



**MSE.2573-PL-HSE-0002**





**Moomba to Sydney Gas  
Pipeline (PL 7)  
Moomba to Sydney Ethane  
Pipeline (PL 8)  
Environmental Impact Report**

This document is an Environment Impact Report and defines the requirements for the MSP Pipelines.

This document is owned by the relevant APA Business Unit, and must be approved by APA's Environment Manager.

In Australian state and territory jurisdictions specific statutory requirements apply to the management of environmental matters. Businesses must ensure that environmental management matters are managed in line with legal requirements. For further information contact APA's Environment Manager your Environment Advisor or equivalent.

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## Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>7</b>
1.1	Background .....	7
1.2	Purpose .....	7
1.3	Environmental Commitment .....	8
<b>2</b>	<b>Legislative Framework .....</b>	<b>10</b>
2.1	Petroleum and Geothermal Energy Act 2000 .....	10
2.2	Other Legislation .....	10
<b>3</b>	<b>Pipeline Description .....</b>	<b>13</b>
3.1	Pipeline Alignment .....	13
3.2	Design and Engineering .....	13
3.2.1	Gas Pipeline .....	13
3.2.2	Ethane Pipeline .....	14
3.3	Operations .....	16
3.3.1	Easement Maintenance .....	18
3.3.2	Pipeline Operation and Maintenance .....	18
3.3.3	Facility Operation and Maintenance .....	18
3.4	Decommissioning .....	19
3.5	Pipeline Management System .....	19
<b>4</b>	<b>Description of the Environment .....</b>	<b>21</b>
4.1	Climate .....	21
4.2	Bioregional Environment .....	21
4.2.1	Channel Country Bioregion .....	22
4.2.2	Simpson-Strzelecki Dunefields Bioregion .....	27
4.3	Heritage .....	30
4.3.1	Aboriginal Heritage .....	30
4.3.2	European Heritage .....	31
4.4	Land Use .....	31
4.4.1	Pastoralism .....	31
4.4.2	Oil and Gas Exploration and Production .....	32
4.4.3	Conservation .....	32
4.4.4	Infrastructure .....	33
4.5	Noise .....	33
4.6	Air Quality .....	34
<b>5</b>	<b>Environmental Risk Assessment .....</b>	<b>35</b>
<b>6</b>	<b>Potential Impacts and Mitigation Measures .....</b>	<b>36</b>
6.1	Soils and Terrain .....	36
6.1.1	Potential Impacts .....	36
6.1.2	Impact Mitigation .....	37
6.2	Water Resources .....	37

6.2.1	Potential Impacts .....	37
6.2.2	Impact Mitigation.....	37
6.3	Flora and Fauna .....	38
6.3.1	Potential Impacts .....	38
6.3.2	Impact Mitigation.....	39
6.4	Weeds and Diseases.....	40
6.4.1	Potential Impacts .....	40
6.4.2	Mitigation Measures.....	40
6.5	Land Use.....	41
6.5.1	Potential Impacts .....	41
6.5.2	Impact Mitigation.....	41
6.6	Heritage.....	42
6.6.1	Potential Impacts .....	42
6.6.2	Mitigation Measures.....	42
6.7	Noise .....	43
6.7.1	Potential Impacts .....	43
6.7.2	Impact Mitigation.....	43
6.8	Air Quality.....	43
6.8.1	Potential Impacts .....	43
6.8.2	Impact Mitigation.....	44
6.9	Third-party Infrastructure .....	44
6.9.1	Potential Impacts .....	44
6.9.2	Impact Mitigation.....	44
6.10	Waste Management .....	45
6.11	Hazardous Storage and Spill Response.....	46
6.12	Public Safety and Risk.....	46
6.12.1	Potential Impacts .....	46
6.12.2	Mitigation Measures.....	47
6.13	Security of Gas Supply.....	48
6.13.1	Potential Impacts .....	48
6.13.2	Mitigation Measures.....	48
<b>7</b>	<b>Environmental Management Framework.....</b>	<b>50</b>
7.1	Environmental Management System.....	50
7.2	Statement of Environmental Objectives.....	51
<b>8</b>	<b>Stakeholder Consultation .....</b>	<b>51</b>
<b>9</b>	<b>References.....</b>	<b>52</b>
<b>10</b>	<b>Abbreviations and Definitions .....</b>	<b>53</b>
	<b>Appendix 1 – Health, Safety and Environmental (HS&amp;E) Policy .....</b>	<b>55</b>
	<b>Appendix 2 – APA Group’s Cultural Heritage Policy .....</b>	<b>56</b>
	<b>Appendix 3 – Rare or Threatened Flora and Fauna Recorded within 20km of the Pipelines ....</b>	<b>57</b>

**Appendix 4 – Risk Matrix and ERA ..... 58**  
**Appendix 5 – Key Environmental Requirements ..... 59**  
**Appendix 6 – Stakeholder Consultation ..... 61**

# 1 Introduction

## 1.1 Background

APA Group is a leading energy transmission business in Australia. APA Group is Australia's largest natural gas infrastructure business, owning and/or operating in excess of \$19 billion of energy assets. Its 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 Natural Gas Pipeline (Gas Pipeline), an underground natural gas pipeline, which runs from Moomba in South Australia to Sydney in New South Wales. The Gas Pipeline is 1,299 kilometres in length and links the Cooper Basin gas fields at Moomba with the Jemena East receiving terminal at Wilton, southwest of Sydney. The first 111 kilometre of the Gas Pipeline is located in South Australia and is operated under Pipeline Licence 7 (PL 7). The PL 7 was issued by the South Australian Department of State Development (DSD), now the Department of Energy and Mining (DEM), in June 1994. A range of industrial, commercial and residential users in New South Wales and the Australian Capital Territory are serviced by gas delivered by the Gas Pipeline.

The Moomba Interconnect Pipeline (MIP) runs from the Moomba Gas Plant to the Moomba Compressor Station (MCS). The initial 821 metres, which runs in the old Moomba Sydney bypass easement, is covered by PL 7 and the remaining 424 metres which runs in the QSN Link easement is covered by Pipeline Licence 18.

APA Group also operates the underground Ethane Pipeline which runs from Moomba to Sydney on behalf of the pipeline Licensee, Gorodok Pty Ltd. APA Group also has a 6.1% interest in the Ethane Pipeline Income Fund whom owns the Ethane Pipeline. The Ethane Pipeline is 1,375 kilometres in length and links the Cooper Basin gas fields with the Qenos Petrochemical Plant in Botany, New South Wales. The first 1,299 kilometres of the Ethane Pipeline, including the 101 kilometres South Australian section, runs parallel to the Gas Pipeline and within the same easement at an 8m offset. The South Australia section of the Ethane Pipeline is operated under Pipeline Licence 8 (PL 8). The PL 8 was issued by DSD (now DEM) in July 1996.

The route of the Pipelines is shown in Figure 1.

## 1.2 Purpose

This Environmental Impact Report (EIR) has been prepared to satisfy the requirements of the *Petroleum and Geothermal Energy Act 2000* with regard to the operation of the South Australian section of the Gas Pipeline and the Ethane Pipeline. This document:

- Outlines legislative approvals required for operations (Section 2);
- Provides a description of both Pipelines and general pipeline infrastructure (Section 3);
- Describes the natural environment which the pipelines intercept (Section 4);
- Outlines the Environmental Risk Assessment processes (Section 5);
- 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 of pipeline operations (Section 6); and

- Describes the environmental management framework which will be applied (Section 7).

A Statement of Environmental Objectives (SEO) (MSE.2573-PL-HSE-0001) has also been developed in conjunction with this EIR. It outlines the environmental objectives that will be achieved and the criteria upon which APA Group's performance against the objectives is assessed. The SEO has been developed on the basis of the information provided in this EIR.

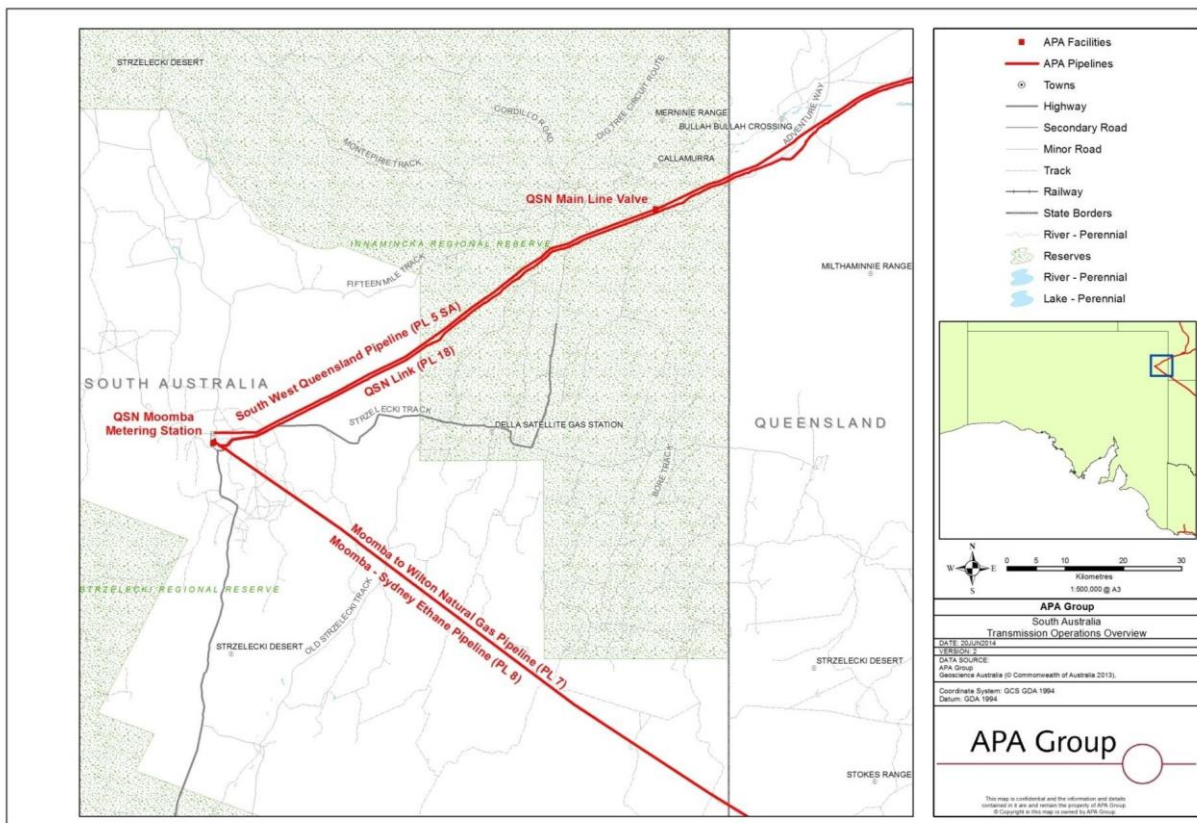


Figure 1 Location of the Gas Pipeline and Ethane Pipeline in South Australia

### 1.3 Environmental Commitment

APA Group is committed to responsible environmental management for the operation of the Gas Pipeline and Ethane Pipeline and believes that any potential adverse environmental effects can be effectively managed in a manner that complies with the requirements of this document, as well as:

- APA Group Pipeline Licence 7 and 8 (Operations) Statement of Environmental Objectives (MSE.2573-PL-HSE-0001);
- 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);
- 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*.

## 2 Legislative Framework

Pipeline operation in South Australia is undertaken pursuant to an approved Pipeline Licence under the South Australian *Petroleum and Geothermal Energy Act 2000*. Operations may also be subject to additional approvals under South Australian and Commonwealth legislation, as discussed in the following sections.

### 2.1 Petroleum and Geothermal Energy Act 2000

The South Australian *Petroleum and Geothermal Energy Act 2000* requires that all regulated activities carried out under the Act must be covered by an approved SEO. As a consequence, this EIR and SEO have been prepared to meet this regulatory requirement in relation to the operation of the Gas Pipeline and the Ethane Pipeline.

The requirements are set out in the following section 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 Section 99 and 100 of the Act and Regulations 12 and 13.

This document fulfils the requirements of an EIR as outlined in the Act and Regulations

### 2.2 Other Legislation

A range of other legislation is relevant to the operations of the Pipelines, including the legislation outlined in Table 1.

Table 1 Key Additional Legislation

Legislation	Activity
<b>Commonwealth</b>	
<i>Environment Protection and Biodiversity and Conservation Act 1999</i>	<ul style="list-style-type: none"> <li>• Protects matters of 'national environmental significance' including World Heritage properties, National Heritage places, RAMSAR wetlands of international importance, listed threatened species and ecological communities and migratory species.</li> </ul>

<b>Legislation</b>	<b>Activity</b>
<i>National Greenhouse and Energy Reporting Act 2007</i>	<ul style="list-style-type: none"> <li>• Annual reporting of fugitive emissions.</li> <li>• Retain fuel usage and gas release data.</li> </ul>
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984.</i>	<ul style="list-style-type: none"> <li>• The pipeline easement is not within a declared significant Aboriginal area.</li> <li>• Requirements for notification of Aboriginal remains are found are also covered by State legislation</li> </ul>
<i>National Environment Protection (National Pollutant Inventory) Measure 1998</i>	<ul style="list-style-type: none"> <li>• South Australia is a participating State to this NEPM, and reporting requirements are also described in the State legislation.</li> <li>• Gas distribution and transmission is a reportable activity. APA will need to assess whether NPI thresholds are exceeded, and submit a report of NPI emissions if triggered.</li> </ul>
<b>South Australia</b>	
<i>Landscape South Australia Act 2019</i>	<ul style="list-style-type: none"> <li>• Sourcing water from new bores</li> <li>• Requirements for new Water Affecting Activities</li> </ul>
<i>Native Vegetation Act 1991</i>	<ul style="list-style-type: none"> <li>• Disturbing or removing vegetation.</li> <li>• Note: Vegetation disturbance incidental to the maintenance of infrastructure is exempt under Regulation 5(1)(g)</li> </ul>
<i>National Parks and Wildlife Act 1972</i>	<ul style="list-style-type: none"> <li>• Handling protected fauna.</li> </ul>
<i>Aboriginal Heritage Act 1988</i>	<ul style="list-style-type: none"> <li>• Protects Aboriginal sites, objects and remains.</li> </ul>
<i>Heritage Places Act 1993</i>	<ul style="list-style-type: none"> <li>• Protects heritage places, relics.</li> </ul>
<i>Environment Protection Act 1993</i>	<ul style="list-style-type: none"> <li>• General duty to prevent environmental harm.</li> <li>• Disposal of water to inland waters.</li> </ul>
<i>Environment Protection (Air Quality) Policy 2016</i>	<ul style="list-style-type: none"> <li>• An occupier of premises must take all reasonable measures to minimize pollution to air by ensuring that: <ul style="list-style-type: none"> <li>• Fuel burning equipment, control equipment or any other plant or equipment is efficiently maintained, operated and serviced</li> <li>• All goods or materials are processed, handled and stored in a proper and efficient manner</li> </ul> </li> </ul>
<i>Environment Protection (Water Quality) Policy 2015</i>	<ul style="list-style-type: none"> <li>• Protects surface water and underground waters</li> </ul>
<i>Environment Protection (National Pollutant Inventory) Policy 2008</i>	<ul style="list-style-type: none"> <li>• Submit annual National Pollutant Inventory (NPI) returns</li> </ul>
<i>Environment Protection (Noise) Policy 2007</i>	<ul style="list-style-type: none"> <li>• Ensure source noise level (continuous) does not exceed the background noise level plus 5 dB (A) or indicative noise level for the noise source.</li> </ul>

Legislation	Activity
Crown Land Management Act 2009	<ul style="list-style-type: none"> <li>• On Crown land do not, without authority, among other things;               <ul style="list-style-type: none"> <li>• Drive a motor vehicle, other than on an established road or track</li> <li>• Damage or remove fossils</li> <li>• Excavate or otherwise damage or interfere with the land, or anything on the land</li> <li>• Cut down, lop branches ,or otherwise damage, any tree or bush (whether alive or dead)</li> <li>• Deposit litter or abandon property</li> </ul> </li> </ul>

## 3 Pipeline Description

### 3.1 Pipeline Alignment

The Gas Pipeline was constructed in the 1970s and commissioned in 1976. It is 1,299 kilometres in length, linking the Cooper Basin gas fields at Moomba in South Australia with the Jemena East receiving terminal at Wilton, south west of Sydney in New South Wales.

In 1984, a 10 kilometre bypass pipeline, the Moomba Loop Pipeline, was installed between KP 0 and KP 10 and is currently considered to be abandoned in-situ.

In 2014, the 1.2 kilometre Moomba Interconnect Pipeline (MIP) was installed to connect the Moomba Plant to the Moomba Compressor Station. This pipeline utilised 818 metres of the existing Moomba Loop Pipeline and a new 424 metre section of pipeline.

The Gas Pipeline runs in a south-easterly direction from the Moomba site, crosses the Strzelecki Track and then the Strzelecki Creek close to the Creek's intersection with the Old Strzelecki Track. It passes through the south-west corner of Innamincka Station before crossing the border into Queensland approximately 101 kilometres from its origin at Moomba.

The Ethane Pipeline was constructed in 1995. It is 1,375 kilometres in length, linking the Cooper Basin gas fields at Moomba with the Qenos Petrochemical Plant in Botany in New South Wales. The first 1,299 kilometres of the Pipeline, including the 101km South Australian section, runs parallel to the Gas Pipeline and within the same easement at an 8m offset.

### 3.2 Design and Engineering

#### 3.2.1 Gas Pipeline

The South Australian section of the Gas Pipeline is approximately 101 kilometres long. A summary of its design parameters are provided in Table 2.

Table 2 Gas Pipeline engineering and design features

Design Element	Gas Pipeline	Interconnect Pipeline (PL 7 section)
Date Constructed	1974-1976	1984
Date Commissioned	1976	1984
Length	1,299 km (101 km in SA)	818 m
Diameter (OD)	860 mm	660 mm
Minimum Depth of Cover	In accordance with AS 2885.1, typically: <ul style="list-style-type: none"> <li>• Cross country sections – 750 mm</li> <li>• Beneath roads and watercourses – 1200 mm</li> <li>• Heavy industrial location classifications – 1200 mm</li> </ul>	
Main Line Valves	Five in SA	Nil
Meter Stations	Santos and QSN receipts	Nil

A brief description of the Gas Pipeline facilities and associated infrastructure is provided in Table 3.

Table 3 Gas Pipeline facilities and infrastructure in SA

Facility	Description
Inlet Metering Station	An inlet metering station is located at Moomba to take receipt of gas from the Moomba Plant and deliver into the Pipeline. The meter station includes flow measurement, emergency isolation and pigging facilities. All stations are surrounded by security fencing.
Mainline Valve (MLV)	There are five MLVs within SA section of Pipeline installed at approximately every 20-30 km, each fitted with an automatic line break facility to minimise product loss in the event of an uncontrolled gas release. MLVs occupy a fenced and gravelled area of approximately 200 m <sup>2</sup> and are located on the pipeline easement.
Cathodic Protection System	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. In addition, cathodic protection test points are located approximately every 1.6 km. The test points are required to allow for monitoring of the effectiveness of the corrosion protection system.
SCADA (Supervisory Control and Data Acquisition) System	A SCADA system is in place for the remote monitoring and control of shared facilities along the pipeline, comprising of Remote Telemetry Units (RTUs) connected to the APA Groups Pipeline Control Centre via Satellite Communication. All telemetered stations utilise 240 volts supplies except where unavailable and solar power with battery back-up is used.
Pipeline Markers	Pipeline marker signs are located at intervals along the pipeline easement in accordance with AS 2885, so that a person can clearly see a marker sign in either direction. The marker signs are placed closer at bends, on either side of road and watercourse crossings and at fence lines.

### 3.2.2 Ethane Pipeline

The South Australian section of the Ethane Pipeline is approximately 101 kilometres long. A summary of its design parameters are provided in Table 4.

Table 4 Ethane Pipeline engineering and design features

Design Element	Ethane Pipeline
Date Constructed	1995
Date Commissioned	1996

Design Element	Ethane Pipeline
Length	1,375 km (101 km in SA)
Diameter (OD)	220 m
Minimum Depth of Cover	In accordance with AS 2885.1, typically: <ul style="list-style-type: none"> <li>• Cross country sections – 750 mm</li> <li>• Beneath roads and watercourses – 1200 mm</li> <li>• Heavy industrial location classifications – 1200 mm</li> </ul>
Main line Valves	Two in SA
Meter Stations	Santos supply only

A brief description of the Gas Pipeline facilities and associated infrastructure is provided in Table 5.

Table 5 Ethane Pipeline facilities and infrastructure in SA

Facility	Description
Inlet Metering Station	An inlet metering station is located at Moomba to take receipt of ethane from the Moomba Plant and deliver into the Pipeline. The meter station includes flow measurement, emergency isolation and pigging facilities. All stations will be surrounded by security fencing
Mainline Valve	There are two MLV installed at approximately 50km interval, comprised of a single actuated MLV and a bypass which includes a low pressure automatic line break. MLVs occupy a fenced and gravelled area of approximately 200 m <sup>2</sup> and are located on the pipeline easement.
Cathodic Protection System	A cathodic protection system is incorporated into the pipeline design to protect the Pipeline from corrosion. It is cross-bonded to the Gas Pipeline.
SCADA System	A SCADA system is in place for the remote monitoring and control of all facilities along the pipeline, comprising of Remote Telemetry Units (RTUs) connected to the APA Groups Pipeline Control Centre via Satellite Communication. Operating in conjunction with the Gas Pipeline, all telemetered stations will utilise 240 volts supplies except where unavailable and solar power with battery back-up is used.
Pipeline Markers	Pipeline marker signs are located at intervals along the pipeline easement in accordance with AS 2885, so that a person can clearly see a marker sign in either direction. The maker signs are placed closer at bends, on either side of road and watercourse crossings and at fence lines.

### 3.3 Operations

The operation of both Pipelines is undertaken by APA Group.

Each pipeline is operated in accordance with approval documentation, an Operations Environmental Management Plan (OEMP), Australian Standard (AS) 2885 and the APGA Code of Environmental Practice – Onshore Pipelines.

A summary of pipeline operational activities, applicable to both Pipelines, is provided in Table 6 below.

Table 6 Summary of Pipeline Activities

Activity	Description
<b>Easement Maintenance</b>	
Weed control	Localised control of weeds is undertaken along the easement as required
Line of sight (LOS) clearance	Clearance of the right of way (ROW) to maintain LOS is generally not required as it is an arid region with predominately low open grassland or shrub land.  Trees retained on the easement during construction will not be removed, however it is necessary to remove trees that regenerate within approximately 3m of the pipeline as they pose a threat to pipeline integrity.
Erosion events	It is possible that erosion can occur on creek lines or run-off areas on right-of-way following major rainfall events. Repairs are effected as soon as practicable following the erosion event and include the replacement of similar materials and re-profiling.
Patrolling – easement access	Patrols are undertaken by travelling along the right-of-way, on private/public roads, designated access tracks or along the right-of-way. Frequency depends on whether particular issue(s) require monitoring; frequency can range from weekly to monthly or longer.
Aerial inspection of easement	Aerial inspections are undertaken using low-flying aircraft and typically carried out every month.
<b>Pipeline Operation and Maintenance</b>	
Cathodic protection surveys	Surveys involve travelling the right-of-way and stopping to inspect Cathodic Protection points (above-ground post) on foot. Typically conducted once per year.
Emissions	Gas is released to the atmosphere as a result of pipeline and facility maintenance operations (i.e. unit blow downs/ venting, valve opening/testing). Small volumes are released. Occurs for duration of operational life.
Pigging	A pipeline 'pig' is placed in the pipe via a launcher trap. The pig travels along inside the pipe before being removed at a pig exit site. Removal of a pig from the pipeline results in minor venting of gas to atmosphere and the collection of some oil sludge and debris. Major Magnetic Flux Leakage pigging programs are typically carried out very infrequently (e.g. every 10 to 15 years), whilst Stress Corrosion Cracking (SCC) pigging is expected to be every five years.

Activity	Description
Excavations (including coating refurbishment, installation of anode beds, emergency response exercises and new tie-ins)	Excavations of the pipeline follow the same processes as those undertaken during pipeline construction but are generally on a much smaller scale. Once vegetation and topsoil have been cleared and stockpiled, the excavation is performed and spoil stockpiled. The pipeline maintenance is then undertaken (this may include welding, coating and sand-blasting). Once complete the trench is then backfilled, the ground surface is re-contoured and the topsoil and vegetation respread. Some re-seeding may be undertaken if necessary.
Replacement of pipeline section	A section of the pipeline (including the section to be replaced) is isolated and a controlled release of gas is undertaken from the isolated section. The section of pipeline to be replaced is then excavated, the old pipeline removed and replaced (includes welding, sand-blasting and coating) and the site reinstated. This is expected to be very rare.
Welding	Welding is usually required when pipeline repairs or modifications are made to existing infrastructure. Pipeline welding usually occurs following the excavation of the pipeline. Pipe spools are welded together. Each weld is inspected using x-ray or ultrasonic equipment as per AS 2885.2.
Pipeline coating	Sleeves or tape are expected to be used to coat welds or repair areas of pipeline or above ground pipeline. Epoxy coating (spray) may be used. The area around the weld is wire-brushed or grit blasted and then coated with a protective coating to prevent corrosion.
Pressure testing	Hydrostatic pressure testing is required when a section of pipe is replaced. During hydrostatic testing the pipeline is capped with test manifolds, filled with water and pressurised up to 100% of specified minimum yield stress (SMYS) for a minimum of four hours. A 24-hour leak test then follows. Fresh water is preferred for hydro-testing, but hydro-test water may be treated prior to testing with chemicals such as biocide, oxygen scavengers and corrosion inhibitors (depending on factors such as the water quality of test water and the length of pipe tested). If hydro-test water meets water quality guidelines and has landholder approval, it is discharged to the surrounding environment. Alternatively, it may be contained and treated on site or removed off site.
<b>Facility Operations and Maintenance</b>	
Metering stations	Metering stations consist of valving, metering, gas analysis and scraper launching or receiving facilities.
Weed control	Localised control of weeds is undertaken in and around compounds, typically annually.
Production of hazardous waste	Waste hydrocarbons are generated from maintenance/pigging operations (ex-pipeline/product). Liquids and heavy metals (e.g. mercury) are not expected in the product, but if present they would be tapped in coalescing filters outside of SA.
Waste disposal	General waste generated during operations is collected on site and removed to licensed facilities for disposal

Activity	Description
Venting	Uncontrolled venting which is a result of equipment failure e.g. regulator failure. Duration would depend on type and duration of failure.

### 3.3.1 Easement Maintenance

A routine operation and maintenance program is in place for the Pipelines which includes leak detection, aerial patrols, repair or replacement of faulty equipment, pigging and cleaning of the pipeline, corrosion monitoring and remediation, easement and lease area maintenance.

Aerial and ground inspections include checking vegetation for discolouration which can be an indicator of a leak, detection of erosion, monitoring of rehabilitation success and detection of weed species.

A light vehicle access track is maintained along the Pipelines to allow inspection and maintenance and existing access tracks are utilised where possible.

Regular consultation is maintained with landowners whose properties are traversed by the Pipelines.

The Dial Before You Dig (DBYD) service is promoted for use by third parties wishing to locate the Pipelines prior to undertaking excavations.

Operational pipelines generally have very little environmental or landholder impact. However, prior to commencing extensive work, or where numerous sites are involved, operations personnel consult with regulatory authorities as appropriate.

### 3.3.2 Pipeline Operation and Maintenance

The Pipelines also require ongoing management for stress corrosion cracking across the South Australian section, including routine pigging and repair activities such as dig-ups.

Dig-ups involve the excavation of material from around the Pipeline (typically referred to as a 'bellhole'), to allow sufficient room for Operations Technicians to safely undertake any remedial works that may be required. The excavation of material is undertaken in accordance with management conditions outlined above for construction (that is, topsoil will be stockpiled separately from trench spoil, and the site will be restored as soon as practical following completion of maintenance works).

The sites will be restored to pre-maintenance condition or better at the completion of project works. Waste recycling and disposal, spill response and depot maintenance will be carried out in accordance with procedures outlined in Appendix 1 of the SEO.

### 3.3.3 Facility Operation and Maintenance

Housekeeping of facilities is undertaken regularly including weed control.

Waste produced from the operations of facilities is minimal and is disposed in a responsible manner in accordance with procedures outlined in Appendix 1 of the SEO.

Operational facilities generally have very little environmental or landholder impact.

### 3.4 Decommissioning

When the utility is no longer required, the pipeline will be decommissioned in accordance with the regulatory requirements and accepted environmental best practices of the day. Currently decommissioning procedures require the removal of all above ground infrastructure and the restoration of associated disturbed areas.

At the time of decommissioning a decision will be made regarding the opportunities for future use of the Pipelines. If no longer required, the Pipeline will be purged of gas and below ground facilities allowed to gradually degrade in-situ. The Pipeline may be filled with grout or another inert material prior to abandonment where there is a risk of collapse (e.g. large diameter sections). However, if it is considered that the Pipeline may offer some future benefits, it will be filled with an inert material and the cathodic protection system maintained to prevent corrosion.

All above ground facilities will be removed.

### 3.5 Pipeline Management System

APA Group operates the Pipelines through the Pipeline Management System which ensures compliance with all aspects of AS 2885 and regulatory requirements. The System requirements are detailed in the Pipeline Management Plan and include the components detailed in Table 7.

Table 7 Pipeline Management System Components

Component	Description
Emergency Management Plan	The 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. The Plan detailing the management external third party interference including management of the land, landholders and third party works.
Pipeline Integrity Management Plan including:	Addresses AS2885.3 Section 5. The PIMP carries relevant details of the assets and a detailed summary of the integrity challenges and mitigation. The PIMP specifies the maintenance requirements and operational guidelines for the pipeline for both normal operations and specific mitigation activities and is the basis of the Maintenance Plan.
<ul style="list-style-type: none"> <li>Remaining Life Review</li> </ul>	Addresses AS2885.3 Section 10.3. The Remaining Life Review is carried out at a maximum of 10 years.

Component	Description
<ul style="list-style-type: none"> <li>Safety Management Study</li> </ul>	The SMS is formally reviewed at least 5 yearly. During the period between formal reviews various specific risk aspects may occur requiring a Study.
<ul style="list-style-type: none"> <li>Location Class Review</li> </ul>	The Local Class Review is be formally reviewed at least 5 yearly as part of the Safety Management Study.
<ul style="list-style-type: none"> <li>Integrity Review</li> </ul>	Outlines to process for assessing and managing the integrity of the asset.
<ul style="list-style-type: none"> <li>Maintenance Plan</li> </ul>	The Maintenance Plan, determined by the PIMP, is programmed into a computerised maintenance system.

## 4 Description of the Environment

This section provide an overview of the existing environment along the Pipelines in South Australia.

### 4.1 Climate

The region has an arid climate, with low average rainfall and high evaporation. Seasons are generally characterised by hot dry summers and mild dry winters. Rainfall in the area is highly erratic, with the annual average being about 150 to 200mm. There is no distinct seasonal rainfall pattern and rainfall is often associated with thunderstorm activity and as a consequence can be intense. Evaporation is extremely high, with average annual evaporation ranging from 2,800 to 3,600mm (Laut et al. 1977, BoM 2020).

Temperatures vary from cool in winter to hot in summer, with diurnal variations also being high. In summer, the average maximum and minimum temperatures are approximately 37.7°C and 23.7°C respectively, and in winter 20.8°C and 7.2°C. The maximum recorded temperature is 49.6°C and the minimum -0.5°C (BoM 2020).

A summary of climate records for Moomba (Station 017123; BoM 2020) is provided in Table 8.

Table 8 Temperature and Rainfall Records for Moomba

Record	Month												Annual
	J	F	M	A	M	J	J	A	S	O	N	D	
Mean Daily Max (° C)	39.0	37.1	34.1	29.4	23.8	19.9	19.8	22.6	27.2	31.0	34.1	36.9	-
Mean Daily Min (° C)	24.9	23.7	20.6	15.8	10.7	7.4	6.4	7.9	12.0	15.9	19.4	22.5	-
Mean Rainfall (mm)	13.7	25.2	23.2	8.1	9.9	10.5	12.8	4.3	14.4	8.3	18.5	13.6	164.1
Median Rainfall (mm)	3.0	4.0	2.4	1.0	4.2	5.8	0.8	0.8	0.8	1.2	7.2	6.2	153.6
Mean number of rain days (>1mm)	1.3	2.1	1.6	1.1	1.2	1.6	1.3	0.8	1.2	1.4	2.3	1.8	17.7

### 4.2 Bioregional Environment

The Gas Pipeline and Ethane Pipeline corridor traverses two Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions, these being, the Channel Country (sub-IBRA Coongie) Bioregion and the Simpson Strzelecki Dunefields (sub-IBRA Strzelecki Desert) Bioregion.

A description of the general climate, geology, flora and significant fauna characteristic of these bioregions is provided in the following sections.

## **4.2.1 Channel Country Bioregion**

The first 37 kilometre of the pipeline corridor (KP 0 to KP 37) traverses the floodplains and sand ridges of the Channel Country Bioregion (Figure 2). This Bioregion is characterised by vast braided, flood and alluvial plains surrounded by gravel or gibber plains, dunefields and low ranges. This includes the waterholes, channels, floodplains, ephemeral lakes of the Cooper and Strzelecki Creeks, and the inter-dune areas connected to and periodically flooded by them. There are multiple floodplain and lake land units, which can be differentiated on the basis of frequency and intensity of flooding.

### **4.2.1.1 Geology, Soils and Landforms**

Dunes vary from red siliceous sands to whitish siliceous sands - red dunes are older and may have a clayey core. The larger are equivalent to the dunes of the Channel Country Bioregion. Pale dunes are recent deposition from the floodplains and are more mobile.

The braided channels and temporary waterholes on both the Cooper and the Strzelecki Creek have pale grey sandy to silty clays.

Extended flats of typically pale sandy clays with a veneer of pale grey sands lie behind the braided channels, extending to adjoining pale dunes. The sandy clay layer is hard setting at a depth of about 25 cm forming a hardpan, preventing deeper water penetration. There are also areas of grey self-mulching cracking clay soils with "crabholes" and deeper water penetration. Sand plains are present slightly above the level of the flats. Soils are sandy loams, with a hard setting layer at about 20 cm (OEH 2015a).

Gilgai flats are generally at a higher level, beyond the low pale dunes and are flooded less frequently. Soils again are pale grey self-mulching cracking clays, with gilgai formation. Large clay inter-dune corridors also have the same soils.

### **4.2.1.2 Hydrology**

Major waterholes are on the main and northwest channels of the Cooper Creek and are post-flooding freshwater pockets with salinity varying both in relation to time since flooding and salt input from saline alluvium or local springs. The land system includes the intermittent lakes of the Coongie Lakes system. Some of these lakes receive a regular flow of water from the northwest branch of the Cooper Creek in average flow years but can dry out almost entirely in extended drought periods. The pipeline corridor crosses the Strzelecki Creek at KP 34 (Figure 3).

Ground water in the general vicinity of the Pipeline is very deep with the majority of existing bores/wells recording ground water at depths between 2401 – 2522 metres (Water Connect 2015). One water well has been installed into an isolated aquifer and has recorded ground water depth of 65 metres.

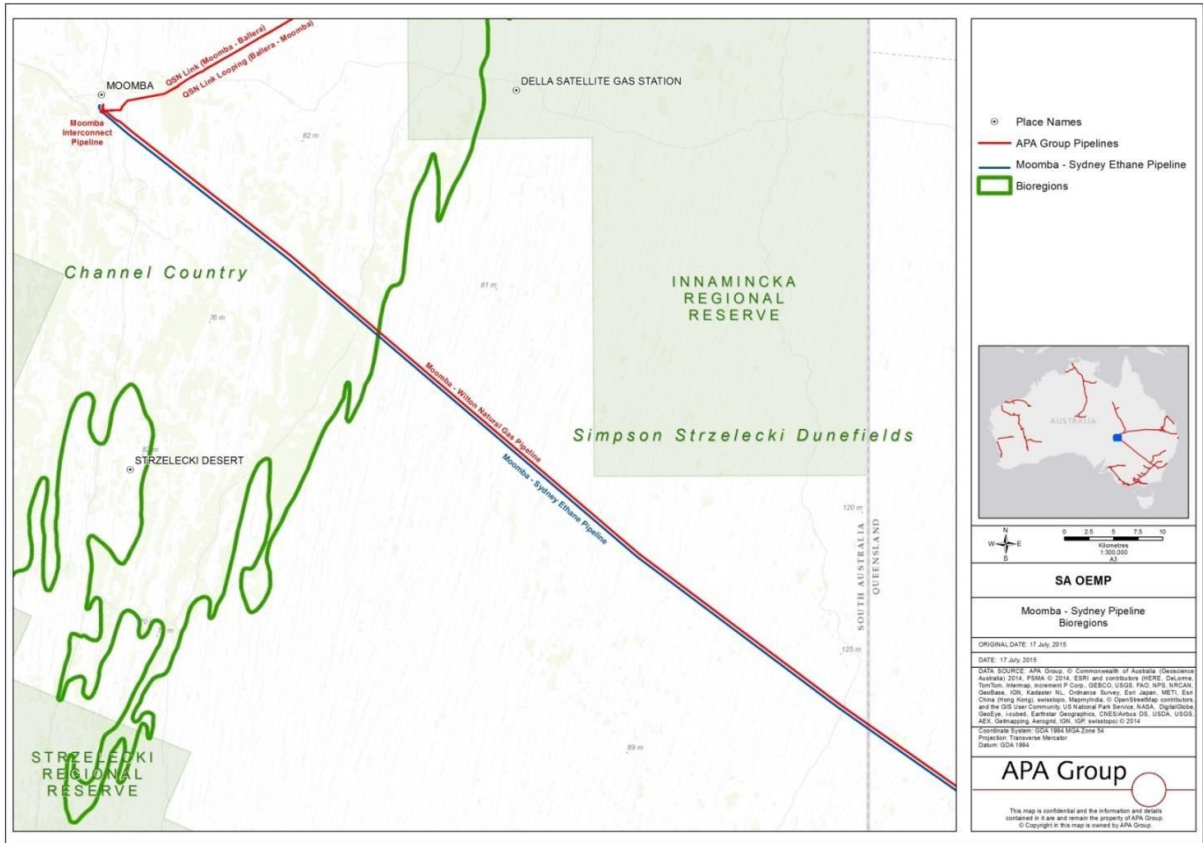


Figure 2 IBRA regions across the Gas Pipeline and Ethane Pipelines

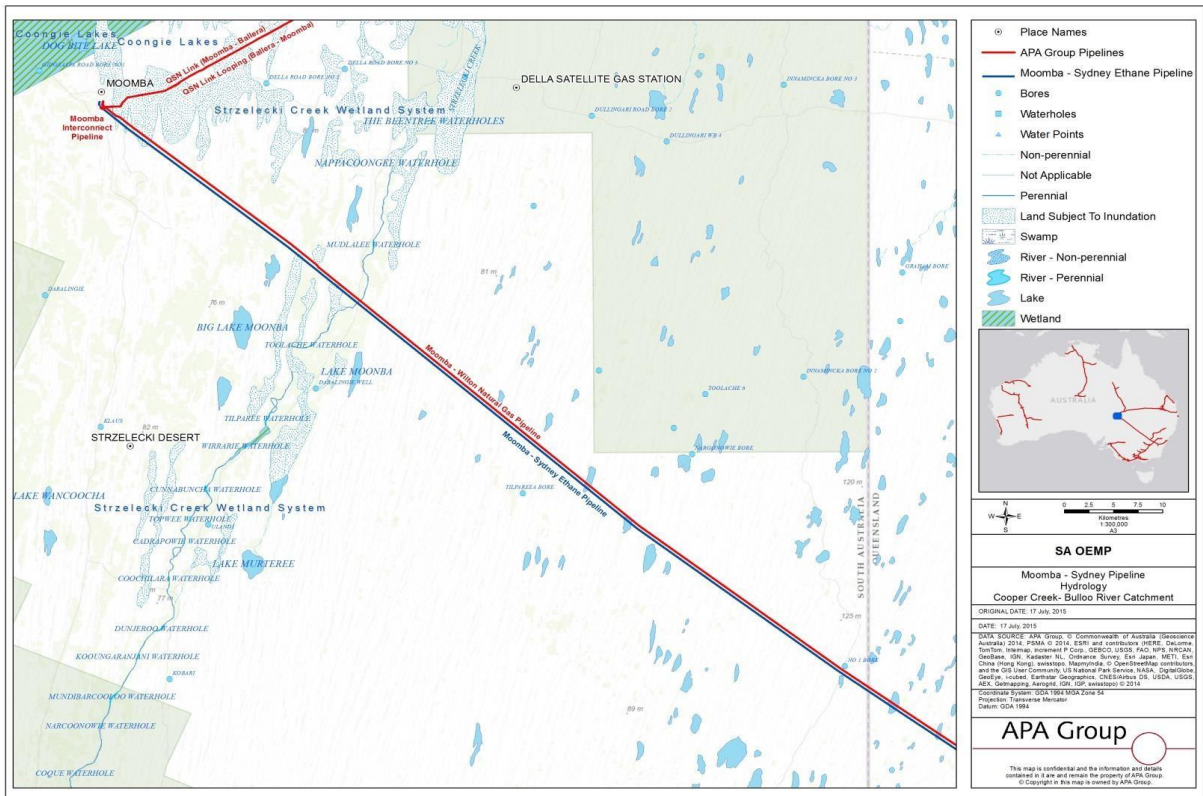


Figure 3 Surrounding hydrology of the Gas Pipeline and Ethane Pipeline



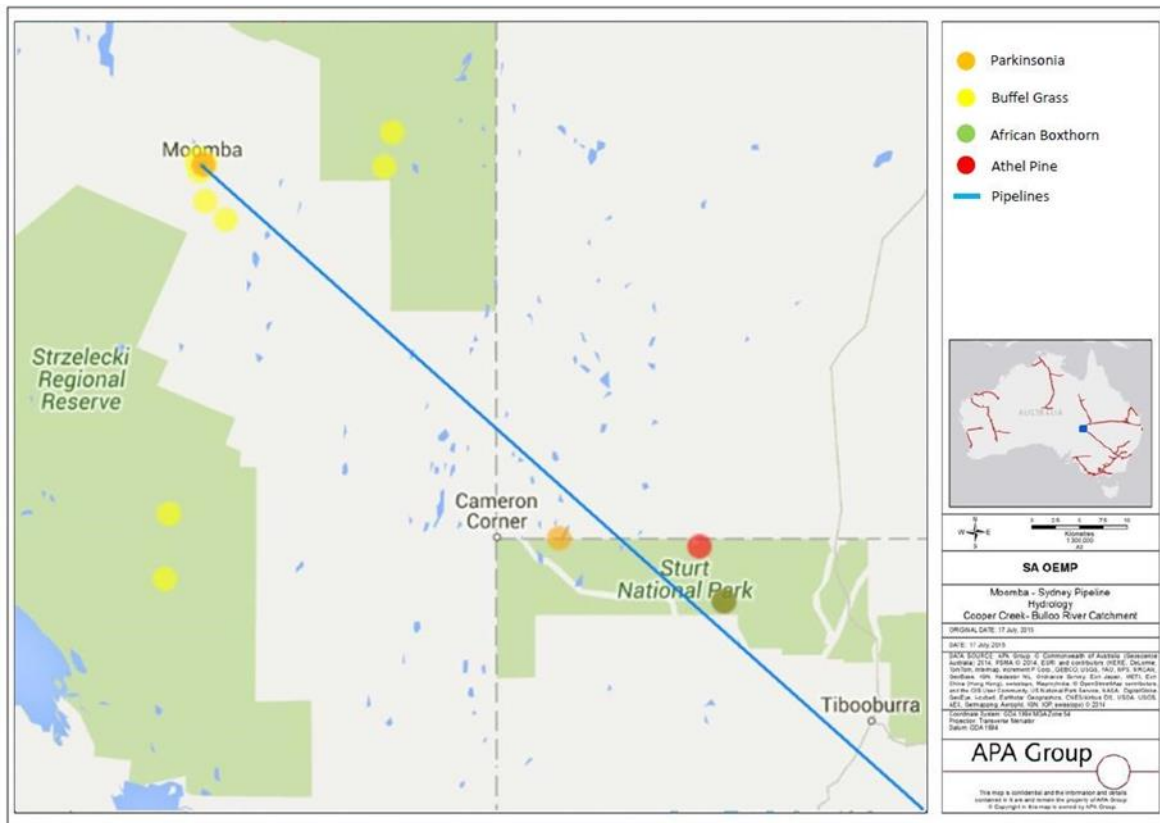


Figure 4 Known weed distribution in the vicinity of the Gas Pipeline and Ethane Pipelines

#### 4.2.1.3 Flora

Typical vegetation in the Channel Country Bioregion is outlined in *Marree Soil Conservation Board District Plan* (MSCB 2004) and summarised below.

Larger red dunes support a low woodland or tall shrubland of Whitewood (*Atalaya hemiglauca*), Narrow-leaf hobbush (*Dodonaea viscosa ssp. angustissima*), Needlewood (*Hakea leucoptera*) and Sandhill wattle (*Acacia ligulata*) over Kerosene and Mulga grasses (*Aristida spp.*), Buckbush (*Salsola kali*) and Grey copperburr (*Sclerolaena diacantha*). The majority of the red dunes in the area have crests and upper slopes carrying Sandhill canegrass (*Zygochloa paradoxa*) and ephemeral species. Lobed spinifex (*Triodia basedowii*) may be present.

The more mobile pale dunes have perennial cover which may be Sandhill wattle, Eurah (*Eremophila bignoniiflora*) and occasionally Coolibah (*Eucalyptus coolabah*), with a hummock grassland cover of Lobed spinifex and ephemeral species.

Major waterholes are on the main and north-west channels of the Cooper Creek and support tall woodland including River red gum (*Eucalyptus camaldulensis*) and Coolibah with Eurah, Bean tree (*Lysiphylum gilvum*), Broughton willow wattle (*Acacia salicina*), Whitewood and Native orange (*Capparis mitchellii*). There is usually an understorey of Lignum (*Muehlenbeckia florulenta*), with groundcover of short-lived perennials or annuals: Cannonball, Tangled poverty bush, Ruby saltbush (*Enchylaena tomentosa*) and annual saltbushes.

The braided channels and temporary waterholes on both the Cooper and the Strzelecki Creeks have similar soils and vegetation. The overstorey is primarily Coolibah with occasional River red gum and Cooba (*Acacia stenophylla*). Lignum stands are dense, growing on pale grey self-mulching cracking clays. This is also the vegetation of the named "swamps" of the land system, e.g. Tirrawarra swamp.

Coolibah, with Whitewood and Spotted emu bush (*Eremophila maculata* var. *maculata*) on sandier patches, forms woodland to open woodland. There is a shrub layer of Old man saltbush (*Atriplex nummularia*), Queensland bluebush (*Chenopodium auricomum*) and Lignum, the first and sometimes the second also absent in areas hard-hit by 19th and early-20th century stocking. Subshrubs include red and other Copperburrs and Poverty bushes (*Sclerolaena* spp.). Annuals include Buck bush and the exotic Onion weed (*Asphodelus fistulosus*).

Gilgai flats, at a higher level than the preceding and generally beyond the low pale dunes bordering the Coolibah woodlands, are flooded less frequently and hence lack the tree cover. Chenopod shrubland of Queensland bluebush dominates, but variations depend on frequency of flooding. Swamp canegrass (*Eragrostis australasica*) or Lignum may appear as single species stands or, mixed with each other and the Queensland bluebush.

Large clay interdune corridors also have the same soils and species, with additional Copperburrs (*Sclerolaena* spp.) in the groundcover. Responses to rain, particularly in clay swales, may be prolific, with Buttongrass (*Dactyloctenium radulans*), New Zealand spinach (*Tetragonia* sp.), Buck bush and Pigweed (*Portulaca* sp.) common.

Sandplains (that are present slightly above the level of the coolibah flats) carry a low open woodland including Whitewood, Prickly wattle (*Acacia victoriae*), Sandhill wattle, some Coolibah, Needlewood (*Hakea leucoptera*) and Beefwood (*Grevillea striata*) over a mixed grass and subshrub groundcover: Mulga grass (*Aristida contorta*), Oatgrass, Katoora (*Sporobolus actinocladius*), Mulka (*Eragrostis dielsii* var. *dielsii*) with Buck bush, Goathead burr (*Sclerolaena bicornis* var. *bicornis*), Tangled lechenaultia (*Lechenaultia divaricata*) and Copperburrs.

No Threatened Ecological Communities (TECs) are located within the vicinity of the Pipelines.

#### 4.2.1.4 Weeds

Dryland weed species such as Prickly Acacia (*Acacia nilotica*), Athel pine (*Tamarix aphylla*) and Parkinsonia (*Parkinsonia aculeate*) have been recorded within the Bioregion, however, the density of weed species is generally relatively low (Figure 4). Weeds known to occur in the Channel Country bioregion are shown in Table 9.

One weed of particular note is Buffel Grass (*Cenchrus ciliaris*) which has been identified as a concern in regard to long term impacts to biodiversity (Greenfield 2007). Figure 4 outlines several occurrences, confirmed in the Atlas of Living Australia, of Buffel Grass in the vicinity of the Moomba.

Table 9 Weeds species of the Channel Country Bioregion

Common Name	Scientific Name	Declared Weed Status	WoNS
Athel pine	<i>Tamarix aphylla</i>	Protect Sites	Yes
Mesquite	<i>Prosopis</i> spp.	Protect sites, destroy infestations	Yes
Noogoora burr	<i>Xanthium occidentale</i>	Monitor	No
Parkinsonia	<i>Parkinsonia aculeata</i>	Protect sites by removal of infestations	Yes
Parthenium weed	<i>Parthenium hysterophorus</i>	Prevent entry; destroy if detected	Yes
Prickly acacia	<i>Acacia nilotica</i> subsp. <i>indica</i>	Monitor	Yes
Rubber vine	<i>Cryptostegia grandiflora</i>	Prohibit sale and movement	Yes
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>	Monitor	Yes

#### 4.2.1.5 Significant Fauna

Two nationally threatened fauna species has been predicted as occurring in the land system (DOE 2014) and three state listed fauna species has been recorded close to the pipeline corridor (DEH 2009). Details on the occurrence of these species are provided in Table 10.

Common fauna in this land system include birds such as Australian magpie, Galah, Brown falcon, Budgerigar, Black-faced wood swallow and Little corella, small mammal species such as Fat-tailed and Stripe-faced dunnarts, Giles planigale, Sandy inland mouse and the introduced House mouse, reptiles such as Fat-tailed gecko, Sand goanna, Painted dragon, Eastern brown snake, Curl snake and Inland taipan and amphibians including Trilling frog and Green tree frog (in areas close to permanent water). The floodplains of the Channel Country Bioregion also support a range of waterbirds when inundated.

Table 10 Listed species recorded within Channel Country Bioregion

Species	Conservation Status		Comment
	Commonwealth	SA	
Australian painted snipe ( <i>Rostratula australis</i> )	Endangered	Endangered	The EPBC Act database predicts the presence of this species but the possibility that it may be present is considered negligible. There are no database records for <i>R. australis</i> in the SA Cooper Basin. It is a wetland species and has been recorded in other areas as occurring in infrequently filled freshwater wetlands, predominantly August to March.

Species	Conservation Status		Comment
	Commonwealth	SA	
Dusky hopping mouse, Wilkiniti ( <i>Notomys fuscus</i> )	Vulnerable	Vulnerable	Present within region. 2 database records on the pipeline easement at KP37 and KP64 near Strzelecki Creek and the border. Numerous other sightings have been recorded on dunes along the Strzelecki Track <sup>1</sup> . Believed to be widespread but sparsely distributed throughout the region.
Black-breasted buzzard ( <i>Hamirostra melanosternon</i> )	-	Rare	The closest database records for this species are within 10 km of the pipeline along the Strzelecki Creek, which acts as a focus for raptors. Widely foraging species. Inhabits open woodlands, floodplains, avoids forests and other dense vegetation. Feeds on lizards, mammals, nesting birds and eggs
Grey falcon ( <i>Falco hypoleucos</i> )	Endangered	Rare	Database record (skeleton) near Moomba. Resident or nomad on tree-scattered plains or along desert watercourses, mainly in the interior.
Woma ( <i>Aspidites ramsayi</i> )	-	Rare	Database records at Moomba and to the south of Moomba along Strzelecki Track. Large python (up to 230 cm) which inhabits dunefields and sandy plains in arid areas of central Australia.

## 4.2.2 Simpson-Strzelecki Dunefields Bioregion

Between KP 37 and the South Australia and Queensland border (KP 101) the pipeline corridor traverses dunefields which are part of the Simpson-Strzelecki Dunefields Bioregion. This region comprises long parallel sand dunes, fringing dunefields, extensive sand plains, dry watercourses and salt pans (Figure 3). Vegetation is predominantly Spinifex hummock grasslands with sparse Acacia shrublands and some narrow River red gum and Coolibah riverine woodlands.

### 4.2.2.1 Geology, Soils and Landform

Simpson-Strzelecki Dunefields Bioregion dunes are deep red siliceous sands with semi-mobile crests and relatively stable slopes. Lower slopes and narrower inter-dunes are clayey sands to

<sup>1</sup> Pers. comm. R. Brandle, Biological Survey and Research, Department for Environment and Heritage.

red sandy clay loams. Narrower (<300 m) inter-dunes are characteristically massive (non-cracking) red sandy clay loam, usually with a shallow veneer of loamy sand to a maximum of 20 cm depth. Wider inter-dunes, up to 1 km between crests, have red self-mulching cracking clay soils with frequent areas of claypan and non-cracking massive red earths.

Within the Bioregion, claypan swamps may be present in any inter-dune but are largest and most frequent in the wider inter-dunes. Margins of swamps have massive red earths with little vegetation, with brown or grey cracking self-mulching clays in lower parts of the swamp. While claypans remain frequent, the development of the productive grey cracking clays of swamp centres is limited. Also, the Queensland bluebush component of swamp vegetation disappears, with Swamp canegrass becoming more important.

Low limestone or kopi rises are present in some inter-dunes as a minor component. Surface soils remain sandy loams, becoming calcareous at depth. Arguably, the Simpson-Strzelecki Dunefields Bioregion is the largest example of a linear sand dune environment in the world (OEH 2015b).

#### 4.2.2.2 Hydrology

Drainage is internal to the particular inter-dune and has no connection to flood flows (Figure 4). The claypan swamps that form diminish in size and importance to the south. No waterway crossings exist in the Bioregion.

Ground water in the general vicinity of the Pipeline is deep with the majority of existing bores/wells recording ground water at depths between 1944 – 2340 metres (WaterConnect 2015). One water well has been installed into an isolated aquifer and has recorded ground water depth of 61 metres. Another water well has been installed within the floodplain of Strzelecki Creek and has recorded a water table depth of 45 metres.

#### 4.2.2.3 Flora

Typical vegetation in the Simpson-Strzelecki Dunefields Bioregion is outlined in *Marree Soil Conservation Board District Plan* (MSCB 2004) and summarised below.

Dune upper and mid-slopes support a low woodland or tall shrubland of Whitewood (*Atalaya hemiglauca*), Narrow-leaf hobbush (*Dodonaea viscosa* ssp. *angustissima*), Needlewood (*Hakea leucoptera*) and Sandhill wattle (*Acacia ligulata*) in the north. Whitewood becomes infrequent in the south. There is a mid-storey of lobed spinifex (*Triodia basedowii*) and Thorny saltbush (*Rhagodia spinescens*) or Sandhill canegrass (*Zygochloa paradoxa*) where crests are semi-mobile, and a groundcover of ephemerals and short-lived perennials particularly Kerosene and Mulga grasses (*Aristida* spp.), Buckbush (*Salsola kali*) and Grey copperburr (*Sclerolaena diacantha*).

In narrow inter-dunes and on lower dune slopes, tree cover diminishes but species composition remains similar.

Apart from occasional groves of very low Senna (*Senna artemisioides*) or Needlewood, wide inter-dunes are treeless. Cover is perennial grass and short-lived perennial Copperburrs and similar: Curly Mitchell grass (*Astrebla lappacea*), Neverfail (*Eragrostris* spp.), Mulka (*Eragrostris dielsii*), Copperburrs and Poverty bushes (*Sclerolaena* spp.).

The grey clays, at the terminus of drainage, support shrubland of Lignum (*Muehlenbeckia florulenta*), Queensland bluebush (*Chenopodium auricomum*) and Swamp canegrass (*Eragrostis australasica*), either mixed or in single-species stands, with perennial grasses Neverfail and Mulka. Following water run-on, ephemeral growth includes Tall copperburr (*Sclerolaena convexula*), Common joyweed (*Alternanthera nodiflora*), Bogan flea (*Calotis hispidula*) and Pop saltbush (*Atriplex spongiosa*).

On the low limestone or kopi rises trees are absent, and the main cover is low shrubland of low Bluebush or Cottonbush (*Maireana* spp.), with Grey copperburr, Buckbush, Pale poverty bush (*Sclerolaena divaricata*), Goathead burr (*Sclerolaena bicornis* var. *bicornis*), Neverfail and annual grasses. Bladder saltbush (*Atriplex vesicaria*) appears to the south.

#### 4.2.2.4 Weeds

Weed species in the Simpson–Strzelecki Dunefields bioregion are limited due to relatively harsh climatic conditions. Weeds known to occur in bioregion, in isolated areas, are summarised in Table 11, however, the density of weed species is generally relatively low adjacent to the Pipelines (Figure 4).

Table 11 Weeds species of the Simpson-Strzelecki Dunefields bioregion

Common Name	Scientific Name	Declared Weed Status	WoNS
African boxthorn	<i>Lycium ferocissimum</i>	Protect site/ Manage sites / Manage weed	Yes
Athel pine	<i>Tamarix aphylla</i>	Protect Sites	Yes
Bathurst burr	<i>Xanthium spinosum</i>	Manage sites (no enforced control, landholders encouraged to manage)	No
Buffel Grass	<i>Cenchrus ciliaris</i>	Notifiable in part of the State only	Yes
Noogoora burr	<i>Xanthium occidentale</i>	Monitor	No
Parkinsonia	<i>Parkinsonia aculeata</i>	Protect sites by removal of infestations	Yes
Prickly acacia	<i>Acacia nilotica</i> subsp. <i>indica</i>	Monitor	Yes
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>	Monitor	Yes

#### 4.2.2.5 Significant Fauna

One nationally threatened fauna species has been identified as present in the region, the Dusky hopping mouse (*Notomys fuscus*). As indicated in Table 12, this species has been recorded as occurring on the pipeline corridor within the Simpson-Strzelecki Dunefields Bioregion (DEH 2009). Although not previously recorded in the vicinity of the pipeline, the Woma (*Aspidites ramsayi*) is also likely to occur in this land system (see Table 12). A full list of rare or threatened species recorded in the BDBSA within 20 kilometres of the pipeline corridor is provided in Appendix 4.

The common fauna species present in this land system are similar to those described for the Channel Country Bioregion above. Bird diversity is generally lower due to the absence of riparian woodland habitat, and sand dune specialist species (e.g. Sandy inland mouse) become more common.

Table 12: Listed Species Recorded Within Simpson-Strzelecki Dunefields Bioregion

Species	Conservation Status		Comment
	Commonwealth	SA	
Dusky hopping mouse, Wilkiniti ( <i>Notomys fuscus</i> )	Vulnerable	Vulnerable	Present within region. 2 database records on the pipeline easement at KP37 and KP64 near Strzelecki Creek and the border. Numerous other sightings have been recorded on dunes along the Strzelecki Track <sup>2</sup> . Believed to be widespread but sparsely distributed throughout the region.

## 4.3 Heritage

### 4.3.1 Aboriginal Heritage

An Aboriginal heritage survey was completed prior to the construction of the Pipelines. The location of Aboriginal heritage sites along the pipeline corridor that have been registered or reported under the *Aboriginal Heritage Act 1988*, are documented in the operations GIS.

A search of the central archive and Register of Aboriginal Sites and Objects, maintained by the Aboriginal Affairs and Reconciliation Division of the SA Department of the Premier and Cabinet, was requested in May 2013. The search identified one registered site and four reported sites within a 30m buffer of the pipelines (See Figure 5). Another search of the central archive and Register of Aboriginal Sites and Objects, was requested in March 2020. 61 records were identified within a 5km radius of the pipelines. Work must be assessed on a case by case basis and the Environment and Heritage Team contacted in the event that work is planned to be completed on the pipelines.

<sup>2</sup> Pers. comm. R. Brandle, Biological Survey and Research, Department for Environment and Heritage.

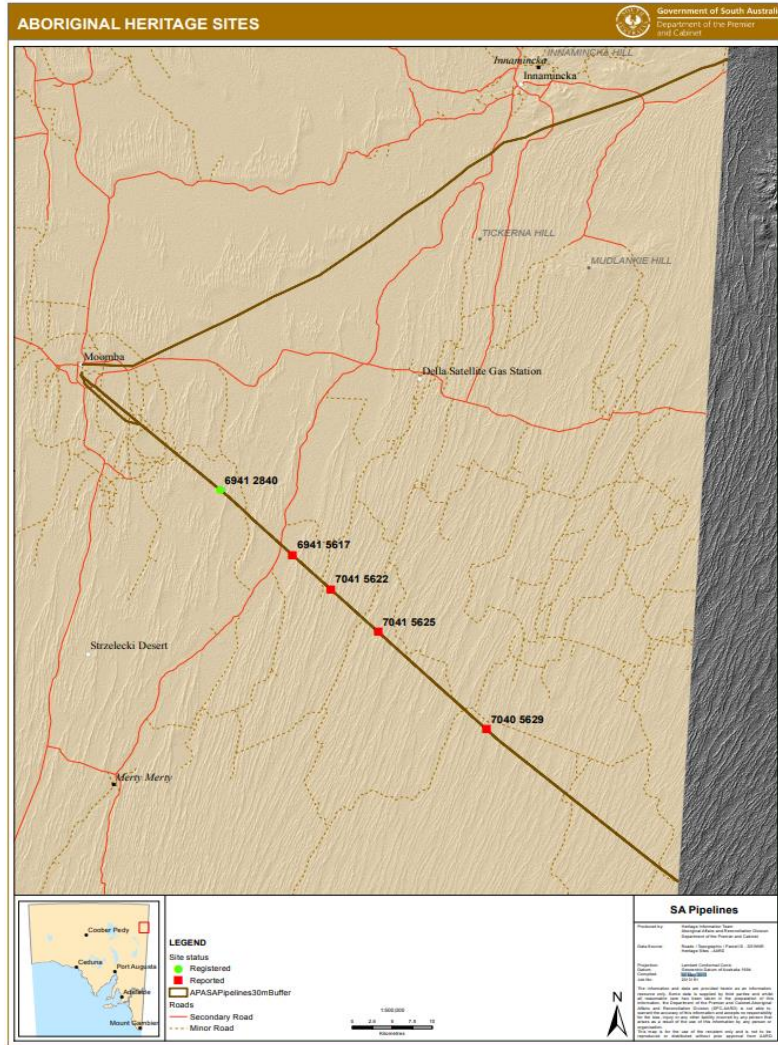


Figure 5 Aboriginal Heritage Sites intersecting the Pipelines 30m buffer (AAR, 2013)

### 4.3.2 European Heritage

The pipeline corridor traverses a short section of the Strzelecki Creek National Heritage Place between KP 32 and KP 36. The site is listed on the Register of the National Estate as an indicative historical heritage site (ID No. 105141). The Register of National Estate has now been replaced by with the National Heritage List under the EPBC Act. The Strzelecki Creek is no longer listed. The pipeline corridor does not traverse any sites listed in the National Heritage Listing.

## 4.4 Land Use

### 4.4.1 Pastoralism

The most extensive form of land used in the region is pastoralism, mainly in the form of cattle grazing, which began in the region in the late 1800s and has continued despite dramatic seasonal and economic fluctuations. The plains and dunefields are utilised for pasture but this

use is dependent on the use of bores to supply water and these areas can generally only support stock on an opportunistic basis after rain. Stocking rates in the region are relatively low.

Pastoral Stations intercepted by the pipeline corridor are:

- Gidgealpa Station (KP 2 – KP 59);
- Merty Merty Station (KP 59 – KP 77); and
- Bollards Lagoon Station (KP 77 – KP 101).

There are a number of properties in the region that have achieved certification by the National Association for Sustainable Agriculture Australia (NASAA) for organic beef production.

The pipelines cross Bollards Lagoon and Merty Merty Stations which have either obtained a level of certification or area in the process of conversion to NASSA Organic Beef Exporters (OBE). The OBE guidelines identify the maximum levels of chemicals allowable in soil, consistent with allowing organic certification for beef exports.

All landholders along the pipelines are certified under the Cattle Care Quality Assurance system. Cattle Care is an initiative of the Cattle Council of Australia and places emphasis on minimising the risk of chemical contamination, bruising and hide damage and ensuring that herds are effectively managed and improved. In particular, the contamination of property and livestock by organochlorines and other persistent chemicals must be minimised, and contaminated cattle identified. Prevention of bruising and hide damage puts the onus on landholders to manage the property carefully and reduce the risk of damage from foreign bodies.

#### 4.4.2 Oil and Gas Exploration and Production

Oil and gas exploration in the Cooper Basin commenced in 1954 and the Cooper Basin has become a major supplier of oil and gas in Australia since the discovery of gas reserved at Gidgealpa, near Moomba, in 1963.

Significant oil and gas infrastructure in the region includes:

- The Santos operated oil and gas production plants at Moomba (Moomba Plant);
- Several large transmission pipelines (Moomba Adelaide Pipeline, Ballera Moomba Pipelines (QSN/QNE));
- Big Lake oil and gas field; and
- Toolachee Gas, Strzelecki Oil/Gas and Limestone Creek Oil fields.

The pipeline corridor passes through a number of petroleum production and exploration licence areas. Numerous oil wells and gathering lines are located throughout the region, and drilling of new oil, gas and geothermal wells is ongoing.

#### 4.4.3 Conservation

The pipeline corridor passes 3 km south-east of Innamincka Regional Reserve. The Reserve, also referred to as Innamincka Station, is a multiple use reserve, with the regional reserve category

designed to enable areas to be managed under a conservation framework while permitting the sustainable use of resources (i.e. oil and gas production and grazing).

The pipeline corridor also traverses the Strzelecki Creek wetland system, which is listed in the Directory of Important Wetlands in Australia, and is considered to be of national importance for its ecological values (Environment Australia 2014). This system is predominately dry and flows very intermittently from Cooper Creek south to Lake Blanche during large flows (Strzelecki Creek flows are thought to occur with an average frequency of 1 in 10 years; Puckridge *et al.* 1999). When flooded, it provides significant habitat for large numbers of waterbirds.

#### 4.4.4 Infrastructure

The pipeline corridor crosses a number of unsealed public roads, stations tracks and Santos access roads. These roads and tracks are used for access to the pipeline corridor by vehicles associated with pipeline operations activities. The main public roads crossings on the pipeline corridor are listed in Table 13.

Table 13 Public Road Crossings on the Pipeline Corridor

Road Name	KP	Location
New Strzelecki Track	2.5	Section of track between Lyndhurst and the Moomba-Dullingari Road (Dillon's Highway) intersection
Old Strzelecki Track	34.0	Lyndhurst to Innamincka to via Merty Merty homestead and the Cooper Creek floodplain

The major road in the region is the Strzelecki Track. This is a multiple use road which carries a relatively high traffic volume, bring predominately a mix of heavy vehicles, light industrial/pastoral vehicles and tourist vehicles. The Strzelecki Track has been estimated to carry approximately 31,000 vehicles every year (DTEI 2007).

There is a significant optic fibre telecommunications cable which parallels the pipeline corridor.

A limited number of power lines are present in the vicinity of some petroleum wells and the vicinity of the Moomba Plant.

#### 4.5 Noise

The existing noise environment in the region is typical of sparsely populated pastoral areas, with generally low levels of background noise dominated by natural sources (e.g. wind, animals and insects) although those sections of the pipeline corridor in close proximity to oil and gas production facilities are an exception. Intermittent background noise from diesel power generators is present near inhabited station dwellings.

The region is extremely sparsely populated and there are no residences near the pipeline corridor.

## 4.6 Air Quality

The air quality in the vicinity of the pipeline route is expected to be typical of a remote rural environment and influenced by a range of activities such as:

- Dust from stock and vehicle movement or high winds; and
- Vehicle and equipment exhaust fumes.

Air quality near existing operations (e.g. Moomba Plant) is expected to be marginally influenced by emissions from these operations.

## 5 Environmental Risk Assessment

An Environmental Risk Assessment (ERA) was undertaken for the operations of The Pipeline, the following APA personnel attended the ERA workshop:

- Manager Operations and Maintenance NSW
- Regional Managers – Young, Albury, Cobar, Wilton
- Environment Advisors – South West, East
- Environment Lead – South West, East, North
- Safety Advisor

The pipeline context defined for the ERA workshop was:

- Operations, inspection and maintenance of the existing pipeline
- Normal and emergency scenarios
- Credible emergencies arising as part of maintenance works (e.g. vehicle collisions, major spill)
- All pipeline assets operated by APA
- No change to existing pipeline design, route, depth or surface features
- Excludes safety risks, pipeline decommissioning and assets managed by other parties (At the time of decommissioning or major construction works, additional Eras will be undertaken. Decommissioning considered separately and is specifically discussed in Section 3.4)
- Current status of the pipeline is either under nitrogen or contains market-compliant sales gas
- No excess pressure from gas plant upsets.

The ERA and Risk Matrix is provided in Appendix 4.

The ERA was carried out in accordance with ISO 31000:2018 Risk Management – Guidelines, and the APA SHE ENV – Guidelines 001 Environmental Risk Assessment Guideline.

## 6 Potential Impacts and Mitigation Measures

This section identifies the potential impacts to the environment as a result of the operation of the Gas Pipeline and Ethane Pipeline and outlines proposed impact mitigation strategies. The implementation of these mitigation strategies is detailed in the Operations Environmental Management Plan and is consistent with the APGA Code of Environmental Practice – Onshore Pipelines.

### 6.1 Soils and Terrain

#### 6.1.1 Potential Impacts

Pipeline operation and maintenance activities that have the potential to impact on soils include:

- Excavation activities ('dig-ups') undertaken to expose a section of pipe requiring repair or replacement. This occurs infrequently, however, it is likely to increase as the Pipelines age. Excavations are generally performed for corrosion or stress corrosion cracking (SCC) repair activities, coating refurbishment work, installation of new anode beds and projects requiring new tie in facilities. Excavations usually occur on the pipeline easement or in designated compounds and are a short term, temporary event.
- Movement of vehicles along the pipeline corridor and associated access tracks. Vehicles travel along access tracks and the pipeline easement while undertaking inspection and maintenance activities. These unsealed tracks are predominantly located on Station properties where public access is restricted. The entire length of the Pipelines is patrolled by a vehicle at least once a year.
- Storage, use, collection and transport of hydrocarbons and chemicals. 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 SA portion of the Pipelines. 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.

Operations and maintenance of the pipeline may result in the following potential adverse effects to soil and terrain:

- Soil inversion during excavation resulting loss in soil fertility or structure;
- Erosion of disturbed sandy soils and the fine powdery sub-soils, particularly by wind;
- Erosion of banks and channels of watercourses;
- Compaction of soils; and
- Contamination of soils by oil or chemicals.

It is considered that these impacts can be appropriately managed through the implementation of the mitigation measures outlined below.

## 6.1.2 Impact Mitigation

Measures to reduce the risk and impact to soil and terrain include:

- Minimising the area cleared during excavations, in particular minimising the disturbance of erodible soils;
- Minimising the time period between clearing and restoration;
- Keeping topsoil stockpiled separate from subsoils when excavating and resspreading after backfilling;
- Promoting rapid restoration by conserving and re-spreading topsoil;
- Reinstating surface contours and natural drainage patterns;
- Reinstating watercourse banks as soon as practicable and applying bank stabilisation techniques, as necessary;
- Restricting the use of heavy machinery to the minimum necessary to complete the task;
- Restricting vehicle use of the easement in wet or boggy conditions;
- Monitoring for erosion, evidence of inversion and compaction via patrolling; and
- Managing all oils, chemicals and wastes in a manner that minimises the risk of spills to the environment and having in place appropriate contingency plans in the event of a spill (see Section 6.11).

## 6.2 Water Resources

### 6.2.1 Potential Impacts

Pipeline watercourse crossings generally have minimal impact on the dynamics of a watercourse as the pipeline is buried at depth. Vehicle access at watercourse crossings is generally restricted to 4WD tracks and dry conditions.

Pipeline operation activities that may have the potential to impact upon surface water resources include the movement of vehicles, the transport of materials along access tracks and the pipeline easement and temporary excavation activities.

Pipeline operation may result in potential impacts to surface water including:

- Disturbance of surface water drainage patterns along watercourses and floodplains due to excavations or vehicle movement; and
- Reduced water quality associated with low-level contamination associated with soil movement or chemical spill.

Pipeline operation may result in potential impacts to ground water including:

- Low-level contamination associated with a chemical spill.

It is considered that these impacts are unlikely to occur but should they occur on a large scale could result in medium term damage to the environment. However, these impacts can be appropriately managed through the implementation of the mitigation measures outlined below.

### 6.2.2 Impact Mitigation

Mitigation of impacts on surface water largely relates to the protection of drainage patterns and preventing contamination. Mitigation methods include:

- Ensuring excavation activities (including stockpiles) do not unduly impede surface water flows;
- Conducting maintenance activities across drainage lines when dry, where practicable;
- Utilising sediment control measures such as sediment fences, where required;
- Reinstating surface contours as part of the rehabilitation process;
- Disposing of hydro-test waters appropriately ( i.e. water disposed of in a manner that prevented discharge or runoff to watercourses or environmentally sensitive areas, no evidence of erosion as a result of discharge, water affecting activity permit from the Landscape Board);
- Reducing the level of activity during wet weather;
- Ensuring all vehicles are well maintained and that all servicing occurs at designated facilities; and
- Adopting appropriate chemical and oil storage, handling and disposal (see Section 6.11).

Mitigation of impacts on ground water include:

- Adopting appropriate chemical and oil storage, handling and disposal (see Section 6.11).

## 6.3 Flora and Fauna

### 6.3.1 Potential Impacts

#### *Flora*

Daily pipeline operation activities have little impact on native vegetation, however, some of the infrequent longer term maintenance activities such as integrity digs and cathodic protection have the potential to result in the clearance of trees, shrubs and groundcover, and may impact on tangible or intangible Aboriginal heritage values. Tangible or intangible Aboriginal heritage values may be intrinsically linked to natural features such as waterholes, culturally significant trees or other sensitive landforms.

Activities which may adversely impact on flora include:

- Vegetation management will be undertaken as trees are not permitted to grow on the easement due to the risk of causing damage to the pipeline coating and to ensure that the line of sight for pipeline markers is maintained. Vegetation is generally removed via slashing, with vegetation left just above ground level (150mm-300mm) to ensure roots and ground covers are left in place and that bare earth is not exposed;
- Excavation activities ('dig-ups') undertaken to expose a section of pipe requiring repair or replacement. Excavations usually occur on the pipeline easement in designated compounds and are a short term, temporary event which only occurs intermittently. Vegetation is removed from the immediate area of excavation, which may extend for 5-10m along the easement; and

- The movement of vehicles along the easement and welding operations also have a very minor potential to result in fire triggering a bushfire.

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.

Targeted weed control may also be undertaken in compounds or on the easement if weed growth is observed during routine surveillance activities. The potential for pipeline operations to spread weed species is discussed in Section 6.4.

### **Fauna**

Daily pipeline operation and maintenance activities have little impact on fauna, however, vegetation management activities have the potential to result in the loss of foraging and breeding habitat. The impact of such disturbances is likely to be short-term and restricted to existing easements that have previously been used for pipeline construction activities. There is also the potential for entrapment of fauna at excavation sites, although the duration of excavation work is generally limited to three days (may be longer for major repair work).

Other potential impacts to fauna as a result of the operation of the pipeline and associated facilities include:

- Fauna mortality, through incidental road kills or occasional contact with facilities; and
- Short-term disturbance associated with noise, vehicle traffic and human activity on the easement and at facilities (especially relevant times, such as breeding, when fauna are sensitive to disturbance).

The Pipelines also traverses pastoral land used for the grazing of livestock. The operation of the Pipelines has little impact upon livestock due to their transient nature.

### **6.3.2 Impact Mitigation**

General management strategies that are implemented to minimise the impacts on flora and fauna are provided below.

Impact mitigation measures include:

- Restricting operational activities to access tracks and the easement;
- Minimising the time between clearing and rehabilitating the easement when excavations are required;
- Trimming vegetation rather than clearing in sensitive areas, particularly at watercourses;
- Where practical, removing vegetation without disturbing the soil to preserve root and seed-stock along the easement;
- Planning excavations to ensure that the period of time that the trench is open is minimised;
- Provide fauna escape means in open trenches and regular inspection of open trenches for trapped fauna. Additional fauna protection measures (e.g. sawdust-

- filled hessian sacks soaked in water) may be installed where appropriate (e.g. where there are long sections of trench open in hot weather);
- 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;
  - Restrict potential ignition sources and welding activities during periods of high fire risk; and
  - Use of a fire-spotter and having fire-fighting equipment of site during welding activities.
  - Include a cultural heritage review for proposed works that may impact established trees or watercourses

## 6.4 Weeds and Diseases

### 6.4.1 Potential Impacts

The movement of maintenance vehicles and equipment along the pipeline easement has the potential to result in the spread of weed species through the transport of plant material or soil on vehicles.

Few declared or non-declared environmental weed species are present in the region. One weed of particular note is Buffel Grass (*Cenchrus ciliaris*) which in 2015 was declared under the Landscape South Australia Act 2019. This weed has been identified as a concern in regard to long term impacts to biodiversity (Greenfield 2007). There are no Atlas of Living Australia records of this species on the pipeline corridor, but it has been recorded within and near the fenced compound area of the Moomba gas plant. The region that the pipeline corridor traverses has been identified as a 'contain the spread zone' for Buffel Grass in the South Australia Buffel Grass Strategic Plan 2012- 2017.

### 6.4.2 Mitigation Measures

Measures to reduce the risk of pest and disease introduction and spread include:

- Identifying and clearly marking known infestations of weeds along the easement;
- Developing and implementing procedures to define access routes to the easement, and where necessary avoiding areas of known infestation;
- Minimising 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, washing vehicles and equipment down thoroughly (i.e. prior to accessing to weed-free areas);
- Ensuring that excavating machinery and other equipment is received on-site free of a build-up of soil and organic matter. Equipment is to be inspected prior to unloading at site; and

Where required, implementation of targeted weed eradication programs in conjunction with surrounding landholders and the SA Arid Land Landscape Board

## 6.5 Land Use

### 6.5.1 Potential Impacts

The operation of the Pipelines has only a minor localised impact on land use. Localised impacts can be summarised as follows:

- Occasional short-term reduction in available pastoral grazing land during excavations; and
- Use of access tracks on pastoral properties to access the easement.

The impact of minor spills on 'chemical free' or 'organic' properties has also been considered. While the potential for such incidents is considered low, mitigation measures will be undertaken to avoid a breach of conditions associated with the property status. This would include isolation of the spill area and restoration of the area in close liaison with the relevant landholder.

The impact of soil inversion has also been considered however procedures are in place concerning the stockpiling of soil and fill during excavations and the return of the original soil profile during re-instatement activities.

Impacts to conservation values are associated with the potential disturbance to flora, fauna or items of cultural heritage. Generally, as the impact will be contained to the existing, previously disturbed easement, it is expected that there will be minimal disturbance to existing land uses as a result of pipeline operations.

No impacts are expected to the petroleum industry outside the assets and operations of APA Group.

### 6.5.2 Impact Mitigation

Measures implemented to mitigate impacts on land use include:

- Minimising the extent of disturbance to vegetation and restricting activities to the immediate easement as far as possible;
- Notification of landholders on 'chemical-free' or 'organic' properties of any spills and obtaining permission prior to the use of chemicals on site;
- Planning activities to minimise the time between clearing of vegetation and rehabilitation;
- Reinstating all fences cut during maintenance activities, following rehabilitation of the easement and ensuring temporary arrangements are determined in consultation with the relevant property manager. Any damage to pastoral property infrastructure is to be rectified; and
- Ensuring property gates are left as found.

## 6.6 Heritage

### 6.6.1 Potential Impacts

Potential impacts to cultural sites are likely to be minimal as all routine operational activities are located within existing easements. However, potential impacts may occur as a result of excavation activities where they result in the accidental discovery of new materials. Such work is required infrequently and occurs within the easement.

The discovery of new sites or identification of cultural material is most likely to occur during excavation activities and may, in the northern regions of the state, yield sub-surface remains, including human remains; buried heritage values could also be exposed through erosion events.

It is also noted that vegetation and fauna are potential Aboriginal cultural heritage values.

### 6.6.2 Mitigation Measures

Measures implemented to mitigate impacts on heritage sites include:

- Completion of an archaeological survey to identify all heritage values prior to the commencement of significant excavation activities in previously un-surveyed areas;
- Entry of all known Aboriginal cultural heritage sites into pipeline GIS system and inclusion in all planning documents and maps; and
- Fencing, flagging and recording of new sites with a GPS and inclusion of sites on the GIS system.
- Vehicles are only to use existing official tracks and roads. No new tracks or deviations are to be formed without proper assessment.
- Works are not to disturb any established trees or vegetation without prior advice from the HSEH team.
- Works in areas installed via directional drilling must be regarded as undisturbed unless subsequent disturbance (e.g. maintenance dig ups) have occurred in the exact same area.
- Yandruwandha Yawarrawarka Traditional Owners to be contacted for works that are outside the approved boundaries and outside previously disturbed areas
- If suspected cultural heritage material is discovered during operations, immediately stop any further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area. Contact the Department of the Premier and Cabinet - Aboriginal Affairs and Reconciliation Division, and the relevant Traditional Owner community (Yandruwandha Yawarrawarka Traditional Land Owners Aboriginal Corporation (YY)), to identify an appropriate course of action.
- Any Aboriginal heritage sites, objects and remains discovered during operations will be appropriately reported and responded to, consistent with the *Aboriginal Heritage Act 1988 (SA)*
- Any historic heritage discoveries will be reported and managed in accordance with the *Heritage Places Act 1993*.

- Awareness training to cover cultural heritage management requirements and obligations.
- Impacts to places listed under the EPBC will be managed in accordance with the requirements of the Act and any applicable guidelines.

## 6.7 Noise

### 6.7.1 Potential Impacts

The normal operation of the pipeline is silent along the pipeline corridor and will not generally involve significant noise impact. Any noise emissions associated with the operation of the pipeline include vehicle movement along the easement, the occasional operation of heavy equipment or machinery such as excavators, graders and bulldozers, and the operation of mainline valves. Some low-level noise is generated at the metering station at Moomba, however given the industrial location of this site the noise is insignificant compared to background noise.

Noise associated with mainline valves is generated during remote valve operation but these operations only occur on an occasional basis. In an emergency, high-pressure gas venting may occur at valve sites or at the site of a pipeline rupture. The duration of the venting and the volume of gas vented would be dependent upon the nature of the emergency.

There is no noise associated with normal operation of the Pipelines.

### 6.7.2 Impact Mitigation

Equipment is maintained in good condition with standard noise suppression devices fitted. It is considered that specific noise mitigation measures are not required.

## 6.8 Air Quality

### 6.8.1 Potential Impacts

Dust is likely to pose the main threat to existing air quality. However, the impact of dust on air quality, vegetation (dusting), land use (air quality) and public safety (visual impairment, air quality) is likely to be localised, short term and restricted to vehicle movement on unsealed roads, occasional excavation, and road maintenance activities. Dry conditions are likely to increase dust generation.

The impact on air quality during pipeline operations is negligible. Dust generation from light vehicles and activities associated with the maintenance and monitoring of the Pipelines does occur. Minor emissions from the Pipelines are likely at above-ground facilities during maintenance operations. Remote operation of valves (in the event of damage or programmed maintenance) uses gas pressure to drive valve actuators and will result in the

release of small amounts of gas. Minor emissions from scraper stations will occur during loading and removal of the pipeline pigs, which would normally occur once every five to ten years.

Fugitive emissions are extremely low from pipeline operations. The risk of pipeline ruptures or leaks is also extremely low due to the implementation of protection measures and the routine monitoring, inspection and maintenance that will be carried out.

Given the isolated nature of potential emission generation, impacts on air quality associated with the pipeline are expected to be low.

## 6.8.2 Impact Mitigation

Dust emissions will be mitigated by minimising the period between clearing and restoration, and limiting vehicle speeds on access tracks and the easement.

Planned releases of gas (e.g. for testing of valves or equipment) are planned for when meteorological conditions are favourable. Other air emissions will be mitigated by employing adequate pollution control measures on plant and equipment.

## 6.9 Third-party Infrastructure

### 6.9.1 Potential Impacts

Impacts to third party infrastructure can be mitigated through planning and appropriate consultation with relevant stakeholders and landholders. With adequate management the following impacts can be prevented:

- Disruption or damage to road infrastructure;
- Disruption or damage to petroleum infrastructure; and
- Disruption or damage to private third party property.

Inspections of the easement are periodically required during pipeline operations. The majority of the inspections are undertaken by air, however, some inspections are undertaken by four wheel drive vehicles. Impacts to roads or traffic conditions are considered negligible.

Impacts to private property infrastructure may include cutting fences and installing temporary gates, and modifications to existing gates or tracks. Damage will be avoided where practicable and made good upon activity completion if unavoidable.

### 6.9.2 Impact Mitigation

Measures implemented to mitigate impacts on transport networks, utilities and private infrastructure include:

- Locating works away from existing infrastructure whenever practicable;

- Addressing any damage caused to roads and tracks;
- Maintaining close liaison with Santos and other utility managers to identify existing overhead and buried cables, lines and pipes;
- Utilising the Dial Before You Dig 'one call' service before undertaking works;
- Obtain standard clearance (as per AS2885) for service crossings from utility managers;
- Road works portal applications to be submitted to the Department of Infrastructure and Transport (DIT) for maintenance/ground disturbance works carried out within Strzelecki Track or other DIT maintained road; and
- Maintaining close liaison with landholders and third parties.

## 6.10 Waste Management

Relatively small amounts of domestic and industrial wastes are generated during the operation of the Pipelines.

Measures adopted for waste management include:

- Development of specific waste management strategies for each waste stream prior to the commencement of any waste producing activities, based on the principles of "Reduce, Reuse, Recycle" and appropriate disposal;
- Education of personnel on the required waste management practices;
- Covering of bins to prevent access by fauna and the spread of rubbish by wind;
- Management of hazardous wastes, such as solvents, rust proofing agents and primer, in accordance with the requirements of relevant legislation and industry standards;
- Appropriate implementation of sewage waste treatment and disposal practices in accordance with the South Australian Public Health (Wastewater) Regulations 2013. The method of disposal for wastewater must comply with the Standard for the Construction, Installation and Operation of Septic Tank Systems in SA, or be to the satisfaction of the Department of Health;
- Obtaining relevant approvals for the disposal of hydro-test water (including a water affecting activity permit from the Landscape Board if applicable);
- Placing a high emphasis on housekeeping and ensuring that all work areas are maintained in a neat and orderly manner;
- Collecting hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations;
- Storage and handling chemicals in accordance with relevant legislation and standards; and
- Remove all waste material from worksites on completion of maintenance activities.

## 6.11 Hazardous Storage and Spill Response

A variety of chemicals may be stored and used in the operation and maintenance of the pipelines. These include fuel, lube oils, solvents, rust proofing agents and primer. No permanent storage of fuel or other chemicals occur along the pipeline corridor. Fuel and chemicals are used for plant and equipment during maintenance, ground inspection works or stress corrosion cracking (SCC) repair works, however these are stored off-site. Bunded fuel pods with spill kits and fire protection may transport fuel for in-situ refuelling.

Potential impacts include contamination to soils and water resources and other environmentally sensitive values.

Measures implemented to reduce the effects of hazardous substances and spill events to the environment and third parties include:

- Secure storage and handling of hazardous material to ensure they cannot drain onto the ground or to watercourses or floodplains;
- Stored chemicals are segregated in accordance with the Australian Dangerous Goods (ADG) Code, and the requirements of their SDSs;
- Flammable and combustible liquids are stored in accordance with AS1940 (Storage and handling of flammable and combustible liquids);
- Secondary containment bunding and the control and management of chemicals (including flammable and combustible liquid) spills is in accordance with the EPA guideline 080/16 Bunding and Spill Management (2016)
- Ensuring materials and equipment required to respond to a hazardous spill (spill kits) are readily available;
- Enforcement of procedures for emergency response;
- Appropriate implementation of clean-up/spill response procedures in the event of a spill;
- Maintenance of Safety Data Sheets and chemical register in Chemwatch; and
- Appropriate training of operations personnel regarding chemical management and spill response.
- If soil is contaminated it is cleaned up and stored in a regulated waste bin until contractor collection
- Contaminated soil and regulated waste is disposed of by a licensed contractor
- Waste Tracking Certificates are obtained and retained.

## 6.12 Public Safety and Risk

Pipelines are recognised as a safe and efficient means of transporting natural gas. However, all pipelines present some level of risk.

### 6.12.1 Potential Impacts

The main threats to public safety resulting from the operation and maintenance of the Pipelines are fire, explosion or radiation exposure as a result of pipeline rupture. The main causes of such ruptures are considered to be:

- External corrosion;

- Overpressure;
- Material defects;
- Design defects;
- Construction defects;
- Direct impact from a vehicle or heavy machinery;
- Installation of electricity poles or other services; and
- Maintenance of roads and drainage ditches.

The greatest threats to the integrity of the Pipelines are associated with:

- Third party or external interference to the pipeline – e.g. excavation, trenching operations, hole boring, core sampling and bore drilling and failure of other pipelines (rupture); and
- Pipeline corrosion especially SCC on the Gas Pipeline.

### 6.12.2 Mitigation Measures

There are a number of features of the design and operation philosophy that mitigate the risk posed by the Pipelines to people who may be living, working or travelling in the immediate area.

The Pipelines are operated in accordance with Australian Standard AS 2885 and Standard requires pipeline operators to:

- Develop operating procedures based on the requirements of the Standard;
- Ensure that operating personnel are suitably qualified, trained and experienced;
- Ensure that changes to the original design of the pipeline are fully assessed to ensure that the integrity of the pipeline is not impaired and that the safety of the public, operating personnel and/or protection of the environment is not diminished;
- Ensure the appropriate inspections, assessments and maintenance activities are completed; and
- Establish safe systems of work for pipeline repairs.

APA Group has implemented a range of measures to ensure that the risks associated with the operation of the pipeline are reduced to As Low As Reasonably Practicable (ALARP). Measures to minimise the risk of third party interference include:

- Implementation of a regular patrolling to identify any activity near the pipeline which may cause a danger to the buried facilities or pose a threat to third parties;
- Implementation of the contact program with all land owners and occupiers and provision of pipeline safety information;
- Provision of 24 hour 'Dial Before You Dig' contact number and pipeline location service;
- Implementation of the community awareness program involving presentations to local contractors, emergency providers and utilities in areas along the pipeline route to educate personnel on the nature of the Pipelines, contents, correct work procedures for the easement and emergency procedures;
- Maintenance of pipeline warning signs along the Pipelines' route; and

- Provision of buried markers above the Pipelines in areas of increased risk from excavation e.g. road crossings.

In addition, APA Group 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 pipeline control centre incorporating monitoring and control systems that continuously receive and analyse pipeline operating reports;
- Gas leak detectors;
- Pigging operations, in which detection equipment travels inside the pipeline checking for abnormalities and corrosion;
- A system of remote controlled valves which allow a pipeline controller to shut off gas flow and isolate any portion of the pipeline; and
- Routine physical surveillance of the pipeline easement via aerial monitoring and vehicle patrols as necessary.

## 6.13 Security of Gas Supply

### 6.13.1 Potential Impacts

The Pipelines supply natural gas and ethane to customers in New South Wales and the Australia Capital Territory. Unplanned malfunction of the Pipelines could occur in certain circumstances due to an equipment failure or pipeline rupture (see Section 6.12) and could result in failure to supply customers.

### 6.13.2 Mitigation Measures

Emergency preparedness and response is taken very seriously through the implementation of the Transmission National Emergency Response and Security Plan. The 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. The plan is maintained to provide an efficient, coordinated response to deal with any emergency, including environmental emergencies. Relevant employees are required to undertake emergency response training as part of their individual training program, and participate in simulated exercises as directed.

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; and

- 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.

## 7 Environmental Management Framework

### 7.1 Environmental Management System

APA Group has developed and implemented a Health, Safety and Environment (HSE) Management System which applied to all APA Group activities. The HSE Management System includes the Environmental Management System which 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:

- **Establishment of a 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.
- **Establishment of a Cultural Heritage Policy:** This Policy provides an overall framework for the management of native title 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:** 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 6 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. Completing a Safe Work Method Statement is a key requirement. Environmental risks and impacts are considered in this analysis and control measures must be outlined and the risk ranking reduced before work can proceed.

## 7.2 Statement of Environmental Objectives

Environmental objectives have been developed for the Gas Pipeline and Ethane Pipeline based on the information and issues identified in this document. These objectives have been designed to provide a clear guide for the management of environmental issues during the operation of the pipeline. The objectives are provided in the corresponding Statement of Environmental Objectives. APA Group is committed to achieving the environmental objectives outlined in the SEO (MSE.2573-PL-HSE-0001).

## 8 Stakeholder Consultation

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

Consultation with relevant stakeholders regarding environmental objectives for operations was carried out by DEM during the initial SEO approvals process for the operation of the Gas Pipeline and Ethane Pipeline. APA Group consider the DEM consultation process to be adequate for the on-going operation of the Pipelines as operational activity is considered to be low impact and very few stakeholders are directly affected by operational activities. As a consequence, APA Group has not undertaken any specific consultation with stakeholders for the operation of the Gas Pipeline and Ethane Pipeline.

Refer to Appendix 6 for key stakeholders consulted during the SEO/EIR 5 yearly review.

Key stakeholders for the pipelines include:

- Department of Energy and Mining (DEM)
- Department of Environment and Water (DEW)
- Environment Protection Authority (EPA);
- Department of Planning, Transport and Infrastructure (DPTI);
- Pastoral lease holders;
- Santos and other petroleum operators;
- Native Title groups and Traditional Owners; and
- Cooper Creek Catchment Committee
- SA Arid Lands Landscape Board

APA Group aims to continue to engage stakeholders for the duration of its pipeline operation activities to ensure that all potential concerns are identified and appropriately addressed.

## 9 References

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## 10 Abbreviations and Definitions

Term	Description
°C	Degrees Centigrade
APGA	Australian Pipeline and Gas Association
AS 2885	Australian Standard AS 2885 <i>Pipelines – Gas and Liquid Petroleum</i>
BDBSA	Biological Databases of South Australia
Bellhole	An enlarged area of trench.
BoM	Bureau of Meteorology
Bund	An earth, rock or concrete wall constructed to prevent the inflow or outflow of liquids.
Cathodic protection system	Application of an electrical current to the pipeline exterior to prevent the electrochemical process of corrosion occurring.
DEWHA	Department of the Environment, Water, Heritage and the Arts (Commonwealth) now DOE
DOE	Department of Environment (Commonwealth)
Easement	A right held by the proponent to make use of the land for the installation and operation of a pipeline. Also referred to as a right-of-way.
EIR	Environmental Impact Report prepared in accordance with Section 97 of the South Australian <i>Petroleum and Geothermal Energy Act 2000</i> and Regulation 10
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
Ephemeral	Existing for only a short time, often dependent upon climatic influences.
Ethane Pipeline	Moomba to Sydney Ethane Pipeline (PL 8)
Gas Pipeline	Moomba to Sydney Gas Pipeline (PL 7)
GIS	Graphic Information System
GPS	Geographic Positioning System
Fugitive emissions	Substances that escape to air from a source not associated with a particular process, such as leaks from equipment.
Hydrostatic testing (or hydro-testing)	A means to check the pipeline for strength and leaks prior to operation in which the pipeline is filled with water and the pressure increased and monitored under controlled conditions.
Mainline valves	Valves located in a pipeline at intervals along its length.
Meter stations	Facility where the flow of gas is measured, particularly where gas is to be reticulated or transferred to local gas users.

MIP	Moomba Interconnect Pipeline
ML	Megalitre (10 <sup>6</sup> litres)
MPa	mega pascal
NASAA	National Association for Sustainable Agriculture Australia
OBE	Organic Beef Exporters
Pig	A tool which is inserted into the pipeline and carried by the gas flow to clean the pipe wall, separate the gas, or inspect the pipeline. A process termed pigging.
Pig receiver	An above ground facility used to launch and receive pigs which have been inserted into the pipeline system.
PL	Pipeline Licence
PIRSA	Department of Primary Industries and Regions, South Australia
Purging	Removing all air from the pipeline, using gas.
Radiography	Non-destructive examination of pipeline welds using X-ray to detect any defects.
Ramsar	A Wetland of International Importance listed under the Ramsar Convention (held in Ramsar, Iran 1971).
RNE	Register of the National Estate
RTU	Remote Telemetry Unit
ROW	Right-of-way
SCADA	Supervisory Control and Data Acquisition
Scarifying	The creation of shallow incisions or furrows in soil, usually by using machinery with tynes, in order to loosen compaction and allow the infiltration of water and seeds
SCB	Soil Conservation Board
SCC	Stress corrosion cracking
SEO	Statement of Environmental Objectives
SMYS	Specified minimum yield stress
Stress corrosion cracking	A form of environmentally assisted cracking in pipelines where the surrounding environment, pipe material, and stress act together to reduce the pipe's strength or load-carrying capacity.
Trench spoil	Soil from the pipeline trench.
Trench water	Water (usually shallow groundwater) in the pipeline trench.
Venting	The deliberate release of gas from a pipeline into the atmosphere (e.g. during maintenance, testing or emergencies).

# Appendix 1 – Health, Safety and Environmental (HS&E) Policy



## Health, Safety and Environment (HSE) Policy

**At APA Health, Safety and Environment are essential to our core business values. We are committed to providing a zero harm work environment for our employees, contractors and visitors, managing our operating risk and protecting the environment from harm. We are also committed to the effective implementation of this HSE Policy and continual improvement in our HSE performance.**

To achieve this APA Group will:

- Provide leadership and direction to drive accountability for our HSE performance.
- Document, implement and maintain an appropriate HSE Management System. Our system is called "Safeguard".
- Comply with applicable HSE legislation and, where applicable, adopt best practice requirements.
- Establish and regularly monitor measurable objectives and targets to ensure continued improvement against established standards.
- Communicate HSE commitments and information to employees, contractors and applicable stakeholders.
- Recognise and reward excellence in HSE performance.
- Proactively seek to identify hazards and reduce the risk of injury, uncontrolled harmful substance release and environmental harm by investigating all reported accidents, incidents and near misses promptly and taking appropriate actions to prevent a reoccurrence.
- Provide appropriate training, supervision, specialist support and other resources to HSE matters.
- Consult and engage with our employees and other stakeholders to build relationships based on our values to assist in meeting the goals of our HSE Policy.
- Partner with companies having similar HSE standards and values as APA Group.
- Ensure processes are in place to protect the environment from harm.
- Manage the operating risks and the critical controls that prevent or mitigate major incident events.

### General Responsibilities for Health, Safety & Environment

**All employees** including contractors have an obligation to look after their own health and safety, the safety of those who may be affected by their acts or omissions, and to prevent incidents arising from APA's operations and activities. We must all comply with APA Group's HSE policies and procedures, including safe work procedures, directions about safety, and environmental requirements and local site rules. All incidents, near misses and hazards must be reported.

**All managers and supervisors** are responsible for managing HSE in accordance with the Group Policy and our HSE Management System as an integral and mandatory duty of their position.

APA's HSE Policy is issued and approved by the HSE Committee of APA's Board and signed by APA's Managing Director / CEO.

  
\_\_\_\_\_  
Rob Wheals Managing Director / CEO

## Appendix 2 – APA Group’s Cultural Heritage Policy



### Cultural Heritage Policy

This Policy provides an overall framework for the management of Aboriginal and historic/shared cultural heritage across APA Group. The Policy provides a controlled and consistent platform to manage cultural heritage and applies to all aspects of the process; from initial planning and community consultation, through to site assessments and the execution of management plans.

#### Policy:

- APA Group will take all reasonable and practicable measures to ensure activities do not harm Aboriginal and historic/shared cultural heritage. If harm cannot be avoided then measures will be taken to ensure management controls are applied in line with legal and licence requirements to minimise and/or mitigate harm.
- All asset management, operational or project areas controlled by APA will manage cultural heritage obligations in accordance with policy requirements; these requirements may include a stand-alone management plan, or be incorporated as a component of an overarching Environmental Management Plan.
- The key objectives of APA’s cultural heritage management requirements are:
  - To undertake due diligence assessments to determine the cultural heritage risks and requirements as part of planning processes;
  - To construct, operate and maintain its land corridors, facilities, and operations in a manner that minimises potential harm to cultural heritage and is compliant with Australia Pipeline and Gas Association (APGA) Codes of Environmental Practice and other relevant legislation, standards and codes;
  - To address the cultural heritage impacts across the life of its assets; including construction, operations, repair, maintenance and decommissioning.
  - To incorporate cultural heritage in environmental risk assessment processes and other relevant risk processes;
  - To ensure that employees and contractors are aware of their roles and responsibilities in regard to the protection and ongoing management of cultural heritage values.
  - To continuously improve our knowledge of cultural heritage associated with our assets; including periodic reviews of policies, procedures and site specific management strategies.
  - To appropriately consult and work with Aboriginal Peoples, communities and other relevant stakeholders who have a recognised interest in cultural heritage within a specific area. Broader consultation may be sought, where appropriate, to support the regulatory approvals process for cultural heritage.

  
Rob Wheels- Managing Director/CEO

Document: APA HSE POL 006 Version: 4.00 Date: 16/12/2019 Page 1 of 1 pages

The policy is subject to review every three years. Next review is due by 16/12/2022



## Appendix 3 – Rare or Threatened Flora and Fauna Recorded within 20km of the Pipelines

Species	Conservation Status	
	Commonwealth	SA
<b>FLORA</b>		
<i>Frankenia plicata</i>	E	V
<i>Gratwickia monochaeta</i>	-	R
<i>Ophioglossum polyphyllum</i>	-	R
<i>Swainsona oligophylla</i>	-	R
<b>FAUNA</b>		
<b>Birds</b>		
<i>Botaurus poicilptilus</i>	E	V
<i>Rostratula australis</i>	E	E
<i>Anhinga novaehollandiae</i>	-	R
<i>Falco hypoleucos</i>	-	R
<i>Hamirostra melanosternon</i>	-	R
<i>Oxyura australis</i>		R
<i>Phaps histrionica</i>	-	R
<b>Mammals</b>		
<i>Macrotis lagotis</i>	V	V
<i>Notomys fuscus</i>	V	V
<b>Reptiles</b>		
<i>Aspidites ramsayi</i>	-	R

Conservation status under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and SA National Parks and Wildlife Act 1972: E – Endangered, R – Rare, V – Vulnerable Source: Biological Databases of South Australia (DEH 2009) and EPBC Protected Matters Search (accessed DOE 2014).

## Appendix 4 – Risk Matrix and ERA

APA Enterprise Risk Matrix - May 18

Likelihood	5. Frequent [many times in 1yr]	Low	Moderate	High	Extreme	Extreme
	4. Occasional [every 2yrs]	Low	Low	Moderate	High	Extreme
	3. Unlikely [every 5yrs]	Negligible	Low	Moderate	High	High
	2. Remote [every 20yrs]	Negligible	Negligible	Low	Moderate	High
	1. Rare [every 50yrs]	Negligible	Negligible	Negligible	Low	Moderate
		1. Minimal	2. Minor	3. Significant	4. Major	5. Catastrophic
Impact (consequences)						
<b>1. Health &amp; Safety</b> Injuries, illness or death of employees, contractors or members of the public	Injuries or illness requiring first aid treatment only i.e. able to return to work immediately or the next day	- Injury / illness resulting in time lost from work of one day / one shift or more (LT1) - Member of the public requiring medical treatment	- Injury / illness resulting in permanent or partial disability to employees - Member of the Public requiring hospitalisation	Fatality or life threatening injuries or illness or permanent total disability of employees and contractors or members of the public	Fatality arising from systemic failure of APA safety or multiple fatalities of employees and contractors or members of the public	
	Psychological illness resulting in inability to return to work for 1-2 months or 1 accepted claim in a month	Psychological illness resulting in inability to return to work for 3-6 months or 2-3 accepted claims in a month	Psychological illness resulting in total inability to return to work or >3 accepted claims in a month	Psychological illness resulting in Fatality		
<b>2. Environment (including heritage)</b> Environmental harm or adverse effect on ecosystem i.e. the surroundings in which APA operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships	One or a combination of the following consequences: - onsite and impacting < 1 ha - no remediation needed - impact continues for < 1 wk	One or a combination of the following consequences: - onsite and impacting > 1 ha - able to be remediated easily - impact continues for <1 yr	One or a combination of the following consequences: - offsite and impacting < 1 ha - able to be remediated with some difficulty - impact continues for <5 yrs	One or a combination of the following consequences: - offsite and impacting > 1 ha - able to be remediated with difficulty - impact continues for <10 yrs	One or a combination of the following consequences: - offsite and impact is widespread (>1ha) - unable to be remediated - impact is irreversible or lasts >10 yrs	
	Impact that causes negligible or no damage to heritage	Temporary and repairable impact or infringement to heritage	Permanent but repairable impact or infringement to heritage	Temporary but irreparable impact or infringement to heritage	Permanent and irreparable impact or infringement to heritage	
<b>3. Operational Capability</b> Disruption in our operations (supply or services)	<b>Transmission</b> Unplanned interruption of < 5 days to the delivery of non-firm services	<b>Transmission</b> Unplanned interruption of: - ≥ 5 days to the delivery of non-firm services (including bi-directional, reverse flow or backhaul services) - < 1 day to the delivery of firm services	<b>Transmission</b> Unplanned interruption of ≥ 1 day but < 1 month to the delivery of firm services	<b>Transmission</b> An interruption of ≥ 1 month but < 1 year to the delivery of firm services	<b>Transmission</b> An interruption of more than 1 year to the delivery of firm services	
	<b>Networks</b> Unplanned loss of service to <100 domestic/I&C corporate customers less than 100  Minor property damage	<b>Networks</b> Unplanned loss of service to - 100 - 1,000 customers - a demand customer (>10TJ pa)	<b>Networks</b> Unplanned loss of service to greater than - >1,000 customers - multiple demand customers (>10TJ pa) - to a single high risk site, without alternate supply options, (hospital, nursing home, home on life support)	<b>Networks</b> Unplanned loss of service to: - a regional area or greater than > 10,000 customers - a demand customer (>10TJ pa)with customer loss of revenue or infrastructure damage - to multiple high risk sites without alternate supply options (hospitals, nursing homes, homes on life support) Extensive property damage	<b>Networks</b> Unplanned loss of service to: - a metropolitan area - multiple demand customer (>10TJ pa)with customer losses of revenue or infrastructure damage	
	<b>Power</b> - Loss of customer load (firm capacity) equivalent to 2hrs – 1 day or - 100% loss of non-firm contracted supply for 1day – 2days	<b>Power</b> - Loss of customer load (firm capacity) equivalent to 1day – 1wk or - 100% loss of non-firm contracted supply for 2days – 2wks	<b>Power</b> - Loss of customer load (firm capacity) equivalent to 1wk – 2wks or - 100% loss of non-firm contracted supply for 2wks – 1mth	<b>Power</b> - Loss of customer load (firm capacity) equivalent to 2wks – 1mth or - 100% loss of non-firm contracted supply for >1mnt or - Loss of single asset availability resulting in liquidated damages	<b>Power</b> - Complete loss of customer load (firm capacity) for > 1mth or - Loss of multiple asset availability resulting in liquidated damages	
<b>4. People</b>	Little or no impact on individual or team engagement	Some impact on team or site engagement / minor site level complaints or breaches	Some impact on Business unit engagement / rising complaints or breach levels / some staff turnover	Some serious complaints or breaches / Staff turnover rising	Increasing serious complaints and breaches/ High staff turnover	
<b>5. Compliance</b> Non-compliance with operating licenses, legal, regulatory, contractual obligations, debt financing covenants or reporting / disclosure requirements.	Immaterial non-compliance which can be resolved internally in < 3 months	Non-compliance which can be resolved in 3 - 12 months. Issuance of formal notice.	Non-compliance reportable to a regulator with potential for regulatory investigation or fines	Non compliance resulting in major fines, restrictions, potential of loss of license or licence variations	Multiple areas of non-compliance / breaches with loss of one or more operating licenses, prosecution of directors or officers of APA.	
	Non-compliance with a contractual obligation - negotiations required	Non-compliance with a contractual/legal obligation(s) - arbitration required	Non-compliance with a contractual/legal obligation(s) - results in litigation	Permanent loss of major/material contract	Permanent loss of multiple material contracts	
		Review event under debt financing obligation addressed through consultation with lender	Immaterial breach of covenant under debt financing obligation reportable to lender	Material breach of covenant under debt financing obligation reportable to lender	Event of Default under debt financing obligations leading to acceleration of drawn debt facilities	
<b>6. Reputation &amp; Customer</b> The view of APA from its stakeholders, customers, investors, regulators, governments and the community.	<b>a. APA Group</b>  Isolated adverse: - local media comment or articles on APA - low levels of detrimental social media comments	Sustained: - adverse local media articles on APA - detrimental social media comments One off negative reports by financial analysts	Sustained adverse national: - media articles on APA - viral social media Multiple negative reports by financial analysts	Considerable, prolonged adverse national coverage (social and media) / Sustained negative reports by financial analysts / ASX Trading halt	Considerable and prolonged adverse international coverage (social and media) on APA and energy industry / Suspension from ASX	
	Some decline in customer satisfaction recoverable in <12 months	Some decline in customer satisfaction recoverable in >12 months	Sustained deterioration in customer satisfaction / Small contract arbitration	Sustained deterioration in customer satisfaction or loss of one top 10 customer / Major contract arbitration	Sustained deterioration in customer satisfaction or loss of multiple top 10 customers	
<b>7. Financial</b>	<b>a. APA Group</b> Balance sheet, P&L impact (cumulative or one off)			Permanent downgrade of either credit rating by a single notch	Permanent downgrade of either credit rating by two or more notches (to sub-investment grade)	
	≤ \$15M	\$16M - \$30M	\$31M - \$60M	\$61M - \$250M or potentially outside market guidance	> \$250M or major impact on market guidance	
	<b>b. Asset</b> Revenue, Cost Impact (cumulative or one off)					
	≤ \$1M	\$1M-\$5M	\$5M-\$20M	\$20M-\$50M	>\$50M	

ERA #	Type: 1. ENVFEAT 2. ASSETHAZ 3. RISKACTIV	Aspect or Activity (Hazard) RISKACTIV (e.g. trenching, filter change)	Event/Cause of harm (Risk) (e.g. chemical spill)	Environment Impact (e.g. soil contamination, death of fauna, nuisance to community)	Relevant Risk? Y/N	Pre-Control (inherent)			Management				Mitigating			Post-Control (residual)		Risks	Risk Management Methods (Controls)					Primary Safeguard Environment Area (select from dropdown box)					
						Likelihood	Consequence	Risk Level	Competency Controls	Inherent controls	Site Setup Controls		Exclusion Zones i.e. Erosion Controls	Reactive controls	Approval (inc. condition ref) or Communication	Other	Administrative Control		Assurance Control	Likelihood	Consequence	Risk Level	Responsible: APA/ Contractor		RISKACTIV Job Plan # or CM task	RISKACTIV only - Maximo Integrated Control			Maximo Planning Control
											Waste Management	Hazardous materials (Storage/ Handling e.g. bundles)														Emergency Response Controls (reactive)	Supporting Documents (e.g. Work Instruction; Tech Guide)	Inspection + Monitoring, Compliance Records or Evidence	
1	ASSETHAZ	Pipeline	Pipeline damage/rupture Loss of Integrity Landholder site access and third party excavation works impacting on the pipeline	GHG Emissions Community impact (odour) Ignition - fire	Y	N	N	AssesthaZ	DBYD, landholder liaison, stakeholder awareness, third party engagement Operator training requirements detailed in 320-POL-AM-0018_3 National Pipeline Management System	Designed and constructed to AS 2885, e.g. pipe wall thickness, isolation valves, pipeline marking. External interference protection e.g. depth of cover, barriers to penetration (concrete slabs). Cathodic Protection system and sacrificial anodes for corrosion resistance, SCADA monitoring			320-PR-QM-0021 Isolation, Gas Blowdown and Repressurization, Isolation plans, Containment, APA HSE GP 11.01 Emergency Management, Emergency response plans - engage RFS/CFA, Integrated Operations Centre (IOC) APA HSE GP 07.01 Incident Reporting, APA HSE GP 07.02 Incident Investigation & Analysis			In line integrity pigging as determined by Pipeline Risk Assessments	APA HSE GP 08.03 Authority to Work Permits APA HSE GP 08.02 Job Risk Assessment third party works approval, Pipeline Integrity Management Plan Stress Crack and Corrosion Repair Program	540-PR-QM-0005 Corridor Condition Inspection, aerial surveillance, in-line integrity pigging as determined by Pipeline Risk Assessments, Maximo, SCADA monitoring and control, monitoring CP, APA HSE GP 08.03 Authority to Work Permits, third party works approval, inhibitor testing	N	N	Low	APA/Contractor							
2	ASSETHAZ	Compressor Station	Noise and vibration during operation	Community impact (noise)	Y	N	N	AssesthaZ	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks	Compressor design with acoustic controls or sound proofing			APA HSE GP 07.01 Incident Reporting		Complaints management process - APA HSE GP 07.01 Incident Reporting	APA HSE EP 13.03.02 Noise and Vibration Management	Maintenance records (servicing of compressors), incident reports	N	N	Negligible	APA								
3	ASSETHAZ	Compressor Station	Overflow from Stormwater overflow Dam Triple interceptor for spon drains Septic system and associated water treatment and drainage	Soil/water contamination	Y	N	N	AssesthaZ	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks, spill response training	Triple interceptor and septic system design Quick break detergents Chemical bunding			APA HSE GP 11.01 Emergency Management, Emergency response plans, APA HSE EP 13.04.01 Chemical Spill Management, spill kits		APA HSE EP 13.06.01 Soil and Land Management	Incident reports, inspections, periodic maintenance, regular checks of triple interceptor and septic systems, servicing of oily water system	N	N	Low	APA									
4	ASSETHAZ	Workshop / depot	Chemical spills, Batteries - leaks/spills, Management of waste inc. regulated waste	Soil/water contamination	Y	N	N	Low	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks, spill response training	Battery rooms at certain sites with bunding	Utilising mechanics for change over of batteries, taking used batteries to scrap metal recyclers		APA HSE GP 11.01 Emergency Management, Emergency response plans, APA HSE EP 13.04.01 Chemical Spill Management spill kits APA HSE GP 07.01 Incident Reporting		APA HSE EP 13.06.01 Soil and Land Management APA HSE EP 13.05.01 - Regulated Waste Management	Work shop inspections, periodic maintenance, battery installations, environmental audits, incident reports	N	N	Negligible	APA									
5	ASSETHAZ	Pressure Reduction Stations CP Stations Mainline Valves Scrapers Stations	Gas release during venting	GHG emissions Community Impact (Dust) Community Impact (Noise)	Y	N	N	Low	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks				APA HSE GP 07.01 Incident Reporting, APA HSE GP 07.02 Incident Investigation & Analysis	Notification by landholder 540-PR-QM-0001 Landholder Engagement Procedure	APA HSE EP 13.03.01 Gas, Dust & Light Emission Management APA HSE GP 08.04 Workplace Inspections and Hazard Reporting		N	N	Low	APA									
6	ASSETHAZ	Pressure Reduction Stations CP Stations Mainline Valves Scrapers Stations	Chemical / waste spill	Soil/water contamination	Y	N	N	Low	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks, spill response training				APA HSE GP 11.01 Emergency Management, Emergency response plans, APA HSE EP 13.04.01 Chemical Spill Management spill kits APA HSE GP 07.01 Incident Reporting		APA HSE EP 13.06.01 Soil and Land Management	Inspections, periodic maintenance, patrol inspection, Maximo	N	N	Low	APA									
7	ASSETHAZ	Waterbath Heaters (up to 40,000 L capacity)	Leaking of contents / draining during maintenance (corrosion inhibitor, biocide)	Soil/water contamination	Y	N	N	AssesthaZ	APA National HSE Induction, APA National Environmental Awareness Induction, OEMP Induction, location specific inductions, Toolbox talks, spill response training				APA HSE GP 11.01 Emergency Management, Emergency response plans, APA HSE EP 13.04.01 Chemical Spill Management spill kits APA HSE GP 07.01 Incident Reporting			Work shop inspections, environmental audits, incident reports, SCADA monitoring and control, Maximo	N	N	Low	APA									







## Appendix 5 – Key Environmental Requirements

### Environment Sensitivities/Surrounding Environment:

- The pipeline corridor crosses the Strzelecki Creek at KP 34
- New Strzelecki Track intersects pipeline at KP 2.5
- Old Strzelecki Track intersects pipeline at KP 34.0
- Dusky Hopping Mouse – recorded along easement at KP 37 and KP 64 near Strzelecki creek and border
- Cultural heritage

**General environmental duty** – a person must not carry out any activity that causes or is likely to cause environmental harm, unless measures to prevent or minimise the harm have been taken and;

**Duty to notify of environmental harm** - to inform the administering authority and landowner to occupier when an incident has occurred that may have caused or threatens serious or material environmental harm

### Heritage

- If suspected cultural heritage material is discovered during operations, immediately stop further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area'. Contact the Department of the Premier and Cabinet – Aboriginal Affairs and Reconciliation Division, and the relevant Traditional Owner community, (Yandruwandha Yawarrawarka Traditional Land Owners aboriginal Corporation (YY)), to identify an appropriate course of action.
- Yandruwandha Yawarrawarka Traditional Owners to be contacted for works that are outside the facility and outside previously disturbed areas
- Any Aboriginal heritage sites, objectives and remains discovered during operations will be appropriately reported and responded to, consistent with the Aboriginal Heritage Act 1988 (SA)'
- The pipeline corridor traverses a short section of the Strzelecki Creek National Heritage Place between KP 32 and KP 36
- Vehicles are only to use existing official tracks and roads. No new tracks or deviations are to be formed without proper assessment.
- Works are not to disturb any established trees or vegetation without prior advice from the HSEH team.

### Housekeeping/Biosecurity

- Minimising 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, washing vehicles and equipment down thoroughly (i.e. prior to accessing to weed-free areas);

### Regulated Waste

- To be stored in a dedicated bin and includes: filters, oily rags, spill waste, waste water etc.
- Licensed contractor and Waste Tracking Certificates required for areas identified

**Vegetation and Ground Disturbance:**

- No removal of vegetation beyond existing cleared areas
- No vegetation clearing outside operational area – field assessment and/or additional approvals may be required prior to works.
- Restrict operational activities to access tracks and the easement;
- Minimising the extent of disturbance to vegetation and restricting activities to the immediate easement as far as possible

**Wildlife Interactions**

- Use nominated, licenced contractor for all animal relocations

**Third Party Infrastructure:**

- Road works portal applications to be submitted to the Department of Infrastructure and Transport (DIT) for maintenance/ground disturbance works carried out within Strzelecki Track or other DIT maintained road;

**General**

- Check XIC/Argo prior to access ROW – due diligence assessment checklist
- Access via approved access tracks
- Ensure storage facilities for hazardous substances are bunded and in good condition
- Know location of SDS and spill kits
- Contractor awareness – APA HSE Induction and APA Environmental Induction (including this key requirements) to be completed and recorded

**Resources/Further info:**

- MWP MSEP OEMP
- Corporate Environmental Procedures 13.00
- Environment & Heritage Team

# Appendix 6 – Stakeholder Consultation

## Government Agency Consultation

Stakeholder	Response	APA Response
EPA	<p>The Environment Protection Authority (EPA) has assessed the documents referred to above and now provides its comments. The comments relate to the gas pipelines (PL 7) and ethane pipeline (PL 8) South Australian sections only, and does not cover the Moomba Compressor Station which is authorised under the <i>Environment Protection Act 1993</i> (EPA licence no. 45002).</p> <p>This correspondence follows EPA concurrence with the Department for Energy and Mining (DEM) classification status of the PL 7 and PL 8 pipeline activity as being of low environmental impact (provided on 10 November 2020).</p> <p>Comments relate to the protection of surface and ground waters and the prevention of pollution events.</p> <p><b>General Comments</b></p> <p>Reporting to the EAP of when environmental harm has occurred or threatened has been adequately described within the SEO. The management of wastes has been adequately described within the SEO and EIR. The EPA acknowledges gas emissions are inherently low and can occur during maintenance operations, emergency shut downs and venting. The APA Group must ensure that all pipeline infrastructure is assessed and maintained to ensure their 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 pigging programs if required) and the cathodic protection.</p>	NA. Comment only.
	<p><b>SEO Comments:</b></p> <p>The EPA supports the Environmental Objectives listed in Appendix 1 and 'Guide to How Objectives Can be Achieved' particularly around Objectives 2 and 3 whereby impacts to drainage lines and surface waters from pipeline activities should be minimised and where an uncontrolled loss of petroleum, processed substance, chemical or</p>	NA. Comment only

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	<p>fuel has the potential to cause environmental harm.</p> <p>The EPA considered key environmental risks to be pipeline corrosion and loss of containment of hydrocarbon product. Pipeline corrosion is referred to in the EIR but not specifically referred to in the SEO. Whilst it is acknowledged that a reference to a Pipeline Integrity Management Plan (PIMP) is made under Objective 3, specific management measures around pipeline integrity should be included in the EIR (and if not included in the EIR, detailed in the SEO under the guide to how objectives can be achieved).</p>	<p>It would not be appropriate to include the Pipeline Integrity Management Plan (PIMP) within the EIR. Environmental Objective 3 and specifically Goal 3.1 relating to 'spills' which includes loss of pipeline fluid (natural gas) as a result of compromised pipeline integrity. Pipeline corrosion is one of several threats that can potentially compromise the integrity of the pipeline. Information on the Pipeline Integrity Management Plan has been included in the 'Guide to How Objectives Can be Achieved'.</p> <p>High level integrity measures from the PIMP for PL 7 &amp; 8 are already included in the EIR. Refer to Section 3.</p> <p>Reference to the Pipeline Integrity Management Plan within Objective 3 reflects the recently approved SEO for the QSN pipeline.</p>
	<p><b>EIR Comments:</b></p> <p>Section 4.2.1.2 refer to watercourses that the pipeline traverses. Pipeline operation may result in potential impacts to surface water including disturbance of surface water drainage patterns along watercourses and floodplains due to excavations or vehicle movement and reduced water quality associated with low-level contamination associated with soil movement or chemical spill. While the EPA accepts these impacts are unlikely to occur, based on the mitigations listed in 6.2.2, these impacts can be appropriately managed.</p> <p>Table 6 (page 14) references cathodic protection surveys 'Surveys involve travelling the right-of-way and stopping to inspect Cathodic Protection points (above-ground posts) on foot. Typically conducted once per year'.</p> <p>The annual cathodic protection specific surveys are not referenced in the SEO under any objectives. These surveys should be a "Guide to</p>	<p>Cathodic Protection Surveys are referenced in Table 6 as one of many pipeline operational and maintenance activities. The survey requirement and frequency are defined within the Pipeline Integrity Management Plan (PIMP), which is referenced in the 'Guide of How Objectives Can be Achieved' in Environmental Objective 3.</p> <p>Reference to the Pipeline Integrity Management Plan within Objective 3 reflects the recently approved SEO for the QSN pipeline.</p>

	How Objectives Can be Achieved' for a number of the Environmental Objectives within the SEO	
The Department for Infrastructure and Transport	<p>The APA Group documents have been reviewed and in principle they are supported.</p> <p>Where physical works are occurring on ground and within a road corridor under the maintenance responsibility of the DIT:</p> <ul style="list-style-type: none"> <li>APA Group (applicant) would be required to submit a road works portal application if maintenance works were carried out on the section of underground pipeline/s that cross the Strzelecki Track (or other DIT road), refer to Section 3.1 Pipeline Alignment. A web link to obtain more information about a road works permit provided.</li> </ul>	<p>Section 6.9.2 of the EIR and Goal 9.1 in the SEO are the appropriate sections for this requirement.</p> <p>Amended as follows:</p> <ul style="list-style-type: none"> <li>Section 6.9.2 of the EIR: "Road works portal applications to be submitted to the Department of Infrastructure and Transport (DIT) for ground disturbing works carried out within Strzelecki Track or other DIT maintained road"</li> <li>Goal 9.1 of the SEO – Assessment Criteria: "No disturbance within Strzelecki Track or other DIT maintained road without approval from DIT"</li> <li>Section 9.1 of the SEO – Guide to How Objectives Can be Achieved: "Submission of a DIT road works portal application before maintenance works within Strzelecki Track or other DIT maintained road"</li> </ul>
	<ul style="list-style-type: none"> <li>Minimum depth cover beneath a DIT road is 1200mm, refer table 3.2.1 &amp; 3.2.2.</li> </ul>	<p>Table 2 within Section 3.2.1 and Table 4 of Section 3.2.2 of the EIR refers to the minimum depth of cover of 1200mm beneath roads. This is in accordance with AS 2885.1. No further amendments made.</p>
The Department for Environment and Water through the SA Arid Lands Landscapes	<p><b>General Comments:</b></p> <p>The documents have correctly identified, in most instances, the <i>Landscape South Australia Act 2019</i> and requirement for a water affecting activity permit for identified activities that must not be undertaken within approval.</p> <p>The SEO has not changed and that important objectives in the SEO</p>	NA. Comment only

Board	are maintained, in particular of relevance to SAAL: <ul style="list-style-type: none"> <li>To maintain soil stability and integrity on the easement</li> <li>To maintain and manage the impacts to water resources</li> <li>To avoid land and water contamination</li> <li>To promote and maintain vegetation cover on the easement</li> <li>To avoid the spread of weeds, pests and pathogens</li> </ul>	
	<b>SEO Comments:</b> Section 2.1, page 7: Noted that constructed completed in 1976 and no further construction is anticipated and has not been included in the SEO	NA. Comment only
	Table 1, Objective 4, page 7: To promote and maintain vegetation cover on the easement does not clearly align with goal 4.3 To ensure maintenance activities are planned and conducted in a manner that minimises impacts to native fauna. While loss of habitat impacts native fauna, direct impacts are also likely, the objective could include 'and minimise impacts to native fauna'. Review objective to address native fauna.	Reviewed and amended Goal 4 to "To minimise adverse impacts to vegetation and fauna". This align with the recently approved SEO for QSN.
	Section 5, Abbreviations and definitions, page 12 Update NRM Native Resource Management (board) to SA Arid Lands Landscape Board	NRM Native Resource Management (board) has been removed.
	Appendix 1, Objective 2, page 15 2.2 To minimise disruptions to third party use of waters, guide and assessment criteria includes reference to excavations and flow interruptions. Assessment criteria to refer to no new WAA's. Assessment criteria to reference No new Water Affecting Activities as defined under the Landscape South Australia Act 2019, without prior approval	Goal 2.2 Assessment Criteria amended to include "No new Water Affecting Activities to be undertaken as defined under the <i>Landscape South Australia Act 2019</i> , without prior approval".
	Appendix 1, Objective 2, page 16 2.3 To minimise impacts to riparian aquatic and water dependent flora and fauna, in the guide to how objectives can be achieved, consider including with "Planning and monitoring of disturbance (i.e. dig-ups) to ensure sensitive areas are identified and post works/excavations rehabilitation is appropriate as per the National Excavation Procedure (320-PR-OM-00067) and APA HSE EP 13.06.02 – Watercourse Management" reference to water affecting activity approval if required.	Reference to water affecting activity approval as defined under the <i>Landscape South Australia Act 2019</i> , has been included.

	Include reference to water affecting activities approval as defined under the Landscape South Australia Act 2019.	
	Appendix 1, Objective 3, page 17-20 Please note that in some instances a Water Affecting Activity approval can be sought for discharge of water (the same or better quality than the surrounding environment), to watercourse if discharge is above 1 ML/year Note WAA permit requirement for discharge of water to watercourse if quality is the same of better than surrounding environment and the volumes exceed 1ML/year.	Noted. Comment only.
	Appendix 1, Objective 4, page 21 4.3 To ensure maintenance activities are planned and conducted in a manner that minimises impacts to native fauna, Assessment criteria is Native fauna casualties associated with operations restricted to as low as reasonably practicable. There are no measures related to habitat for significant fauna species when undertaking maintenance activities. Habitat for significant species to be included when undertaken maintenance activities.	Assessment Criteria amended to include the following: <ul style="list-style-type: none"> <li>Vegetation clearing within the easement or on land adjacent to the easement is limited to previously disturbed areas, unless prior regulatory approval obtained under the <i>Native Vegetation Act 1991</i></li> <li>No unauthorised vegetation clearing of conservation significant fauna habitat</li> </ul>
	Appendix 1, Objective 5, page 23 Weeds managed as per the <i>Natural Resources Management Act 2004</i> (NRM Act). The NRM Act has been replaced by the Landscape South Australia Act 2019. Update reference to Landscape South Australia Act 2019.	Amended
	<b>EIR Comments:</b> Section 2.2, Other legislation, page 9 Landscape South Australia Act 2019 is not just Sourcing water from new bores, includes Water Affecting Activities.	Amended to include Water Affecting Activities
	Section 6.2.2 Impact mitigation, page 35 Note reference of disposing of hydro-test water appropriately with WAA permit from Landscape Board. Note that discharged water to watercourse must be of the same of better quality than surrounding environment.	NA. Comment only
	Section 6.2.2 Impact mitigation, page 35	Noted, however not integrated into this section.

	Ensuring excavation activities (including stockpiles) do not unduly impede surface water flows. Any activity that prevents the passage of low flow or significantly alters flow is considered a water affecting activity. WAA permit requirements.	
	Section 6.4.2, Mitigation measures, page 37 Where required, implementation of targeted weed eradication programs in conjunction with surrounding landholders and the Natural Resource Management (NRM) Board. Update reference to Landscape South Australia Act 2019	Amended to SA Arid Land Landscape Board
	Section 6.10 Waste management, page 37 Obtaining relevant approvals for the disposal of hydro-test water (including a water affecting activity permit from the Landscape Board, if applicable). Note that discharge to be the same or better quality than surrounding environment	Noted. Comment only.
	Section 8, Stakeholder consultation, page 48 Include SA Arid Lands Landscape Board as key Stakeholder.	Amended.
Aboriginal Affairs and Reconciliation Division	<b>EIR Comments:</b> Page 9 – 2.2 Other Legislation, 'Activity' column Suggest change 'Protects Aboriginal relics, sites and places' to 'Protects Aboriginal sites, objects and remains'. Under the Aboriginal Heritage Act 1988 protection is provided to <u>Aboriginal sites, objects and remains</u>	Amended.
	Page 28 – Section 4.3.1 Aboriginal Heritage As discussed in AAR's cover letter, it is noted that APA have included no reference to specific Traditional Owner engagement. Minimal details have been provided in this section regarding an Aboriginal cultural heritage survey conducted prior to the construction of the pipeline, including date and year undertaken, who was involved including Traditional Owner participation and consultation or what management outcomes were implemented further to the site location documentation in the operations GIS. If certain management practices were implement in line with APA's Cultural Heritage Policy, these should be stated and referenced in this section. As also discussed in AAR's cover letter, it would be prudent for APA to	The pipeline was constructed in the mid 1970's and APA acquired afterwards. Cultural heritage surveys were undertaken in the early to mid-1970s for the NSW and Queensland sections of the pipeline. APA has not been able to locate any records for a CH survey conducted for the SA section prior to the construction of the pipeline, but heritage legislation did exist in SA at the time and it is expected that any survey results should be reflected in the current AAR archives  A search of the central archives including the Register of Aboriginal Sites and Objects in May

	<p>develop an overarching Cultural Heritage Management Plan (CHMP) for the Project. A CHMP would augment APA's existing heritage management frameworks by specifying measures to be undertaken before, during and after Project activities to adequately manage Aboriginal Heritage.</p> <p>This section also makes it unclear as to whether the 'one registered site and four reported sites...recorded to date' are a result of the cultural heritage survey or an AAR central archives search. As E2M Consulting undertook a search of AAR's central archives on 13 March 2020 this should be included in the discussion here and reference clearly made to the results of both the previous heritage survey (sites identified) and the outcomes of the central archives search (recorded sites).</p>	<p>2013 demonstrate that there were 5 sites (One registered site and four reported sites) within a 30m buffer of the pipelines. A map has been added demonstrating where these sites from the search intersect this buffer (see Figure 5).</p> <p>Section 4.3.1 has been amended as follows.</p> <p>'A search of the central archive, including the Register of Aboriginal Sites and Objects, maintained by the Aboriginal Affairs and Reconciliation Division of the SA Department of the Premier and Cabinet, requested in May 2013, recorded one registered site and four reported sites, within a 30m buffer of the pipelines (Figure 5).</p> <p>Another search of the central archive and Register of Aboriginal Sites and Objects, was requested in March 2020. 61 records were identified within a 5km radius of the pipelines. Work must be assessed on a case by case basis and the Environment and Heritage Team contacted in the event that work is planned to be completed on the pipelines.</p>
	<p>Page 35 – 37 – Section 6.3.1, Potential Impacts, Flora and Fauna AAR notes that this section should incorporate information regarding the connection between flora and fauna and Aboriginal sites/cultural landscapes. Tangible or intangible Aboriginal heritage values may be intrinsically linked to natural features such as waterholes, mound springs, culturally significant stands of trees or other sensitive landforms and local faunal species that could be affected by Project works. Damage, disturbance or interference with these elements of the landscape may cause distress and/or concern to the Aboriginal Community.</p>	<p>Section 6.3.1 amended to include potential impact to tangible or intangible heritage.</p> <p>Operations and maintenance activities remain within the heavily disturbed approved licence area and vehicles will remain within existing access tracks, reducing the likelihood of impacting on Aboriginal heritage values, both tangible and intangible.</p>

		Section 6.3.2 has been amended to include additional control, being to include a cultural heritage review for proposed works that would impact established trees or watercourses.
	Page 38 – Section 6.5.1, Potential Impacts, paragraph 4 Despite the fact that an area has been heavily disturbed through previous ground disturbing works, APA should be aware that ground disturbing activities may still pose a risk to Aboriginal sites, objects and remains that exist on the surface and the sub-surface.	Noted. Comment only.
	Page 39 – Section 6.6.1, Potential Impacts Comment – As per previous comment	As above
	Page 39 – Section 6.6.2, Mitigation Measures Suggest change 'Entry of all known sites into pipeline GIS system and inclusion in all planning documents and maps...' and replace with 'Entry of all known Aboriginal cultural heritage sites into pipeline GIS system and inclusion in all planning documents and maps...'	Amended.

	<p>Page 39 – Section 6.6.2, Mitigation Measures Suggest add – ‘If suspected cultural heritage material is discovered during operations, immediately stop any further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area’.</p> <p>‘Any Aboriginal heritage sites, objectives and remains discovered during operations will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988 (SA)</i>’.</p> <p>‘Induction/training for all personnel on Aboriginal cultural heritage as well as their obligations under the <i>Aboriginal Heritage Act 1988 (SA)</i>’.</p> <p>APA must ensure work ceases when a possible discovery of Aboriginal heritage is made. Explicitly expressing this assists APA in preventing a breach of the Act. AAR should be contacted in the event of damage, disturbance or interference. Section 20 of the Act provides that if Aboriginal sites, objects or remains are discovered, APA is required to report the procedures to AAR as soon as practicable. See Attachment 2 and 3 for the AAR approved discovery procedures that will assist APA in meeting its obligations under the Act.</p>	<p>Section 6.6.2 amended to include the following: ‘If suspected cultural heritage material is discovered during operations, immediately stop further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area’. Contact the Aboriginal Affairs and Reconciliation Division and the relevant Traditional Owner community, (Yandruwandha Yawarrawarka Traditional Land Owners aboriginal Corporation (YY)), to identify an appropriate course of action.</p> <p>‘Any Aboriginal heritage sites, objectives and remains discovered during operations will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988 (SA)</i>’</p> <p>‘Awareness training to cover cultural heritage management requirements and obligations’. An APA heritage manual has been drafted with specific information regarding obligations under the <i>Aboriginal Heritage Act 1988 (SA)</i>.</p>
	<p>Page 46 – Section 7.1, Environmental Management Systems, Establishment of Cultural Heritage Policy. As discussed in AAR’s cover letter, the views of all Traditional Owners of Aboriginal heritage should be ascertained and considered when making decisions about cultural heritage policy and Aboriginal heritage management within the project area. A Cultural Heritage Policy should be based around the consultation with all interested Traditional Owners. The Act defines Traditional Owner as any individual with traditional social, economic or spiritual affiliations with, or responsibilities for, specific heritage.</p>	<p>NA. Information only.</p>

	<p>While registered native title bodies corporate (RNTBCs) are required to represent their member and other common law holders in areas that have native title, please be aware that in most native title areas, there will be Traditional Owners who are not RNTBC members or common law holders, but who nevertheless assert traditional interests in heritage on native title lands. Such Aboriginal people will likely not have access to information from the RNTBCs.</p> <p>For this reason, several Aboriginal heritage bodies may legitimately exist within any given area. Each should be respectively engaged on equal merit to understand the heritage that they seek to represent.</p> <p>While RNTCs have a particular role under mining legislation, under the Act, they simply serve as a mechanism to corral the views of Traditional Owners. Accordingly, the heritage views of RNTBCs as corporations should not be automatically preferred to those of Traditional Owners with particular responsibilities for specific heritage.</p>	
	<p>Page 53 – Appendix 2 – APA Group's Cultural Heritage Policy. AAR notes that APA's Cultural Heritage Policy includes many policy elements that do not translate into the Project EIR. The Policy itself contains the elements for satisfactorily dealing with heritage. These elements should be considered when reviewing AAR's comments in relation to the cultural heritage information included in APA's Project EIR.</p>	<p>APA meet the objectives in the Cultural Heritage Policy by;</p> <ul style="list-style-type: none"> <li>• Undertaking due diligence assessments prior to ground disturbance works. This includes a cultural heritage review.</li> <li>• Operations and maintenance works remain within the heavily disturbed approved licence area and vehicles will remain within existing access tracks</li> <li>• Facilities and operations are compliant with APGA Codes of Environmental Practice and relevant legislation, standards and codes (Section 1.3 of the EIR)</li> <li>• Cultural heritage impacts during operations are identified in Section 6 of the EIR</li> <li>• Cultural heritage is included in the ERA (Line 8 and 12 of the ERA –Appendix 4 of</li> </ul>

		<p>the EIR)</p> <ul style="list-style-type: none"> <li>• Training and awareness and inductions in place to ensure APA personnel and contractors are aware of their responsibilities</li> <li>• Reviews of legislation and documentation undertaken during 5 yearly SEO/EIR review</li> <li>• Engagement with TO's and relevant stakeholders prior to ground disturbing works outside of licence and un-disturbed areas.</li> </ul>
Page 48 – Section 8, Stakeholder Consultation As per comment on Establishment of a Cultural Heritage Policy (p.46) above. The views of <u>all</u> Traditional Owners of Aboriginal heritage should be ascertained and considered when making decisions about cultural heritage policy and Aboriginal heritage management within the Project area.		Traditional Owners have been added to the line including Native title holders.
Page 56 – APA Enterprise Risk Matrix – May 18, row 8, column 5, 'Environment Impact' Suggest add – 'Emotional impact and stress to Aboriginal community members'.		Line 8, column 5 Environment Impact, of Environmental Risk Assessment updated as follows: 'Damage to heritage items, & emotional impact and stress to Aboriginal community members'.
Page 56 – APA Enterprise Risk Matrix – May 18, row 8, column 10, 'Competency Controls' Suggest add – 'Induction/training for all personnel on Aboriginal cultural heritage as well as their obligations under the <i>Aboriginal Heritage Act 1988 (SA)</i> '.		The APA Environmental Awareness Induction and OEMP Induction contains heritage awareness. An APA heritage manual has been drafted with specific information regarding obligations under the <i>Aboriginal Heritage Act 1988 (SA)</i> .
Page 56 – APA Enterprise Risk Matrix – May 18, row 8, column 16-17, 'Approval (Inc. condition ref) or Communication'/'Other'. Suggest add – 'If suspected cultural heritage material is discovered during operations, immediately stop any further work in the area, secure the site and ensure no further access or ground disturbing takes place in the immediate area'.		Line 8, column 16 Approval (Inc. condition ref) or Communication, of the Environmental Risk Assessment updated as follows: 'Immediately cease works and secure site if suspected cultural heritage material discovered during operations'. APA have an incidental heritage discovery guide

	<p>'Any Aboriginal heritage sites, objects and remains discovered during operations will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988 (SA)</i>'.</p> <p>APA must ensure work ceases when possible discovery of Aboriginal Heritage is made. Explicitly expressing this in an Environmental Risk Assessment assist APA in preventing a breach of the Act. AAR should be contacted in the event of damage, disturbance or interference. Section 20 of the Act provides that if Aboriginal site, objects or remains are discovered, APA is required to report the procedures to AAR as soon as practicable. See Attachment 2 and 3 for the AAR approved discovery procedures that will assist APA in meeting its obligations under the Act.</p>	<p>that applies to all sites and assets - APA HSE TB ENV 008</p> <p>Line 8, column 15 Emergency Response Controls (reactive) updated to include the APA HSE GP 07.01 Incident Report Procedure and APA HSE GP 07.02 Incident Investigation &amp; Analysis. This procedure outlines reporting requirements.</p>
	<p>Page 56 – APA Enterprise Risk Matrix – May 18, row 12, column 10, 'Competency Controls'</p> <p>Suggest add – 'Induction/training for all personnel on Aboriginal cultural heritage as well as their obligations under the Aboriginal Heritage Act 1988 (SA)'.</p>	<p>The APA Environmental Awareness Induction and OEMP Induction contains heritage awareness. An APA heritage manual has been drafted with specific information regarding obligations under the <i>Aboriginal Heritage Act 1988 (SA)</i>.</p>
	<p>Page 56 – APA Enterprise Risk Matrix – May 18, row 12</p> <p>Heritage mitigation measures should be applied to minimise damage. Avoid damage, disturbance or interference to Aboriginal heritage sites, objects and remains by undertaking risk mitigation strategies.</p> <p>APA must ensure work ceases when a possible discovery of Aboriginal heritage is made. Authorisation under section 23 of the Act should be sought prior to works where damage is possible or unavoidable.</p> <p>If suspected cultural heritage material is discovered during operations, APA must immediately stop any further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area. Contact the relevant Traditional Owner community, in this case the Yandruwandha Yawarrawarka Traditional Land Owners aboriginal Corporation (YY), to identify an appropriate course of action. Options include risk managing the area with YY's assistance or seeking authorisation under Section 23 of the Act where</p>	<p>Refer to comment relating to Page 39 – Section 6.6.2, Mitigation Measures.</p> <p>Row 12 column 16 Approval (Inc. condition ref) or Communication, of the Environmental Risk Assessment updated as follows:</p> <p>'Immediately cease works and secure site if suspected cultural heritage material discovered during operations'</p>

	<p>damage to Aboriginal heritage cannot be avoided. Section 20 of the Act provides that if Aboriginal sites, objects or remains are discovered, APA is required to report to the Premier, currently responsible for the Act, through AAR, as soon as practicable. See Attachments 2 and 3 for AAR approved project planning and sites and objects discovery procedures.</p>	
	<p><b>SEO Comments:</b> Page 24 – Appendix 1 – Statement of Environmental Objectives and Assessment Criteria for Operational Activities, column 3, Guide to How Objectives Can be achieved.</p> <p>Suggest change 'Site examined for cultural heritage material prior to work involving disturbance outside known surveyed areas by appropriately qualified personnel (e.g. NT group, anthropologist, relevant Aboriginal heritage group)' and replace with 'Previously un-surveyed project areas inspected for Aboriginal cultural heritage material/sites by appropriately qualified personnel (e.g. Relevant Traditional Owner group, NT group, anthropologist, archaeologist) prior to ground disturbing works'.</p>	<p>Sentence amended as follows, aligning with recently approved SEO for QSN.</p> <p>'Site examined for cultural heritage material prior to work involving disturbance outside known disturbed areas by appropriately qualified personnel (e.g. NT group, anthropologist, relevant Traditional Owner group).'</p>
	<p>Page 24 - Appendix 1 – Statement of Environmental Objectives and Assessment Criteria for Operational Activities, Guide to How Objectives Can be achieved.</p> <p>Suggest add after point 4 – 'Any Aboriginal sites, objects and remains discovered during the Aboriginal cultural heritage survey will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988 (SA)</i>'.</p>	<p>This point is already reflected within point 9 in this section (last dot point). No further amended added in relation to this suggestion.</p>
	<p>Page 24 - Appendix 1 – Statement of Environmental Objectives and Assessment Criteria for Operational Activities, Guide to How Objectives Can be achieved.</p> <p>Suggest change 'If suspected Aboriginal cultural heritage material is discovered during operations, immediately stop and further work in the area, secure the site and ensure no further ground disturbing activity takes place in the immediate area. Any Aboriginal heritage sites, objectives and remains discovered during operations will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988</i>' and replace with -</p>	<p>Amended.</p>

	<p>'If suspected cultural heritage material is discovered during operations, immediately stop any further work in the area, secure the site and ensure no further ground disturbing takes place in the immediate area'.</p> <p>'Contact the relevant Traditional Owner community, in this case the Yandruwandha Yawarrawarka Traditional Land Owners Aboriginal Corporation (YY), to identify an appropriate course of action. Options include risk managing the area with YY's assistance or seeking authorisation under section 23 of the <i>Aboriginal Heritage Act 1988</i> (SA) where damage to Aboriginal heritage cannot be avoided'.</p> <p>'Any Aboriginal heritage sites, objectives and remains discovered during operations will be appropriately reported and responded to, consistent with the <i>Aboriginal Heritage Act 1988</i> (SA)'.</p>	
	<p><b>Aboriginal Heritage Act</b> The <i>Aboriginal Heritage Act 1988</i> (SA) applies to the entirety of the Project area, protecting all Aboriginal heritage sites, objects and ancestral remains (together heritage) there, where recorded, reported or undiscovered. This protection extends to heritage that may exist within areas that have been previously disturbed, subjected to cultural heritage surveys, or work area 'clearances'.</p> <p>Section 20 of the Act requires APA to report any discoveries of Aboriginal heritage in the Project area to the Premier. This may be done through AAR, by calling (08) 8226 8900 or emailing <a href="mailto:DPC-AAR.HeritageSites1@sa.gov.au">DPC-AAR.HeritageSites1@sa.gov.au</a>.</p> <p>If heritage is discovered, work in the area must immediately cease, and the site should be secured and avoided unless and until authorisation to affect the heritage is granted under section 23 of the Act. If ancestral remains are discovered, APA must immediately contact SAPOL as required by the Coroners Act 2003 (SA).</p>	NA. Information only.
	<b>The central archives and the Register of Aboriginal Sites and Objects</b>	Reference to this search has been included in

	<p>AAR administers central archives containing a Register of Aboriginal Sites and Objects. EMM Consulting searched the central archives on behalf of APA on 13 March 2020. AAR advised EMM that 61 recorded heritage sites, objects or remains exist within a five kilometre radius of the Project area.</p> <p>The central archives are not an exhaustive record of South Australian heritage. Undiscovered or unrecorded heritage may exist within APA's operations area, even in areas that have been significantly altered by past activities. Local heritage archives may also be kept by Aboriginal heritage organisations within an interest in the area.</p> <p>The central archives are regularly updated with new site records. Searches of the archives are strongly recommended immediately prior to any ground disturbing works, and regularly during longer-term projects. Requests for central archives searches may be made through AAR's online portal, Taa wika:  <a href="https://taawika.sa.gov.au/public/request-for-access/enter">https://taawika.sa.gov.au/public/request-for-access/enter</a>. Please call (08) 8226 8900 for assistance with searches.</p>	<p>Section 4.3.1 as follows:</p> <p>'A search of the central archive, including the Register of Aboriginal Sites and Objects, maintained by the Aboriginal Affairs and Reconciliation Division of the SA Department of the Premier and Cabinet, requested in May 2013, recorded one registered site and four reported sites, within a 30m buffer of the pipelines (Figure 5).</p> <p>Another search of the central archive and Register of Aboriginal Sites and Objects, was requested in March 2020. 61 records were identified within a 5km radius of the pipelines. Work must be assessed on a case by case basis and the Environment and Heritage Team contacted in the event that work is planned to be completed on the pipelines.</p>
	<p><b>Heritage Management and Aboriginal Engagement</b></p> <p>The Project documents provide no specific information about APA's engagement with Traditional Owners. Discussion about the establishment of a Cultural Heritage Policy at page 46 of the EIR suggests that APA has framed its policy solely around native title claim groups.</p> <p>The Act is essentially blind to native title, instead prioritising 'Traditional Owners' who are defined as individual connections, to and responsibilities for, heritage. The views of all Traditional Owners should be sought and considered in the context of cultural heritage policies.</p> <p>While registered native title bodies corporate (RNTBCs) are required to represent their members and common law holders in respect of their lands, please be aware that in most native title areas, there will be Traditional Owners who are not RNTBC members or common law holders. Such people may nonetheless have traditional interests in heritage on native title lands, and will likely not have access to</p>	<p>Further emphasis regarding engagement of Traditional owners is now included within the EIR.</p>

	<p>information from RNTBCs.</p> <p>Several Aboriginal heritage organisations may legitimately coexist within the one area. Each should be respectively engaged on equal merit to understand the heritage they speak for. The heritage groups known to AAR in this case are listed below. While RNTCs have a particular role under mining legislation, under the Act, Aboriginal organisations imply serve as a convenient mechanism to collate the views of the Traditional Owners they represent. An RNTBC itself cannot be a Traditional Owner under the Act, and the views expressed by the RNTBC as a corporation should not automatically be preferred to those of Traditional Owners within particular responsibilities for specific heritage.</p> <p>AAR notes that heritage management measures for the Project are referenced in the EIR in section 7.1 and Appendix 2. It would be prudent for APA to bring these together under an overarching Cultural Heritage Management Plan (CHMP) for the Project. A CHMP would augment APA's existing heritage management framework by specifying measures to be undertaken before, during and after Project activities to adequately manage Aboriginal heritage.</p> <p>APA should refer to Attachment 2 and 3 to this letter for information that will assist it in meeting its obligations under the Act.</p>	
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