Queensland to Hunter gas pipeline

Preliminary environmental assessment report
November 2007

Queensland Hunter
Gas Pipeline

Manidis Roberts

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Proposal objectives

The objectives of the proposal are to:

- Provide an alternative and secure gas supply to NSW, and in particular the Newcastle area.
- Provide NSW direct access to the rapidly expanding Queensland gas fields.
- Encourage exploration and development of gas fields in northern NSW.
- Provide for increased competition within the NSW gas market.
- Facilitate the development of clean burning natural gas power plant(s) for base and/or peak load power generation, along the route of the gas pipeline.
- Support regional NSW economic development through the provision of a new gas supply and regional power generation opportunities.
- Select a pipeline route, cognisant of social, heritage, environmental, geotechnical, and topographical constraints that provides for the most efficient and economically feasible construction methodologies.
- Design and construct a pipeline that has the minimum practicable impact on both the natural and built environment.
- Utilise regional skilled labour in the construction and operational phases of the proposal to the extent possible.
- Construct and commission the pipeline on a schedule that makes this gas available to customers as quickly as possible.

Pipeline details

The pipeline would be a single high pressure natural gas pipeline constructed from high strength steel pipe, with a nominal outside diameter of 508mm. The maximum allowable operating pressure (MAOP) would be 15.3 MPa. The pipeline would generally be buried with a minimum cover of 750mm dependent upon land use, as per the requirements of *AS 2885 Pipelines – Gas and Liquid Petroleum* and risk management processes. The pipeline would be externally coated for protection against corrosion with an anti-corrosion coating and would have a cathodic protection system. A Supervisory Control and Data Acquisition (SCADA) system would be installed to monitor the pipeline operations. The right-of-way (ROW) during construction would generally be between 25 and 30m in width, subject to particular location constraints. Additional working room, up to 50m in width, may be required at special river and infrastructure crossings and in areas subject to sensitive biodiversity constraints.

Construction activities and staging

Pipeline construction requires a number of procedures to be undertaken consecutively: survey and fencing, set up of temporary facilities, clear and grade of the right-of-way (ROW), trenching, pipe stringing and bending, pipe welding and inspection, pipe coating, pipe placement in the trench (lowering in and laying), backfilling and compaction, hydro-testing and rehabilitation. Each procedure is undertaken by a separate crew. The entire suite of activities is referred to as a 'spread'. Blasting would be required to form the trench in areas of igneous rock. This is anticipated to total less than 20km of the length of the pipeline and would be concentrated in the Liverpool Ranges and in some areas on the northern edge of the Hunter Valley region.

It is anticipated that three pipeline construction spreads would be simultaneously mobilised for construction over the total length of the pipeline. Two spreads would construct the northern 600 to 700km, including the Queensland portion of the pipeline, with the third spread being used in the more populous southern 150km length of the pipeline in New South Wales. Additional small teams would be required for areas involving specialised construction techniques, including horizontal directional drilling, blasting and above ground facility installation.

Each crew works at the rate of about 3-4km per day depending on the terrain (ie. if there are more trees or the ground is very rocky progress may be slower). To enable the crews to work safely and efficiently there is often a delay between the arrival dates of each crew. Typically it would take up to 12 weeks for all the crews to pass through an area and complete their tasks.

Stakeholder and community engagement

Stakeholders for the proposal include the following groups and individuals:

- Statutory bodies and authorities.
- Local council officers.
- Individual landowners.
- Commonwealth and state government departments (officers).
- Industries – potential customers.
- Industries – bystanders.
- Media – local, metropolitan and national.
- Communities around the pipeline corridor.
- Elected representatives (federal, state and local).
- Aboriginal communities and land councils.
- Special interest groups:
  - Environment groups.
  - Local interest groups.
  - Non-local interest groups.
- Utilities and transport infrastructure.

The stakeholder engagement plan categorises each of these stakeholder groups according to their level of interest in the proposal and their potential level of impact on project planning, implementation and outcomes.

Environmental issues

Through the process detailed within this preliminary environmental assessment, environmental issues have been classified into key and other issues:

Key environmental issues	Other environmental issues
• Biodiversity. • Noise and vibration. • Water quality and hydrology. • Aboriginal heritage. • European heritage. • Land use and agriculture. • Infrastructure.	• Waste management. • Contamination. • Geology and soils. • Greenhouse gases. • Air quality. • Traffic and transport. • Hazards and risks. • Cumulative impacts. • Socio-economic. • Visual amenity.

Strategic justification for the proposal

The QHGP would be a represent critical energy infrastructure connecting the emerging coal seam gas reserves in south central Queensland with the Newcastle, and wider Hunter Valley industrial region, significantly enhancing the Australian pipeline network. It would provide additional capacity to the growing demand for gas in the Hunter Valley industrial region, as well as providing a new energy resource to the broader rural and regional areas of northern NSW. The QHGP aims to deliver increased gas supply to meet the growing demand of gas along the pipeline route and in the Hunter industrial region. The construction and operation of this pipeline would also provide a flow on of economic benefits throughout the region.

The QHGP would provide greater security of supply to the Sydney metropolitan area, as there is potential to connect to the existing gas main that connects the Hunter region to the Sydney gas supply. The QHGP would have the capacity to augment this existing gas network by providing an additional source of gas supply.

Glossary

AS 2885.1-2007	Pipelines gas and liquid petroleum and risk management processes.
DECC	Department of Environment and Climate Change (NSW).
DEW	Department of Environment and Water Resources (Commonwealth).
DoP	Department of Planning (NSW).
EA	Environmental assessment
EP&A Act	*Environmental Planning and Assessment Act 1979 (NSW).*
EPBC Act	*Environment Protection Biodiversity Conservation Act 1999 (Commonwealth).*
GIS	Geographic information systems.
GHG	Greenhouse gas.
HDD	Horizontal directional drill.
HGP	Hunter Gas Pipeline Pty Ltd, the proponent of the proposal.
MAOP	Maximum allowable operating pressure.
MOU	Memorandum of Understanding.
NES	National Environmental Significance (as in, a matter of NES under the EPBC Act).
Proposal	The NSW portion of the QHGP, including all associated construction and operation activities and structures.
QHGP	Queensland Hunter Gas Pipeline, the proposed pipeline connecting Wallumbilla in QLD to Newcastle in NSW.
RLMS	Resource and Land Management Services, the company responsible for the licensing and approvals for the Queensland portion of the pipeline.
ROTAP	Rare or threatened and protected
ROW	Right-of-way.
RTA	Roads and Traffic Authority (NSW).
SCADA	Supervisory Control and Data Acquisition.
SEPP	State Environmental Planning Policy.
Spread	Term used to describe a suite of pipeline construction activities undertaken together.

1 Introduction

Hunter Gas Pipeline Pty Ltd is proposing to construct an approximately 820km high pressure gas transmission pipeline to supply gas from Wallumbilla in the Surat Basin of south central Queensland to the Newcastle area in NSW. The entire gas transmission line is referred to as the Queensland Hunter Gas Pipeline (QHGP). The pipeline is split into approximately 220km in Queensland and 600km in NSW. A lateral of about 10km extends from the main pipeline to the Maitland area. This preliminary environmental assessment refers to the components of the QHGP from the NSW/Queensland border near Boomi to the Newcastle area (the proposal).

1.1 Background to proposal

Proposal status

The history of the proposal in relation to its planning and approval is as follows:

- Proposal commenced under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).
- Planning focus meeting on 20 February 2006.
- Department of Planning Director-General requirements under Part 5 issued 30 March 2006.
- Applied for project approval under Part 3A of the EP&A Act on 17 October 2006.
- Director-General environmental assessment requirements under Part 3A issued 14 November 2006.
- Draft version of the environmental assessment issued to the Department of Planning on 8 December 2006 for a review of adequacy.
- Comment from the Department of Planning, the then Departments of Environment and Conservation, Natural Resources and Primary Industries received around January/February 2007.

Comments received from NSW departments and agencies on the draft version of the environmental assessment highlighted concerns relating to the route alignment and selection, lack of conceptual design of the pipeline including a framework for detailed design and the need for a systematic approach to the environmental assessment.

The environmental assessment for the Queensland portion of the QHGP has been approved and a pipeline licence granted effective 1 May 2007.

Review of previous work

A review of the information gathered as part of a previous study was undertaken[1]. Where possible, and relevant to the proposal, background information pertaining to this preliminary environmental assessment has been used.

[1] HSO. (2007). *Queensland Hunter Gas Pipeline Proposed Natural Gas Pipeline*, Wallumbilla to Hexham, Environmental Assessment. Harper Somers O'Sullivan.

Based on the review, the following aspects of the proposal were identified as requiring additional information, development and/or further information:

- The current key issues relating to the proposal.
- Key 'fundamentals' for the proposed pipeline, including engineering requirements and the proposed route alignment.
- The basis for the route alignment and selection, which is the premise for the pipeline to be assessed.
- The most appropriate and risk averse planning approvals pathway.
- The methodology within which the proposal could be undertaken, which in turn would influence engineering, social, environmental and planning considerations.
- This review has resulted in a revised project team, proposal alignment, approvals approach and proposal objectives. Refer to Section 1.2 and Chapter 6.

Meeting with government departments

Meetings were undertaken between the project team and government departments responsible for the approval of the proposal. The purpose of the meetings was to informally:

- Introduce the proponent and new project team.
- Understand the current status of the proposal:
  - The general consensus for the proposal from the relevant departmental perspective.
  - Fundamental challenges with the route alignment and selection.
  - Community and stakeholder consultations undertaken to date.
- Discuss and confirm planning approvals pathway.
- Present a route selection methodology.
- Explore the proposed environmental assessment framework.

The following meetings were held:

- 18 May 2007 – Department of Planning;
- 8 June 2006 – Department of Planning and Department of Environment and Climate Change.
- 30 August 2007 – Department of Water and Energy and Department of Planning.

The following general outcomes were inferred from the meetings with the departments:

- Planning approval process:
  - Need to advise the Department of Planning, regarding the proponent's preferred approvals pathway.
  - It is likely that Director-General requirements issued at concept plan stage would be broad and flexible.
  - Suggestion to include preferred options and/or sub options in the concept plan.
  - Need to liase with the Commonwealth Department of the Environment and Water Resources (DEW) at an early stage to ensure alignment on the approvals pathway.

- Route selection process:
  - Need to define principles that would be underpinned by objectives and flexibility.
  - Need enough information that would enable the designers to modify the route in relation to critical environmental issues identified.
  - Department of Environment and Climate Change wished to become involved or be advised of the route selected.
  - A constraints and risk analysis approach will be undertaken. Areas that are known to be potentially high environmental risk areas (based on impacts), will be committed to a detailed assessment in the concept plan, and undertaken as part of the project approval.

Additionally, a meeting was held with DEW on 18 September 2007, attended by representatives from DEW and the project team. The purpose of the meeting was to obtain clarification and advice on the operation of the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act), with regard to the QHGP generally. It is likely that the proposal would, in some capacity, interact with matters of national environmental significance (NES), which would trigger the EPBC Act. Options for proceeding with EPBC Act matters are presented further in Section 4.3.

1.2 The proposal

The proponent

The proponent is Hunter Gas Pipeline Pty Ltd.
The project team currently working on the design, assessment and approval documentation for the proposal are:

RLMS

Resource and Land Management Services (RLMS) is responsible for the approval and licensing of the Queensland portion of the QHGP. RLMS are also working on the route selection and landowner consultation for the NSW portion of the pipeline and providing specialist support in relation to pipeline construction impacts.

URS

URS Australia Pty Ltd is responsible for the overall coordination of the project.

Manidis Roberts

Manidis Roberts is responsible for the approval under the provisions of the EP&A Act and Regulations for the construction of a pipeline in NSW.

Proposal objectives

The objectives of the proposal are to:

- Provide an alternative and secure gas supply to NSW, and in particular the Newcastle area.
- Provide NSW direct access to the rapidly expanding Queensland gas fields.
- Encourage exploration and development of gas fields in northern NSW.
- Provide for increased competition within the NSW gas market.

- Facilitate the development of clean burning natural gas power plant(s) for base and/or peak load power generation, along the route of the gas pipeline.
- Support regional NSW economic development through the provision of a new gas supply and regional power generation opportunities.
- Select a pipeline route, cognisant of social, heritage, environmental, geotechnical, and topographical constraints that provides for the most efficient and economically feasible construction methodologies.
- Design and construct a pipeline that has the minimum practicable impact on both the natural and built environment.
- Utilise regional skilled labour in the construction and operational phases of the proposal to the fullest extent possible.
- Construct and commission the pipeline on a schedule that makes this gas available to customers as quickly as possible.

1.3 Overview of this report

Purpose

This report has been prepared to support an application to the Minister for Planning (Section 75M of the EP&A Act) to authorise a concept plan. Subsequent environmental assessment requirements for a concept plan under Part 3A of the EP&A Act would then be issued by the Director General of the Department of Planning (DoP) under Section 75F of the EP&A Act.

This preliminary environmental assessment identifies key issues associated with the proposal and outlines a standardised and consistent methodology for evaluating potential impacts associated with the proposal during construction and operation. This report is intended to guide and define the assessment process at concept plan stage and through to the project application stage. The role of the concept plan is to demonstrate, as a strategic concept, that the proposal can be implemented based on an understanding of the likely environmental impacts, and proposed management approaches to resolving any identified adverse impacts. The role of the project environmental assessment is to assess potential impacts based on a more detailed understanding of the proposal, which would be informed through detailed site investigations and stakeholder consultations.

Structure

The following provides an outline of the preliminary environmental assessment:

- Chapter 2 – the strategic assessment of the proposal, including proposal justification and need.
- Chapter 3 – the proposal description, used to guide an initial review of potential key environmental issues.
- Chapter 4 – the likely planning and approval process for the proposal, taking into consideration coordinated assessment processes encompassing NSW, Queensland and Commonwealth assessment requirements.
- Chapter 5 – an outline of community and stakeholder engagement, including a proposed methodology to ensure comprehensive engagement is tailored (to each relevant stakeholder group).
- Chapter 6 – the environmental assessment approach proposed for the concept plan with a consideration of subsequent project approval requirements.
- Chapter 7 – the preliminary environmental assessment, detailing the potential impacts and assessment methodologies for key and other issues.

2 Strategic planning and justification

2.1 Summary of proposal need

The concept plan will provide a strategic assessment of the need for the proposal, with reference to the existing Australian pipeline network, the location of gas reserves, areas of gas demand and expected demand growth.
The proposal need can be summarised with regard to supply and demand.

Supply

In addition to the major gas reserve located in south central Queensland, the northern part of NSW contains substantial sedimentary sequences, which are prospective sources of natural gas, both conventional and coal seam gas. Substantial gas resource potential is evident in the:

- Southern Surat Basin, in the north of NSW.
- Gunnedah Basin, around Narrabri, Coonabarabran and Gunnedah.

Overall, the proposal is anticipated to improve both delivered gas cost and supply availability for NSW.

Demand

Overall, it is anticipated that the proposal would open up new markets for gas in NSW and greatly improve reliability and competition in the current gas and electricity supply market.

The substantial probable gas demand is from industrial users within the Newcastle and adjacent Hunter region. With competitive gas transport costs, this demand is expected to increase.

Probable new gas demands in the northern region of NSW could include new regional or embedded power generation. Regional power generation would offer benefits to the region through local investment and the use of an energy source with reduced greenhouse gas emissions.

2.2 Route development

The first step to the development of a pipeline route was to identify a region that potential route options may fall within. The region selected was a 200km wide area, centred around a line extending from Wallumbilla in Queensland to Newcastle in NSW.

Various route options were identified within the region that took into consideration:

- Supply of gas to Newcastle.
- Proximity to potential coal seam gas reserves in NSW.
- Servicing potential markets in NSW.

- Economically feasible construction, including the avoidance of geotechnically constrained topographical features.
- Operability considering environmental, access, stakeholder and cost implications.
- Acceptable gas transmission costs.
- Acceptable environmental impacts.

An assessment of the route options will be presented in the concept plan. The selected route was based on a comparative analysis of the following objectives:

Land use and social

- Minimise community disturbance.
- Minimise impacts to mining tenements.
- Minimise disturbance to land subject to native title.
- Minimise interruption to land use.
- Minimise disturbance to third party infrastructure.
- Preserve landscape quality.

Environment

- Avoid protected areas and areas of high ecological value.
- Minimise disturbance to remnant and/or isolated vegetation.
- Minimise disturbance to sensitive or unstable landforms.
- Minimise disturbance to wetlands and riparian areas.
- Utilise previously disturbed areas where practical.
- Minimise disturbance to heritage values.

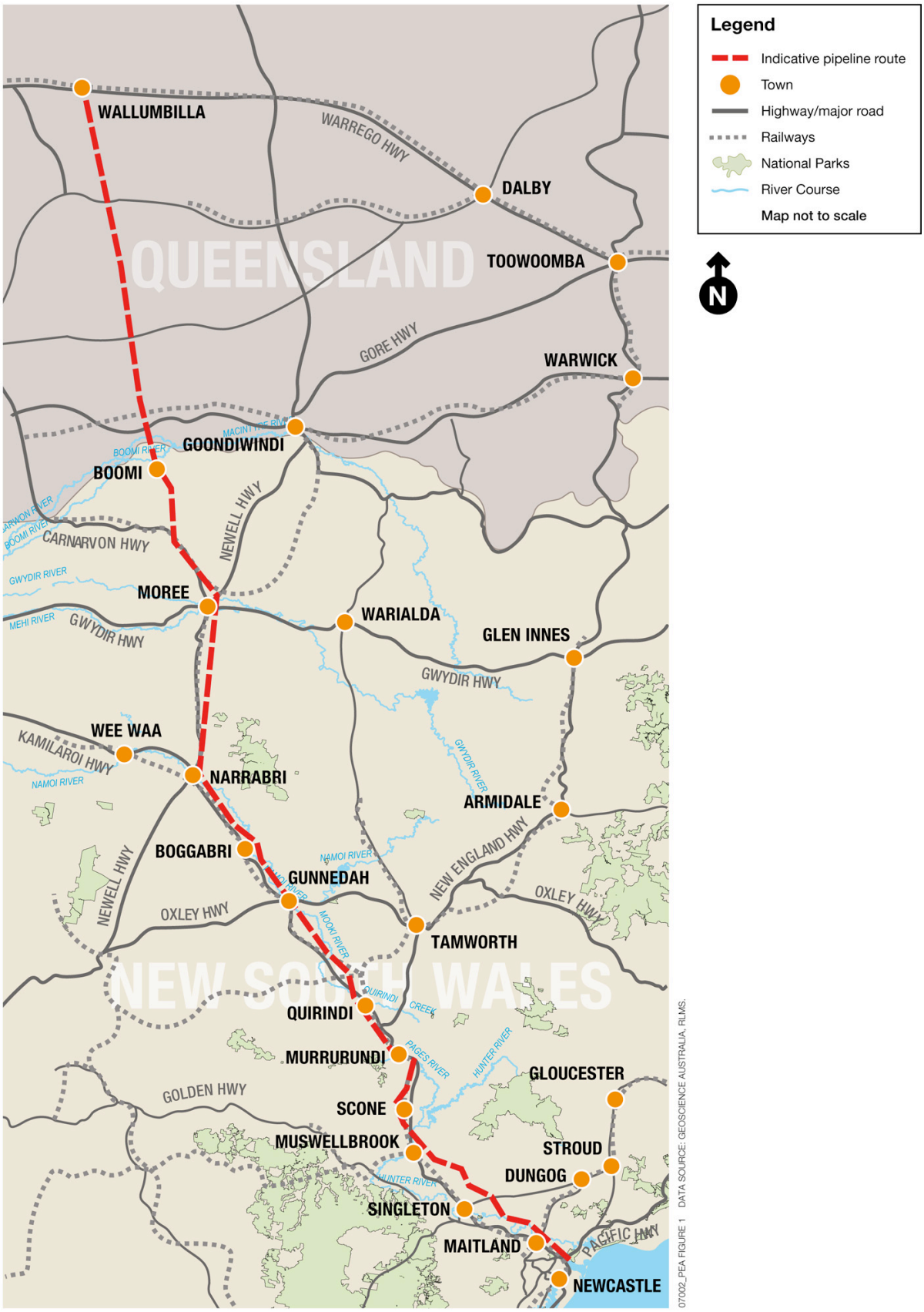
Technical and financial

- Minimise pipeline length.
- Minimise extent of terrain constraints.
- Avoid areas subject to subsidence.
- Maximise ease of access for construction and operations.
- Minimise construction constraints.
- Maximise financial benefit.

Preferred pipeline route

0 details the preferred pipeline route that is subject to further detailed assessment in NSW, indicating local government areas and key geographical features. The preferred pipeline route has been chosen such that several key regional NSW centres would be located within close proximity to the pipeline. This would allow opportunities for these communities to utilise this resource to further develop industries and potentially provide power generation in the future.

Figure 1 Preferred pipeline route



Potential offtakes and intakes for the pipeline

Future intakes are possible from other coal seam gas resources as a result of successful petroleum exploration adjacent to the pipeline or to deliver gas to customers at points of load along the pipeline route. Potential connection points (offtakes) may also be built into the pipeline at construction, or added to the pipeline system during operation, through a process known as 'hot-tapping'. Offtakes would be added to the pipeline dependent on future market opportunities.

2.3 Strategic justification

The QHGP is critical energy infrastructure that would connect the emerging coal seam gas reserves in south central Queensland and northern NSW with the Newcastle, and wider Hunter Valley industrial region, significantly enhancing the Australian pipeline network. It would provide additional capacity to meet the growing demand for gas in the Hunter Valley industrial region, as well as providing a new energy resource to the broader rural and regional areas of northern NSW. The construction and operation of this pipeline would also provide a flow on of economic benefits throughout the region.

The proposal would also provide greater security of supply to the Sydney metropolitan area, as there is potential to connect to the existing gas system that connects the Hunter region to the Sydney gas supply. A justification for the proposal will be provided in the concept plan, taking into consideration the overall benefits and impacts of the proposal.

3 Proposal description

This chapter provides a description of the proposal. The proposal description has been used to provide an understanding of the potential impacts associated with the proposal and is presented in Chapter 7.

3.1 Pipeline design

Key principles for design

The proposed pipeline would be designed and constructed in accordance with the current versions of *AS2885 Pipelines Gas and Liquid Petroleum.* This standard covers the design, construction and operation of gas transmission pipelines. AS2885 calls up in excess of 80 Australian, American and European standards in accordance with which the pipeline and facilities must be designed.
The design can be broken down into two main activities:

- Risk assessment – including route selection, third party activities, future development, erosion, flooding and land movement.
- Pipeline design – including steel and coating selection, valve spacing, depth of burial, corrosion protection, AC interference, remote monitoring, operations and maintenance.

Prevention of third party damage

Prevention of damage due to third party activity is mitigated through appropriate depth of cover, signposting of the pipeline, one call 'dial before you dig' programs, regular inspection of the construction corridor to spot any construction or earthmoving activities in the area, and education of landholders and the community of the potential dangers of carrying out activities in proximity to the pipeline. In some areas, such as road crossings, additional protection may be provided to reduce the risk of third party interference (eg marker tape buried above the pipeline, physical barriers such as concrete slabs or thicker wall pipe). Security fencing, gates and locks would be provided around all above ground facilities (eg scraper stations and mainline valves) to inhibit accidental or unauthorised tampering.

Ancillary infrastructure

Above ground facilities for the pipeline may include:

- Mainline valves, which are used to shut the pipeline down in emergency or upset conditions.
- Scraper stations, which are used for access to the pipeline for cleaning and inspection.
- Meter stations.
- Communication towers.
- Cathodic protection facilities.
- Marker signs.
- The number and location of these items has not been determined at this stage and would form part of the detailed design phase of the proposal.

Tie-ins and connection points

If there is a requirement to add more offtakes the facilities for these are likely to be a similar size to a main line valve (MLV) and would consist of pressure and flow regulation and metering equipment at points of gas reception and delivery. There is also the potential to connect gas reserves along the route to the pipeline via intakes, particularly in the Gunnedah region.

3.2 Pipeline construction activities

Pipeline construction requires a number of procedures to be undertaken consecutively: survey and fencing, set up of temporary facilities, clear and grade of the ROW, trenching, pipe stringing and bending, pipe welding and inspection, pipe coating, pipe placement in the trench (lowering in and laying), backfilling and compaction, hydro-testing and rehabilitation. This suite of activities is referred to as a 'spread'.

Blasting would be required to form the trench in areas of igneous rock. This is anticipated to total less than 20km of the length of the pipeline and would be concentrated in the Liverpool Ranges and in some areas on the northern edge of the Hunter Valley region. Key characteristics of the construction program are given in Table 1.

Table 1 Construction program characteristics

Construction element	Details
Width of vegetation clearing	30m
Depth of trench to provide the minimum depth of cover required under AS2885	Generally 1,450mm Deep cultivated areas 1,900mm Road crossings 1,900mm Creeks/rivers 2,700mm
Construction workforce	Approx 600
Construction spreads	3 main spreads plus a smaller crew for special crossings and difficult areas.
Standard construction hours	06:00 – 18:00 hours 7 days / week
Standard work cycle	28 days on, 9 days off
Construction duration (approximate)	8 months
Refuelling	Mobile fuel truck and construction depot
Normal time between clear and grade and reinstatement	Up to 4 months

Equipment

Typical equipment used in pipeline construction includes:

- Bull dozers.
- Loaders.
- Graders.
- Sideboom tractors.
- Trucks.
- Padding machines.
- Excavators.
- Wheel ditching machines.
- Welding units.
- Crew vehicles.

Infrastructure crossings

The crossing of any roads or rail lines would be carried out by a specialist crew enabling the activity to be completed within one to two days. At no time would a road be permanently impassable, as traffic management measures would be implemented. All rail and major sealed road crossings would be bored and there would be no interruption to rail traffic although some reduction in speed may be required. This would be negotiated with the relevant infrastructure service authority prior to commencement of a specific crossing. Refer to Chapter 5 for the stakeholder engagement strategy and Chapter 7 for details relating to potential infrastructure impacts.

Pipe coating plant and associated material storage

To protect the metal pipe from corrosion in the ground, the external surface of the pipe is coated with a form of epoxy or other plastic material. To achieve this, a dedicated coating plant would be set up at an appropriate location for access to the pipeline route. The location of the plant would be guided by logistic efficiency, as well as other considerations such as available land, infrastructure and transport, labour resources, environmental and heritage issues. The materials stored and used on site would be garnet for grit blasting to clean the pipe, acid to etch the pipe surface prior to coating, and fusion bonded epoxy (FBE) powder or other plastic material for coating the pipe. A site for the plant would be required to have the following characteristics either existing or able to be constructed:

- 20ha of cleared, compacted, levelled and drained land.
- Hardstand high traffic areas.
- Building of approximately 2,400m^2.
- Office building.
- Cyclone fencing around the perimeter.
- Area for materials storage.
- Transformer substation.
- Water and sewerage services.
- Storm water drainage.

- Rail network with rail siding located on site.
- All weather, major road access available.
- Suitable access for 18m trailers.
- Close proximity to services, such as contractors and labour, accommodation and hospitality.

Watercourse crossings

Several methods can be used at watercourse crossings depending upon the size and nature of the watercourse flow regime and the quality of the riparian vegetation. In addition to pipe laying temporary vehicle crossings may also be constructed to facilitate the movement of construction vehicles over watercourses (refer Section 7.1).

Common pipeline construction methods available for the crossing of watercourses include:

- Open cut with or without flow diversion depending upon the flow of water in the watercourse.
- Horizontal directional drill (HDD).

Preferred methods for major watercourse crossings would be finalised during the concept plan and would be determined subject to sensitivity criterion and proposed water crossing construction techniques. Refer to Section 7.1 for a detailed description of high, medium and low risks relating to the environmental assessment of surface water crossings.

3.3 Construction staging

Staging of construction

It is anticipated that three pipeline construction spreads would be simultaneously mobilised for construction over the total length of the pipeline, with each spread being made up of a number of different crews. Two spreads would construct the northern 600 to 700km, including the Queensland portion of the pipeline, with the third spread being used in the more populous southern 150km length of the pipeline in New South Wales. Additional small teams would be required for areas involving specialised construction techniques, including horizontal directional drilling, blasting and above ground facility installation.

Each crew works at the rate of about 3–4km per day depending on the terrain (eg if there are more trees or the ground is very rocky progress may be slower). To enable the crews to work safely and efficiently there is often a delay between the arrival dates of each crew. Typically it would take up to 12 weeks for all the crews to pass through an area and complete their tasks. During this time there would be interruptions to some land uses (eg no crop growing or limited grazing over the ROW) and this would be negotiated with the landowner.

Construction workforce

It is anticipated that up to 600 direct jobs would be created during construction. Local contractors and service companies would be involved with the construction phase of the pipeline and associated facilities where possible. However, some aspects of the construction process (eg welding, specialist crossing techniques and testing) require specialist pipeline/technical expertise which may not be available in some local areas.

Construction camps

Due to the size of the construction workforce and the lack of available accommodation in rural areas, the construction workforce would most likely be housed in self sufficient construction camps. It is estimated that each of the two large spreads would utilise up to three or four camp sites each during the construction period.

Camps are normally located to keep travel distances to the work area to a maximum of 70km.

The temporary camp facilities would be air conditioned demountable style units including:

- Accommodation blocks containing up to six rooms with shared ensuites (ie three bathrooms per block). The ensuite would contain a toilet and shower with hand basins being provided in each room. Rooms are typically equipped with a bed, wardrobe, table and small fridge.
- Central ablution unit containing toilets and laundry facilities for use by camp occupants.
- Messing units which include cooking and eating facilities and a wet mess with recreation lounge.
- Offices.
- Training/meeting room.
- Equipped recreational room.
- First aid room.
- Workshop for maintenance of vehicles and equipment.

3.4 Other activities during construction

Other construction activities include:

- Property acquisition.
- Property and access arrangements.
- Use of utilities such as natural gas (to purge the pipeline after it is constructed), electricity, telecommunications, water and sewerage.
- Traffic management.
- Plant, equipment and heavy haulage.

3.5 Commissioning activities

Commissioning activities would include the following:

- Hydrostatic testing.
- Clean up and restoration.
- Hand over commissioning encompassing five key activities:
  - Instrumentation calibration.
  - Performance testing.
  - Baseline intelligent pig run.
  - Pipeline drying.
  - Purging and loading.

3.6 Operational activities

Operating conditions and practices

General operations encompass routine operation and maintenance programs including ground and aerial patrols, repair of equipment, cleaning of the pipeline (pigging), monitoring for corrosion and remediation and tenure area maintenance including access roads. Aerial and/or ground inspections include detection of erosion, monitoring of reinstatement success and detection and control of weed species. The pipeline would have a cathodic protection system, which would be regularly monitored.

All gas flows are metered with high accuracy metering. This information is continually checked against the volume of gas within the pipeline and any major imbalance immediately checked to confirm the pipe integrity.

Maintenance of pipeline

Corrosion is prevented by the protective external coating and cathodic protection systems. The cathodic protection system is checked regularly to ensure that the protection voltages are within limits and to monitor any likely areas of corrosion activity. The cathodic protection system and external coating system work independently to protect the pipeline from corrosion. If corrosion is detected the relevant section of pipe may need to be excavated and remediation measures implemented.

A maintenance schedule would be created for the orderly undertaking of valve lubrication and maintenance, sign and sign post maintenance, painting of above ground facilities and other needed activities.

In the fifth year of operation, an intelligent pig run would be conducted. The results of this run would be used to determine if, and where, any remedial action is required. This would also be compared to the intelligent pig run during the hand over, to determine the timing of the next intelligent pig run, if there is any rate of degradation of the pipe wall.

Maintenance of corridor

Maintenance of the pipeline corridor is carried out through a process of regular inspections and repairs. Inspection of the pipeline corridor would target:

- Erosion.
- Encroachment.
- Potential injurious construction or other activity.

4 Planning and approvals process

This section outlines the statutory context within which the Queensland Hunter Gas Pipeline (QHGP) is proposed. It identifies the potentially applicable legislation, nominates relevant statutory instruments and provides preliminary information regarding their application.

4.1 Background

As a consequence of its location partially within Queensland and partially within NSW, the QHGP is subject to the requirements of a range of legislation within these jurisdictions and at the Commonwealth level. The QHGP has received relevant licences/approvals in Queensland under the *Petroleum and Gas (Production and Safety) Act*, *2004* and the *Environment Protection Act*, *1994*. It is not necessary to discuss the Queensland process further here.

Preliminary discussions with the Commonwealth DEW have occurred, however the need for referral under the EPBC Act is a matter that would be addressed following the concept plan assessment and approval process.

In the NSW context, assessment of the QHGP has been underway since early 2006. The process to date has been:

- January 2006 – Assessment of the QHGP commences under Part 5 of the EP&A Act.
- 20 February 2006 – Planning focus meeting is held.
- 30 March 2006 – Department of Planning Director-General's requirements for the preparation of an environmental impact statement (EIS) under Part 5 of the EP&A Act are issued.
- 17 October 2006 – Assessment transitions to Part 3A of the EP&A Act and project approval is sought.
- 14 November 2006 – Director-General's environmental assessment requirements under Part 3A are issued.
- 8 December 2006 – Draft Part 3A environmental assessment is submitted to the Department of Planning.
- January and February 2007 – Comment from the Department of Planning, Department of Environment and Conservation, Department of Natural Resources and Department of Primary Industries is received.
- May 2007 – Following consideration of agency comment on the draft environmental assessment, a decision is made to revisit the route development and selection process with a greater focus on identifying and addressing key environmental constraints. The concept plan assessment and approval process under Part 3A of the EP&A Act is identified as the appropriate vehicle for the revised approach.

This preliminary environmental assessment supports a major projects application to the Department of Planning for approval of a concept plan. Accompanying the application is a request that the previously issued environmental assessment requirements be amended to reflect a level of detail commensurate with a concept plan assessment.

4.2 NSW assessment framework

Part 3A *Environmental Planning and Assessment Act 1979*

Clause 6 and Schedule 1 of the Major Projects SEPP identifies development to which Part 3A of the EP&A Act applies.

Clause 6 provides:

> Development that, in the opinion of the Minister, is development of a kind:
>
> *(a) that is described in Schedule 1 or 2…*

Schedule 1 Item 26A provides:

> Development *for the purposes of a pipeline in respect of which:*
>
> *a licence is required under the Pipelines Act 1967, or*
>
> *an application for a licence is made under that Act or after the commencement of this clause, or*
>
> *a licence was granted under that Act before the commencement of this clause.*

Hunter Gas Pipeline Pty Ltd proposes to make an application for a licence under the *Pipelines Act 1967*. If the Minister for Planning is satisfied the proposal is within the scope of the item referred to above, it becomes a project to which Part 3A applies. The previous issuing of environmental assessment requirements and more recent discussions with the department indicate that assessment under Part 3A is appropriate.

Hunter Gas Pipeline Pty Ltd is the proponent for the proposal and now seeks concept plan approval. This preliminary environmental assessment supports a major project application to the Department of Planning for approval of a concept plan. In accordance with Section 75M(2) of the EP&A Act, the application package outlines the scope of the proposal, describes development options, and sets out proposals for staged implementation.

The Minister for Planning may also declare development subject to Part 3A to be a “critical infrastructure project” if it is of a category that, in the opinion of the Minister is essential to the State for economic, environmental or social reasons. It is understood that currently the proposal in the process of being declared critical infrastructure under Section 75C of the EP&A Act.

Other NSW legislation

Specific elements of projects can require approval or notification under a range of other NSW statutes. The following table discusses some of these requirements in the context of the proposal.

Table 2 Other NSW legislation

Act or statute	Requirements
Contaminated Land Management Act 1997	Notification of contaminated land that presents "a significant risk of harm".
Heritage Act 1977	Excavation permit under Section 140 in relation to relics. Not required for approved Part 3A projects pursuant to section 75U of the EP&A Act.
National Parks and Wildlife Act 1974	Permits and consents under Section 87 and 90 in relation to disturbance of Aboriginal objects. Not required for approved Part 3A projects pursuant to section 75U of the EP&A Act.
Occupational Health and Safety Act 2000	Keeping, selling, disposal, manufacturing, preparing for use, packing or using dangerous goods or explosives is regulated by operation of Section 135A.
Pipelines Act 1967	Hunter Gas Pipeline Pty Ltd proposes to make an application for a licence to construct and operate a pipeline under this Act.
Rivers and Foreshores Improvement Act 1948	Permit in relation to excavation on protected land. Not required for Part 3A projects pursuant to section 75U of the EP&A Act.
Water Management Act 2000	Water extraction and related matters in areas where a water sharing plan has been gazetted. Certain exemptions for Part 3A projects pursuant to section 75U of the EP&A Act.
Water Act 1912	Licence under Section 10, or a permit under Section 18F of the *Water Act* may be required for water extraction where the *Water Management Act* does not apply.

Environmental planning instruments

The relevance of environmental planning instruments to the Part 3A concept plan assessment and approval process is dictated by 75O(3) of the EP&A Act.

Section 75O(3) states:

> (3) *In deciding whether or not to give approval for the concept plan for a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved. However, the regulations may preclude approval for a concept plan for the carrying out of a class of project (other than a critical infrastructure project) that such an instrument would otherwise prohibit.*

In recognition of the Minister's discretion to consider the provisions of environmental planning instruments (EPIs), a preliminary review has been undertaken to identify those which may be potentially relevant. They are listed below.

State Environmental Planning Polices

- *State Environmental Planning Policy No.44 – Koala Habitat Protection.*
- *State Environmental Planning Policy (Major Projects) 2005.*

Regional Environmental Plans

- *Hunter Regional Environmental Plan 1989.*
- *Hunter Regional Environmental Plan 1989 (Heritage).*

Local Environmental Plans

- *Port Stephens Local Environmental Plan 2000.*
- *Maitland Local Environmental Plan 1993.*
- *Narrabri Local Environmental Plan No 2.*
- *Narrabri Local Environmental Plan 1992.*
- *Narrabri Local Environmental Plan No 5 (Township of Boggabri).*
- *Singleton Local Environmental Plan 1996.*
- *Quirindi Local Environmental Plan 1991.*
- *Parry Local Environmental Plan 1987.*
- *Scone Local Environmental Plan 1986.*
- *Murrurundi Local Environmental Plan1993.*
- *Gunnedah Local Environmental Plan 1998.*
- *Merriwa Local Environmental Plan 1992.*
- *Muswellbrook Local Environmental Plan 1985.*
- *Moree Plains Local Environmental Plan 1995.*
- *Dumaresq Local Environmental Plan No.1.*
- *Newcastle Local Environmental Plan 2003.*

4.3 Commonwealth assessment framework

The primary legislation governing environmental assessment at the Commonwealth level is the EPBC Act. Under the provisions of the EPBC Act, a project (or action in EPBC Act terminology) which is likely to result in a significant impact on a matter of National Environmental Significance (NES) must be referred to DEW. If the project is subsequently determined to be a controlled action then a requirement for the approval of the Commonwealth Environment Minister arises. Based on preliminary investigations the most likely NES trigger for the proposal is nationally threatened species or ecological communities.

Investigations into potential impacts on NES matters are continuing and it is likely a referral will be made following the conclusion of the concept plan assessment and approval process. In the event the QHGP is determined to be a controlled action, it is anticipated that a co-operative assessment approach would be explored by the relevant jurisdictions. Such an approach is contemplated by Clause 9.2 of both the NSW and Queensland Bilateral Agreements under the EPBC Act.

5 Community and stakeholder engagement plan

5.1 Methodology

The methodology that was used to develop the stakeholder engagement plan is outlined in the flowchart shown below:

5.2 Identifying stakeholders

Stakeholders for the proposal include the following groups and individuals:

- Statutory bodies and authorities.
- Local council officers.
- Individual landowners.
- Commonwealth and state government departments (officers).
- Industries – potential customers.
- Industries – bystanders.
- Media – local, metropolitan and national.
- Communities around the pipeline corridor.
- Elected representatives (federal, state and local).
- Aboriginal communities and land councils.
- Special interest groups:
  - Environment groups.
  - Local interest groups.
  - Non-local interest groups.
- Utilities and transport infrastructure.

The stakeholder engagement plan categorises each of these stakeholder groups according to their level of interest in the proposal and their potential level of impact on project planning, implementation and outcomes.

Stakeholder engagement is a dynamic process and the role and importance of stakeholders will grow and diminish over time. New stakeholders may emerge as the engagement process progresses.

Whilst this plan identifies stakeholder and their issues as they presently appear, it will remain dynamic and be revised as the proposal evolves to reflect the change in focus by various stakeholders.

5.3 Key issues for stakeholders

In August 2007 a stakeholder review of earlier consultation on the QHGP project was undertaken identifying issues previously raised by different stakeholder groups.

We have identified the types of issues that are likely to be raised during the stakeholder engagement process and that could put the approval of the proposal at risk if they are not addressed.

The key issues for stakeholders identified to date are summarised below.

- Pipeline route selection.
- Impacts of ongoing pipeline access/maintenance (particularly weed management).
- Hazards presented by the pipeline.
- Compulsory land acquisitions.
- Limitations on easements.
- Clarification of health and safety issues.
- Perception of limited consultation.
- Compensation for affected landowners.
- Legal issues around land rights.
- Ongoing management of easement land.
- Erosion management.

- Local employment opportunities.
- Economic advantages.
- Social impacts.
- Cultural impacts.
- Greenhouse gas impact.

5.4 Strategic project positioning

There are four key messages about the QHGP that will be used in all stakeholder engagement and communications materials to support the strategic positioning of the QHGP as vital national infrastructure. These messages are:

- The QHGP is critical energy infrastructure that would connect the emerging coal seam gas reserves in south central Queensland and NSW with the Hunter Valley industrial region.
- The QHGP would provide greater security of supply and additional capacity to the growing demand for gas in the Hunter Valley industrial region as well as providing a new energy resource to the broader rural and regional areas of northern NSW.
- The QHGP would lead to increased competition and choice in the NSW energy market.
- The construction and operation of the QHGP would provide a flow on of economic benefits throughout the region.

5.5 Message development

In addition to the key strategic messages outlined above, the QHGP has the potential to deliver many environmental, economic and social benefits specific to different interest groups. These benefits need to be integrated into the various communication processes undertaken for the relevant stakeholders.

Table 3 outlines the main benefits of the proposal broken down into environmental, economic and social categories and the stakeholder groups for whom this information is most relevant.

Table 3 Benefits to be considered in message development

Benefit	Relevant stakeholder groups
Environmental	
Natural gas used for electricity generation has a smaller greenhouse gas (GHG) footprint than coal.	• Electricity generators. • Consumers (industry, business and residential). • Environmental non-government organisations (NGOs).
Supports NSW and Commonwealth Government objectives to meet lower GHG targets.	• Commonwealth Government. • NSW Government.

Benefit	Relevant stakeholder groups
Reduce reliance on coal-fired power stations.	• Electricity generators. • Consumers (industry, business and residential).
Potential reduction in greenhouse gas emissions (as an example an 800MW power station could reduce emissions by three million tonnes per year).	• Electricity generators.
Development of coal seam gas production – extracting methane from coal seams.	• Electricity generators. • Rural land-owners. • Gas producers.
Economic	
Greater security/diversification of supply (more reliable than existing arrangements).	• NSW Government. • Electricity generators. • Hunter region industry.
Potentially cheaper gas supply.	• Electricity generators. • Electricity purchasers. • Hunter region industry. • Gas purchasers.
NSW could become a larger gas supplier (currently most gas is imported from interstate).	• Electricity generators. • NSW Government. • Gas producers. • Gas customers.
Increased competition in the energy market generally.	• Electricity generators. • Consumers (industry, business and residential).
Investment in regional NSW ($600–700 million capital investment in NSW).	• NSW Government. • Hunter region industry. • Local businesses. • Local community.
Industrial development (eg expansion of aluminium smelters, and other potential commercial users in the Hunter Region).	• NSW Government. • NSW LGAs. • Hunter region industry. • Local businesses. • Local community.
Creation of NGACs (NSW gas abatement certificates).	• Electricity generators.

Benefit	Relevant stakeholder groups
Revenue for NSW.	• NSW Government.
Broader effect on employment with development of new industries, increased economic activity resulting from the proposal.	• Hunter region industry. • Local businesses. • Local community.
New markets for QLD and NSW gas producers.	• QLD gas producers.
Social	
Up to 600 jobs during construction.	• Local community.
Around 25 jobs when operational.	• Local community.
Broader effect on employment with development of new industries, increased economic activity resulting from the proposal.	• Hunter region industry. • Local businesses. • Local community.
Greater choice of energy products in areas where gas is not readily available.	• Consumers (industry, business and residential).

6 Assessment approach

This chapter presents a methodical approach to the environmental assessment of the proposal. A review of the likely environmental issues is provided on the basis of considering the proposal description and knowledge of the receiving environment. An overview of the proposed assessment approach is provided, detailing the development of a focussed assessment of key environmental issues, based on a screening of potential risks to each environmental issue. Potential impacts and detailed issue specific assessment methodologies are elaborated in Chapter 7.

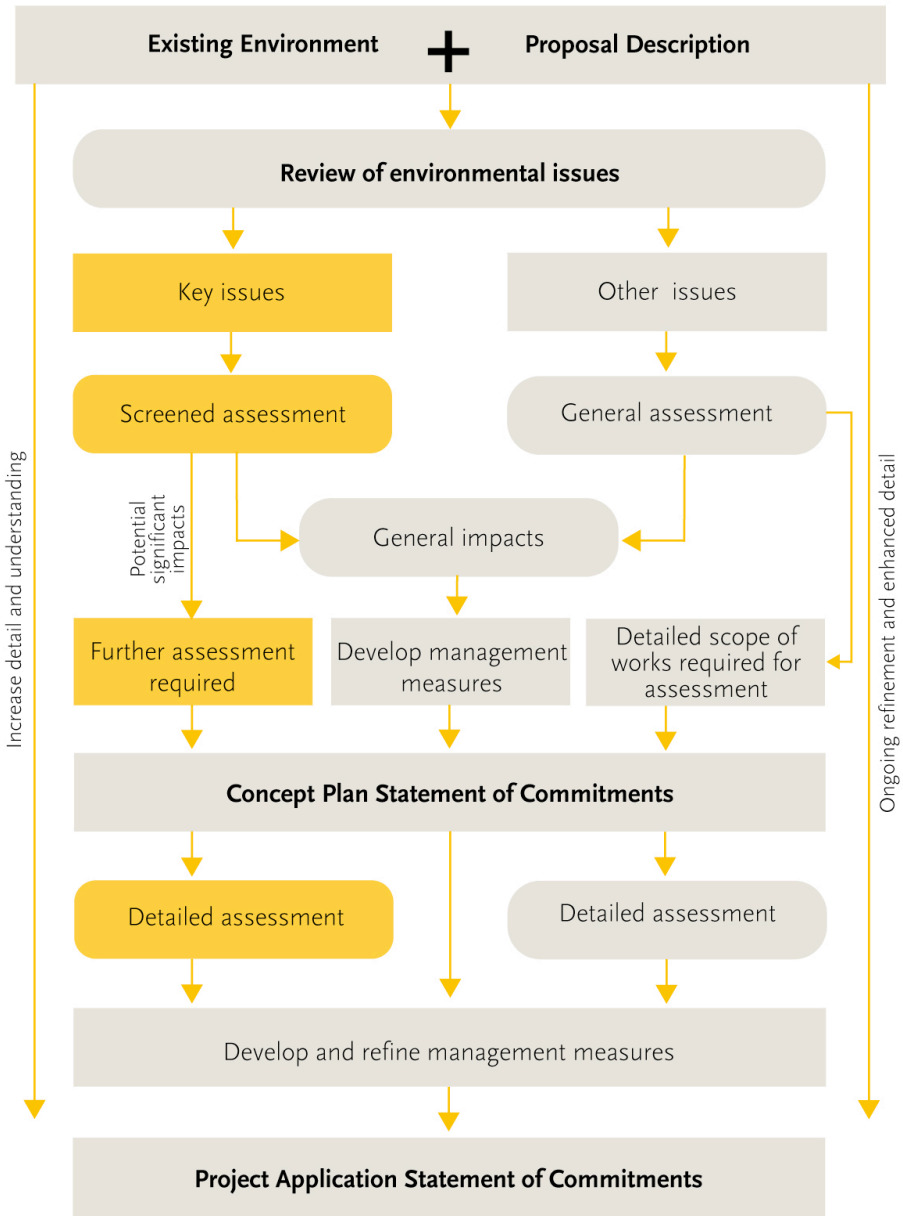
6.1 Overview of environmental assessment approach

To ensure adequate consideration during the concept plan environmental assessment the proposed environmental assessment approach would utilise three approaches, namely

- Review of environmental issues.
- General assessment.
- Screening assessment.

Following the outcomes of the concept plan environmental assessment, a further more detailed and focussed assessment would be undertaken during the project application environmental assessment. Figure 2 presents an overview of the proposed assessment approach, and the following sections describe in specific detail the key aspects for consideration under each approach.

Figure 2 Overview of the proposed assessment approach



6.2 Review of environmental issues

Rationale and objective of the review of environmental issues

The purpose of the review of environmental issues is to identify and rank environmental issues for consideration as part of the concept plan environmental assessment. The review of environmental issues would identify the two categories of environmental issues defined in Section 6.1.

While the approach is qualitative, it provides an important step in the process of project planning and assessment of environmental impacts. In particular it is used to guide the scope of environmental investigations and assessments, proposal design and assist in identifying appropriate mitigation measures and management responses.

Review methodology

A review of environmental issues (Table 4) has been undertaken for this proposal to assist in forming the scope and detail of the environmental assessment. The review is based on information available to date, including previous studies, consultation and correspondence with relevant stakeholders and desktop research.

Table 4 Review of environmental issues

Scoping considerations	Environmental issue	Environmental assessment requirements
Key environmental issues		
Environmental impacts that may be significant and therefore require detailed investigation to adequately determine the level of potential impact and identify appropriate measures to manage and mitigate the effects.	• Biodiversity. • Noise and vibration. • Water quality and hydrology. • Aboriginal heritage. • European heritage. • Land use and agriculture. • Infrastructure.	**Concept plan** Application of significance criteria through a screened assessment process. Development of appropriate statement of commitments. **Project application** Detailed assessment of issues identified as having potentially significant impacts. Refinement of mitigation and management measures for those issues not identified as potentially significant.
Other environmental issues		
Environmental impacts that are expected to be associated with the development and delivery of pipeline projects (particularly construction related impacts) and which can be managed accordingly through detailed design and/or through the implementation of standard management and mitigation measures.	• Waste management. • Contamination. • Geology and soils. • Greenhouse gases. • Air quality. • Traffic and transport. • Hazards and risks. • Cumulative impacts. • Socio-economic. • Visual amenity.	**Concept plan** General assessment of impacts to inform development of statement of commitments. **Project application** Refinement of statement of commitments to inform the development of appropriate mitigation and management measures for the other issues adequately assessed during the concept plan. Detailed assessment of the other issues identified, if any, as requiring a detailed project description.

The methodology associated with the review of environmental issues is further detailed in Chapter 7.

6.3 General assessment

Rationale and objectives of the general assessment approach

The issues identified as other environmental issues (Table 4) would undergo a general assessment of impacts. The objective of the general assessment is to focus on the development of overarching environmental management frameworks for mitigation, management and monitoring.

The general assessment may determine that some of the other issues require a detailed assessment during the project application environmental assessment, once a detailed proposal scope is available (example traffic impacts).

Methodology

The general assessment would involve consideration of the existing environment through the detailed desktop assessment, consultation with relevant agencies and rapid field validation such as fly overs where required. The scope of the general assessment approach for each environmental attribute is further detailed in Section 7.2.

6.4 Screened assessment

Rationale and objectives of the screened assessment approach

It is proposed that only key environmental issues identified through the review of environmental issues (as identified in Table 4) would be subject to the screened assessment. The screening of key environmental issues would provide for a more focussed and efficient environmental assessment. The overriding objective of the screened assessment process is to utilise a standardised and consistent approach in evaluating potential impacts along the entire length of the proposal. The screened assessment would identify areas of potentially significant impact.

Screening methodology

In order to identify whether impacts would likely be significant or otherwise, the screening process would utilise a set of tailored significance criteria across the entire proposal and the need to investigate in detail certain specific environmental issues during the project application environmental assessment.

The significance criteria would be derived on the basis of the extent to which an environmental attribute deviates from the normal baseline situation and would be ranked as being either a major, moderate, minor or negligible impact. Residual impacts, ie those that cannot be mitigated, would be then ranked according to the significance criteria.

The application of the significance criteria along the length of the proposal, would derive the following three outcomes for each key issue:

- Further assessment required, and the development of associated specific management measures.
- Specific or detailed management requirements.
- Standardised management approaches.

The methodology associated with the assessment of these key environmental issues, and the relevant significance criteria is further detailed in Section 7.1.

6.5 Detailed assessment

Rationale and objectives of the detailed assessment approach

As the proposal is developed in more detail, feedback is received from relevant stakeholders and results become available from the concept plan environmental assessment, a deeper understanding of potential impacts associated with other environmental issues deferred for assessment at the project application stage would be possible.

The detailed assessment would be undertaken during the project application environmental assessment for:

- Key issues identified as being significant during the screened assessment.
- Other issues identified as requiring a more detailed project description.

The objective of the detailed assessment is to allow the refinement of the statement of commitments developed for the concept plan environmental assessment.

Methodology

The methodology of the detailed assessment used for the project application environmental assessment is further detailed in Chapter 7.

6.6 Outcomes

The outcome of the assessment approach proposed would be a clear set of identified potential impacts that would occur either in specific areas along the proposal (geographically based) or occur along the entire length of the proposal (issue based). The following three examples provide context for the outcomes of the proposed assessment approach:

- In areas where the pipeline is proposed to traverse agricultural lands currently under cultivation, the risk of adverse ecological impacts would likely be low (area specific minor impact significance).
- In areas where the pipeline crosses watercourses and associated riparian areas, the risk of adverse ecological impacts may be greater (area specific major to moderate impact significance).
- Across all areas during construction, the movement of most fauna would be restricted while an open trench is in place (proposal wide moderate impact significance).

The environmental assessment would use geographic information systems (GIS) for the display of assessment outcomes. All data collected for the proposal would be spatially referenced on the same datum to facilitate integrated reporting and assessment. Area maps at specific scales would be used to present outcomes specific to that area. Aspects requiring further investigation at the project application environmental assessment stage would also be identified.

6.7 Reporting

The proposed assessment approach would deliver defined assessment outcomes. Table 5 provides the context for the assessment approach in relation to approval documentation.

Table 5 Environmental assessment reporting

Theme	Preliminary environmental assessment	Concept plan environmental assessment	Project environmental assessment
Pipeline route identification	Identify proposed route options for the gas pipeline, including any major laterals.	Narrow route to a pipeline corridor of 200m, with wider corridor bubbles around areas with significant constraints or areas requiring further investigation.	Identify final pipeline easement alignment, including alignment around identified constraints.
Project description	General description of proposal.	More detailed description of the proposal.	Detailed description of the proposal, including likely staging, specific details around construction methodology and likely location of temporary infrastructure sites and so on.
Environmental impact assessment	Review environmental issues – identify and scope the potential impacts for the proposal (based on broad desktop level environmental assessment).	Revise and consider in detail existing environment, drawing on detailed desktop and literature review sources, consultation with relevant agencies and rapid field validation including interpretation and review of detailed aerial photos and a fly over. Applicable to other issues.	Assess in detail other issues identified for detailed assessment during project application due to need to detailed description of proposal.
	Develop significance criteria for the magnitude of proposal impacts, and the scenarios where specific impact magnitudes would apply.	Finalise the significance criteria for magnitude of impacts and identify where these impact levels apply. Applicable to key issues.	Assess in detail key issues identified as potentially having a significant impact.

Theme	Preliminary environmental assessment	Concept plan environmental assessment	Project environmental assessment
Management measures	Detail intended scope of statement of commitments in relation to management framework for magnitudes of impact.	Propose high level overarching management frameworks and generic impacts via statement of commitments.	Propose site-specific management measures or a more general framework for mitigation, management and monitoring of more minor and proposal wide environmental issues.

7 Preliminary environmental assessment

This chapter includes a summary of potential impacts, based on current understanding of the existing environment. Environmental issues have been divided into those that are considered key or other based on the environmental issues review presented in Chapter 6. An environmental assessment methodology is presented, tailored to the level of assessment considered necessary at the concept plan stage.

7.1 Key environmental issues

Key environmental issues are those issues identified as requiring further detailed investigations and research. This section presents those environmental attributes and issues that are considered key to the assessment of the proposal at the concept stage. A screened assessment methodology (as described in Section 6.4), based on significance criteria, has been identified for each environmental issue, to determine those areas along the pipeline that may present major, moderate or minor impact significance.

Biodiversity

The proposal would traverse a wide variety of environments, from south central Queensland semi-arid lands to coastal hinterland environments near Newcastle on the NSW coast. The proposal would be located within the Darling Riverine Plains, Brigalow Belt South, Nandewar, Sydney Basin and NSW North Coast bioregions[2,3]. Figure 3 shows the location of each of the bioregions with respect to the pipeline.

[2] HSO. (2006). *Ecological assessment report for the Queensland Hunter Gas Pipeline*. Harper Somers O'Sullivan. (Appendix S of the environmental assessment)

[3] Thackway, R. and Creswell, I.D. (1995). *An Interim Biogeographic Regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program - Version 6.1*. Australian Nature Conservation Agency, Canberra.

Figure 3 Bioregions through which the proposal would pass

Potential impacts – construction

The construction of the pipeline would involve working in a corridor of an average of 30 metres in width, which would contain the trench and other earthworks. Actual trench widths may vary depending on substrate and the need for boulder removal and excavation through rock. Other activities would include camps for construction teams and the construction of permanent buildings for the operational phase of the pipeline. The potential impacts on biodiversity that may result from the proposal during construction include:

- Clearing of native vegetation and other habitat through the preparation of the easement, resulting in reduced habitat areas for native flora and fauna species for the duration of the construction period.
- Removal of vegetation over the area of the pipeline trench and peripheral impacts to vegetation from vehicle and machinery access, spoil deposition and retrieval and materials and equipment laydown. The trenching, boring and vehicle traffic may impact on trees by damaging roots and soils.

- Potential for the introduction and spread of weeds, directly by importing weed propagules on machinery and materials and indirectly by removing competing native vegetation and altering site conditions in favour of weed species. Measures to minimise weed risks, covering weed control, weed hygiene and rehabilitation, would be formulated. These measures would also reduce risks to vegetation from soil-borne pathogens.
- Disturbance to soils and vegetation resulting from the pipeline trenching may provide opportunities for a suite of herbaceous weeds. Many of these species would however likely decline over time as perennial vegetation becomes re-established. Invasion of native plant communities by exotic perennial grasses is listed as a key threatening process in the *Threatened Species Conservation Act 1995*, and these species have the potential of transforming the understorey of grassy forest communities.
- Damage to or removal of endangered ecological communities, threatened flora species and/or populations or habitat for threatened fauna species and/or populations during the construction period.
- Increased vehicle/fauna interactions due to increased traffic, primarily during the construction periods.
- Disturbance to native fauna, particularly nocturnal species, due to increased lighting around construction compounds and for certain night-time construction activities.
- Entrapment of small mammals, reptiles and frogs may pose a risk to fauna during construction. During construction it is desirable to only leave the trench open for the minimum period possible in the interests of general trench stability, the objective being days, not weeks. However given that the trench may be open at any time and the timing from clearing to rehabilitation could be up to four months, without appropriate environmental management this could represent an environmental risk to fauna. Regular patrols and removal and relocation of trapped fauna from trenches would minimise this impact.
- The cleared easement and trench may act as a barrier to some ground dwelling species of fauna. Fragmentation of habitat may result in some level of impact especially if the home range of a ground dwelling species is fragmented.
- Damage to habitat resulting from accidental spills, clearing, emergency or maintenance works other occurrences.
- Blasting, welding and use of machinery introduces a risk of fire, which may impact on vegetation.

Potential impacts – operation

The potential impacts on biodiversity that may result from the proposal during operation include:

- Fragmentation or isolation of existing habitat areas. This would be magnified where closed or dense native vegetation is removed and requires maintenance of the clear easement.
- Increased incidence of weeds along the disturbed easement.
- Edge effects resulting from clearing, this may include weed invasion of intact native vegetation and wind-throw of trees adjacent to the gas pipeline. An ‘ecotone’ where woodland and forest meet the cleared easement may also be created. This could potentially result in changed species composition, especially in relation to woodland and forest dependent birds, where the route requires clearing of these vegetation types.

Assessment methodology

The biodiversity assessment at the concept plan stage would include two distinct phases, desktop review and field validation and analysis of data and impact screening assessment.

A desktop review would be undertaken targeted to a corridor, which is 200m wide (100m either side of the proposed centreline) for the length of the proposal.

The desktop review would include a review of relevant literature, previous studies, interpretation of high resolution aerial photos and validation of existing vegetation maps. This desktop review would identify areas that may potentially pose biodiversity constraints for the proposal.

Around these constraint areas, the corridor investigation width may need to be expanded. This would enable later refinements of the proposal route in order to avoid identified biodiversity sensitivities.

Following the desktop review, a rapid field assessment would be undertaken. This may include a validation component employing a flyover of the route with fixed wing aircraft. The objective of such work would be to validate the field maps, with a particular focus on the extent and potential condition of areas within the corridor containing native vegetation. This risk based approach would also allow the validation of sections of the corridor that do not contain native vegetation and give confidence that these areas are low risk and as such do not require detailed field assessment.

Following completion of the desktop review and field validation, a biodiversity assessment would be prepared and would include the following:

- Identification of potentially major, moderate and minor risk areas (to guide the assessment and help to define the Statement of Commitments at concept stage).
- Determination of the level of impact on biodiversity likely to be associated with the proposal route.
- An identification of areas where, owing to identified potential major impacts, detailed field assessment is required to refine the proposal route and acceptably manage potential adverse impacts.

The significance of impacts on the biodiversity would be undertaken through a screened assessment approach, using the significance criteria as outlined in Table 6.

Table 6 Significance criteria - biodiversity assessment

Biodiversity assessment		
Major	**Moderate**	**Minor**
Threatened flora and fauna		
• Have an adverse effect on the life cycle of a viable local* population and place it at risk of extinction. • Fragmentation or isolation of habitat from other areas of habitat to a level that would impact on a viable population. • Remove a significant area of habitat.	• Potential for an impact on the life cycle of a viable local* population and place it at risk of extinction. • Potential fragmentation or isolation of habitat from other areas of habitat.	• Unlikely to impact on the life cycle of a viable local* population • Unlikely to fragment or isolate habitat from other areas of habitat.
Endangered populations		
• Have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	• Potential to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	• Unlikely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.
Endangered ecological communities or critically endangered ecological communities		
• Work that is likely to place a local community at risk of extinction. • Work that is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	• Work that is likely to remove more than 2% of a local community. • Has potential to adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	• Work that is unlikely to place a local community at risk of extinction.
ROTAP species, biogeographical forest ecosystems and protected species		
• Work likely to place a local forest ecosystem, ROTAP species or protected species at a risk of extinction.	• Works likely to reduce the abundance of a local population by more than 2%	• Works would have only a minimal impact on attribute.

**Note: For the purposes of this significance criteria, "local" would be determined during the assessment based on the habitat, lifecycle, and/or distribution for each relevant species, community or population.*

The outcome of the biodiversity assessment prepared for the concept plan environmental assessment, would present a way forward for further detailed field assessment during project application environmental assessment.

Noise and vibration

Potential impacts – construction

For the majority of its length, the proposal would be located away from populated centres and rural residences. However the proposal may run adjacent to a number towns along the route and, dependant on the separation distance, may cause adverse impacts during the construction and operational phases. As the route approaches Newcastle, the adjacent areas are generally more densely populated thereby increasing the likelihood of sensitive receivers being sufficiently close to the route to experience potential noise and vibration impacts.

Potential construction impacts on populated centres and isolated residences would be a function of the distance to the construction works.

The pipeline is proposed to be located in a trench generally 1250mm in depth, excavated using conventional techniques. Typically, this would involve bulk excavating machinery such as bulldozers ripping, trenching machines and excavators. Blasting of rock is also proposed through the Liverpool Ranges, and in some areas on the northern edges of the Hunter Valley for about 20km in total where the rock is not rippable.

The potential impacts from noise and vibration that may result from the proposal during construction include:

- Noise and vibration created by construction teams and associated machinery, including camps, affecting sensitive receivers during the construction period.
- Noise and vibration as a result of blasting activities.
- Noise created from operations within the pipe coating plant and associated materials storage area.

Potential impacts – operation

As the pipeline would be buried, most receivers would not be impacted by noise or vibration during the operational phase. However, above ground structures, such as scraper and metering stations, as well as maintenance and emergency works, may in some instances create levels of temporary and ongoing impacts.

Potential impacts from noise and vibration that may result from the proposal during operation include:

- Noise and vibration during the operational phase, generally concentrated at above ground structures, such as scraper stations, as well as maintenance and emergency activities, such as digging and welding.

Assessment methodology

A review of the length of the proposal in order to identify sensitive, generally occupied, receptors that may be impacted by the proposal would be undertaken. This review would characterise potentially impacted receptors in terms of receptor type (eg isolated residences), receptor areas (such as residential zones or towns) and sensitive receptors (such as schools or hospitals). An important element of the review would be to determine the distance from the proposal to the receptor. Accordingly, the following methodology is proposed:

- Identification of all residential receivers adjacent to and along the proposal, including the distance to the trench utilising aerial photo interpretation, review of databases, literature review, and rapid flyover validation.
- Identification of the construction processes and equipment combinations to be used.
- Calculation of typical distances from the construction works to the receptors, in order to screen major, moderate and minor noise and vibration impacts. The proposed criteria for the respective categories are presented in Table 7 and Table 8.

Table 7 Significance criteria - construction noise and vibration impacts

Construction noise	**Major (background +20 dBA)**	**Moderate (background +10 dBA)**	**Minor (background +5 dBA)**
Isolated residence	50 dBA	40 dBA	35 dBA
Township residences	55 dBA	45 dBA	40 dBA
Construction vibration	Major	Moderate	Minor
All residences [2]	15 mm/s	10 mm/s	5 mm/s

Note 1: Assumed L_{A90} or Rated Background Levels for Isolated rural residences are 30 dBA, and 35 dBA for residences in rural and semi rural towns.

Note 2: Peak component vibration velocity.

Table 8 Significance criteria - construction blast vibration and airblast impacts

Airblast	**Major**	**Moderate**	**Minor**
All residences	125 dBL	120 dBL	115 dBL
Blast vibration	Major	Moderate	Minor
All residences [1]	15 mm/s	10 mm/s	5 mm/s

Note1: Peak component vibration velocity.

Water quality and hydrology

The pipeline would cross many major and minor watercourses, as well as being located in the vicinity of groundwater reserves and aquifers. Many rivers are used by local communities for drinking water, as well as for agricultural purposes. Major watercourses that would be affected by the pipeline include the Mehi, Gwydir, Boomi, Quirindi, Hunter, Macintyre/Barwon, Namoi and Pages systems.

Potential impacts – construction

During the construction period and depending on the chosen construction methodology, riparian vegetation may be cleared, and banks and beds of watercourses may be disturbed. Depending on the flow regimes of a watercourse at the time of construction, the appropriate flow diversion and construction techniques would be employed. Construction activities may occur within watercourses and there is the potential for short term impacts to downstream water flow and hydrological regimes.

Potential impacts to the water environment (surface and groundwater) that may result from the proposal during construction include:

- Bank erosion and instability at waterway crossings resulting from grading, trenching and associated activities during the construction period.
- Erosion and sedimentation resulting from construction activities within water catchments.
- Pollution of waterways and groundwater resulting from construction activities and camps.
- Changes to flow regimes during waterway crossing construction.
- Potential damage to the ecological functioning of native aquatic species habitat, including threatened species habitat.
- Contamination of groundwater reserves from accidental spills, including drinking water reserves, such as the Tomago aquifer in the Hunter region.

After construction, water would be needed for hydrostatic testing of the pipe prior to accepting for operation. Impacts may relate to:

- Water extraction from local watercourses for the supply of water.
- Potential erosion and pollution of watercourses from discharge of the hydrostatic test water.

It is noted that options to minimise impacts relating to hydrostatic water pressure testing would include:

- Maximising the length and minimising the number of hydrostatic pressure testing sections to reduce water supply requirements (controlled by AS2885).
- Reusing disposal water, for example aerial spraying onto open pastures.
- Avoiding discharging directly into a watercourse.

Potential impacts – operation

During operation, impacts to watercourses and groundwater reserves are expected to be negligible.

Assessment methodology

Surface watercourses and groundwater reserves would be identified over the entire length of the QHGP. Significant and important water resources would be identified including wetland areas, drinking water sources, catchment areas and major aquifers.

The assessment would consider construction techniques at each water crossing, in relation to the sensitivity of the receiving water environment. The possible impacts of an unplanned incident, such as a spillage of hazardous substances, would also be considered. The assessment would consider a number of factors such as the sensitivity of the water body and the dependent receptors of water, etc. The assessment of aquatic habitats would be included as part of the biodiversity assessment.

The significance of impacts on the water environment would be undertaken through a screened assessment approach, using the significance criteria as outlined in Table 9 below.

Table 9 Significance criteria – water quality and hydrology

	Significance criteria		
Environmental attribute	**Major**	**Moderate**	**Minor**
Water course characteristics	• Major change to existing river flow. • Major change in channel or bank form. • Major upstream or downstream flooding potential.	• Moderate change to existing river flow. • Moderate change in channel or bank form. • Moderate upstream or downstream flooding potential.	• Minor change to existing river flow. • Minor change in channel or bank form • Minor upstream or downstream flooding potential.
Water quality and use	• High flow at time of construction. • Threatened species habitat present. • Known presence of threatened species. • Protected wetland areas (SEPP14). • Near natural/excellent in-stream habitat. • Good intact native riparian vegetation. • Highly sensitive downstream water users. • Interception of water bodies identified as drinking water sources. • Sensitive catchment areas. • Major aquifers.	• Flow at time of construction. • Some good quality in-stream habitat. • Moderate riparian vegetation, with some native species present. • Downstream water users that can tolerate temporary increased sediment load. • Water abstraction for non-potable use.	• Ephemeral stream (or no flow at time of construction). • No threatened species habitat. • In-stream habitat highly modified/ disturbed. • Poor riparian vegetation, high percentage of; and introduced and/or weed species.

Aboriginal heritage

Potential impacts – construction

The pipeline may traverse areas that have significance to Aboriginal communities along the pipeline route. The route within NSW passes through nine local Aboriginal land council areas: Mungindi, Toomelah, Moree, Narrabri, Red Chief, Walhallow, Nungaroo, Wanaruah and Mindaribba. In general, known areas of significance have been avoided entirely or minimally affected. Unknown deposits may be discovered during the study period or construction processes, particularly in the vicinity of watercourses.

Potential impacts to items of Aboriginal heritage significance that may result from the proposal during construction include:

- Disturbance to areas of known Aboriginal heritage, such as potential archaeological deposits, scar trees or other objects.
- Clearing of vegetation and construction within Aboriginal lands.
- Visual modification of sites of Aboriginal significance.

Potential impacts – operation

During operation, impacts to items of Aboriginal heritage significance are expected to be negligible.

Assessment methodology

In summary, the initial indigenous heritage impact assessment would aim to identify known Aboriginal sites within the development corridor. Following the identification of these sites, a brief physical assessment would be completed to verify the location of the sites and their condition.

The steps involved in completing the initial assessment are detailed below.

The Department of Environment and Conservation (DECC) Aboriginal Heritage Information Management System (AHIMS) and Historical Heritage Information Management System (HHIMS) registers would be searched to identify previously recorded sites within the study area. Relevant Local Aboriginal Land Councils (LALC) along the pipeline corridor would be contacted to identify the presence of known sites within the concept proposal corridor that may not have been recorded on the AHIMS or HHIMS register.

The above data would then be mapped using GIS. This information would be used to create a predictive model identifying the landforms present within the corridor and the types of Aboriginal sites likely to occur on each landform. Using the GIS mapping and predictive modelling, a survey strategy would be developed that targets both sites identified within the major impact category and a representative cross section of other identified sites along the concept corridor. The purpose of the survey would be to assess the condition and location of sites as well as forming a preliminary overview of the nature and extent and the archaeological resource. This would in turn identify and inform:

- Additional Aboriginal heritage constraints not previously identified.
- How the archaeological resource may be affected by the works.
- Requirements for detailed assessment during the project application stage.

The data compiled from the above searches and Aboriginal consultation would be further supplemented with historical research on the history of Aboriginal groups associated with land associated with the proposed pipeline route(s) to assist identification of historical and contemporary associations and attachments.

A concise presentation of the outcomes of the investigation, potential impacts upon heritage sites and values, and the need for further archaeological investigation and/or Aboriginal community consultation would be provided in a preliminary Aboriginal heritage impact assessment report that complies with DECC Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005 and the Aboriginal Cultural Heritage Standards and Guidelines Kit 1997. This report would also consider conservation and management options, identify a preferred pipeline route(s) and describe proposed measures to minimise and mitigate adverse impacts or to conserve the heritage significance of heritage sites.

The significance of impacts on Aboriginal heritage would be undertaken through a screened assessment approach, using the significance criteria as outlined in Table 10 below:

Table 10 Significance criteria – Aboriginal heritage

Aboriginal heritage		
Major	**Moderate**	**Minor**
Major impacts to Aboriginal sites and or objects would include undertaking works (including excavation, construction of new structures/plant, and vegetation clearance) that results in the direct disturbance and/or destruction of an Aboriginal site and/or object that has or may potentially have high cultural or archaeological significance. This could include disturbance of highly significant Aboriginal sites, places or objects, for example bora grounds or scarred trees.	Would include undertaking work (as described above) that results in the disturbance or a reduction in the significance and/or fabric of an Aboriginal site and/or object. Such impacts may be mitigated by detailed assessment, further Aboriginal community consultation, archaeological investigation and/or recording.	Would include undertaking works (as described above) that may result in slight disturbance to the periphery of an Aboriginal site that may already be disturbed or may hold limited Aboriginal cultural significance. Such impacts may be mitigated by detailed assessment, further Aboriginal community consultation, archaeological investigation and/or recording.

European heritage

Potential impacts – construction

The design philosophy of the alignment of the pipeline has been to avoid areas of heritage significance.

Potential impacts to European heritage that may result from the proposal during construction include:

- Direct or indirect disturbance to items of heritage significance during the construction of the pipeline.
- Amenity of heritage artefacts within close proximity of the pipeline easement, during construction and operation.

Potential impacts – operation

During operation, impacts to European heritage items are expected to be negligible.

Assessment methodology

The key requirement of the initial European heritage impact assessment of the proposal would be to identify listed heritage items that may be impacted by the proposal. A secondary element in any such study would be to physically assess the items that would be affected by the proposal.

All relevant heritage registers maintained by Commonwealth, state and local government agencies would be collated and filtered to define heritage items and sites previously recorded within the concept proposal corridor. These places would be plotted onto plans of the concept to form the initial European heritage constraints map. The initial constraints map would then be augmented and validated using one of two approaches:

- Rapid physical assessment of the identified sites and places by 'windscreen' survey.
- By undertaking detailed review of high resolution aerial photography covering the entire concept corridor.

This would allow the basic collated data to be reviewed in such a way that the achievement of the project objectives would be optimised, in addition to allowing production of an initial, broad-scale predictive model of areas that may have potential to contain heritage sites (and within which potential impacts may be incurred).

Concurrent with this data collection and overview survey, historical research would be undertaken as a gap-analysis scope of work. This research would seek to review any relevant previous heritage studies held by the Heritage Office or within local government libraries and to define any omissions in the basic locational dataset held by the government agencies, thus abridging the timeframe required to 'patch' the constraints map during subsequent more detailed environmental assessment work undertaken during the project application environmental assessment. In addition, the research would allow the significance of previously identified items and the indicative significance of 'new' heritage items identified as potential constraints to be assessed. Information produced by the initial investigations would be described in a written preliminary European heritage impact assessment report that follows the principles outlined in the *NSW Heritage Manual*.

This approach allows identification of European heritage sites and places that should be avoided by detailed design work and/or where detailed additional heritage investigation would be warranted during subsequent project application environmental assessment. The significance of impacts on European heritage would be undertaken through a screened assessment approach, using the significance criteria as outlined below:

Table 11 Significance criteria – European heritage

European heritage		
Major	**Moderate**	**Minor**
The undertaking of work (namely excavation, construction of new structures/plant and vegetation clearance) that results in the direct disturbance and/or modification of the fabric, setting, views and/or the public's future enjoyment of and access to relics, built and landscape heritage items identified as having, or that potentially have state heritage significance.	The undertaking of work (as described above) that results in substantial reduction of the significance of relics, built and landscape heritage items identified as having, or that potentially have state or local heritage significance but which may be mitigated by archival recording, archaeological investigation and recording and/or the implementation of mitigation measures such as screening.	The undertaking of work (as described above) that results in limited reduction of the significance of relics, built and landscape heritage items identified as having, or that potentially have local heritage significance, but which may be mitigated by archival recording and/or the implementation of mitigation measures.

The Heritage Office, Department of Planning, have not released guidelines for historical heritage assessments that support Part 3A applications in any form comparable with those released by the DECC (Draft guidelines for the preparation of *Aboriginal Cultural Heritage Impact Assessment and Community Consultation* required for Part 3A Projects); however the proposed methodology for initial European heritage assessment on this proposal would satisfy the requirements of the Heritage Office for a study of this nature because it complies with the general approach outlined in the *NSW Heritage Manual* published in 1996 (updated in 2001) in addition to the *Code of Practice* for Heritage Assessment.

Landuse and agriculture

Potential impacts – construction

The design philosophy of the alignment of the pipeline has been to avoid areas of conservation value. The pipeline route also aims to avoid all mining leases wherever possible. The pipeline would therefore predominantly be constructed within agricultural lands, requiring the clearing and grading of a 30m easement for the duration of the construction period. Towns and urban areas would largely be avoided by the easement, however in the more densely populated southern areas of the route, built up areas are more likely to be affected by the construction of the pipeline.

Potential impacts on land use and/or agriculture that may result from the proposal during construction include:

- Clearing of crops and disruption to regular farming activities within the easement for the duration of the construction period and certain site studies.
- Restricted or revised access arrangements to properties, particularly where the pipeline alignment runs parallel to the road reserve and adjacent to property lots.
- Temporary access restrictions to the functionality of travelling stock reserves.
- Restrictions to the type of activities and structures permitted on land affected by an easement.
- Temporary land use change in and around locations of construction camps to accommodate construction workers.

Potential impacts – operation

Following completion of construction, most agricultural activities would be able to recommence within the easement, including shallow ploughing. Property access would be reinstated.

In order to secure a pipeline licence, all landholders would be approached with a view to agreeing easements, on mutually acceptable terms, for the purpose of construction, operation and maintenance of the pipeline and facilities. The easements would be secured on the basis of legally binding easement agreements, which would define the rights and obligations of the parties and specify any activity exclusions required to secure the ownership and safety of the pipeline within the easement into the future. Easements would be registered with the Department of Land and Property Information and appended to land titles of the specific parcels of land accommodating the proposed gas pipeline.

Potential long term and permanent impacts on land use and/or agriculture that may result from the proposal during operation include:

- Restricted use of land within the pipeline easement. Agricultural activities may be limited to shallow ploughing and precedence would be given to protection of the pipeline within its easement.
- Long term access arrangement to the pipeline easement, for maintenance purposes.

Assessment methodology

Land use would be characterised within a buffer area either side of the entire length of the proposed easement. Land use categories would include classes of agricultural land as defined by NSW Department of Primary Industries. Land use categories would be defined and would be used as the basis for land use description over the pipeline length.

The significance of impacts on land use would be undertaken through a screened assessment approach, using the significance criteria as outlined in Table 12 below.

Table 12 Significance criteria – land use and agriculture

Agriculture and land use		
Major	**Moderate**	**Minor**
• Impeded access and/or no deviation and diversion opportunities. • Existing or future land use potential within easement terminated.	• Restricted access and/or moderate diversion. • Existing or future land use within easement changes.	• Minor access disruption and/or minor diversion. • Existing or future land use potential within easement restricted.

Infrastructure

Potential impacts – construction

The pipeline would intersect and cross existing infrastructure and utilities, including major roads, minor roads, railways, pipelines, cables and electricity supply lines. At road and rail crossings, the pipeline may be buried deeper (cover of 1200mm), compared to the general cover of 750mm depth in most sections of the pipeline.

Potential impacts to infrastructure that may result from the proposal during construction include:

- Delays and interruptions to road and rail services during construction works, affecting commuters, local communities, freight and other users.
- Trenching and other earthworks affecting existing infrastructure and utilities, such as other pipelines.

Potential impacts – operation

During operation, impacts to infrastructure are expected to be negligible as the QHGP would be buried.

Assessment methodology

All items and networks of infrastructure would be identified, including but not limited to:

- Roads – major roads, state highways, local roads.
- Rail – interstate and national networks, private lines.
- Pipelines – gas, water, sewerage.
- Cables, such as the Telstra network.
- Electricity easements.

The assessment of potential impacts on infrastructure and the application of appropriate mitigation measures would be developed in consultation with the relevant utility and/or service provider. Stakeholder consultation is detailed in Chapter 5.

Upon consideration of the outcomes of consultation and mitigation measures, the significance of impacts on infrastructure would be undertaken through a screened assessment approach, using the significance criteria as outlined in Table 13 below.

Table 13 Significance criteria – infrastructure

Infrastructure		
Major	**Moderate**	**Minor**
• Interruption of major road and rail infrastructure including major roads (freeways, highways, state roads) and state rail lines. • Interruption to the supply of major water lines and high-pressure gas supply infrastructure.	• Closure of local roads and private rail lines. • Interruption to the supply of domestic water and sewage reticulation lines and local roads.	• Minimal change (no closure or interruption) of existing infrastructure.

7.2 Other environmental issues

Other environmental attributes and proposed methodologies for assessment are presented in this chapter. As noted in Chapter 6, other environmental issues would be assessed using a general assessment approach. A general assessment approach at the concept plan stage may result in the following outcomes:

- Project wide frameworks being developed for the assessment, management and monitoring of potential impacts.
- The need to undertake a more detailed assessment at project application stage, subject to a more thorough understanding of project details. It is noted that the duration and extent of potential impacts may depend largely on the type of construction adopted for each section of the proposal and also the location of works depots and other facilities.

Soils and geology

The soils and geology vary substantially along the pipeline route. Within the Darling Riverine Plains Bioregion, the geology is composed of quaternary riverine depots primarily clays, sands and gravels. Throughout the Brigalow Belt South Bioregion, the geology is composed of both basaltic lava flows and quartz sandstones, thus resulting in differing soil and vegetation types depending upon the local parent rock type.

In the Nandewar Bioregion, the geology comprises Jurassic and Carboniferous sediments, tertiary basalts and volcanics. The soils of the area are complex due to the differing parent materials, topography and drainage.

The geology of the Sydney Basin Bioregion is characterised by Hawkesbury Sandstone and shales of the Permian to Triassic periods underlain by the Lachlan Fold Belt. Within the NSW North Coast Bioregion, a wide variety of soils are present due to the complexity of the substrates present throughout the bioregion.

Potential impacts – construction

Soil and rock would be disturbed as a result of construction activities, particularly grading, trenching and other necessary earthworks. Soil would be stockpiled within the 30 metre ROW, with the topsoil piled towards the edges and trench spoil piled adjacent to the trench. Rock breaking would be required in certain areas to achieve the specified pipeline depth. Trench spoil would be screened prior to refilling the trench around the pipeline.

Potential impacts on soils and geology that may result from the proposal during construction include:

- Potential disturbance to acid sulphate soils along the route, particularly between the Maitland to Newcastle areas.
- Loss of topsoil and increased erosion potential due to disturbance of topsoil and loss of vegetation.
- Disturbance to soils as a result of clearance of vegetation within the pipeline easement.
- Erosion of soil, spoil and fill stockpiles, potentially impacting waterways downstream in the catchment.
- Compaction of soils due to construction vehicles and processes, changing soil structure and leading to less permeability.
- Landslip and risk of subsidence of the trench backfill.

Potential impacts – operation

Potential impacts on soils and geology during operation may result from changed soil structures as a result of replacing areas previously containing deep rooted vegetation with shallow rooted vegetation (shrubs and grasses) within the easement. Ongoing compaction of the soils within the easement may also occur, through vehicle movements for pipeline monitoring and maintenance.

Assessment methodology

A desktop study of published information would be undertaken at the concept stage. This would include a review of geological maps, geological sheets, soil landscape maps and acid sulphate soils risk maps. Geography and regional geology would be defined and characteristics of the soil types identified. Salinity potential would be reviewed. Seismicity and earthquake risk would be reviewed in the context of potential risk to the operation of the pipeline. Geohazards including landslip, subsidence from mines (existing or abandoned), and slope stability would be investigated. Regional topography would be reviewed to enable a description of the terrain over the proposal route. The assessment would provide recommendations for a framework for the mitigation, management and monitoring of geology and soils during construction of the proposal.

Waste management

Potential impacts – construction

The pipeline construction methods are designed to produce little waste. Waste would be produced by the use of the construction camps by personnel. Chemicals, oils and fuels would be stored and used as part of the construction processes.

Potential impacts from waste that may result from the proposal during construction include:

- Excess spoil (rock and soil) from the pipeline trenching that may require transport and disposal.
- Waste produced as part of the construction processes, such as excess metal, oil, fuel and chemicals that would require disposal or transport for reuse or recycling. This would be particularly relevant for operations at the temporary pipe coating plant facility.
- Waste produced from camps, including food waste, general rubbish and effluent requiring disposal or treatment.

Potential impacts – operation

During operation, waste impacts are expected to be negligible.

Assessment methodology

Waste streams would be classified in accordance with the *Waste Avoidance and Resource Recovery Act 2001.* Investigation into the opportunities for waste recycling or use of recycled materials during construction would be undertaken. The assessment would also provide recommendations for a framework for the mitigation and management of waste and resource impacts.

Contaminated land

Potential impacts – construction

Contaminated land could potentially be encountered and disturbed at various locations along the pipeline route. Trenching and grading activities that disturb contaminated lands are likely to adversely impact the surrounding environment if not managed appropriately. In addition, construction activities may lead to the contamination of land as a result of chemical, oil or other material spills or leaks.

Potential impacts that may result from the proposal include:

- Disturbance of contaminated land as a result of clearing or trenching activities during the construction period, affecting the local environment.
- Contamination of land or soils due to spills such as chemicals and oils, resulting in pollution and environmental damage.

Potential impacts – operation

There is limited potential for contamination during operation. Maintenance procedures may incur a risk of potential contamination of soils due to spills such as chemicals and oils. Risks associated with the operation of the pipeline are examined in hazards and risks assessment.

Assessment methodology

During concept plan environmental assessment, a risk based approach would be undertaken to areas of potential contamination. The risk approach would be based on known types of activities (e.g. proximity to a hazardous industry, rail crossings, waste disposal, sheep dips etc) and the likelihood of them being present. The assessment would provide recommendations for a framework for the mitigation and management of potential contamination impacts, based on the identification of potential areas of contamination and contamination that may be encountered during construction. Potential contaminating activities, within the easement area of the proposal, would further be identified during the project approval stage and consultation with landholders.

Climate change and greenhouse gas emissions

The construction of the pipeline would have various implications for the production of greenhouse gas (GHG) emissions and anthropogenic climate change. These range from emissions directly resulting from the construction of the pipeline, such as the manufacturing processes and construction vehicle emissions, to the emissions resulting from the use of the transported gas by the consumers.

Potential impacts that may result from the proposal include:

- Energy used in the construction of the pipeline (including flights, manufacturing of pipeline, use and manufacturing of vehicles/tools/equipment, construction camps etc) producing GHG emissions.
- Energy used to extract coal seam gas and prepare for transport producing GHG emissions.
- Energy for compression used to transport the gas.
- Removal of vegetation and release of CO_2 resulting from disturbance of decomposing organic material.
- GHG emissions resulting from the burning of gas by end users.
- Minor gas escapes during commissioning, operations and maintenance.

Assessment methodology

The assessment would include a review of greenhouse gas implications from the consumption of electricity and fuel for both construction and operation phases and from fugitive and venting emissions of gas during operation. This would include an assessment of both indirect and direct emissions including a comparison of the positive greenhouse implications of the development. The assessment would be consistent with Australian Greenhouse Office guidelines, where relevant and appropriate.

Air quality

Potential impacts – construction

During the construction period, dust and airborne particles may result from construction activities within the easement and temporary construction camps. Potential impacts that may result from the proposal include:

- Dust, emissions, odours and vapours produced from construction vehicles, both on formed roads and along the pipeline easement, may affect nearby receivers, such as landowners, during the construction period.
- Dust caused by the setup and operation of the construction camp compounds, for the duration of the activity of the camp, may affect nearby receivers.
- Dust impacts on vegetation (crops, vines, sensitive ecological communities) and dust impacts on livestock.

Potential impacts – operation

During operation, as the pipeline would be buried and maintenance activities are generally passive, air quality would be unlikely to be affected. Gas leaks and other emergencies may impact the air quality for a limited period in a specific location. This aspect has been reviewed as a hazard and risk.

Assessment methodology

A review of the length of the proposal to identify human receptors that would be or may be impacted by the proposal would be undertaken. This review would characterise potentially impacted human receptors in terms of receptor type (eg isolated receptors), receptor areas (such as residential zones) and sensitive receptors (such as schools, hospitals etc).

Areas requiring further assessment would be identified taking into account:

- Changes in prevailing conditions in terms of meteorology.
- Changes in existing ambient air quality.
- Variations in processes – construction and operation.
- Worse case potential impact areas.

A qualitiative assessment would be undertaken at the concept approval stage that would include the development of measures for incorporation into construction management plans. Areas that are considered as requiring a quantitative assessment would also be identified at concept approval stage. A quantitative assessment may be undertaken at the project approval stage, using assessment methodologies as defined by the *DEC Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

Traffic

Potential impacts – construction

During preparation of the project application environmental assessment, traffic may increase slightly on roads throughout the study area, due to the presence of study teams, some of whom may require specialised vehicles or equipment. Throughout the construction period, lasting for approximately four months in any location, construction traffic may be present at various times and may necessitate limited temporary delays to some routes.

Potential impacts on traffic that may result from the proposal during construction include:

- Increased traffic generation due to construction teams and delivery of materials, including heavy vehicle, machinery movements and pipe delivery. This would be particularly relevant in the vicinity of the pipe coating plant.
- Changes to traffic characteristics, distribution and flows in built up areas, particularly in the Hunter region, due to revised traffic arrangements during construction.
- Traffic disruption resulting in potential traffic delays and detours on roads, rail lines and major waterways due to crossing construction.

Potential impacts – operation

Following completion of construction, traffic impacts would be minimal, with certain operational staff occasionally requiring access.

Assessment methodology

This assessment would review heavy vehicle movement and generation and impact to existing road traffic. Heavy vehicle movement (number of truck movements per day) would be provided based on an understanding of the proposal at the peak vehicle movement generation (for example, haulage and delivery of pipe, delivery of plant and equipment, haulage of spoil or other materials) would also be indicatively assessed. Heavy vehicle movement would be reviewed in relation to existing traffic conditions in adjacent major centres and major roads and the respective potential for disruption. The impact upon roads of varying classification, function and geometry, which cross or run parallel to the route would also be considered.

The assessment would provide recommendations for a framework for the mitigation, management and monitoring of traffic impacts during construction of the proposal.

Socio-economic

Socio-economic impacts may vary, however, in terms of the proposal as a whole, landholders and their local communities would likely benefit from the compensation for the creation of the easement on private lands.

Potential impacts – construction

The pipeline easement would be largely located in regional areas and sparsely populated regions. In the southern, more densely populated areas, pipeline construction activities are more likely to affect a greater number of people than in the other areas of the route.

Potential socio-economic impacts that may result from the proposal during construction include:

- Interruptions to the movement of people during the construction periods, affecting local landholders and communities.
- Reduced privacy during study, construction and maintenance periods due to the presence of project personnel on private property.
- Amenity issues stemming from other impacts such as noise, vibration, pollution and traffic.
- Local economic development and employment opportunities during construction.

Potential impacts – operation

Potential socio-economic impacts that may result from the proposal during operation include:

- Perception of lack of ownership of the land affected by the easement for the life of the QHGP.
- Local economic development and employment opportunities during operation.
- Cumulative social impacts which may arise from the pipeline infrastructure (example other developments).

Assessment methodology

An overall indicative socio-economic assessment of the QHGP would be undertaken. The socio-economic assessment would include an assessment of the economic impact of the development and operation of the QHGP. The benefits from the construction phase would be considered, as well as the annual ongoing benefits from the operation of the pipeline. The economic impact of constructing the pipeline would be analysed, with particular respect to the employment (both direct and indirect) associated with the construction phase and the overall economic impact of the construction outlays. The economic impact of the possible additional economic activities (industrial, commercial and residential)

would also be reviewed, with particular respect to the overall on-going economic value of these activities and related contribution to employment and economic activity.

Hazards and risks

The pipeline has the potential to pose a variety of hazards and risks, both during the construction and operation phases[4]. A preliminary risk assessment would be undertaken and would consist of two parts:

- A hazard identification and risk assessment based on AS2885.
- A quantitative risk assessment, using the methodology of NSW Department of Planning *Hazardous Industry Planning Advisory Paper* (HIPAP) No. 6 (Ref. 2), the risk criteria given in HIPAP No.4 (Ref. 3), with reference to multi-level risk assessment (Ref. 4).

Potential impacts – construction

Potential hazards and risks that may result from the proposal during construction include:

- Interference with other services.
- Trench collapse.
- Traffic hazards.
- Bushfire.
- Impact with overhead powerlines.

Potential impacts – operation

Potential hazards and risks that may result from the proposal during operation include:

- Scouring and erosion at rivers and creeks and drainage points.
- Pipeline 'floating' in 'black soil' country.
- Third party impact on the pipeline.
- Corrosion.
- Induced voltages on pipeline equipment near high voltage pipelines.
- Weld/material defects.
- Ground movement due to earthquake, subsidence or seismic impact from blasting activity near mining leases.
- Overpressure/overtemperature.
- Impact of potential bushfires on above ground infrastructure.

Assessment methodology

The assessment would be undertaken in accordance with the methodology outlined within AS2885.1-2007. The objective of the AS2885 assessment is to identify hazardous incidents that could affect the pipeline, resulting in impacts on people or the environment. AS 2885 includes guidelines for assessing the risk of gas pipeline failures and therefore this was used in the assessment of the gas pipeline failures.

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[4] Sherpa. (2006). *Queensland-Hexham Gas Pipeline – preliminary risk assessment. Hazard identification and quantitative risk assessment*. Sherpa Consulting. (Appendix V of HSO Environmental Assessment).

The following tasks would be undertaken during the hazard identification process:

- Identification of the hazardous event of interest.
- Identification of the consequences of the hazardous event and the proposed safeguards.
- Qualitative assessment of the severity (the magnitude of the effect) of the hazardous events.
- Qualitative assessment of the frequency (likelihood of occurrence) of the hazardous events.
- Qualitative assessment of the risk using a risk matrix.
- Ranking risks into extreme, high, intermediate, low and negligible.

Extreme, high and intermediate risk ranks require further risk identification and reduction measures modify the threat to ensure the risk is as low as reasonably practical. Low and negligible risks require no further consideration and can be addressed through the implementation of standard management measures.

Visual amenity

Potential impacts – construction

During the construction period, vehicles, materials, plant, equipment and site works may be visible to nearby receivers and construction camp activities would likely occur at night.

Potential impacts relating to visual amenity that may result from the proposal during operation include:

- Construction vehicles and personnel within the pipeline easement, camps and nearby roads during the construction period being visible to receivers in the area.
- During study and construction periods, various personnel and vehicles would be present in the vicinity of the pipeline easement.
- Presence of construction camp compound temporary buildings and structures, for the duration of the construction period in a particular area.
- Presence of the pipe coating facility, for the duration of the construction period in a particular area.
- Light produced by any night activities, such as that within camp compounds, limited night works and vehicle movements that may affect local communities.

Potential impacts – operation

The pipeline would be buried, following completion of construction activities and rehabilitation works. Potential impacts relating to visual amenity that may result from the proposal during construction include:

- Presence of permanent facilities, such as compressor stations, mainline valves, scraper stations, meter stations and telecommunications towers, changing the landscape character of certain regions.
- Placement of marker signs at roads, crossings, fences, bends and other necessary locations, providing an obvious visual change to the existing landscape.
- Changing landscape due to clearing of vegetation within the easement for construction and permanent maintenance of vegetation within the easement in perpetuity.
- Light produced by any night activities, such as pipeline emergency or maintenance works that may affect local communities.

Assessment methodology

The assessment of potential visual impacts would include an analysis of sensitive receivers in relation to the construction works and pipeline alignment. The potential for long term visual 'scarring', due to vegetation clearance requirements in the maintenance of the pipeline easement, would also be considered, particularly in relation to any areas of high scenic or visual value. The assessment would provide recommendations for a framework for the mitigation and management of visual impacts.

APPENDIX A Stakeholder engagement – plan of activities

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Commonwealth Department of Environment and Water Resources (DEW)	• The project will stimulate the interest of the DEW in matters of national environmental significance and we need to understand their expectations and requirements with respect to the EPBC Act. • To understand how the proposal will be assessed and develop mutual understanding of environmental assessment requirements. • We will need to develop a process that provides for joint agreement of the criteria for assessment as the DEW legislative framework differs from the state planning framework. • There is limited precedence for a project of this nature so a coordinated government approach is paramount from both project reputation and program delivery.	• Face-to-face meetings • Letters • Development of Memorandum of Understanding (MOU)	• Strategic positioning statements.
Department of Planning	• It is critical to develop a level of confidence with DoP that environmental assessment matters are being dealt with appropriately so that seamless approval processes can be achieved. • To understand the expectations and requirements of the Department of Planning with respect to the EP&A Act. • To understand how the proposal will be assessed and develop mutual understanding of environmental assessment requirements.	• Face-to-face meetings • Letters • Workshops	• Strategic positioning statements.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Department of Environment & Climate Change	• While DECC technically does not have any input, as a government regulator they have significant influence. It is therefore important to make sure we understand the department's expectations and respond accordingly. • The overlap between DEW and DECC is significant and as much as possible, needs to be seamless. • To develop mutual understanding of environmental assessment requirements.	• Face-to-face meetings • Letters • Workshops	• Strategic positioning statements.
Department of Water and Energy	• There are significant water crossings considered their jurisdictional domain • Provide the license for the pipeline operation • To understand the expectations and requirements of Department of Water and Energy with respect to legislative requirements. • To develop mutual understanding of environmental assessment requirements and pipeline licensing requirements.	• Face-to-face meetings • Letters • Workshops	• Strategic positioning statements.
Department of Primary Industries	• The department's interests are likely to be regarding perceived loss of productive agricultural lands, mining leases. • To understand the expectations and requirements of Department of Primary Industries. • To identify key issues to be addressed in the environmental assessment.	• Face-to-face meetings • Letters • Workshops	• Strategic positioning statements.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Department of Lands	• Main interest will be with respect to travelling stock reserves and Crown lands. • To understand the expectations and requirements of Department of Lands with respect to legislative requirements. • To identify key issues to be addressed in the environmental assessment.	• Letters	• Strategic positioning statements
Department of State and Regional Development	• Opportunity to create buy-in and support with exposure to economic benefits and employment opportunities associated with construction. • To inform Department of State and Regional Development about the project and its economic benefits for regions and identify economic development opportunities. • To understand the expectations and requirements of Department of State & Regional Development in relation to the environmental assessment process.	• Letters	• Strategic positioning statements
Mine Subsidence Board	• To understand where mining leases are located in relation to the pipeline corridor. • To ensure that the preferred pipeline corridor does not run through land potentially impacted by mine subsidence and identify any potential issues to be addressed in the environmental assessment.	• Letter advising of proposed pipeline corridor and requesting advice of any issues relating to mine subsidence.	• Strategic positioning statements • Explain purpose and location of pipeline corridor. • Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Rural Lands Protection Boards (Moree, Narrabri, Tamworth, Hunter and Maitland)	• To inform Rural Land Protection Boards of the proposed pipeline corridor and identify and understand any issues relating to land management and travelling stock reserves.	• Face-to-face meeting. • Follow-up with letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the environmental impacts of the project and we need to understand their issues to achieve this.
Regional Development Boards (Northern Inland Regional Development Board, Hunter Economic Development Corporation, others)	• To inform Regional Development Boards of the pipeline project and proposed corridor and seek their views.	• Letter advising of proposed corridor and requesting feedback.	• Strategic positioning statements
Catchment Management Authorities (Border Rivers, Gwydir, Namoi, Hunter-Central Rivers	• To inform Catchment Management Authorities of the pipeline project and proposed corridor and identify any issues they may have.	• Letter advising of proposed corridor and requesting feedback.	• Strategic positioning statements
TransGrid	• To inform TransGrid of the pipeline project and proposed corridor and identify any issues they may have.	• Letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
RTA (road authorities)	• The pipeline corridor crosses a number of roads. • To inform the RTA of the pipeline project and proposed corridor and identify any issues they may have. • To minimise impacts of the pipeline on RTA corridor and infrastructure and understand their issues and any management measures required.	• Face-to-face meeting. • Follow-up with letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.
Australian Rail Track Corporation	• The pipeline corridor crosses a number of rail tracks. • To inform Australian Rail Track Corporation of the pipeline project and proposed corridor and identify any issues they may have. • To minimise impacts of the pipeline on Australian Rail Track Corporation corridor and infrastructure and understand their issues and any management measures required.	• Face-to-face meeting. • Follow-up with letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.
Hunter Water Corporation	• Linear infrastructure assets need to be considered for concept, design and construct. • To inform Hunter Water of the pipeline project and proposed corridor and identify any issues they may have. • To obtain information on the location of existing Hunter Water infrastructure and minimise impacts of the pipeline corridor on it.	• Letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.
Country Energy	• To inform Country Energy of the pipeline project and proposed corridor and identify any issues they may have.	• Letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Energy Australia	• To inform Energy Australia of the pipeline project and proposed corridor and identify any issues they may have.	• Letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.
Macquarie Generation	• To inform Macquarie Generation of the pipeline project and proposed corridor and identify any issues they may have.	• Face-to-face meeting. • Follow-up with letter advising of proposed corridor and requesting feedback.	• Aim is to minimise the impacts of the project and we need to understand their issues to achieve this.
Local council officers (Moree Plains, Narrabri, Gunnedah, Liverpool Plains, Upper Hunter, Muswellbrook, Singleton, Cessnock, Dungog, Maitland, Port Stephens, Newcastle)	• To identify and understand any specific local issues (such as proposed developments, sensitive community issues) that may impact on route selection. • To enlist council support in informing the local community about the project. • To acquire relevant data.	• Face-to-face meetings with council officers. • Provision of information for local community to access (leaflets, fact sheets with feedback mechanisms as detailed below).	• Aiming to minimise impacts on local environment and individual landowners. • The pipeline will support economic development of the local area. • New opportunities for local businesses and industry. • Job creation. • Potential for cheaper and more reliable gas supply.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Local elected members (councillors and MPs)	• To inform elected members about the project and its benefits for the local area.	• Face-to-face meetings.	• Aiming to minimise impacts on local environment and individual landowners. • The pipeline will support economic development of the local area. • New opportunities for local businesses and industry. • Job creation. • Potential for cheaper and more reliable gas supply.
Aboriginal communities and Aboriginal Land Councils	• To inform Aboriginal communities about the project and the proposed corridor and seek their feedback on any issues.	• Face-to-face meetings.	• TBA

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
Local communities	• To inform local communities in each affected local government area of the pipeline proposal, reasons behind it, and potential benefits to the area. • To seek feedback from local residents and businesses about the proposal and its impacts. • To build community support and momentum for the project.	• Media release/s. • Fact sheets/Q&As at council chambers, libraries, community centres. • Community noticeboards. • Website. • Phone number. • Email address. • Postal address.	• The pipeline has many benefits for local communities and industry. • Will help to develop the economy of the Hunter region. • New jobs. • More competitive and reliable electricity supply.
Individual landowners	• To inform individual landowners that a gas pipeline is being proposed for the area. • To advise that subcontractors may need to enter their property to survey local flora and fauna (subcontractors will contact them to arrange this). • To seek information on any potential issues/concerns they may have.	• Letter to landowners. • Website. • Phone number • Email address. • Postal address. • Phone calls. • Site visits if required.	• The pipeline is likely to be passing through the local area. • Many benefits to local community and economy of the Hunter region. • Route selection aims to minimise impacts on individual landowners and the local environment. • The exact route hasn't been finalised so we don't yet know specific properties that will be affected by the pipeline.

Stakeholder	Purpose of engagement	Activities/communication tools to be used	Key messages
			• Intrusion of construction from start to finish can be done within a week (weather permitting).
Media (local, regional)	• To help inform local communities about the project. • To position the project as beneficial for local residents, businesses and industry. • To build momentum and community support for the project. • To pre-empt any negative claims from project opponents.	Tools may include: • Fact sheets • Media releases • Media briefing • Information kits	• Benefits for the local community. • Jobs. • Potentially cheaper electricity supply. • Economic development of Hunter region. • Investment in regional NSW. • Gas production in NSW. • Greater energy security in NSW.

Note: Potential industry customers for whom the business case for the pipeline has been built will have a significant bearing on the proposal. However, they will not be engaged during the stakeholder engagement plan other than to impart the key messages and communication advocating the support for the QHGP.