



Environmental Impact Report

Riverland Pipeline (PL6)


Berri to Mildura Pipeline (PL11)

Australian Gas Networks Limited

ACN 078 551 685

420-RP-AM-0006

Revision 7.0

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APPROVAL DATE	01/02/2024

DOCUMENT CONTROL & APPROVAL INFORMATION

Summary of Changes

Below is a brief summary of the changes made to the document since the previous issued version.

Revision	Amendment	Date	Prepared by
0 (Initial)	Initial issue of the Angaston to Berri Transmission Pipeline and Murray Bridge Lateral Pipeline (Riverland Pipeline – PL6) Environmental Impact Report.	December 2003	Origin Energy & Epic Energy
0 (Initial)	Initial issue of the Berri to Mildura Natural Gas Transmission Pipeline, Declaration of Environmental Factors/Environment Effects Report.	October 1998	Boral Energy Asset Management Limited & Ecos Consulting (Aust.) Pty Ltd.
1.0	Consolidation of Riverland and Berri Mildura Gas pipelines into one common EIR. Incorporation of APA Groups National Environmental Management Framework. 5 year review.	25/08/2015	T. Godfrey
2.1	New format and content update.	23/08/2017	L. McFarlane
2.2	Department of the Premier and Cabinet comments incorporated.	08/11/2017	L. McFarlane
2.0	Issued for Use	08/11/2017	L. McFarlane
3.0	Figure 1 and Section 4.5.2 updated	28/11/2017	G. Sorensen
4.0	Other SA Government Department comments incorporated, including updating of Appendix D	23/04/2018	G. Sorensen
5.0	5 year review. Update of information incorporating new Environmental Risk Assessment and Operational Environmental Management Plan	30/05/2023	Senversa
6.0	DEM comments incorporated	10/08/2023	S. Franceschini
7.0	SA Government Department comments incorporated, including updating of Appendix D	01/12/2023	S. Franceschini

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1 INTRODUCTION

1.1 Background

APA Group (APA) is a leading energy transmission business in Australia and is Australia's largest natural gas infrastructure business, owning or operating in excess of \$21 billion of energy assets. APA's gas transmission pipelines span every state and territory in mainland Australia, delivering approximately half of the nation's gas usage.

APT O&M Services Pty Ltd (ACN 112 358 586), a wholly owned subsidiary of the APA Group, operates and maintains the Riverland Gas Pipeline and the Berri to Mildura Gas Pipeline on behalf of pipeline owner and licensee, Australian Gas Networks Limited (AGN) (ACN 008 139 204).

1.1.1 Riverland Pipeline

The Riverland Pipeline (RLP) comprises of the Angaston to Berri natural gas lateral pipeline (167.0km) and the Murray Bridge natural gas lateral pipeline from Sedan Junction to Murray Bridge (64.1km). The RLP is operated under Pipeline Licence 6 (PL6) issued by the Department of Primary Industries and Resources, South Australia (PIRSA) (now the Department of Energy and Mining (DEM)) in January 1994.

The RLP delivers odorised natural gas from the Angaston Compressor Station in the outskirts of Angaston, South Australia to the Berri Gate Station at Accolade Wines (Berri Estates Winery), Glossop, approximately 5 kilometres West of Berri, South Australia, with a lateral pipeline from Sedan (Sedan Junction), South Australia to the Delivery Station, Murray Bridge, South Australia. The Pipeline supplies natural gas to industrial, commercial and domestic consumers in the townships of Berri and Murray Bridge respectively and the City of Mildura and surrounding townships in Victoria via the Berri to Mildura transmission pipeline.

The RLP route is shown in Figure 1.

1.1.2 Berri to Mildura Pipeline

The Berri to Mildura Pipeline (BMP) is an onshore gas transmission pipeline that supplies natural gas from an off-take on the Riverland Gas Pipeline near Berri in the Riverland of South Australia, to industrial, commercial and domestic markets in the city of Mildura in Victoria, and nearby areas including the Redcliffs township and Karadoc Winery. The BMP is approximately 148 km in length, with 42.3 kilometres in South Australia, and just over 105 kilometres in Victoria. The South Australian section of the BMP is operated under Pipeline Licence 11 (PL11) issued by PIRSA (now DEM) in May 1999; whilst the Victorian section of the pipeline is operated under Pipeline Licence 226 (PL226) issued by the Department of Natural Resources and Environment, Victoria (now the Department of Energy, Environment and Climate Action) in June 1999. The day-to-day operations of Pipeline Licence PL226 is administered by Energy Safe Victoria.

BMP route is shown in Figure 2.

The RLP and BMP together are collectively referred to throughout this document as the Pipeline.

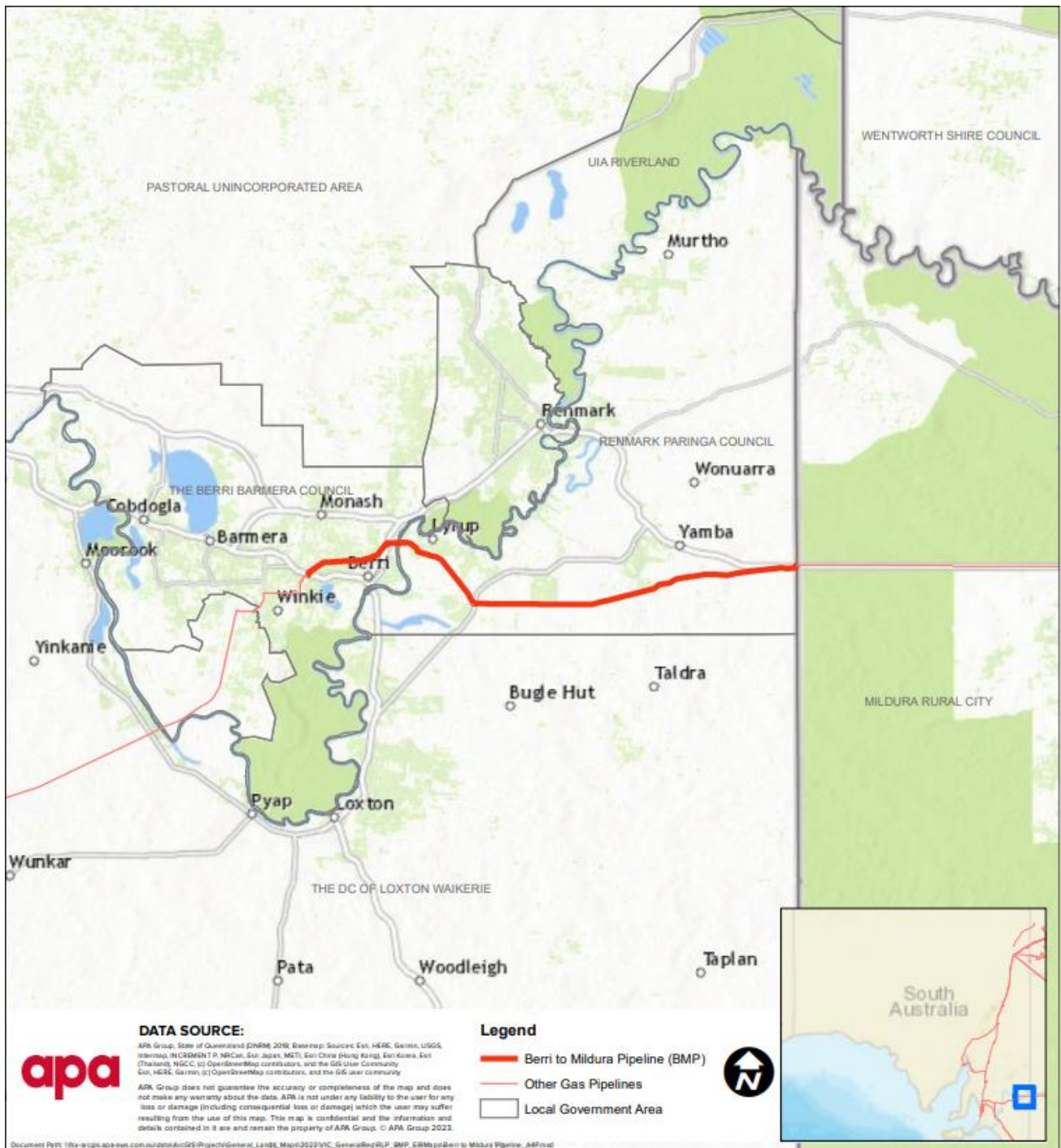


Figure 2: Berri to Mildura Pipeline

1.2 PURPOSE

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

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

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

1.3 Environmental Commitment

APA is committed to responsible environmental management for the operation of the RLP and BMP 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:

- All relevant State and Commonwealth laws and regulations;
- APA Health, Safety, Environment and Heritage Policy (Appendix A);
- RLP and BMP Operational Environmental Management Plan (870-PL-HSE-0020);
- Relevant industry standards (e.g. Australian Standard AS2885.3-2022: Pipelines – Gas and Liquid Petroleum – Operation and maintenance); and
- The Australian Pipeline and Gas Association Code of Environmental Practice – Onshore Pipelines (Revision 5, 2022).

2 LEGISLATIVE FRAMEWORK

2.1 Petroleum and Geothermal Energy Act 2000

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

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

2.2 Environmental Legislation

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

Table 1: Key Additional Legislation

Legislation	
COMMONWEALTH	
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	<ul style="list-style-type: none"> The pipeline easement is not within a declared significant Aboriginal area. Requirements for notification of Aboriginal remains found are also covered by State legislation.
<i>Environment Protection and Biodiversity and Conservation Act 1999</i>	<ul style="list-style-type: none"> Protects "Matters of National Environmental Significance" (MNES) including World Heritage areas, National Heritage places, Ramsar wetlands of international importance, listed threatened species and ecological communities, and listed migratory species. Act is unlikely to be triggered during operations as there will be no impact to MNES.
<i>National Greenhouse and Energy Reporting Act 2007</i>	<ul style="list-style-type: none"> Annual reporting of fugitive emissions. Retain fuel usage and gas release data.
STATE	
<i>Aboriginal Heritage Act 1988</i>	<ul style="list-style-type: none"> Provides for the protection of all Aboriginal sites, objects and remains, including recorded, reported or undiscovered heritage. The discovery of all Aboriginal heritage sites should be reported to the Minister for Aboriginal Affairs and Reconciliation (through the Attorney-General's Department, Aboriginal Affairs and Reconciliation).
<i>Agricultural and Veterinary Products (Control of Use) Act 2002</i>	<ul style="list-style-type: none"> The Act prohibits use or possession of an agricultural chemical product that has not been registered by the APVMA unless authorised under a permit.
<i>Controlled Substances Act 1984</i>	<ul style="list-style-type: none"> Under section 22 of the Act, a licence is required to possess a poison prescribed by the regulations. Sections 25, 26, and 27 of the Act outline the requirements for packaging and labelling, storage, transport, and use of poisons. Use of any poisons defined in regulation 5 of the poisons regulations must comply with the requirements set out in the regulations. Regulations 48 and 49 (poisons regulations) outline disposal and record keeping requirements for different poison classes. A pest controller's licence is required to conduct a pest control business, as outlined in Part 2 of the pesticides regulations. The regulations do not apply to the application of glyphosate in certain circumstances outlined in Regulation 5 (pesticides regulations). Any pest control conducted for a fee must be conducted by a person/ business who holds a pest controller's licence in accordance with Part 2 the Regulations, and only the specified pest control authorised under that licence.
<i>Crown Land Management Act 2009</i>	<ul style="list-style-type: none"> Makes provision for the disposal, management and conservation of Crown land.
<i>Dangerous Substances Act 1979 and Regulations 2002</i>	<ul style="list-style-type: none"> Sets out the requirements for the keeping, handling, transporting, conveyance, use and disposal, and the quality, of dangerous substances. Sets out the general duty to take precautions when keeping, handling, conveying, using or disposing of a dangerous substance, or in transporting dangerous goods. Dangerous goods and substances are defined in the Regulations.
<i>Environment Protection Act 1993</i>	<ul style="list-style-type: none"> Outlines the general environmental duty to ensure that all reasonable and practicable measures are taken to prevent or minimise environmental harm and to protect, restore and enhance the quality of the environment while having regard to the principles of ecologically sustainable development. Disposal of wastewater (i.e. trench or hydro-test water) to inland waters may require approval under the Act. Protects water quality and waterways as per the Environment Protection (Water Quality) Policy 2015.

Legislation	
<i>Fire and Emergency Services Act and Regulations 2005</i>	<ul style="list-style-type: none"> Section 89 sets out restrictions on the use of engines, vehicles or appliances of prescribed kind (e.g. welders or angel grinders) during the fire danger season. All unattended fires should be reported. Duties to prevent fire based on land ownership are outlined in Division 3 of the Act. The Regulations define requirements for fire extinguishers.
<i>Forestry Act 1950</i>	<ul style="list-style-type: none"> Authorisation must be sought from Forestry SA prior to activity in forest reserves.
<i>Heritage Places Act 1993</i>	<ul style="list-style-type: none"> Allows for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance. Should works be required outside the existing easement they will be assessed under the Act. The discovery of new Heritage sites will be dealt with as per the requirements under the Act.
<i>National Parks and Wildlife Act 1972</i>	<ul style="list-style-type: none"> Provides for the conservation of wildlife in a natural environment. In the unlikely event that protected fauna are required to be handled a permit will be sought under the Act.
<i>Native Title (South Australia) Act 1994</i>	<ul style="list-style-type: none"> Act relating to the Native Title of Traditional Owners. Native Title holders or Traditional Owners will be managed as landholders on all tenure types (other than freehold). New works (and some maintenance activities) may require formal notification under the Act.
<i>Native Vegetation Act 1991</i>	<ul style="list-style-type: none"> Controls the clearance of native vegetation. Vegetation disturbance incidental to the repair or maintenance of infrastructure is exempt under the <i>Native Vegetation Regulations 2017</i> (Schedule 1 - Regulation 8(2) Maintenance of Infrastructure). New infrastructure may require assessment under the Act.
<i>Landscape South Australia Act 2019</i>	<ul style="list-style-type: none"> Key framework for managing the state's land, water, pest plants and animals and biodiversity across the state. Outlines the general statutory duty to act responsibly in the management of natural resources, including the protection of biodiversity, and the potential impact of a failure to comply with the relevant duty. Prescribed water resources are managed under this Act and include the issuing of water licences that endorse a water entitlement. Water Affecting Activities (i.e., excavation in a water course, riparian vegetation clearing, disposing of wastewater into a waterway) undertaken during operations may require a Permit.

Legislation	
<p><i>Planning, Development and Infrastructure Act 2016</i></p>	<ul style="list-style-type: none"> • Infrastructure for the distribution of gas is defined as essential infrastructure under the Act. Part 8 sets out the development assessment pathways for essential infrastructure. • Development includes any tree-damaging activity in relation to a regulated tree. • There are exemptions for utilities works on local heritage places under the Regulations that meet the following conditions: <ul style="list-style-type: none"> - Does not encroach on a public street, and - Will not (once installed) be able to be seen by a person standing at ground level in a public street; and - Does not affect the ability of the place to resist the spread of fire. • Works must avoid damaging any other heritage elements such as established trees, significant structures or historic fixtures (such as original driveways or fences). • Activities that are approved under the PG&E Act do not generally require approval under the PDI Act. Projects of major environmental, social, and economic importance require approval via an EIS under the PDI Act. The Building Rules under the PDI Act still apply to any building work. (s.161) • Emergency orders are set out under Division 5 of the Act. • An authorised officer may make an emergency order under this section if the officer is of the opinion that the order is necessary— <ul style="list-style-type: none"> - because of a threat to safety arising out of the condition or use of a building or an excavation; or - because of a threat to any State heritage place or local heritage place. - An emergency order may require an owner to evacuate, stop works, or carry out works.
<p><i>Radiation Protection and Control Act 2022 & Radiation Protection and Control Regulations 2022</i></p>	<ul style="list-style-type: none"> • Provides for the control of activities related to radioactive substances and radiation apparatus, and for protecting the environment and the health and safety of people against the harmful effects of radiation. • A licence is required to handle radioactive substances under s.28 e.g., non-destructive testing. • A person must not dispose of a radioactive substance without the prior approval of the Minister. • A natural person must not use or handle a radioactive substance unless that use or handling is authorised by a licence or temporary licence granted by the Minister under this section. • In accordance with APA National Radiation (NORM) Management Plan, Project Manager to notify environment team prior to applicable activities identified in the ERA (Appendix C), to discuss potential for Naturally Occurring Radioactive Material (NORM) waste.
<p><i>River Murray Act 2003</i></p>	<ul style="list-style-type: none"> • Provides for the protection, restoration and enhancement of the Murray River and its natural resources (including water, soil, ecosystems and heritage associated with the River). • Aims to ensure that the River and natural resources are used and managed in a sustainable way, in order to support environmental, social and economic values. • Outlines a general duty of care to take all reasonable measures to prevent or minimise harm to the River Murray. • Under this Act, the Minister responsible for the administration of the Act has the power to review applications such as Statements of Environmental Objectives.

Table 2: Key Additional Policies

Policies	
Commonwealth	
<i>National Environment Protection (National Pollutant Inventory) Measure 1998</i>	<ul style="list-style-type: none"> • South Australia is a participating State to this NEPM, and reporting requirements are also described in the State Legislation. • 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.
State	
<i>Environment Protection (Air Quality) Policy 2016</i>	<ul style="list-style-type: none"> • Sets maximum pollutant levels for air. • Operational sites must comply with air quality standards.
<i>Environment Protection (Commercial and Industrial Noise) Policy 2023</i>	<ul style="list-style-type: none"> • Outlines the assessment framework for the assessment of commercial and industrial noise sets limits for noise production. • Operations and operational sites must comply with noise standards. • Application of construction noise restrictions.
<i>Environment Protection (Water Quality) Policy 2015</i>	<ul style="list-style-type: none"> • Declares environmental values for the protection of streams, rivers, oceans and groundwater. • Operations will manage wastewater by: <ul style="list-style-type: none"> - Avoiding its production - Eliminating, or reducing it - Recycling and re-using it - Treating it to reduce potential harm to the environment
<i>Environment Protection (Movement of Controlled Waste) Policy 2014</i>	<ul style="list-style-type: none"> • Outlines <ul style="list-style-type: none"> - Requirements for tracking of controlled waste, and any associated reporting - Categories and characteristics of controlled waste - Consignment and record keeping requirements
<i>Environment Protection (Waste to Resources) Policy 2010</i>	<ul style="list-style-type: none"> • Outlines <ul style="list-style-type: none"> - Waste management objectives and obligations - Waste transport requirements - Restrictions related to various types of waste - Requirements around waste disposal facilities
<i>Environment Protection (National Pollution Inventory) Policy 2008</i>	<ul style="list-style-type: none"> • Outlines <ul style="list-style-type: none"> - Types of substances - Record and reporting requirements

3 PIPELINE DESCRIPTION

3.1 Pipeline Alignment

Riverland Pipeline

The RLP was constructed and commissioned in 1994. It is 231 kilometres in length, comprising of the Angaston to Berri natural gas lateral pipeline (167.0km) and the Murray Bridge natural gas lateral pipeline from Sedan Junction to Murray Bridge (64.1km). The pipeline supplies natural gas to the townships of Berri and Murray Bridge respectively and the City of Mildura and surrounding townships in Victoria via the BMP transmission pipeline.

The RLP commences from the Angaston Compressor Station located on Stockwell Road, Angaston. The pipeline crosses the River Murray at Swan Reach and then again at New Residence northwest of Loxton. The pipeline terminates at the Berri Gate Station. The Murray Bridge Lateral begins at the Sedan Junction and terminates at the Murray Bridge Gate Station.

The RLP is predominately located within registered easements passing through private properties; these are typically 15m - 20m in width. The balance of the pipeline passes through crown land and road reserves enroute to Berri and Murray Bridge respectively.

Berri to Mildura Pipeline

The BMP was constructed and commissioned in 1999. It is 148 kilometres in length and supplies natural gas to the City of Mildura and surrounding townships in Victoria.

The South Australian section of the BMP commences from the Berri Off-take Station located in the same compound as the Berri Gate Station, the terminal point for the RLP. The route follows a disused railway easement and is installed in the same easement as a 1400kPag distribution line that connects the RLP to a number of local industries. This distribution line terminates at the former Berrivale Cannery, north of Berri.

From the former Berrivale Cannery (KP7.4) the pipeline heads north for a short distance on the western side of the Sturt Highway, prior to crossing the Highway and traversing a disused Council waste depot. The pipeline remains south of the Wilabalangaloo Reserve, managed by the National Trust.

The pipeline then traverses the Lyrup Forest (part of the Murray River National Park) for a distance of approximately 1km. This area is managed by the Department of Environment and Water (DEW). The area is included in the Riverland Biosphere Reserve and the Gurra Gurra Lakes management area and listed on the Register of the National Estate.

To the east of the Lyrup Forest the pipeline is installed through the township of Lyrup, along exiting road reserves. Beyond Lyrup, the pipeline traverses gently undulating broad-acre farmland until the South Australia-Victoria Border where it follows the Sturt Highway. Generally, the pipeline is installed across grazing and cropping paddocks.

3.2 Pipeline Customers

The Pipeline supplies natural gas from the Epic Energy Moomba to Adelaide Gas Pipeline to industrial and domestic customers within the townships of Berri, Murray Bridge and the City of Mildura, Victoria.

3.3 Design and Engineering

3.3.1 Riverland Pipeline

The RLP is approximately 231 kilometres long. A summary of its design parameters are provided in Table 3. A brief description of the Riverland Gas Pipeline facilities and associated infrastructure is provided in Table 4.

Table 3 Riverland Gas Pipeline Engineering and Design Features

Design Element	Gas Pipeline	
	Angaston to Berri	Sedan Junction to Murray Bridge
Date Constructed	1993-1994	1993-1994
Date Commissioned	October 1994	December 1994
Length	167 km	64.1 km
Diameter (OD)	114.3 mm	114.3 mm

Design Element	Gas Pipeline	
	Angaston to Berri	Sedan Junction to Murray Bridge
Minimum Depth of Cover	In accordance with AS 2885.1, typically: Cross country sections – 600-900 mm Beneath roads and watercourses – 1500 mm	
Main Line Valves	8	2
Meter Stations	Angaston Compressor Station and Berri Gate Station	Murray Bridge Gate Station and Thomas Food (Pallamana) PRMS

Table 4 Riverland Gas Pipeline Facilities and Infrastructure

Facility	Description
Inlet Metering Station	There are three metering stations on the Riverland Pipeline. Metering stations are located at Berri, Murray Bridge, and Thomas Foods (Pallamana) PRMS. The meter stations include flow measurement, emergency isolation, gas filtration, pressure regulation and gas heating. The stations are surrounded by security fencing.
Compressor Station	The compressor station at Angaston is supplied natural gas from the Moomba to Adelaide Pipeline via a connection between Wasleys and Angaston; delivering the gas into the Riverland Pipeline. There is one compressor station located at Angaston on the Riverland Pipeline. The compressor station is surrounded by security fencing.
Mainline Valve (MLV)	There are ten MLVs on the Riverland Pipeline. MLVs are installed above ground at the Angaston compressor station (Berri MLV1), in the Berri Gate Station Compound (Berri MLV8) and at the Murray Bridge Gate Station (Murray Bridge MLV2). All other Main Line Valves are installed in pits. They are located on both sides of the River Murray at each river crossing, near Sedan, adjacent to the Murray Bridge lateral branch, and midway between Swan Reach and New Residence. MLVs are located within the pipeline easement and are protected by various means, such as bollards, vehicle barrier fencing and, in some locations, complete security fencing.
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 sacrificial anode beds, which are connected to the Pipeline via cabling. In addition, cathodic protection test points are located at various positions along the Pipeline, dependent on infrastructure, but at a distance no greater than 3 km apart. The test points are required to allow for monitoring of the effectiveness of the corrosion protection system.
SCADA System	A SCADA (Supervisory Control and Data Acquisition) 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 Kidman Park Control Centre. 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.

3.3.2 Berri to Mildura Pipeline

The BMP is approximately 148 km in length. The South Australian section of the BMP is just over 42 km whilst the Victorian section is just over 105 km in length. A summary of its design parameters is provided in Table 5. A brief description of the BMP facilities and associated infrastructure is provided in Table 6.

Table 5 Berri to Mildura Pipeline engineering and design features

Design Element	Gas Pipeline
Date Constructed	1999
Date Commissioned	1999
Length	148 km (42 km in SA and 105 km in VIC)
Diameter (OD)	114.3 mm
Minimum Depth of Cover	In accordance with AS 2885.1, typically: - Cross country sections – 900 mm

Design Element	Gas Pipeline
	- Beneath roads / watercourses – 1200 - 1500 mm
Main Line Valves	1 in SA, 3 in VIC
Meter Stations	Berri Off-take Station (SA) and Mildura Gate Station (VIC)

Table 6 Berri to Mildura Pipeline facilities and infrastructure in SA

Facility	Description
Inlet Metering Station	<p>There are two metering stations on the Berri to Mildura Pipeline. Metering stations are located at Berri and Mildura.</p> <p>An inlet metering station is located at the Berri Off-take Station to take receipt of natural gas from the Riverland pipeline, delivering it into the Berri to Mildura Pipeline. The offtake station at Berri includes flow measurement, inlet pressure measurement, a gas flow-limiting device, emergency isolation and gas filtration. The metering station is surrounded by security fencing.</p> <p>A metering station is also located at Mildura. The Mildura Gate Station includes emergency isolation, gas filtration, pressure regulation, gas metering for downstream distribution and gas heating. The metering station is surrounded by security fencing.</p>
Mainline Valve (MLV)	<p>There is one MLV installed on the SA section of the Berri to Mildura pipeline located approximately 20km upstream of the Berri Off-take Station.</p> <p>The MLV is installed above ground and occupies a fenced and gravelled area of approximately 200 m² and is located on the pipeline easement.</p> <p>Three further MLVs are located on the Victorian section of the pipeline.</p>
Cathodic Protection System	<p>A cathodic protection system is incorporated into the pipeline design to protect the Pipeline from corrosion. This involves the use of buried sacrificial anode beds, which are connected to the Pipeline via cabling. In addition, cathodic protection test points are located at various positions along the Pipeline, dependent on infrastructure, but at a distance no greater than 3 km apart. The test points are required to allow for monitoring of the effectiveness of the corrosion protection system.</p>
SCADA System	<p>A SCADA (Supervisory Control and Data Acquisition) 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' Kidman Park Control Centre.</p> <p>All telemetered stations utilise 240 volts supplies except where unavailable and solar power with battery back-up is used.</p>
Pipeline Markers	<p>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.</p>

3.4 Operations and Maintenance

A routine operation and maintenance program is in place for the entire pipeline network including facilities and third-party activities operated by the company. This may include leak detection surveys, ground and aerial patrols, repair or replacement of faulty pipe or other equipment, corrosion monitoring and remediation, and easement and maintenance. Aerial and/or ground inspections include checking for subsidence, erosion and third-party encroachments along the pipeline route.

Housekeeping of the above ground facilities is undertaken regularly.

Maintenance activities such as integrity digs to confirm pipeline integrity occur infrequently. When these occur, efforts are made to minimise any impact upon the surroundings and the land is returned to as close as possible to the pre-existing condition. Integrity digs involve the excavation of material from around the pipeline to allow sufficient room for operations technicians to inspect, check and safely undertake any remedial work required.

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.

Before You Dig Australia (BYDA) 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.

Operations along the pipelines are undertaken by Adelaide based teams within the company with the support of regionally based operations in Mildura and dedicated trained contractors in regional locations, all with access to specialist national staff utilised across the company.

A summary of pipeline operational and maintenance activities applicable is provided in Table 7.

Table 7 Summary of Pipeline Activities

Activity	Description
Easement Maintenance	
Weed control	Localised control of weeds is undertaken along the easement as required.
Line of sight (LOS) clearance	The pipeline is clearly marked with pipeline markers and both upstream and downstream markers are visible by line of sight. Vegetation management is performed to keep the pipeline easement clear from a line of sight perspective and to protect the pipeline from tree root damage. Significant trees outside of the pipeline easement will not be impacted by vegetation management or pipeline maintenance activities.
Erosion Detection and Remediation	It is possible that erosion can occur on creek lines or run-off areas along the pipeline easement following major rainfall events. Pipeline patrolling activities are undertaken to identify erosion events and repairs are affected as soon as practicable following the erosion event and include the replacement of similar materials and re-profiling.
Patrolling – easement access	Ground patrols are completed via vehicle and in some instances by foot if access is difficult. The frequency of inspections is determined based on specific risks posed to the Pipeline and is regularly confirmed during the SMS. Generally, ground patrols are completed at least annually. Additional inspections may be scheduled in response to aerial sightings, landowner concerns or extreme weather events such as flooding or fire.
Aerial inspection of easement	Aerial surveillance is undertaken by low flying aircraft, usually a fixed wing plane. The frequency of inspections is determined based on specific risks posed to the Pipeline and is regularly confirmed during the SMS. Generally, aerial surveillance is completed monthly.
Pipeline Operation and Maintenance	
Cathodic protection surveys	Cathodic protection maintains the condition of the Pipeline by polarising the steel to reverse the corrosion process. Surveys are undertaken regularly to monitor

Activity	Description
	<p>electrical currents and the resulting level of cathodic protection. The general process involves connecting a voltage meter to cathodic protection test post to check for any indication of corrosion or pipeline coating damage. Should additional cathodic protection be required then a cathodic protection unit will be installed. A unit consists of a ground bed, built from coke, which is buried away from the pipeline in a suitable soil type, above ground control equipment and marker posts.</p>
<p>Pigging</p>	<p>Cleaning pigs are run through the pipeline, as required. A pig is placed in the Pipeline via a launch bay with the pig travelling along inside the Pipeline at a set pace as determined by gas flow and pressure before being removed at a pig receiving site. Launch bays and receiver traps are located at Inlet and Outlet Stations. Removal of pigs from the Pipeline results in minor venting of gas into the atmosphere and the collection of some sludge and debris. Any sludge or debris that may come out of the receiver trap with the pig is captured in the pig barrel and removed from site for appropriate disposal. Small amounts of general purpose grease and degreaser may be used during pigging.</p> <p>Pipeline integrity gauge pigs are not used on the RLP and BMP, at this stage, due to size restrictions.</p>
<p>Excavations (including coating refurbishment, installation of anode beds, emergency response exercises and new tie-ins)</p>	<p>Excavation of the pipeline may be undertaken for maintenance purposes. Once vegetation and topsoil have been cleared and stockpiled, the excavation is performed and spoil stockpiled. The pipeline maintenance is then undertaken (and 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 re-spread.</p>
<p>Replacement of pipeline section</p>	<p>Replacement of a pipeline section may be undertaken following in-line inspection, or following an emergency event.</p> <p>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 the pipeline to be replaced is then excavated, removed and replaced and the site reinstated.</p> <p>This is a very rare occurrence and not expected to occur within the life of this EIR.</p>
<p>Welding</p>	<p>Welding is usually required when pipeline repairs or modifications are made to existing infrastructure. Pipeline welding usually occurs following the excavation of the pipeline, if the pipeline requires a mechanical repair (welded reinforcement or clock spring). Each weld is inspected using x-ray or ultrasonic equipment as per AS 2885.2.</p> <p>Occasionally welding of above ground pipework and fittings is required.</p>
<p>Pipeline coating</p>	<p>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 round the weld is wire-brushed or grit blasted and then coated with a protective coating to prevent corrosion.</p>
<p>Pressure testing</p>	<p>Hydrostatic pressure testing is required when a section of pipe is replaced or during construction of a new pipeline. During hydrostatic testing the pipeline is capped with test manifolds, filled with water and pressurised up to 110% 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, in accordance with the Environment Protection (Water Quality) Policy 2015 Alternatively, it may be contained and treated on site or removed off site.</p>
<p>Filter inspection and replacement</p>	<p>Filter inspections and replacements are carried out within secure compounds at Inlet and Outlet metering stations. The filter is removed, washed down with water and put into a secure container for discarding. Water for wash down of filters and degreaser is captured and disposed of offsite. Minimal natural gas is released during this work.</p>

Activity	Description
Valve maintenance	Valve checks are carried out within secure compounds at Inlet and Outlet Metering Stations. The valve is turned on and off to check the integrity of the seal. A small amount of degreaser may be used and is captured and disposed of offsite. Minimal natural gas is released during this work and, although odourised, it is not likely to be noticeable outside of Station perimeters.
Facility Operations and Maintenance	
Metering stations	Metering stations consist of valving, metering, gas analysis and scraper launching or receiving facilities.
Compressor station	Angaston compressor station consists of two compressor packages, switch room, control room, water bath heater, transformer, two aboveground 1kl lubrication oil storage, two below ground 2kl concentrate tanks (collect scrubber condensate drop out and oily water from compressor skid bunds), diesel generator and ablutions.
Weed control	Localised control of weeds is undertaken in and around compounds, typically annually.
Production of hazardous waste	Waste hydrocarbons are generated from maintenance/in-line inspections (ex-pipeline/product).
Waste disposal	General waste generated during operations is collected on site and removed to licensed facilities for disposal.
Venting	<p>Unplanned emissions: Uncontrolled venting which is a result of equipment failure e.g. regulator failure. Duration would depend on type and duration of failure, uncontrolled venting is a rare occurrence. This is not expected to occur during pipeline operation and has an extremely low likelihood of happening.</p> <p>Planned emissions: A small amount of natural gas may be released to the atmosphere on an infrequent basis as a result of some critical maintenance activities (i.e., unit blow downs/ venting, valve opening/testing) during the operational life of the pipeline.</p> <p>Noise emissions during normal operations are generated due to, vehicles and machinery travelling along access tracks and the easement, activities such as earthworks, vegetation management and infrequently gas venting from pressurised vessels or pipes. Non-routine corrective and preventative maintenance, such as venting, pigging, purging or excavations may generate elevated noise levels, however these activities occur very infrequently and only on an as needed basis.</p>

3.5 Pipeline Management System

The Pipeline is operated under a Pipeline Management System which ensures compliance with all aspects of AS2885 and regulatory requirements. The System requirements that are detailed in the Pipeline Management Plan include the components outlined in Table 8.

Table 8 Pipeline Management System Components

Component	Description
RLP and BMP Operational Environmental Management Plan (OEMP)	The OEMP details the environmental management framework that APA operates under and provides control measures to manage environmental risks associated with operations and maintenance in accordance with APA's Environmental Risk Assessment. The OEMP is applicable to all activities undertaken by APA employees and contractors and reflects APA systems, detailing environmental management expectations and relevant legislative and regulatory obligations.
Emergency Management Plan	Sets out the procedures and resources to be deployed by personnel in the event of an emergency incident to the Pipeline. The Plan establishes the structure of emergency management teams, the communication processes and the resources that may be required to manage an emergency.

Component	Description
Infrastructure Management Plan	Addresses AS2885.3 2022 Section 7. Details the management external third-party interference/s including management of the land, landholders and third party works.
Pipeline Integrity Management Plan (PIMP) including:	Addresses AS2885.3 Section 5. Carries relevant details of the assets and a detailed summary of the integrity challenges and mitigation. Specifies the maintenance requirements and operational guidelines for both normal operations and specific mitigation activities and is the basis of the Maintenance Plan.
<ul style="list-style-type: none"> Fit For Purpose 	Addresses AS2885.3 Section 10.3. Carried out at a maximum of 10 years.
<ul style="list-style-type: none"> Safety Management Study (SMS) 	The SMS is formally reviewed at least 5 yearly in accordance with AS 2885.6. During the period between formal reviews various specific risk aspects may occur requiring a Study.
<ul style="list-style-type: none"> Location Class Review 	Formally reviewed at least 5 yearly as part of the SMS.
<ul style="list-style-type: none"> Integrity Review 	Outlines process for assessing and managing the integrity of the asset.
<ul style="list-style-type: none"> Maintenance Plan 	Determined by the PIMP and is programmed into a computerised maintenance system.

3.6 Decommissioning

Decommissioning may occur for an entire pipeline or for an end section/s of a pipeline, laterals from a main line or small sections off a pipeline to a facility where that facility is closing down. In the event that a pipeline is decommissioned legislative and licence conditions will apply, and work will be undertaken based on the standards of the day, current version of cl 10.10 AS 2885.3, current international guidelines, and/or as directed by the relevant Minister.

Upon cessation of facility operations all surface plant will be decommissioned and removed. Infrastructure will be decommissioned and either removed or plugged and left in situ as per the standards of the day. Site remediation will be undertaken according to a site-specific rehabilitation / remediation management plan which may be required as part of the decommissioning plan. This plan will be submitted to the appropriate Regulatory body for review and acceptance within one year of complete cessation of operational activities at the site.

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

3.7 Emergency Response

APA has an Emergency Response Plan (the Networks Emergency Response Plan) which provides personnel with an integrated management plan which ensures an effective and consistent response to incidents on assets. For further details refer to the Statement of Environmental Objectives.

4 DESCRIPTION OF THE ENVIRONMENT

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

4.1 Climate

The climate of Adelaide and Mount Lofty Ranges can be described as temperate, with cool, wet winters and hot, dry summers. The rainfall in the region varies considerably, due to topography and altitude, and ranges from an average of 300 mm in the Barossa Valley to 1000 mm on the highest ridges of the Mount Lofty Ranges.

The Murray Mallee region has a semi-arid climate, characterised by a pattern of very low average rainfall that is relatively uniform in nature across the year. Near Berri (Loxton Station 024024), the wettest month is September at an average of 28.7mm and the driest being March at 11.5mm. Winds in the Murray Mallee region are usually from the northern, western or southern directions. Northerlies in the summer are typically very dry and hot with cooler winds from the west and southwest. In winter, southwest and northwest winds dominate, with greater speeds occurring in the afternoons.

Climatic conditions of the Murray Mallee region are strongly seasonal and typical of an inland temperate zone. As an example, at Renmark in the northern Murray Mallee, the hottest month is January. The coolest months throughout the region are June and July. Relative humidity is low in the area due to the temperate latitude (34 degrees south) and a lack of large water bodies to increase atmospheric moisture levels.

Temperate zone evaporation is extremely high, ranging from 1,800 mm/yr at Angaston to 2,500 mm/yr at Renmark. Evaporation exceeds rainfall for most months of the year. On an annual basis evaporation exceeds rainfall by 3:1 in the ranges from Angaston to Sedan Hill, 4.5:1 from Sedan Hill to Towitta and about 8:1 across the remaining mallee. This rate can be up to 10 times the mean monthly rainfall in summer and virtually equal to rainfall in winter. The high evaporation rate and low rainfall contribute to droughts, which are a natural feature of the region.

Generally, the climate experienced throughout the region through which the pipeline passes, has no effect on pipeline operations. No adverse climatic effects, either directly or indirectly have affected the operation of the pipeline since construction and commissioning.

A summary of climate records for Nuriootpa (Station 023373; BoM 2023), Murray Bridge (Station 024521; BoM 2023) and Loxton (Station 024024; BoM 2023) are provided in Table 9, Table 10, Table 11.

Table 9 Temperature and Rainfall Records for Nuriootpa

Record	Month												Annual
	J	F	M	A	M	J	J	A	S	O	N	D	
Mean Daily Max (°C)	30.2	29.3	26.0	22.0	17.4	14.1	13.5	14.7	17.8	21.4	25.0	27.6	21.6
Mean Daily Min (°C)	14.6	14.6	12.0	9.2	6.9	5.1	4.6	5.0	6.6	8.3	10.8	12.4	9.2
Mean Rainfall (mm)	16.1	23.7	24.8	33.9	48.9	55.2	57.6	58.7	58.4	38.5	35.7	29.9	475.7

Table 10 Temperature and Rainfall Records for Murray Bridge

Record	Month												Annual
	J	F	M	A	M	J	J	A	S	O	N	D	
Mean Daily Max (°C)	29.4	29.3	26.9	23.6	19.6	16.8	16.3	17.6	20.0	23.1	25.9	27.9	23.1
Mean Daily Min (°C)	14.8	14.7	13.0	10.4	8.0	6.0	5.4	5.9	7.2	9.1	11.5	13.3	9.9
Mean Rainfall (mm)	16.4	18.6	20	28.8	35.2	38.0	35.8	36.9	37.0	33.3	25.4	23.4	248.9

Table 11 Temperature and Rainfall Records for Loxton

Record	Month												Annual
	J	F	M	A	M	J	J	A	S	O	N	D	
Mean Daily Max (°C)	32.2	31.4	28.4	24.0	19.6	16.4	16.0	17.6	20.9	24.4	27.6	30.0	24.1
Mean Daily Min (°C)	14.7	14.5	12.2	8.6	6.5	4.7	3.9	4.4	6.4	8.4	11.2	13.1	9.1
Mean Rainfall (mm)	18.1	17.7	11.5	18.4	23.4	23.9	26.0	26.4	28.7	26.7	25.1	22.7	263.1

4.2 Bioregional Environment

The RLP corridor traverses three Interim Biogeographic Regionalisation for Australia (IBRA) bioregions. These being:

- Flinders Lofty Block (Sub-IBRA Mt Lofty Ranges, FLB01) Bioregion;
- Kanmantoo (Sub-IBRA Fleurieu, KAN02) Bioregion; and
- Murray Darling Depression (sub-IBRA Murray Mallee, MDD02) Bioregion.

The BMP traverses only the Murray Darling Depression (sub-IBRA Murray Mallee, MDD02) 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 Flinders Lofty Block and Kanmantoo Bioregions

Between KP 0 and KP 27.4 the Riverland pipeline corridor traverses the undulating to low hilly uplands of the Mt Lofty Ranges and the steeper marginal ranges and hills of the Fleurieu IBRA subregions.

The Mount Lofty Ranges IBRA subregion extends from north of the Fleurieu Peninsula to the Barossa Valley, and is predominantly an undulating to low hilly upland with steeper marginal ranges and hills. The Barossa Valley is the lowest area in this subregion and represents a structural basin. Mount Lofty is the highest peak, at 720 m. The rest of the subregion consists of hilly uplands on sandstone and shale with northerly trending strike ridges and dissected lateritic tableland remnants.

The Fleurieu IBRA subregion is predominantly an undulating to low hilly upland with steeper marginal ranges and hills. A lateritized surface occurs on the Fleurieu Peninsula and becomes increasingly dissected northward to where only a few remnants survive as rounded crests and summits with mottled -yellow duplex soils.

Much of the native vegetation has been cleared, however; Low open woodland commonly dominated by *Eucalyptus obliqua* and *E. baxteri* are found in higher rainfall areas on deep, lateritic soils. Shallower or sandy soils support *E. fasciculosa*, *E. cosmophylla* and in the northern part of the region *E. goniocalyx*, *E. leucoxydon* dominates the woodlands on podzolised soils in the lower rainfall areas, *E. viminalis* ssp. *cygnetensis* dominates the wetter and cooler woodlands and *E. odorata* characterises drier sites. Eucalypts give way to drooping sheoak (*Allocasuarina verticillata*) in the most arid woodlands and in coastal situations on shallow rocky soils.

Geology, Soils and Landforms

Landscapes in the vicinity of the pipeline route vary from steep slopes, crests and rolling hills – from Angaston to the eastern section of the Mount Lofty Ranges, approximately 21km. The eastern slopes and face zone of the Mount Lofty Ranges provide an attractive backdrop when looking west from the undulating plains near Sedan and Towitta. Numerous small intermittent watercourses are present along these slopes, along which, mature River Red Gums line the watercourse banks.

The natural environments of the eastern Mount Lofty Ranges have been predominantly established by past geological and geomorphologic processes, climate and modern land use practices. The majority of the pipeline route comprises terrain that is essentially a series of undulating dunes and hummocks to 3m high, interspersed by large individual plains up to 2km across. Dominant soils are calcareous sandy loams, with relatively fertile red sands on dunes and upper slopes of hummocks. Areas of shallow sandy loams over limestone are widespread towards the west of the land system, with some areas of light clays present on the plains. The finely textured red dunal sands are very sensitive to wind erosion, with the calcareous sandy loams, moderately affected by wind. These sandy loams also contain high levels of chloride ions, indicating the likelihood of salt damage if water-logging occurs.

There are numerous seismic fault lines through the Mt Lofty Ranges. Most notable regarding the Riverland PipelineRLP is the Palmer fault which forms the eastern escarpment of the Mt Lofty Ranges. Minor earthquakes are common in the area but large ones are rare. The Riverland PipelineRLP east of the Palmer fault is considered to be in a stable tectonic area.

Intramontane basins and hilly uplands developed on anticlinal cores of crystalline basement rocks of the Barossa Complex are typical of the eastern side of the Mount Lofty Block. Folding of overlying Adelaidean sediments in the Lower Palaeozoic and intrusion and metamorphism resulted in the formation of schists, pegmatitic and granitoid rocks and augen gneisses. On the eastern slopes, descending to the River Murray Valley and floodplains, rocks of the Cambrian Kanmantoo Group are exposed. The Kanmantoo group includes metasediments such as silty shales, greywacks and arkoses. Easterly running streams on the eastern fault scarp of the Mount Lofty Ranges incise the Kanmantoo Group. The Kanmantoo Group underlies most of the Murray Valley Plains, which are subsequently overlain by predominantly marine Renmark Beds, Mannum Formation and Morgan Limestone.

Hydrology

The North Para River and several small intermittent watercourses are traversed by the pipeline in the western section of the pipeline route, east of Angaston for approximately 21km.

Vegetation and Flora

The pipeline generally traverses a disturbed and almost entirely modified landscape (greater than 95%) consisting mostly of non-native pasture grassland and cereal crop areas. The two major vegetation associations located in the vicinity of the pipeline route in Flinders Lofty Block (Sub-IBRA Mt Lofty Ranges, FLB01) and the Kanmantoo (Sub-IBRA Fleurieu, KAN02) Bioregions are:

- Grassland with emergent remnant woodland Eucalypt species; and
- Grassland with emergent remnant mallee Eucalypt species.

Grassland with Emergent Remnant Woodland Eucalyptus Species

This vegetation community is found among the steep slopes, crests, valleys and rolling hills associated with the Mount Lofty Ranges Block, which comprise approximately the first 12km of the pipeline route. Much of the land has been previously cleared for stock grazing, with some cleared for fruit, viticulture and cereal cropping. Generally improved, non-native pastures have largely replaced the Eucalyptus woodland and native grassland, which was the dominant vegetation community present prior to European settlement. Blue Gum (*Eucalyptus leucoxylon*), Peppermint Box (*Eucalyptus odorata*), Mallee Box (*Eucalyptus proserpinacifolia*) and *Eucalyptus camaldulensis* occur as emergents over the grassland understorey, or where slopes and crests are too rocky or precipitous for cultivation, where access to valleys is limited and along roadside corridors. The floristic composition of understorey native vegetation species in many roadside corridors in the region is high, especially when compared to the neighbouring cleared paddocks. Other remnant vegetation consists of Golden Wattle (*Acacia pycnantha*), Sheoak (*Allocasuarina verticillata*), Yacca (*Xanthorrhoea*), Mat Rush (*Lomandra*), Flax Lily (*Dianella*), Spear Grass (*Stipa*) and Kangaroo Grass (*Themeda*), with introduced Olives (*Olea europaea*), Soursobs (*Oxalis pes-caprae*), Salvation Jane (*Echium plantagineum*), Hare's tail grass (*Lagurus ovatus*) and various pasture grasses and forbs within disturbed areas.

The North Para River and several small intermittently flowing watercourses traverse the pipeline route through this region. Riparian vegetation in the vicinity of the North Para River is dominated by *Eucalyptus camaldulensis* over a sparse understorey of introduced grass and weed species. In the vicinity of the smaller watercourses the overstorey vegetation consists of a very sparse cover of mature *Eucalyptus camaldulensis*. Regeneration of native riparian (primarily riverbank) vegetation in this area appears to be very limited.

Pipeline operations and maintenance activities impose minimal environmental impacts in the vicinity of these watercourses, considering past and present disturbances arising primarily from agricultural activities.

Careful alignment of the pipeline corridor to avert impacts to remnant native vegetation has significantly reduced the amount of vegetation likely to be affected by pipeline operations and maintenance activities. Thorough post construction reinstatement of watercourse banks, in conjunction with revegetation following construction, has ensured the long-term stability of these riparian environments, highlighting sustainability via the rapid recolonisation by plants.

Grassland with Emergent Remnant Mallee Eucalyptus Species

This community is found in the undulating plains, east of the Mount Lofty Ranges Block. Stock grazing and cereal production are the dominant land uses of the region. Due to the inherent nature and effects of these land uses, native vegetative cover has been reduced considerably and pasture and crop species predominate. Mallee Eucalyptus species, such as Yorrell (*Eucalyptus Gracilis*), Red mallee (*Eucalyptus Socialis*), Slender-leaved mallee (*Eucalyptus Foecunda*), Ridgefruited mallee (*Eucalyptus Incrassata*), Whtie mallee (*Eucalyptus Dumosa*) and Red mallee (*Eucalyptus Oleosa*), generally occur as emergents only. Small patches of low-density remnant native mallee scrubland are scattered throughout this region. Most of these remnant patches are used as windbreaks and stock shelters and have been heavily disturbed. Grazing by stock and feral animals (such as goats and rabbits), have contributed to the degradation of remnant vegetation communities within this community.

Sugarwood (*Myoporum platycarpum*) also occurs as an emergent in this grassland community, especially on soils with coarse texture and low moisture retention. However, this species is more common in drier regions and is replaced by Dryland Tea Tree (*Melaleuca lanceolata*) on poorly drained loams, red earths or heavy clays, which in addition may be saline or highly calcareous. Patches of remnant native Eucalyptus woodland and mallee scrubland are scattered throughout the region through which the pipeline is located.

Within the Mount Lofty Ranges, in the Angaston and Keyneton regions, most of the remnant vegetation is confined to roadside corridors or as isolated trees within grassland areas.

Five Listed Threatened Ecological Communities (TECs) may be present within the vicinity of the Pipeline including:

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions;
- Iron-grass Natural Temperate Grassland of South Australia;
- Mallee Bird Community of the Murray Darling Depression Bioregion;
- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia; and
- Plains mallee box woodland of South Australia.

Several nationally threatened flora species may potentially occur within the vicinity of the pipeline (DCCEE 2023), these are listed in Appendix B.

Significant Species

Flora and Fauna searches have been conducted using the DCCEE EPBC Protected Matters Search Tool (DCCEE 2023) and DEW NatureMaps Tool (DEW 2023) to identify the potential presence of threatened species in vicinity of the pipeline. Details on the occurrence of these species are provided in Appendix B.

Common fauna in the bioregion includes a variety of birds such as Sulphur-crested Cockatoo, Little Corella, Long-billed Corella, Rainbow Lorikeet, Australian Magpie, Grey Currawong, Kookaburra, Australian raven and Toressian crow. A number of frogs are noted in the region, the more common ones are the common froglet, Brown Tree and Burrowing frogs. Up to 20 native species of fish can be found in the Ranges, many of which are small bodied. There are 27 species of mammals including echidna, wombat, three possums, two kangaroos and koala. Sixty eight species of reptile have been found including tortoises, three turtle species, two goanna's and 12 species of snakes.

4.2.2 Murray Darling Depression Bioregion

The Murray-Darling Depression bioregion is in south-eastern South Australia, New South Wales and Victoria. About 19% of the bioregion is in South Australia and it includes the River Murray. The climate is semi-arid in the north which means that it is hot in the summer and mild in the winter. The south experiences a Mediterranean climate with warm to hot summers and cool moist winters. Average annual rainfall in the bioregion ranges between around 200 to 550mm per year and most of the rain falls in winter. Much of the native vegetation in the bioregion has been cleared. The cleared land is now mainly used for grazing, irrigated horticulture and growing cereal crops.

This bioregion has broad, rolling plains, sand dunes and lakes. There are large areas of mallee shrublands and woodlands. There are also open woodlands, tussock grasslands, heath and acacia shrublands. Threatened bird species include the Malleefowl, Black-eared Miner and Redlored Whistler. Threatened plant species include the Jumping-jack Wattle and Hairy-pod Wattle. The Carpet Python is a threatened reptile of the region.

Extensive calcreted plains overlain by a series of sand dunes. The calcreted ridges which form the undulating plain have a distinct west-north-westerly trend. The soils are shallow reddish sands on the plains and deep yellowish sands on the dunes. Fans bordering the Mt Lofty Ranges with low isolated hills rising above them have red duplex soils and calcareous earths subject to sheet erosion. Mallee is the dominant vegetation of the subregion. Its species composition reflects the diminishing coastal influence towards the north, especially in the understorey: broombush gives way here to saltbush and bluebush (*Atriplex* and *Maireana* spp.) and hummock grass (*Triodia irritans*). Blue gum (*E. leucoxylon*) and peppermint box (*E. odorata*) are characteristic species in the west of the region. Although tracts of mallee still occur, most of the original vegetation has been cleared for agriculture.

Geology, Soils & Landform

Riverland Pipeline

Within the bioregion, depositional plains form the major landform of the route, with low sand ridges, lakes, seasonal swamplands and floodplains forming minor landform elements. The region has a low to moderate relief, with elevation ranging from 81–200 m above sea level. Calcarosols, principally red calcareous earths (Gc1.12), dominate the soils from Sedan to New Residence. Duplex soils, Dr2.43 and Dy4.83, occur as minor soil profiles east of Sedan to the Murray River. Vertosols (grey self-mulching cracking clays Ug5.2) are located either side of the Murray River.

The Murray Bridge lateral runs parallel and adjacent to the Mount Lofty Ranges. The pipeline traverses similar landform as discussed above. However this area comprises a diversity of soil profiles including red duplex, yellow duplex, uniform and gradational profiles. Red duplex soils (Dr2.23) are the most frequent, followed by the uniform coarse-textured soils (Uc6.11 and Uc2.21).

The soils of the Murray River floodplain itself are predominantly grey clays and sands. Unlike the alluvial plain soils, these clays and sands are not highly erodible, but are subject to compaction.

The Kanmantoo Group underlies most of the Murray Valley Plains, which are subsequently overlain by predominantly marine Renmark Beds, Mannum Formation and Morgan Limestone. The Mannum Formation and Morgan Limestone are visible in cliffs along the River Murray. The marine Bookpurnong Beds and Loxton Sands located within the area were deposited during the late Miocene and early Pliocene periods. During the Pleistocene and recent periods, silicification and clacretisation occurred with the formation of the Karoonda Surface, Ripon Calcrete and Bungunnia Limestone. These latter units now represent most of the surface upon which shallow, sandy, duplex and nodular calcrete soils have since formed.

Plains of skeletal soils over calcrete and dunes of red sand comprise the land systems between Swan Reach and New Residence. The eastern most section of the pipeline route, between New Residence and Berri, consists of the incised floodplain of the River Murray. The landforms of this floodplain include levees, billabongs, oxbows, back swamps, lakes, low terraces and near-vertical cliffs. Bird life is abundant in this area. The appeal and landscape of these areas was not degraded during the construction process, resulting in little visual appearance of the underground pipeline, beyond the above ground marker posts. Pipeline operations and maintenance activities have not resulted in any disturbance to these areas.

Berri to Mildura Pipeline

The majority of the pipeline route comprises terrain that is essentially a series of undulating dunes and hummocks to 3m high, interspersed by large individual plains up to 2km across. Dominant soils are calcareous sandy loams, with relatively fertile red sands on dunes and upper slopes of hummocks. Areas of shallow sandy loams over limestone are widespread towards the west of the land system, with some areas of light clays present on the plains. The finely textured red dunal sands are very sensitive to wind erosion, with the calcareous sandy loams, moderately affected by wind. These sandy loams also contain high levels of chloride ions, indicating the likelihood of salt damage if water-logging occurs.

The land system present near Yamba Is characterised by saline loam and gypsiferous soils in depressions. These areas are severely affected by wind erosion and are usually inundated following heavy rainfall.

The soils of the Murray River floodplain itself are predominantly grey clays and sands. Unlike the alluvial plain soils, these clays and sands are not highly erodible, but are subject to compaction.

There are no seismic faults crossing the pipeline route.

Hydrology

Riverland Pipeline

Ten watercourses, mostly small and/or intermittent in nature (and an open drain), intersect the pipeline route along the Riverland pipeline corridor between Angaston at KP 0 and Sedan Junction at KP 24.7, the largest being the North Para River at KP 7.99 which then flows into the Gawler River. There are two additional creek crossings between KP 141 and KP 143.1 on the Angaston to Berri lateral.

There are two major river crossings of the Murray River at Swan Reach (KP 57.25— 57.5) and at New Residence (KP 140 – 140.3); and another smaller crossing at Reedy Creek (KP44), near Caloote, located along the Murray Bridge lateral pipeline. Reedy Creek is an area of significant biological diversity, with the wetland area being 60-90 hectares in size.

Nineteen watercourses, mostly minor and/or intermittent in nature, intersect the pipeline route along the Murray Bridge lateral; these include the Marne River at KP 13.75 and Saunders Creek at KP 20.4.

Wetlands of high to moderate conservation status are located along the River Murray pipeline crossing at Swan Reach (KP 57.25— 57.5); at Spectacle Lakes, wetlands northeast of the River Murray pipeline crossing (KP 140 – 140.3) at Pyap, a complex of intermittently flowing interconnecting depressions and channels and at Pyap Lagoon a permanent water body south of the Spectacle Lakes wetland area.

Berri to Mildura Pipeline

The pipeline area is comprised of five surface water drainage basins as defined by the Australian Water Resources Council. The pipeline only crosses one of these: the Mallee surface drainage basin. Drainage from this basin usually terminates in lakes or shallow depressions that fill either intermittently or seasonally, and does not flow into the Murray River. There is very little surface run-off from rainfall in the region due to low rainfall and the porous nature of the aeolian sediments.

There is one significant wetland in the proximity of the pipeline; the Gurra Gurra Lakes. The Gurra Gurra Lakes area is located within the Lyrup Forest (part of the Murray River National Park) on the eastern side of the Murray River. The pipeline passes to the north of the main lake complex. This area is managed for conservation purposes by Department for Environment and Water (DEW). It comprises a floodplain of intermittent ponds connected by groundwater.

There is one major river crossing of the Murray River at Berri (KP 8.6). The Murray River is one of the major waterways in Australia and passes through three states, Victoria, South Australia and New South Wales. It flows all year due to a series of locks and weirs. These produce permanently navigable waters as well as water for irrigation. Water flow along the river, upstream from the pipeline crossing, varies between 3000 and 5000 ML per day, with water levels at Berri averaging 13.2m in winter. Peak water levels during flood events at Berri have been recorded at 17.8m.

There is currently a very high level of utilisation of water from the river for irrigation purposes, with a large number of channels constructed since pumping commenced in the late 1800's. Numerous channels have since been abandoned in preference for more efficient irrigation systems. The pipeline crosses a number of these channels.

The high volume of water flow in the Murray River dilutes the salt present and results in generally good quality surface water. However, in low rainfall years, salinity levels can increase and become damaging to horticultural and agricultural activities. The pipeline is underlain by an extensive system of groundwater aquifers, which tend to flow in a westerly direction. Where they intersect the surface, these aquifers discharge into saline lakes and discharge complexes, such as the Kopi Plains near Yamba. The pipeline crosses three main aquifer systems, only one of which (the Parilla Sand aquifer) is shallow and in some areas discharges directly into the Murray River. Salinity levels in this aquifer are very high and it has been identified as contributing to most of the dryland salting problems in the region. As a result of the high salinity, the Parilla Sand is not generally used as a water supply.

Vegetation and Flora

The pipeline generally traverses a disturbed and almost entirely modified landscape (greater than 95%) consisting mostly of non-native pasture grassland and cereal crop areas. The major vegetation associations located in the vicinity of the pipeline route in the Murray Darling Depression (Sub-IBRA Murray Mallee, MDD02) Bioregion is:

Mallee woodland / scrubland with mixed species understorey;

Mixed species riparian flora;

Aquatic vegetation in riverine wetlands.

Vegetative cover varies throughout the length of the pipeline alignment. Whilst large mature Blue Gums and Peppermint Box dominate the mostly cleared landscape in the Angaston region, mallee species of Eucalyptus dominate the undulating plains, which surround the River Murray. Stands of remnant mallee vegetation dot the landscape. Riparian vegetation communities dominated by large River Red Gums and River Box, with understoreys of lignum and reeds, dominate river and creek banks and floodplains.

In the course of field surveys during 2002, a significant *Lomandra effusa* (Iron-grass) community was noted along the pipeline route, within private property to the north of the Swan Reach Conservation Park. This significant threatened species is endemic to this section of pipeline route, requiring specific site management protocols to ensure long term sustainability. Every attempt shall be made to minimise entry into this section of the pipeline route during routine operations and maintenance activities. Where entry into this area is deemed essential in order to comply with the requirements of Australian Standard AS2885 (eg – pipeline corrosion surveys), operations shall be pre-planned and managed to ensure minimal impact upon this threatened vegetation community.

Additional significant flora along the pipeline route includes Menzel's Wattle (*Acacia menzeli*) and Peep Hill hop-bush (*Dodonea subglandulifera*), both being nationally threatened plant species

Several rare and uncommon species were located during biological surveys conducted by the Mantung/Maggea Land Management Project group in Heritage Agreement sections within the Mantung/Maggea region. These Heritage Agreement areas have been subject to reduced disturbance in the past and are now protected from disturbance following a written agreement between the Native Vegetation Branch of DEW and respective landowners. These areas exhibit high species diversity when compared to the more recently disturbed regions. Therefore, it is expected that other areas of similar low disturbance and high species diversity could provide suitable habitats for some rare, endangered and vulnerable species.

Since the alignment of the pipeline has generally been constructed within existing, disturbed areas (i.e. areas without major conservation significance or status), no environmental impacts were evident to species with significant conservation status, during field surveys conducted along the length of the pipeline during 2002. Based on current pipeline operations and maintenance activities, it is unlikely that pipeline operations have had an adverse impact.

Mallee Woodland / Scrubland with Mixed Species Understorey

Remnant mallee woodland and scrubland are scattered along the pipeline route where the landform consists of undulating calcrete plains interspersed with sand dunes. Clearing of most of the vegetation in this region for stock grazing and cereal production has left very small isolated areas of remnant mallee woodland or scrubland.

Mallee woodland / scrubland are indicative of a drier climate with limited available soil water and generally, soils with low fertility status. Mallee vegetation is often considered a "transition" vegetation community located between the dry, arid zones of South Australia's northern regions and the higher rainfall, humid regions of the state's Mount Lofty Ranges and southeastern regions.

Remnant mallee may occur in two forms – first growth mallee and second growth mallee:

First growth mallee, which averages approximately 10m in height, comprises the original woodland present in the region prior to land clearance. Mallee communities of this form are comprised of single-stemmed trees and as such are classed as a woodland community. The occurrence of these remnants is restricted and this community is of conservation significance.

Second growth mallee, which averages approximately 7m in height, is present in areas where the original mallee woodland has been cleared and subsequent regrowth has taken a multi-stemmed shrub form. Communities dominated by these species are classified as scrub rather than woodland. This is a common growth form characteristic of mallee Eucalypt species and it is this form, which dominates mallee communities in the Murray Mallee region. The characteristic habit of second growth mallee is characterised by several to many stems developing from a main underground lignotuber, a 'mallee-root' or stump.

Significant mallee woodland/scrubland communities, which occur along the pipeline alignment, are described in the following text in accordance with their relationship to the particular section of the pipeline alignment.

Murray Bridge Alignment

Roadside vegetation fringing the north-south alignment, bordered by Sections 88, 89, 206 and 241 in the Hundred of Angas, consists of a diverse number of mature mallee species, including *Eucalyptus Dumosa*, Square-fruited Mallee (*Eucalyptus calycogona*), *Eucalyptus socialis* and *Eucalyptus oleosa*, with an understorey of chenopods such as *Maireana* spp., *Schlerolaene* spp. and *Enchylaena*. Regenerating mallee species are also present in this roadside vegetation.

A corridor of mallee scrubland, consisting of second-growth *Eucalyptus socialis* and *Eucalyptus Dumosa* with an understorey of *Atriplex* spp. and *Maireana* spp., now occurs in the disused road easement in between Sections 201-205 and 239 in the Hundred of Angas and Sections 59-61, 69,70 and 71 in the Hundred of Finnis.

Another corridor of second-growth mallee, consisting of *Eucalyptus calycogona* and *Eucalyptus Dumosa*, occurs east of this corridor. Communities of *Eucalyptus calycogona* are poorly conserved and are considered threatened in the Murray mallee region (Stephens, 1992). Prior to construction the pipeline route was re-aligned to avoid this area entirely.

Sedan Region

An area of significant diversity and in which disturbance must be minimised, occurs along the road easement between sections 228, 229 and 2 of the Hundred of Bagot and Sections 89 and 78 of the Hundred of Fisher. This area is dominated by *Eucalyptus gracilis* and *Eucalyptus socialis* with an understorey consisting of *Dodonaea* spp., *Sennar artemesioides* (Silver Cassia), *Acacia colletioides* (Wait-a-while), *Acacia notabilis* (Notable wattle), *Exocarpus aphyllus* (Jointed native cherry), *Melaleuca lanceolata* (Dryland Tea-tree Moonah), Weeping Pittosporum (*Pittosporum phylliraeoides*), *Grevillea* spp., Quondong (*Santalum acuminatum*), *Zygophyllum aurantiacum* (Twin-leaf) with a variety of chenopod species, including *Atriplex* spp., and *Maireana* spp. A protective cover of various cryptogams, primarily crustose, foliose and fruticose lichens but also including liverworts and mosses, is responsible for stabilizing the soil surface. The presence of diverse, unbroken cryptogamic crusts suggest that this area has had little or no grazing by hooved animals. Therefore, it is likely to be a community that is relatively undisturbed.

Although this alignment follows a declared road easement there are two areas, which have high densities of overstorey and understorey vegetation, minimal impact on this vegetation has occurred post construction. In order to preserve the line of sight between pipeline marker posts, future minimal vegetation trimming may be necessary to ensure compliance with the requirements of Australian Standard AS2885 Pipelines – Gas and Liquid Petroleum.

Mantung to Maggea Region

Heritage Agreement areas in the vicinity of the pipeline route are situated in the Mantung / Maggea region (Sections 67, 102 and 103 of Bakara and 32, 33 and 103 of Mantung). Once a Heritage Agreement is placed over an area of native vegetation the principal land use for the remnant vegetation is nature conservation. Many local landholders are active members of the Mantung / Maggea Land Management Project group. Members of this group are actively involved in the preservation and restoration of remnant mallee scrublands within the area, including feral animal and pest plant eradication programmes.

Biological surveys of these Heritage Agreement areas by members of the Mantung / Maggea Land Management Project group took place in 1990 and a conservation handbook and district guide was produced following assessment of the survey results (Barrett et al., 1991). These surveys recorded many species of flora and fauna with significant conservation status (e.g. rare, threatened, vulnerable and uncommon) within the Murray Mallee region.

This region is dominated by a variety of mallee *Eucalyptus* species, including *Eucalyptus gracilis*, *Eucalyptus socialis*, *Eucalyptus incrassata*, *Eucalyptus Dumosa*, *Eucalyptus foecunda* and *Eucalyptus oleosa*. Most of the region is covered by second-growth mallee, with an average height of 6m; however, some sections of Bakara Conservation Park, which is adjacent to Heritage Agreement areas, have retained first-growth mallee with an average height of 11m. Southern Cypress Pine (*Callitris preissii*) is also a dominant overstorey species in a limited section of this Park.

The understorey species diversity is also high on a regional basis and is one of the reasons for heritage protection. Understorey vegetation includes species such as *Melaleuca lanceolata*, *Acacia sclerophylla* (Hard-leaved Wattle), *Zygophyllum aurantiacum* (Shrubby Twinleaf), *Heterodendrum oleaefolium* (Bullock Bush), *Exocarpus aphylla* (Stiff Cherry), *S. artemisioides*, *Dodonaea* spp. and various chenopod species, including *Atriplex* spp., and *Maireana* spp.

Porcupine Grass (*Triodia irritans*) is the dominant grass within this area, with a variety of other grasses and forbs, including Flax Lily (*Dianella revoluta*). The central bare section of the circular *T. irritans* hummocks, which have a diameter of up to 6m, are often used as resting and sunning places by kangaroos.

Following in-field assessment prior to pipeline construction, and subsequent decision to alter the proposed route, the current pipeline alignment now bypasses this entire area. Additionally, a large and significant area of remnant first and second-growth mallee vegetation with species high in conservation value was also avoided.

Myrla Region

Roadside vegetation fringing Gibbs Road to the southwest of Myrla consists of *Eucalyptus gracilis* and *Eucalyptus foecunda* with an understorey of *Melaleuca lanceolata* and *Dodonaea* spp., up to 2m in height. Lands bordering the eastern section of Gibbs Road also support significant examples of remnant mallee vegetation. In order to avoid vegetation clearance within these roadside verges, or in neighbouring land, the pipeline was constructed along the centre of the unsealed Gibbs Road so as to preserve these vegetation communities.

Berri Region

A large area of first and second growth mallee is present within Sections 80 and 110 in the Hundred of Katarapko, Lot 1 of Deposited Plan 33386 and Lots 111 and 113 of Deposited Plan 27597. The mallee woodland and scrubland communities throughout this region are dominated by first and second growth *Eucalyptus socialis* and *Eucalyptus cyanophylla* over an understorey consisting of *Melaleuca platycarpum*, *Dodonaea* spp., *Acacia* spp., *S. artemisioides*, *Maireana* spp., and *Atriplex* spp., whilst *T. irritans* dominates the grass layer.

Communities of *Eucalyptus cyanophylla* are considered threatened in the Murray Mallee region due to clearance in the past for agricultural purposes (Stephens, 1992). The pipeline alignment avoids impacts to vegetation communities in which *Eucalyptus cyanophylla* is present. This has predominantly been achieved by utilising existing cleared tracks, which are located within Section 110 and Lots 1, 111 and 113. Furthermore, the use of these existing tracks for pipeline construction has minimised overall vegetation clearance and subsequently reduced other environmental impacts through this section.

Another area of biological significance in the Berri region is located within Section 942 in the Hundred of Loveday. This scrubland community is dominated by *Eucalyptus socialis* with some *Eucalyptus gracilis* and *Eucalyptus cyanophylla*. *Acacia* spp., *Senna* spp., *Dodonaea* spp., *Exocarpus aphylla* and *Maireana* spp. dominate the understorey vegetation. The grass layer is dominated by *T. irritans*. Clearance of this regionally significant vegetation community was avoided by using the nearby Puddletown Road easement for pipeline construction.

Moderately dense roadside vegetation fringing Spendiff Road, Winkie, consists of an overstorey of second-growth mallee scrub dominated by *Eucalyptus gracilis*, *Eucalyptus socialis* and *Eucalyptus cyanophylla*. The understorey vegetation consists mainly of *Maireana* spp. and *Atriplex* spp. In order to minimise clearance of these roadside verges, the pipeline was constructed along the centre of the Spendiff Road.

Berri to Renmark Region

A large area of mallee scrubland is situated in the region of the disused railway easement between Berri and Renmark (Sections 311, 474, 475, 648, 680 and 1264 in the Hundred of Renmark). The community is dominated by second-growth *Eucalyptus socialis* and *Eucalyptus cyanophylla*. The understorey vegetation is dominated by *Acacia ligulata* (Umbrella wattle), *S. artemisioides* and *Dodonaea* spp. However, this understorey is generally found in recently disturbed areas and is replaced by a *Maireana* spp. shrub layer in less disturbed areas. Weed species, including *C. longispinus* and *Echium plantagineum* (Salvation Jane), are also common within the easement area. Minimal vegetation clearance was required in this region as construction activities were restricted to the disused railway easement and to an area consisting of *Maireana* shrubland only. During routine operations and maintenance activities, care should be taken to avoid traversing *Maireana* communities wherever possible as they recover slowly from physical disturbance caused by vehicle movements.

Mixed Species Riparian Flora

This community, which is dominated by *Eucalyptus camaldulensis* and *Eucalyptus largiflorens*, is found in the vicinity of large and small watercourses. *Eucalyptus camaldulensis* is common along the banks of watercourses, especially the River Murray, whereas *Eucalyptus largiflorens* is more commonly found on slightly higher ground (i.e. as a 'fringe' above *Eucalyptus camaldulensis* stands and bordering swampy areas). There is evidence of regeneration of both of these species in many of the areas in which this community occurs. Permanent and intermittent watercourses within the floodplain are bordered by lignum (*Muehlenbeckia cunninghamii*). Samphire (*Halosarcia halocnemoides*) dominates the heavy saline soils of the floodplain, which undergo intermittent inundation. Trunks of dead *Eucalyptus largiflorens* are present on these samphire flats, providing important habitat areas for bird and marsupial species.

Understorey vegetation is generally severely disturbed and degraded due to past and present vegetation clearing and stock grazing. Since the clearance of shrubby vegetation during pipeline construction was kept to a minimum, natural regeneration within these areas has occurred. Reedbeds of *Phragmites australis* (common reed) and *Typha* sp. border the River Murray crossing at New Residence and Reedy Creek near Caloote. These vegetation communities provide a dense understorey in mature and regenerating *Eucalyptus camaldulensis* communities and are very important fauna habitats. Mid-stratum vegetation includes a variety of chenopod species including *Sclerolaena tricuspis*, *S. quinquecuspidata*, *S. brachyptera*, *Atriplex lindleyi*, *A. conduplicata* and *Maireana pentagona*.

Understorey vegetation along the banks of watercourses also includes short sedges, such as *Scirpus luitans*, *Bolboschoenus* sp. Aff. *Cardwellii*, *Eleocharis acuta* and *Juncus articulatus*, Water Primrose (*Ludwigia peploides*), *Potamogeton* spp. and *Aponogeton* spp.

Murray Bridge Alignment

Nineteen watercourses, mostly small and/or intermittent in nature, intersect the pipeline route along the Murray Bridge section. Vegetation consists primarily of large mature *E. camaldulensis* along the watercourse banks and *Eucalyptus largiflorens* away from the banks. Understorey vegetation is generally low in species density and diversity. Weed species, especially *Oxalis pes-caprae*, often dominate the lowest stratum vegetation. Reedy Creek is of particular conservation significance and is considered in the next section.

Hollow trunks and branches of living and dead trees, in particular *Eucalyptus camaldulensis*; provide a range of habitats for a variety of fauna, including reptiles, small mammals and birds.

Construction of the pipeline across these watercourses has resulted in minimal impact on the vegetation communities present, primarily due to existing disturbance in the form of vehicle tracks and domestic grazing animals. Alignment of the pipeline through natural, clear corridors and along current tracks has again minimised the amount of remnant vegetation, which is likely to be affected by pipeline operations and maintenance activities throughout this section.

Reedy Creek

Reedy Creek, near Caloote, located along the Murray Bridge lateral pipeline, is an area of significant biological diversity. The wetland area, which is 60-90 hectares in size, is comprised of mature and regenerating *Eucalyptus camaldulensis*, *Eucalyptus largiflorens* and *Acacia oswaldii* (Oswald's wattle). *P. phillyreoides*, *Callitris columellaris* (Northern Cypress Pine), *Acacia verticillata* and reeds (*P. australis*), all being present in significant quantities, and *Muehlenbeckia cunninghamii* is located in swampy areas where inundation is intermittent.

Revegetation through the Reedy Creek section has been vigorous, with marker signs being totally obscured due to reed growth. Subsequently marker posts and signs are of greater height in this location.

Swan Reach

A wetland considered high to moderate, in conservation status is present along the River Murray pipeline crossing at Swan Reach (Thompson, 1986). Mature and regenerating *Eucalyptus camaldulensis* and sedges, such as *S. fluitans*, *B. sp. Aff. Cardwellii*, *Eucalyptus acuta* and *J. articulatus*, occur along the wetland shores, while *Eucalyptus largiflorens* and *Muehlenbeckia cunninghamii* occurs further up the riverbanks. The attraction of this area to some species, possibly due to the habitat diversity and larger populations of invertebrates, (i.e. food resources), is responsible for this wetland being classified as high-moderate conservation significance.

Construction of the pipeline across this wetland area has resulted in minimal impact to the vegetation community, since the alignment avoided areas of dense vegetation by utilising existing cleared corridors and vehicle tracks within the vegetation.

Spectacle Lakes

Spectacle Lakes, wetlands northeast of the River Murray pipeline crossing at Pyap, is considered to be moderate in conservation status (Thompson, 1986). The two lakes that make up Spectacle Lakes have *Muehlenbeckia cunninghamii* and *Eucalyptus largiflorens* lining their banks. Mature and regenerating River Red Gums (*Eucalyptus camaldulensis*) are also present around the southern lake's banks. Spectacle Lakes are important habitats for a variety of locally resident and migratory birds, such as Grey Teal (*Anas gibberifrons*).

The complex of intermittently flowing interconnecting depressions and channels, which occur in the vicinity of Spectacle Lakes, are considered to be of high conservation value (Thompson, 1986). *Muehlenbeckia cunninghamii* and *Eucalyptus largiflorens* are common throughout this area. Following flooding this area provides a habitat suitable for aquatic plants and insects thus providing a breeding and feeding area for water birds, fish, reptiles, amphibians and aquatic insects.

Alignment of the pipeline generally avoids dense vegetation or utilises existing clear corridors within the vegetation communities associated with this area, thus minimising any likely impact which could be attributed to pipeline operations and maintenance activities on these wetland areas.

Pyap Lagoon

Pyap Lagoon is a permanent water body south of the Spectacle Lakes wetland area. Shoreline vegetation includes mature and regenerating *Eucalyptus camaldulensis* with or without an understorey of *Muehlenbeckia cunninghamii* and *L. peploides* and sedges. This wetland has a range of conservation values ranging from high to low depending on the area considered and generally provides an important refuge for water birds.

No impact to this wetland area has arisen following pipeline construction and ongoing operations, as the pipeline has avoided dense vegetation along the banks of the lagoon and utilises natural corridors within the surrounding vegetation.

Berri Evaporation Basin

The Berri evaporation basin complex once provided a refuge for significant numbers of various water birds. Degradation of this area has caused a decline in water bird visitation and hence downgraded the conservation status of the area. The high conservation value given to this area by Thompson (1986) is due to the past history of this wetland.

No impacts to this area were noted following construction of the pipeline and subsequent operations and maintenance activities. Continuing disturbance has primarily arisen due to the continuing disturbance being caused by agricultural and horticultural activities.

Aquatic Flora

Microscopic and macroscopic plants, phytoplankton and macrophyton dominate the aquatic floral community respectively. Phytoplankton includes blue-green algae, green algae and diatoms, whereas macrophyton includes large macroalgae and emergent aquatic vegetation. The diversity of phytoplankton and macrophyton species in aquatic ecosystems has been related to ecosystem 'health' and lack of disturbance (Camougis, 1981; Dunne and Leopold, 1978). The most diverse aquatic ecosystems on the route occur in some billabongs, oxbows and backwaters near the pipeline crossings at Swan Reach and New Residence, and Reedy Creek.

Toxic blue-green algal blooms are common along the River Murray during the warmer months of the year, when the rate of water flow is at its lowest and there is a build up of nutrients causing acceleration of algal growth within the river system. These large blooms inhibit light capture by other photosynthesising organisms, thus dominating the aquatic ecosystem. During the decomposition of these blooms a toxic substance is released which has the capability of causing death to other aquatic and terrestrial organisms.

Pipeline operations and maintenance activities have no known impacts upon blue-green algal blooms. Surveys along the pipeline route have indicated that aquatic floral communities have not been impacted by pipeline construction activities where the pipeline crosses the River Murray, at Swan Reach and New Residence, and Reedy Creek. Regrowth and aquatic habitats within these areas has been consistent with surrounding areas in the vicinity of pipeline.

Five TECs may be present within the vicinity of the Pipeline including:

- Buloke Woodlands of the Riverina an Murray-Darling Depression Bioregions;
- Iron-grass Natural Temperate Grassland of South Australia;
- Mallee Bird Community of the Murray Darling Depression Bioregion;
- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia; and
- Plains mallee box woodland of South Australia.

Several nationally threatened flora species may potentially occur within the vicinity of the pipeline (DCCEE 2023), these are listed in Appendix B.

Significant Species

Flora and Fauna searches have been conducted using the DCCEE EPBC Protected Matters Search Tool (DCCEE 2023) and DEW NatureMaps Tool (DEW 2023) to identify the potential presence of threatened species in vicinity of the pipeline. Details on the occurrence of these species are provided in Appendix B.

The floodplains of the Murray Darling Depression Bioregion also support a range of waterbirds when inundated; including four nationally threatened migratory wetlands species.

4.3 Weeds

A number of weed species which have been declared under the *Landscape South Australia Act 2019* are present in the region. One weed of particular note is Branched Broomrape (*Orabanche spp.*, except *O. cernua* var. *Australiana* and *O. minor*) which has been declared under the *Landscape South Australia Act 2019* and is present in the pipeline corridor on the Murray Bridge lateral of the Riverland Pipeline.

Table 12 Weed species of the Flinders Lofty Block, Kanmantoo & Murray Darling Depression Bioregions.

Common Name	Scientific Name	Status	WoNS
African boxthorn	<i>Lycium ferocissimum</i>	Category 2	Yes
African lovegrass	<i>Eragrostis curcula</i>	Category 3	No
Branched broomrape	<i>Orabanche</i> spp. (except <i>O. cernua</i> var. <i>Australiana</i> and <i>O. minor</i>)	Category 1	No
Calomba daisy	<i>Oncosiphon suffruticosum</i>	Category 2	No
Caltrop	<i>Tribulus terrestris</i>	Category 2	No
Dodders	<i>Cuscuta</i> spp	Category 1	No
False caper	<i>Euphorbia terracina</i>	Category 3	No
Horehound	<i>Marrubium vulgare</i>	Category 3	No
Innocent weed	<i>Cenchrus incertus</i> or <i>Centrus longispinus</i>	Category 3	No
Lincoln weed	<i>Diplotaxis tenuifolia</i>	Category 2	No
Noogoora burr complex	<i>Xanthium strumarium</i> sp. agg.	Category 2	No
Prickly pear	<i>Opuntia</i> spp. (except <i>O. ficus-indica</i>)	Category 2	No
Salvation Jane	<i>Echium plantagineum</i>	Category 3	No
Scotch Thistle	<i>Onopordum acanthium</i> L. subsp. <i>acanthium</i>	-	No
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>	Category 2	Yes
Skeleton weed	<i>Chondrilla juncea</i>	Category 2	No
Spiny rush	<i>Juncus acutus</i>	Category 3	No
Three corner jack	<i>Emex australis</i>	Category 3	No
Yellow burrweed	<i>Amsinckia</i> spp.	Category 2	No

4.4 Heritage

4.4.1 Aboriginal heritage

The location of known aboriginal heritage sites, registered or reported under the *Aboriginal Heritage Act 1988*, that are located along the pipeline corridor in South Australia is documented in the operations GIS.

Riverland Pipeline

Origin Energy conducted in-field site assessments of significant Aboriginal heritage areas along the pipeline during 2002, in consultation with the relevant Aboriginal representatives of the Mannum and Riverland Aboriginal Communities.

Sites predominantly included sections pipeline, which pass through river floodplain within private property, and included sections:

- West of the River Murray pipeline crossing at Swan Reach (KP 55 – 57.5); and
- East of the River Murray at New Residence (KP 140.0 – 140.3).

The above sections of pipeline easement host areas of Aboriginal heritage significance, both along the easement and in close proximity. Easement inspections with Aboriginal representatives confirmed that pipeline operations and maintenance activities had not resulted in any physical impacts to these sites.

Identified Heritage Sites along the Pipeline Corridor

Several sites have been identified along the Riverland pipeline corridor; these sites have been assessed as being of significant Aboriginal heritage value.

Reedy Creek Area

A number of sites, comprising middens, campsites and scarred trees have been previously recorded in the vicinity of the pipeline route through this area, with the pipeline route being in close proximity to a scarred tree and midden complex, which are situated off the pipeline easement. Since construction of the gas pipeline, operations have been restricted to the access track along the easement situated away from any known heritage sites. Pipeline operations and maintenance activities have not resulted in any impacts to identified heritage sites within this area.

Murray Bridge Area

Numerous burials have been unearthed at Murray Bridge during house and road construction and some of these are in close proximity to the pipeline route. However, no items of Aboriginal heritage significance were unearthed during the construction of the pipeline.

Other Areas

Prior to construction, two isolated artefacts were recorded on Section 71, to the west of Swan Reach. The pipeline alignment avoids this site; subsequently no cultural material has been excavated.

A number of burial sites have been recorded along the numerous creek lines draining the eastern scarp of the Mount Lofty Ranges, however no cultural material was excavated during pipeline construction.

Berri to Mildura Pipeline

Eight sites were detected during the field survey of the pipeline route.

A disturbed shell midden was found on the Western side of the Murray River crossing on and around the pipeline easement. This site extends for at least 260m back from the riverbank and on the surface comprises fragmentary mussel shell and a small number of chert stone artefacts. This location forms part of the former Berri rubbish dump and thus the land was previously disturbed before construction of the natural gas pipeline.

Aboriginal archaeological sites were also found on the eastern side of the river crossing. Relatively dense shell middens containing faunal material and hearths were found on each of the sandy levees on the floodplain. Scattered, fragmentary shell midden was also found on the riverbanks.

A search of the Taa Wika Cultural Heritage Search Register was undertaken in May 2023 in order to identify any additional reported sites. The search was undertaken with a 100m buffer and can be found at Appendix D. The search for the BMP identified 11 reported Archaeological sites, one Archaeological/Burial site and one Scarred Tree site. The search for the RLP identified 9 reported Archaeological sites and four Scarred Tree sites. The approximate location is identified on the maps provided in Appendix D.

4.4.2 European Heritage

The Pipeline route avoids areas of significant European heritage significance by utilising roads, roadside verges, disused railway easements and cleared paddocks. The central areas of towns, where many buildings and structures of heritage significance occur, were generally avoided. Consequently, there has been limited potential for impact upon items of European heritage significance within these areas.

Dry stone walls in the Keyneton region (KP 15.6) were traversed during construction, whereby each wall was dismantled and reinstated to its original condition following completion of construction activities. Following an inspection of these sites no post-construction damage (i.e. subsidence or collapse) was noted at these dry-wall crossings.

4.5 Land Use

4.5.1 Agricultural and Horticultural Land

The majority of the land both gas pipelines pass through is largely undulating broad-acre agricultural land used for cropping and livestock grazing (sheep, cattle and pigs). The tenure of these areas is a combination of leasehold and freehold land. Whilst significantly smaller in size, there are also areas of uncleared scrub, and remnant vegetation particularly in roadside verges.

On the eastern side of the Murray River upstream of Berri, the pipeline route follows a road reserve through the Lyrup Village, an area of intensive horticulture production. From here to the Victorian border the route has been selected, in consultation with landowners, to avoid land that is either currently used for, or intended for use for, intensive agriculture such as orchards and vineyards.

Typical crops are grapes, cereals, vegetables, citrus and almonds.

4.5.2 Conservation

The Pipelines traverse through areas of conservation, heritage and cultural significance, such as roadside reserves, rivers, creeks, conservation parks, wetlands and the River Murray National Park. The sites include Reedy Creek, North Para River, Marne River, the Murray River floodplains and tributaries protection areas, Keyneton stone walls and isolated strands and corridors of remnant vegetation remaining in roadside reserve.

Riverland Pipeline

Sections of the RLP reside within the floodplain and tributaries areas of the River Murray Protection Areas. In addition, there are two significant wetlands within close proximity of the Riverland pipeline; the Swan Reach Wetland Complex and Spectacle Lakes, which are both listed in the Directory of Important Wetlands in Australia, and are considered to be of national importance for their ecological values (Environment Australia 2015).

The Swan Reach Wetland Complex consists of five broad waterbodies connected at varying levels by a branched creek and seven smaller wetlands which are either semi-permanent or permanent. The site is bordered on the western side by the river and on the eastern side by cliffs. This complex provides a number of diverse interconnected wetland habitats for aquatic fauna and waterbirds. It acts as a drought refuge and breeding area for waterbirds, and controls the quality of the water as it flows through the system. The wetland may also be an important fish spawning area since it consists of a number of islands and flats.

The Spectacle Lakes are two seasonally inundated basins that are joined by a creek, and connected to a wetland complex downstream by a wide channel; Spectacle Lakes South are a complex of seasonally inundated basins and channels; 300 ha of the floodplain surrounding the areas are intermittently inundated. Two of the Spectacle Lakes South channels are directly connected to the River Murray by narrow creeks; inundation of these and the remainder of the basins is mostly caused by River Murray floodwaters. The Spectacle Lakes and Spectacle Lakes South basins hold water seasonally, other areas are intermittent. Contains a mosaic of small temporary wetlands and larger waterbodies that provide a breeding habitat for a variety of wetland fauna.

Additional to these two wetlands, there are four other significant wetlands in the general region of the Pipeline; these are the Banrock Swamp Wetland Complex (Wetland of International Importance (Ramsar)), Loch Luna Wetland Complex, Loveday Swamps and Marne River Mouth.

Every precaution has been taken to ensure the integrity of the pipeline to prevent any breach which may detrimentally affect these wetlands. Regular audits, patrols and aerial surveys are conducted to ensure continual safe operation.

Berri to Mildura Pipeline

A section of the BMP traverses the River Murray Protection floodplain area and the Murray River National Park in the Lyrup region. There are two significant wetlands within close proximity of the BMP; the Gurra Lakes Wetland Complex and Pike-Mundic Wetland Complex, which are both listed in the Directory of Important Wetlands in Australia, and are considered to be of national importance for their ecological values (Environment Australia 2015).

The Gurra Lakes Wetland Complex is located within the Lyrup Forest (part of the Murray River National Park) on the eastern side of the Murray River. Gurra Gurra Lakes are two large adjoining lakes connected to the River Murray via Salt Creek, which is another large but linear water body to the south. The area is totally confined to the river valley, and contains over 600 ha of permanent wetland and an unknown area of seasonally inundated low lands. The area is used as a drought refuge and loafing habitat for waterbirds. The complex has a variety of habitats available for wetland fauna, and frequent wetting and encourages vigorous regeneration of floodplain plant species. The BMP passes to the north of the main lake complex. This area is managed for conservation purposes by DEW. It comprises a floodplain of intermittent ponds connected by groundwater and is part of the Riverland Biosphere Reserve.

The Pike-Mundic Wetland Complex is located approximately 10 kilometres to the north of the BMP and approximately 2 kilometres south east of Renmark. The wetland area is a complex system of creeks, backwaters and lagoons. Between the waterbodies are extensive areas of low-lying land which are flooded during high rivers and retain water temporarily. Mundic Creek is a broad former river channel and has permanent deep waters; Pike Lagoon and Tanyaca Creek are oxbow lakes; Pike River is also a broad channel and many much narrower creeks form a network across the floodplain. The major waterbodies (except upper Pike River and Snake Creek) are connected to the River Murray by small creeks. The upper Pike River and Snake Creek are fed by overflow from Mundic Creek. River Murray floodwaters also supply the complex. The Pike River region provides a breeding habitat for fish and waterbirds during and after floods, as well as permanent refuge habitat for these species during drought. The complex network of small creeks and pools limits accessibility to some small islands, allowing waterbirds to breed there undisturbed. Mundic Creek supports a River Red Gum *Eucalyptus camaldulensis* forest that is rare on the River Murray in South Australia.

Additional to these two wetlands, there is one other significant wetland upstream of the pipeline; being the Riverland Swamp Wetland Complex (Wetland of International Importance (Ramsar)).

4.5.3 Infrastructure

The Pipeline corridor crosses a number of sealed and unsealed public roads and access tracks. These roads and tracks are used for access to the pipeline corridor by vehicles associated with pipeline operations activities. The main public road crossings on the RLP corridor are listed in Table 13, whilst those on the BMP are listed in Table 14.

A Telstra fibre optic cable has been laid alongside the RLP between Angaston and Swan Reach. The RLP crosses Telstra cables at KP 139.3.

The MurrayLink High Voltage Direct Current (HVDC) cable, as well as a Telstra Broadband Fibre Optic cable, have been installed since the BMP was constructed. The MurrayLink HVDC cable runs parallel to the pipeline between KP 7 and KP 16.6 and between KP 42.5 and KP 85.3.

The Telstra Broadband fibre optic cable crosses the BMP at two points these are:

- The corner of Settlement Road and Old Sturt Highway at KP 54.9; and
- The corner of Hoskins Road and Old Sturt Highway at KP 7.4.

Table 13 Public Road Crossings on the RLP Corridor

Road Name	KP	Location
RLP Corridor		
Long Gully Road	1.3	Intersection with Menglers Hill & Radford Rds
Mt Pleasant - Angaston Rd	5.5	4 km South of Angaston
Keyneton - Angaston Rd	9.7	7 km SE of Angaston
Blanchetown Rd	30.9	2.6 km NE of Sedan
Murray Lands Rd	55.7	~1.0 km West of Murray River Crossing @ Swan Reach
Sedan - Swan Reach Rd	55.8	~1.0 km West of Murray River Crossing @ Swan Reach
Nildottie Rd	59.2	1 km SE of Swan Reach Township
Rubbish Dump Rd	59.6	~2km SE of Swan Reach Township
Swan Reach - Walker Flat Rd	59.7	~2km SE of Swan Reach Township
Netherleigh Rd	73.4	15km E on Stott Hwy from Swan Reach, 5km Sth to Netherleigh
Swan Reach - Loxton Rd	92.2	32km E on Stott Hwy from Swan Reach, intersection with Newell Centre Rd.
Lowbank Rd	105.8	800m Nth of Stott Hwy at Maggea
West Boundary Rd	117.2	14km West of Wunkar, 1km Nth of Stott Hwy/ Wunkar Rd
Heinrich Rd	129.7	2 km East of Wunkar, 3km Nth of Stott Hwy/ Wunkar Rd
Kingston - Loxton Rd	139.6	3km NW of Pyap
Garwood & Rumble Rds	154.5	Winkie
Dalziel Rd	156.3	Intersection Mander, Dalziel & Spendiff Rds
Dalziel Rd	159.4	Glossop – Dalziel Rd, Sth of Berri Estate Wines

Road Name	KP	Location
Murray Bridge Lateral Pipeline Corridor		
Sedan Hill Rd	0.1	0.1 Sth of MLV1 & MLV2 – Sedan Junction
Pine Hutt Rd	6.7	~7 km Sth of Sedan Hill Rd intersection at Towitta
Three Chains Rd	6.8	~7 km Sth of Sedan Hill Rd intersection at Towitta
Walker Flat – Mt Pleasant Rd	23.3	Intersection with Miller and Punthari Rds
Adelaide - Mannum Rd	38.2	Intersection with Pfeiffer & Rosenzweig Rds
Mannum Rd	43.5	Intersection with Pfeiffer Rd
Mannum Rd	44.9	~100m Sth of intersection with Caloote Rd
Wagenknecht Rd	53.1	~Lot 163 Wagenknecht Rd
Wilkin Rd	57.0	~2km SE of Pallamana
Reedy Creek Rd	60.5	Intersection with Stonefence Rd
Mannum Rd	63.4	Intersection with Bigmore and Nilpena Rds

Table 14 Public Road Crossings on the BMP Corridor (SA only)

Road Name	KP	Location
BMP Corridor		
Old Sturt Highway	0.3	Intersection with Winkie Rd adjacent Berri Estate Wines
Jury Rd	3.0	Intersection adjacent Berri Township #1
JC Smith Rd	4.5	Adjacent intersection of Scott & Mortimer Rds
JC Smith Rd	5.8	50m West of intersection with Verrall Crescent
Jellet Rd	6.3	Intersection of JC Smith, Shiell & Jellet Rds
Old Sturt Highway	7.8	Intersection with Hoskins Rd, adjacent Old Rubbish Dump – Berri
Brown St	10.4	300m North of Lot 510 – Lyrup
Stanitzki Rd	16.8	Adjacent Gurra Gurra Lake
Sturt Highway	42.6	SA/VIC Border

The major roads in the regions of both the RLP and BMP are listed in Table 15. These roads are all multiple use roads carrying a mid to high traffic volume, being predominantly a mix of heavy vehicles, light industrial/pastoral vehicles and tourist vehicles.

The major roads and associated traffic volumes are listed in Table 15. Data has been collected from the Government of South Australia – Department for Infrastructure and Transport , Road Asset Management Section – 4 May 2015 – Annual Average Daily Traffic Estimates – 24 hour two-way flows.

Table 15 Major Roads (Traffic Volumes)

Road Name	KP	Location	Traffic Volumes
RLP Corridor			
Mt Pleasant - Angaston Rd	5.5	4 km South of Angaston	1,900
Keyneton - Angaston Rd	9.7	7 km SE of Angaston	950
Blanchetown Rd	30.9	2.6 km NE of Sedan	850
Murray Lands Rd	55.7	~1.0 km West of Murray River Crossing @ Swan Reach	950
Sedan - Swan Reach Rd	55.8	~1.0 km West of Murray River Crossing @ Swan Reach	950
Swan Reach - Walker Flat Rd	59.7	~2km SE of Swan Reach Township	280
Swan Reach - Loxton Rd	92.2	32km E on Stott Hwy from Swan Reach, intersection with Newell Centre Rd.	230
Kingston - Loxton Rd	139.6	3km NW of Pyap	900
Murray Bridge Lateral Pipeline Corridor			
Walker Flat – Mt Pleasant Rd	23.3	Intersection with Miller and Punthari Rds	550
Adelaide - Mannum Rd	38.2	Intersection with Pfeiffer & Rosenzweig Rds	1,100
Mannum Rd	43.5	Intersection with Pfeiffer Rd	2,400
Mannum Rd	44.9	~100m Sth of intersection with Caloote Rd	2,400
Reedy Creek Rd	60.5	Intersection with Stonefence Rd	1,400
Mannum Rd	63.4	Intersection with Bigmore and Nilpena Rds	5,100
BMP Corridor			
Old Sturt Highway	0.3	Intersection - Winkie Rd adjacent Berri Estate Wines	4,400
Old Sturt Highway	7.8	Intersection with Hoskins Rd, adjacent Old Rubbish Dump – Berri	5,400
Stanitzki Rd	16.8	Adjacent Gurra Gurra Lake	420
Sturt Highway	42.6	SA/VIC Border	1,800

4.6 Noise

The existing noise environment in the region is typical of low populated pastoral/cropping areas, with generally low levels of background noise dominated by natural sources (e.g. wind, animals and insects) and road traffic associated with major roads in the region.

Whilst there are residences located close to the pipeline corridor, there are few residences located near pipeline infrastructure facilities.

4.7 Air Quality

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

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

Air quality near existing operations (e.g. on the RLP - Angaston Compressor Station, Berri & Murray Bridge Gate Stations and MLVs and on the Berri to Mildura Station – Berri offtake Station and MLV) is expected to be marginally influenced by emissions from these operations.

5 ENVIRONMENTAL RISK ASSESSMENT

An original risk assessment of the Pipeline was undertaken with experienced pipeline staff to inform the EIR (2017 revision). In addition to the potential environmental aspects and impacts, an initial risk assessment to public safety and security of supply was also completed.

An updated environmental risk assessment of the Pipeline was undertaken in February 2021 to identify any additional risks and controls and as part of the Operations Environmental Management Plan development. While contamination from chemical storage and use was covered in the 2017 review, during the 2021 review, this aspect was broken down further into storage tank sizes and types. Contamination from sewage systems was a new risk identified during the 2021 review. No other additional environmental risks were identified. All actions raised in the ERA have been completed.

The environmental risk assessment and risk matrix, including APA personnel that attended the ERA review, are provided in Appendix C. The ERA was carried out in accordance with ISO 3100:2018 Risk Management – Guidelines and the APA HSE ENV Guidelines 001 Environmental Risk Assessment Guideline.

The pipeline context defined for the ERA workshop was:

- Operations, inspections and maintenance of the existing pipeline;
- Normal and emergency scenarios;
- Credible emergencies arising as part of the maintenance works (e.g. vehicle collisions, major spills);
- 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 ERA's will be undertaken. Decommissioning considered separately and is specifically discussed in Section 3.5);
- Current status of the pipeline is containing market-compliant sales gas; and
- No excess pressure from gas plant upsets.

6 POTENTIAL IMPACTS AND MITIGATION MEASURES

This section reviews the potential hazards and consequences on areas of the environment from operations and maintenance of the easement, pipelines and facilities. The OEMP further outlines the activity specific controls to manage potential impacts on the environment. APA also have an Environmental Line List (ELL) that provides details on high-risk environmental features, which require approval for all or some works in each specific area of the pipelines.

6.1 Soils

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

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

According to Australian Soil Resource Information System, the pipeline is situated in low risk area for acid sulfate soils (ASS). Excluding a small section of the pipeline, located directly underneath the Murray River (2.5km north east of Berri), which is located in an area of high risk of ASS. Should works be conducted within the high risk area, an ASS Management Plan will be developed in line with appropriate EPA Guidelines.

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

APA may encounter pre-existing land contamination as part of operation and maintenance activities. Works near former or current industrial land uses and areas used for illegal dumping have an increased risk of encountering land contamination. Land parcels that are known to be affected by land contamination are recorded on the public register, under the Environment Protection Act 1993. Affected sites can be searched on the South Australian EPA Site Contamination Index. According to Networks GIS (May 2021), there are no contaminated sites recorded that intercept with the RLP and BMP.

Potential Impacts

Potential impacts to soils from operation and maintenance of the pipeline include:

- Disturbance of Acid Sulfate Soils (ASS) due to pipeline excavation and erosion repairs;
- Soil contamination due to the use of oils or chemicals; and
- Erosion from poor reinstatement or dewatering.

Mitigation Measures

Key preventative and reactive controls include:

- The ELL contains details of areas of potential ASS and locations of where the pipeline intercepts protected areas and will be reviewed prior to any excavation;
- If indicators of unanticipated contamination or ASS are discovered, contractors will stop work and seek site specific advice;
- Contaminated soil will be removed and disposed of at an appropriately licenced waste facility and controlled waste tracking receipts will be obtained and stored;
- Chemicals will be appropriated managed as discussed in section 6.3;
- Erosion and sediment controls installed as necessary in accordance with best practice, and routinely checked to ensure they are stable, effective and in good repair;
- All discharge will be monitored for erosion;
- Vehicle movement will be confined to the easement and existing access tracks to reduce soil compaction;
- Watercourse banks will be reinstated as soon as practicable and banks stabilisation techniques will be applied as necessary; and
- Topsoil stripping and separate stockpiling will be implemented. Specialist erosion repairs will be conducted, as required, and vegetation matter will be respread over easement.

6.2 Water

The pipeline traverses portions of the River Murray Protected Floodplain Area defined under the *River Murray Act* 2003 and Water Protection Areas defined under the *Environment Protection Act* 1993. These are identified in the ELL.

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

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

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

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

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

Vehicle access through and across waterways will be required for easement patrols and Cathodic Protection surveys. These will be planned for completion in the drier seasons so to limit disturbance.

Potential Impacts

Potential impacts to water from operation and maintenance of the pipeline include:

- Reduced water quality (surface and ground water) due to contamination from the use of oils, chemicals and/or land disturbance; and
- Disturbance of surface water drainage patterns along water courses and floodplains due to excavation

Mitigation Measures

Key preventative and reactive controls include:

- Erosion and sediment controls installed as necessary in accordance with best practice, and routinely checked to ensure they are stable, effective and in good repair;
- Riparian vegetation will be trimmed to maintain line of sight rather than cleared by other means so not to disturb water and soil in riparian zones;
- Surface contours will be reinstated as part of the rehabilitation process;
- Secure storage and handling of hazardous material to ensure they cannot drain onto the ground or to watercourses or floodplains, as discussed in section 6.3;
- Refuelling vehicle and equipment will only occur in bunded area and no refuelling will be undertaken within 10m of a watercourse or environmentally sensitive area;
- Ensuring an appropriate earthworks drainage licence is in place from the EPA for dewatering works, if required;
- If dewatering is required, dewatering works to align with EPA Guidelines Environmental Management of Dewatering during Construction activities EPA 1093/21. Note - Water exceeding turbidity levels of 25 mg/l and 100KL will require an EPA earthworks drainage licence;
- Excavations which have the potential to intercept groundwater should be avoided wherever practicable;
- If unanticipated groundwater is intercepted, the activity should be stopped and the APA Environment and Heritage Team and EPA consulted prior to continuing;
- Prior to an excavation which is planned, or has the potential, to intercept groundwater, all applicable permits/approvals shall be attained and all necessary notifications shall be conducted and only licenced waste disposal companies are engaged i.e. Veolia;
- Prior to conducting ground disturbing works, due diligence assessment shall be completed highlighting whether watercourses or inland waters will be impacted;
- Works in areas of shallow ground water will ideally be scheduled over the summer months to reduce the likelihood of excavating below the water table and resulting in trench water;
- Water shall not be extracted from watercourses unless the appropriate approval has been attained from the EPA and works to comply with the conditions of those approvals;
- To prevent sedimentation into watercourses, potential sedimentation methods when working within watercourses can be as follows:
 - Minimise vehicle access/movement;
 - Install perimeter control structures such as
 - Sediment fences
 - Coir logs
 - Rock bunds
 - Sediment basins
 - Maintain and clean sediment structures when required
 - Place sediment stockpiles upslope of a sediment barrier
 - Inspect perimeter control structure to ensure ongoing effectiveness
- Ensuring a licence is in place from the EPA is works involve the removal of solid matter from the beds of any inland waters

6.3 Hazardous Storage and Spill Response

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

All staff must be trained and competent in the use and management of chemicals. Chemicals and other wastes are stored in container or storage areas as per the relevant requirements detailed in the product's SDS, AS 1940-2004 *The storage and handling of flammable and combustible liquids* and the EPA Bunding and Spill Management Guideline. Spill kits are located at each site that has a chemical storage area. Spill kits may also be required on work sites should it be identified in the risk assessment completed for the work.

Potential Impacts

Potential impacts from hazardous storage and spill response from operation and maintenance of the pipeline include:

- Contamination of soil and water and other environmentally sensitive values.

Mitigation Measures

Key preventative and reactive controls 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;
- Secondary containment bunding and the control and management of chemicals (including flammable and combustible liquids) spills is in accordance with the EPA guidelines 080.16 Bunding and Spill Management (2016);
- Erosion and sediment controls installed as necessary in accordance with best practice, and routinely checked to ensure they are stable, effective and in good repair.
- Vehicle and equipment will undergo pre-start checks;
- Refuelling vehicle and equipment will only occur in bunded area and no refuelling will be undertaken within 10m of a watercourse or environmentally sensitive area;
- A registered/ licensed contractor will be used for all chemical transport;
- Handling of chemicals will be conducted over hard stand and storage of chemicals will be in bunded undercover areas;
- Spill kits will be kept at sites where chemicals are stored;
- Staff will be trained to implement appropriate clean-up/spill response procedures in the event of a spill; and
- Reporting loss of containment where harm is threatened or caused to the EPA

6.4 Waste Management

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

Potential Impacts

Potential impacts from waste generated from operation and maintenance of the pipeline include:

- Contamination of soil and water and other environmentally sensitive values.

Mitigation Measures

Key preventative and reactive controls include:

- All condensate waste will be captured, transported and disposed of as regulated waste and controlled waste tracking receipts will be retained;
- All bins will be lidded and labelled and all waste collected by licenced contractor;
- Waste management strategies developed for each waste stream prior to the commencement of any waste producing activities, based on the principles of 'Reduce, Reuse, Recycle; and appropriate disposal;
- Personnel will be educated on the required waste management practices;
- Bins will be covered to prevent access by fauna and the spread of rubbish by wind;
- Hazardous wastes, such as solvents, rust proofing agents and primer, will be managed in accordance with the requirements of relevant legislation and industry standards; and
- All waste material will be removed from worksites on completion of maintenance activities.

6.5 Vegetation and Fauna

Vegetation

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

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

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

The asset traverses various road and rail easements, reserves and farmland. A section of the asset is located within Vegetation Heritage Agreement areas and another section traverses the Murray River National Park. Whilst most maintenance activities are exempt from requiring further approvals, additional approvals and management requirements apply in these areas under *the Native Vegetation Act 1991* and the *National Parks and Wildlife Act 1972*. Local council or heritage laws may apply to individual trees on public land. On private land, trees may be of individual landholder significance.

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

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

Fauna

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

Integrity digs usually occur in the line of sight area of the easement and all efforts are made not to disturb remnant or retained vegetation. Excavations are fenced if left open overnight. The *National Parks and Wildlife Act 1972* may be triggered should protected fauna need to be removed from trenches.

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

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

Potential Impacts

Potential impacts from operation and maintenance of the pipeline include:

- Unauthorised clearing of native vegetation;
- Removal or damage to fauna habitat;
- Injury or death to fauna; and
- Damage due to fire.

Mitigation Measures

Key preventative and reactive controls include:

- The ELL includes features such as threatened ecological habitat, heritage agreements, parks and conservation reserves; and will be reviewed prior to vegetation control occurring;
- Operational and vehicle activity will be confined to the easement and existing access tracks where practicable, so as not to damage surrounding vegetation;
- Remnant or retained vegetation at the edges of the easement is left in-situ where it does not interfere with line of sight or the Pipeline. This provides habitat and movement pathways for fauna, while low growing ground cover along the easement provides cover and interconnection for fauna movement;
- Trimming vegetation rather than clearing in sensitive areas, particularly at watercourses;
- All clearing outside of the existing easement will require assessment and approval under the *Native Vegetation Act 1991*;
- Minimising the time between clearing and rehabilitating the easement when excavations are required;
- 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;
- Disturbance of native vegetation is avoided during excavation activities where practicable;
- Provide fauna escape means in open trenches and regular inspection of open trenches for trapped fauna. Additional fauna protection measures 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, or fauna;
- 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
- Include a cultural heritage review for proposed works that may impact established trees or watercourses.

6.6 Weeds, Pests and Diseases

Movement along easements of operational and maintenance personnel have the potential to spread weeds, pests and disease by transferring matter attached to vehicles, equipment or personnel. Soil disturbance and transfer during pipeline construction and maintenance has the potential to encourage weed growth.

Weeds reduce farm productivity; they invade crops, smother pastures and in some cases can harm livestock. They aggressively compete for water, nutrients and sunlight, resulting in reduced crop yield and poor crop quality.

Pest and Diseases may adversely affect plant and animal health or welfare; pose a serious threat to livestock, horticultural, and forestry industries, water catchments, nature reserves and national parks as well as general public amenity. In agricultural areas pests and diseases can have extremely detrimental effects on agricultural

productivity and operations. Pest and diseases of note include, Equine influenza, Footrot, Bovine or Ovine Johne's, Foot and mouth, Q Fever, Phylloxera and Phytophthora - Dieback.

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

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

In SA, the Weed Control App provides colour photographs and descriptions of the declared plants under the *Landscape South Australia Act 2019*, to aid identification. Individual local governments have also developed Pest Management Plans that prioritise the management of invasive species at a local level.

The OEMP and ELL contain properties that have biosecurity requirements.

Potential Impacts

Potential impacts from operation and maintenance of the pipeline include:

- Spread of declared weeds and pests (biosecurity diseases) from vegetation control and driving.

Mitigation Measures

Key preventative and reactive controls include:

- Routine ground patrols are used to monitor the easement for the location of infestations and the extent of infestations;
- Where access to areas infested by weeds is required, wash vehicles and equipment down (i.e. prior to accessing to weed free areas);
- Ensuring that machinery and other earth moving 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;
- Vehicles accessing the easement will be kept clean of debris and soil and washed down on an as needs or periodic basis to prevent the introduction of new weeds, pests and diseases;
- Minimising soil transport along the easement and prevention of soil transport out of areas of known weed infestation;
- Identifying and clearly marking known infestations of weeds along the easement; and
- Developing and implementing procedures to define access routes to the easement, and where necessary avoiding areas of known infestation.
- Landholder requirements for declared weeds information and clean down will be reviewed prior to works and high risk landowners will be contacted in advance for advice;
- Vehicles and equipment will remain on designated roads and tracks; and
- Implement weed management (such as target weed spraying) as required and in line with advice from PIRSA. Ensure technicians/contractors spraying chemicals is suitably licenced.

6.7 Land Use

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

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

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

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

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

Potential Impacts

Potential impacts from operation and maintenance of the pipeline include:

- Disruption of land use rights and practices, disturbance of residents, landholders and third parties.

Mitigation Measures

Key preventative and reactive controls include:

- Minimising the extent of disturbance to vegetation and restricting activities to the immediate easement as far as possible;
- Existing access tracks to the easement will be used to reduce the need to traverse large lengths across private property. All vehicle movement is confined to the easement and formal access tracks unless prior approval from landholders has been sought;
- Regular annual contact with landholders is maintained and all relevant pipeline and easement management issues discussed;
- Landholders, residents within proximity and any relevant third parties are notified in advanced of any non-routine activities likely to cause disruption;
- New landholders are contacted and briefed regarding approved and prohibited land uses on the pipeline easement, as well as safety, emergency and operational considerations;
- Ongoing communication with landholder in an emergency situation as soon as practicable;
- Reinstating all fences cut during maintenance activities, following rehabilitation of the easement and ensuring any damage to crops or pasture is repaired to a standard the same or better than current condition; and
- Where practicable, operations and maintenance activities are scheduled during appropriate seasons in relation to land use activities including cropping regimes, and livestock cycles, in order to reduce potential adverse effects.

6.8 Heritage

Heritage includes both Aboriginal and European heritage sites and artefacts. Sites of cultural heritage may comprise areas or items of archaeological, anthropological, historical, cultural, ethnological, scientific or environmental significance. Prior to the construction of the Pipeline a cultural heritage assessment was undertaken and identified no heritage sites on the easement. As discussed in section 4.4.1, there are some reported sites within 100m of the pipeline easement.

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

Pipeline personnel are aware that they may uncover areas of unknown cultural heritage within the easement. If during the process of pipeline operations, any evidence of artefacts or a burial site are uncovered, then work is to stop immediately and an exclusion barrier is installed. Police will be contacted by the senior company personnel in the event that a burial site is uncovered and Aboriginal Affairs and Reconciliation will be notified in the event that a suspected heritage site is uncovered. In the event that Aboriginal sites, objects or remains are discovered, the site area should be avoided. Prior authorisation from the Minister for Aboriginal Affairs and Reconciliation is required to damage, disturb or interfere with the site pursuant to section 23 of the *Aboriginal Heritage Act*.

Potential Impacts

Potential impacts from operation and maintenance of the pipeline include:

- Unauthorised damage to Aboriginal Heritage sites due to vegetation control or pipeline excavation.

Mitigation Measures

Key preventative and reactive controls include:

- The ELL contains records of Aboriginal Sites and Objects and will be reviewed prior to clearing works;
- 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;
- Fencing, flagging and recording of new sites with a GPS and inclusion of sites on the GIS system;
- Restricting operational activities to existing access tracks and the easement;
- 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 to identify an appropriate source of action;
- All approvals under the Aboriginal Heritage Act 1988 (SA) are obtained prior to any activity that is likely to disturb or has the potential to disturb cultural heritage items or sites;
- 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*;
- Works are not to disturb any established trees or vegetation without prior advice from the HSEH team; and
- 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.

6.9 Air Emissions

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

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 Pipeline does occur. Minor emissions from the Pipeline 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 amount of gas. Minor emissions from metering 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.

Mitigation Measures

Key preventative and reactive controls include:

- Greenhouse gas emissions reporting undertaken for venting and other gas emissions;
- Particular emissions and combustion emissions are reported to the National Pollutant Inventory (NPI);
- Adjacent residents and local authorities are advised of pending major venting operations prior to undertaking the activity and notification is documented;
- Venting or purging activities are undertaken on as needed basis;
- Minimising time between clearing and rehabilitating the easement when excavations are required; and
- Speed limits set to minimise the production of dust.

6.10 Noise Emissions

Potential Impacts

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

Mitigation Measures

Key preventative and reactive controls include:

- All plant and facilities are designed and operated to comply with the EPA Guidelines for the Environment Protection (Noise) Policy and the Australian Standard 1055: Acoustics; and
- Adjacent residents and local authorities are advised of pending major venting operations prior to undertaking the activity.

6.11 Third Party Infrastructure

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

Inspection 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.

Mitigation Measures

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

- Locating works away from existing infrastructure whenever practicable;
- Addressing any damage caused to roads and tracks;
- Maintaining close liaison with utility managers to identify existing overhead and buried cables, lines and pipes;
- Utilising the Before You Dig Australia '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 DIT maintained road; and
- Maintaining close liaison with landholders and third parties.

6.12 Public Safety

Potential Impacts

The main threats to public safety resulting from the operation and maintenance of the Pipelines are fire, explosion or radiation exposure (such as thermal radiation) 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 (corrosion mechanisms such as external interference, external corrosion, environmentally assisted cracking, undetected flaw in Zaplok connections (RLP), intentional damage, mechanical joins leakage).

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 required 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 and pipeline corrosion include:

- Implementation of a regular patrolling to identify and 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 'Before You Dig Australia' contact number and pipeline location service;
- Implementation of the community awareness program involving presentations to the local contractors, emergency providers and utilities in areas along the pipeline route to educate personnel on the nature of the Pipelines, contents, correct works procedures for the easement and emergency procedures;
- Maintenance of pipeline warning signs along the Pipeline route;
- Provision of buried markers above the Pipeline in areas of increased risk from excavations e.g. road crossings;
- Implementation of SMS as per AS 2885.6; Security fences around above ground facilities and depth of cover;
- Cathodic Protection (CP) and undertaking regular CP surveys; and
- Compliance with AS 2885.1

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:

- 24 hour pipeline control centre incorporating monitoring and control systems that continuously receive and analyse pipeline operating reports
- Gas leak detectors;
- Routine Direct Current Voltage Gradient (DCVG) survey, followed by direct assessment (digups) for selected DCVG detection locations;
- 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.

Additionally, refer to Section 3.7 for emergency preparedness and response measures.

6.13 Security of Gas Supply

Potential Impacts

Potential causes of an interruption to gas supply include the following:

- An equipment failure within a facility that prevents delivery or receipt of gas at a particular point. This is likely to be a short term interruption;
- A pipeline integrity issue that requires the maximum allowable operating pressure of the pipeline to be reduced, therefore capacity of the pipeline to decrease. Repair strategies would be enacted resulting in a short term impact;
- A pipeline failure/rupture event. A rupture is very unlikely due to the pipeline being managed and maintained in accordance with AS 2885; and
- A short term supply interruption (of up to 2 weeks) could occur due to a pipeline incident

Mitigation Measures

Emergency preparedness and response is taken very seriously through the implementation of the Networks Emergency Response Plan (400-PL-ER-0001). The Plan sets out the procedures and resources to be deployed by personnel in the event of an emergency incident to the Pipeline. 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 plan establishes emergency response planning consideration such as having adequate emergency equipment, pipe and fittings fit for the intended purpose readily available at all times, complete with traceable material test certificates.

The Emergency Response Plan incorporates the following:

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

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

Simulation exercises are a key resource in the emergency training of all staff. In South Australia, a report is required by DEM on the outcomes of the emergency simulation with the debrief plan outlining lessons learnt and actions taken. The training outcomes for an individual/team from a simulation exercise are;

- Initiation of emergency response and how emergency teams are activated;
- Individual response to an emergency, reporting, escalation of emergency through levels;
- Individual roles and responsibilities of emergency team members;
- Review of personal protective equipment required, condition and evacuation techniques, and any species emergency response equipment required;
- Integrated Operations Centre actions and response, communications and notifications;
- Command, control and communication arrangements between company personnel and stakeholders, external response agencies and statutory authorities;
- Teamwork and response to emergency, implementation of control procedures;
- Resolution of emergency, reinstatement of normal supply/operations; and
- Debrief of items of concern, barriers to response, lessons learnt.

In the event of an incident causing a loss of gas supply, and following the emergency response phase, a pipeline repair strategy would be implemented where the damaged pipeline would be replaced. We envisage that such an outage would not last longer than 2 weeks to initiate a repair to get the gas flowing. This may include initiating a temporary repair prior to completing a permanent repair.

A formal Pipeline Repair Plan would be developed to ensure that the technical operation of the repaired pipeline would be engineered sufficiently to ensure ongoing operation. APA would engage with the technical regulator to ensure repair work was sufficient to meet regulatory standards.

7 ENVIRONMENTAL MANAGEMENT FRAMEWORK

APA Group has developed and implemented a Health, Safety and Environment and Heritage (HSEH) Management System, which applies to all APA Group activities. The HSEH 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:

Health, Safety, Environment and Heritage Policy

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

Operational Environmental Management Plan

The OEMP incorporates a risk assessment that outlines all environmental hazards associated with operational activities across APA. 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 HSEH system APA 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.

The APA Hazard and Incident Reporting system (Safeguard+) forms part of the APA Health Safety Environment and Heritage Management system and caters for the reporting, recording and follow up of all safety and environmental hazards and incidents. The process in reporting incidents, near misses and hazards is governed by the APA HSE GP 07.01 Incident, Near Miss & Hazard Management Protocol (the Protocol).

Personnel who observe, or are involved in a hazard or incident must enter the incident or hazard into Safeguard+ database system, in accordance with the Protocol.

This Protocol has a notification flow chart for personnel to use to ensure that the appropriate teams are notified following an incident or hazard. Additionally, the Protocol includes immediate notification requirements for Level 3 actual/potential incidents.

Notification is then sent to the relevant Team Leader or Manager and Environment and Heritage Team (or has thus far been verbally informed) and reported to the relevant government agencies in accordance with reporting requirements for incidents under the relevant Acts.

The above is communicated to the teams via the Protocol and associated flow charts.

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 be completed.

8 STAKEHOLDER CONSULTATION

APA maintains regular contact with the landholders and other directly affected stakeholders (e.g. local government) 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 Pipeline. APA Group consider the DEM consultation process to be adequate for the on-going operation of the Pipeline as operational activity is considered to be low impact and very few stakeholders are directly affected by operational activities. Key stakeholders include, but are not limited to:

- Department of Energy and Mining (DEM);
- Department for Environment and Water (DEW);

- Environment Protection Authority (EPA);
- Department for Infrastructure and Transport (DIT);
- Landholders;
- Native Title Claimants (First Peoples of the River Murray and Mallee Region, First Peoples of the River Murray and Mallee Region #2, Ngadjuri Nation #2, and Ngarrindjeri and Others Native Title Claim); and
- Murray River Landscape Board and Northern and Yorke Landscape Board. .

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

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

9 REFERENCES

- Aboriginal Affairs and Reconciliation (2023) Aboriginal Heritage Sites Report. PL 11, May 2023.
- Aboriginal Affairs and Reconciliation (2023) Aboriginal Heritage Sites Report. PL 6, May 2023.
- APA Group (2015) Moomba to Sydney Pipeline, Pipeline Licence 7 & Moomba to Sydney Ethane Pipeline, Pipeline Licence 8 – Environmental Impact Report (Transmission Operations). Prepared by APA Group, July 2015.
- APA Group (2003) Angaston to Berri Transmission Pipeline and Murray Bridge Lateral Pipeline (Riverland Pipeline – PL6) Environmental Impact Report. Prepared by Origin Energy and Epic Energy, December 2003.
- APA Group (1998) Berri to Mildura Natural Gas Transmission Pipeline, Declaration of Environmental Factors / Environment Effects Report. Prepared by Boral Energy Asset Management Limited in consultation with Ecos Consulting (Aust.) Pty Ltd, October 1998.
- APA Group (2012) Safety and Operation Plan for the Riverland Pipeline. Prepared by APA Group, October 2012.
- APA Group (2012) Safety and Operation Plan for the Berri Mildura Pipeline. Prepared by APA Group, November 2012.
- APA Group (2021) Riverland Pipeline and Berri to Mildura Pipeline – Operational Environmental Management Plan, June 2021.
- BoM (2023). Climate Data Online. Accessed in May 2023 at www.bom.gov.au/climate/averages. Bureau of Meteorology, Australia.
- DCCEE (2023). EPBC Act Protected Matters Search Tool. Searched 31 May 2023 at <http://www.environment.gov.au/erin/ert/epbc/index.html>.
- DOE (2015). Species Profile and Threats Database. Accessed in August 2015 at <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.
- DTEI (2015) Department of Transport, Energy & Infrastructure - Traffic Volumes. Accessed in August 2015 at http://www.transport.sa.gov.au/transport_network/facts_figures/traffic_volumes.asp#rural.
- Gillam, S. and Urban, R. (2014) Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region. Department of Environment, Water and Natural Resources, South Australia.
- Environment Australia (2001) A Directory of Important Wetlands in Australia. Third Edition. Environment Australia, 2001. Available at the DOE website: <http://www.environment.gov.au/water/publications/environmental/wetlands/directory.html>
- DEW (2023) NatureMaps Search Tool. Searched 31 May 2023 at [NatureMaps \(environment.sa.gov.au\)](http://NatureMaps.environment.sa.gov.au)
- DOE (2015). EPBC Act List of Threatened Fauna. Accessed in July/August 2015 at <http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna>
- DOE (2015). EPBC Act List of Threatened Flora. Accessed in July/August 2015 at <http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>
- DOE (2015). Australia's Bioregions (IBRA) Accessed in July 2015 at <http://www.environment.gov.au/land/nrs/science/ibra>

10 SUPERSEDED DOCUMENTS

Document	Title / Description
420-RP-AM-0006	APA Group (2017) Environmental Impact Report RLP BMP 2017 Report Riverland Pipeline (PL6) and Berri to Mildura Pipeline (PL11). Prepared by APA Group, 8 November 2017 (Revision 3).
0566	APA Group (2003) Angaston to Berri Transmission Pipeline and Murray Bridge Lateral Pipeline (Riverland Pipeline – PL6) Environmental Impact Report. Prepared by Origin Energy and Epic Energy, December 2003.
0510	APA Group (1998) Berri to Mildura Natural Gas Transmission Pipeline, Declaration of Environmental Factors / Environment Effects Report. Prepared by Boral Energy Asset Management Limited in consultation with Ecos Consulting (Aust.) Pty Ltd, October 1998.

11 RELATED DOCUMENTS

Document	Title / Description
420-PL-AM-0005	APA Group (2023) Statement of Environmental Objectives - Riverland Pipeline (PL6) and Berri to Mildura Pipeline (PL11).

12 ABBREVIATIONS/DEFINITIONS

Abbreviation	Description
°C	Degrees Centigrade
AGN	Australian Gas Networks Limited
ALARP	As Low As Reasonably Practicable
APIA	Australian Pipeline Industry Association Inc
APGA	Australian Pipeline and Gas Association
ASS	Acid Sulfate Soils
AS 2885	Australian Standard AS 2885.3-2012: Pipelines – Gas and liquid petroleum – Operation and maintenance
BDBSA	Biological Databases of South Australia
BMP	Berri to Mildura Pipeline
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.
DBYD	Dial Before You Dig
DEW	Department for Environment and Water (South Australia)
DEM	Department of Energy and Mining (South Australia)
DOE	Department of Environment (Commonwealth)
DPC	Department of Premier and Cabinet (South Australia)

Abbreviation	Description
DSD-AAR	Department of State Development, Aboriginal Affairs and Reconciliation (South Australia)
Easement	An easement is considered to be an area of land that is located directly above the buried pipeline. The width of the easement will vary depending on factors such as construction requirements and land tenure, but is typically up to 30m.
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, South Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
Gas Pipeline	Riverland Pipeline (PL 6) and/or Berri to Mildura Pipeline (PL 11)
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 hydrotesting)	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. There may be a potential for chemicals such as oxygen scavenger, biocide and corrosion inhibitor to be present.
LOS	Line of Sight
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
ML	Megalitre (10 ⁶ litres)
MPa	mega pascal
OEMP	Operational Environmental Management Plan
PG&E Act	<i>Petroleum and Geothermal Energy Act 2000</i> (SA)
PG&E Regs	<i>Petroleum and Geothermal Energy Regulations 2013</i> (SA)
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
PL	Pipeline Licence
Pipeline	Pipeline refers collectively to both the BMP and RLP
PIRSA	Department of Primary Industries and Regions, South Australia

Abbreviation	Description
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)
RLP	Riverland Pipeline
RTU	Remote Telemetry Unit
SCADA	Supervisory Control and Data Acquisition
SEO	Statement of Environmental Objectives prepared in accordance with Section 99 and 100 of the <i>Petroleum and Geothermal Energy Act 2000</i> and Regulations 12 and 13.
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 A: HEALTH, SAFETY, ENVIRONMENT AND HERITAGE POLICY

Health, Safety, Environment and Heritage Policy

1st January 2023

Purpose

At APA Group (APA) we strive to be world class in health, safety, environment and heritage performance. Our foremost priorities are the health, safety and wellbeing of our workers and protection of the environment, heritage and the communities in which we operate.

APA is committed to managing and minimising our impact on the environment and heritage. We foster a culture of responsibility, leadership and awareness of our environment and heritage obligations and practices. We recognise our role as land stewards and aspire to not just respect the past but protect values for the future.

Strategic Intent

We are committed to establishing a workplace culture that values and prioritises safety, respect and inclusion. We aspire for our workers to be free of illness and injury which includes the health, wellbeing and psychological safety such that the whole person is considered.

Objectives

The APA's Health, Safety Environment and Heritage (HSEH) Management System outlines accountabilities to implement this Policy and requires that we:

- Proactively identify hazards and aim to eliminate or implement effective controls to minimise the risk of injury, illness to people or unacceptable impacts on the environment and heritage as far as reasonably practicable;
- Provide systems of work that focus on guiding workers to manage and control critical risk;
- Provide a work environment and fit for purpose equipment that minimises the risk to workers so far as is reasonably practicable;
- Provide systems of work that empower workers to control the risks to themselves, others and the environment, whilst carrying out their duties;
- Meet or exceed applicable HSEH statutory, regulatory, legal and social obligations;
- Adopt and monitor measurable, fit for purpose objectives and targets around HSEH performance;
- Consult, engage and educate with our workers and communities on HSEH matters that affect them;
- Undertake early intervention and support the rehabilitation of workers in the event of injury or illness;
- Establish a learning culture through investigation of incidents to embed learnings and reduce the risk of repeated events;
- Ensure HSEH leadership is visible across the organisation to promote a strong culture;
- Undertake activities to continuously improve the effectiveness of the HSEH Management System and controls.

Accountabilities

The Board of Directors of APA Group Limited is responsible for overseeing and supporting APA's commitment to HSEH in accordance with this Policy and for monitoring the performance of the HSEH Management System. The Safety and Sustainability Committee is in place to assist the Board to carry out its role in overseeing APA's safety and sustainability matters, including APA's compliance with this Policy.

The CEO is responsible for resourcing the implementation of the HSEH Management System to ensure these Policy commitments are being achieved.

The Group Executive of each division is responsible for the implementation of the HSEH Management System within their area of responsibility.

The General Manager HSEH is responsible for facilitating the implementation of the HSEH Management System, collating information and reporting on APA's performance.

All workers have an obligation to manage HSEH risks that impact themselves, others, the environment and communities in which they operate. All workers have the authority to stop work if the HSEH risks cannot effectively be managed to an acceptable level.

Adam Watson
Chief Executive Officer

APPENDIX B: THREATENED SPECIES LIST

The following fauna species have been previously recorded within 1 kilometre of the pipeline, according to a search using the EPBC Protected Matters Search Tool (2023) and the NatureMaps Search tool (2023).

Threatened Fauna Species

Species	Conservation Status		Comment
	C'wealth	SA	
Mammals			
Feathertail glider <i>Acrobates pygmaeus</i>)	-	Endangered	Confined to the riparian zone of the Murray River in the Riverland area, in <i>Eucalyptus camaldulensis</i> and <i>E. largiflorens</i> woodlands.
Southern myotis <i>(Myotis macropus)</i>	-	Endangered	May be present in the corridor; colonies recorded near Nildottie (outside of the pipeline route) in the river corridor.
Burrowing Bettong (Shark Bay) <i>(Bettongia lesuer lesuer)</i>	Vulnerable	Endangered	The EPBC Act database predicts the presence of this species but the possibility that it may be present is considered negligible. Unlikely to be present within pipeline easement. Subspecies reintroduced at Yookamurra Sanctuary 24 km north east of Sedan.
Common Brushtail Possum (<i>Trichosurus vulpecula</i>)	-	Rare	Unlikely to be present in the pipeline easement. Present at Yookamurra Wildlife Sanctuary 24 km north east of Sedan.
Southern Brown Bandicoot (Eastern) <i>(Isodon obesulus obesulus)</i>	Endangered	Vulnerable	Unlikely to be present within pipeline easement. Populations apparent in the Northern and Southern Fleurieu Peninsula regions only.
Greater Bilby) <i>(Macrotis lagotis)</i>	Vulnerable	Vulnerable	Unlikely to be present within pipeline easement. Species reintroduced at Yookamurra Sanctuary 24 km north east of Sedan.
South eastern Long-eared bat <i>(Nyctophilus corbeni)</i>	Vulnerable	Vulnerable	Unlikely to be present within pipeline easement. Largely restricted to the Murray Darling Basin where it is patchily distributed and occurs in a range of inland vegetation types.
Grey-headed Flying-fox) Pteropus poliocephalus	Vulnerable	Rare	Restricted to woodlands for foraging, unlikely to be present within the pipeline easement.
Birds			
Australasian bittern <i>(Botaurus poiciloptilus)</i>	Endangered	Vulnerable	Unlikely to be present within pipeline easement. Located around the Murray River National Park and wetlands of the Riverland.
Glossy Black-Cockatoo (Kangaroo Island subspecies) <i>(Calyptorhynchus lathami halmaturinus)</i>	Endangered	Endangered	Unlikely to be present within pipeline easement. No confirmed sighting on South Australian mainland since 1977. Restricted to Kangaroo Island.
Spotted Quail thrush <i>(Cinnclosoma punctatum anachoreta)</i>	Critically Endangered	Endangered	Unlikely to be present within pipeline easement. No published records of sightings since 1984.
Chestnut-rumped Heathwren <i>(Hyacola pyrrhopygia parkeri)</i>	Endangered	Endangered	Located in the Mt Lofty Ranges. The closest database records for this species are within 10km of Angaston in Tanunda; however there have been no recent records of sightings. Inhabits heathlands and woodlands with dense scrub and ground-layer vegetation, most commonly found in rocky areas. Feeds on insects and occasionally eats spiders and seeds.

Species	Conservation Status		Comment
	C'wealth	SA	
Malleefowl (<i>Leipoa ocellata</i>)	Vulnerable	Vulnerable	Unlikely to be present within pipeline easement. Predicted and recorded habitat around Bakara Conservation Park, Swan Reach Conservation Park, Yookamurra Sanctuary and heritage agreements around Maggea.
Black-eared Miner (<i>Manorina melanotis</i>)	Endangered	Endangered	Unlikely to be present within pipeline easement. Restricted to mature mallee eucalypt woodland. Main SA colonies are in the Bookmark Biosphere Reserve, north of the Murray River; although sightings have occurred in Glenburr Scrub near Murray Bridge.
Curlew Sandpiper (<i>Calidris ferruginea</i>)	Critically Endangered	Endangered	Unlikely to be present within pipeline easement. Widespread in coastal and subcoastal areas east of Streaky Bay.
Grey Falcon (<i>Falco hypoleucos</i>)	Vulnerable	Rare	The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. May fly over the pipeline area.
Major Mitchell's Cockatoo (eastern) (<i>Lophochroa leadbeateri leadbeateri</i>)	Endangered	-	Occur in the Murray Darling Basin, habitat includes large mature trees, unlikely to be present within the pipeline easement.
Hooded Robin (south-eastern) <i>Melanodryas cucullate cucullate</i>	Endangered	Rare	Occur in the Murray Darling Basin, habitat includes dry eucalypt and acacia woodlands, unlikely to be present within the pipeline easement.
Blue-winged Parrot (<i>Neophema chrysostoma</i>)	Vulnerable	Vulnerable	Unlikely to be present within pipeline easement. Occurs in coastal south-eastern South Australia.
Eastern Curlew (<i>Numenius madagascariensis</i>)	Critically Endangered	Endangered	Unlikely to be present within pipeline easement. Primarily coastal, with records in n Lake Alexandrina and Lake Albert, South Australia.
Little Eagle (<i>Hieraaetus morphnoides</i>)	-	Vulnerable	Records around Bakara Conservation Park and Swan Reach Conservation Park.
Painted Honeyeater (<i>Grantiella picta</i>)	Vulnerable	Rare	Present in eucalypt forests/woodlands hosting mistletoes. Occur in semi-arid regions such as north-eastern South Australia.
Plains-wanderer (<i>Pedionomus torquatus</i>)	Critically Endangered	Endangered	Unlikely to be present within pipeline easement.
Red-lored whistler (<i>Pachycephala rufogularis</i>)	Vulnerable	Rare	Pipeline passes through species distribution and predicted habitat around Bakara Conservation Park.

Species	Conservation Status		Comment
	C'wealth	SA	
Regent Parrot (Eastern) (<i>Polytelis anthopeplus monarchoides</i>)	Vulnerable	Vulnerable	Unlikely to be present within pipeline easement. Predicted habitat west of Swan Reach, around Bakara Conservation Park and reserves of the Murray River corridor. Major breeding populations near Renmark.
Night Parrot (<i>Pezoporus occidentalis</i>)	Endangered	Endangered	Present in grasslands or shrublands in arid zones, low number of sightings in South Australia.
Spotted Quail thrush (<i>Cinclosoma punctatum anachoreta</i>)	Critically Endangered	Endangered	Unlikely to be present within pipeline easement. No published records of sightings since 1984.
Striated grasswren (<i>Amytornis striatus</i>)	-	Rare	Predicted habitat in and around Bakara Conservation Park and the north-east of the river at Pyap.
Striped honeyeater (<i>Plectorhyncha lanceolata</i>)	-	Rare	Predicted and recorded habitat in vegetation blocks between Swan Reach Conservation Park and Renmark.
White-throated Needletail (<i>Hirundapus caudacutus</i>)	Vulnerable	-	Almost exclusively aerial, occurring in Yorke Peninsula and the Mount Lofty Ranges.
White-winged Chough (<i>Corcorax melanorhamphos</i>)	-	Rare	Several records in woodland areas along the pipeline route.
Southern Whiteface (<i>Aphelocephala leucopsis</i>)	Vulnerable		Occurs in open woodlands and shrublands. Records in areas along the pipeline route.
Australian Painted Snipe (<i>Rostratula australis</i>)	Endangered	Vulnerable	Likely to be present in pipeline easement in Mt Lofty Ranges and Murray Darling Basin. Records in Murray River National Park.
Reptiles			
Flinders Ranges Worm-Lizard (<i>Aprasia pseudopulchella</i>)	Vulnerable	-	Likely to be present in pipeline easement. Inhabits open woodland, native tussock grassland, riparian habitats and rocky isolates. Feeds on larvae and pupae of ants. The distribution of this species overlaps with the following EPBC Act listed threatened ecological communities: Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, Iron-grass natural Temperate Grassland of South Australia; and Peppermint Box (<i>Eucalyptus odorata</i>) Grassy Woodland of South Australia.
Pygmy Blue-tongue Lizard, Adelaide	Endangered	Endangered	Likely to be present within pipeline easement.

Species	Conservation Status		Comment
	C'wealth	SA	
Blue-tongue Lizard (<i>Tiliqua adelaidensis</i>)			Found in Iron-grass natural Temperate Grassland of South Australia
Bardick (<i>Echiopsis curta</i>)	-	Rare	May be present in the pipeline corridor. The distribution and habitat requirements of the species are poorly known.
Broad-shelled tortoise) (<i>Chelodina expansas</i>)	-	Vulnerable	Recorded in the river corridor in the Riverland. Predicted and recorded habitat in Lyrup Forest Reserve.
Carpet python (<i>Morelia spilota</i>)	-	Rare	Inhabitant of woodlands, especially River red gum. Predicted and recorded habitat in Lyrup Forest Reserve.
Common bandy-bandy (<i>Vermicella annulata</i>)	-	Rare	Recorded in Murray Mallee/Murray Plains and River Corridor ecological areas. Recorded between Sturt Highway and Murray River (former Berri Council dump) and Lyrup Forest Reserve.
Grey Snake (<i>Hemiaspis damelii</i>)	Endangered		Not many records in South Australia, unlikely to be present in the pipeline corridor.
Amphibians			
Golden bell frog (<i>Litoria raniformis</i>)	Vulnerable	Vulnerable	Recorded in reserves in the River Corridor regional ecological area.
Brown toadlet (<i>Pseudophryne bibroni</i>)	-	Rare	Recorded in reserves in the River Corridor regional ecological area.
Fish			
Murray hardyhead (<i>Craterocephalus fluviatilis</i>)	Endangered	Critically endangered (non-statutory listing)	The species has been recorded from several locations near Renmark, downstream to near the mouth of the Murray River, including the Murray River and tributaries, Finnis River, Angas River, Marne River and Dishers Creek (Lloyd & Walker 1986). Known populations of the species exist (in South Australia) in two salt evaporation basins near Berri (Disher Creek and Berri) in the Rocky Gully wetland near Murray Bridge and in the Lower Lakes (Bice et al. 2008).
Murray Cod (<i>Maccullochella peelii</i>)	Vulnerable	-	Occurs naturally in the waterways of the Murray-Basin Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers and billabongs.
Silver Perch (<i>Bidyanus bidyanus</i>)	Critically Endangered	-	Endemic to the Murray-Darling system.
(<i>Galaxias rostratus</i>)	Critically Endangered	-	Known from the southern half of the Murray-Darling Basin system.
Macquarie Perch (<i>Macquaria australiasica</i>)	Endangered	-	Considered rare downstream in the Murray River.

The following plant species have been previously recorded within 1 kilometre of the pipeline, according to a search using the EPBC Protected Matters Search Tool (2023) and the NatureMaps Search tool (2023).

Threatened Flora Species

Species	Conservation Status	
	C'wealth	SA
Mallee Wattle (<i>Acacia montana</i>)	-	Rare

Species	Conservation Status	
	C'wealth	SA
<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>	-	Rare
Rohlach's Bluebush (<i>Maireana rohrlachii</i>)	-	Rare
Creeping Boobialla (<i>Myoporum parvifolium</i>)	-	Rare
Menzel's Wattle (<i>Acacia menzeli</i>)	Vulnerable	Vulnerable
Neat Wattle (<i>Acacia rheticocarpa</i>)	Vulnerable	Vulnerable
White-beauty Spider-orchid (<i>Caladenia argocalla</i>)	Endangered	Endangered
Coloured Spider-orchid (<i>Caladenia colorata</i>)	Endangered	Endangered
Greencomb Spider-orchid (<i>Caladenia tensa</i>)	Endangered	-
Trailing Hop-bush (<i>Dodonaea procumbens</i>)	Vulnerable	Vulnerable
Osborn's Eyebright (<i>Euphrasia collina</i> subsp. <i>osbornii</i>)	Endangered	Endangered
Peep Hill Hop-bush (<i>Dodonaea subgladulifera</i>)	Endangered	Endangered
Clover Glycine (<i>Glycine latrobeana</i>)	Vulnerable	Vulnerable
Winged Pepper-cress (<i>Lepidium monoplacoides</i>)	Endangered	Endangered
Silver Daisy-bush (<i>Olearia pannosa</i> subsp. <i>Pannosa</i>)	Vulnerable	Vulnerable
Pale Leek-orchid (<i>Prasophyllum pallidum</i>)	Vulnerable	Rare
Monarto Mintbush (<i>Prostanthera eurybioides</i>)	Endangered	Endangered
Desert Greenhood (<i>Pterostylis xerophila</i>)	Vulnerable	Vulnerable
Large-fruit Fireweed (<i>Senecio macrocarpus</i>)	Vulnerable	Vulnerable
Yellow Swainson-pea (<i>Swainsona pyrophila</i>)	Vulnerable	Rare
Metallic Sun-orchid (<i>Thelymitra epipactoides</i>)	Endangered	Endangered
Spiral Sun-orchid (<i>Thelymitra matthewsii</i>)	Vulnerable	Endangered

APPENDIX C: ENVIRONMENTAL RISK ASSESSMENT / RISK MATRIX



RISK ASSESSMENT MATRIX

APA uses a 5x5 risk matrix to assign likelihood and consequence ratings to risk items outlined below

The official Enterprise Risk Matrix for your session can be accessed via the link below

<http://thehub.apa.com.au/WorkArea/Risk/Toolbox/Forms/GuidanceView.aspx>

NOTE: DO NOT DELETE OR MODIFY THIS MATRIX

		Consequence				
		Minimal	Minor	Significant	Major	Catastrophic
		1	2	3	4	5
Frequent	5	Low	Moderate	High	Extreme	Extreme
Occasional	4	Low	Low	Moderate	High	Extreme
Unlikely	3	Negligible	Low	Moderate	High	High
Remote	2	Negligible	Negligible	Low	Moderate	High
Rare	1	Negligible	Negligible	Negligible	Moderate	Moderate

Final Risk Rating	Negligible	
	Low	
	Moderate	
	High	
	Extreme	

Level	Descriptor	Description*	Descriptor	Description	
5	Frequent- Many times in 1yr	Expected to occur on a regular basis and many times	Catastrophic	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	Permanent and irreparable impact or infringement to heritage
4	Occasional - Every 2yrs	May occur occasionally or in many circumstances	Major	One or a combination of the following consequences: - offsite and impacting > 1 ha - able to be remediated with difficulty - impact continues for <10 yrs	Temporary but irreparable impact or infringement to heritage
3	Unlikely - Every 5yrs	Unlikely to occur but possible when certain circumstances prevail	Significant	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	Permanent but repairable impact or infringement to heritage



2	Remote - Every 20yrs	Not anticipated but may occur if certain abnormal circumstances prevail	Minor	One or a combination of the following consequences: - onsite and impacting > 1 ha - able to be remediated easily - impact continues for <1 yr	Temporary and repairable impact or infringement to heritage
1	Rare - Every 50yrs	Conceivable, but has not been known to arise previously	Minimal	One or a combination of the following consequences: - onsite and impacting < 1 ha - no remediation needed - impact continues for < 1 wk	Impact that causes negligible or no damage to heritage

ERA #	SELECT ACTIVITY OR ASSET FROM LIST	MULTI LOOK UP COLUMN: This column must remain as column D for multilookup to work	Hazardous Aspect or Activity (Hazard): Aspect - Element of an organisation's activities that can	Consequence / Impacts Try to describe the direct specific consequences Impact - Any change to the environment, whether adverse or	Pre-Control (Inherent)				Preventative Controls	Reactive / Mitigating Controls	Key Supporting Management Actions Scheduled tasks, Inspections, Records, Training, Awareness and Procedures that support the controls	Post-Control (residual)		
					Credible	Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level
1	Pipelines		Vegetation control	Spread of declared weeds, pests and (biosecurity) diseases	Yes	Occasional	Major	High	<ul style="list-style-type: none"> Landholder requirements stored in XIC Review XIC for declared weed information and clean down requirements Documented vehicle and equipment clean down after entering known infested areas Vehicles and equipment to remain on designated roads and tracks Employees and contractors to complete APA National Environmental Awareness Induction and Environmental Management Plan Training Review Environmental Line List prior to works Patrol packs with declared weed information (for team to consider) 	<ul style="list-style-type: none"> Declared weeds reported to environmental representative Inspections undertaken as part of regular patrols (ground) to identify the presence of weeds and pathogens on easement and adjacent land (if weeds on easement but not adjacent land must implement control to prevent spread). (SEO requirement) Weed management as required (i.e. weed spraying) 	<ul style="list-style-type: none"> Pest, Weeds and Disease Management Procedure (APA HSEH GP 43) Pest, Weeds & Disease Clean Down Guideline (APA HSEH GD 43.02) Wash-down and Inspections Toolbox (APA HSE TB ENV 006) Vehicle Clean down record form (APA-HSE-EF-004) Pipeline patrols 5-yearly environmental audits APA Permit to Work Contractor JHEA Annual Environmental Reporting 	Remote	Major	Moderate
2	Pipelines		Vegetation control	Unauthorised clearing	Yes	Unlikely	Significant	Moderate	<ul style="list-style-type: none"> No clearing outside of previously disturbed boundaries No clearing within 10m of a major water course without environmental approval Employees and contractors to complete APA Environmental Awareness Training Environmental Line List If unauthorised clearing is done in national park, an action is triggered in the Environmental Line List 		<ul style="list-style-type: none"> Native Vegetation Management (APA HSE EP 13.02.01) Native Vegetation Management Toolbox (APA HSE TB ENV 003) APA Permit to Work Contractor JHEA 	Remote	Significant	Low
3	Pipelines		Vegetation control	Injury or death of fauna, impact to habitat	Yes	Occasional	Minor	Low	<ul style="list-style-type: none"> No clearing outside of previously disturbed boundaries Complete Checklist for Engaging the Environment Team - SA prior to clearing works Review Environmental Line List prior to clearing works Employees and contractors to complete APA Environmental Awareness Training <p>Action: Check against a checklist for threatened ecological habitat or fauna (BDBSA)</p> <p>Action: If there is an identified wombat population, develop a specialist management plan. Add known wombat populations to the Environmental Line List</p>	<ul style="list-style-type: none"> Injured fauna reported in SG+ Injured fauna to be taken to wildlife carer, where possible 	<ul style="list-style-type: none"> Fauna Management Environment Procedure (APA HSE EP 13.02.02) Fauna Management Toolbox (APA HSE TB ENV 012) APA Permit to Work Contractor JHEA Annual Environmental Reporting 	Remote	Minor	Negligible
4	Pipelines		Vegetation control	Unauthorised European heritage impact	Yes	Unlikely	Minor	Low	<p>NOTE: INCLUDES PIPE EXCAVATION IMPACTS</p> <ul style="list-style-type: none"> No clearing outside of previously disturbed boundaries Checklist for Engaging the Environment Team - SA Review Environmental Line List prior to clearing works Employees and contractors to complete APA Environmental Awareness Training <p>EIR Condition: Information on heritage sites is maintained during operations on the company wide database and/or GIS system and Alignment sheets, from information that has been prepared prior to pipeline construction or during subsequent projects by suitably qualified persons with input from indigenous communities. Information kept includes detail regarding the significance, location and management measures for each site. Information from this database is available to patrol officers and environmental advisers and auditors during operations.</p>	<ul style="list-style-type: none"> Implement the Stop Works / Accidental Discovery Procedure if items found / suspected SG+ Incident reporting and investigation 	<ul style="list-style-type: none"> Stop Works Procedure Toolbox (APA HSE TB ENV 008) APA Permit to Work Contractor JHEA Annual Environmental Reporting 	Remote	Minor	Negligible
	Pipelines		Vegetation control and Pipeline Excavation	Unauthorised Aboriginal heritage impact	Yes	Unlikely	Major	High	<p>Actions: Initial surveys, updated AAR site identification</p> <ul style="list-style-type: none"> Stop work procedure Where maintenance work or other operations are planned to take place, a heritage consultant (in consultation with the relevant Aboriginal traditional owners) should be engaged to undertake an assessment of the risk. If the consultant confirms that there is a risk of damaging, disturbing or interfering with Aboriginal sites, objects and/or remains, authorisation must be sought from the Minister for Aboriginal Affairs and Reconciliation. <p>EIR Condition: Information on heritage sites is maintained during operations on the company wide database and/or GIS system and Alignment sheets, from information that has been prepared prior to pipeline construction or during subsequent projects by suitably qualified persons with input from indigenous communities. Information kept includes detail regarding the significance, location and management measures for each site. Information from this database is available to patrol officers and environmental advisers and auditors during operations.</p>	<ul style="list-style-type: none"> Report any cultural heritage discoveries to the E&H team 	<ul style="list-style-type: none"> Heritage Management Procedure (APA GP 47.00) Aboriginal Cultural Heritage Toolbox (APA HSEH TMP 47.21) 	Unlikely	Major	High
5	Pipelines		Pipeline Excavation and erosion repairs	Trapped fauna: Injury or death of fauna	Yes	Occasional	Minor	Low	<ul style="list-style-type: none"> Fencing / barricading, 45 degree egress ramp and hessian bag for any excavations left open overnight Daily inspections of open excavations to be carried out. If any fauna are found, a trained fauna handler is to be engaged for removal Employees and contractors to complete APA Environmental Awareness Training Environmental Line List 	<ul style="list-style-type: none"> SG+ incident reporting and investigation Trench fauna mortalities to be reported in SG+ 	<ul style="list-style-type: none"> Fauna Management Environment Procedure (APA HSE EP 13.02.02) Fauna Management Toolbox (APA HSE TB ENV 012) APA Permit to Work Contractor JHEA Annual Environmental Reporting 	Remote	Minor	Negligible
6	Pipelines		Pipeline Excavation and erosion repairs	Unauthorised heritage impact				See ERA #4	See ERA#4	See ERA #4				

ERA #	SELECT ACTIVITY OR ASSET FROM LIST	MULTI LOOK UP COLUMN: This column must remain as column D for multilookup to work	Hazardous Aspect or Activity (Hazard): Aspect - Element of an organisation's activities that can	Consequence / Impacts Try to describe the direct specific consequences	Credible	Pre-Control (inherent)			Preventative Controls	Reactive / Mitigating Controls	Key Supporting Management Actions Scheduled tasks, Inspections, Records, Training, Awareness and Procedures that support the controls	Post-Control (residual)		
						Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level
7	Pipelines		Pipeline Excavation and erosion repairs	Acid sulphate soils	Yes	Rare	Minor	Negligible	<ul style="list-style-type: none"> Checklist for Engaging the Environment Team - SA Review Environmental Line List prior to excavation If ASS is deemed likely, prepare and implement ASS management plan. Testing of ASS to be carried out by a suitably qualified person and analysed by a NATA accredited lab Employees and contractors to complete APA Environmental Awareness Training 	<ul style="list-style-type: none"> If indicators of unanticipated ASS are discovered, stop work and seek site specific advice. Any exposed ASS to be reported in SG+ Add identified site to database 	<ul style="list-style-type: none"> Acid Sulfate Soils toolbox (APA HSE TB ENV 027) Contaminated Sites Management (APA HSE EP 13.04.02) APA Permit to Work Contractor JHEA Annual Environmental Reporting EPA guidelines 638/07 Site contamination – acid sulfate soil materials 	Rare	Minor	Negligible
8	Pipelines		Pipeline Excavation and erosion repairs	Contaminated lands	Yes	Remote	Minor	Negligible	<ul style="list-style-type: none"> Checklist for Engaging the Environment Team - SA Review Environmental Line List prior to excavation Site specific investigation in areas of known or suspected contaminated soils. 	<ul style="list-style-type: none"> If indicators of unanticipated contamination are discovered, stop work and seek site specific advice. 	<ul style="list-style-type: none"> Contaminated Sites Management (APA HSE EP 13.04.02) Contaminated Sites Management Toolbox (APA HSE EP 13.04.02 T5) Annual Environmental Reporting 	Rare	Minimal	Negligible
9	Pipelines		Dewatering	Unauthorised dewatering, downstream water quality, erosion	No				<ul style="list-style-type: none"> Checklist for Engaging the Environment Team - SA Review Environmental Line List prior to excavation Employees and contractors to complete APA Environmental Awareness Training Site specific investigations in areas of suspected high water table and use of qualified contractors when dewatering required (EIR requirement) Dewatering permit (if required) Avoid dewatering into surface water or drains If dewatering into surface water is unavoidable and >100kL, Dewatering Management Plan required Monitor discharge for erosion Environmental management of dewatering during construction activities EPA 1093/21 		<ul style="list-style-type: none"> Waste Management (APA HSE EP 13.05) Waste Toolbox Talk APA Permit to Work Contractor JHEA Annual Environmental Reporting 			
10	Pipelines		Driving	Spread of declared weeds, pests and (biosecurity) diseases	Yes	Occasional	Major	High	<ul style="list-style-type: none"> See ERA #1 Contact high risk landowners in advance and follow their advice. (High risk landowners are documented on CP survey work pack) Regular vehicle wash-downs and pre-starts between properties Avoid long weeds/ vegetation where possible Brush-down at state border Add spatial layers of declared weeds within the area. (GIS) Action: Weed identification training (top 10 for each region) Stakeholder database (to be updated). Further investigation (loading vehicles onto a trailer to contain weeds) 	<ul style="list-style-type: none"> See ERA#1 Declared Quarantine zone 	<ul style="list-style-type: none"> See ERA #1 	Occasional	Significant	Moderate
11	Pipelines		Driving	Injury or death of fauna	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> Licensed drivers Avoid driving during dusk and dawn Speed limit along easement (80km/hr) IVMS (In vehicle management system) Employees and contractors to complete APA Environmental Awareness Training Action: Installation of shoo-roo on vehicles 	<ul style="list-style-type: none"> Injured fauna reported in SG+ Injured fauna to be taken to wildlife carer, where possible 	<ul style="list-style-type: none"> APA HSE FRP 030 Driving APA HSE FRP 030 T02 Journey Management Guide APA HSE GP 07.01 Incident Reporting APA HSE 13.02.02 Fauna Management Annual Environmental Reporting 	Frequent	Minimal	Low
13	Pipelines		Refuelling	Ground contamination	Yes	Unlikely	Minimal	Negligible	<ul style="list-style-type: none"> Note: Only jerrycans less than 20L no refuelling trailer used. Vehicle and equipment maintenance Vehicle and equipment pre-start Avoid refuelling outside bunded area Action: No refuelling within 10m of watercourse or environmentally sensitive areas Manned during refuelling Employees and contractors to complete APA Environmental Awareness Training Long rage fuel tanks Heavy duty pump guards 	<ul style="list-style-type: none"> All spills reported in SG+ Contaminated soil removed and disposed of at an appropriately licenced waste facility Controlled waste tracking receipts obtained and stored 	<ul style="list-style-type: none"> Spill Preparation and Response Toolbox Talk (APA HSE EP 13.04.01 T7) Spill Preparation and Response (APA HSE EP 13.04.01) EPA Bunding and Spill Management Guidelines EPA 880/016 Incident, Near Miss & Hazard Management Protocol (APA HSE GP 07.01) APA Permit to Work JHEA Chemwatch SDS available Annual Environmental Reporting 	Unlikely	Minimal	Negligible
12	Pipelines		Light vehicle and heavy vehicle fuel tank rupture	Ground contamination (max 200L)	Yes	Remote	Minor	Negligible	<ul style="list-style-type: none"> Vehicle and equipment maintenance Vehicle and equipment pre-start checks No parking HV within 10m of watercourse Employees and contractors to complete APA Environmental Awareness Training 	<ul style="list-style-type: none"> All spills reported in SG+ Contaminated soil removed and disposed of at an appropriately licenced waste facility Controlled waste tracking receipts obtained and stored 	<ul style="list-style-type: none"> Spill Preparation and Response Toolbox Talk (APA HSE EP 13.04.01 T7) Spill Preparation and Response (APA HSE EP 13.04.01) Incident, Near Miss & Hazard Management Protocol (APA HSE GP 07.01) APA Permit to Work JHEA Chemwatch SDS available Annual Environmental Reporting 	Remote	Minor	Negligible



APA HSE Env Risk Assessment AGN SA RLP BMP



ERA #	SELECT ACTIVITY OR ASSET FROM LIST	MULTI LOOK UP COLUMN: This column must remain as column D for multilookup to work	Consequence / Impacts Try to describe the direct specific consequences	Pre-Control (inherent)				Preventative Controls	Reactive / Mitigating Controls	Key Supporting Management Actions Scheduled tasks, Inspections, Records, Training, Awareness and Procedures that support the controls	Post-Control (residual)		
				Credible	Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level
17	Pipelines	Abrasive blasting and recoating	Ground contamination	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> Controls that eliminate or reduce the likelihood of the causes. □ Include mandatory controls (legislative / APA Protocols) Critical Controls are controls that directly prevent the causes. HINT: For dot points use ALT 7 (7 on number pad part of keypad) For new line use ALT Enter Persons conducting abrasive blasting shall be trained in the process and a verification of competency retained (APA-HSE-PRO-016- Abrasive Blasting) Persons conducting abrasive blasting shall be licenced under the Environment Protection Act 1993 (abrasive blasting is a prescribed activity) Drop sheets or drip trays used during coating Sandblasting tent used in residential areas Employees and contractors to complete APA Environmental Awareness Training. Tents used in major coating works 	<ul style="list-style-type: none"> Controls that minimise Consequence / Impacts or Significance if event occurs; □ Includes Emergency Response 	<ul style="list-style-type: none"> Permit to Work APA-HSE-PRO-016- Abrasive Blasting JHEA Annual Environmental Reporting 	Rare	Minimal	Negligible
16	Pipelines	Hot works, Smoking	Fire	Yes	Remote	Major	Moderate	<ul style="list-style-type: none"> Facility fire breaks maintained Review fire ban status prior to conducting hot works Employees and contractors to complete APA Environmental Awareness Training Vehicles and equipment to be parked in areas of low fire risk Hot works are not feasible on the pipeline but may be a rare occurrence on MLY and compounds Consultation with CFS for major works 	<ul style="list-style-type: none"> Fire extinguishers in vehicles and compounds APA fire extinguishers serviced regularly (6-monthly) in accordance with manufacturer specifications and Australian Standards Enact Emergency Response Management Plan 	<ul style="list-style-type: none"> APA HSE PRO 037 T3 Hot Work Tool Box Talk APA HSE PRO037 Hot Work APA IOC Emergency Response Management Plan (320-PL-ER-0001) Emergency Response Notification Protocol (320-GD-ER-0002) Emergency Response Field Manual (320-MAN-ER-0001) Emergency response training APA Permit to Work JHEA Annual Environmental Reporting 	Remote	Major	Moderate
18	Pipelines	Pigging and filter change - NORM waste	Ground contamination	No	Unlikely	Significant	Moderate	<ul style="list-style-type: none"> Controls for NORM as per APA HSE ENV GDE 005 NORMs waste general guidance document Action: Test for NORMs - Operations to contact environment team re: advice to handle NORM waste. Employees and contractors to complete APA Environmental Awareness Training 		<ul style="list-style-type: none"> APA HSE ENV GDE 005 NORMs waste general guidance document Annual Environmental Reporting 			
19	Pipelines	Pigging and filter change - condensate waste	Ground contamination	No				<ul style="list-style-type: none"> All condensate captured, transported and disposed of as regulated waste Controlled waste tracking receipts retained Employees and contractors to complete APA Environmental Awareness Training 		<ul style="list-style-type: none"> Spill Preparation and Response Toolbox Talk (APA HSE EP 13.04.01 T7) Spill Preparation and Response (APA HSE EP 13.04.01) Annual Environmental Reporting Regulated Waste Tracking Toolbox (APA HSE TB ENV 020) Waste Management Procedure (APA HSE EP 13.05) Waste Toolbox Talk Annual Environmental Reporting 			
14	Pipelines	Chemical transport-IBC rupture	Ground contamination	No				<ul style="list-style-type: none"> Employees and contractors to complete APA Environmental Awareness Training 		<ul style="list-style-type: none"> Annual Environmental Reporting 			
15	Pipelines	Chemical transport- Vac truck rupture / hose rupture	Ground contamination	Yes	Unlikely	Minor	Low	<ul style="list-style-type: none"> Use registered/ licenced contractor Handling is conducted over hard stand. Chemical handling is manned. Spill kits at sites with water bath heaters and underground tanks Employees and contractors to complete APA Environmental Awareness Training 		<ul style="list-style-type: none"> Annual Environmental Reporting 	Remote	Minor	Negligible
21	Pipelines	Pipeline rupture	Greenhouse gas emissions	Yes	Remote	Minimal	Negligible	<ul style="list-style-type: none"> Asset managed in accordance with AS 2885 requirements Slabbing, depth of cover, marker tape CP system Pipeline warning markers Landholder/ stakeholder management programme Pipeline has a known route (Right of way/ Known registered asset) 	<ul style="list-style-type: none"> Ground and aerial patrols to identify third party activity 	<ul style="list-style-type: none"> SCADA monitoring CP DBYD Ground and aerial patrols to identify third party activity Pipeline awareness program with all land owners, occupiers and stakeholders (EIR requirement) Pipeline warning markers IOC Annual Environmental Reporting Emission data captured and reported in NGER Annual Environmental Reporting 	Remote	Minimal	Negligible
20	Pipelines	Depressurisation, venting and flaring	Greenhouse gas emissions	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> Valve isolation Limit volume Employees and contractors to complete APA Environmental Awareness Training 		<ul style="list-style-type: none"> Annual Environmental Reporting 	Frequent	Minimal	Low
22	Depots_Bases_Stations_Facilities	Chemical storage in containers, IBCs and drums (<400L)	Ground contamination	Yes	Unlikely	Minor	Low	<ul style="list-style-type: none"> Note: storage of Lube oil (1000L pods) *excluding odorant Stored in banded and undercover area Conducted on Hardstand Maintenance and inspection routine Inspection for leaks and spills 5-yearly environmental audits Monthly- 6-monthly and annual inspections 	<ul style="list-style-type: none"> Spill kits available where chemicals stored Action: Annual inspection of spill kits Ensure personnel are trained in chemical management and spill response procedures (SEO requirement?) All spills reported in SG+ Contaminated soil removed and disposed of at an appropriately licenced waste facility Controlled waste tracking receipts obtained and stored 	<ul style="list-style-type: none"> Spill Preparation and Response Toolbox Talk (APA HSE EP 13.04.01 T7) Spill Preparation and Response (APA HSE EP 13.04.01) EPA Bunding and Spill Management Guidelines EPA 680/016 Incident, Near Miss & Hazard Management Protocol (APA HSE GP 07.01) APA Permit to Work JHEA APA ER training Chemwatch SDS available Annual Environmental Reporting Station inspections 	Unlikely	Minimal	Negligible
	Depots_Bases_Stations_Facilities	Chemical storage in tanks (XL)	Ground contamination Above ground tanks (clean oil (1050L) 2- one for each compressor)	Yes	Remote	Minor	Negligible	<ul style="list-style-type: none"> Stored in twin skin and on hardstand. On monitored levels Visual monthly inspections 	<ul style="list-style-type: none"> Spill kits available where chemicals stored Action: Annual inspection of spill kits Ensure personnel are trained in chemical management and spill response procedures (SEO requirement?) All spills reported in SG+ Contaminated soil removed and disposed of at an appropriately licenced waste facility Controlled waste tracking receipts obtained and stored 5-yearly environmental audits Monthly- 6-monthly and annual inspections 		Remote	Minor	Negligible

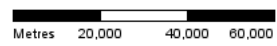
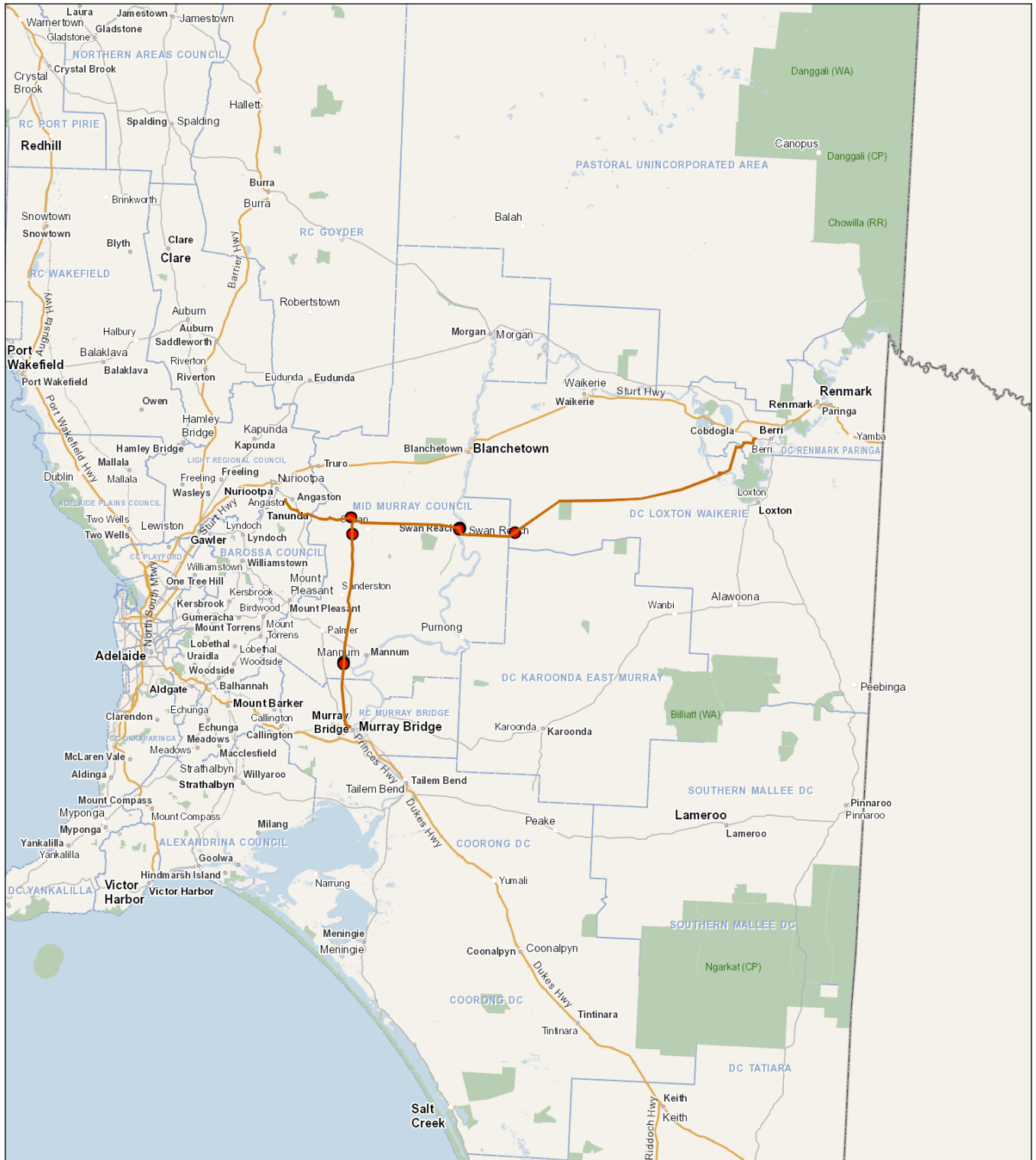
ERA #	SELECT ACTIVITY OR ASSET FROM LIST	MULTI LOOK UP COLUMN: This column must remain as column D for multilookup to work	Consequence / Impacts Try to describe the direct specific consequences	Pre-Control (inherent)				Preventative Controls	Reactive / Mitigating Controls	Key Supporting Management Actions Scheduled tasks, Inspections, Records, Training, Awareness and Procedures that support the controls	Post-Control (residual)		
				Credible	Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level
23	Depots_Bases_Stations_F acilities	Chemical storage in tanks (XL)	Ground contamination underground tanks (2x 2000L- waste oil from the compressors)	Yes	Occasional	Significant	Moderate	<ul style="list-style-type: none"> Maintenance regime Monitoring through SCADA Visual Monthly inspections Use of twin skin Monitored levels (Groundwater 10m from surface) 	<ul style="list-style-type: none"> Spill kits available where chemicals stored Ensure personnel are trained in chemical management and spill response procedures (SEO requirement?) All spills reported in SG+ Contaminated soil removed and disposed of at an appropriately licenced waste facility Controlled waste tracking receipts obtained and stored 	<ul style="list-style-type: none"> Spill Preparation and Response Toolbox Talk (APA HSE EP 13.04.01 T7) Spill Preparation and Response (APA HSE EP 13.04.01) Incident, Near Miss & Hazard Management Protocol (APA HSE GP 07.01) APA Permit to Work JHEA APA ER training Chemwatch SDS available Annual Environmental Reporting Station inspections 	Unlikely	Minor	Low
24	Depots_Bases_Stations_F acilities	Groundwater abstraction	Any groundwater bores at Anaastan?	No						<ul style="list-style-type: none"> Annual Environmental Reporting 			
25	Depots_Bases_Stations_F acilities	Facility lines	Ground Contamination - underground or above ground tube oil/oily water facility lines?	Yes	Occasional	Minimal	Low	<ul style="list-style-type: none"> Note: All above ground (oil) Inspections Monitoring systems Spill containment Spill kits Sealed drains 		<ul style="list-style-type: none"> Annual Environmental Reporting 	Occasional	Minimal	Low
	Depots_Bases_Stations_F acilities		Odorant storage - Impact: Air emissions	No									
26	Depots_Bases_Stations_F acilities	Odorant transfer & refilling	Ground contamination and Odour emissions	No						<ul style="list-style-type: none"> Annual Environmental Reporting 			
27	Depots_Bases_Stations_F acilities	Sewage systems	Ground Contamination	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> Operated by a contractor Contractor empties portaloos 		<ul style="list-style-type: none"> Annual Environmental Reporting 	Remote	Minimal	Negligible
28	Depots_Bases_Stations_F acilities	Vehicle washdown	N/A	No						<ul style="list-style-type: none"> Annual Environmental Reporting 			
29	Depots_Bases_Stations_F acilities	Water bath heater	Ground Contamination	Yes	Unlikely	Minimal	Negligible	<ul style="list-style-type: none"> Drainage is operated by a licenced operator. Water used to wash the coil in collected in a bund (sandbags with plastic sheets) (approx. 100L of water would be contained and then taken by a licenced contractor Maintenance done every 5 years 		<ul style="list-style-type: none"> Annual Environmental Reporting 	Unlikely	Minimal	Negligible
30	Depots_Bases_Stations_F acilities	Waste	Ground contamination (General Waste)	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> All bins lidded and labelled General waste and hydrocarbon bin located at XXX Waste collected by licenced contractor Controlled waste tracking receipts obtained and stored Empty containers with residue banded or disposed of as contaminated waste All waste on easement returned to CS or MB 		<ul style="list-style-type: none"> Waste Management Procedure (APA HSE EP 13.05) Waste Toolbox Talk Housekeeping inspections Annual Environmental Reporting 	Remote	Minimal	Negligible
31	Pipelines	Poor reinstatement	Erosion	Yes	Unlikely	Minor	Low	<ul style="list-style-type: none"> Topsoil stripping and separate stockpiling Specialist erosion repairs, as required Vegetation matter respread over easement 		<ul style="list-style-type: none"> Soil and Land Management (APA HSE EP 13.06.01) Vehicle and aerial patrols Annual Environmental Reporting 	Remote	Minimal	Negligible
32	Pipelines	Pipeline Excavation and erosion repairs, Vegetation control, Driving, Abrasive blasting and recoating, Depressurisation, venting and flaring	Community nuisance	Yes	Frequent	Minimal	Low	<ul style="list-style-type: none"> Sandblasting tent used in residential areas Letter drops for major venting Annual landholder consultation Access agreements Gates left as found Silencers Mechanical noise control Adhering to the Noise Policy Persons conducting abrasive blasting shall be licenced under the Environmen Protection Act 1993 (abrasive blasting is a prescribed activity) 	<ul style="list-style-type: none"> Community complaints (managed through a separate customer service group) Landholder communication and consultation retained in XIC Complaints procedure 	<ul style="list-style-type: none"> Annual Environmental Reporting XIC 	Occasional	Minimal	Low

APPENDIX D: CULTURAL HERITAGE REPORTS

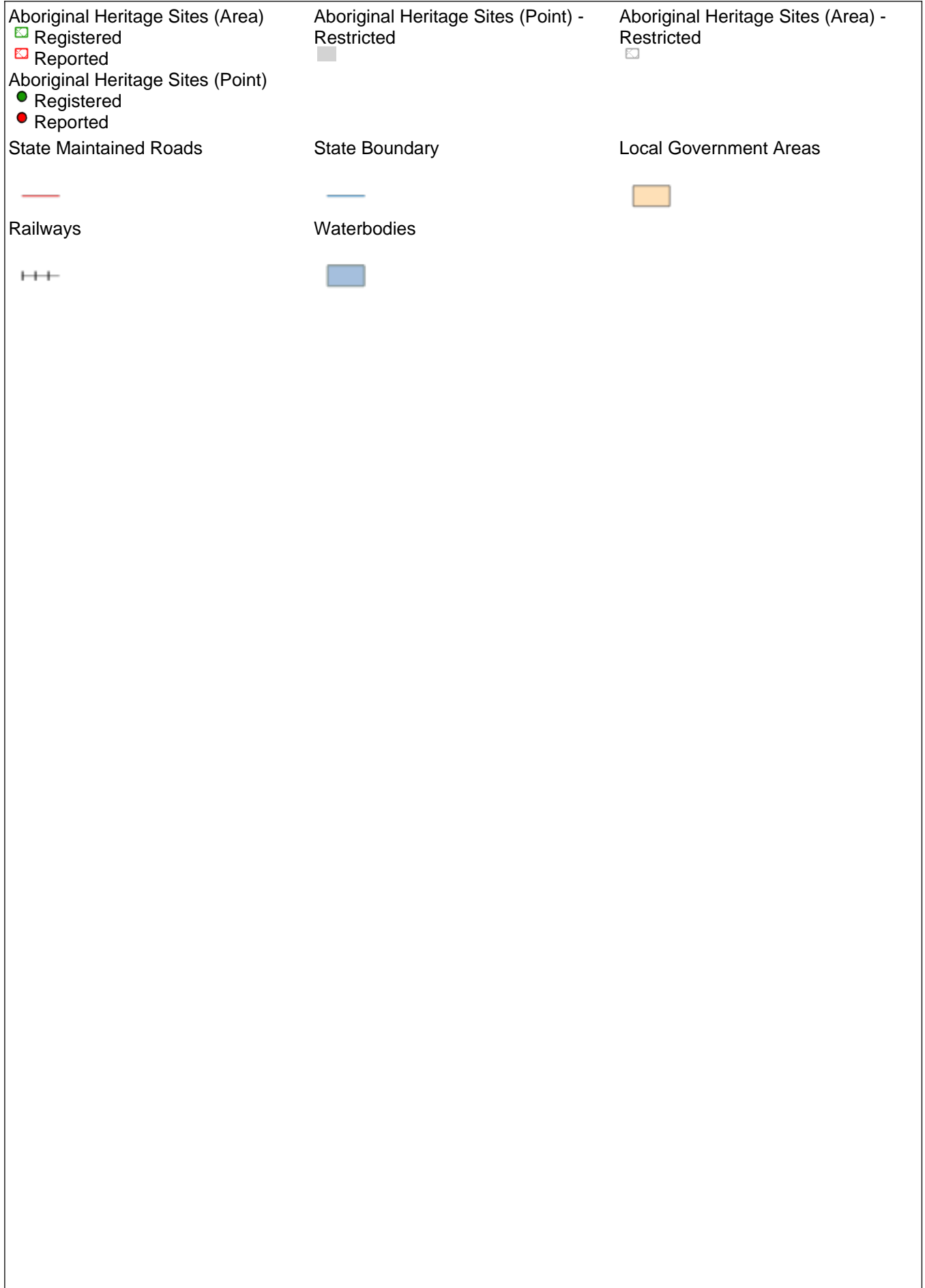
ABORIGINAL HERITAGE SITES



Reference Number:	4,774
Tenement Type:	PL
Tenement Number:	6
Buffer Distance (m):	100



EPSG:3107 projection



Melissa Roberts
Senversa
190 Flinders Street
Adelaide 5000 South Australia

Dear Melissa

Thank you for the search request dated 15 May 2023. The search was based on the tenement PL 6. Your reference is 4774.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by Aboriginal Affairs and Reconciliation (AAR), has entries for Aboriginal sites within 100m of this location.

Cultural Heritage Sites (Point) in the tenement:

Map Number	Site Number	Site Type	Site Status
6728	3906	Archaeological	Reported
6728	2458	Scarred Tree	Reported
6728	3902	Archaeological	Reported
6728	3911	Archaeological	Reported
6828	3920	Archaeological	Reported
6828	3922	Scarred Tree	Reported
6828	3926	Scarred Tree	Reported
6828	3928	Scarred Tree	Reported
6828	3939	Archaeological	Reported

Cultural Heritage Sites (Polygons) in the tenement:

Map Number	Site Number	Site Type	Site Status
6728	3906	Archaeological	Reported
6728	3902	Archaeological	Reported
6728	3911	Archaeological	Reported
6929	3940	Archaeological	Reported

The enclosed map identifies the approximate site location. It should be noted however that the site indicator does not reflect the actual area of the site; as this will vary from site to site, depending on the site information contained in the Central Archive.

The applicant is advised that sites, objects or remains may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Premier. If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Premier under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Premier. Penalties apply for failure to comply with the Act. It should be noted that this Aboriginal heritage advice has not addressed any relevant obligations pursuant to the *Native Title Act 1993*.

Please be aware in this area there are Aboriginal groups/organisations/traditional owners that may have an interest. These may include:

Ngadjuri Nation Aboriginal Corporation

Chairperson: Carlo Sansbury

Address: C/- South Australian Native Title Services Level 4 345 King William Street ADELAIDE SA 5000

Telephone:

Email: CarloSansbury@outlook.com

Contact Officer: Daniel Webb

Telephone: 08 81102800

Email: info@nativetitlesa.org

River Murray and Mallee Aboriginal Corporation

Chairperson: Julie Cook

Address:

Telephone:

Email: julierosecook70@gmail.com

Contact Officer:

Telephone:

Email:

Peramangk Descendants Heritage and Land Council

Chairperson: Michael Hunter Coughlan

Address:

Telephone: 0472771816

Email: mhc1261@hotmail.com

Contact Officer: Courtney Hebbberman

Telephone:

Email: clhebbberman82@gmail.com

First Peoples of the River Murray and Mallee Region #2

Chairperson: Robert Agius

Address: C/- South Australian Native Title Services Level 4 345 King William Street ADELAIDE SA 5000

Telephone:

Email: Robertagius2010@hotmail.com

Contact Officer: Tim Graham

Telephone: 08 81102800 0459868558

Email: TimG@nativetitlesa.org info@nativetitlesa.org

Ngarrindjeri Aboriginal Corporation RNTBC

Chairperson: Clyde Rigney Snr

Address: 4 Third Street MURRAY BRIDGE SA 5253

Telephone: 0439736866

Email: clyderigney@gmail.com

Contact Officer: Tim Hartman Snr

Telephone: 08 95134838

Email: tim.hartman@ngarrindjeri.com.au

River Murray and Mallee Aboriginal Corporation

Chairperson: Julie Cook

Address:

Telephone:

Email: julierosecook70@gmail.com

Contact Officer:

Telephone:

Email:

Peramangk Descendants Heritage and Land Council

Chairperson: Michael Hunter Coughlan

Address:

Telephone: 0472771816

Email: mhc1261@hotmail.com

Contact Officer: Courtney Hebbberman
Telephone:
Email: clhebbberman82@gmail.com

Mannum Aboriginal Community Association Incorporated

Chairperson: Anita Hunter
Address: PO Box 58 NILDOTTIE SA 5238
Telephone: 0484898285
Email:
Contact Officer: Izzy Campbell
Telephone: 0407006651
Email: issobellee@gmail.com

First Peoples of the River Murray and Mallee Region #2

Chairperson: Robert Agius
Address: C/- South Australian Native Title Services Level 4 345 King William Street ADELAIDE SA 5000
Telephone:
Email: Robertagius2010@hotmail.com
Contact Officer: Tim Graham
Telephone: 08 81102800 0459868558
Email: TimG@nativetitlesa.org info@nativetitlesa.org

Ngarrindjeri Regional Authority Incorporated

Chairperson: Grant Rigney
Address: PO Box 371 MURRAY BRIDGE SA 5253
Telephone: 08 83513868
Email: info@ngarrindjeri.org.au
Contact Officer:
Telephone:
Email:

River Murray and Mallee Aboriginal Corporation

Chairperson: Julie Cook
Address:
Telephone:
Email: julierosecook70@gmail.com
Contact Officer:
Telephone:
Email:

Peramangk Descendants Heritage and Land Council

Chairperson: Michael Hunter Coughlan
Address:
Telephone: 0472771816
Email: mhc1261@hotmail.com
Contact Officer: Courtney Hebbberman
Telephone:
Email: clhebbberman82@gmail.com

Mannum Aboriginal Community Association Incorporated

Chairperson: Anita Hunter
Address: PO Box 58 NILDOTTIE SA 5238
Telephone: 0484898285
Email:
Contact Officer: Izzy Campbell
Telephone: 0407006651
Email: issobellee@gmail.com

First Peoples of the River Murray and Mallee Region #2

Chairperson: Robert Agius

Address: C/- South Australian Native Title Services Level 4 345 King William Street ADELAIDE SA 5000

Telephone:

Email: Robertagius2010@hotmail.com

Contact Officer: Tim Graham

Telephone: 08 81102800 0459868558

Email: TimG@nativetitlesa.org info@nativetitlesa.org

Aboriginal Lands Trust

Chairperson:

Address: PO Box 3437 RUNDLE MALL SA 5000

Telephone: 08 82071476

Email: reception@alt.sa.gov.au

Contact Officer: Grant Rigney

Telephone:

Email:

Aboriginal Lands Trust

Chairperson:

Address: PO Box 3437 RUNDLE MALL SA 5000

Telephone: 08 82071476

Email: reception@alt.sa.gov.au

Contact Officer: Grant Rigney

Telephone:

Email:

Terms and conditions for use of information derived from the central archive:

- Information derived from the central archives is confidential under section 10 of the *Aboriginal Heritage Act 1988* (the Act)
- Under section 35 of the Act, information derived from the central archives must not be divulged contrary to Aboriginal tradition unless authorised under these terms and conditions.
- Breaches of sections 10 and 35 of the Act may attract fines of up to \$10,000 or imprisonment for 6 months.
- The Applicant agrees to use the confidential information solely for the approved purpose in line with the specified current or contemplated approved use, subject to any restrictions of use detailed on this request form.
- The Applicant agrees that they are only authorised to disclose or transfer the confidential information to parties listed on this form and in accordance with any restrictions of use detailed on this request form.
- The Applicant agrees that all confidential information must remain marked "confidential", including where the information is shared in accordance with the approved use detailed on this request form.
- The Applicant will keep all information derived from the central archives (either digital or hard copy) in a secure location/format.
- If there has been any unauthorised release or use of any information derived from the central archives other than for the approved purpose and/or approved use in accordance with the restrictions of use, the Applicant will notify AAR immediately.
- All information derived from the central archives (both digital and any hard copies) must be destroyed once no longer required for the approved purpose, unless an updated central archives access information request form has been approved by AAR.

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8303 0738 or send to our generic email address AAR.HeritageSites@sa.gov.au

Yours sincerely,

HERITAGE INFORMATION TEAM

Aboriginal Affairs and Reconciliation | Date: Thu May 25 2023 09:13:22 GMT+0930 (ACST)

Level 16, 30 Wakefield Street | GPO Box 464 Adelaide SA 5001

Tel (+61) 08 8303 0738 | www.agd.sa.gov.au | ABN 15 088 976 178

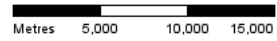
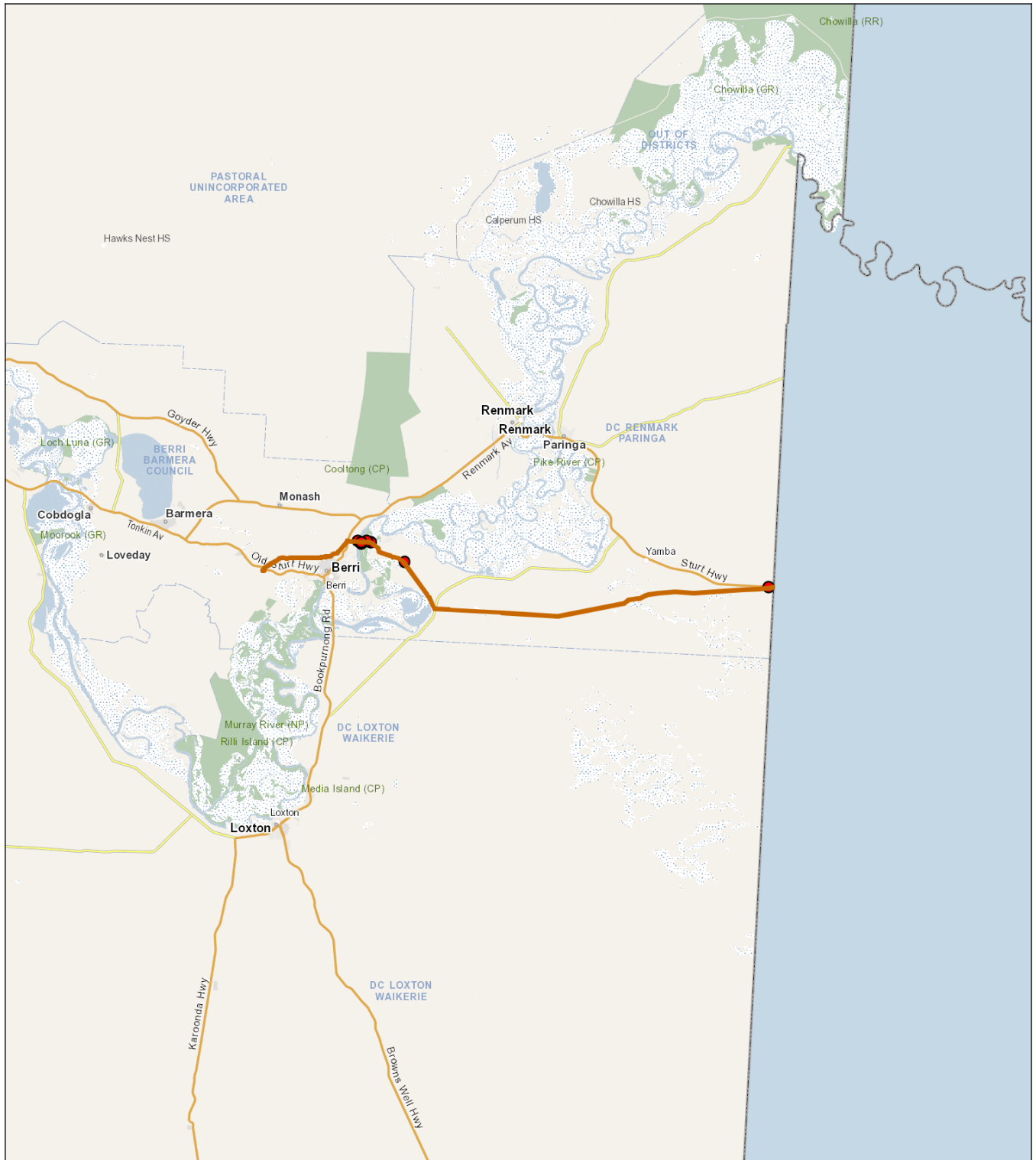
ABORIGINAL AFFAIRS & RECONCILIATION

25 May 2023

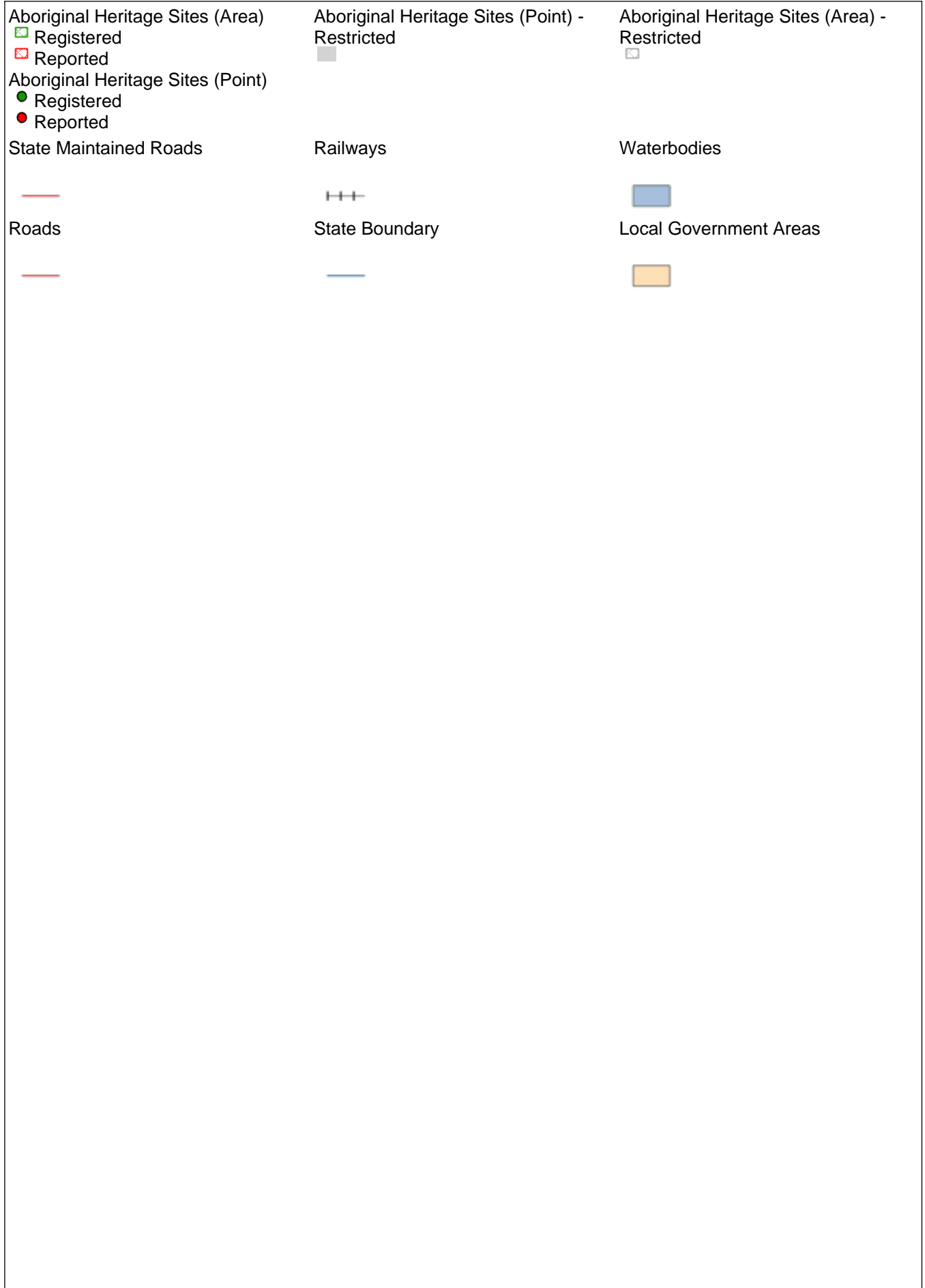
ABORIGINAL HERITAGE SITES



Reference Number:	4,774
Tenement Type:	PL
Tenement Number:	11
Buffer Distance (m):	100



EPSG:3107 projection



Melissa Roberts
Senversa
190 Flinders Street
Adelaide 5000 South Australia

Dear Melissa

Thank you for the search request dated 15 May 2023. The search was based on the tenement PL 11. Your reference is 4774.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by Aboriginal Affairs and Reconciliation (AAR), has entries for Aboriginal sites within 100m of this location.

Cultural Heritage Sites (Point) in the tenement:

Map Number	Site Number	Site Type	Site Status
7029	3952	Archaeological	Reported
7029	3953	Archaeological	Reported
7029	3954	Scarred Tree	Reported
7029	3955	Archaeological	Reported
7029	3957	Archaeological	Reported
7029	3958	Archaeological	Reported
7029	6816	Archaeological	Reported

Cultural Heritage Sites (Polygons) in the tenement:

Map Number	Site Number	Site Type	Site Status
7029	3950	Archaeological / Burial	Reported
7029	3952	Archaeological	Reported
7029	3953	Archaeological	Reported
7029	3955	Archaeological	Reported
7029	3957	Archaeological	Reported
7029	3958	Archaeological	Reported

The enclosed map identifies the approximate site location. It should be noted however that the site indicator does not reflect the actual area of the site; as this will vary from site to site, depending on the site information contained in the Central Archive.

The applicant is advised that sites, objects or remains may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Premier. If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Premier under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Premier. Penalties apply for failure to comply with the Act. It should be noted that this Aboriginal heritage advice has not addressed any relevant obligations pursuant to the *Native Title Act 1993*.

Please be aware in this area there are Aboriginal groups/organisations/traditional owners that may have an interest. These may include:

River Murray and Mallee Aboriginal Corporation

Chairperson: Julie Cook

Address:

Telephone:

Email: julierosecook70@gmail.com

Contact Officer:

Telephone:

Email:

Terms and conditions for use of information derived from the central archive:

- Information derived from the central archives is confidential under section 10 of the *Aboriginal Heritage Act 1988* (the Act)
- Under section 35 of the Act, information derived from the central archives must not be divulged contrary to Aboriginal tradition unless authorised under these terms and conditions.
- Breaches of sections 10 and 35 of the Act may attract fines of up to \$10,000 or imprisonment for 6 months.
- The Applicant agrees to use the confidential information solely for the approved purpose in line with the specified current or contemplated approved use, subject to any restrictions of use detailed on this request form.
- The Applicant agrees that they are only authorised to disclose or transfer the confidential information to parties listed on this form and in accordance with any restrictions of use detailed on this request form.
- The Applicant agrees that all confidential information must remain marked "confidential", including where the information is shared in accordance with the approved use detailed on this request form.
- The Applicant will keep all information derived from the central archives (either digital or hard copy) in a secure location/format.
- If there has been any unauthorised release or use of any information derived from the central archives other than for the approved purpose and/or approved use in accordance with the restrictions of use, the Applicant will notify AAR immediately.
- All information derived from the central archives (both digital and any hard copies) must be destroyed once no longer required for the approved purpose, unless an updated central archives access information request form has been approved by AAR.

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8303 0738 or send to our generic email address AAR.HeritageSites@sa.gov.au

Yours sincerely,

**HERITAGE INFORMATION TEAM
ABORIGINAL AFFAIRS & RECONCILIATION**

25 May 2023

APPENDIX E: STAKEHOLDER CONSULTATION COMMENTS

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
DEM - EIR	Table 8 incorrectly references AS 2885.3:2012, DEMs expectations is compliance with AS 2885.3:2022. Please fix all reference to the superseded standard in both documents.	Amended.		
	Formatting error, table duplicated across two pages	Table 5 amended.		
	In Tables 3 and 4 and more widely throughout the document the Pallamana PRMS is omitted when discussing meter stations. This should be referenced in all relevant locations. While constructed under the SEA Gas SEO, DEM would expect ongoing to operation and maintenance to be under APA's SEO	Thomas Foods (Pallamana) PRMS added to Table 3 and 4.		
	Table 7 under Facility Operations and Maintenance omits reference to the Angaston compressor station and associated activities – should be included in a similar manner to MS. Broadly throughout the document operation of the CS should be appropriately recognised (e.g. in regard to noise emissions or venting)	Angaston compressor station added to Table 7. Description added is similar to that of the MS as requested. Added specific reference to Angaston compressor station in Section 6.9 Air Emissions and 6.10 Noise Emissions.		
	Table 8 incorrectly references RLRs' new nomenclature under AS2885.3:2022 is FFP	Table 8 amended, 2012 changed to 2022.		
	Table 8 SMS entry would benefit from referencing compliance with AS 2885.6	Table 8 amended to include reference to AS 2885.6 when referencing SMS.		
	3.6 Decommissioning – would benefit with reference to compliance with cl 10.10 AS 2885.3	Section 3.6 amended to include reference to cl 10.10 AS 2885.3 as requested.		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p>"Near Berri, the rainfall is slightly more winter dominant with the wettest month being July at an average of 35mm and the driest being May at 9mm." Please update, Tables 9, 10, and 11 do not indicate that May is the driest month.</p>	<p>Data within Table 9, 10 and 11 are correct. Text within Section 4.1 amended.</p>		
	<p>Please include additional wording to specify that Appendix C only refers to additional risks to those identified and assessed in 2017.</p> <p>Were any updates made to the existing risks and controls (2017 version) during the 2021 review?</p>	<p>An entire new ERA was completed in 2021 for the development of the APA Operations Environmental Management Plan.</p> <p>Requirements from the SEO / EIR were brought across to the 2021 ERA.</p> <p>While contamination from chemical storage was covered in the 2017 review, this aspect was broken down further into chemical storage in containers, IBCs and drums, chemical storage in above ground tanks, chemical storage in below ground tanks.</p> <p>Sewage waste systems was identified as a new risk and added to the 2021 ERA.</p> <p>Section 5 updated to include the above information.</p>		
	<p>"Disturbance of surface water drainage patterns along water courses and floodplains due to excavation or use of chemicals." Please clarify if the reference to the use of chemicals impacts surface water rather than disturbing drainage patterns?</p>	<p>Upon review of this dot point, the potential impact is due to excavations. Amended to 'Disturbance of surface water drainage patterns along water courses and floodplains due to excavations'.</p>		
	<p>Typo, "are maintenance" update to 'are maintained'</p>	<p>Typo amended.</p>		
	<p>Typo, "prior approval from landholders has been sort", update to 'sought'. Please check remainder of document for consistency.</p>	<p>Amended throughout document.</p>		
	<p>"The main threats to public safety resulting from the operation and</p>	<p>Amended to include thermal radiation.</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	maintenance of the Pipelines are fire, explosion or radiation exposure as a result of pipeline rupture.” Please include the type of radiation, i.e. thermal.			
	The point “Pipeline corrosion on the Pipelines.” consider rewording. Consider providing brief list of relevant corrosion mechanisms in lieu of ‘pipeline corrosion’. Consider the inclusion of the CP system, regular system surveys and compliance with AS 2832.1. as a mitigation measure for ‘Pipeline corrosion’.	Dot point amended to ‘Pipeline corrosion (corrosion mechanisms such as external interference, external corrosion, environmentally assisted cracking, undetected flaw in Zaplok connections (RLP), intentional damage, and mechanical joins leakage’. Mitigation measures updated to include Cathodic Protection (CP) and undertake regular CP surveys and compliance with AS 2885.1.		
	Typo, “refer to Section 0”	Amended to Section 3.7.		
	Consider including under 6.13 Security of Gas Supply – commentary on Emergency preparedness with regard to inventory of spares (equipment, machinery, pressure tested pipe) and/or timeframe to access emergency spares in remote locations.	Section 6.13 Mitigation Measures updated to include ‘The plan establishes emergency response planning consideration such as having adequate emergency equipment, pipe and fittings fit for the intended purpose readily available at all times, complete with traceable material test certificates’.		
	Please update key stakeholder list to include native title claimants over the pipeline licence area, also the relevant landscapes board(s).	Section 8 Stakeholders amended to include the following: <ul style="list-style-type: none"> Native Title Claimants (First Peoples of the River Murray and Mallee Region, First Peoples of the River Murray and Mallee Region #2, Ngadjuri Nation #2, and Ngarrindjeri and Others Native Title Claim) South Australian Arid Lands Landscape Board 		
	The abbreviations list includes SCC twice but no were else in the document is SCC considered. Please rectify the abbreviations list and consider including the risk assessment for SCC.	Stress corrosion cracking repairs is covered in the ERA as pipeline excavation and erosion repairs. Removed reference to the SCC terminology in the Abbreviation Table.		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p>"Only jerrycans less than 20L no refuelling trailer used. Volume of spillage that requires reporting is 200L". Please note that a spill of any quantity is reportable to DEM (as per the SEO).</p>	<p>Noted.</p> <p>ERA amended to remove reference to 'Volume of spillage that requires reporting is 200L'.</p> <p>The control, 'All spills reported in SG+' is already referenced in the ERA.</p>		
	<p>The risk assessment appears to have open actions and not all risks assessed have residual risk level identified. Please note that future risk assessments should document finalised risks and incorporate outcomes of actions into risk mitigation.</p>	<p>All actions have been completed. Section 5 of the EIR has been amended to include this statement for clarity.</p> <p>Residual risk was not assessed for those risk that were considered not credible.</p> <p>Regarding 'NORM waste'. We have confirmed that no NORM has currently been produced. This risk is not credible.</p> <p>Noted.</p>		
	<p>General note on stakeholder engagement, e.g. noise complaints. Will there be a register to record complaints and close out?</p>	<p>Complaints are recorded in X-Info and SG+</p>		
DEM - SEO	<p>The inclusion of intelligent pigging in the guidance is potentially misleading, APA do not currently undertake any ILI on these pipelines i.e APA are failing to follow this guidance. Consider inclusion in this context.</p>	<p>Reference to intelligent pigging removed.</p> <p>The BMP and RLP are both too small to be intelligently pigged.</p>		
	<p>Reference to a cl.1.6.16 of AS2885.1 is incorrect, potentially should be cl 1.5.18 AS 2885.0. Please rectify.</p>	<p>Amended to 1.5.18 AS 2885.0</p>		
DEM - EIR	<p>DEM has also noted one additional edit for Section 8 of the EIR that includes the South Australian Arid Lands Landscape Board in the list of stakeholders, however this should refer to the relevant Landscapes Boards for PL6 & PL11, i.e. Murray</p>	<p>Section 8 amended.</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	River Landscape Board and Northern and Yorke Landscape Board.			
EPA - SEO	<p><i>Objective 8 To minimise atmospheric emissions</i></p> <p>The EPA acknowledges gas emissions are inherently low and can occur during maintenance operations, emergency shutdowns and venting. 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. The Objective 8 assessment criteria should also have regard to and comply with the Environment Protection (Air Quality) Policy 2016.</p>	<p>Noted.</p> <p>Compliance with the Environment Protection (Air Quality) Policy 2016 added as an Assessment Criteria for Goal 8.1 To minimise controlled and uncontrolled atmospheric emissions and Goal 8.2 To minimise the generation of dust.</p>		
	<p><i>Section 4 Reporting</i></p> <p>While the reporting obligations to the EPA are correctly described in this section, the final paragraph should be amended to include advice that the definition of 'serious' and 'material' environmental harm can be found under Section 5 of the EP Act.</p>	<p>Additional sentence added to the last paragraph 'Note – the definition of 'serious' and 'material' environmental harm can be found under Section 5 of the EP Act'.</p>		
EPA - EIR	<p><i>2.2 Environmental Legislation</i></p> <p>Table 1. Reference to Radiation Protection and Control Act 1982 & Radiation Protection and Control (Ionising Radiation) Regulations 2015 must be updated to reflect the new act and regulations - Radiation Protection and Control Act 2021 & Radiation Protection and Control Regulations 2022.</p> <p>The Table 1. Entry 'In accordance with APA National Radiation (NORM) Management Plan, Project Manager to</p>	Table 1 amended.		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p>notify environment team prior to pigging activities to discuss potential for Naturally Occurring Radioactive Material (NORM) waste.' should be modified to at least reflect all activities identified in the Environmental Risk Assessment (ERA) (Appendix C of the EIR), specifically filter changes. The EPA notes that APA deem the risk of NORM for both PL6 and PL11 as not credible based on no detected NORM to date.</p> <p>Table 1. Reference to Environment Protection (Noise) Policy 2007 must be updated to reflect the new policy Environment Protection (Commercial and Industrial Noise) Policy 2023 that was authorised on 3rd August 2023.</p>			
	<p><i>6.2 Water</i></p> <p>In the 2017 SEO/EIR review comments (Appendix D 420-RP-AM-0006_4.0 EIR RLP BMP 2017 Report), the EPA recommended APA develop a soil erosion and drainage management plan (SEDMP) to the satisfaction of the EPA, which outlines how the aquatic environment will be protected when works are undertaken to the pipeline. This is considered important given the pipeline traverses many waterbodies, including the Murray River and wetlands that are listed in the directory of important wetlands in Australia.</p> <p>In response to the request for a SEDMP, the EPA considered the following documents.</p> <ul style="list-style-type: none"> Environmental Procedures for Soil and Land Management (APA HSE EP 	<p>APA Response from 2017:</p> <p>As part of APA operations, APA's adopts numerous Safeguard Group Procedures for Health, Safety and Environment (HSE), which includes Environmental Procedures for Soil and Land Management (APA HSE EP 13.06.01) and Water Management (APA HSE EP 13.06.02). These procedures outline steps to be applied to mitigate and manage the risk of erosion and avoid and minimise negative impacts to watercourses. In addition, APA's Erosion Control Guide (320-GD-HEL-0002) provides the philosophies and techniques for the management of soil during the operational phase of pipelines. For new significant works or construct works, project specific erosion and drainage management plan may also be incorporated.</p> <p>2023 response:</p> <p>Section 6.2 talks to preventative measures relating protecting water resources from soil movement.</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p>13.06.01) and Water Management (APA HSE EP 13.06.02).</p> <ul style="list-style-type: none"> APA's Erosion Control Guide (320-GD-HEL-0002) <p>Based on that consideration and the current EIR, further information is required to describe work conducted within a waterbody.</p> <ul style="list-style-type: none"> How works in waters will be conducted e.g. <ul style="list-style-type: none"> Works to occur when the waterbody is dry, if this is not possible, details of how the water will be banded such as coffer dams If the works would involve removing of solid matter from the bed of any inland waters an EPA licence for dredging may be required <p>How dewatering will be managed in areas where groundwater may be intercepted.</p>	<p>If works are required within a watercourse such as excavations, the following will be applied:</p> <ul style="list-style-type: none"> Prior to conducting ground disturbing works, due diligence assessment shall be completed highlighting whether watercourses or inland waters will be impacted Works in areas of shallow ground water will ideally be scheduled over the summer months to reduce the likelihood of excavating below the water table and resulting in trench water Relevant approvals to be sought from the EPA and works to comply with the conditions of those approvals Water shall not be extracted from watercourses unless the appropriate approval has been attained from the EPA To prevent sedimentation into watercourses, potential sedimentation methods when working within watercourses can be as follows: <ul style="list-style-type: none"> Minimise vehicle access/movement; Install perimeter control structures such as <ul style="list-style-type: none"> Sediment fences Coir logs Rock bunds Sediment basins Maintain and clean sediment structures when required Place sediment stockpiles upslope of a sediment barrier 		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
		<ul style="list-style-type: none"> ○ Inspect perimeter control structure to ensure ongoing effectiveness • Ensuring a licence is in place from the EPA is works involve the removal of solid matter from the beds of any inland waters <p>If dewatering works is required:</p> <ul style="list-style-type: none"> • Excavations which have the potential to intercept groundwater should be avoided wherever practicable • If unanticipated groundwater is intercepted, the activity should be stopped and the APA Environment and Heritage Team and EPA consulted prior to continuing • Prior to an excavation which is planned, or has the potential, to intercept groundwater, all applicable permits/approvals shall be attained and all necessary notifications shall be conducted and only licenced waste disposal companies are engaged i.e. Veolia. <p>The abovementioned controls have been added to Section 6.2 Mitigation Measures</p>		
	<p>6.2 Water</p> <p>Dewatering activities should have regard for EPA guidelines Environmental management of dewatering during construction activities EPA 1093/21. Water exceeding turbidity levels of 25 mg/l</p>	<p>Added to Section 6.2 Mitigation Measures</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	and 100KL will require an EPA earthworks drainage licence.			
	<p><i>6.2 Water</i></p> <p>The potential impact 'Reduced water quality.....' should be amended to include contamination due to land disturbance</p>	Amended		
	<p><i>6.3 Hazardous Storage and Spill Response</i></p> <p>Reactive controls should include EPA reporting requirements in the event there is a loss of containment where harm is threatened or caused.</p>	Added.		
	<p><i>6.6 Weeds, Pests and Disease</i></p> <p>There is no reference to the use of chemicals in the management of weed infestations. The 2017 SEO/EIR review captured the activity of chemical spraying in the aspects and impacts table (Table 23 Rev 4 EIR). APA should clarify if the use of chemicals to manage weed infestations is conducted and update section 6.6 to capture the potential impacts and mitigation measures accordingly. Further, the Environmental Risk Assessment (Appendix C) should be updated to reflect this activity where applicable.</p> <p>EPA understands the Department of Primary Industries and Regions (PIRSA) regulate the lawful use of pesticides.</p>	<p>This requirement had been mistakenly removed from the document.</p> <p>Section 6.6 updated to include weed spraying as required.</p> <p>The following has been added to the ERA Line Item 1 to address the 'Spread of declared weeds, pests and (biosecurity) diseases'.</p> <ul style="list-style-type: none"> 'Weed management as required (i.e. weed spraying)' 		
	<i>Section 7 Environmental Management Framework</i>	The following has been added to Section 7 Safeguard+.	It is noted that the EPA comment has been incorporated into the EIR,	Section 7 updated.

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p>APA should describe how serious or material environmental harm reporting obligations under the EP Act are managed through Safeguard+ and/or the Operational Environmental Management Plan. Further, how are these communicated to personnel working under the SEO/EIR.</p>	<p>The APA Hazard and Incident Reporting system (Safeguard+) forms part of the APA Health Safety Environment and Heritage Management system and caters for the reporting, recording and follow up of all safety and environmental hazards and incidents.</p> <p>The process in reporting incidents, near misses and hazards is governed by the APA HSE GP 07.01 Incident, Near Miss & Hazard Management Protocol (the Protocol).</p> <p>Personnel who observe, or are involved in a hazard or incident must enter the incident or hazard into Safeguard+ database system, in accordance with the Protocol.</p> <p>This Protocol has a notification flow chart for personnel to use to ensure that the appropriate teams are notified when a serious or material environmental harm is caused. Additionally, the Protocol includes immediate notification requirements for Level 3 actual/potential incidents. Any material or serious harm incidents would fall into this category.</p> <p>Notification is then sent to the relevant Team Leader or Manager and Environment and Heritage Team (or has thus far been verbally informed). At this point, any incidents that trigger the definition of 'serious' and 'material' environmental harm will then be escalated and reported to the EPA.</p> <p>The above is communicated to the teams via the Protocol and associated flow charts.</p>	<p>however, for completeness, please ensure that all relevant government agencies that have hazard and incident reporting requirements under their relevant Acts are included in this explanation of Safeguard+, e.g. DEM, SafeWork SA, etc.</p> <p>It is noted that DEM reporting requirements for incidents are outlined in Section 4 of the SEO.</p>	
	<p><i>Section 8 Stakeholder Consultation</i></p> <p>This section refers to Appendix E for key stakeholders engaged in the consultation process. It is EPA understanding that agency comments will be incorporated under this section once received</p>	<p>Correct, Appendix E will be updated with comments received in relation to this revisions EIR and SEO</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p><i>Abbreviations/definitions</i></p> <p>The Hydrostatic Testing definition should be amended to acknowledge to potential for chemicals such as oxygen scavengers, biocides and corrosion inhibitors to be present. Section 6.2 should be amended to include the presence of chemicals in the hydro-test water.</p>	<p>The Hydrostatic Testing (or hydro testing) definition in the Abbreviations/Definitions Table has been amended to include 'There may be a potential for chemicals such as oxygen scavenger, biocide and corrosion inhibitor to be present'.</p> <p>Section 6.2 Water amended to include the potential of chemicals in hydrotest water.</p>		
	<p><i>Appendix C</i></p> <p>As a general comment reference to bunding should have regard to the EPA Bunding and Spill Management Guidelines EPA 880/016</p>	<p>ERA # 13 and 22 amended under the key supporting tab to include reference to EPA Bunding and Spill Management Guidelines EPA 880/016.</p>		
	<p><i>ERA#9 Dewatering</i></p> <p>EPA's guideline – <i>Environmental Management of dewatering during construction activities EPA 1093/21</i> should be referred to as a preventative control</p>	<p>ERA #9 amended to include <i>Environmental Management of dewatering during construction activities EPA 1093/21</i>.</p>		
	<p><i>ERA#7 Acid Sulfate Soils</i></p> <p>Preventative controls should have regard for EPA <i>guidelines 638/07 Site contamination – acid sulfate soil materials</i></p>	<p>ERA #7 amended.</p>		
	<p><i>ERA#23 Underground storage tanks</i></p> <p>The preventive controls include storage on a hardstand and elevated storage, yet the controls are for risks associated with underground storage tanks. This should be reviewed and corrected.</p>	<p>ERA # 23 reviewed and corrected by removing reference to storage on a hardstand and elevated storage.</p>		

Stakeholder	Comment	APA Response	DEM 02/02/2024	APA Response 02/02/2024
	<p><i>ERA#17 and ERA#32 Abrasive Blasting</i></p> <p>Abrasive blasting is a prescribed activity of environmental significance under the <i>Environment Protection Act 1993</i>. Persons conducting this activity must be licenced by the EPA.</p>	<p>The following has been added to ERA # 17 and 32.</p> <p>Persons conducting abrasive blasting shall be licenced under the Environment Protection Act 1993 (abrasive blasting is a prescribed activity).</p>		