - Remove "reasonably".	Removed.
		Criteria 3 for goal 4.3 - insert "on [the easement]".	Inserted.
		Note in criteria for goals 4.3 & 14.1 - Replace wording of note with the wording used for goal 9.3.	Replaced.
		Criteria for goals 6.1 & 16.1 - Include reference to the Heritage Act and Aboriginal Heritage Act, following comments by DAARE.	Included – see response 12 above.
		Criteria for goals 7.1 & 17.1 - Remove reference to Victorian publication.	Removed.
		Criteria for goals 8.1 & 18.1 - Origin to check if EPA guidelines for dust exist. If so, criteria should be compliance with EPA guidelines.	No guidelines for dust management exist. The stated criterion is considered to be a practical measure of effects on amenity values and has been left unchanged.

Doc.	Stakeholder	Comment	APA Response
		Goal 11.3 - Delete "if necessary by remedial action" from the goal, as this relates to construction not operation. Any remedial action required is covered by the measure/how column.	Deleted.
		Goal 13.1 - Delete "and if they occur minimise their impact"; Include management/clean up procedures in the measure/how column (eg. dot points that were in original version of SEO).	Deleted "and if they occur minimise their impact". Added to measure/how column for goal 13.1 and also goal 3.1: *Spill response/cleanup procedures, requiring spills to be:* • *Reported* • *Contained* • *Cleaned-up* • *Cause investigated and corrective and/or preventative action implemented*
		Goal 18.1 - Need to define "uncontrolled" and incorporate this into the criteria, eg. due to misoperation/malfunction. Also include definition in glossary; Add "Maintenance procedures designed for controlled venting" to measure/how column (incident reports is only a measure).	Added "(e.g. due to malfunction or mis-operation)" to criteria "Uncontrolled emission" is defined in the *Definitions* section of the SEO. Added to measure/how column: • *Maintenance procedures* • *Design for controlled venting*
	Setonix Pty Ltd	The alignment of the pipeline gives scant priority to the future needs of the farming enterprise It seems to me that too much emphasis is given to protection of remnant trees, and too little emphasis is placed upon the needs and rights of primary producers. The pipeline is run through primary production land with little thought to the long term consequences.	The process of pipeline route selection involves balancing a number of competing factors to achieve a route that is as direct as possible while minimising disturbance to landholders, minimising clearance of remnant vegetation and maximising engineering efficiency of both pipeline construction and operation. Possible long term consequences to primary production land are a major consideration. Extensive consultation is undertaken with landholders during alignment selection and easement negotiations to discuss current and future land-use. The pipeline alignment and depth of cover are then designed to minimise, as far as practicable, disruption to current primary production activities and to allow planned future activities to be carried out with minimal restrictions.

Doc.	Stakeholder	Comment	APA Response
		The pipeline should travel in a north-south line along the Border Road until it reaches Tower Road, and it should then run west until it comes into the Katnook Gas Plant. The adoption of this route would avoid disruption to existing agricultural / horticultural and grazing land. Tower Road, for a great deal of its length, has wide open spaces that can accommodate the pipeline; and the Border Road is somewhat similar.	A route following Border Road and Tower Road is extremely indirect, and was not considered feasible. It is noted that this route would still require that agricultural / horticultural and grazing land is traversed for several kilometres.
		From what I can gather, it appears that undue emphasis is placed upon roadside trees. The surveyors seem at pains to avoid removing any roadside tree, instead preferring to find a gap in the vegetation as a passage for the pipeline. This can lead to a greater intrusion into farmland, with the consequent risk that future farming activities will be hindered by the presence of the pipeline. The proposed pipeline will have a perpetual title in the nature of an easement. This needs to be balanced with that of a roadside gum tree which will have a life of decades, or perhaps a century. We should also recognize that many roadside trees are mis-shapen and of poor form, and likely to break, snap, or fall, before reaching full maturity.	Avoiding or minimising removal of roadside trees is one factor which is considered during alignment selection. As indicated in response 28 above, future farming activities are also a major consideration. Origin is in the process of finalising appropriate land tenure for the pipeline alignment on all properties along the selected route. This includes obtaining easements that are intended to allow planned future farming activities to be undertaken with minimal restrictions and also avoid clearing roadside trees.
		I submit that it should be in order for the pipeline authority to remove roadside vegetation, and in turn, provide a fenced-off area on nearby land for a revegetation project. If the re-vegetation project is on privately owned land, it could perhaps be a requirement that it be fenced-off until the trees are of reasonable height, and the landowner be paid rent or other compensation until the trees have reached sufficient height to be "stock proof".	A process exists under the *Native Vegetation Act 1991* to allow vegetation clearance and planting of offset areas where there is no alternative to vegetation clearance. However, Origin's preference is to avoid removing roadside vegetation where a suitable and acceptable alternative is available. It is noted that offset areas under the Native Vegetation Act are generally required to be permanently protected from stock and would not be able to be grazed in the short or long term.
		If the pipeline is to pass within some two kilometres of the Penola township, then one would expect there to be a community or social obligation to provide benefit to the citizens of Penola by way of a	As the SESA Pipeline will operate under high pressure, it is subject to strict engineering and safety standards. As a consequence, construction of offtakes and lateral pipelines is not simple or inexpensive. Construction of an off-take and lateral is generally

Doc.	Stakeholder	Comment	APA Response
		take-off from the gas main to provide reticulated gas to the Penola town. Likewise, there ought to be facilities to allow a take-off of gas for domestic or industrial use for those residences and workshops that are in close proximity to the proposed pipeline, it surely cannot be too difficult to devise a relatively easy strategy to provide small quantities of gas at the appropriate quality and to do so at the standard "town price".	only economically feasible where there is a very high demand for gas or energy such as a large industrial user. Currently there are no industries in the Penola township or along the route that would make this feasible. Reticulation of natural gas for the township of Penola would be subject to assessment by gas distribution companies and the local community. The SESA pipeline has been designed to enable "hot-tap" connections for creation of future off-take points with suitable pressure reducing facilities, should a user or distribution company find it economic to do so.
	Transport SA	Transport SA appreciates the efforts made to select an alignment that avoids the removal of any trees. However, the situation at the crossing of the railway for each of the optional alignments under consideration is not so clear. It is requested that the report be amended to provide greater clarification at each crossing option of the railway and be forwarded to Transport SA for further comment	The construction right-of-way does not impact native vegetation at either crossing of the railway (i.e. Option A or B). The vegetation in these locations is dominated by grassy weeds (e.g. Phalaris) and ecological inspections have not detected any vegetation of significance. Native vegetation is present inside the rail reserve to the north of the Option B crossing point (Table A4-6, KP 40.8) and this vegetation avoided by the alignment.
		It is requested that the report include a requirement that any disturbance within the road and railway corridors be appropriately rehabilitated, including the return of topsoil, mulching and respreading of any removed vegetation.	These requirements apply for the entire pipeline alignment. They are specified in the Construction Environmental Management Plan. Any site-specific details for rehabilitation / revegetation of sites where native vegetation is to be removed are recorded in the Environmental Line List. However, as native vegetation is not present at the Transport SA road and railway crossings, there are no specific requirements listed for these sites.
		It is considered that the report should specifically state that the proposed mitigation measures for the prevention of soil erosion and the spread of weeds and pathogens shall also apply to road and railway corridors.	These measures apply to road and railway corridors. The EER/EIR discusses these measures in relation to the right of way and landholders; the right-of-way encompasses Transport SA land and Transport SA is considered to be a landholder.
		Whilst not of an environmental nature, I would like to	These requirements have been noted.

Doc.	Stakeholder	Comment	APA Response
		take this opportunity to draw attention to requirements that Transport SA will have in relation to the construction of the pipeline. (1) The crossing of the railway is to be in accordance with the requirements of AS4799 –2000. (2) The crossing of the two roads maintained by Transport SA is to be achieved by boring to avoid disturbance of the road pavement and to minimise disruption to traffic. Boring shall extend beyond the road shoulder and any table drains and be at right angles to the road. (3) All works on Transport SA roads are to be conducted in accordance with enclosed Standard Specification "Excavation and Reinstatement of Road Pavement". This document details Transport SA's requirements for notification of works, traffic management, excavation (including trenchless methods) and reinstatement.	

7. References

APGA (2013) *Code of Environmental Practice*. Australian Pipeline and Gas Association, Canberra.

ASRIS 2016 Australian Soil Resource Information System Available http://www.asris.csiro.au/mapping/viewer.htm

Bassett (2000) *Ladbroke Grove Power Station Environmental Noise Measurements*. Unpublished report to Origin Energy. Bassett Acoustics, Adelaide.

BOM (2015) Climatic statistics for Australian locations. Visited August 2015 at http://www.bom.gov.au/climate/averages/tables/cw_026036.shtml

Department of Planning, Transport and Infrastructure (2014) Railside Significant Sites. Visited December 2015 at https://data.sa.gov.au/data/dataset/railside-significant-sites

Origin Energy (2004) SESA Pipeline Statement of Environment Objectives.

Sonus (2004) Ladbroke Grove Environmental Noise Assessment. Unpublished report to Origin Energy.

South East NRM (2009) *South East Pest Management Plan.* Available http://www.naturalresources.sa.gov.au/southeast/plants-and-animals/pest-plants-and-animals/pest-animals

Twidale, C., Campbell, E. and Bourne, J. (1983) *Granite Forms, Karst and Lunettes.* Natural History of the South East. Royal Society of South Australia Adelaide.

WaterConnect (2015) *Groundwater Data*. Visited 11 September 2015 and available https://www.waterconnect.sa.gov.au/Systems/GD/Pages/default.aspx

Wood, V. *Aboriginal heritage survey of the SESA pipeline.* Unpublished report to Origin Energy.

APPENDIX 1. COMMENTS FROM GOVERNMENT CONSULTATION

Table 1 Comments from Govt. Consultantion - 2016: SEO

Comment No	SMK Comment (to identify relevant section / paragraph and consider required actions)	APA Group Response	Addressed (Y/N)
1	Section 2.1, operational objective 2 – impacts to water resource receptors appear not to be considered. Therefore to consider adding 'and water resource receptors.' to the objective. Appendix A will need to be altered to accommodate this change.	Included as per adjacent request.	Y
2	Section 2.2 - The pipeline decommissioning objective "To appropriately decommission the pipeline in accordance with regulatory requirements and accepted best practice environmental management criteria" requires further clarity to support assessment, specifically with regard to the subjective nature of the phrase "best practice". It is suggested that the objective outline the key environmental objectives and criteria that will be used to assess the pipeline decommissioning. A number of the operational environmental objectives could also apply to the pipeline decommissioning. Do the environmental objectives need to be split between operational and decommissioning?	Best practice environmental management criteria will be dependent on the strategy determined at the time of decommissioning. Throughout Australia, pipeline decommissioning strategies and methods are varied on numerous factors such as age and type of asset, environmental condition and budgetary constraints. A risk assessment would be completed at the time of decommissioning, in line with the standard and regulatory requirements of the time. Notwithstanding, objectives would align, and this has been reflected in the update.	Y
3	Section 3 – It is identified that if a major non-conformance is detected then additional audits will be instigated. What is the process for a minor non-conformance? What is the definition of a "major" non-conformance? A summary of the audit results, assessment of achievements against the SEO and any monitoring should be presented in the EIR document to show that the SEO is adequate and to support any changes made to the SEO objectives, goals, assessment criteria and how the objectives can be achieved.	Non-conformance levels have been qualified as requested, within section 3. The last audit was completed in January 2015. Findings concluded all Objectives / assessment requirements compliant, excepting Item 9. Which found some pipeline marker signs required update to ensure information compete and accurate, and legible to the public. Information has been added to the EIR to reflect this.	
4	Section 4.3 – a definition is required for the expression "serious or material environmental harm".	Inserted definition as per Environment Protection Act 1993.	Y

5	Appendix 1, objective 2, goal 2.1 – Water affecting activities are defined in the South East NRM Plan, not the Act. (again in Objective 3. Goal 3.3)	Amended in both sections; reference to the Act removed and South East NRM Plan inserted.	Y
6	Appendix 1, goal 2.2 - Application of a water affecting activity permit for new activities to be added to the assessment criteria.	Inserted adjacent assessment criteria as per comment.	Y
7	Appendix 1, goal 3.1 – To consider moving the second paragraph in the 'guide to' section to goal 3.3 as appears more suited to this section.	Paragraph moved to S3.3 as per comment.	Y
8	Appendix 1, objective 3 – it is noted in the EIR that chemicals may be used in the control of vegetation along the pipeline corridor. Shallow groundwater occurs along the length of the pipeline corridor and the use of chemicals could, over time, impact on the water quality in the shallow aquifer. This is not addressed in either the EIR or SEO.	Vegetation management along the asset is irregular, and not required for the entity of the line due to degradation and agricultural use. APA assesses all chemicals prior to procurement, and use, and would not apply chemicals is such a way as to allow bioaccumulation and impact water quality. This is not deemed to be a credible risk.	Y
9	Appendix 1, Objective 4 assessment criteria – The assessment criteria suggests that the assessment will need to account for seasonal variation and time since regrowth started. This statement would not appear to be required, as the assessment should account for this. It is suggested that reporting on the assessment should document the time of the assessment, and any differences between easement and the surrounding area should be discussed within.	Assessment Criteria amended to reflect adjacent comment.	Y
10	Appendix B – the objective notes 'best practice environmental management' but this is not identified anywhere in the goals, achievement guide or assessment criteria. Given that 'best practice environmental management' is a subjective term it should be defined in the appendix.	Best practice has been defined in line with best practice environmental management guidelines such as the APGA Code of Environmental Practice.	Y
11	Reword Goal 2.2: Application of a water affecting activity permit for new activities.' to – 'Application of a water affecting activity permit for new activities, where required'	Updated as per request.	
Page/ Section	**EPA Comments**	**APA Group Response**	**Addressed (Y/N)**
Page 16 Goal 3.2	Assessment criteria – Applicable EPA Act environmental protection policies would be Environmental Protection (Movement of Controlled Waste) 2014 and EP (Waste to Resources) Policy 2010	Adjacent Policies have been inserted to the referenced section as Assessment criteria.	Y
Page 19 Goal 8.1	It is noted that the EP (Air Quality) Policy 2016 is now effective and supersedes all earlier versions.	Amended to current version	Y

Page 19 Goal 8.2	Only complaints is shown as assessment criteria for assessment. This metric alone may not be sufficient.	Additional criteria have been added. The pipeline is located in a remote area, with minimal sensitive receptors. These metrics are considered sufficient.	Y
General	APA are suggested to ensure all pipeline and compressor station infrastructure are assessed and maintained to ensure effective operation and prevent any loss of containment to the environment. With respect to pipelines, this would include maintaining effective pipeline pigging programs (and enhanced pipeline pigging programs if required) and cathode protection.	APA operates and maintains all pipelines in line with regulatory requirement and AS2885. Pigging, and other in-line-inspections are carried out in line with asset management plans, and associated risk assessment materials. Cathodic protection is regularly assessed by specialist engineers, with amendment made to the system, as required for best condition of the pipeline. Additional information has been added so S1.3 to clarify this.	Y
Page/ Section	**AAR Comments**	**APA Group Response**	**Addressed (Y/N)**
General	AAR encourages the maintenance of an up-to-date contact list or the relevant Aboriginal agencies for ongoing engagement.	Added a commitment to Section 6 of Appendix 1	Y

Table 2 Comments from Govt. Consultantion - 2016: EIR

Comment No	SMK Comment (to identify relevant section / paragraph and consider required actions)	APA Group Response	Addressed (Y/N)
1	The EIR report would benefit from the inclusion of a more detailed map(s) of the South Australian section of the pipeline, which would provide greater support for the claim that "The Pipeline passes close to a number of seasonally inundated depressions but not in such close proximity to impact on surface waters". The paucity of hydrological information restricts further comment on surface water issues.	The map has been revised to only show the SA section of the pipeline. All publically available date was used in the creation of this map.	Y
2	Figure 1.1.1 - The department's spatial layer Petroleum Pipeline Licences and SARIG shows more pipelines in PL16 than are displayed in fig 1.1.1. Clarification is required.	Figure 1.1.1 shows the 'as built' pipeline alignment. SARIG is showing the 'as built' and an alternative pipeline route as proposed in the construction phase. The 'as built' pipeline alignment has been updated by DSD on SARIG. Thanks for bringing this to our attention.	Y
3	Section 3.3 - Shallow water resources occur along the pipeline corridor with SWL ranging from 1.2 to 6.5m (within 0.5km of pipeline). There is potential for the pipeline to exist below the water table – how is this managed during installation or operation?	There are various construction methods used to lay pipe through areas of shallow ground water. APA acquired the pipeline, and so cannot confirm the construction methodology. However, standard pipeline depth of cover if 700mm, reducing the likelihood of encountering water. During operation, if the pipeline was required to be excavated for inspection or repair, various management would be employed; scheduling of works outside higher risk periods is the primary. Should water be encountered the most likely course of action would be to pump and release from the excavation to allow for works. All required permits would be acquired, and release parameters abided by.	Y
4	Section 3.4 – there is an opportunity to provide a summary of activities undertaken for a number of the sub-sections e.g.: 3.4.6 and 3.4.8. This would assist in showing the adequacy of the SEO?	Additional information has been added as requested.	Y

5	Section 3.4.4 – to what depths are the cathode protectors installed and are they above the water table? Can the existing cathode protectors be displayed on a map?	Soil resistivity results meant the CP bed was required to be buried no deeper than 1.5m. CP bed effectiveness is enhanced when within the water table, and has not been known to leach any hazardous materials.	Y
6	Section 3.4.10 — recommend using the term decommission rather than abandon. 2nd dot point – what are the risks to the shallow groundwater resources if the pipeline is disconnected and left in-situ?	Abandonment is a type of decommissioning strategy. As is suspension and removal. It would not be accurate to refer to abandonment as decommissioning in this instance. Abandonment has been widely adopted across the county. There is minimal risk as the pipeline would be thoroughly cleaned before disconnection and hold no hydrocarbons. Rust is non-toxic and so presents no biological hazards.	Y
7	Section 4.1 – the section starts by describing the area as having hot and dry summers, however, then describes the temperatures as mild in summer. This should be consistent.	The statement has been removed for consistency.	Y
8	Table 5.3.1 – What are the control measures that relate to vegetation control activities, particularly where chemicals are used. If shallow groundwater is intersected during any of the construction or maintenance activities how is this monitored or impacts assessed? It is stated that the contamination of ground and surface is managed as per section 5.2, yet there are no control measures regarding the contamination of groundwater in the section. The consequence of contamination of the shallow groundwater resources as per table 5.2.1 is set as minor which is not consistent with the severe rating in table 5.3.1.	It is not anticipated that chemical vegetation control would be undertaken for this pipeline, all references to the potential use of chemicals for vegetation management have therefore been removed. Contamination of the shallow groundwater resources as is not referenced in table 5.2.1, as this pertains to soil. Contamination to water is considered a more significant, hence the higher consequence rating.	Y
9	Comments and APA responses to those comments will need to be published within the EIR document	Addition of this Appendix.	Y

Page/ Section	EPA Comments	APA Group Response	Addressed (Y/N)
Page 9 Table 2.2.1	EP Act Policies Only some of the policies under the EP Act are shown. It is suggested that all applicable policies under the EP Act to be shown. Some of the identified policies from the SEO are; -EP (Air Quality) Policy 2016 -EP (Movement of Controlled Waste) Policy 2014 -EP (Noise) Policy 2007 -EP (Waste to Resources) Policy 2010 -EP (Water Quality) Policy 2015 Other applicable policy is EP (national Pollution Inventory) Policy 2008.	Polices missing have been added to the reference Table 2.2 (Key additional Policies)	Y