Moomba to Adelaide Pipeline System

&

Beverley Lateral Pipeline

Environmental Impact Report

Pipeline Licence 1 & Pipeline Licence 12

S-1-101-ER-L-001

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This EIR was originally prepared in 2002 and 2003 by Ecos Consulting (Aust) Pty Ltd on behalf of Epic Energy.

DOCUMENT CONTROL SHEET

PL1 Environmental Impact Report

Reference	Rev	Date	Prepared by	Reviewed by	Approved by	Comment
ENV490-EIR	A-D	2002	KD/ZB	KD		Internal revisions
ENV490-EIR	E	11/12/02	ZB/KD	CB		Draft issued for client comment
ENV490-EIR	F	22/01/03	ZB/KD			Internal revisions following community consultation
ENV490-EIR	G	30/01/03	ZB/KD	CB		Draft issued to Epic Executive and PIRSA
ENV490-EIR	H	06/03/03	ZB/KD	KD		PIRSA Comments Included
ENV490-EIR	0	20/03/03	ZB/KD	KD		Submitted to PIRSA
S-1-101-ER-L-001	0A	22/10/14	NF	PF/DSD		Updated practices. New document number. Issued to DSD for review
S-1-101-ER-L-001	0B	02/09/15	NF	AT/BW		Amalgamation of PL12 with PL1 into one EIR / SEO
S-1-101-ER-L-001	0C	22/01/16	NF	AT	DSD	DSD comments incorporated and addressed
S-1-101-ER-L-001	0D	08/06/16	NF	AT/BW		Reply to comments from consultation included
S-1-101-ER-L-001	1	28/07/16	NF	AT/BW	DSD	Issued for use

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1 Introduction

1.1 Background

The Moomba to Adelaide Pipeline (MAP) was constructed by the Pipeline Authority of South Australia (PASA) in 1969, and acquired by Epic Energy in 1995. The pipeline transports natural gas from the Cooper Basin to markets in Adelaide and, via a series of lateral pipelines to regional centres such as Peterborough, Port Pirie, Whyalla, Burra, Angaston and Nuriootpa.

The MAP and laterals are referred to as the Moomba to Adelaide Pipeline System (MAPS) and are owned and operated by Epic Energy South Australia (Epic Energy) under Pipeline Licence 1 (PL1).

The Beverley Lateral was constructed in 2000 to transport natural gas from the MAP to the Beverley mine site. It is owned by Heathgate Resources Pty Ltd (Heathgate) and operated by Epic Energy under Pipeline Licence 12 (PL12).

1.2 Regulatory Framework

This document was first prepared in 2002/03 following changes to the South Australian *Petroleum Act 2000* (now the *Petroleum and Geothermal Energy Act 2000*) (the Act) that required the following documents be prepared in relation to the operation of a pipeline system:

- An Environmental Impact Report - in accordance with Section 97 of the Act and Regulation 10 of the *Petroleum Regulations 2000* (now the *Petroleum and Geothermal Energy Regulations 2013*) (the Regulations); and
- A Statement of Environmental Objectives - in accordance with Section 99 and 100 of the Act and Regulations 12 and 13.

This document fulfils the requirements of an Environmental Impact Report (EIR) as outlined in the Act and Regulations.

1.3 About this Document

This EIR has been prepared to satisfy the requirements of the Act with regard to the operation of the MAPS (as detailed under Pipeline Licence 1) and the Beverley Lateral. This document:

- Provides a description of the MAPS and Beverley Lateral (Section 2);
- Describes the specific features of the environment that are reasonably expected to be affected by pipeline operational activities (Section 3);
- Identifies potential environmental impacts and consequences (Section 4);
- Proposes measures to mitigate potential environmental impacts and consequences (Section 4); and
- Summarises stakeholder consultation (Section 5).

This EIR was updated in 2016 to reflect changes to, Epic Energy's Environmental Management System, mitigation measures used to minimise environmental impacts and to update the pipeline system description and to incorporate the Beverley Lateral.

A Statement of Environmental Objectives (SEO) was developed in conjunction with this EIR, outlining the environmental objectives that Epic Energy is required to achieve and the criteria upon which the objectives are assessed. The SEO was developed on the basis of information provided in this EIR and subsequently updated in 2009 and again 2016.

1.4 About Epic Energy

Epic Energy South Australia owns and operates high pressure gas transmission pipelines to provide gas transportation services for customers in the electricity generation, gas distribution and industrial sectors. Epic Energy owns and operates the MAPS and the South East Pipeline System (SEPS), both of which are located in South Australia. Customers include AGL, Origin Energy, Amcor, Arrium, Energy Australia and Adelaide Brighton Cement.

Epic Energy also maintains the Moomba to Port Bonython High Vapour Pressure Liquid Hydrocarbon Pipeline (Liquids Line) on behalf of Santos, and the Beverley Lateral on behalf of Heathgate Resources Pty Ltd.

1.5 Environmental Management System

The Epic Energy Environmental Management System (EMS) provides a framework for the management of environmental responsibilities, issues and risks associated with the operation and maintenance of pipelines and associated infrastructure. The EMS ensures that commitments contained within the Environmental and Land Access Policy are achieved and provides clarity and direction for employees and contractors.

The EMS applies to all personnel associated with and activities undertaken for Epic Energy including:

- Pipeline construction (including route selection, design, land access and construction activities);
- Pipeline operations; and
- Operation of ancillary facilities.

The ‘environment’ is defined as the surroundings in which Epic Energy operates including:

- Land, air, water (surface and underground), organisms and ecosystems;
- Buildings, structures, cultural artefacts and other heritage factors;
- Social and economic life;
- Amenity value of an area.

The EMS is based on a continuous improvement model as defined in the Australian/New Zealand Standard ISO 14001:2004 Environmental management systems–Requirements with guidance for use.

Driven by leadership, the EMS is used to integrate objectives, plans and activities into daily operations. The model is utilised within Epic Energy to ensure a systematic approach to environmental management.

The EMS consists of an Overview Manual and supporting documents including the policy, risk and compliance registers, management plans, procedures, work instructions, as well as monitoring and auditing programs.

The EMS consists of 5 elements and associated sub elements. The elements are interrelated and the proper implementation of each element is essential for the effective functioning of the EMS.

Refer to Figure 1 for a graphical representation of the relationship between the 5 elements:

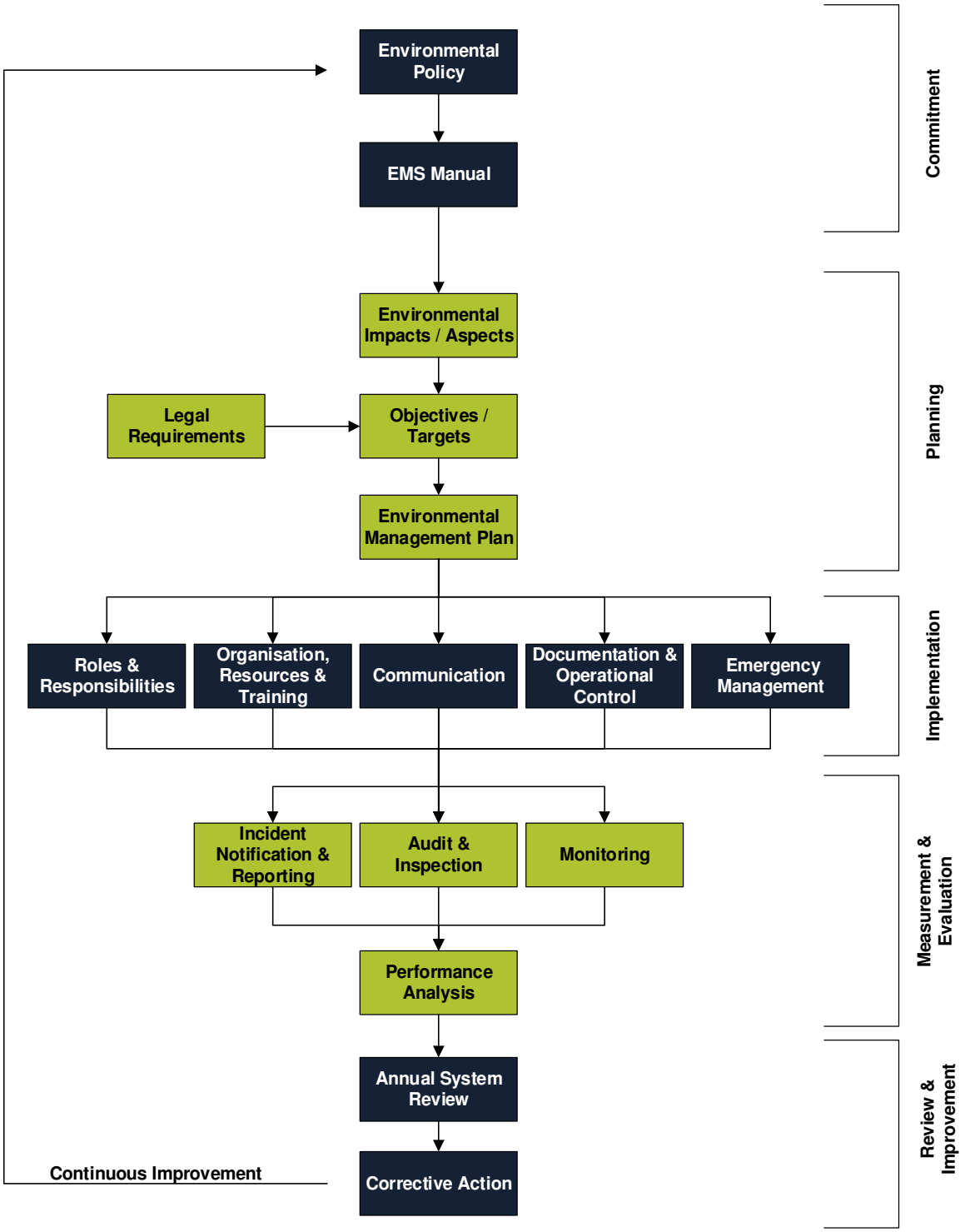
1. Commitment;
2. Planning;
3. Implementation;
4. Measurement & Evaluation; and
5. Review & Improvement.

The following section details the key components of the EMS that are relevant to operation and maintenance of the MAPS.

Any contractors engaged by Epic Energy are required to undertake environmental inductions and carry out their work in compliance with the EMS and associated procedures and work instructions.

The Epic Energy Environmental Management System Overview Manual provides full description of the EMS and supporting documents.

Figure 1: Structure of the Environmental Management System



1.5.1 Environmental Commitment

Epic Energy has a sound environmental record and reputation, and is committed to conducting its business operations in an environmentally responsible manner.

Environmental Values

Epic Energy has a corporate culture which stresses environmental, health and safety excellence and makes this the responsibility of every employee and contractor. Epic Energy seeks to be recognised as a leader in the protection of the environment, the public, its employees, contractors and the communities it works with.

Policy

Epic Energy has a Corporate Environmental and Land Access Policy that outlines in broad terms how environmental objectives will be achieved.

The policy is endorsed by the Chief Executive Officer, reviewed regularly and updated as required. It commits the company to achieving a high standard of environmental compliance.

The policy is communicated by a number of methods to all personnel and contractors. It is available in all new contracts packages, communicated at corporate and field inductions, and displayed on the internet, intranet and in all foyer areas. Refer to Appendix A, Environmental and Land Access Policy.

Leadership

Leadership accountability and visibility is key to the success of the EMS. Leaders direct the management system process, set objectives that challenge the organisation to achieve continuous improvement, and monitor progress via management review.

Leaders demonstrate their commitment through engagement with the workforce, setting personal examples in day-to-day work and sharing information learned inside and outside of the workforce.

1.5.2 Planning

Epic Energy's activities are managed to reduce environmental impacts through the following methods:

- Conducting activities in accordance with relevant regulatory and corporate obligations;
- Considering the concerns of the community and landholders;
- Conducting risk assessment workshops to identify environmental aspects and impacts;
- Implementing measures during the project planning phase to minimise environmental impacts;
- Developing and documenting control measures for all activities considered to have a potentially significant impact on the environment; and
- Defining responsibilities for the implementation of environmental control measures.

Environmental Impacts & Aspects

Epic Energy is committed to identifying and managing environmental impacts for all activities and maintains an Environmental Risk Register, managed via the online Corporate Governance Risk program (CGR), which documents key activities, environmental aspects and impacts, business consequence and control measures identified through risk assessment processes.

Control measures for environmental impacts are implemented through:

- Development of control documentation such as environmental procedures, work instructions, guidelines, emergency response plans and management plans;
- Implementation of the above documentation via the Environmental Management Induction and the Operations Field Induction;
- Briefing staff on environmental responsibilities;
- Complying with regulatory requirements;
- Ongoing monitoring of the effectiveness of control measures; and
- Corrective action to improve on control measures.

Legal Requirements

Epic Energy is required to be compliant with the relevant regulatory obligations and other standards to which it subscribes. The Regulatory & Government Affairs Advisor maintains a Compliance Register and provides guidance on legislative obligations, including licences, codes, industry standards, commitments and relevant legislation to be consulted for particular licensing requirements.

Objectives & Targets

Epic Energy has developed a number of environmental objectives, targets, indicators and programs consistent with the environmental policy and commitments.

Epic Energy aims to conduct its activities in line with the Environmental Objectives to ensure appropriate environmental work practices are applied. These objectives are reflected in the Environmental Objectives and Targets document on the Epic Energy intranet (E-00-000-PL-L-003).

In establishing the environmental objectives, targets and programs, Epic Energy has considered:

- Environmental Policy;
- Environmental aspects and impacts;
- Relevant Australian and other standards;
- Legal and other requirements;
- Measurability of objectives; and
- The drive for continuous improvement.

Statement of Environmental Objectives

This EIR forms the foundation for a Statement of Environmental Objectives (SEO) which includes measurable criteria used to assess whether the objectives are being achieved.

In developing an SEO, the following shall be considered:

- Environmental objectives and performance;
- Environmental aspects; and
- Regulatory compliance.

1.5.3 Implementation

The successful implementation and operation of Epic Energy's EMS requires commitment from all levels of the organisation. Epic Energy management ensures the availability of resources to establish, implement, maintain and improve the EMS.

Organisation, Resources and Training

Roles and responsibilities are defined, documented and communicated to facilitate effective environmental management.

Training and education ensures employees have the skills to undertake their work in an environmentally sound manner. All employees are required to complete the:

- Corporate Induction, which provides introduction to the environmental program;
- Online Environmental Induction for all workers which introduces Epic Energy's EMS, environmental risks, documentation, responsibilities and implementation strategies;
- Operations Field Induction, which includes an environmental component and provides a broad introduction to environmental risks and management requirements. All Epic Energy employees and contractors are required to complete the induction prior to engaging in field activities; and
- Additional face to face training as required to address specific environmental issues or field based risks.

All staff are briefed on environmental responsibilities by line management prior to commencement of new activities.

Recruitment, selection and placement processes ensure that personnel with environmental responsibility have the required experience, knowledge and skills to undertake their position.

Environmental competency requirements and key accountabilities are defined for individual roles and included in position descriptions.

Communication

Continuous improvement to achieve best environmental practice requires effective liaison with local councils, government departments, industry associations (e.g. Australian Pipeline & Gas Association) and other gas utilities. This provides an opportunity to share expertise, co-ordinate efforts, and remain aware of new developments throughout the industry.

Where appropriate, documentation is maintained from meetings with regulatory agencies and key stakeholders. This includes:

- Records of attendance;
- Agendas (including key discussion topics);
- Issues discussed/minutes; and
- Actions identified.

All landholder contact details and other relevant information is maintained and updated on the Epic Energy Land Management System (LMS), X-Info Connect. Other details such as land-use, foreign crossings, landholder concerns and issues are recorded on the LMS for future reference and reporting.

There is scheduled, formal contact with relevant landholders on an annual basis. Additional contact is conducted as required, or if there is perceived environmental risk. Landholder liaison involves

discussion of relevant environmental issues or concerns. This ongoing process is designed to reduce the risk of third party incidents and to encourage ownership of activities around the pipeline.

Meetings of workgroups and committees foster discussion of environmental and safety issues, and provide an opportunity for the dissemination of new technologies, standards, and procedures to all staff. Minutes of meetings are maintained, action items identified, and accountabilities assigned.

Documentation and Operational Controls

Epic Energy's environmental documentation supports the EMS and provides direction on environmental management. In addition to the Environmental and Land Access Policy and the 'planning' documents described above, Epic Energy maintains the following:

- Environmental Management System Overview Manual;
- Environmental procedures, work instructions and guidelines to address significant environmental aspects and ensure activities are undertaken consistently across the company;
- Specific management plans such as weed management plans;
- Environmental Monitoring Program; and
- Environmental Audit Program.

Epic Energy aims to plan its operations to ensure consistency with its environmental policy, objectives and targets, by:

- Establishing, implementing and maintaining processes and procedures to control situations where the absence of such measures could lead to deviation from the company's environmental policy, objectives and targets;
- Stipulating the company's required operating criteria in the procedures; and
- Establishing, implementing and maintaining procedures related to the identified environmental aspects arising from Epic Energy's environmental activities and relationships.

The identification of specific actions in documented procedures, work instructions, guidelines and management plans are based on:

- The consequences, including those to the environment, of not doing so; and
- The need to demonstrate compliance with legal and other requirements to which the organisation subscribes.

A Job Hazard Analysis (JHA) is also used to help personnel identify, analyse and manage the hazards that exist in the work they undertake. The JHA requires personnel to examine the task they are about to undertake and:

- Break the job into separate, defined steps;
- For each step, identify the potential hazards associated with that job step; and
- For each potential hazard, list the method to be followed to prevent the hazard causing an injury, loss, damage or environmental incident.

A JHA must be completed prior to the commencement of any task that has the potential to cause a significant adverse environmental or cultural impact (e.g. ground disturbance, vegetation clearing, handling hazardous materials and identified high risk activities).

Epic Energy's Environmental Monitoring Program and Environmental Audit Program are designed to measure compliance with regulatory requirements, SEO obligations, and the effectiveness of implemented procedures, work instructions, guidelines and management plans.

Emergency Management

Crisis and emergency response plans have been developed and are in place for Epic Energy's pipeline systems and associated facilities. Resources are available to protect the public and environment in the event of an incident. The requirements of the crisis and emergency response plans are communicated to all relevant personnel.

1.5.4 Environmental Monitoring Program

Key characteristics of operations that can have a significant environmental impact are included in the Epic Energy Environmental Monitoring Program. The characteristics to be monitored are based on significant environmental aspects as per the risk assessment process, or regulatory requirements.

The objectives of the monitoring program are:

- To assist in demonstrating compliance with regulatory requirements; and
- To measure performance against the Environmental Policy and SEO obligations.

Patrols

Regular patrols are undertaken to look for evidence of adverse environmental impacts from operations. The Environmental Advisor is advised of any issues requiring remediation.

Disturbance Checklists

Disturbance checklists are used during excavation activities or land disturbance to ensure compliance with the requirements of internal procedures and work instructions. Copies are provided to the Environmental Advisor, with selected sites included in the Annual Environmental Monitoring Report (document number E-00-099-ER-L-001). Refer to Appendix C: Disturbance Checklist.

Monitoring Points

Environmental Monitoring Points are established along pipeline routes to maintain records of:

- Different land systems and environmentally sensitive areas (e.g. vulnerable or actual soil erosion sites) along the route; and
- Pre-disturbance and post-remediation condition of key areas along the route.

The location and interval for monitoring each of the points is to be maintained within the GIS database for future reference. A record must be maintained of each of the Monitoring Points including a photograph and when the site was visited. Monitoring results are recorded in the Annual Environmental Monitoring Report.

Groundwater and Soil Contamination

Consultants are engaged as required, but at least every 5 years, to undertake environmental monitoring at Epic Energy facilities to monitor for groundwater contamination, bore water quality, soil contamination and water vapour contamination.

Additional Monitoring

Any additional site-specific monitoring requirements for new projects (e.g. resulting from a license or approval condition) are to be documented within the project specific Construction Environmental Management Plan (CEMP). This is to include accountabilities, review of results and reporting requirements. Once a pipeline or facility has been commissioned the relevant environmental information in the CEMP is to be included in the Operational EMP.

1.5.5 Environmental Incidents

Epic Energy has an incident reporting and investigation process underpinned by the Incident Reporting and Investigation Procedure and managed within CGR to:

- Provide guidance and minimum requirements for incident notification and reporting;
- Ensure corrective actions have been identified to address each root cause and any other actions required to reinforce immediate controls; and
- Enable final approval of the incident by the responsible manager.

All incidents are managed and recorded online via Epic Energy's CGR system.

In the event of an incident occurring or a hazard being identified, a Report Form is completed by the person reporting the hazard or incident. The appropriate Team Leader and Manager is notified of the incident without delay and the report forwarded for further action in a timely manner.

In an emergency situation, the Incident Management Plan and supporting Emergency Response Manual is enacted.

For non-emergencies, the Manager notifies the WHS Officer, Environment Officer and Regulatory & Government Affairs Advisor to determine the requirement for response and also to provide relevant information to the regulatory bodies and corporate management.

All significant incidents are investigated to identify root causes and/or contributing factors that need to be rectified in order to prevent recurrence.

Following the reporting and investigation of an incident, the relevant Manager is responsible for developing and implementing corrective actions to address the incident in a timely manner.

1.5.6 Auditing

The Epic Energy Environmental Audit Program assesses the implementation and effectiveness of the EMS and the management of significant environmental risks.

Regular inspections of all pipelines and facilities are completed to monitor the effectiveness of the defined control measures in minimising the environmental impacts of the activity.

Environmental compliance audits will be conducted on a recurring basis, so that at least one section of a pipeline is audited annually, with the audit criteria based on the relevant Statement of Environmental Objectives (SEO).

Auditors are to be appropriately qualified and experienced in auditing environmental management systems including documentation and implementation.

Each auditor shall complete a review of all relevant documentation, prior to undertaking the audit. This shall include the identification of key regulatory requirements, if an assessment of compliance to the requirements is to be included as part of the audit. Reference should also be made to the Compliance Register.

Audit results are to be discussed at the following Epic Energy Corporate Land Access & Environment (LA&E) Committee meeting, where the findings and recommendations will be used to determine the corrective actions required. Corrective Actions are managed and recorded online via Epic Energy's CGR system.

1.5.7 Review and Improvement

The Epic Energy Corporate LA&E Committee meets regularly, providing a forum to manage, monitor and support the environmental objectives of the company and is responsible for setting the direction for LA&E management, including:

- Evaluating effectiveness of the EMS;
- Monitoring the Environmental Audit process;
- Reviewing changes to legislation and recommending updates to the EMS where required; and
- Ensuring that all corrective actions are addressed in a timely manner.

A regular review of the EMS shall be conducted to monitor overall effectiveness and determine areas for improvement. The review is to address as a minimum:

- The Environmental and Land Access Policy;
- The relevance of the Key Environmental Objectives in light of changes to operations, legislation, industry best practice, results of audits and incidents/complaints;
- Progress of any recommended improvements, particularly the availability of resources to implement plans for the following year;
- Review of resourcing and the organisational structure for environmental management;
- Review of training needs with respect to environmental management;
- The results from any audits with a focus on trends that require actioning;
- Trends from incidents or public comments; and
- Efficiency of the EMS and recommendations for improvement.

The review shall be used to inform changes to the EMS.

2 Pipeline Description

2.1 Moomba to Adelaide Pipeline System Alignment

The Moomba to Adelaide Pipeline was commissioned in 1969 to transport natural gas from the Cooper Basin in far northeast South Australia to domestic and industrial customers in Adelaide (refer to Figure 2). The pipeline route runs parallel to and east of the Flinders Ranges, past Peterborough and Burra in the mid-north before terminating at Torrens Island. Lateral pipelines supply the regional centres of Peterborough, Port Pirie, Whyalla, Burra, Angaston and Nuriootpa.

2.2 Design and Engineering

2.2.1 Pipelines and Laterals

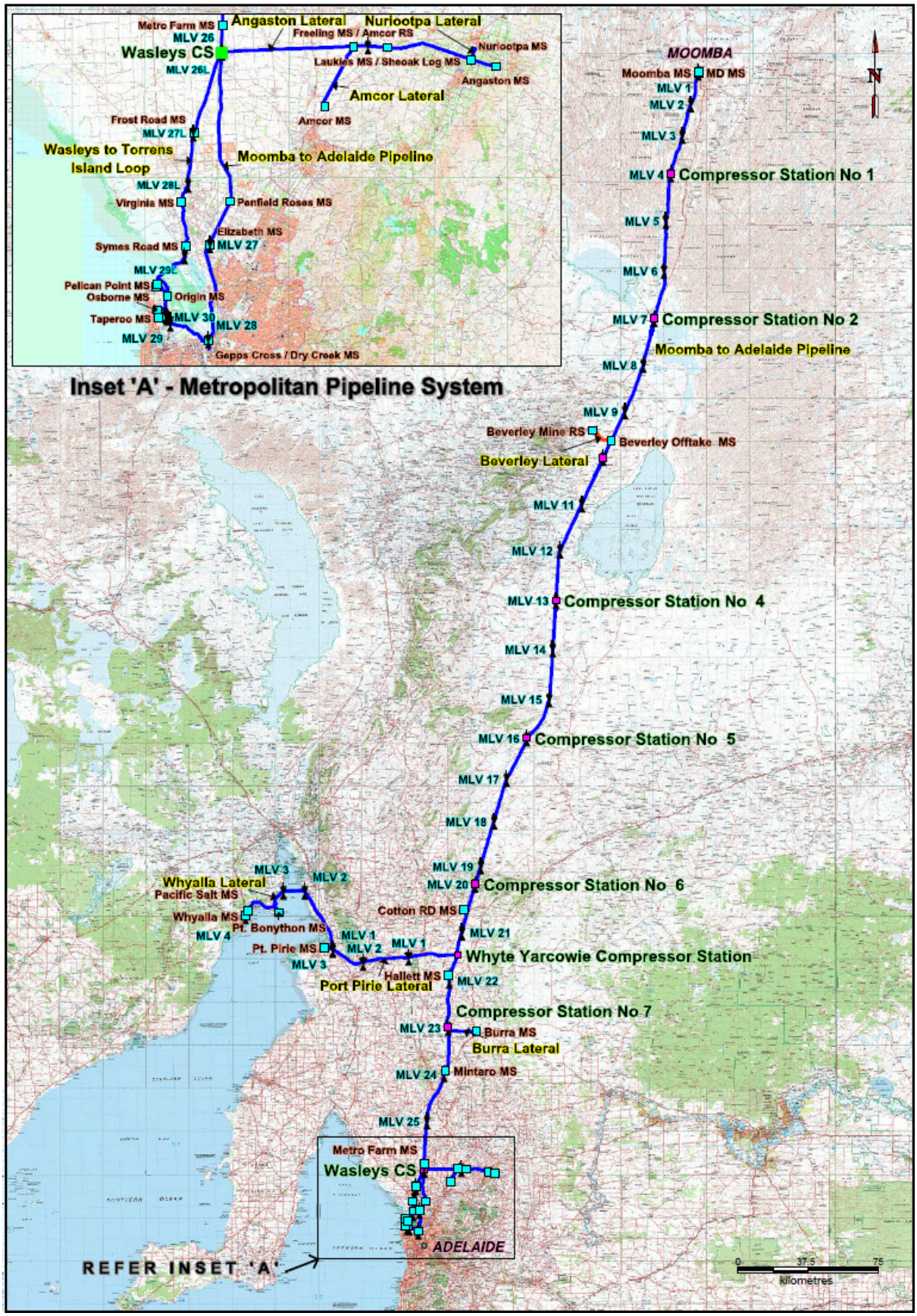
The MAPS is a 1,115km pipeline system consisting of a mainline pipe of 781km, 76km of mainline loops, and 257km of laterals. The MAPS has been progressively upgraded to boost capacity and increase security of gas supplies, including a 43km loop line of 510mm diameter between Wasleys and the Torrens Island Power Station, where pressure limiting is installed to protect the mainline. The design parameters for the MAPS are provided in Table 2-1.

Plate 1: Pipeline Marker Signs

Table 2-1: Pipeline Design Parameters

Pipeline Description	Com-mission Date	MAOP (MPa)	Outer Diameter (mm)	Wall Thickness (mm)	Pipe Grade	Length (km)	Coating Material
Moomba to Adelaide Pipeline							
Moomba-CS1	1969	7.322	559.0	7.92, 9.53	API 5L X52	67.700	Plicoflex tape
CS1-CS2	1969	7.322	559.0	7.92, 9.53	API 5L X52	94.100	Plicoflex tape
CS2-CS3	1969	7.322	559.0	7.92, 9.53	API 5L X52	94.300	Plicoflex tape
CS3-CS4	1969	7.322	559.0	7.92, 9.53	API 5L X52	96.600	Plicoflex tape
CS4-CS5	1969	7.322	559.0	7.92, 9.53	API 5L X52	92.200	Plicoflex tape
CS5-CS6	1969	7.322	559.0	7.92, 9.53	API 5L X52	98.300	Plicoflex tape
CS6-CS7	1969	7.322	559.0	7.92, 9.53	API 5L X52	95.000	Plicoflex tape
CS7-Wasleys	1969	7.322	559.0	7.92, 9.53	API 5L X52	93.600	Plicoflex tape
Wasleys-TI	1969	7.322*	559.0	7.92, 9.53	API 5L X52	49.500	Plicoflex tape
Moomba Interconnect	1999	9.680	273.1	12.70	ASTM A53B	0.083	--
TOTAL	7 Compressors, 28 Meter Stations, 34 MLVs, 16 Actuators					**781.300**	**-**
MAP Loops							
Wasleys-TI Loop	1986	7.322	508.0	9.00	API 5L X60	42.000	Fusion Bonded Epoxy (FBE)
MAP 1 / CS1	2000	7.322	610.0	7.14	API 5L X65	5.193	FBE
MAP 2 / CS2	2000	7.322	610.0	7.14	API 5L X65	9.995	FBE
MAP 3 / CS3	2000	7.322	610.0	7.14	API 5L X65	13.278	FBE
MAP 4 / CS4	2000	9.240	610.0	8.74	API 5L X65	5.961	FBE
TOTAL LOOP	6 Meter Stations, 6 MLVs, 5 Actuators on Wasleys-TI Loop					**76.427**	**-**
MAP Laterals							
Amcor	2002	9.930	114.3	4.00	API 5L X42	10.208	Yellow Jacket
Angaston	1969	7.322	219.1	4.78	API 5L X42	38.700	Plicoflex PVC
Burra	1974	7.322	88.9	4.78	API 5L Gr. B	15.000	Yellow Jacket
Dry Creek	1971	2.067	323.9	9.53	API 5L X42	1.267	Yellow Jacket
Dry Creek Interconnect	1981	12.800	323.9	9.52	ASTM A106B	0.146	Yellow Jacket
Hallett	2000	7.322	219.1	4.78, 8.19	API 5L X42	0.720	Yellow Jacket
Mintaro	1984	7.322	219.1	4.77	API 5L X42	0.335	FBE
Nuriootpa	1972	1.379	114.3	4.78	ASTM A53B	1.600	Armathene
Osborne (River-Wharf)	1998	10.00	273.1	6.40	API 5L X42	0.852	FBE
Osborne (MS-Wharf)	1998	10.00	273.1	9.20	API 5L X42	0.273	Yellow Jacket
Osborne (Downstream MS)	1998	10.00	219.1	4.00	API 5L X42	0.188	Yellow Jacket
Peterborough	1972	0.690	88.9	4.78	ASTM A53B	1.900	Armathene
Pelican Point - Land	2000	9.60	355.6	7.10	API 5L X52	1.007	FBE
Pelican Point - River	2000	9.60	355.6	7.10	API 5L X52	0.855	FBE, Powercrete
Port Bonython	1989	7.322	114.3	4.1/4.8	API 5L X42	5.500	Polyken tape
Port Pirie	1976	8.240	168.3	4.37, 4.78	API 5L Gr. B	77.800	Plicoflex PVC
Quarantine (Origin)	2001	7.322	219.1	8.19	API 5L X42	0.140	Yellow Jacket
SEA Gas Moomba Interconnect	2015	10.2	273.1	9.27	API 5L X42	0.540	3-layer HDPE
Taperoo	1969	7.322	323.9	9.53	API 5L X42	1.200	Concrete / tape
Tarac	1972	1.379	88.9	4.78	ASTM A53B	0.400	Armathene
Whyalla	1989	10.130	219.1	4.4, 5.2	API 5L X52	87.800	Polyken tape
Whyalla Loop	1989	10.13	114.3	4.30	API 5L X52	11.540	FBE
TOTAL LATERALS						**257.971**	**-**
Beverley Lateral							
Beverley Lateral	2000	10.2	88.9	4.00	ASTM A106B	14.430	Yellow Jacket
TOTAL	1 Inlet Meter Station					**14.430**	

Figure 2: Pipeline Alignment



2.2.2 Facilities and Infrastructure

A description of the pipeline facilities and associated infrastructure is provided in Table 2-2.

Table 2-2: Pipeline Facilities and Infrastructure

Facility	Description.
Compressor Stations	There are seven gas turbine driven compressor stations located about 100 km apart. Major components of typical compressor stations include duel compressor sets, gas filters to remove particulates, gas metering system, air cooled heat exchanges, gas powered generating sets, a control room housing the automated system and communications, and accommodation. These stations are designed to be operated from the Pipeline Control Room at the Epic Energy Head Office in Dry Creek, SA, and are visited regularly for maintenance and instrument calibration.
Station Accommodation	Adjacent to Compressor Stations 1, 2, 3, 4, 5 and 6 are the permanent accommodation facilities for field based staff. The accommodation facilities are fully equipped for long term stays.
Metering Stations	Metering stations are located where gas volumes leave the main transmission lines.
Scraper Stations	Scraper stations are required to allow for cleaning devices (pigs) to be inserted into, and removed from, the pipeline to clean the line and/or detect damage or pipe corrosion along the pipeline.
Mainline Valves	Mainline valves are located approximately every 32 km. Mainline valves are installed to automatically shut down a section of the pipeline when any rapid drop in system pressure is detected. The valves are designed to operate automatically, but may also be operated manually.
Cathodic Protection	A cathodic protection system is incorporated into the pipeline design to protect the pipeline from corrosion. This involves the use of buried anode beds, which are connected to the pipeline via cabling. In addition, cathodic protection test posts are located approximately every 2km. The test posts are required to allow for monitoring of the effectiveness of the corrosion protection system.
Pipeline Marker Signs	Pipeline Marker Signs are located along the pipeline easements, at intervals, so that a person can clearly see a marker sign in either direction. The maker signs are placed closer at bends, on either side of road and watercourse crossings and at fence lines.
Regulator Station	The Regulator Station reduces the gas pressure to meet supply pressure.
Right of Way	Where there are no gazetted roads to allow access to the pipelines, Epic Energy maintains a pipeline track or 'Right-of Way' within the pipeline easement.

2.3 Operation

Day-to-day operations of natural gas transmission pipelines pose few environmental implications. The pipeline is designed to be operated remotely from the Pipeline Control Room at the Epic Energy Head Office in Dry Creek. Field operators undertake regular route inspections, maintain ongoing liaison with landholders, and respond to maintenance requirements such as erosion control and weed control, as necessary.

The key activities which may have an impact on landowners, occupiers and the environment include:

- Maintenance of the pipeline easement (e.g. weed control, rehabilitation of erosion and excavation sites);
- Maintenance of the pipeline and facilities (e.g. excavation of the pipeline for maintenance, hydrotesting, assessment of internal pipeline integrity and welding);
- Compressor station operations;
- Access to the pipeline easement;
- Inspection & testing of the pipeline, easement and facilities;
- Emissions from the pipeline;
- Storage and use of hazardous substances;
- Production and disposal of waste materials; and
- Potential accidents or emergency situations.

2.4 Decommissioning

Epic Energy is committed to decommissioning the pipeline system to an appropriate standard as required by the legislation and standards of the day.

Currently decommissioning procedures require the removal of all above ground infrastructure and the restoration of associated disturbed areas.

At the time of decommissioning a decision will be made regarding the opportunities for future use of the pipeline. If no longer required, the pipeline will be purged of gas and below ground facilities allowed to gradually degrade in-situ. If however, it is considered that the pipeline may offer some future benefits, it will be filled with an inert material and the cathodic protection system maintained to prevent corrosion. Above ground facilities will be removed.

3 Description of Environment

3.1 Introduction

The purpose of this section of the document is to describe the environment in which the pipeline system operates and was prepared in 2002 following a desktop assessment of the entire pipeline route. Publicly available information and previous environmental and cultural heritage investigations completed on behalf of Epic Energy were referred too. In addition, site specific information was sourced from an Environmental Risk Assessment completed by Epic Energy, the Epic Energy Aspects Register, the Epic Energy Land Management System (LMS) and a range of Epic Energy personnel. A list of reference sources is included in Section 7.

As the pipeline system extends for over 1,000km and crosses a range of difference landforms and land uses, the pipeline has been divided into regions. This section of the document is presented in terms of the relevant environmental regions. It is important to note that the location specific information presented in this section is not exhaustive, and is included to provide an example of the specific issues that may exist in each region.

The original pipeline and facilities were installed approximately 35 years before the 2002/3 assessment. Consequently the easement had, for the most part, revegetated to a state similar to adjoining land. In the northern pastoral regions only the pipeline access track and major facilities remain visible and relatively free of vegetation. In the southern regions where the dominant land use is agriculture, the pipeline easement is virtually indistinguishable from the surrounding land and for the most part is covered by crops or paddocks.

3.2 Environmental Regions

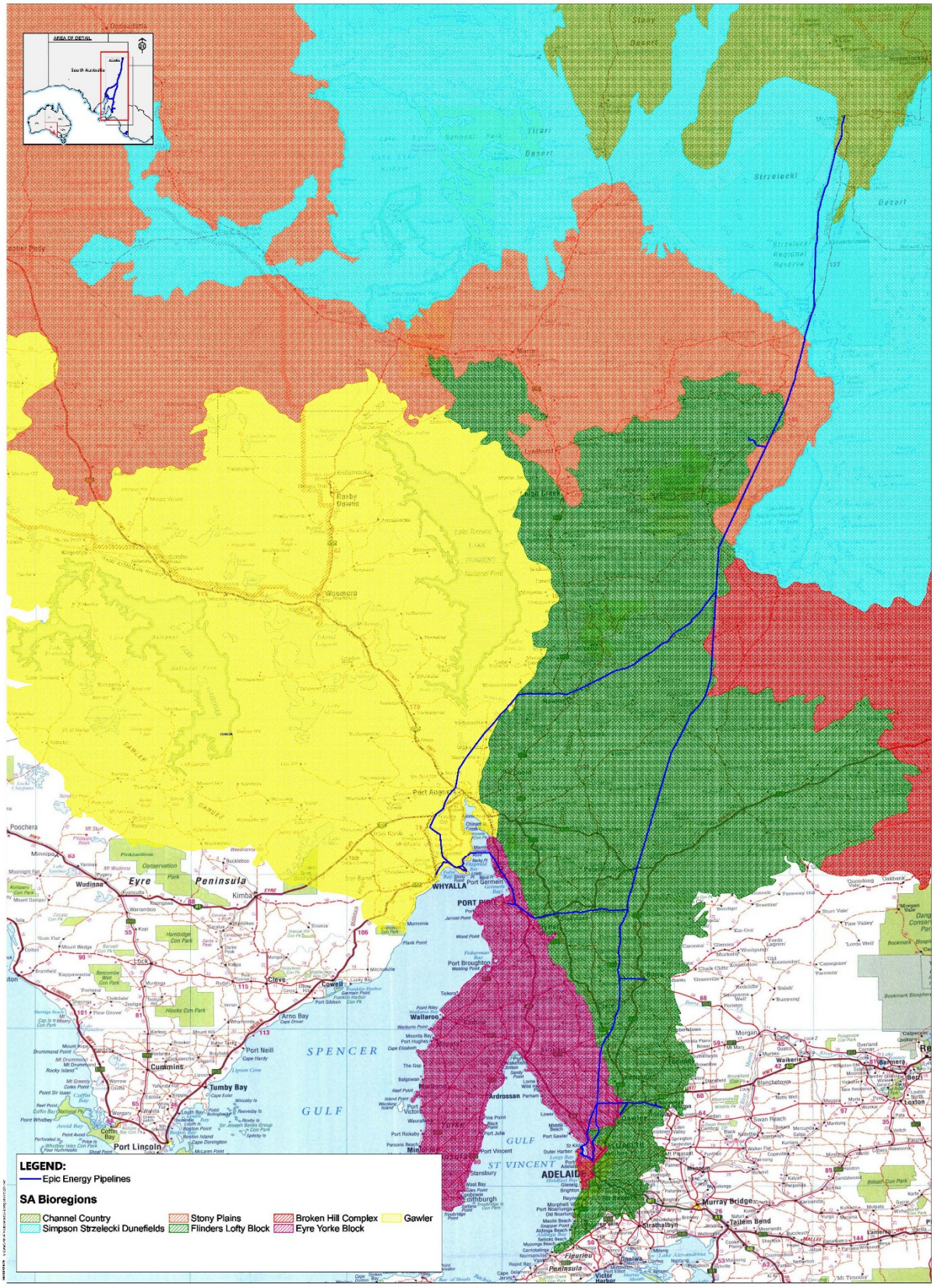
In order to manage the environmental issues associated with the pipeline, the route has been divided into environmental regions. The environmental regions are based on the bioregions and land systems of South Australia and are used to describe the sections of the pipeline with similar receiving environments and/or land uses. The use of the regions allows for specific controls, where required, to be identified and implemented to address the environmental issues specific to the region.

The regions associated with the pipeline route are summarised in Table 3-1 and described in detail in below. It is important to note that while a specific start and end point has been provided for each region, these are indicative only. In practice, the landforms of the area generally change over a number of kilometres. The location specific information presented in this section is not exhaustive, and is included to provide an example of the specific issues that may exist.

Table 3-1: Locations of Environmental Regions

Region	Mainline (Kilometre Point)	Laterals within Region	Section Reference
Channel Country	0.0 – 26.7		3.3
Dunefields	26.7 – 162.0		3.4
Stony Plains	162.0 – 215.0 234.0 – 314.1	Beverley Lateral	3.5
Flinders Lofty	215.0 – 234.0 314.1 – 359.5 367.6 – 376.5 400.0 – 695.2	Beverley Lateral Peterborough Lateral Port Pirie Lateral Hallett Lateral Burra Lateral Mintaro Lateral Nuriootpa Lateral	3.6
Broken Hill	359.5 – 367.6 376.0 – 400.0		3.7
Eyre Yorke	695.2 – 751.8	Port Pirie Lateral Whyalla Lateral Port Bonython Lateral Amcor Lateral Angaston Lateral Nuriootpa Lateral Dry Creek Lateral Taperoo Lateral Wasleys-Torrens Island Lateral Pelican Point Lateral Osborne Lateral Quarantine Lateral SEA Gas Moomba Interconnect	3.8
Western Pastoral		Whyalla Lateral Whyalla Loop (Gulf Crossing – Douglas Point to Mambray Creek) Port Bonython Lateral	3.9
Spencer Gulf		Whyalla Loop	3.10

Figure 3: Environmental Regions



3.3 Channel Country Region

The MAP passes through the Channel Country region between KP 0 and KP 26.7.

3.3.1 Climate

This region has a hot dry desert climate with short cool to cold winters. Rainfall is low and extremely unreliable, with a mean annual rainfall of 125-150 mm and evaporation is high throughout the year with a mean annual evaporation of 3800 mm (Laut et al 1977). Temperatures in this area range from average maximums of 36-39°C in summer and 18-24°C in winter to an average minimum of 5°C in winter (Allan 1990).

3.3.2 Soils and Terrain

This region is dominated by a system of parallel dunes and an extensive system of interconnected claypans. The area is subject to periodic flooding from the Cooper Creek system.

The sand hills are dominated by siliceous red sands while the soils between the dunes are grey and brown clays. The dune soils are prone to wind erosion especially where the soil structure has been disturbed or altered (e.g. addition of clay for road caps). The claypans between the dunes comprise grey clays with strong shrink/swell potential and are subject to wide cracking when drying (Laut et al 1977, Wright et al 1990).

3.3.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of the following associations:

- A mixed cover of chenopod shrubland and grassland on the inter-dunes predominated by Golden Goosefoot (Chenopodium auricomum), Saltbush (Atriplex numularia), Coolibah (Eucalyptus microtehca), Polygonum (Muehlenbeckia cunninghamii), Curly Wiregrass (Aristida contorta), and Eragrostis species;
- A tall shrubland with a grass and forb understorey and hummock grasslands on the dunes predominated by Sandhill Wattle (Acacia ligulata), Whitewood (Atalaya hemiglauca), Hakea species, Sandhill Canegrass (Zygochloa paradoxa) and Spinifex (Triodia basedowii); and
- Fringing woodland on the floodplain predominated by Coolibah (Eucalyptus microtehca), Broughton Willow (Acacia salicinina), Polygonum (Muehlenbeckia cunninghamii), Bean Tree (Bauhinia carronii), with Acacia species, chenopods and flood plain ephemerals (Laut et al 1977).

Fauna

The Channel Country, Simpson Strzelecki Dunefields and Stony Plains regions provide a rich diversity of habitats for a wide range of arid zone fauna. Distribution is largely affected by the location of water resources. Studies of the region (Tyler et al, 1990) indicate that 56 mammal species, 225 bird species and 120 amphibian and reptile species are present.

3.3.4 Water Resources

Sections of this region lie within the Lake Eyre Drainage basin. Drainage systems within the area are ephemeral and streams are characterised by extreme variations in discharge and flow duration.

Shallow aquifers are located throughout this region and are generally recharged during floods. These aquifers are utilised by pastoralists as stock water. The Great Artesian Basin also underlies this region and is utilised for domestic and stock water supplies by local inhabitants (Epic Energy 2000).

3.3.5 Land Use

The main land use of this zone is extensive cattle grazing, with some conservation (Innamincka Regional Reserve and Coongie Lake to the north) and tourism (the Strzelecki Track and Simpson Desert to the east) also occurring in the region.

Merty Merty Station (KP18-52) is chemical free, and no chemicals are to be used on the lease without the prior approval of the Lessee. The main land use of this zone is extensive cattle grazing, with some conservation (Innamincka Regional Reserve and Coongie Lake to the north) and tourism (the Strzelecki Track and Simpson Desert to the east) also occurring in the region.

Petroleum production and oil and gas exploration also occur in the region.

3.4 Dunefields Region

The MAP passes through the Simpson Strzelecki Dunefields region between KP 26.7 and KP 162.

3.4.1 Climate

This region has a hot dry desert climate with short cool to cold winters. Rainfall is low and extremely unreliable, with a mean annual rainfall of 125-150 mm and evaporation is high throughout the year with a mean annual evaporation of 3200-3800 mm (Laut et al 1977).

Temperatures in this area range from average maximums of 36-39°C in summer and 18-24°C in winter to an average minimum of 5°C in winter (Allen 1990).

3.4.2 Soils and Terrain

This region consists of an extensive undulating dunefield with numerous small claypans and encompasses the Strzelecki Desert. It also includes Lake Frome and other regional saltlakes with gypsum dunes.

The sand hills are dominated by siliceous red sands while the soils between the dunes are grey and brown cracking clays and red calcareous earths. These soils are prone to wind erosion or water erosion where water has been concentrated by alterations to the soil structure (e.g. addition of clay for road caps). However the dunes have the capacity to store water following rains and consequently are often stabilised by vegetation. The plains between the dunes comprise grey clays with strong shrink/swell potential and are subject to wide cracking when drying (Laut et al 1977, Wright et al 1990).

3.4.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of low shrublands on the dunes predominated by Marpoo (Acacia ligulata), Needlewood (Hakea leucoptera), Whitewood (Atalaya hemiglauca), with Spinifex (Triodia species), Canegrass (Zygochloa paradoxa), Eremophila and Cassia species.

The inter-dune depressions are also vegetated with low open shrubland, with Acacia and Hakea species, Nitrebush (Nitraria schoberi), chenopods, forbs and grasses (Laut et al 1977).

Fauna

The Channel Country, Simpson Strzelecki Dunefields and Stony Plains regions provide a rich diversity of habitats for a wide range of arid zone fauna. Distribution is largely affected by the location of water resources. Studies of the region (Tyler et al, 1990) indicate that 56 mammal species, 225 bird species and 120 amphibian and reptile species are present.

Fauna species likely to be found in this region, listed as endangered, vulnerable or rare under the SA *National Parks and Wildlife Act 1972* include:

Name	Classification
Mulgara (Dasycercus cristicauda cristicauda)	Rare
Fawn Hopping-mouse (Notomys cervinus)	Rare
Kowari (Dasycercus byrnie)	Vulnerable
Dusky Hopping-mouse (Notomys fuscus)	Vulnerable
Plains Rat (Pseudomys australis)	Vulnerable
Bronze-back Legless Lizard (Ophidiocephalus taeniatus)	Vulnerable
Desert Glossy Skink (Notoscincus ornatus)	Rare
Desert Death Adder (Acanthophis curta)	Rare
Common Bandy Bandy (Vermicella annulata)	Rare

3.4.4 Water Resources

Sections of this region lie within the Lake Eyre Drainage basin. Drainage systems within the area are ephemeral and streams are characterised by extreme variations in discharge and flow duration.

Shallow aquifers are located throughout this region and are generally recharged during floods. These aquifers are utilised by pastoralists as stock water.

The Great Artesian Basin also underlies this region and is utilised for domestic and stock water supplies by local inhabitants (Epic Energy 2000).

3.4.5 Land Use

The main land use of this zone is extensive cattle grazing. The region also encompasses the Strzelecki Regional Reserve, Lake Frome Regional Reserve and the Lake Callabonna Fossil Reserve.

Lindon Station (KP 52-158) and Murnpeowie Station (KP 158-183) have “Organic Beef” status. As a result, no chemicals are to be used on the lease without the prior permission of the leasee.

3.5 Stony Plains Region

The MAP passes through the Stony Plains region between KP 162 and KP 215 and again between KP 234 and KP 314.1.

3.5.1 Climate

This region has warm to hot summers and cool to cold winters. Rainfall is low and extremely unreliable, with a mean annual rainfall of 150 mm and evaporation is high throughout the year with a mean annual evaporation of 3100 - 3600 mm (Laut et al 1977).

3.5.2 Soils and Terrain

The northern part of this region is characterised by gently sloping gibber plain with drainage lines, while the southern part of this region is characterised by wide flood plains and some occasional dunes (Laut et al 1977).

The stony tablelands of this region are dominated by a complex arrangement of Gilgai depressions and flats where desert loam, crusty red duplex soils or red clay soils dominate with a stone (gibber) cover. The desert loams form a surface seal that often prevents the infiltration of water. The red clays crack widely until they begin to swell following the infiltration of run-off water.

The gibbers provide an effective stabilising cover on the tablelands, however when gibbers are disturbed the underlying soils are subject to water and wind erosion with gullying common. The dunes are also prone to drift as a result of wind erosion (Laut et al 1977, Wright et al 1990).

3.5.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of the following associations:

- Chenopod shrubland on plains predominated by Low bluebush (Maireana astrotricha), Cottonbush (Maireana aphylla), Mealy Saltbush (Rhagodia parabolica), Scleroliena species and grasses;
- Tall open shrubland or low woodland with a mixed shrub understorey on flood plains and in drainage lines. Dominant species found in this association include Low bluebush (Maireana astrotricha), Cottonbush (Maireana aphylla), Mealy Saltbush (Rhagodia parabolica), Bullock Bush (Alectryon oleifolium), Mulga (Acacia anura), Eremophila species, Dodonaea species, Coolibah (Eucalyptus microtheca) and Broughton Willow (Acacia saliciina); and
- Shrubland comprised of Senna, Eremophila and Acacia species on dunes (Laut et al 1977).

Fauna

The Channel Country, Simpson Strzelecki Dunefields and Stony Plains regions provide a rich diversity of habitats for a wide range of arid zone fauna. Distribution is largely affected by the location of water resources. Studies of the region (Tyler et al, 1990) indicate that 56 mammal species, 225 bird species and 120 amphibian and reptile species are present.

Conservation

Part of the pipeline easement (KP 284 to KP 300) in this region lies within the Vulkathunha-Gammon Ranges National Park. This park provides an important habitat for a wide variety of endemic arid zone plants and animals including the vulnerable Yellow-footed Rock Wallaby. Epic Energy does not undertake work within the National Park without the prior approval of the Senior Ranger.

3.5.4 Water Resources

Sections of this region lie within the Lake Eyre Drainage basin. Drainage systems within the area are ephemeral and streams are characterised by extreme variations in discharge and flow duration.

Shallow aquifers are located throughout this region and are generally recharged during floods. These aquifers are utilised by pastoralists as stock water.

The Great Artesian Basin also underlies this region and is utilised for domestic and stock water supplies by local inhabitants (Epic Energy 2000).

3.5.5 Land Use

The main land use of this zone is livestock grazing (sheep and cattle). The region also encompasses the Vulkathunha-Gammon Ranges National Park.

Murnpeowie Station (KP158-183) has “Organic Beef” status. As a result, no chemicals are to be used on the lease without the prior permission of the leasee.

3.6 Flinders Lofty Region

The MAP passes through the Flinders Lofty region at the following points:

- Between KP215.0 and KP234.0;
- Between KP314.1 and KP359.5;
- Between KP367.6 and KP376.5; and
- Between KP400.0 and KP695.2.

This region can be divided into 3 sub-regions:

- Balcanoona / Wirrealpa (KP215.0 - KP234.0, KP314.1 - KP359.5 and KP367.6 - KP376.5);
- South Olary Plains (KP400 - approximately KP550 or southern edge of Terowie Association); and
- Yongala / Hansen (KP500 - KP695.2).

3.6.1 Climate

The Balcanoona / Wirrealpa sub-region has warm to hot summers and cool to cold winters. Rainfall is low and extremely unreliable with the higher falls generally occurring in winter. The mean annual rainfall is 150-300 mm and evaporation is high throughout the year with a mean annual evaporation of 2700 - 3500 mm (Laut et al 1977).

The South Olary Plains sub-region has a warm climate characterised by high evaporation and low, unreliable rainfall throughout the year. The mean annual rainfall is 200-400 mm and the mean annual evaporation is 2100 - 2750 mm (Laut et al 1977).

The Yongala / Hansen sub-region has a cool to mild climate with a distinct winter rainfall. The mean annual rainfall is 300-650 mm and the mean annual evaporation is 1850 – 2200 mm (Laut et al 1977).

3.6.2 Soils and Terrain

The northern section of this region includes the eastern slopes of the Flinders Ranges and the Lake Frome Basin. The Balcanoona / Wirrealpa sub-region is characterised by coalescing fans with broad flood plains, bordering on the ranges and outlying ridges. The soils in this subregion are characterised by duplex soils and silicerous loams with stones and rock outcrops (Laut et al 1977).

The South Olary Plains sub-region is characterised by granite hills with shallow loamy soils and gentle foot-slopes and plains with deeper duplex soils and calcareous earths (Laut et al 1977).

The Yongala / Hansen sub-region is characterised by wide undulating basins separated by ridges and leads into the Southern Flinders Ranges. Red duplex soils, self-mulching cracking clays and calcareous loams are the dominant soil types in this sub-region. These soils become powdery and loose when dry especially following disturbance.

All of the soils in this region are prone to local gullying, sheet erosion and some drift (Laut et al 1977).

3.6.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of the following associations:

- Chenopod shrubland and fringing woodland on plains predominated by Saltbush (Atriplex vesicaria), Maireana species, Black Oak (Casuarina cristata), Mulga (Acacia anura), Eremophila species, Dodonaea species, Bullock Bush (Alectryon oleifolium), Mallees (Eucalyptus socialis and E. oleosa) and Red Gum (Eucalyptus camaldulensis) in drainage lines;
- Low open woodland or tall shrubland on hills dominated by False Sandalwood (Myoporum platycarpum) and Mallee (Eucalyptus socialis), with Acacia, Eremophila, Dodonaea and Senna species; and
- Grasslands, dominated by Irongrass (Lomandra dura and L. effuse) are present in the South Olary Plains sub-region.

Only a small amount of remnant native vegetation is present in the Yongala / Hansen subregion due to the widespread clearing of the area for farming. The vegetation in this subregion is characterised by cereal crops and plantings of exotic and native trees along roads and around settlements. Some remnant mallee and grasslands are still present on stony crests and steep ridges (Laut et al 1977).

While a range of weed species are present within the region, a significant outbreak of African Rue has been identified on a property crossed by the ROW (between KP454-488). Information regarding the control measures implemented by Epic Energy to prevent the spread of the African Rue is outlined in Section 4.4 of this document.

Fauna

The native vegetation in this region provides an important habitat for a variety of animals, many of which are now restricted by loss or modification of habitat as a result of agricultural practices. Fauna found in the region include 120 bird, 5 mammal and 8 reptile species classified as rare or threatened under the SA *National Parks and Wildlife Act 1972* (Graham et al 2001).

3.6.4 Water Resources

Drainage systems within this region are predominantly intermittent and ephemeral depending upon seasonal conditions. Creeks and drainage lines are characterised by extreme variations in discharge and flow duration.

Shallow aquifers are present in the region and are utilised primarily for stock watering (Laut et al 1977).

3.6.5 Land Use

The main land use in the Balcanoona / Wirrealpa and South Olary Plains sub-regions is livestock grazing (sheep and cattle).

The Yongala / Hansen sub-region is used for cereal cropping and livestock grazing and delineates the boundary between pastoral and farming land use in the region.

3.7 Broken Hill Complex Region

The MAP passes through the Broken Hill Complex region between KP 359.5 and KP 367.6 and again between KP 376.0 and KP 400.0.

3.7.1 Climate

This region experiences a semi-arid climate with a mean annual rainfall of 150-200 mm and a mean annual evaporation of 2700 - 3000 mm (Laut et al 1977).

3.7.2 Soils and Terrain

This region is characterised by a broad alluvial plain, partly overlain by dunes and sand sheets with some clay pans (Laut et al 1977). It also includes a series of low ranges, known as the Olary Spur, which run eastward from the Flinders Ranges (Barnes 1997).

The dominant soils in this region are calcareous red and brown earths including solonized brown loams. These soils become powdery and loose when dry especially following disturbance and are prone to wind and water erosion. Reddish sands and cracking clays are also present, with the sands being prone to drift (Laut et al 1977, Wright et al 1990).

3.7.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of the following associations:

- Chenopod and tall open shrubland on the plains dominated by Atriplex, Maireana and Rhagodia species and Bullock Bush (Alectryon oleifolium), Mulga (Acaica aneura) and Acacia species (including Acacia victoriae). Seasonal grasses including Stipa and Enneapogon are also locally abundant. Scattered populations of Mallee (Eucalyptus socialus and E. oleosa), occasional Sugarwood (Myocarpum platycarpum) and Coolibah Box (Eucalyptus intertexta) are also present;
- Tall woodland and low open shrubland on the dunes and sand sheets. Dominant species include Black Oak (Casuarina cristate) and Mulga (Acaica aneura). Cassia and Eremophila species are also present; and
- Tall woodland of Redgum (Eucalyptus camaldulensis) and Teatree (Melaleuca species) on flood areas and in drainage channels.

These associations form a mosaic on the eastern margins of the Flinders Ranges and the adjacent flood plains to the east.

Fauna

This region supports a wide variety of arid zone fauna including 22 species of significant vertebrate fauna (7 mammals, 11 birds, 2 reptiles and 2 frogs) (Kahrimanis et al 2001).

3.7.4 Water Resources

Drainage systems within this region are predominantly intermittent and ephemeral depending upon seasonal conditions. Creeks and drainage lines are characterised by extreme variations in discharge and flow duration.

Shallow aquifers are present in the region and are utilised primarily for stock watering (Laut et al 1977).

3.7.5 Land Use

The main land use of this zone is livestock grazing (sheep and cattle).

3.8 Eyre Yorke Block

The MAP passes through the Eyre Yorke Block region between KP 695.2 and KP 781. This region can be divided into two sub-regions:

- Clare / Mallala (KP695.2 - KP740); and
- Adelaide (KP740 - KP781).

From KP 740 the region is highly populated, and includes hobby farms and light industry.

3.8.1 Climate

The Clare / Mallala sub-region has a cool mild climate with a distinct winter rainfall. The mean annual rainfall is 450 - 650 mm and the mean annual evaporation is 1850 - 2100 mm (Laut et al 1977).

The Adelaide sub-region experiences warm dry summers and cool wet winters. Rainfall has a strong seasonal distribution (i.e. distinct winter rainfall) with a mean annual rainfall of 585mm and a mean average evaporation rate of 1460 mm (Bureau of Meteorology, 2002).

3.8.2 Soils and Terrain

The Clare / Mallala sub-region is comprised of narrow crested ridges and gentle foot-slopes. The soils are dominated by duplex soils (Laut et al 1977).

The Adelaide sub-region traverses the Adelaide Plains, located between the Adelaide Hills and the Spencer Gulf. The soils in this region are characterised by well drained calcareous earths and sands. The coastal areas are fringed by low dunes.

It should be noted that there are a number of potential contaminated soil sites present within the Adelaide metropolitan region, namely in the historical industrial areas around Dry Creek – Torrens Island area.

3.8.3 Flora and Fauna

Flora

The Clare / Mallala sub-region has been widely cleared for cultivation and is dominated by cropland, open parkland, forestry plantations and vineyards (Laut et al 1977).

The original grassy woodlands in the Adelaide region have been highly modified as a result of clearing for agriculture, housing and industry and the introduction of exotic plant and animal species. Consequently only a small amount of remnant vegetation remains within reserves and parks.

Remnant samphire flats are present on the coastal fringes of this region including the Torrens Island Conservation Park. The Barker Inlet and Port River Estuary support an extensive area of mangrove (Avicennia marina var. resinifera) woodlands and seagrass flats (PASA 1985).

Fauna

A variety of introduced and native animal species can be found throughout the region. However due to the modified landscape in this region, the majority of the native wildlife species, unable to adapt to the habitat modifications, are restricted to areas of remnant vegetation and conservation reserves.

The pipeline passes through the significant Greenfield / Barker Inlet Wetlands area. These wetlands are utilised by international migratory waders and shorebirds and are listed under the CAMBA / JAMBA migratory bird agreements.

The Wasleys Loop passes through the Barker Inlet Aquatic Reserve, The Adelaide Dolphin Sanctuary and adjacent to the Torrens Island Conservation Park.

3.8.4 Water Resources

The southern section of this region lies within the catchment of the Mount Lofty Ranges and includes the permanent South Para, North Para, Gawler and Torrens Rivers. A number of ephemeral creeks and rivers are also present in this region.

Local aquifers are also present in the region. Aquifers in the Adelaide Plains and the Barossa Valley are generally of good quality and are utilised for irrigation, livestock watering and some domestic use (RSSA 1988).

3.8.5 Land Use

The dominant land use in this region is intensive agriculture (market gardens, irrigated crops), industry and urbanisation.

The dominant land use in the Clare / Mallala sub-region is agriculture comprised of cereal cultivation and livestock grazing with grape cultivation and forestry.

The dominant land use in the Adelaide sub-region is intensive agriculture (market gardens, irrigated crops), industry and urbanisation.

3.9 Western Pastoral Region

The Port Bonython, Whyalla Lateral and Whyalla Loop (Gulf Crossing – Point Douglas to Mambray Creek) pipelines pass through the Western Pastoral region.

3.9.1 Climate

This region is characterised by a mild to hot summer and cool to cold winter. Rainfall is low and unreliable, with a mean annual rainfall of 225 mm. Evaporation is high throughout the year with a mean annual evaporation of 2200 - 2600 mm (Laut et al 1977).

3.9.2 Soils and Terrain

This region is characterised by a plateaux with steep escarpments and long footslopes mantled by Aeolian sand and undulating plains with low sand dunes. Samphire or mangrove flats are also present along the coastal margins.

The soils in this region are characterised by well drained red duplex soils and calcareous loams with reddish sands in the dunes (Laut et al 1977). The dunes are prone to wind erosion when disturbed.

3.9.3 Flora and Fauna

Flora

The vegetation in this region is generally comprised of the following associations:

- Chenopod shrubland on the plateaux and plains dominated by Atriplex vesicaria and Maireana sedifolia;
- Low open shrubland on the plateaux and plains dominated by Black Oak (Casuarina cristate) Myall (Acacia papyrocarpa), False Sandlewood (Myoporum platycarpum) and occasional stands of Red Mallee (Eucalyptus socialus); and
- Mangrove woodlands or low Samphire on the tidal flats comprised of Mangrove (Avicennia marina) and Samphire (Halosarcia and Sarcocornia species).

Fauna

Studies of this western pastoral region have indicated that approximately 10 species of native mammal, 50 reptile and amphibian species and over 165 species of bird are expected to occur in this region (Santos 1981).

Fauna species likely to be found in this region, listed as endangered, vulnerable or rare under the SA *National Parks and Wildlife Act 1972* include:

Name	Classification
Thick-billed Grasswren (Amytornis textiles myall)	Rare
Redthroat (Pyrrholaemus brunneus)	Rare
Rock Parrot (Neophema petrophila)	Rare
Blue-winged Parrot (Neophema chrysostoma)	Vulnerable

3.9.4 Water Resources

Drainage systems within this region are predominantly ephemeral depending upon seasonal conditions. Creeks and drainage lines are characterised by extreme variations in discharge and flow duration.

Some shallow aquifers are present in the region but the majority of the water is too salty to be utilised for either stock or human consumption (Laut et al 1977).

3.9.5 Land Use

The main land use of this zone is pastoral livestock grazing (sheep). Some recreational land use also occurs along the shores of the upper Spencer Gulf between Whyalla and Port Augusta. The Regional

centres of Whyalla and Port Augusta and the Port Bonython Oil Refinery are also present in this zone. The Cultana Army Training Reserve is located within this region, to the north-east of Whyalla.

3.10 Spencer Gulf Region

The Whyalla Loop (Gulf Crossing – Point Douglas to Mambray Creek) passes through the aquatic Spencer Gulf region.

3.10.1 Oceanography

Water quality investigations of the Spencer Gulf indicate that there is an increase in salinity towards the top of the Gulf due to greater evaporation in the shallow waters and the limited rate of interchange of water within the Gulf. Salinities vary from an average of 40 parts per thousand (ppt) at Whyalla to 46.7 ppt at Port Augusta.

Water temperatures in the Gulf show similar variations to the salinity data but there is no north-south gradient. The water temperature closely follows air temperature and responds rapidly to heating and cooling.

Spencer Gulf has a tidal anomaly which results in a fortnightly phenomenon where virtually no tidal variation occurs (a 'dodge tide') over the period of a day or so. Meteorological conditions also alter the tidal range.

The wave climate in Spencer Gulf consists of a combination of swell and short period seas with the swell component dominating at the southern end of the Gulf and the seas dominating at the northern end (Santos 1981).

3.10.2 Soils and Terrain

The northern Spencer Gulf is a minor rift valley. The bedrock is a thick succession of clays, sands and gravels and is topped by thick non-marine mottled clays. Marine sediments include shelly limestone, clay and sand (Santos 1981).

3.10.3 Flora and Fauna

The Spencer Gulf contains four major habitat zones. These are:

- The costal fringe of mangroves or shingle beach in the intertidal zone;
- The shallow sub-tidal seagrass meadows;
- The deep water seafloor; and
- The overlaying water column (Santos 1981).

Flora

The intertidal zone is dominated by samphire vegetation (Halosarcia and Sarcocornia species). This generally merges into the southern mangrove Avicennia marina community which occupies the intertidal mudflats in the more sheltered parts of the gulf.

The sub-tidal shallows are generally covered by dense stands of seagrasses (progressing with increased water depth), comprising Zostera micronata (0 - 0.4m), Posidonia australis (0.2 - 6m), Posidonia sinuosa (3 - 10m), Amphibolis antarctica (0.8 - 7.2 m) and Heterozostera tasmanica (7 - 10m) (Santos 1981).

Fauna

The rocky intertidal zone is inhabited mainly by gastropods (snails), barnacles and crustaceans, while the sandy intertidal zone is inhabited by several species of gastropods, bivalves, annelids and crustaceans.

The rocky sub-tidal zone is colonised by a variety of red and brown algae, sponges, cnidarians, molluscs and echinoderms.

Three categories of fauna inhabit the seagrass meadows: those living in the sediment, those living on the sediment or seagrass and the free swimming species. The species living in the sediment include detrital-feeding organisms such as crustaceans, polychaete worms and molluscs. The species living on the sediment or seagrass include suspension-feeding organisms which ingest plankton and organic matter, such as bivalves and ascidians. A large variety of epiphytic algae and small invertebrates also inhabit the surface of the seagrass leaves. Juveniles of many species, including fish and prawns also shelter and feed in the shallow seagrass communities.

The deep water seafloor and areas beyond the seagrasses are dominated by filter-feeding benthic organisms including the razor shell (Pinna bicolour), the hammer oyster (Malleus meridianus) and a variety of sponges, ascidians and cnidarians.

The upper Spencer Gulf also supports a rich and diverse fish and crustacean biota including a wide variety commercial fishing species such as the Western King Prawn (Penaeus latisulcatus), Garfish (Hyporhamphus melanochir), King George Whiting (Sillaginodes punctatus), Snapper (Chrysophrys auratus), Silver Whiting (Sillago schomburgkii), Tommy Ruff (Arripis georgianus), Snook (Australuzza novaehollandiae), Blue Crab (Portunus pelagicus) Calamari (Sepioteuthis australis) and Australian Salmon (Arripis trutter esper).

Several species of Stingray, Sharks and the Bottle-nosed Dolphin (Tursiops truncates) also inhabit the Gulf (Santos 1981).

3.10.4 Land Use

The upper Spencer Gulf is primarily utilised for Commercial fishing and Commercial shipping. Recreational fishing and boating activities also occur in the region.

3.11 Cultural Heritage

The pipeline easements traverse a number of Native Title claimant and cultural heritage areas. It also passes by a number of European heritage sites.

In recent years a number of cultural heritage surveys have been undertaken at various locations on the easement as a component of infrastructure upgrades. A summary of the findings for the regions in which they have been undertaken is provided below.

Channel Country

No heritage places of value have been noted in archaeological surveys of this region in the vicinity of the pipeline easement, however a number of artefact sites have been located (ACS 2000). Restrictions apply to the movement of Epic Energy personnel off the access track on the ROW between KP1.5 and 18.2 as this area has been identified as being of archaeological significance and consequently may to contain archaeological material.

Dunefields

The Lake Frome environmental association (KP145 to KP164.5) has been assessed as being of moderate to high archaeological sensitivity due to the active dunes exposing and recovering Aboriginal cultural material. Two areas of particularly high sensitivity are located at KP145 to KP150.3 and KP161 to 163.6 (ACS 1999).

Stony Plains

The Pootkamaunta environmental association (KP198 to KP332) has been assessed as being of moderate archaeological sensitivity with archaeological sites occurring on most of the dunes and creek lines. One area of high archaeological sensitivity is the red linear sand dunes located between KP234 and KP302 (ACS 1999).

Eyre Yorke Block

The northern Adelaide Plains have been shown to contain a rich and varied archaeological record with stone artefact scatters, burials, scarred trees and earthen mound sites present in the general region. However the majority of sites are focussed around the coastal regions or along major watercourses. A number of sites have been located in the Bolivar – Parafield area and on the southern and eastern margins of the Port River estuary. The Port River estuary represents one of the most sensitive archaeological provinces in the region and contains a large number of sites. A number of campsites and burials have also been recorded within the dune systems on Torrens Island (Wood 2002).

European heritage sites present adjacent to the pipeline include the North Arm-St Kilda levee, Dry Creek Explosives Magazine Reserve (1903) and Torrens Island Quarantine Station (Wood 2002).

Western Pastoral

A number of Aboriginal archaeological sites have been found in the vicinity of the Port Bonython facility in the sand dunes to the west and north of Weeroona Bay. It is possible that there may be further sites within the coastal dunes of the region.

The historical Lowly Point Lighthouse and cottages (built in the 1880's) are also located near the Port Bonython facility (Santos 1981).

Spencer Gulf

A number of ship-wrecks are present in the upper Spencer Gulf including two vessels which were reportedly wrecked off Lowly Point in the late 1880's (Santos 1981).

3.12 Historical Land & Groundwater Contamination

As previously stated, the MAPS has been in operation since 1969. Epic Energy previously recognised that previous practices have caused some contamination. These practices included:

- The use of underground storage tanks (USTs);
- Contaminated discharges from triple interceptor trap systems and soakage pits; and
- Vents and bleedlines that discharged to ground.

Between 1995 and 1999, Epic Energy instigated an improvement program to minimise the risk of any further hydrocarbon contamination occurring and minimise the impact of any existing contamination. Activities included:

- Removal USTs and testing the surrounding soils for residual contamination;
- Installation of leakage monitoring systems where it was not possible or feasible to remove a UST (e.g. those attached to gas scrubber tanks);
- Establishment of landfarms to treat hydrocarbon contaminated soil (these are no longer in use - contaminated soil is now removed by licenced contractors);
- Installation of groundwater monitoring bores where there was the potential for contamination;
- Installation of groundwater remediation systems (where required) to remove hydrocarbon contamination;
- Relining triple interceptor pits and decommissioning soakage pits;
- Installation of oil containment systems including bunding in compressor buildings and mist eliminators on vents; and
- Implementation of a monitoring program to establish the extent of any contamination and monitor effectiveness of the management programs.

Since 1999 Epic Energy has continued to engage consultants to undertake groundwater and soil monitoring at compressor stations and meter stations. The aim of these investigations is to:

- Assess the status of soils, ground and bore water at the sites;
- Ensure that the integrity of USTs is maintained;
- Assess the potential risks to humans and the environment from any soil, ground or bore water contamination detected at the sites; and
- Determine the requirements, if any, for further investigations and/or remediation work if the risks were determined to be unacceptable.

This monitoring has found:

- That no leaks or discharges are apparent from USTs still in use;
- Previously identified areas of contamination have been remediated or undergoing natural attenuation; and
- While USTs remain in use, ongoing monitoring is required to ensure their integrity is maintained.

4 Potential Impacts & Mitigation Measures

This chapter describes the potential impacts to the environment as a result of pipeline operation and provides an outline of the impact mitigation strategies adopted by Epic Energy. Identification of potential impacts and mitigation strategies are based on environmental issues (e.g. soil, flora, heritage, etc.) rather than operational activity.

A summary of the potential impacts in terms operational activities is included in Appendix B.

4.1 Flora

4.1.1 Potential Impacts

Daily pipeline operation activities have little impact on native vegetation, however some maintenance activities have the potential to impact on flora. Impacts are short-term and generally restricted to existing easements that have previously been used for pipeline construction activities. These activities include:

Pipeline Excavations

Excavations are required to undertake inspection and repair of the pipeline or pipeline coating. It is estimated that up to 30 dig-ups occur per year (over 780km of pipeline), but this is highly dependent on the inspection and maintenance program. This number is dependent on planned activities for the year. Excavations are generally performed for pipeline repairs, coating refurbishment, installation of new anode beds and projects requiring new tie in facilities. Vegetation is removed from the immediate area of excavation, which may extend for 5-10m along the ROW and from storage and stockpile areas if required.

Vegetation Control

Vegetation on the pipeline easement is maintained in accordance with *Australian Standard 2885.3—2012, Pipelines—Gas and liquid petroleum, Operation and maintenance*, which stipulates that vegetation must be controlled to maintain visibility of signs, access and to prevent tree roots from damaging the pipeline coating. Vegetation is generally removed just above ground level with roots and ground covers left in place.

4.1.2 Mitigation Measures

Epic Energy subscribes to the Australian Pipeline Industry Association Code of Environmental Practice, which includes obligations regarding vegetation management. Epic Energy maintains low-level vegetation on the pipeline easement to provide ground stability, protection against erosion and habitat for fauna.

Epic Energy has developed a Vegetation Management Procedure to summarise requirements and provide clear and concise direction to field staff involved with vegetation management. Some management strategies that are implemented to minimise the impacts on flora include:

- Restricting operational activities to access tracks and the pipeline easement;
- Trimming vegetation rather than clearing;

- Where possible, avoiding the clearing of isolated trees, roadside tree belts and small isolated clumps of trees; and
- Where practical, removing vegetation without disturbing the soil to preserve root and seed-stock along the easement.

When required, excavations are undertaken in accordance with Epic Energy's Excavation Procedure, which includes land access, cultural heritage and environmental requirements. These requirements are documented in the 'Land Access & Environmental Checklist' which is completed for all excavations. Some specific vegetation management strategies included in the checklist include:

- Photo point monitoring before and after land disturbance;
- Keeping cleared vegetation, topsoil and subsoils stockpiled separately;
- Reinstating soil profiles post pipeline repair;
- Respreading cleared vegetation after backfilling in the immediate vicinity of its origin; and
- Re-contouring the land surface consistent with the surrounding area to ensure localised habitats/niches are maintained.

4.2 Fauna

4.2.1 Potential Impacts

The pipeline facilities cover a rich diversity of habitats in the northern and pastoral regions of the state.

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

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

The pipeline and facilities also traverse agricultural land used for the grazing of livestock, however the daily operation of the pipeline has little impact upon livestock.

Pipeline maintenance activities have the potential to result in the loss of foraging and breeding habitat. Impacts are short-term and restricted to existing easements that have previously been used for pipeline construction activities.

There is also the potential for entrapment of fauna at excavation sites, although the duration of excavation work is generally limited to 3 days (may be longer for complicated maintenance work).

4.2.2 Mitigation Measures

Impact mitigation measures to reduce the potential impact to fauna include:

- Restricting operational activities to the easement access tracks and the easement;
- Minimising time between clearing and rehabilitating the easement following excavations;
- Planning excavations to minimise the period of time that the trench is open;
- Liaising with landholders to determine appropriate livestock management during excavations;
- Provision of fauna escape means in open trenches and regular inspection of open trenches for trapped fauna; and

- Re-contouring the land surface consistent with the surrounding area to ensure localised habitats/niches are maintained.

4.3 Soils and Terrain

4.3.1 Potential Impacts

Operation and maintenance of the pipelines may result in the following potential adverse effects to soil and terrain:

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

The regions that are more susceptible to soil erosion are:

Region	Potential Impact
Dunefields	Sand dunes - prone to erosion through water and wind processes. Fine clays – easily dispersed through water and wind processes. Watercourses – prone to erosion and sedimentation during flood events.
Stony Plains	Watercourses – prone to water erosion and sedimentation following rainfall events. On-flow areas – prone to water erosion and sedimentation following rainfall events.
Flinders Lofty	Watercourses – prone to water erosion and sedimentation following rainfall events.

The potential for the movement of water (leading to tunnel erosion) along/within the trench of the MAP and associated lateral pipelines has been considered. However due to the nature of the soils (primarily clays and loams), the landforms through which the pipelines pass and the installation of trench breakers during the construction of the pipelines, it is unlikely that sufficient water movement would occur along the trench to cause a problem.

4.3.2 Mitigation Measures

Measures that are adopted by Epic Energy to reduce the risk and impact of soil erosion include:

- Minimising the area cleared during excavations, in particular minimising the disturbance of erodible soils;
- Minimising the time period between clearing and restoration;
- Promoting rapid restoration by conserving and re-spreading topsoil;
- Reinstating surface contours and natural drainage patterns;
- Reinstating watercourse banks as soon as practicable and applying bank stabilisation techniques as necessary;

- Restricting the use of heavy machinery to the minimum necessary to complete the task; and
- Restricting vehicle use in wet or boggy conditions.

Epic Energy have implemented various mitigation methods for preventing contamination to land resources including the following:

- Chemical and fuel storage facilities are bunded and in hardstand areas in accordance with applicable licence conditions and Australian Standards (e.g. AS1940: 2004 The storage and handling of flammable and combustible liquids). New bunds are designed in accordance with *EPA Guideline 080/12: Bunding and spill management*;
- Epic Energy has implemented a Hazardous Substances & Dangerous Goods Management Procedure to provide formal instruction on the protocols required for managing the storage and use of hazardous substances and dangerous goods in the workplace. The document provides a systematic method for identifying, assessing and controlling potential chemical and hydrocarbon related hazards in order to minimise the risk of adverse health and safety effects to persons, the environment or property;
- Epic Energy has a Spill Prevention & Response Procedure that describes the process and considerations that apply to the appropriate environmental management of fuel, oils, chemicals, and other hazardous liquids (pollutants) and the response to spills on Epic Energy's pipeline easements, access tracks and associated facilities. This procedure provides practical guidance to ensure that;
    - Pollutants are handled and stored in a manner that will reduce the likelihood of a spill occurring resulting in the escape of pollutants to the environment;
    - Epic Energy is prepared for a spill event and able to respond in a timely and appropriate manner;
    - Epic Energy can minimise the potentially serious environmental impacts of a spill event;
- Ensuring all vehicles are well maintained and that all servicing occurs at designated facilities;
- Epic Energy Waste Management Procedure describes appropriate waste disposal practices for all waste generated by Epic Energy including solid and putrescible waste, waste water, electronic waste and hazardous waste; and
- Workers are required to complete a Job Hazard Analysis (JHA) prior to the commencement of any task that has the potential to cause a significant adverse environmental impact to help personnel identify, analyse and manage the hazards that exist in the work they undertake. For each potential hazard identified, a method is agreed to be followed to prevent the hazard causing an injury, loss, damage or environmental incident.

4.4 Pests and Diseases

4.4.1 Potential Impacts

A variety of weed species are present along the pipeline. The type and distribution of weeds are related to land use and rainfall with some species thriving under grazing or cropping regimes. Generally weed species are fewer in number in the northern zones of the state were stocking rates and rainfall are low, however in the higher rainfall areas of the state where grazing and agriculture are more intensive and the natural vegetation is highly modified, weeds are common. The density and abundance of weeds on the easement is comparable to adjoining land and land use.

While most weeds have become endemic and can be spread by stock, animals and agricultural vehicles there are a number of weeds which can be spread by pipeline operations, and of particular concern is the weed African Rue.

In 2015 Buffel Grass was declared under the *NRM Act* and can be found on the pipeline easement having been widely dispersed in the past by landholders for cattle feed.

The movement of maintenance vehicles and equipment along the easement has the potential to result in the spread of weed species (African Rue, Buffel Grass etc.) through the transport of plant material on vehicles or soil.

4.4.2 Mitigation Measures

Measures that are adopted by Epic Energy to reduce the risk of pest and/or disease spread include:

- Identifying and clearly marking known infestations of weeds along the easement;
- Developing and implementing procedures to define access routes to the easement to avoid areas of known infestation;
- Remaining on existing road and established access tracks;
- Minimising the transportation of soil along the easement and prevention of soil transport out of areas of known weed infestation;
- Ensuring vehicles are soil and weed free before entering the pipeline easement;
- Maintaining facilities to be weed free; and
- Targeted weed management programs for declared weeds on the pipeline easement.

4.5 Water Resources

4.5.1 Potential Impacts

As described in Section 3, the MAP and associated laterals traverse a number of on shore water courses and surface water drainage areas. The majority of the watercourses crossed (i.e. those on the eastern side of the Flinders Ranges) are ephemeral and are only subject to flow following seasonal or heavy rainfall events. As a consequence these watercourses are naturally prone to erosion and sedimentation following rainfall events. Off shore water crossings are discussed in section 4.6 Marine Environments.

Pipeline watercourse crossings generally have minimal impact on the dynamics of a watercourse as the pipeline is buried at depth and the banks are battered on the vehicle crossing, reducing the erosivity of the banks and facilitating vehicle movement. The vehicle access crossings have been designed to have minimal impact on the direction and flow of surface water. This has been demonstrated following flow events as vehicle crossings often require repair to replace road base material removed by flood waters. No re-direction of watercourses due to the installation of access tracks has been observed along the ROW.

Daily pipeline operation activities that may have the potential to impact upon surface water resources include the movement of vehicles and the transport of materials along the ROW and temporary excavation activities.

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

- Reduced water quality associated with low level contamination; and
- Disturbance of surface water drainage patterns along creeks and floodplains.

It is considered that these impacts are minimal in terms of severity and duration, and can be appropriately managed through the implementation of the mitigation measures outlined below.

Due to the depth of the MAP and associated laterals it is unlikely that the pipeline operations will impact on ground water unless it is within 2m of the surface. The pipeline does pass through shallow groundwater in the coastal regions but the physical presence of the pipeline has had no observed impact

on these areas. The only pipeline operations likely to have a potential impact on groundwater are those involving the use of hydrocarbons or chemicals where there is the potential for an uncontrolled spill.

The potential for pipeline operations to impact on upon subsurface water (aquifers) has been considered. However it is considered that impacts to aquifers would be minimal due to the majority of the aquifers present, within the operational area, being confined to a depth of more than 2m or being unsuitable for use due to poor water quality.

4.5.2 Mitigation Measures

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

- Ensuring excavation activities (including stockpiles) do not unduly impede surface water flows;
- Conducting maintenance activities across drainage lines when dry, where practicable;
- Utilising sediment control measures;
- Reinstating surface contours as part of the rehabilitation process; and
- Reducing the level of activity during wet weather.

Epic Energy have implemented various mitigation methods for preventing contamination to water resources (also described in Section 4.3 Soil and Terrain). These include:

- Chemical and fuel storage facilities are bunded and in hardstand areas in accordance with applicable licence conditions and Australian Standards (e.g. AS1940: 2004 The storage and handling of flammable and combustible liquids). New bunds are designed in accordance with *EPA Guideline 080/12: Bunding and spill management*;
- Epic Energy has implemented a Hazardous Substances & Dangerous Goods Management Procedure to provide formal instruction on the protocols required for managing the storage and use of hazardous substances and dangerous goods in the workplace. The document provides a systematic method for identifying, assessing and controlling potential chemical and hydrocarbon related hazards in order to minimise the risk of adverse health and safety effects to persons, the environment or property;
- Epic Energy has a Spill Prevention & Response Procedure that describes the process and considerations that apply to the appropriate environmental management of fuel, oils, chemicals, and other hazardous liquids (pollutants) and the response to spills on Epic Energy's pipeline easements, access tracks and associated facilities. This procedure provides practical guidance to ensure that;
    - Pollutants are handled and stored in a manner that will reduce the likelihood of a spill occurring resulting in the escape of pollutants to the environment;
    - Epic Energy is prepared for a spill event and able to respond in a timely and appropriate manner;
    - Epic Energy can minimise the potentially serious environmental impacts of a spill event;
- Ensuring all vehicles are well maintained and that all servicing occurs at designated facilities;
- Epic Energy Waste Management Procedure describes appropriate waste disposal practices for all waste generated by Epic Energy including solid and putrescible waste, waste water, electronic waste and hazardous waste; and
- Workers are required to complete a Job Hazard Analysis (JHA) prior to the commencement of any task that has the potential to cause a significant adverse environmental impact to help personnel identify, analyse and manage the hazards that exist in the work they undertake. For each potential hazard identified, a method is agreed to be followed to prevent the hazard causing an injury, loss, damage or environmental incident.

4.6 Marine Environments

4.6.1 Potential Impacts

Maintenance activities undertaken in the marine environment which have the potential to cause an impact include visual inspection of the pipeline ROW and the undertaking of excavation or repair work. Visual inspection of the pipeline involves a diver inspecting the ROW. In the event that repairs are required on a marine section of pipeline, disturbance of the seabed and associated flora and fauna may be required to access the pipeline.

No impacts are expected to the marine environment, including vegetation and fauna, as a result of normal operation of the pipeline. The pipeline has been designed to minimise the need to disturb the line following construction, however disturbance is possible during the life of the pipeline. The impact of such disturbance would be temporary and restoration measures would be implemented to protect the ongoing integrity of the pipeline and surrounding environment. Reinstatement and re-vegetation of the sea floor would be undertaken where appropriate.

4.6.1 Mitigation Measures

Measures adopted to reduce the risk to the marine environment include:

- Managing all oils, chemicals and wastes in a manner that minimises the risk of spills to the environment and having in place appropriate contingency plans in the event of a spill;
- Regular monitoring of the pipeline integrity through visual inspections, intelligent pipeline instruments and or cathodic protection survey where appropriate;
- Utilising the appropriate equipment to undertake maintenance activities in a marine environment; and
- Obtaining regulatory approval prior to the undertaking of any significant work in a marine environment.

4.7 Land Use

4.7.1 Potential Impacts

Following construction of the pipeline, land use along the pipeline easement was able to resume (e.g. cropping, grazing, conservation, etc.) with the exception of unapproved excavation activities immediately above the pipeline. The operation of the pipeline has only a minor localised impact on land use. Localised impacts can be summarised as follows:

- Occasional short-term reduction in available pastoral grazing or cropping land during excavations;
- Occasional temporary cutting of fences to allow access during excavations;
- Use of access tracks on pastoral properties to access the existing private road maintained by Epic Energy;
- Restrictions on land use changes that have the potential to adversely impact on the safe operation of the pipeline such as the construction of building over the pipeline and planting of vegetation that could affect the pipeline coating or above ground line-of-sight.

The impact of minor spills on ‘chemical free’ or ‘organic’ properties has also been considered. While the potential for such incidents is considered low, mitigation measures are undertaken to avoid a breach of conditions associated with the property status. This would include restricting use of chemicals on

organic properties and removal of any waste or contamination in close liaison with the relevant landholder.

The impact of soil inversion on soil fertility has also been considered however procedures are in place concerning the stockpiling of vegetation, topsoil and fill during excavations and the return of the original soil profile during re-instatement activities. Impacts to conservation values are associated with the potential disturbance to flora, fauna or items of cultural heritage. These issues are dealt with sections 4.1, 4.2 and 4.10, respectively. Generally, as the impact will be contained to the existing, previously disturbed easement, it is expected that there will be minimal disturbance to existing land uses as a result of pipeline operations.

No impacts are expected to conservation areas or tourism.

No impacts are expected to the petroleum industry outside the assets and operations of Epic Energy.

4.7.2 Mitigation Measures

Measures implemented to mitigate impacts on land use include:

- Minimising the extent of disturbance to native vegetation/pastoral fodder/crops and restricting activities to the immediate easement as far as possible;
- Notification of landholders on 'chemical free' or 'organic' properties of any spills and obtaining permission prior to the use of chemicals on site;
- Planning activities to minimise the time between clearing of ground cover and rehabilitation;
- Reinstating all fences cut during maintenance activities, following rehabilitation of the easement and ensuring temporary arrangements are determined in consultation with the relevant property manager. Any damage to farm property infrastructure is to be rectified;
- Ensuring property gates are left as found and maintaining stock grids on the easement;
- Contacting National Parks South Australia regarding protection of conservation values in any of the National Parks prior to commencing work;
- Adherence to the Epic Energy Environmental Management System; and
- Annual communication with all landowners to ensure any potential impacts from pipeline operation and maintenance are appropriately managed.

4.8 Noise

4.8.1 Potential Impacts

Noise emissions associated with the operation of the pipeline include vehicle movement along the easement, the occasional operation of heavy equipment or machinery such as excavators, graders and bulldozers, the operation of compressor stations and mainline valves.

Heavy vehicles and machinery typically have a noise level of 90-95 dB(A) at distances of 10 m from the source. Helicopters undertaking pipeline inspections have noise levels of 90-92 dB(A) at 100 meters.

Compressor stations produce noise 24 hours a day. The compressor stations associated with the pipeline infrastructure are located in rural or industrial areas where noise levels are within acceptable limits of 35-40 dB(A).

Noise may also be generated as a result of venting gas during emergency situations. Depending on the nature of the situation, noise emissions could be remain for few minutes up to 1 or 2 hours. Whilst there

are no dwellings in close proximity to the mainline valves, there is some commercial and industrial activity. This type of emission would occur very rarely.

Minor noise emissions result from routine testing and inspection of relief valves (6 monthly), but the duration is generally limited to less than 30 seconds.

Noise associated with normal operation of mainline valves is generated during remote valve operation but these operations only occur on an occasional basis.

There are very few residential areas in the immediate vicinity of the pipeline. Theses residential areas are unlikely to be affected by noise associated with the operation of the pipeline. In the metropolitan region noise associated with the pipeline is comparable to background industrial noise levels.

There is no noise associated with normal operation of the gas pipeline.

4.8.2 Mitigation Measures

Equipment is maintained with standard noise suppression devices fitted. Compressor stations are designed to ensure that operational noise emissions are within prescribed EPA limits. It is considered that specific noise mitigation measures are not required.

Helicopters undertaking pipeline inspections comply with the 'Air Navigation (Aircraft Noise) Regulations 1984 Statutory Rules 1984 No. 188 as amended made under the *Air Navigation Act 1920*'. Aircraft are generally operated at 300' (approximately 90 m) above ground level, but no closer than 100 meters from buildings, homes etc.

Emergency situations are minimised through pipeline protection and maintenance activities. Refer to 4.11 below.

4.9 Emissions

4.9.1 Potential Impacts

The operation of compressors and gas engine alternators (GEAs) at compressor stations results in emissions of carbon dioxide and small amounts of methane and nitrous oxide.

Dust poses a threat to existing air quality. However, the impact of dust on air quality, vegetation (dusting), land use (visual impairment, 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.

No significant impacts are expected to occur to agricultural areas, pastoral areas, residences, native vegetation or water bodies.

Minor air emissions of nitrous oxides, sulphur oxides and carbon monoxide are associated with the exhausts of machinery and support vehicles. These are small and limited. Minor gas emissions also occur from mainline valves during remote valve operation and some minor emissions may occur from scraper stations during the loading and removal of 'pigs' and during routine inspection and testing of relief valves. Minor quantities of gas may also be discharged where it is necessary to remove sections of the pipeline or equipment for maintenance or repair. The pipeline has been designed to allow sections of the pipeline to be isolated to minimise the amount of gas discharged in these circumstances. The air quality and greenhouse gas impacts of these emissions will be insignificant.

Emissions may also be generated as a result of venting gas during emergency situations. Depending on the nature of the situation, gas could be emitted for few minutes up to 1 or 2 hours. This type of emission would occur very rarely.

4.9.2 Mitigation Measures

Compressors and GEAs are located at the remote compressor stations with no residents nearby. In 2014 Epic Energy implemented a new pipeline compression regime to minimise the use of compressors where possible, resulting in a significant reduction of CO2-e emissions.

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

Other air emissions will be mitigated by employing adequate pollution control measures on plant and equipment.

Emergency situations are minimised through pipeline protection and maintenance activities. Refer to 4.11 below.

4.10 Cultural Heritage

4.10.1 Potential Impacts

Potential impacts to cultural sites are likely to be minimal as nearly all operational activities are located within existing easements. However, potential impacts may occur as a result of excavation activities where they result in the accidental discovery of new materials.

The discovery of new sites or identification of cultural material is most likely to occur during excavation activities and may, especially in the northern regions of the state, yield sub-surface remains, including human remains.

The regions where accidental discovery of cultural heritage sites is more likely to occur are:

Region	Potential Impact
Dunefields	Sand dunes – active dunes are prone to exposing and recovering Aboriginal cultural material
Stony Plains	Dunes & creek lines – prone to archaeologically sensitive areas
Eyre Yorke Block	Coastal regions including dunes - prone to archaeologically sensitive areas
Western Pastoral	Coastal dunes - prone to archaeologically sensitive areas

4.10.2 Mitigation Measures

The principal keys to effective management of cultural heritage issues lie in awareness of heritage as a valid management issue, commitment to protection of cultural heritage and the adoption of clear, systematic and consistent management procedures.

The Aboriginal Cultural Heritage Management Procedure has been adopted to reduce potential impacts to sites of cultural significance and help ensure compliance with the *Aboriginal Heritage Act 1988*. These include:

- Completion of an archaeological survey to identify all significant areas prior to the commencement of excavation activities in previously undisturbed areas;
- Entry of all known sites into Epic Energy's GIS system;

- Implementation of a comprehensive induction program to ensure that all personnel are aware of cultural heritage obligations;
- Where an archaeological survey has identified cultural heritage site/s, a qualified archaeologist and Aboriginal Monitors are employed during excavation activities to ensure the site/s are protected; and
- When required, development of further management measures are adopted in consultation with community representatives.

4.11 Social and Economic Factors

High pressure natural gas transmission pipelines have made a significant contribution to social and economic prosperity in Australia. Since 1969 the MAPS has provided South Australia an extremely safe and reliable transportation service for customers in the electricity generation, gas distribution and industrial sectors.

Although pipelines are one of the safest forms of transporting fuel such as natural gas and liquid hydrocarbons, damage to a pipeline which causes the gas or liquid to escape can pose a public safety risk for those in close proximity to the pipeline.

Reliability of gas supply has become an expectation and Epic Energy is committed to ensuring all practical measures are taken to maintain the transmission pipelines. Any interruption to a transportation service has the potential to cause social and economic disruption to customers. In April 2015 an incident on the Port Pirie Lateral caused an interruption to gas supplies in the Port Pirie and Whyalla regions, affecting customers for one week. Epic Energy continues to invest heavily in pipeline integrity to prevent such occurrences. Refer to Mitigation Measures below.

Currently, there are over 10,000km of high-pressure natural gas transmission pipelines operating in south-eastern Australia. Pipelines are recognised as a safe and efficient means of transporting natural gas. Epic Energy's MAPS infrastructure poses a very low level of risk to public safety.

4.11.1 Potential Impacts

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

- Earthquake;
- 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.

Epic Energy has completed a Safety Management Study (SMS) of the MAPS and Beverley Lateral in accordance with the requirements of AS2885. The SMS is reviewed on a 5 yearly basis or as required with changed land use. It is used to verify appropriate control measures are implemented to ensure that the risks associated with the operation of the pipeline were reduced to As Low As Reasonably Practical.

The SMS identified that the greatest threats to the integrity of the pipeline were associated with:

- Third Party or External Interference to the pipeline; and
- Pipeline Corrosion.

All other threats were identified as low or negligible.

4.11.2 Mitigation Measures

Pipeline Design and Redundancy

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

The MAPS and Beverley Lateral are operated in accordance with the *Australian Standard 2885.3—2012, Pipelines—Gas and liquid petroleum, Operation and maintenance.* This Australian Standard describes the minimum standards for the operation and maintenance of pipelines, and requires Pipeline Licence holders 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.

Redundancy has also been built into the design of the pipeline system that can help to lessen the social and economic impacts of an interruption to supply. An outage on a lateral pipeline will cause interruption to customers in that regional centre for up to one week. However, an outage on the MAP is less likely to cause significant interruptions as this pipeline is bidirectional, with gas flowing both north and south.

Pipeline Integrity Management

Epic has a Pipeline Integrity Management Plan to ensure continued pipeline integrity during the life of the pipeline. The plan describes the monitoring, inspection and mitigation of the identified integrity threats, and includes the following:

- Pipeline structural integrity, including the technical aspects of maintaining pipelines;
- Anomaly assessment and defect repair;
- External interference threats to the pipeline;
- Operating condition changes and remaining life review; and
- Stations operations and maintenance.

External Interference Management

With over 1,250 km of gas pipelines under operation across South Australia, Epic recognises the importance of ensuring people who live or work near the company's gas transmission pipelines are aware of those pipelines and their operation.

Epic aims to maintain a high level of public safety through Community Awareness Programmes specially developed to promote awareness of the company's assets and operational requirements.

In order to ensure that all risks associated with the operation of the pipeline is reduced to As Low as Reasonable Practicable, control measures implemented by Epic Energy include:

- Vehicle and helicopter pipeline patrols to identify any unauthorised activity near the pipeline which may cause a danger to the buried facilities or pose a threat to third parties and the public;
- Operation of a 'One Call - Dial Before You Dig' service to provide third parties that are intending to work near the pipeline the location of pipeline assets, prior to the work activity;
- Control and supervision of approved activities near the pipeline;
- Annual Landowner Contact Program with all land owners and occupiers, providing pipeline safety information and discussing changes to land use;
- Community Pipeline Awareness Program involving presentations to local contractors, emergency service providers and utilities in areas along the pipeline route to educate personnel on the nature of the pipeline, contents, correct work procedures for the easement and emergency procedures;
- Pipeline danger signs along the pipeline route;
- Buried tape markers above the pipeline in areas of increased risk from excavation e.g. road crossings; and
- Pipeline awareness advertising in industry publication.

Pipeline Monitoring

In addition, Epic Energy has in place a range of advanced monitoring and control techniques to ensure the safety and security of the pipeline and facilities. These measures include:

- A 24 hour pipeline control centre incorporating state-of-the art monitoring and control systems that continuously receive and analyse pipeline operating reports;
- Fire and gas leak detectors; and
- 'Intelligent pigging' operations, in which detection equipment travels inside the pipeline checking for abnormalities and corrosion.

A corrective action program is developed and implemented for identified risks that are not considered to be ALARP. Implementation of such programs is monitored by the Department of State Development.

Emergency Response

It is a key objective of Epic to maintain, review and enhance crisis and emergency management procedures to ensure the company can implement those procedures efficiently and effectively whilst minimising impacts on the environment.

Epic is committed to ensuring open and pro-active communication on pipeline safety issues with local communities in which Epic operates. Regular briefings are held with emergency services personnel and testing of crisis and emergency procedures up to four times per year.

The Epic Energy Incident Management Process is made up of the following parts that are enacted in an emergency situation:

- Incident Management Plan (E-00-000-CMP-G-001) to provide guidelines to manage a crisis and determine the objectives for recovery from a crisis situation;

- Emergency Response Manual Part 1, Pipeline Control Procedures for Immediate Response and Support (E-00-000-ERM-G-001); and
- Emergency Response Manual Part 2, In the Field Procedures for Immediate Response and Support (E-00-000-ERM-G-002).

5 Consultation

5.1 Consultation Specific to the EIR & SEO

During the initial preparation of the draft PL1 EIR and SEO, Epic Energy initiated consultation with various stakeholders and interested groups that may have an interest in the operation of the pipeline. The following section summarises the consultation undertaken with State and Local Government, landholders and/or occupiers and Aboriginal Organisations.

5.1.1 Stakeholder Mailout

Key stakeholders associated with the operation of the MAPS were contacted by Epic Energy. They were informed that Epic Energy was in the process of developing the EIR and SEO and invited to identify any issues that they may have in relation to the operation of the pipeline. A summary of the stakeholders contacted is provided inTable 5-1.

Table 5-1 Stakeholders Contacted

Group	Stakeholder
Landholders / Occupiers	As listed in Epic Energy's Landholder Management Database
Local Councils	City of Playford Corporation of the City of Salisbury District Council Of Mallala Light Regional Council Regional Council of Goyder City of Port Adelaide Enfield District Council Of Clare & Gilbert Valley District Council Of Peterborough Wakefield Regional Council
Government Agencies	SA Water Corporation Transport SA Australian Rail Track Corporation Ltd Adelaide Plains Animal and Plant Control Board Eastern Eyre Animal and Plant Control Board Grant Animal and Plant Control Board Lower Flinders Animal and Plant Control Board Lower North Animal and Plant Control Board Northern Animal and Plant Control Board Salisbury Animal and Plant Control Board Upper North Animal and Plant Control Board
Aboriginal Groups	Nukuna Peoples Council Inc Flinders Ranges Aboriginal Heritage Consultative Group Ngaduri Walpa Juri Lands and Heritage Association Kaurna Aboriginal Community Heritage Association Kaurna Elders Council Inc

Group	Stakeholder
	Kaurna Meyunna Inc North East Aboriginal Corporation Biringa Incorporated
Soil Control Boards	Central Flinders Ranges SCB Gawler Ranges SCB Hummocks SCB Lower North SCB Marree SCB Mt Remarkable SCB North East Pastoral SCB Northern Flinders Ranges SCB Northern Hills SCB West Broughton SCB

A summary of the feedback received is provided in Appendix E – Stakeholder Response. All of the issues raised have been taken into consideration and addressed in the preparation of the EIR and SEO.

5.1.2 Government Workshop

On 1st November 2002, Epic Energy held a workshop that was attended by representatives from:

- Primary Industry and Resources SA (PIRSA);
- Department of Environment and Heritage (DEH);
- Department of Water Land and Biodiversity Conservation (DWLBC); and
- Planning SA.

The purpose of the workshop was to provide the government representatives and stakeholders with information regarding:

- The operation of the pipeline;
- The key areas that Epic Energy had identified where there may be an environmental impact;
- Epic Energy's Environmental Management System; and
- Epic Energy's proposed environmental objectives for the operation of the pipelines.

The workshop also allowed representatives to identify any additional issues that they considered should be addressed in the preparation of the EIR and SEO.

A copy of the Meeting Record is provided in Appendix F. All of the issues raised have been taken into consideration and addressed in the preparation of the EIR and SEO.

Epic Energy held a second Government consultation workshop on 12th March 2003, which was attended by representatives from PIRSA, DEH and DWLBC.

The purpose of the workshop was to present the outcomes of the consultation process undertaken by Epic Energy, demonstrate how feedback from stakeholders had been addressed in the EIR and SEO and obtain comments on the final draft of the Environmental Objectives.

As a result of the workshop, minor changes were made to the Statement of Environmental Objectives before it was finalised.

5.1.3 PIRSA Website Information

As an outcome of the Government Workshop, additional consultation material was prepared and placed upon PIRSA's website (now DSD). All government representatives that were unable to attend the workshop were notified that the material was available for review on the website. In addition, all letters sent to stakeholders after the 1 November 2002, included information regarding the website and access.

5.2 Consultation Specific to the Beverley Uranium Mine

The consultation process during the development of the environmental impact assessment (EIA) for the Beverley Uranium Mine was extensive. The EIA process was conducted jointly by the State and Commonwealth Governments, and was led by the EIA Branch of Planning SA. In making its assessment, the EIA Branch coordinated input from a wide range of technical expertise within the State Government, drew on information and expertise from a number of Commonwealth agencies and independent consultants, and sought input from all interested parties, including members of the public, in a comprehensive consultation process. High-level input ranged across many disciplines including:

- Hydrogeology;
- Aboriginal and European heritage;
- Mining engineering;
- Social science;
- Environmental protection;
- Mine rehabilitation;
- Radiation protection;
- Biology — flora and fauna;
- Air quality;
- Economics; and
- Hydrogeochemistry.

Heathgate continues its community engagement through formal meetings with state regulators on a quarterly basis and with combined state and commonwealth regulators twice a year, together with many informal meetings. Informal meetings are held with local stakeholders in addition to the Adnyamathanha people, notably neighbouring pastoralists and the nearby Arkaroola Wilderness Sanctuary.

The route of the Beverley Lateral was subject to archaeological and anthropological surveys and cleared by native title claimants. Heathgate also meets funding and employment targets for the Adnyamathanha people.

5.3 Existing Consultation Program

5.3.1 Landholder Contact

Epic Energy maintains a Landowner Contact Program for the MAPS and Beverley Lateral, visiting each owner or occupier along the pipeline system annually. Other contacts made by Field Maintenance Officers and Superintendents during the course of daily business, or other land related issues that arise occasionally are recorded in the Land Management System (LMS).

Landholder contact and management is supported by dedicated LMS software (X-Info Connect) that provides a powerful data base of Epic Energy facilities and landowner and property details. All property details and notes relating to discussions or issues with property owners are recorded in the LMS.

Through the LMS's mapping facility, aerial imagery and cadastral boundaries of each property relative to the pipeline route can be displayed.

If personal contact cannot be made during a visit (e.g. unattended premises), the occupier or owner is telephoned or mailed a letter explaining the reason for the visit, the contact officer's business card, an information brochure on pipeline safety and the 'Dial Before You Dig' contact phone number. Each year property owners receive the Epic Energy's pipeline safety brochure and other pipeline awareness material, such as a note pad, pen and a calendar, all of which strongly reinforce safe working practices near high-pressure gas lines.

A file is maintained for each of the 1500 land parcels crossed by pipelines. Each property is flagged with the Land Titles Office who informs Epic Energy of any changes in ownership or land tenure details, ensuring that Epic Energy's records are always up to date for pipeline awareness mail outs and personal visits.

5.4 Pipeline Location Service

Epic Energy provides a free service to locate pipelines for which they are responsible. This service is primarily used by other companies carrying out civil works in the vicinity of pipelines administered by Epic Energy.

The majority of the pipeline locations requested were as a result of the 'Dial Before You Dig' system, and required Epic Energy supervision for third party activity within the pipeline easement, mainly for the replacement or installation of new fences and vehicles working within the easement boundaries.

All authorised activities within the pipeline easement are supervised by Epic Energy field officers to ensure the safety and integrity of the pipeline.

5.5 Community Awareness

Epic Energy implements a Community Awareness Program, which entails holding awareness meetings with communities along the pipeline route.

Meetings are held regularly with key stakeholders such as the CFS, MFS, Police, Ambulance, SES, Local Councils, earth moving contractors, irrigation installation contractors, fencing contractors and various community members invited to attend.

The focus of awareness presentation are on the specific nature and characteristics of the natural gas carried by the MAPS, the route of the pipeline system, basic information about the pipeline and its monitoring, control, restrictions for working near a pipeline and emergency procedures.

6 Conclusion

High pressure gas pipelines are a vital component in the gas supply chain, transporting natural gas from the producing regions to the demand centres of cities and industry, thus helping to deliver social and economic prosperity in a very safe, reliable and efficient manner. There are currently over 25,000 km of gas transmission pipelines performing this task in Australia.

The MAPS has been in operation since 1969 without any significant injury or damage to property. However in April 2015 a rupture on the Port Pirie Lateral affected continuity of gas supply to the Port Pirie and Whyalla regions, with a regrettable one week interruption. Epic Energy is committed to preventing such occurrences and continues to invest heavily in pipeline integrity measures.

The impacts from typical operations to landholders, the environment and stakeholders are short-term and minor, however any major incident resulting in interruption to gas supply can cause considerable inconvenience to gas users and is very regrettable. No significant long term adverse impacts have arisen or are expected to arise from the operation, maintenance or decommissioning of the MAPS and Beverley Lateral. The following key issues require ongoing attention to ensure any impacts to the public, landholders, the environment and stakeholders are minimised:

- Avoiding disturbance to 3rd party infrastructure, landholders or landuse;
- Prevention of soil erosion and inversion;
- Maintenance of vegetation cover;
- Prevention of weed and disease introduction and spread;
- Prevention of water and land contamination;
- Safeguarding public safety;
- Minimisation of noise due to operations;
- Pipeline integrity and external interference management to provide security of gas supply;
- To minimise atmospheric emissions; and
- Protection of cultural heritage sites and values.

The Australian high pressure gas pipeline industry has an excellent record in safety and environmental performance and has worked with government to develop industry standards that lead the world. Epic Energy and Heathgate Resources are committed to working closely with all relevant authorities and landholders and monitoring our activities to ensure that all potential impacts are minimised.

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Appendix A

Epic Energy Environmental & Land Access Policy

Commitment:

Epic Energy South Australia Pty Ltd shall act responsibly and proactively to identify and manage our environmental and social impacts. In keeping with 'OUR EPIC' values, Epic Energy has established and implemented effective management processes that shall be regularly evaluated and continually improved, in the ongoing pursuit of reliability and excellence.

Policy:

To achieve our commitment, we will:

- Act in accordance with 'OUR EPIC' values and take responsibility for managing environmental and social impacts by complying with our established Environmental Management System.
- Identify and manage environmental and social aspects and impacts utilising our enterprise wide risk management systems;
- Comply with, as a minimum all relevant legislation and industry standards;
- Implement a program for setting and reviewing measurable environmental and land access objectives;
- Ensure that we have the appropriate resources, skills and training with roles and responsibilities defined and understood;
- Communicate issues and promote worker involvement and consultation in developing and maintaining environmental management and land access systems;
- Integrate environmental management and respect for landholders into the training and responsibilities of all workers;
- Where practicable, apply sustainable solutions to manage the impact of our activities on the environment, landholders and the community;
- Endeavour to prevent pollution and develop opportunities for recycling and more efficient use of energy, water and other resources;
- Openly and transparently communicate and report on environmental, social and land access issues and performance to interested parties;
- Monitor and continually improve our environmental and land access performance through regular process review and adjusting our practices as required.

Approved by:

Clive D'Cruz – Chief Executive Officer

Date Approved: **23rd February 2016**

Appendix B

Potential Environmental Impact from Operational Activities

POTENTIAL IMPACTS FROM OPERATION OF PL1 and PL12 – EASEMENT MAINTENANCE

ACTIVITY DESCRIPTION				PRIMARY IMPACTS & EIR REFERENCE *							
ACTIVITY	**WHAT IS DONE**	**SIZE**	**FREQUENCY / DURATION**	**VEGETATION & FAUNA (Section 4.1, 4.2 & 4.4)**	**SOIL (Section 4.3 & 4.11)**	**WATER (Section 4.5& 4.6)**	**DRAINAGE (Section 4.5)**	**LANDHOLDERS / LANDUSE (Section 4.7)**	**EMISSIONS (Air & Noise) (Section 4.8 & 4.9)**	**CULTURAL HERITAGE (Section 4.10)**	**SOCIAL & ECONOMIC FACTORS (Section 4.11)**
1. Weed Control	Localised spraying of African Rue is conducted along the easement between CS6 and CS5. Weed control in completed as required in other areas. Buffel grass is manually removed or sport sprayed.	Control for African Rue occurs on the ROW, between CS6 and CS5. Buffel grass occurs at various locations between CS5 and CS3	Control of weeds occurs annually over period of 1-2 weeks. Other control occurs as required including limiting access to weed infested areas.	Death of target weed species. Weed species of concern is targeted. Minor temporary impact to non-target species may occur within the immediate vicinity.	None	None	None	None	Minor air and noise emissions from vehicles, limited to the immediate vicinity of the activity.	None	None
2. Line-of-Sight	Removal of trees greater than 1m tall and within 2m of the centreline of the pipeline is carried out to ensure line-of-sight is maintained. Trees usually cut at ground level and roots left in place. In some cases, trimming of branches is sufficient. This is necessary to enable pipeline marker signs to be clearly identified along the ROW.	Line of site control occurs over the entire length of ROW, 2m either side of centreline. However the majority of vegetation control occurs between CS3 and CS5 (approx. KP 260-450) where vegetation habit warrants removal.	Experience shows line-of-sight operations are required every 5+ years, depending upon rainfall events.	Permanent removal of trees greater than 2m tall and within 2m of the pipeline centreline. Where possible, trees are trimmed rather than removed. Undergrowth is allowed to revegetate across the ROW. Majority of vegetation control occurs between CS3 and CS5 (approx. KP 260-450) where vegetation habitat warrants removal. Vegetation removed is abundant in the areas adjacent the easement and therefore fauna habitat loss is minor. Fauna will only be temporarily disturbed while the activity is occurring.	None	None	None	Short term access to land required which may cause minor temporary impact to landholders and land use within the immediate area of the activity.	Minor air and noise emissions from vehicles. Noise also associated with machinery used to clear vegetation (dozer, saws). Impacts are minor and temporary and occur for the duration of the activity only.	None	Only an issue if carried out where there is a public access or near public places. Majority of work is undertaken in remote areas.
3. Patrolling / inspections - easement access	Traveling along ROW, on formed tracks (either purpose built for pipeline or private/public roads) or over cleared paddocks. Involves access to private property and use of private tracks.	Entire length of ROW (excluding marine sections).	Properties south of CS6 are generally not traversed on – access via public roads. North of CS6 access is via the ROW during general easement inspections. Easement inspections can be carried out on a daily to monthly basis. Frequency is increased where a particular issue exists on a property that may require maintenance / monitoring.	Patrolling has the potential to spread of weeds/diseases. Epic has implemented a range of control measures to ensure that this risk is minimised (refer Section 4.4) Patrolling has the potential for occasional road kill (stock or native animals), although this rarely occurs.	Soil compaction is not considered an issue as formed tracks are generally used. Access to pipeline only occurs over cleared paddocks when access to a particular pipeline section is required (e.g. for maintenance) and not on a continuous basis.	None	None	Temporary disturbance while Epic personnel traverse properties.	Temporary minor impacts from dust generation, vehicle emissions and noise. These are limited to the immediate are of the activity.	None	Access and patrolling the easement does not impact on public safety. Epic uses public roads from CS6 South (approx. KP 550- 780) but these vehicles create no greater risk than other vehicles on the roads.
4. Aerial inspection of easement	Aerial inspections.	Entire length of ROW.	Aerial inspections carried out monthly and take 1/2 day to complete.	None	None	None	None	Potential for temporary disturbance of stock. Aircraft travels at a safe distance to prevent significant disturbance.	Temporary and minor noise disturbance from passing aircraft, up to 92 dB(A) at 100 m.	None	None
5. Inspection of marine sections of easement	Use of boat and divers to visually inspect sections of pipeline in marine zones.	Marine sections of ROW (sections of Whyalla & Pt Bonython laterals, Wasleys loop).	Marine inspections are carried out annually. Inspections of all marine sections takes a total of 1 week.	None	None	None	None	None	Minor noise emissions associated with vehicles.	None	None
6. Easement Maintenance	ROW access tracks require maintenance, i.e. grading, re-sheeting, to allow on-going use by vehicles and to prevent major damage to road infrastructure.	Applies to ROW North of CS6 (approx. 550km). Public roads are used to access the easement south of CS6).	Maintenance occurs on an ongoing basis, depending on track condition, weather condition and track use.	None	Impact from excavation of borrow pits. Refer to Activity # 12 Excavations.	None	Access tracks have been in place for over 35 years. Construction of the access tracks may have caused minor disturbance to surface drainage. All easement maintenance work is conducted to ensure that the new drainage patterns are maintained (i.e. no further impact to drainage occurs).	Temporary disturbance while maintenance work is completed. As tracks tend to be located away from residences etc., this is considered minor.	Temporary minor impacts from dust generation, vehicle emissions and noise. These are limited to the immediate are of the activity.	Potential for impact on unknown cultural heritage sites from excavation of burrow pits. Refer to Section 4.10.	Refer to Activity # 3 Patrolling.

* Refer to relevant section of the EIR for control measures applied by Epic Energy to minimise the risk of adverse impacts.

POTENTIAL IMPACTS FROM OPERATION OF PL1 and PL12 – PIPELINE OPERATIONS

ACTIVITY DESCRIPTION				PRIMARY IMPACTS & EIR REFERENCE *							
ACTIVITY	**WHAT IS DONE**	**SIZE**	**FREQUENCY / DURATION**	**VEGETATION & FAUNA (Section 4.1, 4.2 & 4.4)**	**SOIL (Section 4.3 & 4.11)**	**WATER (Section 4.5& 4.6)**	**DRAINAGE (Section 4.5)**	**LANDHOLDERS / LANDUSE (Section 4.7)**	**EMISSIONS (Air & Noise) (Section 4.8 & 4.9)**	**CULTURAL HERITAGE (Section 4.10)**	**SOCIAL & ECONOMIC FACTORS (Section 4.11)**
7. Cathodic Protection Surveys	Traveling ROW, stopping to inspect CP points (above-ground post) on foot. May involve repairs - see activity #12 Excavations	Cathodic Protection inspection posts are located approximately every 1.5km along the entire length of ROW, usually on fence lines to reduce impact to land use.	Conducted every 2 months, over a 3 week period	As per Activity # 3 Patrolling	As per Activity # 3 Patrolling.	None	None	As per Activity # 3 Patrolling	As per Activity # 3 Patrolling	None	As per Activity # 3 Patrolling
8. Testing and Inspection of Relief Valves	Involves the controlled venting of minimal quantities of gas to atmosphere	Relief valves are located at every Compressor Station and at each Meter Station	Relief valves are tested on a 6 monthly basis. Air and noise emissions are limited to the duration of the test, which is generally limited to 30 seconds.	None	None	None	None	None	Minor volume of methane gas emitted when each valve is tested. Discharge of gas also results in noise generation, although the duration is generally limited to less than 30 seconds. All impacts are considered to be minor and temporary. Refer also to Activity #10 Emissions.	None	None
9 Erosion events - washouts - loss of cover	Following major rainfall events creek lines or runoff areas on ROW can experience significant soil erosion resulting in a significant reduction in cover over the pipeline or exposure of the pipeline. Repairs effected immediately following erosion event and include the replacement of similar materials and re-profiling. In some creek lines permanent repairs such as gabions are used to prevent further erosion and/or re-exposure of the pipeline.	Usually affects sections of ROW within the banks of a creek or drainage line i.e. 10- 20m length of pipeline.	Erosion events are seasonal and dependent on major rainfall events. Erosion most frequently observed on the ROW between CS7 and CS3 (approx KP 260- 640) where climate and terrain result in ephemeral drainage lines (refer to section 4.3).	Potential impact to vegetation may occur in association with alteration of drainage patterns. As stated, this risk is minimised through effective detection and repair.	Erosion events result in the loss of topsoil and exposure of subsoil in the impacted area. Epic undertakes field inspections following significant rainfall events to ensure that erosion events are detected and repaired, to ensure that any damage is restricted to the immediate area. Tunnel erosion is considered unlikely. Refer to Section 4.3 for additional information.	Erosion events have the potential to increase sediment load of adjacent watercourses. However, as the majority of erosion events result from heavy rainfall events, the erosion tends to occur as a result of soil type. The additional sediment load from the pipeline is not considered to be significant.	Erosion events have the potential to alter drainage patterns in the area of the event. As stated previously, repairs are effected immediately and drainage patterns restored to minimise this risk.	None	None	Erosion events tend to occur on the easement and therefore unlikely to impact on known cultural heritage sites (these are located off the easement). Erosion events may uncovered previously unidentified cultural material. Refer to Section 4.10 for additional information.	None
10. Emissions	Methane gas is released to atmosphere as a result of pipeline and facility maintenance operations (i.e. Unit blow downs / venting, valve opening / testing).	23.320Tj of gas released per year during unit blow downs. 2.1Tj of gas released per year during compressor station Emergency Shutdowns (ESD's)	Occurs for the duration of operational life 1166 unit blow downs per year. 7 station ESD's per year	None	None	None	None	None	Controlled release of 23.320Tj of gas per year during unit blow downs and 2.1Tj of gas per year during station ESD's. Minor noise associated with venting/release of gas.	None	None
11. Pipeline Incident	The main threats to public safety from the operation and maintenance are fire, explosion or radiation exposure as a result of pipeline rupture. Epic has completed a Safety Management Study (SMS) of the MAPS and determined that the greatest threats are associated with third party or external interference to the pipeline and pipeline corrosion. The SMS is to also ensure that the risk associated with the operation of the pipeline (e.g. risk of a pipeline incident occurring) are reduced to As Low As Reasonably Practical (ALARP). Refer to 4.11	A pipeline rupture could affect an area up to the size of the pipeline measurement length from the point of rupture. This varies depending on the pipeline size and pressure. The measurement length on the MAP is 300m.	One pipeline rupture since 1969.	The actual impact of a potential pipeline incident would be dependent on the nature and scale of the incident. In addition to the potential to create a public safety risk, incidents have the potential to disturb and destroy vegetation, disturb wildlife, cause soil disturbance and erosion and result in significant air and noise emissions. Epic Energy has procedures in place to ensure that once the emergency situation has ceased and access to the area is available, remediation measures would be put in place to restore the area.					Noise may also be generated as a result of venting gas at mainline valves during emergency situations. Depending on the nature of the pipeline fault, noise emissions could be remain for few minutes up to 1 or 2 hours. Whilst there are no dwellings in close proximity to the mainline valves, there is some commercial and industrial activity. This type of emission would occur very rarely. Air emissions may also be generated as a result of venting or uncontrolled gas release. Main line valves limit the volume of gas released.	Dependent on location of incident. Cultural heritage could be impacted during emergency response.	Dependent on location. Potential to create public safety risk. An incident on a lateral pipeline could cause interruption to supply for one week.

* Refer to relevant section of the EIR for control measures applied by Epic Energy to minimise the risk of adverse impacts.

POTENTIAL IMPACTS FROM OPERATION OF PL1 and PL12 – PIPELINE MAINTENANCE

ACTIVITY DESCRIPTION				PRIMARY IMPACTS & EIR REFERENCE *							
ACTIVITY	**WHAT IS DONE**	**SIZE**	**FREQUENCY / DURATION**	**VEGETATION & FAUNA (Section 4.1, 4.2 & 4.4)**	**SOIL (Section 4.3 & 4.11)**	**WATER (Section 4.5& 4.6)**	**DRAINAGE (Section 4.5)**	**LANDHOLDERS / LANDUSE (Section 4.7)**	**EMISSIONS (Air & Noise) (Section 4.8 & 4.9)**	**CULTURAL HERITAGE (Section 4.10)**	**SOCIAL & ECONOMIC FACTORS (Section 4.11)**
12. Excavations-coating refurbishment - installation of anode beds – emergency response exercises - new tie-ins	Vegetation is cleared. Topsoil is stockpiled. Excavation performed and spoil stockpiled. Pipeline maintenance performed (may include welding, painting, and sand blasting). Backfill of trench spoil. Topsoil replaced. Surface re-contoured. Rip compacted areas. Respread of vegetation. Seeding / planting if necessary.	Pipeline excavations typically 4 metres wide by 5 metres long and 2 metres deep, located entirely on the easement. In extreme cases, excavations can be 50m metres long.	Excavations typically up to 30 times per year at various locations (operations dependent). Typically maximum of 2 weeks. Vegetation rehabilitation is dependent on seasonal conditions.	Excavations generally occur within the easement and therefore areas that have been previously disturbed. Vegetation clearance is limited to the area of excavation and 5-10m beyond for storage and stockpile areas. Cleared vegetation is respread as part of restoration. Area of disturbance is limited to that required for the safe conduct of the activity. Regrowth is ultimately dependent on seasonal conditions. In some cases, seed and fertiliser may be spread to assist regrowth. Fauna impacts are primarily associated with vegetation clearance and subsequent regrowth on the disturbed area. There is potential for fauna entrapment but this is rare, as fences are installed to prevent stock entrapment and ramps are placed in the pit to assist reptile/mammal escape. Refer to Section 4.1 & 4.2 for additional mitigation measures.	Topsoil and subsoil are disturbed by excavation. There is the potential for loss of topsoil and soil inversion. Impacts to soil are minimised through the implementation of management measures. Soils in the Dunefield, Stony Plains & Flinders Lofty Regions have soils that are more susceptible to erosion (refer to Section 4.3). Mitigation measures include: Separating topsoil and subsoil upon excavation and backfilling soil in the correct horizons.	No impacts for aquifers greater than 2 metres deep occur. Exception in tidal areas (e.g. Adelaide coastal and Whyalla lateral). For very near surface groundwater, an area of 4 by 5 by 2m is disturbed (i.e. volume less than 40 m3). Where required, surface water (creeks and watercourses) may be temporarily dammed and diverted for excavations (which would require a Water Affecting Activities (WAA) permit). No permanently flowing creeks are encountered on the ROW. Primary mitigation is avoiding such areas when wet. Some silt may be generated during temporary diversions however sediment traps are usually installed as part of standard management measures Excavations in the marine environment will only be undertaken following the development of a specialised management plan (similar to construction EMP) in consultation with regulators	Surface drainage patterns over the area of the excavation may be disturbed for the duration of excavation. These are restored as part of the restoration process.	Impacts to landuse are limited to the area of disturbance. In some instances fences are cut to allow temporary access. Any impacts to landholders and land use are generally restricted to the duration of the activity.	Minor air and noise emissions from vehicles. Noise also associated with machinery used for clearing and excavation. Impacts are minor and temporary and occur for the duration of the activity only.	No impact to known sites due to the implementation of effective management measures. There is potential for accidental discovery of previously unknown site (potential is higher in some zones). Epic has implemented detailed management measures to address accidental exposure/discovery. Refer to Section 4.10 for additional information.	Only an issue if carried out where there is public access or near public places. Majority of work is undertaken in relatively remote areas.
13. Hydrotest	Hydrotesting involves filling a section of pipe with water under pressure to test the integrity of the pipe. Sometimes an inhibitor is added to the water to prevent organisms colonising the pipe but this usually only happens on very long sections of pipe (e.g. 100km). Depending upon the location of the testing water is usually sourced locally from mains, dams, bores or trucked in. Water is discharged from the pipe onto a suitable area of ground away from water bodies. Sedimentation / erosion controls are used where required.	Hydrotesting is usually only occurs on new or repaired sections of pipe which can vary in length from 10m up to 100km.	Testing is carried out on an as – required basis. Recently testing has been undertaken approx. once every 2-5 years. Tests normally take between 4 and 24 hours to complete.	Nil or minimal – Ref Sect. 4.5.2	Impacts to soil are minimal as water is discharged onto a suitable area of ground (stable or stabilised before discharge) and erosion and sediment controls are used where there is the potential or sedimentation to occur. Refer section 4.3.	None – water is discharged onto solid ground away from waterways.	None	None	None	None	None
14. Pigging	Pipeline 'pig' placed in the pipe via a launch bay. Pig travels along inside pipe before being removed at a pig exit site. Removal of pig from pipeline results in minor venting of gas to atmosphere and collection of some oil sludge and debris.	Confined to existing facilities. 100km sections usually completed at a time.	Cleaning pigging undertaken annually or as required. Major intelligent pigging programs (to monitor pipeline integrity) conducted every 5-7years. Program takes 2 weeks per 100km section/run	None	Pigs are removed within a contained area, therefore contamination from debris and oily sludge is unlikely.	Where required, surface water (creeks and watercourses) may be temporarily dammed and diverted for excavations (which would require a WAA permit). No permanently flowing creeks are encountered on the ROW.	None	None	Minor controlled release of methane upon removal of the pig. Refer also to Activity #10 Emissions.	None	None
15. Welding	Welding usually required when undertaking repairs of pipeline or making modifications to existing infrastructure. Pipeline welding usually occurs following the excavation of the pipeline (refer Activity 12 Excavations).	Dependent upon length of pipeline under repair	Ongoing as required	The risk of bushfire as a result of welding is minimised through the implementation of strict management measures refer Section 4.12.2.	None	None	None	None	None	None	None
16. Painting	Epoxy painting (spray) of welds or repair areas of pipeline or above ground pipeline	Dependent upon length of pipeline under repair	Painting completed as required, activity duration is less than 2 hours.	None	Potential for minor contamination from overspray and cleaning agents	Potential for minor contamination from overspray and cleaning agents	None	None	Minor noise emissions associated with operation of paint compressor	None	None
17. Sand Blasting	High-pressure abrasive surface blasting of pipe work prior to painting. Undertaken for pipeline inspection or for pipeline coating systems	Area of exposed pipe	Sand blasting completed as required, activity duration is less than 2 hours.	None	Minor contamination from excess sand, the majority of which is usually captured within the trench.	Minor contamination from excess sand, the majority of which is usually captured within the trench.	None	None	Dust generation from blasting activity. Minor noise emissions associated with blasting. This is restricted to the duration of the activity.	None	None
18. Replacement of pipeline section	Section of pipeline is isolated and controlled release of gas undertaken from affected section. Affected area then excavated, old pipeline removed and replaced (includes welding, blasting, coating). Excavation then reinstated.	Generally less than 100m section of pipe excavated	Historically occurs once every 5 to 10 years. Activity usually lasts for approximately 2 weeks.	Refer to Activity #12 Excavations	Refer to Activity #12 Excavations	Refer to Activity #12 Excavations	Refer to Activity #12 Excavations	Refer to Activity #12 Excavations	Controlled release of methane to atmosphere occurs upon isolation of the pipeline section. Minor noise is associated with venting/release of gas. Impact is temporary only.	Refer to Activity #12 Excavations	Refer to Activity #12 Excavations

* Refer to relevant section of the EIR for control measures applied by Epic Energy to minimise the risk of adverse impacts.

POTENTIAL IMPACTS FROM OPERATION OF PL1 and PL12 – FACILITY OPERATION AND MAINTENANCE

ACTIVITY DESCRIPTION				PRIMARY IMPACTS & EIR REFERENCE *							
ACTIVITY	**WHAT IS DONE**	**SIZE**	**FREQUENCY / DURATION**	**VEGETATION & FAUNA (Section 4.1, 4.2 & 4.4)**	**SOIL (Section 4.3 & 4.11)**	**WATER (Section 4.5& 4.6)**	**DRAINAGE (Section 4.5)**	**LANDHOLDERS / LANDUSE (Section 4.7)**	**EMISSIONS (Air & Noise) (Section 4.8 & 4.9)**	**CULTURAL HERITAGE (Section 4.10)**	**SOCIAL & ECONOMIC FACTORS (Section 4.11)**
19. Compressor Stations - operation - maintenance/ venting	Compressor Stations (CS) push gas down the line and maintain the pressure in the pipe. Equipment at a CS includes compressors, control room, workshop, ancillary pipeline equipment, buildings, ablution facilities, accommodation block, generator and battery room, fuel and oil storage, chemical storage.	Existing compressor stations are located within compounds approx 150m by 100m. Accommodation facilities are located in separate compounds approx 100m by 50m.	Compressor Stations are generally operated 24 hours/day, 365 days/year for the duration of the pipeline operating life.	None	Refer Activities # 22-26	Refer Activities # 22-26	None	None	Minor exhaust emissions from generators occur continuously. Controlled release of methane during venting (occasional). Noise associated with continual operation (24 hrs/ day). Majority of compressor stations are located in rural or industrial areas where noise levels are within acceptable limits of 35-40dB(A).	None	Risk to public safety is considered As Low as Reasonable Practicable (ALARP). Refer to Section 4.11.
20. Main Line Valves	Main Line valves are used to isolate sections of pipeline. They are used for controlled pipeline activities & in the event of an emergency.	Located either within a CS compound or within a compound 4m by 4m. The valve is located within the pipe.	72 MLVs on PL1 are open continually except if isolations are required or in the event of an emergency. Operated every 6 months for testing or in emergency.	None	None	None	None	None	None	None	None
21. Meter Stations	Meter Stations measure gas flow and regulate and filter gas	Located in a compound with a control building, batteries, and oil collection facilities. Compound size ranges from 4m x 4m to 10m x 10m square.	Operated 24 hrs/day 365 days/yr.	None	Potential for contamination associated with failure of underground and overhead oil collection tanks for debris removed from product in pipe (CS dropout). Risk is minimised through monitoring and control measures (refer Section 4.3 and 4.11).	Potential for contamination associated with failure of underground and overhead oil collection tanks for debris removed from product in pipe (CS dropout). Risk is minimised through monitoring and control measures (refer Section 4.3 and 4.11).	None	None	Minor controlled release of methane for maintenance activities. Refer also Activity # 10 Emissions.	None	None
22. Weed Control	Spray pack used to spray weeds in and around compounds	Conducted within compounds at CS and MS	Weed control typically occurs twice per year for 1 week duration (additional control as required)	Death of target weed species. Weed species of concern is targeted. Minor temporary impact to non-target species may occur within the immediate vicinity.	None	None	None	None	Refer to Activity # 1 Weed Control.	None	None
23. Storage and Use of diesel and oils	Oils and lubricants stored for use in maintenance at CS Storage of clean oil & diesel fuel for use.	Oil stored = 5,400l at CS1-CS4. Tanks re-filled 3 to 4 times a year. Diesel stored in 1,200l tanks at CS1-CS4 and CS6. Tanks re-filled 3 times a year.	Materials stored for use for duration of pipeline operation	None	Potential for contamination associated with failure of oil/fuel storage tanks. Risk is minimised through the implementation of control measures (refer Section 4.3 and 4.11).	Potential for contamination associated with failure of oil/fuel storage tanks. Risk is minimised through the implementation of control measures (refer Section 4.3 and 4.11).	None	None	None	None	None
24. Production of Hazardous Waste	Meter Stations (MS) separators remove debris from line - includes hydrocarbons and compressor oil. Waste oil produced from CS operation Waste oil from maintenance & compressor unit (ex-pipeline/product) stored in oily water pit. Waste hydrocarbons generated from pigging operations (ex-pipeline/product). Mercury and other heavy metals extracted from product and trapped in filters. Contaminated filters from maintenance changeovers Contaminated waste and oils removed from site for disposal by a licensed contractor.	Amount of waste oil removed from CS each year totals 34,400l	Materials continually produced, stored and disposed during the operation of the pipeline.	None	Potential for contamination associated with failure of oil/fuel storage tanks. Risk is minimised through the implementation of control measures (refer Section 4.3 and 4.11).	Potential for contamination associated with failure of oil/fuel storage tanks. Risk is minimised through the implementation of control measures (refer Section 4.3 and 4.11).	None	None	None	None	None
25. Waste disposal - sewage - refuse	Sewage collected in septic systems Domestic waste collected on site and removed to licensed facilities	None	Materials produced, stored and disposed of for duration of pipeline operation Sewage disposal - continually. Refuse removed by licensed contractor on a weekly basis	None	Potential for contamination associated with overflow of sewage tanks	Potential for contamination associated with overflow of sewage tanks	None	None	None	None	None
26. Station blow downs	Uncontrolled venting as a result of equipment failure e.g. regulator failure at MS & compressor unit failure at CS	Refer to Activity #10 Emissions	Dependent upon type and duration of failure.	None	None	None	None	None	Release of gas to atmosphere. Noise associated with release of gas	None	Risk to public safety is considered As Low as Reasonable Practicable (ALARP). Refer to Section 4.11.

* Refer to relevant section of the EIR for control measures applied by Epic Energy to minimise the risk of adverse impacts

Appendix C

Disturbance Checklist

Disturbance Checklist

DESCRIPTION OF ACTIVITY		
Description:		
Pipeline:	**KP:**	**Other Ref:**
Project Manager/Supervisor:		
Crew/Contractor undertaking work:		
Commencement Date:	**Completion Date:**	

PLANNING		
Checklist	**Y/N**	**Comment/Details**
Landowner / affected parties contacted and informed of works? Name/s and date/s contact made (or attach list): _____ _____		Attached record of any agreement or file reference.
Are there any chemical restrictions on the property (i.e. Organic farming)?		
Has the GIS been consulted to determine if there are any known heritage sites or environmentally sensitive areas in the area of impact?		List any known sites / areas:
Will the site require examination for cultural heritage material prior to the commencement of work (for work involving significant off ROW disturbance)?		If yes, include date completed and reference to any reports:
Will the site require an ecological assessment (for work involving significant off ROW disturbance)?		If yes, include date completed and reference to any reports:
Name of person completing planning checklist:		
Position Title:		**Date:**

Note: Photo Monitoring

Environmental Photo Points should provide a comparison with adjacent land and a record of the following impacts:

- Pre-disturbance condition of area;
- Activities undertaken;
- Area of clearing (has it been minimised); and
- Post disturbance condition (erosion, contamination, litter, soil inversion, contours, 3rd party infrastructure).

Continue over page…

UNDERTAKING ACTIVITY			
Environmental Photo Point (pre disturbance)			
Location of photo point(s):	Photo Record No(s).		Date Taken:
Checklist	**Y/N**	**Comment**	
Did work involve opening a trench or significant excavation?		Date Trench Opened:	
		Date Trench Closed:	
Vegetation above 300 mm removed and stockpiled separately?			
Topsoil (including low level vegetation) removed and stockpiled separately?			
Overburden removed and stockpiled separately?			
Stockpiles been placed outside drainage lines?			
Is the open trench being monitored for fauna?		Raise incident report (or keep a record) for any trapped fauna. Report number:	
Is Hydro testing required? Consider any possible chemical restrictions on the property.		Record if chemicals added, relevant approvals sought, disposal location and method.	
Name of person completing checklist:			
Position Title:			**Date:**

SITE REMEDIATION			
Checklist	**Y/N**	**Comment/Details**	
Overburden and topsoil has been replaced in the correct profile?			
Site lightly ripped and contours have been returned to original / stable condition?			
Any cleared vegetation has been respread over site?			
Environmental Photo Point (post remediation)			
Location of photo point(s): *As above*	**Photo Record No(s).**		**Date Taken:**
Name of person completing checklist:			
Position/Title:			**Date:**

Appendix D

Stakeholder Feedback Form 2002

YOUR CONTACT DETAILS (OPTIONAL)				
Name:			**Contact Address:**	
Phone:				
Fax:			**Organisation & Position:** *(where relevant)*	
Email:				
Stakeholder Category:	Landholder/Occupier			Aboriginal Group	
	Government			Other	

KEY ENVIRONMENTAL ISSUES IDENTIFIED (Please add any additional issues/comments that you may have)	
Disturbance/Disruption to Landuse - Disruption to landuse over the pipeline - Disturbance to infrastructure (fences, gates etc) - Access to the pipeline - Use of private roads / tracks - Changes to landuse over the pipeline - Excavations	*Your Issues / Comments*
Flora and Fauna - Protection of sensitive vegetation and habitats - Maintenance of regrowth - Introduction and spread of pest species	*Your Issues / Comments*
Erosion / Runoff - Protection of drainage channels and watercourses - Erosion and sediment runoff - Maintenance of soil stability - Protection of topsoil	*Your Issues / Comments*
Emissions - Noise - Odour - Uncontrolled / unplanned gas emissions - Dust	*Your Issues / Comments*

Cultural Heritage - Protection of known heritage sites - Accidental discovery of previously unknown heritage sites - Protection of areas of cultural significance	*Your Issues / Comments*
Public Safety - Identification of the pipeline - Signage - Controlling external activities on the easement - Risk from third party activities - Protection of the public during normal operations and maintenance - Protection of the public during uncontrolled events	*Your Issues / Comments*
Other Issues *Please include any other issues that you would like to see addressed during the preparation of the Environmental Impact Report and Statement of Environmental Objectives for the Moomba to Adelaide Pipeline.*	

Once completed, please return in the reply paid envelope, or fax to 08 8357 0411.

Appendix E

Stakeholder Response 2002

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	NC	NC	NC	NC	NC	NC	Landholders have no problems and know where to contact Epic if and when they need to.
NP	NP	L	NC	NC	NC	NC	NC	NC	Has no issues with the pipeline operation.
NP	NP	L/O	No issues at present - landholder may want to plant vines on the property.	No issues	No issues	No issues	No issues	Signage is adequate on their land	NC
Transport SA	Manager, Statewide Operation -al Coordin- ation	G		TSA has developed a Weed Management Plan for TSA's Northern and Western Region - appreciate Epic advising Port Augusta Office of any instances where certain weeds (refer list) are identified, controlled, removed etc					Weeds of concern include Prosopis spp. (mesquite), Acacia farnesiana (Mimosa Bush), Parkinsonia aculeata (Parkinsonia), Parthenium hysterophorus (Parthenium weed) and Acacia nilotica (Prickly acacia).

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NA	NA	L/O	Gates have been left open and fences have been cut	NC	NC	NC	NC	Have been unauthorised people travelling through our property	Unauthorised people are gaining access via the easement, cutting locks and fences and leaving our gates open
NP	NP	L/O	No disruption to land after the initial pipe laying	No issues - no-one would know pipeline was there (except for signs)	No Issues	No Issues	No Issues	No issues - Signage is more than adequate	No concerns about pipeline going through the property. Appreciates that David Fotheringham calls regularly for a PR visit and comments that it is always good to catch-up on pipeline news.
Regional Council of Goyder	Manager, Environmental Services	LG	Fire prevention- adequate measures need to be taken to prevent any fires being caused by workmen.	NC	NC	NC	NC	Pipeline identification- maintain clear identification by signage on location of pipeline	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	Concern regarding the importing of soil- potential for weed seeds in the soil. We have to keep going back to this spot to keep controlling the weeds.	NC	NC	NC	NC	NC	NC
NP		L/O	NC	NC	NC	NC	NC	Signage - 3 signs within approx 100m, on posts approx 1 metre from fence line. Comment that it was better when signs were on the fence line.	NC
NP	NP	L/O	Landholder concerned that she may not be able to farm the land over the easement, or develop it in another way. This landholder has existing fencing securing the property and is concerned that it may be damaged by those accessing the pipeline.	The introduction and spread of pest species through any machinery bought onto the property is a grave concern to this landholder.	Protection of topsoil in any excavation work is important as the land is used for farming	Any emissions are of concern to this landholder as neighbours are close to pipeline and the landholders home is on the same property.	No issues	No issues	No Issues

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
Management Group	NP	L/O	For any disturbance to the landholders will require notification except in emergencies where serious situation requires instant action	No Issues	No Issues	No Issues	No Issues	Signage could be better. No other comments	No Issues
Gregor & Co Pty Ltd.	Manager/ Director	L/O	Subsoil left on surface creating crop yield variation. Limestone rocks bought to surface which have to be removed by hand.	No Issues	No Issues	No Issues	No Issues	No Issues	The easement creates opportunity for other organisations to use it. The land owner is obliged to deal with the associated issues for the 'public good'.
NP	NP	L/O	NC	NC	NC	NC	NC	NC	The landholder would like to see people educated about the pipeline better-recently neighbours using machinery to knock down stumps. The landholder contacted Epic, who acted promptly - but neither the owner or contractor realised the pipeline was there.

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	No Issues	No effect on vegetation or regrowth. No introduction or spread of pest species has occurred	Erosion related problems regularly inspected and controlled sufficiently on this property.	Never experienced any problems in relation to emissions	Not applicable	Excellent signage. Pipeline easement regularly inspected to control external activities. Knowing the pipeline is there the landholder does not take any risks. Protection of public sufficient.	Landholder frequently visited by pipeline officials, are well informed on pipeline operations and are happy for the pipeline to continue.
NP		L/O	NC	NC	NC	NC	NC	NC	NC
TXU TI	Performance Monitoring Officer	L/O	Need consultation with the land owner/occupiers in conjunction with a hazard identification and risk assessment on work proposals	Torrens island has a sanctuary located in the southern half. Is covered under the National Parks and Wildlife Act.	Operator is obligated to control erosion, runoff and any discharge into the environment as per regulations and codes of practice.	Open air abrasive blasting should give regard to fugitive emissions, deposition and clean up or waste material on land owners property	Torrens island has sites of cultural significance. Landowners should be consulted and care should be taken to disturbing such sites prior to inspections or work on the pipeline.	NC	NC
NP	NP	L/O	No problems	No concerns	ok	Nil	Nil	ok	NC
NP	NP	L/O	Disturbance to land use through access to the pipeline	Natural grassland regrowth. No problems with pest species exists.	Maintenance of soil stability and protection of topsoil is good. No erosion and sediment runoff problems.	No issues	No issues	Signage exists.	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	NC	NC	NC	NC	NC	NC	Landholder has no issues relating to the pipeline through their property.
NP	NP	L	No damage to land, I crop over the pipeline. Have not had any disturbance to infrastructure and have no problems with Epic using private roads or access the pipeline.	Always in contact with me regarding weeds	I have no problems, holes are always filled in. Topsoil is not an issue as it is not disturbed.	No worries with noise. No problem with dust. No odour. Not aware of any uncontrolled emissions.	Does not apply to me. Have not heard of any problem.	Signage is good. Always in contact with me.	I do not have any complaint at all. I have a relief valve on my sons property and it is no problem at all. Epic men are good at communication and their boss Pat O'Dea is always talking to the farmers and informs them of changes.
Taylors Wines	Vineyard Supervisor	L/O	No real disturbance/disruption	No native flora/fauna on line, mostly vineyards around pipeline, so therefore no issues	Appears to be no erosion problems	Would like some guidelines/ emergency procedures if there is some problem with the pipeline (i.e. uncontrolled/unplanned gas emissions)	No Issues	Main issues are landholders remembering to notify third parties when they are working around pipeline.	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
Lower North Animal and Plan Control Board	Authorised Officer	Other	NC	Prior to excavation/ soil removal from any properties, check with local animal and plant control board for any proclaimed plant restrictions. Always clear machinery prior to leaving a property	NC	NC	NC	NC	NC
NA	NA	L	Surface soil different to rest of paddock. Plant back periods extended if we use sulphur ureas. There are stones on surface	NC	NC	Noise from power station	NC	Risk from third party activities.	NC
Upper North Animal and Plant Control Board	Senior Authorised Officer	LG	NC	Continue with control, aim at eradication of outbreaks of African Rue. This is a proclaimed pest plant and is predominately found between Com Station 5 & 6.	NC	NC	NC	NC	Address and rabbit issues that may arise over the pipeline and work in conjunction with the landholders eradication plans
NP	NP	L/O	No Issues	No Issues	No Issues	No Issues	No Heritage sites known.	Satisfactory	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
Ambro Pty Ltd	NP	L/O	Loss of part of crop over pipeline. Restrict use of private roads and tracks. Replace topsoil correctly after any excavation.	Do not import foreign growth/material which may contain pest species.	Do not leave pipeline trench open for any period. Replace topsoil after backfill.	Precent dust from blowing over existing crops	Epic to cover costs or losses associated with discovery of previously unknown heritage sites.	Risk from third party activities is an Epic risk. Epic has responsibility to protect public during normal operations and maintenance. Epic is responsible for protection of public during uncontrolled events.	NC
Transport SA	Environmental Officer	G	Crossing of roads a potential problem	Control of weeds along roads and pipeline	Refer to Flinders Ranges Soil Conservation Board	NC	NC	Road trains carrying pipes on our unsealed network. Increased traffic flows etc.	
NP	NP	L	Landholder uses pipeline road as a station road.	Introduction and spread of pest species not a problem on Minburra or Koonabore stations	Nil erosion/ runoff problems	Nil emissions	No Issues	Signage and control of external activities on easement good. Low risk from third party activities and public safety concerns in relation to pipeline operation or uncontrolled events.	In relation to African Rye seed spread, if Epic would like more information contact landholder on number provided at night.

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	No disturbance or disruption to normal usage of property	Vegetation well maintained (reserve next door to landholder property)	Drainage channel has been a little dubious in the past - recent work is a big improvement	Rarely	NC	Signage and maintenance thereof very good.	NC
Australian Rail Track Corporation Ltd	Property Development Manager	L/O	Access to ARTC land must be approved in advance and the appropriate "Authority & Indemnity" form executed in advance. The presence of a rail safe worker may be needed, which will have to be arranged in advance and costs met by Epic.	NC	NC	NC	NC	Pipeline to be marked pursuant to AS4799	Current Pipeline Licences must be in place for every undertrack crossing of the pipeline on ARTC property. ARTC is not confident that this is in place at present.
NP	Grazier	L/O	We have had no problems	The native vegetation and weeds are no different to the rest of the paddock	No problems	No problems	No problems	I leave responsibility of signage to you	NC
NP	Manager	L/O	NC	NC	Erosion Hamilton Creek flood out area - just North of communication tower.	NC	NC	NC	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	NC	NC	NC	NC	NC	Lack of fire knapsacks/ equipment/ shovels. Lack of fire awareness when driving through properties (particularly in fire season periods) - keeping in mind underside of vehicles warm up.	NC
NP	NP	L/O	Concern regarding pipeline workers not closing gates to property. Also concerned that pipeline workers do not understand where the ROW ends and make use of private property tracks.	NC	NC	NC	NC	NC	NC

Organisation	Position	Category	Key Environmental Issues						
			Disturbance to Land	Flora & Fauna	Erosion/ Runoff	Emissions	Cultural Heritage	Public Safety	Other Issues
NP	NP	L/O	NC	NC	NC	NC	NC	NC	All issues on this property have been addressed. Landholder feels that Epic has met its obligations in regard to the pipeline where it traverses this property.
NP	NP	L/O	All most nil disturbance	No problems. No problems with spread of weeds	No problems	Nil	NC	NC	NC

Legend

L – Landholder

LG – Local Government

L/O – Landholder / Occupier

N/A – Not applicable provided in feedback form

NC – No comment made on feedback form

NP – Not provided, information not provided on feedback form

Appendix F

Workshop Meeting Record 2002

Client	Epic Energy	Pages: 5
Project	Pipeline Licence 1 EIR/SEO	Meeting No. 1 Consultation Phase
Location	Stanford Hotel – Adelaide	Date of Meeting 01 Nov 02

Client	Epic Energy	Pages: 5
Project	Pipeline Licence 1 EIR/SEO Consultation Phase	Meeting No. 1
Location	Stanford Hotel – Adelaide	Date of Meeting 01 Nov 02

Recorded by	Z. Bowen, S. Smith	Time meeting started 9.35 am Time meeting ended 12.00pm

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Purpose of meeting:	Information & Consultation Session for key government stakeholders
Present at meeting:	

Name	Company
John Bourne	DWLBC
Vince Rigter	DWLBC
Stephen Howles	DWLBC
Simon Wheaton	Planning SA
Brian Moore	NPWS – DEH
David Hart	NPWS – DEH
Terry Aust	PIRSA
Michael Malavazos	PIRSA
Richard McDonough	PIRSA
Angela Crimes	PIRSA
Tawake Rakai	Epic Energy
Tim Cleary	Epic Energy
David Fotheringham	Epic Energy
Geoff Balmer	Epic Energy
Susie Smith	Ecos Consulting
Zoe Bowen	Ecos Consulting

Copies issued to:	Epic Energy, Ecos Consulting
Apologies:	Kym Davie, Ecos Consulting

Item No.	Description of Discussion	Action
1	Meeting opened by TR	
2	TR provided an overview of legislative requirements of EIR & SEO process	
3	TC Provided an overview of current MAP and Liquids Line operations	
4	**Questions/Observations from the floor relating to Operational practices:** 1. Cathodic Protection Ground-beds – how many are there, where are they placed, how often are they installed, what depth are they installed at? (NPWS/PIRSA) 2. What is the depth of the pipeline? (DWLBC) approx 900mm, AS2885 is 750mm, risk assessment undertaken to determine depth. 3. 3rd Party use of ROW is likely to lead to degradation of ROW in northern area of state (PIRSA) 4. African Rue control is not just Epic problem but also a regional problem. What control measures are being undertaken by Epic? (NPWS) – vehicle exclusion control measures already in place and additional spraying program measures planned. 5. Spencer Gulf – how is the underwater section of pipeline managed? (NPWS) – pipeline was buried next to water pipeline. 6. Spencer Gulf – how are the issues of seagrass/benthic fauna rehabilitation and erosion associated with strong tidal currents addressed/managed? (NPWS) – erosion matting & sand bags installed over pipeline.	Discussion at meeting - note
5	SS provided an overview of the environmental regions traversed by the pipeline. SS opened the floor for the discussion of Activities and Potential Impacts associated with operation of PL1. A summary of comments is provided in Table 1.	Ecos to add additional activities & impacts to SEO
6	**Questions/Observations from the floor relating to Discussion of Potential Impacts:** 1. Consultation with other stakeholders – needs to be widened to cover other government organisations. NPWS can provide Epic with a list of other potential government stakeholders (e.g. local plant & animal control boards, soil boards, CFS, etc.) who could be included in current consultation process. 2. There appear to be 2 aspects of today's discussions – the discussion of EIR & SEO impacts and risks, and discussion of the consultation phase of the process. 3. River crossings in flash-flood areas – there appears to be a risk of large items hitting an exposed pipeline during extreme flood events (i.e. 1 in 50 yrs) (NPWS). 4. PIRSA explained that pipeline standards are regularly reworked and that the SEO must be reviewed within 5 years of approval. This review accommodates the re-assessment of risks. 5. Below surface soil tunnelling and dispersive soils should be considered as a risk as they can act as a conduit for groundwater movement (DWLBC). 6. Risk assessment should include impact of response to and clean-up from emergencies (PIRSA)	Epic / Ecos to obtain & include in consultation process Note Note Note

	7. Venting & Purging – objectives & goals need to include EPA Act triggers (PIRSA)	
7	SS continued discussion of Draft Environmental Objectives & Measures. A summary of comments is provided in Table 2.	
8	**Questions/Observations from the floor relating to Discussion of Draft Environmental Objectives & Measures:** 1. Does pipeline rehabilitation involve the use of local/endemic species? (NPWS) – yes 2. Hydrostatic testing needs to be included to items covered by objectives (PIRSA) 3. Ramsar sites need to be considered, if not already included (NPWS) 4. No spill to watercourses (NPWS)	Include as Goal 6.4
9	To facilitate the consultation process for the EIR/SEO review PIRSA have suggested that the Presentation Notes be posted on the PIRSA web page for easy access by interested stakeholders.	Ecos to forward PDF to PIRSA for posting
10	PIRSA explained to the forum that they would like to be able to define acceptable/workable levels for assessment of Objectives. They are seeking feedback from other stakeholders on suitable assessment parameters.	Note

Table 1: Suggested Additional Activities & Potential Impacts to be added to SEO

Operation	**Activity/Aspect**	**Issue/Potential Impact**	**Relevant Objective/Goal Reference**
Pipeline operation & Maintenance	Land disturbance / dig ups	Soil erosion / Loss of topsoil / Subsidence	
		Soil inversion / crown	
		Groundwater	As per Water Resources Act
	Normal Operations	Tunnelling	
	Emergency situation	Fire	
	Testing & inspection of relief valves	Noise emissions	
		Disturbance to 3rd party	
ROW Maintenance	Marine Environment		
Facility Operation & Maintenance – accommodation facilities	Spill or discharge of hazardous substances		EPA Act
	Venting / Purging		EPA Act
	Production of hazardous wastes	Tunnelling & movement of fluids along sub-surface soil corridors	

Table 2: Suggested additions to Draft Environmental Objectives & Measures

Objective	**Goal**	**Measure**	**GAS – Objective Achieved**
2.To promote & maintain soil stability	2.5 Prevent redirection of subsurface water & tunnel erosion along pipeline trench		Measuring soil movement?
	2.6 Avoid drainage lines or minimise disturbance to drainage lines		
3. To promote & maintain vegetation cover on ROW & minimise disturbance to fauna	3.2 Avoid disturbance of terrestrial & marine habitats		
5. To minimise the impact of operations on water	5.2 Management of hydrostat water		
6 To manage risk to environment of contamination	6.4 Prevent spills into watercourses (especially those of Ramsar sites) or significant environmental habitats 6.5 Management of hydrostat water		

Appendix G

Comments and Replies from Government Consultation 2016

No.	Department	Document	Comment	Epic Energy Response
1	Environmental Protection Authority	SEO	Section 4.2 'Reporting Requirements' should incorporate the requirement to notify the Environmental Protection Authority (EPA) for events where 'serious' or 'reportable' incidents have occurred.	These reporting requirements are specifically related to section 85 of the *Petroleum and Geothermal Act 2000*. Whilst not described in this SEO, Epic Energy acknowledges additional reporting obligations in accordance with section 83 of the *Environmental Protection Act 1993 (EP Act)*.
2	Environmental Protection Authority	SEO	Section 83 of the *Environment Protection Act 1993 (EP Act*) states if serious or material environmental harm from pollution is caused or threatened in the course of an activity undertaken by a person, the person must, as soon as reasonably practicable after becoming aware of the harm or threatened harm, notify the Authority of the harm or threatened harm, its nature, the circumstances in which it occurred and the action taken to deal with it.	Noted.
3	Environmental Protection Authority	SEO	Further, section 83A requires the mandatory notification of site contamination that affects or threatens water occurring naturally under the ground or introduced to an aquifer or other area under the ground.	Noted.
4	Environmental Protection Authority	SEO	A reference to the *Environmental Protection (Water Quality) Policy 2003* is made in Table A1 within the 'Guide to How Objectives Can be Achieved' column of Objective 3. The reference should be removed as this Policy has been revoked and replaced with the *Environment Protection (Water Quality) Policy 2015*. Epic Energy should understand this replacement Policy and include a reference in Table 1.	Reference amended.
5	Environmental Protection Authority	EIR	A description around the installation of groundwater monitoring bores and ongoing monitoring of these bores has been provided. Further, Epic Energy states that environmental Consultants are engaged as required, but at least every 5 years, to undertake environmental monitoring at Epic Energy facilities to monitor for groundwater contamination, bore water quality, soil contamination and water vapour contamination. Epic Energy (and its consultants) are reminded of the requirement to notify of site contamination under sections 83 and 83A of the *EP Act*.	Noted.
6	Environmental Protection Authority	EIR	It is noted that the Moomba to Adelaide Pipeline System and its laterals may traverse through water courses (flowing and ephemeral) and shallow groundwater. The EPA considers the role of groundwater as being a significant component in the physical environment and therefore considers groundwater to have an intrinsic and permanent value, regardless of its location within the State.	Noted.

7	Environmental Protection Authority	EIR	It is an EPA expectation that all industry operators in outer regional and remote areas carry out their activities with due care for the environment taking all reasonable and practicable measures to prevent contamination of land and water, and preserving groundwater resources for future generations. In the event of contamination, Epic Energy should be aware that the EPA will apply the relevant site contamination provisions of the EP Act to ensure the Objectives of this Act are met.	Noted.
8	Environmental Protection Authority	EIR/SEO	Epic Energy must ensure that all pipeline and compressor station infrastructure is assessed and maintained to ensure their effective operation and prevent any loss of contamination to the environment. With respect to pipelines, this would include maintaining effective pipeline pigging programs (and enhanced pigging programs if required) and cathodic protection.	Epic Energy maintains pipelines and associated infrastructure in accordance with the requirements of *AS2885.3-2012 Pipeline – Gas and liquid petroleum – Operations and maintenance*, which includes pipeline pigging and cathodic protection programs.
9	Environmental Protection Authority	EIR/SEO	Epic Energy has indicated that a cathodic protection system is incorporated into the pipeline design to protect the pipeline from corrosion. Further, that cathodic protection test posts are located at regular intervals and allow for monitoring of the effectiveness of the corrosion protection system. The integrity of the complete cathodic system during the operational life of the pipelines is critical and must be maintained.	Noted. See response as documented in reply No. 8 above. .
10	Department of Environment, Water and Natural Resources	EIR	In 4.5.2 Mitigation Measures, Epic identified measures to protect drainage patterns and Epic need to ensure that the activity does not prevent the passage of low flow, divert or impede more than 10 mega litres of water in one flow event or significantly alter the geomorphology of the area as a permit is required.	Noted.
11	Department of Environment, Water and Natural Resources	EIR	Appendix B – Potential Environmental Impact from Operation Activities- Activity 12 Excavations and 14 Pigging, where required, surface water (creeks and watercourses) maybe temporarily dammed and diverted for excavations would require a WAA permit.	Requirement for a Water Affecting Activities Permit added to these references.

12	Department of Environment, Water and Natural Resources	SEO	Objectives and Assessment Criteria, Objective 3 – Minimise disturbance to drainage patterns and avoid water contamination - No water affecting activities as defined under the *NRM Act* undertaken unless relevant permits have been obtained - requires clarification in the Guide to How Objectives Can be Achieved - i.e. is this built into their management systems?	Epic Energy has an Environmental Management System that helps to ensure environmental obligations are met. The EMS includes the following documents: - Environmental procedures, work instructions and guidelines to address significant environmental aspects and ensure activities are undertaken consistently across the company; - Specific management plans such as the African Rue Management Plan; - Environmental Monitoring Program; and - Environmental Audit Program. 'Compliance with relevant sections of the *NRM Act'* added to Guide to How Objectives Can be Achieved.
13	DSD - Aboriginal Affairs and Reconciliation	EIR	References to flora and fauna should also consider the relevance, direct or indirect to Aboriginal heritage. Consultations with Aboriginal parties may provide further information as relevant.	In section 4.1 Flora, the EIR states the following: "When required, excavations are undertaken in accordance with Epic Energy's Excavation Procedure, which includes land access, cultural heritage and environmental requirements."
	DSD - Aboriginal Affairs and Reconciliation	EIR	Water and sources of water was and still is a resource of high cultural value particularly in desert regions. There may be archaeological evidence of Aboriginal occupation in or near such places. Coastal places and expanses of the sea (for example, around Port Bonython) may also hold heritage significance for Aboriginal nations.	Noted.
	DSD - Aboriginal Affairs and Reconciliation	EIR	In the unlikely event of environmental contamination, any damage to the environment may also be damage to Aboriginal heritage.	Noted.
	DSD - Aboriginal Affairs and Reconciliation	EIR	Mitigation measures (not only in the context of environmental contamination as mentioned in the previous paragraph) are commendable and should consider increased involvement of Aboriginal Traditional Owners as a measure in healing the land.	Noted.

	DSD - Aboriginal Affairs and Reconciliation	EIR	At pages 49-50 there is reference to "Aboriginal Groups" that appear to be on or adjacent to the PL route. The list may be indicative only, however there are noticeable omissions at times e.g. Adnyamathanha Traditional Land Association Inc. (ATLA) – ATLA is the Prescribed Body Corporate representing the Adnyamathanha Native Title Holders and will, I expect, insist on being involved in any development works affecting Adnyamathanha country. This feedback does acknowledge (see p51) Heathgate consultations with Adnyamathanha in relation to the Beverley Uranium Mines.	The Moomba to Adelaide Pipeline, which passes through Adnyamathanha country was commissioned in 1969. Table 5-1 lists all stakeholders consulted during the development of the EIR in 2002 and 2003 to satisfy the requirements of the new *Petroleum Act 2000*. The Adnyamathanha community was represented in the consultation by the Flinders Ranges Aboriginal Heritage Consultative Group. This EIR was updated in 2016 to reflect changes to, Epic Energy's Environmental Management System, mitigation measures used to minimise environmental impacts and to update the pipeline system description and to incorporate the Beverley Lateral. Over the past decade Epic Energy has developed an excellent working relationship with ATLA who participate in Work Area Clearances before installation of anode ground beds that are part of the MAPs cathodic protection system.
	DSD - Aboriginal Affairs and Reconciliation	EIR	The Determination of Native Title in 2015 in favour of Barngarla People also calls for particular recognition of Barngarla People in any activity that affects their native title rights and interests.	Noted.
	DSD - Aboriginal Affairs and Reconciliation	EIR	Under the heading "Consultation" at p49, reference is made to government workshops from the period 2002 and 2003. Are there more recent engagements that might be referred to? No mention is made of the relevant Aboriginal Affairs agency (now DSD-AAR) responsible for administration of the Act, which is a 1988 Act.	No consultation workshops were held for the review of the EIR. The EIR refers to Epic's Aboriginal Cultural Heritage Management Procedure. This will be updated to remove the reference to the Aboriginal Heritage Branch Aboriginal Affairs and Reconciliation Division, Department of the Premier and Cabinet and replaced with details for DSD-AAR.

	DSD - Aboriginal Affairs and Reconciliation	EIR	There is no mention of the Aboriginal Heritage Act 1988 in the EIR at other relevant places, for instance under the headings "Cultural Heritage" at p34 and again at p45 – the question can be asked: has there been sufficient regard for the Act. The point to be made now is that DSD-AAR is in the picture and may well have been consulted (or its predecessor) in the period 2002 and 2003 although any such consultation in not apparent in the EIR.	Section 3 'Description of Environment', including 3.11 'Cultural Heritage' on page 34, is just a description of the environments through which the pipelines pass and does not attempt to discuss their management there of or compliance requirements, as such the *Aboriginal Heritage Act 1988* is not referenced here. Section 4 'Potential Impacts & Mitigation Measures', including 4.10 'Cultural Heritage' on page 45, describes the potential impacts to the environment as a result of pipeline operation and provides an outline of the impact mitigation strategies adopted by Epic Energy. 4.10.2 'Mitigation Measures' refer to the Aboriginal Cultural Heritage Management Procedure, which in turn references the *Aboriginal Heritage Act 1988* along with other relevant state and commonwealth legislation. A reference to the *Aboriginal Heritage Act 1988* has been added to 4.10.2. The *Aboriginal Heritage Act 1988* is also referred to in the PL1 & PL12 Statement of Environmental Objectives, specifically in Section 4.2 'Reporting Requirements', Table 1, and Appendix A 'Objectives and Assessment Criteria', Objective 5. As noted in the comment below, the SEO does not apply to construction activity, reducing the potential for non-compliance with the *Aboriginal Heritage Act 1988*. The SEO also describes Epic Energy's commitment to 'Consultation with relevant heritage groups if operations occur outside existing pipeline corridors, highly modified environments or known surveyed areas'.
	DSD, Aboriginal Affairs and Reconciliation	SEO	I note the comments "the SEO applies to pipeline operations, maintenance and decommissioning only" (p3) which suggests to me that there is no new work arising, especially works involving ground disturbance activities. Work of the nature carries the potential to damage, disturb or interfere with Aboriginal heritage (Aboriginal sites, objects and remains) and may require applications under relevant sections of the Act.	Noted.

	DSD, Aboriginal Affairs and Reconciliation	SEO	At particular places in the SEO, Aboriginal heritage is joined with non-Aboriginal heritage and this tends to alter (unintentionally) the way Aboriginal heritage is intended to be protected and preserved under the provisions of the Act. I refer to three examples: - At p2 is says: *5. Minimise disturbance to indigenous and non-indigenous heritage sites, remains and places unless prior approval under relevant legislation is obtained.* The Act refers to "Aboriginal sites, objects or remains"; see for example sections 23 and 24 in the Act. "Objects" is omitted in the above quote from p2. - At p8 under Serious Incidents at 3. a) it says: *a) Disturbance to sites of cultural and/or heritage significance without appropriate permits and approvals.* The Act requires an "authorisation" from the Minister for Aboriginal Affairs and Reconciliation to do certain things, for instance to damage, disturb or interfere with Aboriginal heritage. It is acknowledged that the intention of Epic Energy is clear in its desire to comply with relevant provisions of the Act. - Under Appendix A, Objectives and Assessment Criteria, at objective 5), last dot point under the column "Guide to How Objectives Can be Achieved: it says: *Comply with the Aboriginal Heritage Act 1988 or the Heritage Place Act 1993* The Word "or" should be replaced with "and" because the two pieces of legislation mentioned do not operate as an alternative to each other. Again the intention of Epic Energy is clear in its desire to comply with relevant provisions of both Acts.	1. Omission in Objective 5 on page 5 rectified to align with Objective 5 in Appendix A. 2. The incident definitions on page 8 under 'Serious Incidents' are provided by DSD to provide consistency with Licence reporting. 3. Reference amended.
	DSD, Aboriginal Affairs and Reconciliation	Environmental Significance Assessment	I note the heading "Culture & Heritage Impacts". I refer again to the map and a list of Aboriginal heritage sites attached to this letter and ask that appropriate steps be taken under the Act if the sites were to be affected.	Noted.
	DSD, Aboriginal Affairs and Reconciliation	Environmental Significance Assessment	I refer to the last sentence under "Additional Comments" where it says: "Flagging of know sites will also be undertaken." I bring to your attention section 20 of the Act which requires the reporting of sites, objects or remains to the Minister, "as soon as practicable" after discovery and ask that you tailor your activities in accordance with the requirements of section 20. The Aboriginal Cultural Heritage Management Procedure should not confine its considerations to archaeological surveys. It will need to also consider anthropology and history as well as Aboriginal traditions, in accordance with section 3 (Interpretations) of the Act.	Noted. The Aboriginal Cultural Heritage Management Procedure describes reporting requirements for discovered sites, objects or remains to the Minister. The procedure also notes that "Aboriginal cultural heritage sites may comprise areas or items of archaeological, anthropological or ethnological significance'.

	DSD, Aboriginal Affairs and Reconciliation	EIR/SEO	Risk Management In areas where the heritage is unknown or may be sub-surface, a proponent may choose to manage its risk of breach of the Act by implementing a program of identification, analysis and assessment followed by controls which mitigate any risk of damage, disturbance or interference with any Aboriginal sites, objects or remains discovered during the project works. Risk management is about managing the risk of a possible breach of the Act. It is a process of gathering all the information regarding heritage that will allow you to assess your risk of breaching the Act. Generally speaking, risk management is the identification, analysis and assessment of the effects of uncertainty followed by the application of controls which are designed to avoid, minimise or eliminate the probability of unacceptable consequences. In order to satisfactorily pursue a risk management strategy that complies with the provisions of the Act it is necessary to ensure there is no damage, disturbance or interference to any Aboriginal sites, objects or remains. DSD-AAR has a Risk Management Guideline that suggests steps a proponent should address when adopting a best practice risk management strategy. Included in that document are measures designed to mitigate the risk of a breach of section 23 of the Act. These steps include: • requesting a search of the Central Archive's Register of Aboriginal Sites and Objects; • seeking the views of the relevant Aboriginal parties as identified in the EIR; and • engaging professional expertise where appropriate to conduct an archaeological and/or anthropological survey with the participation of appropriate Aboriginal custodians who have knowledge of and responsibility for the area of country and/or Aboriginal sites in question.	Whilst the SEO does not apply to new construction activities, some small scale ground disturbing activities can occur outside existing pipeline corridors, highly modified environments or known surveyed areas. The risk management process noted is undertaken for such ground disturbing activities to reduce the risk of breaching the *Aboriginal Heritage Act 1988*.

	DSD, Aboriginal Affairs and Reconciliation	EIR/SEO	Delegations under the Act Aboriginal organisations or Traditional Owners of an Aboriginal site or object can apply under section 6(1) of the Act, for a delegation from the Minister of the Minister's powers under sections 21, 23, 29 and 35. It is advisable for a risk management strategy to include inquiry into whether an application for a delegation has been made under section 6(1) of the Act in the area where any development activity is proposed. Please note that sections 6(2) and 6(4) of the Act regarding requests for delegation from traditional owners was repealed by recent amendments to the Act, in March 2016. I need to inform you that the Yandruwandha Yawarrawarrka Traditional Land Owners Aboriginal Corporation has been granted a Delegation pursuant to s6(1) of the Act, and as such they have the delegated authority to make decisions under sections 21, 23, 29 and 35 of the Act, in the claim area SAD 6024/98. If PL 1 and PL 12 affects the Yandruwandha Yawarrawarrka claim area SAD 6024/98 in relation to sections 21, 23, 29 and 35 of the Act then you will need to contact the Yandruwandha Yawarrawarrka Traditional Land Owners Aboriginal Corporation.	Noted.
	DSD, Aboriginal Affairs and Reconciliation	EIR/SEO	Legislation Awareness Finally I can say that DSD-AAR is in a position to conduct an Aboriginal Heritage Legislative Awareness Induction program for Epic Energy employees at no cost to them but they will need to let DSD-AAR know of their wish to undertake the program.	Epic Energy will gladly accept the offer and will contact DSD-AAR to arrange the induction program.