

# **Jemena Northern Gas Pipeline Pty Ltd**

## **Northern Gas Pipeline**

### **Draft Environmental Impact Statement**

#### **EXECUTIVE SUMMARY**

Public

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## EXECUTIVE SUMMARY

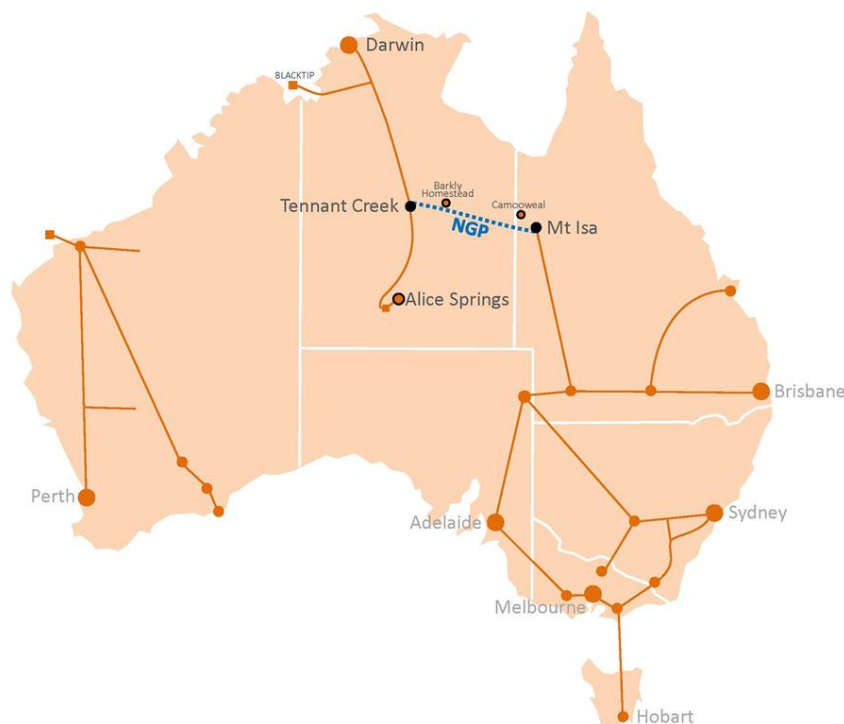
### INTRODUCTION

Jemena Northern Gas Pipeline Pty Ltd (Jemena) proposes construction of a new natural gas pipeline, approximately 622 kilometres (km) in length. The buried pipeline will connect the existing Amadeus Gas Pipeline (AGP) at the Warrego Compressor Station, 45 km north-west of Tennant Creek in the Northern Territory, to the existing Carpentaria Gas Pipeline (CGP) at Mount Isa in Queensland (Figure 1). The project is referred to as the Northern Gas Pipeline (NGP) Project (the Project).

Jemena was selected to develop the Project by the Northern Territory Government following a competitive tender process in 2015. During the tender process, Jemena completed a comprehensive desktop assessment of the proposed alignment and adopted an avoidance approach aimed at minimising environmental, cultural heritage, and landholder impacts. The alignment selection optimised these aspects and established a strong starting point for planning and approvals works in 2016. The submission of this Draft EIS is a culmination of almost two years of investigation and planning works.

A Draft Environmental Impact Statement (EIS) has been prepared for the Project in accordance with the requirements of the Environmental Assessment Act (EA Act) (NT) and to support an application for a Pipeline Licence under the Energy Pipelines Act (NT). The EIS also supports an application for approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Cth). A separate approvals process applies to the Queensland portion of the Project that is under the jurisdiction of the Environmental Protection Act 1994 (EP Act) (Qld).

This Executive Summary provides an overview of the Project, a summary of the environmental assessment and approvals processes, and the key findings of the environmental risk assessment process undertaken in preparing the Draft EIS documentation.



**Figure 1. Location of NGP in relation to existing gas pipelines in Australia**

### THE PROPONENT

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Jemena is an Australian infrastructure company that builds, owns and maintains more than \$9 billion worth of energy and water transportation assets. Jemena is backed by the strong resources of its shareholders, State Grid Corporation of China and Singapore Power. Jemena has significant and proven experience in safely building and operating gas transmission and distribution assets. Jemena's current assets include the Eastern Gas Pipeline, Queensland Gas Pipeline, VicHub, Colongra Gas Storage and Transmission facility, Jemena Gas Network, and the Jemena Electricity Network.

Environmental sustainability and safety of Jemena's customers, contractors, staff, their families and the communities in which the company operates are core values for Jemena and the NGP Project. Jemena's Health, Safety and Environment requirements are managed through the company's Health, Safety and Environment Management System (HSEMS). The system comprises a hierarchy of policies, standards and procedures, supported by corporate and business unit management systems, which define the philosophy, strategy and compliance requirements for effective HSE management. Jemena's Environmental Policy outlines Jemena's its commitments to environmental management (Figure 2).

Jemena has appointed a Construction Contractor to undertake the construction of the NGP Project. The contractor is responsible for providing and implementing a Construction Health and Safety Management Plan (CHSMP) and Construction Environment Management Plan (CEMP) which meet or exceed the requirements of the Jemena HSEMS.

Jemena will engage appropriately qualified personnel and provide adequate resources to ensure all NGP Project activities are conducted in accordance with Jemena's HSEMS and in full compliance with all legislative requirements and approvals.

### PROJECT JUSTIFICATION

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The Australian Government's Energy White Paper sets out a framework for ensuring competitively priced and reliable energy supply to households, businesses and international markets; chiefly through competition and investing in Australia's energy future. The Council of Australian Governments (COAG) Energy Council supports the work of the Northern Territory Government to foster the connection of Australia's northern and eastern gas markets.

The NGP will benefit the economies of the Northern Territory and northern Australia, and the broader Australian economy, by:

- stimulating the development of the Northern Territory through increased gas exploration and production
- providing a new source of competitively-priced clean, reliable energy to eastern Australia
- implementing regional industry capacity building initiatives
- contributing to the continued development of a liquid and competitive wholesale gas market.

# Environmental Policy

Jemena is committed to reducing its environmental footprint.

In delivering on this commitment it is the policy of Jemena to:

1. Comply with all relevant legal and other environmental requirements and provide employees and contractors with the necessary training and tools to maintain its assets in compliance to such requirements.
2. Conduct its business in a way that employees and contractors understand and ensure that they are accountable, for Jemena's environmental performance in their day to day activities.
3. Facilitate continual improvement in environmental performance and prevent pollution by establishing and maintaining an appropriate Environmental Management System and related documents for all assets.
4. Identify and minimise risk by continually assessing, controlling and monitoring our environmental aspects and impacts.
5. Utilise its knowledge and expertise by supporting and pursuing strategies and projects that reduce our impact on the environment as well as providing customers with the necessary tools and information to understand and better manage their environmental impacts.
6. Identify, set and monitor realistic environmental performance measures and communicate them to all employees and stakeholders.
7. Actively engage with customers, government and other stakeholders to recognise and respond to all environmental concerns.

It is a requirement that all employees, contractors and visitors comply with the requirements of this policy and our Environmental Management standards at all times.



Paul Adams  
Managing Director  
Jemena Limited  
August 2015



## APPROVALS, CONDITIONS AND AGREEMENTS

The Project falls within the legal jurisdiction of the Commonwealth, Northern Territory and Queensland governments. In each of the jurisdictions there are various approvals, conditions and agreements relevant to aspects of the Project.

### PIPELINE APPROVALS

The primary approval required for construction and operation of the NGP and associated facilities in the Northern Territory is a Pipeline Licence issued pursuant to the Energy Pipelines Act (*NT*). The primary approval required for the Project in Queensland is a Pipeline Licence pursuant to the Petroleum and Gas (Production and Safety) Act 2004 (*Qld*). The pipeline licencing processes in both the Northern Territory and Queensland require the relevant environmental assessment and approvals processes to be complete.

### ENVIRONMENTAL APPROVALS

The Project requires environmental assessment and approval pursuant to the EPBC Act (*Cth*), EA Act (*NT*) and EP Act (*Qld*). The Draft EIS is the key document supporting approval under both the EPBC Act and EA Act. Queensland approval requirements are noted for context only as the Queensland Government will not be assessing the Draft EIS documentation as part of their approvals processes. The key stages of the environmental assessment, approvals and associated timelines are shown in Figure 3.

Jemena submitted a Notice of Intent for the Project to the Northern Territory Environment Protection Authority (NTEPA) in September 2015. The proposed action was concurrently referred by Jemena to the Commonwealth Department of Environment (DoE) for consideration under the EPBC Act. The NTEPA determined that the Project required assessment under the EA Act at the level of an EIS. The Delegate to the Commonwealth Minister for the Environment determined that the Project was a controlled action that required assessment and approval under the EPBC Act in relation to potential impacts on threatened species or endangered ecological communities (sections 18 & 18A).

The Project could not be assessed under the bilateral agreement between the Commonwealth and Northern Territory governments because part of the proposed action falls within the Queensland jurisdiction. To facilitate a collaborative assessment, criteria for matters relevant to the EPBC Act were incorporated into the EIS Terms of Reference (ToR) prepared by the NTEPA. Jemena prepared a single Draft EIS document for assessment by both the NTEPA and Commonwealth DoE.

The Draft EIS document will be advertised as available for public comment for a period of six weeks. During this time the public and other stakeholders may provide comments, which will subsequently be addressed by Jemena in their final submissions to NTEPA and DoE. At the end of the environmental assessment process the following will occur:

- DoE will make recommendations to the Commonwealth Minister for the Environment in relation to whether or not the proposed action should receive approval under the EPBC Act, and the conditions associated with that determination.
- NTEPA will issue an EIS Assessment Report and Recommendations to the Northern Territory Minister for Mines and Energy, who is responsible for determining whether to grant the Pipeline Licence (PL) pursuant to the *Energy Pipelines Act* and the conditions of any such grant.

## OTHER APPROVALS, PERMITS AND LICENCES

The Project requires various other approvals, permits and licences prior to commencement of construction and operations. These include:

- Aboriginal Land Rights (Northern Territory) Act 1976 (*Cth*) – The Project will require consent from Traditional Owners because parts of the NGP are located on Aboriginal land. This consent will be granted in the form of a Grant of access
- Native Title Act 1993 (*Cth*) - Jemena is currently negotiating Indigenous Land Use Agreements (ILUAs) with Native Title Parties. Once the ILUAs are finalised Jemena will seek certification and registration on the National Native Title Tribunal's Register of ILUAs pursuant to the requirements of the Act.
- Northern Territory Aboriginal Sacred Sites Act (*NT*) – An Authority Certificate is required to ensure compliance with the Act when works are undertaken on or near Sacred Sites. Jemena has applied to the Aboriginal Areas Protection Authority (AAPA) for an Authority Certificate for the Project.
- Heritage Act (*NT*) – A Works Approval is required prior to any disturbance of a heritage place or object. Archaeological surveys have been undertaken in the Project footprint. Jemena will apply for works approvals prior to undertaking any works that could disturb identified heritage sites or objects.
- Planning Act (*NT*) – The Project will require a Development Permit for clearing native vegetation.
- Water Act (*NT*) – Various permits and licences may be required pursuant to the Act including Licence to take or use groundwater (bores), Permit to Construct or Alter Works (dams and water storages), Waste Discharge Licence (disposal of hydrostatic test water).

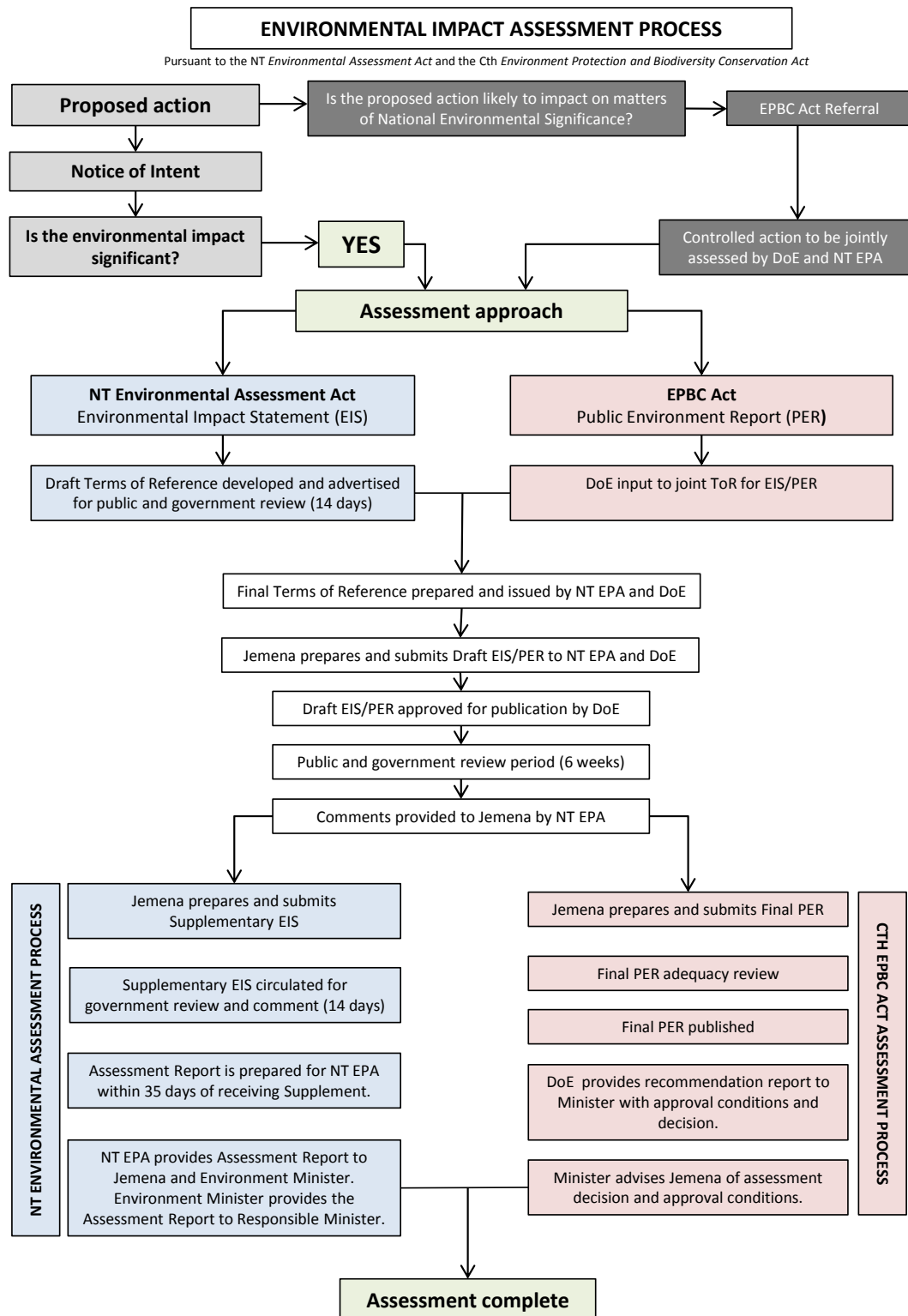


Figure 3. Environmental impact assessment process

## PROJECT OVERVIEW

The NGP Project will transport gas from the Northern Territory to the Eastern Gas Market. The Project will comprise a high pressure, underground gas pipeline (approximately 622 kilometres in length) and associated above-ground facilities. Compressor stations will be located at each end of the pipeline, with additional nitrogen removal facilities at the Warrego end. Other above-ground facilities will comprise mainline valves (MLV) and cathodic protection stations (CP) located at intervals along the pipeline.

## LOCATION

The NGP will extend from Warrego, approximately 45 km north-west of Tennant Creek in the Northern Territory, across the Northern Territory/Queensland border, to connect into the existing Carpentaria Gas Pipeline, at a location approximately 7 km south-west of Mount Isa (Queensland). Approximately 457 km of the pipeline will be in the Northern Territory and 165 km in Queensland. Figure 4 shows the location of the proposed pipeline route and facilities locations.

The pipeline route runs south of the Barkly Highway, mostly through remote and sparsely populated cattle stations and Aboriginal land. The route traverses underneath both the Adelaide to Darwin railway line and Stuart Highway to the north of Tennant Creek. The route is a predominantly 'straight-line' alignment with deviations around rocky hills which occur to the east of Warrego and south-west of Mount Isa. The key rationale for this route is to provide the shortest distance option, whilst avoiding major construction impediments such as environmental, sacred site, archaeological and landholder impacts and their associated costs.

The Phillip Creek Compressor Station site is located on Warrego Road, adjacent to an existing gas compressor station and the AGP. The Mount Isa Compressor Station is located on the south west side of Mount Isa, near to the location of other infrastructure facilities held under sub-lease by a mining company. These locations were selected as the most appropriate tie-in points to the Amadeus Gas Pipeline and Carpentaria Gas Pipeline respectively.

The pipeline route and proposed locations for facilities have been progressively refined over the past two years through consultation with landholders, land councils, Native Title parties and other parties that possess an interest in land. Desktop and ground-based environmental and heritage studies were also undertaken. The Project has adopted the principle of impact avoidance throughout the design phase wherever possible, consistent with the industry standard *Australian Pipeline and Gas Association (APGA) Code of Environmental Practice (2013)*.

## REGIONAL SETTING

The Project will be located across two Local Government Areas (LGAs) - Barkly Regional Council in the Northern Territory and Mount Isa City Council in Queensland. The region is characterised by a low level of industrial development, except for the areas around Mount Isa. The majority of land traversed by the proposed pipeline route is remote and sparsely populated land used for beef production. Parcels of Crown land, Aboriginal-owned land, and land subject to native title claims are also traversed. In the Northern Territory, Jemena has undertaken significant engagement with landholders, land council's, native title representative bodies, road and railway authorities, leaseholders, governments, local councils and a wide range of other stakeholders.

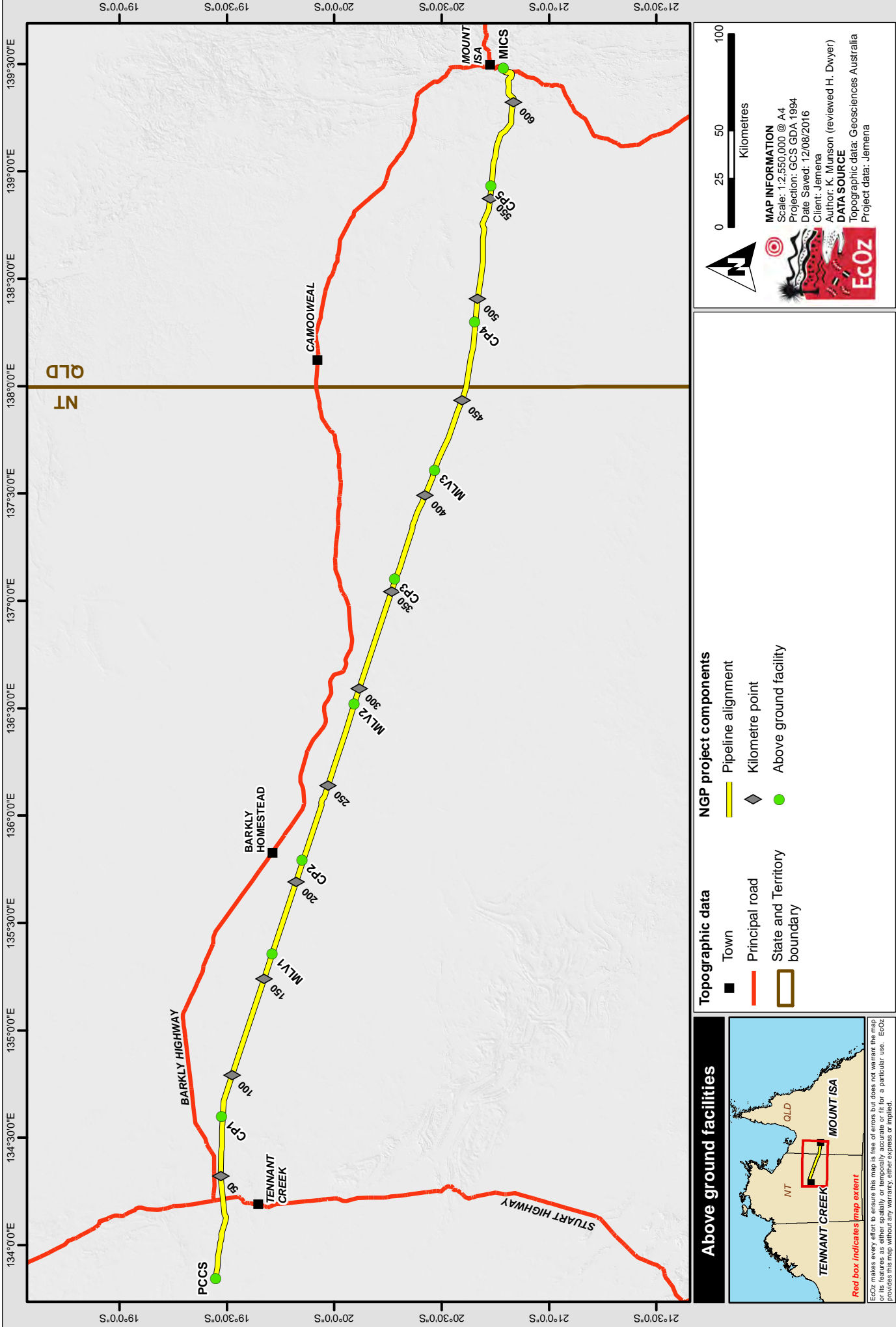
The main towns and populated places in the region are Tennant Creek, Threeways Roadhouse, Barkly Homestead Roadhouse, Camooweal and Mount Isa. The closest city to the NGP is Mount Isa, which is approximately 7 km north east of the Mount Isa Compressor Station. The town of Tennant Creek is 16.5 km to the south of the pipeline route and 41.5 km south east of the Phillip Creek Compressor Station.

There are a number of small Aboriginal family outstations and pastoral homesteads in the areas traversed by the pipeline route in the Northern Territory. The closest residential areas (sensitive receptors) are an Aboriginal family outstation located 3.4 km from the pipeline route and a pastoral homestead located 3.5 km north of the pipeline route. Due to the large separation distance from the Project footprint, these areas are not expected to be significantly impacted by construction or operation of the NGP.

## INFRASTRUCTURE AND FACILITIES

Details of the infrastructure and facilities that will be constructed are described below in order from west (Northern Territory) to east (Queensland):

- A 12-inch (323.9 mm) buried gas pipeline.
- A start of line receipt/compressor station at Warrego, located 45 km north-west of Tennant Creek. Referred to as the Phillip Creek Compressor Station (PCCS), the site will cover an area of 9 hectares (ha) (300 m by 300 m).
- Three main line valve (MLV) facilities at locations along the pipeline, two covering an area of approximately 0.12 ha (30 m x 40 m) each and one covering an area of approximately 0.24 ha (30 m x 80 m).
- An end of line (EOL) delivery compressor station located to the south-west of the Mica Creek Meter Station in Queensland. Referred to as the Mount Isa Compressor Station (MICS), the site will cover an area of approximately 9 ha (300 m by 300 m).
- Five cathodic protection (CP) stations, spaced between the PCCS, MICS and the MLV sites, each covering an area of approximately 0.04 ha (20 m by 20 m). The CP sites will comprise buried anode beds, located some distance from the pipeline (generally less than 500 m), that will be connected to the pipeline by buried cables.



**Figure 4. Northern Gas Pipeline route and facilities overview**

## PROJECT FOOTPRINT

Construction of the pipeline, compressor stations and above-ground facilities will require land clearing totalling approximately 2,470 hectares; of which 1,753 hectares will be in the Northern Territory and 717 hectares in Queensland. The majority of land disturbance will be temporary – only approximately 102 hectares will remain cleared for operational purposes.

The construction footprint will comprise a 30 m wide pipeline construction Right of Way (ROW), and extra work space for temporary facilities required to support construction. Extra work space and temporary facilities will include:

- accommodation camps for work personnel (five remote construction camps along the ROW and one construction camp near Warrego)
- access tracks to the construction ROW (upgrade of existing and construction of new)
- additional works areas (turn-around points, additional work space for crossings and, if required, temporary storage areas)
- water supply bores and dams for storing water required for dust suppression and hydrostatic testing (pressure testing) of the pipeline.

The construction ROW and all temporary facilities, temporary access tracks and extra work areas will be progressively decommissioned and reinstated on completion of the construction phase<sup>1</sup>. The only components to be retained in the long term are the compressor stations and above-ground facilities, access tracks to the facilities and any access tracks, bores or dams agreed with the landholder.

Following construction of the pipeline, landholders will be able to resume use of the land. Excavating or erecting permanent structures or buildings over the buried pipeline will be prohibited in accordance with the requirements under the relevant legislation and pursuant to agreements with landholders. Pipeline markers will be provided at fences, road crossings and other locations as required by *Australian Standard 2885 Pipelines – Gas and Liquid Petroleum (AS 2885)*.

## CONSTRUCTION PHASE

The Project construction phase is planned to begin in early 2016. Construction will be in accordance with AS 2885 and the *Code of Environmental Practice – Onshore Pipelines (APIA 2013)*.

Pre-construction activities will include:

- transportation of pipe, equipment and machinery
- establishing laydown areas
- construction of access roads/tracks from public roads/existing tracks to construction ROW
- establishing construction camps
- drilling water bores and construction of dams for construction water.

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<sup>1</sup> Final rehabilitation of the ROW and selected access tracks will take place progressively over an extended period (possibly a number of years) to allow Jemena to ensure the ROW is reinstated. Some access tracks, bores and dams may remain subject to landholder agreement.



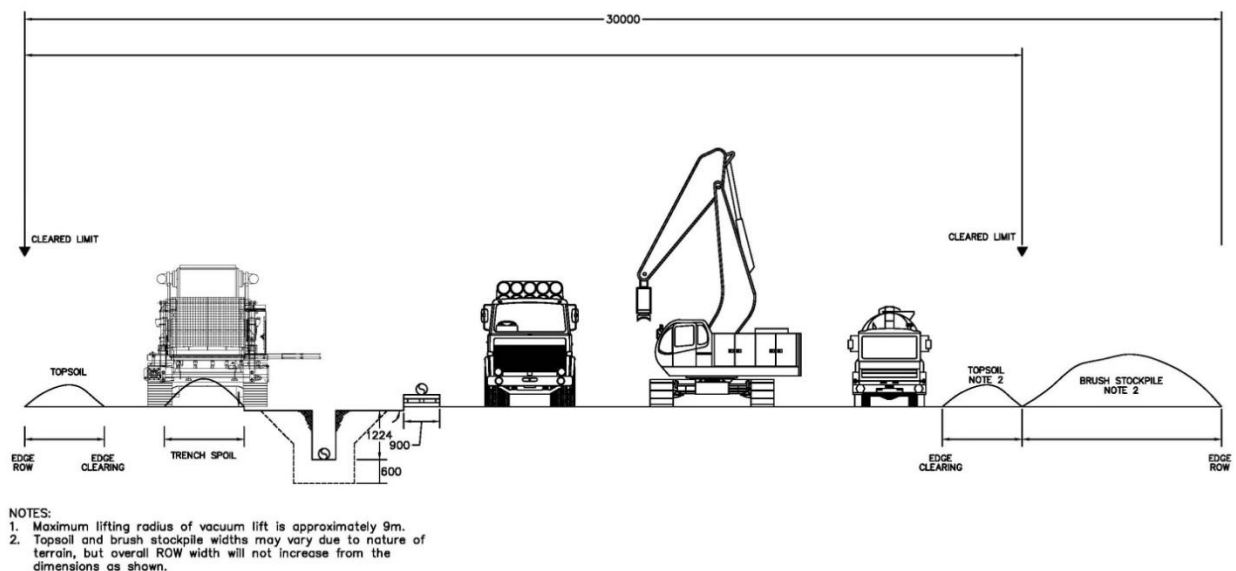
Existing access tracks will be utilised to access the construction ROW wherever possible. They will be upgraded as required to ensure they are at least 5 m wide. New access tracks will be constructed only where needed and where none currently exist.

Pipeline construction activities will occur within a 30 m wide construction ROW (Figure 5). Activities within the ROW occur progressively in the following order: clearing and grading, trenching, spoil placement, stringing and welding the pipeline, lowering-in and then backfilling the trench. Photos illustrating typical pipeline construction activities are shown in Figure 6, Figure 7 and Figure 8.

An allocated crew will construct the compressor stations independently of the pipeline. Once surveying and earthworks are complete, underground services will be installed. The foundations for major equipment, utilities, pads and site buildings will then be prepared, followed by the necessary footings, steel reinforcing and other required infrastructure indicated on drawings. Further structural, mechanical, piping and electrical works will be completed before completion of instrumentation and control systems.

## REINSTATEMENT AND REHABILITATION

Reinstatement of the construction ROW will occur progressively. Specific reinstatement requirements for areas potentially susceptible to erosion, such as major watercourse crossings and areas of dispersive soils, will be determined in Progressive Erosion Sediment Control Plans (ESCP). All reinstated areas will be monitored following completion of construction activities, and it is anticipated that additional minor rehabilitation works and weed control activities will likely be required along the reinstated ROW and other areas during the first few years of operation.

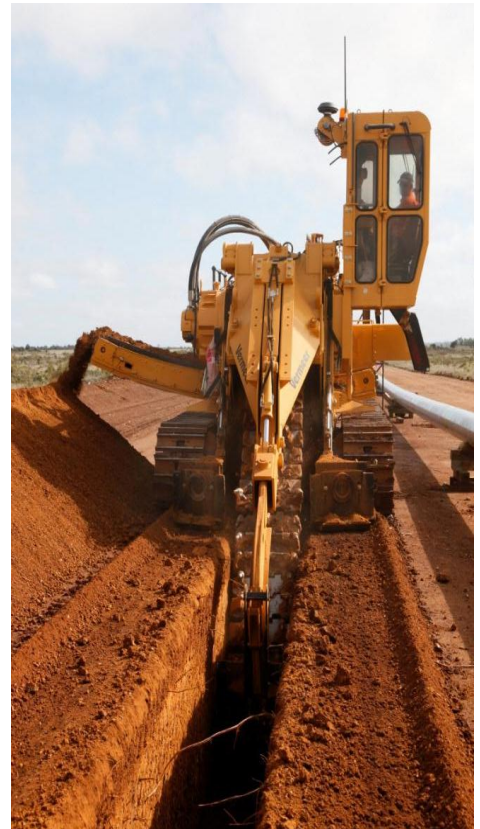


**Figure 5. Typical Construction ROW layout**





**Figure 6. A cleared pipeline construction ROW**



**Figure 7. Trenching**



**Figure 8. Lowering in a pipeline using booms**

## TESTING/COMMISSIONING

The pipeline will be subject to strength and leak testing, called hydrostatic pressure testing. This process involves filling a section of the pipeline with water and monitoring the pressure to detect for leaks.

Prior to hydrostatic pressure testing, the test section will be flushed with approximately 20,000 L of water to clean the pipe, removing any dirt, dust and debris (although this is expected to be minimal as the pipeline is internally coated). This water is referred to as pre-fill, and will be appropriately discharged to land at the end of each test section. Following pre-fill, the test section will be filled with hydrostatic test water.

A total of 22 ML of hydrostatic test water will be required; this volume includes pre-fill water. Water will be stored in dams along the ROW and reused for each test section, minimising the demand for water sources and the requirement for multiple treatment and discharge sites. At the completion of testing, hydrostatic test water will be sampled and analysed for potential contaminants, treated as required, and discharged to land. A Waste Discharge Licence will be sought from the NTEPA for the discharging of hydrostatic test water and conditions of this licence will guide discharging protocols.

## OPERATION AND MAINTENANCE

Day-to-day operation and maintenance of the compressor stations and above-ground facilities will be performed by field staff based primarily in Tennant Creek and Mount Isa. Jemena's control room staff will remotely perform a range of management and monitoring functions and manage pipeline throughput, customer billing, daily gas accounting and planning for scheduled outages.

The field operations bases will be supported by Jemena's standard maintenance scheduling processes and procedures that are currently in place on other pipeline assets. Easement and facility access will be via a combination of existing and Project-created access tracks, with use of helicopter where wet weather or other factors prevent access. Jemena's existing engineering resources will manage the new assets to align with current processes and offer support to field operations when coordinating key maintenance activities.

The pipeline has a design life of 30 years, but with ongoing integrity management, and subject to appropriate commercial drivers, the operational life is expected to be longer. If, and when, the pipeline is no longer required, it will be suspended and, if a decision is made to abandon the pipeline, all above-ground infrastructure will be disposed of appropriately in accordance with the legislative requirements applicable at the time.

## PERSONNEL AND ACCOMMODATION

The peak construction workforce is predicted to be approximately 725 personnel. While the majority of these workers will be sourced from within the region, skilled pipeline and facilities construction personnel will likely be sourced from outside the region. Other than construction personnel, drivers and plant operators, trades personnel, traffic controllers, trade assistants, security staff, stores workers, camp management and catering staff, and general labourers, will be employed locally.

Most construction personnel will be accommodated at the temporary construction camps. Construction personnel required for construction of Mount Isa Compressor Station will be accommodated locally in existing commercial accommodation out of Mount Isa with approximately 100 personnel anticipated to require commercial accommodation between January 2017 and March 2018. The Project intends to source and utilise local commercial accommodation providers in Tennant Creek and Mount Isa where it is available and feasible to do so. It is envisaged that up to 35 personnel will require commercial accommodation in Tennant Creek between March 2017 and May 2018; and a total of up to approximately 150 personnel will require commercial accommodation in Mount Isa between January 2017 and May 2018.

Operation and maintenance of the pipeline and above-ground facilities will require a small team of field staff (~10 personnel) responsible for day-to-day pipeline operations and maintenance activities. A control room will remotely manage day-to-day project and maintenance operations, monitoring, management and scheduling of pipeline throughput.

Specialist environmental staff will be responsible for ensuring the Project's construction phase is undertaken in accordance with regulatory requirements and industry best-practice. Environmental inspections will be conducted pre-construction, during construction and post-construction to ensure adherence to environmental management plans, commitments made in the EIS documentation and subsequent approval conditions. Operations phase environmental management planning will be overseen by Jemena's corporate environmental management staff, with specialist consultants and contractors engaged as required.

Specialist socio-economic impact personnel will be engaged and responsible for ensuring the implementation of the Economic and Social Impact Management Plan (ESIMP) and the Cultural Heritage Management Plan (CHMP), including the capacity building initiatives and for the continual implementation of the socio-economic risk mitigation and opportunity aspects of the Project.

### WATER USE

The majority of water required for the Project will be during the construction phase, when construction water (i.e. for dust suppression), hydrostatic pressure test water and potable water will be used. The average daily construction water use is estimated at 0.35 ML/day. Construction water will be sourced from existing supplies at Mount Isa and Tennant Creek, and existing groundwater bores (or new, if required) along the construction ROW as required. Potable water will be sourced from existing potable water suppliers, trucked to construction camps and stored in allocated potable water tanks.

Water requirements during the operational phase will be minimal with the exception of the Phillip Creek Compressor Station which will require up to 4,800 L/day for the nitrogen removal process. Water for operational requirements will be sourced from a groundwater bore that will be drilled near the facility. The details of this will be finalised prior to operation.

### ROADS AND TRANSPORT

Existing rail and road infrastructure will be used where possible. The Warrego Road, Stuart Highway and Barkly Highway will provide the main arterial route for transport of materials, equipment and personnel.

Traffic along the construction ROW will be controlled with speed limits, designated radio channels, access gates, boundary fences and access tracks. Construction camps will be located as close to the ROW as possible, with personnel moving between the ROW and camps in light vehicles (LVs) or small buses.

A Traffic Management Plan has been developed for the construction phase of the Project, and will be refined through the detailed planning and design phase. The Traffic Management Plan and all Traffic Guidance Schemes will be in accordance with the requirements of the relevant regulations and regulatory bodies. Any required works on roads (including closures or traffic diversions) will be discussed with the relevant road authority and landholder.

There will be limited traffic once the pipeline is operational, with staff movements limited to between Tennant Creek and the PCCS, and Mount Isa and the MICS. In addition, use of unsealed access tracks to above-ground facilities will be infrequent and used mostly for routine inspection and maintenance.



## OPERATION

The NGP facilities and pipeline will be designed and sufficiently automated for safe and reliable local and remote operation. The operation and proactive maintenance of the plant will be to a level consistent with Jemena's practice in its existing facilities. Each facility will be monitored and controlled from the remote Jemena control room 24 hours per day.

There will be sufficient remote and local manual isolation to maintain security of supply during normal and abnormal operations, maintenance activities, and to enable the safe shutdown, bypass and reduction in pressure during an emergency.

All maintenance and servicing requirements will be outlined in an Operations and Maintenance Manual.

## DECOMMISSIONING

The NGP has a design life of at least 30 years, however it could operate for longer if pipeline integrity is maintained. In the event that the pipeline is no longer required, it will be decommissioned in accordance with AS 2885. It is preferred that the pipeline be left in situ, as this will limit the environmental impacts associated with recovering the buried pipe.

## SCHEDULE

Construction is currently scheduled to commence in early 2017 with the pipeline system planned to be operational in 2018 (Figure 9).

The exact timing is dependent on a number of factors including the timeliness of the required approvals, access agreements with relevant stakeholders and weather conditions. Construction of the compressor stations is planned to extend through to early 2018, as access to these locations is less dependent on dry weather conditions. The construction schedule is driven by the Project objective to achieve commencement of gas transportation services (commercial operation) in 2018.

**Figure 9. Indicative Project schedule**



## PROJECT FEASIBILITY AND ALTERNATIVES

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The Project's feasibility was assessed by Jemena during the Northern Territory Government led three-stage tender process. The NGP was sized to match the Northern Territory's current gas production and Mount Isa's current demand requirements. The alternative of 'not proceeding' with the Project was considered through Jemena's feasibility assessments; the NGP was deemed feasible with the Northern Territory's current gas production, and there is significant potential for future expansion.

Initially a desk top assessment study was performed to select a preferred pipeline route corridor from a selection of four routes proposed by the Northern Territory Government, which covered a range of possible inlet and outlet connections along the Amadeus and Carpentaria Gas pipelines and the Moomba Gas Plant. The pipeline options considered would either terminate at Mount Isa or Moomba. The Tennant Creek to Mount Isa alignment was chosen as the preferred route by Jemena as it was the shortest route distance to connect Northern Territory gas reserves to the Eastern Gas Market, and a tariff price could be determined at a significantly lower cost than a southern option.

A 20 km wide 'planning corridor' was defined within which the pipeline route would be refined through further desktop and ground-based assessment. Following a site visit in April 2015, which involved aerial surveillance and on-ground inspection utilising public road accesses, four main route variations were identified within the 'planning corridor' for further assessment.

To select an alignment from the four route variations, an assessment was performed to rank the routes based on a number of criteria. The chosen pipeline route is the preferred route corridor due to the relatively low risk profile low and low capital expenditure. The route represents a compromise between maintaining regular access to the route via the Barkly Highway and avoidance of black soil areas. The western half of the route maintains access via the Barkly Highway through the portion of the route where there are little to no public access tracks. Along the eastern half the route deviates significantly from the Barkly but this area has a number of good condition access tracks predominantly used by the local cattle graziers. Access to water is generally available along the preferred route.

Over the course of 2016, the preferred locations for the pipeline corridor, above-ground facilities and access tracks were further refined to address the requirements of landholders and other stakeholders, and to avoid impacts to significant Aboriginal Sacred sites. Environmental surveys undertaken in May and June 2016 did not identify any areas of sensitivity which would require re-routing of the pipeline.

## STAKEHOLDER ENGAGEMENT

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As a member of the Australian Pipelines and Gas Association (APGA) and an acknowledged energy infrastructure sector leader in stakeholder engagement, Jemena is committed to the principles of stakeholder engagement outlined in APGA's draft *Code of Practice for Stakeholder Engagement*. Jemena believes successful communication and engagement is based on simple, practical principles that represent a combination of common sense, good business practice and ethical considerations.

Stakeholders of the Project can be categorised into three sectors:

- government
- private
- community and non-government sector.

Jemena has employed, and will continue, a multi-faceted approach to proactively engaging with stakeholders who are directly and indirectly impacted by the Project. Jemena intends to build upon the

positive relationship that exists with each of these stakeholder groups and the broader community fostered during the bid phase and further developed since being selected to develop the Project.

The frequency and methods of Jemena's communication and engagement will vary throughout the Project depending on each stakeholder's requirements and level of interest or involvement in the Project. The main engagement tools and methods Jemena has and will continue to use include regular newsletters, face to face meetings and discussions, roadshows, community and business briefings and emails.

A community feedback phone line (1300 578 518) and email enquiry address ([NGP.Enquiry@jemena.com.au](mailto:NGP.Enquiry@jemena.com.au)) have been established to allow members of the public to contact the Project's Approvals and Stakeholder Management Team and Community Relations Manager.



**Figure 10. Participants at a Mount Isa business briefing and open office**



**Figure 11. NGP External Affairs Manager discusses the Project at the Camooweal Information Booth**

## RISK ASSESSMENT

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An environmental risk assessment was conducted to support the identification, analysis and mitigation of potential environmental, social and economic impacts associated with the Project. The purpose of the environmental risk assessment was to demonstrate that:

- Jemena has fully considered the environmental risks associated with the Project
- risk prevention and mitigation are properly addressed in the design specifications
- risks will be managed effectively throughout the construction, operation and decommissioning phases of the Project.

The risk assessment was guided by Jemena's corporate risk management procedures and the principles in *AS/NZS ISO 13000:2009 – Risk Management – Principles and guidelines*. Risks were systematically identified taking into consideration:

- the Project activities in relation to individual aspects of the existing environment
- the existing knowledge and experience held by Jemena and the Construction Contractor in relation to identification and management of environmental risks on gas pipeline projects
- feedback from stakeholder engagement activities, including targeted consultation with NT Government agencies
- preliminary risks specified in the EIS ToR.

The following aspects of the environment were considered as part of the risk assessment.

- Biodiversity
- Water
- Historic and cultural heritage
- Human health and safety
- Socio-economic aspects
- Air, noise and vibration
- Matters of National Environmental Significance (i.e. EPBC-listed threatened species and ecological communities).

Once all risks had been identified, the consequence and likelihood of each individual risk was assessed. In accordance with Jemena's risk level and target action matrix, treatment options (controls) were considered for each risk with an inherent (pre-mitigation) risk level of MODERATE or above. Controls were generally identified using the *Code of Environmental Practice – Onshore Pipelines* (APIA 2013), management plans prepared by specialist consultants, input from Project stakeholders and the past project experience of Jemena and the Construction Contractor. Following documentation of practicable control measures, the risk of the impact occurring was re-assessed, and the resulting risk level is referred to as the 'residual risk'.

The Draft EIS documents the environmental risk assessment prepared for the Project. An Environmental Risk Register and separate Economic and Social Risk Register are provided as appendices to the Draft EIS.

A total of 162 potential environmental, social and economic impacts were identified and assessed. The risk assessment process demonstrates that with mitigation measures in place, the majority of environmental risks associated with the Project can be reduced to LOW or MODERATE. There is one risk with a residual



risk level of Significant; this is related to risks associated with the introduction and spread of weeds during the construction phase of the Project. No residual risks were rated as HIGH or EXTREME. The residual risk profile for the Project planning, construction and operation phases are summarised in Table 1, Table 2 and Table 3.

The risk assessment presented in the Draft EIS will form the basis for ongoing management and review of risks throughout the life of the Project under the guidance of Jemena's Environmental Management System (EMS) risk management procedures. Communication and consultation is central to the risk assessment process and accordingly a range of internal and external stakeholders were consulted through the risk assessment process. The outcome of the risk assessment undertaken as part of the EIS process will be scrutinised by the public, government and non-government stakeholders. As the Project progresses through to detailed design, Jemena will review and update the NGP environmental risk register in response to feedback received from stakeholders.

Management controls identified through the risk assessment process are included in the framework Environmental Management Plan (EMP) provided in Chapter 13 of the Draft EIS.

Table 1. NGP planning phase residual risk profile

ENVIRONMENTAL ASPECT	LOW	MODERATE	SIGNIFICANT	HIGH	EXTREME
BIODIVERSITY & THREATENED SPECIES	3	1	-	-	-
WATER	3	-	-	-	-
HERITAGE	3	-	-	-	-
ECONOMIC AND SOCIAL	8	1	-	-	-
HEALTH AND SAFETY	-	-	-	-	-
AIR QUALITY	1	-	-	-	-
NOISE & VIBRATION	1	-	-	-	-

Table 2. NGP construction phase residual risk profile

ENVIRONMENTAL ASPECT	LOW	MODERATE	SIGNIFICANT	HIGH	EXTREME
BIODIVERSITY & THREATENED SPECIES	26	4	1	-	-
WATER	9	2	-	-	-
HERITAGE	3	-	-	-	-
ECONOMIC AND SOCIAL	42	9	-	-	-
HEALTH AND SAFETY	5	3	-	-	-
AIR QUALITY	1	-	-	-	-
NOISE & VIBRATION	3	-	-	-	-

Table 3. NGP operational phase residual risk profile

ENVIRONMENTAL ASPECT	LOW	MODERATE	SIGNIFICANT	HIGH	EXTREME
BIODIVERSITY & THREATENED SPECIES	6	2	-	-	-
WATER	4	1	-	-	-
HERITAGE	2	-	-	-	-
ECONOMIC AND SOCIAL	5	2	-	-	-
HEALTH AND SAFETY	3	2	-	-	-
AIR QUALITY	-	2	-	-	-
NOISE & VIBRATION	1	3	-	-	-

## BIODIVERSITY AND THREATENED SPECIES

The Draft EIS describes the biodiversity and threatened species that characterise the existing environment within and surrounding the Project footprint, and assesses the potential impacts to biodiversity and threatened species from the proposed activities. Risks associated with each potential impact to biodiversity and threatened species were analysed and evaluated using the environmental risk assessment process. Ecological surveys were conducted to inform the risk assessments and the development of a Biodiversity Management Plan.

Broadly, there are two habitats within the Project footprint – grasslands and open woodland. These are common within the bioregions traversed and form broad areas of largely contiguous habitat. The dominant habitats are crossed by ephemeral and intermittent braided streams with riparian vegetation. At the eastern and western ends of the pipeline route there are rocky hills and outcrops which extend over a broad area. There are no national parks, conservation reserves or other sites of conservation significance intersected by the Project footprint.

There are no Threatened Ecological Communities (listed under Section 18 A of the EPBC Act) within the Project footprint. Two sensitive vegetation types - riparian vegetation and wetlands – do occur in the region. There is some riparian vegetation along the Ranken, James, Blue Bush and Georgina rivers. This is mostly comprised of a few reeds on the bank, some with *Eucalyptus coolabah* trees. There are temporary swamps and flood-outs proximate to the Project footprint; however none are directly intersected.

The Draft EIS contains a Threatened Species Survey Report that details the approach, methods and results of field-based ecological assessments. Table 4 lists the threatened flora and fauna species listed under both the EPBC Act and the Territory Parks and Wildlife Conservation Act (NT) (TPWC) that are known or likely to occur in the Project footprint.

**Table 4. Threatened flora and fauna species known or likely to occur in the Project footprint**

Common name	Scientific name	EPBC status	TPWC status
Carpentarian Antechinus	<i>Pseudantechinus mimulus</i>	Vulnerable	Vulnerable
Plains Death Adder	<i>Acanthophis hawkei</i>	Vulnerable	Vulnerable
Tobermorey Melon	<i>Austrobryonia argillicola</i>	-	Vulnerable
Grey Falcon	<i>Falco hypoleucos</i>	-	Vulnerable
Painted Honeyeater	<i>Grantiella picta</i>	Vulnerable	Vulnerable

The Carpentarian Antechinus (a carnivorous marsupial) and the Tobermorey Melon (a creeping herb) were both recorded within the Project footprint during field surveys. The Painted Honeyeater (a mistletoe-eating bird), Grey Falcon (a small bird of prey) and Plains Death Adder (a snake) were not recorded during the surveys; however, based on habitat assessment, there is a high chance they could occur.

Each of the five Threatened species that are known or likely to occur within the Project footprint was assessed to determine whether or not the species occurrence would meet the criteria for being defined as an 'important' population in accordance with *EPBC Significant Impact Guidelines 1.1*. The assessment concluded that important populations of two threatened fauna species are likely to occur as follows:

- Carpentarian Antechinus in the rocky country between KP 609.5 and KP 620.5
- Plains Death Adder in the black soil country between KP 355 and KP 561.

The Draft EIS includes an assessment of potential impacts on threatened flora and fauna species and on biodiversity at the species and ecosystem level. It considers direct impacts associated with clearing of vegetation and habitat and indirect impacts associated with mortality of fauna in the pipeline trench, effects of noise and vibration, vehicle strikes, dust, erosion and the introduction of weeds. Details of risk mitigation and management are included in the Biodiversity Management Plan and Weed Management Plan provided within the Draft EIS. Other management plans that will contain controls to minimise potential impacts on biodiversity include the Water Management Plan, Traffic Management Plan, Air and Noise Management Plans and Rehabilitation Plan.

The controls documented in the Draft EIS are expected to reduce most biodiversity risks to LOW. The Project activities are not expected to cause any significant residual impact on either the Carpentarian Antechinus or Plains Death Adder. There is a level of residual risk associated with the following potential impacts:

***Introduction and spread of weeds***

The Weed Management Plan provided with the Draft EIS will greatly reduce weed risks; however, experience on other linear Projects in the Northern Territory indicates that, even with controls in place, managing the spread of weeds is difficult. The Draft EIS contains a commitment to complete weed surveys across the entire Project footprint prior to commencement of construction. Following these surveys it may be possible to further reduce the levels of residual risk through implementation of targeted site-specific weed management controls. It is expected that weeds will require ongoing management during the operations phase.

***Reduced water quality and availability - effects on sensitive riparian habitats and ecosystems.***

Impacts to surface water and/or groundwater could occur through disposal of hydrostatic test water and extraction of groundwater, which could have an effect on sensitive riparian habitats and ecosystems. The Draft EIS contains commitments to developing a Hydrostatic Test Plan and obtaining Waste Discharge Licences for discharge sites, and confirming sustainable levels of groundwater extraction. These controls are expected to further reduce the residual risk to LOW.

***Rehabilitation failure***

Development of a Rehabilitation Plan prior to commencement of construction activities will maximise the likelihood of rehabilitation being successful. However, the environmental conditions within the Project footprint, i.e. extreme dry and wet conditions, mean there is a residual level of risk that rehabilitation could fail. This risk is greatest at watercourses and where there are pre-existing weed infestations. The Draft EIS contains commitments to ongoing weed controls and monitoring of rehabilitated areas to ensure the rehabilitation acceptance criteria prescribed in the Rehabilitation Plan are achieved and maintained.

## WATER

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The Draft EIS describes the surface and groundwater features that characterise the existing environment within and surrounding the NGP Project footprint, and assesses the potential impacts to surface water and ground water from Project activities. Risks associated with each potential impact to water were analysed and evaluated using the environmental risk assessment process. Major watercourses that will be crossed by the pipeline were subject to ground-based observations and a Hydrogeologist was engaged to characterise the groundwater features within the Project footprint and to inform preliminary assessment of risks to groundwater.

### SURFACE WATER

The Project will occur mainly within the Barkly and Georgina River basins and to a smaller extent the Wiso and Leichhardt River basins. Watercourses within the Project footprint are generally ephemeral and intermittent, and drain inland. Construction of the pipeline will involve six major watercourse crossings (stream order five and above; rivers), 12 minor watercourse crossings (stream order three and four; creeks) and a number of drainage line crossings (stream order one to two) (Figure 12). The major watercourse crossings in the Northern Territory are at the Ranken, James and Georgina rivers. In Queensland the Project crosses Redbank, Mingerla, Polygonum, Yaringa and Mica creeks, plus the Templeton River.

Watercourse crossings will be constructed via open-trench and will be installed in the following order of preference: first, in times when there is no water present; second, in times of no flow, or third, in times of flow, but in a way that does not impede low flow. Watercourse crossings will be reinstated progressively and as soon as practicable to minimise the duration of disturbance. The Draft EIS contains a Primary Erosion and Sediment Control Plan that describes the procedures for construction and reinstatement of watercourse crossings that are expected to ensure minimal impact occurs to downstream water quality or aquatic ecosystems.

In the Northern Territory, there are no known springs or permanent water bodies within the Project footprint. Permanent pools have been recorded along the major rivers, which are likely to be sustained by groundwater seepage from locally perched watertables. Surveys to date have indicated that no large permanent pools are likely to be present within the construction ROW; however, some smaller pools could occur depending on the wet season conditions over the period preceding the construction phase. The Water Management Plan provided with the Draft EIS identifies controls to minimise potential impacts on both groundwater and surface water, and accounts for the range of surface water conditions that may be present at the time of construction.

The controls documented in the Water Management Plan are expected to reduce most surface water risks to LOW. There is a level of residual risk associated with release of wastewater from hydrostatic testing (refer relevant section below).

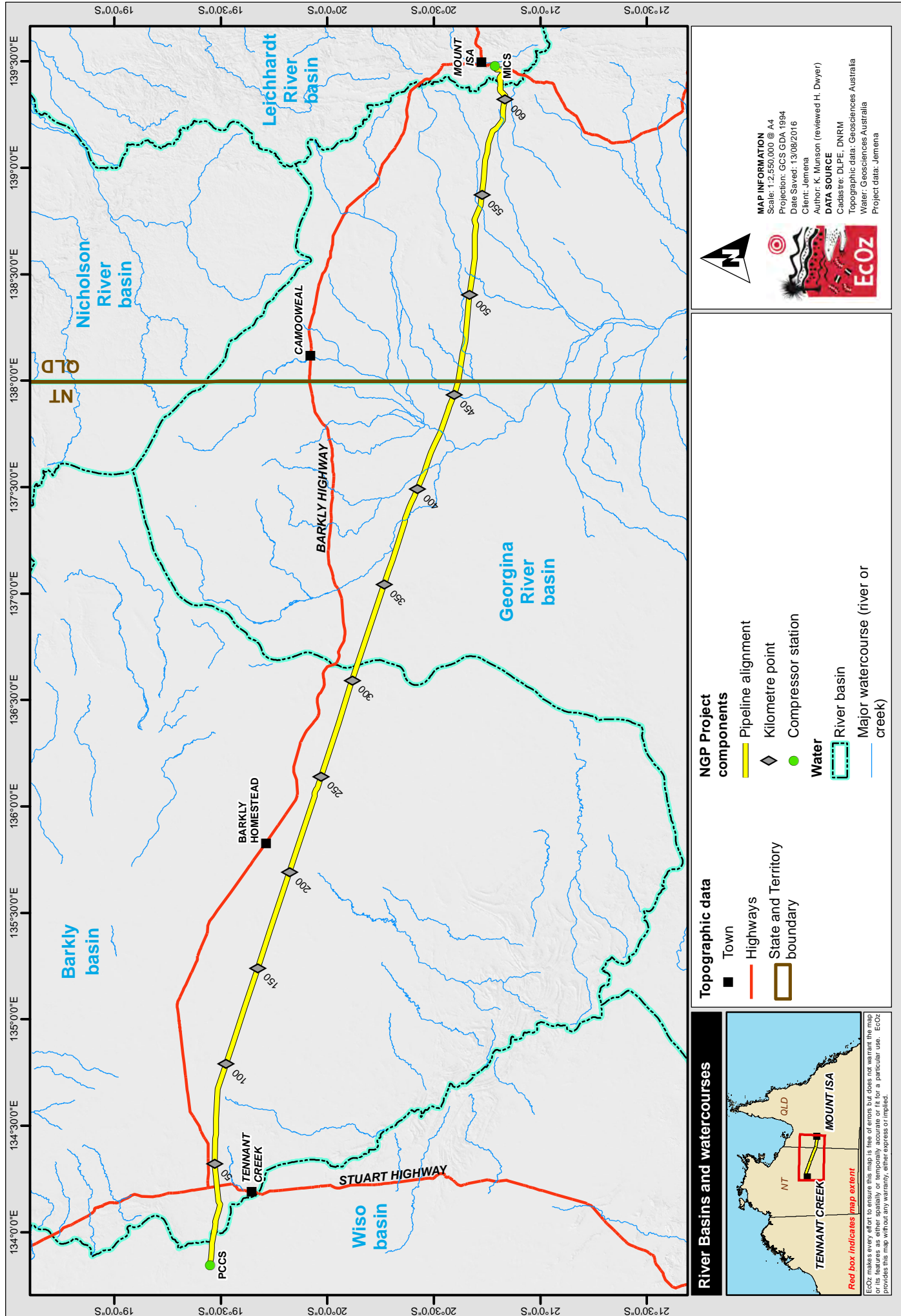


Figure 12. Map of river basins and major watercourses in relation to the Project footprint



## GROUNDWATER

During the construction phase a total volume of approximately 111 ML of water will be required for dust suppression, potable water, and hydrostatic testing of the pipeline. Water will be sourced mainly from existing suppliers at Mount Isa and Tennant Creek, or from existing groundwater bores (subject to Landholder approval). The relatively short construction timeframe (i.e. over a single dry season) and modest extraction volumes minimises the risk of groundwater drawdown occurring, and impacts on other users or the environment are therefore not expected to occur.

The Phillip Creek Compressor Station will require up to 4,800 L of water per day for operations, which will be sourced from a groundwater bore drilled near the site. The Draft EIS contains a commitment to undertake further assessment of sustainable yields of target aquifers, and potential impacts to other users and the environment. These studies will occur prior to any extraction, following which any risks to the local groundwater aquifer will be re-assessed.

## HAZARDOUS MATERIALS TRANSPORT STORAGE AND HANDLING

Volumes of hazardous materials will be transported and stored at purpose built storage facilities located at the temporary construction camps and compressor station construction sites. In the event of a major spill or leak, pollution could enter surface water courses or seep into underlying groundwater. The Draft EIS contains a commitment that all dangerous goods transport and storage will be in accordance with the requirements of the *Australian Dangerous Goods Code, Australian Standard (AS) 1940 Storage and handling of flammable and combustible liquids* and the *National Standard NOHSC: 1015 (2001) Storage and Handling of Workplace Dangerous Goods*. In addition, the Construction Contractor will develop and implement a Dangerous Goods and Hazardous Substance Management Procedure, including a Spill Response Plan. These controls are expected to reduce the risks of pollution impacting surface waters to LOW.

## WASTEWATER

The main sources of wastewater associated with the Project construction phase are construction camps (grey water, sewage, washdown bay water) and hydrostatic test water. During operations, gas treatment at the Phillip Creek Compressor Station will produce wastewater. Storage and disposal of the wastewater has potential pollute surface water and groundwater if not appropriately managed. The Draft EIS describes the proposed approach to capturing, treating and disposing of each wastewater stream, including the approvals and licences that will be secured pursuant to Northern Territory regulatory requirements.

### ***Construction camps***

Construction camp wastewater will be captured and treated using suitably sized and designed wastewater treatment plants and disposed of by irrigation to approved land disposal sites. The Draft EIS contains a commitment that wastewater disposal sites will be chosen based on a Land Capability Assessment, and water will be treated to a suitable quality for release via irrigation as specified in a *Wastewater Works Design Approval* from Department of Health. These controls are expected to minimise the risks associated with pollution entering surface water or groundwater.

### ***Hydrostatic test water***

The pipeline will be hydrostatically tested prior to operation to detect potential leaks and confirm the pipeline's capability to operate at the proposed operating pressure. The testing involves pumping water into lengths of the pipeline. Water is expected to be sourced from approved sources along the pipeline construction ROW and will be stored in temporary dams and reused in subsequent test sections where

practicable, to minimise the demand on water resources and the number of discharge sites. At the completion of testing, hydrostatic test water will be discharged to approved land disposal sites, subject to sampling of the water quality and compliance with relevant guideline values. No discharge will occur near watercourses, in areas overlying highly porous aquifers, or near sinkholes, reducing the consequence of discharge on both surface and ground water quality.

The Draft EIS includes a Construction Water Management Plan that describes the procedures for selecting disposal sites, sampling of hydrostatic test water and associated water quality guidelines values. Where guideline values are not met, water will be treated to reduce the likelihood of impacts to surface water and groundwater quality. If guideline values still are not met, or if biocides are added to the water, then the water will be disposed of via alternative methods such as evaporation ponds. For discharges in the Northern Territory a Waste Discharge Licence (WDL) will be sought from the NTEPA, the conditions of which will stipulate water quality and discharge requirements.

The Draft EIS risk assessment indicates a level of residual risk associated with the disposal of hydrostatic test water, which is mainly a function of the disposal locations not being finalised at the time of the risk assessment. The Draft EIS contains a commitment that the Construction Contractor will develop a Hydrostatic Test Management Plan prior to commencing any testing. Implementation of the approved plan and compliance with Waste Discharge Licences is expected to ensure that surface water and groundwater is protected.

### ***Operational wastewater***

Approximately 200 L/hr of waste water will be produced at the PCCS as part of the nitrogen removal process. This water will be treated and then directed to an on-site evaporation pond for disposal by evaporation. The evaporation pond to be engineered and designed to accommodate expected water volumes, with sufficient freeboard for expected rainfall volumes. The Draft EIS indicates that there is a level of residual risk to groundwater associated with the disposal of wastewater at the PCCS site, which is mainly a function of the preliminary nature of the pond design at the time of the risk assessment. Subject to completion of the detailed design process and subsequent development of operational procedures for managing the wastewater, it is anticipated that this risk level will be reduced.



## HISTORIC AND CULTURAL HERITAGE

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The Draft EIS describes the historic and cultural heritage values that characterise the existing environment within and surrounding the Project footprint, and assesses the potential impacts to historic and cultural heritage values from Project activities. Risks associated with each potential impact to heritage were analysed and evaluated using the environmental risk assessment process. Aboriginal groups were consulted, through their Representative Bodies, and an archaeological survey of the Project footprint was undertaken by qualified archaeologists.

The Draft EIS identifies and assesses the risk of any impacts on the following types of heritage items or places:

- places inscribed on the World Heritage Register
- places on the National and Commonwealth Heritage Register's
- places or objects on the Northern Territory Heritage Register
- sites that are significant according to Aboriginal tradition (Sacred Sites)
- Aboriginal archaeological sites protected under the Heritage Act (NT).

The Draft EIS focus is on those places or items of historic and cultural heritage value within the Northern Territory, noting that a similar approach has been applied in Queensland in accordance with the legislative requirements of that jurisdiction.

An assessment of the risks to historic and cultural heritage resulting from the Project was informed by desktop research, in-field Sacred Site and archaeological surveys, and ongoing direct engagement with key Aboriginal leaders, Traditional Owners and their representatives.

The Draft EIS identified the following potential impacts to heritage values during the planning, construction and operations phases:

- unlawful entry into, or physical disturbance of Aboriginal Sacred Sites
- impacts associated with physical disturbance of Aboriginal archaeological sites
- impacts associated with the accidental disturbance of skeletal remains.

The NT Heritage Register does not record any declared heritage places located within the Project footprint and so impacts are not expected to occur.

## ABORIGINAL SACRED SITES

The Aboriginal language groups represented across the modern Barkly region include the Warumungu, the Wakaya, the Arruwurra (a subset of land owning group of the Wakaya) and the land owning groups associated with the Burramurra Native Title Claim. Each of these groups has been, and will continue to be engaged, in the identification and management of Aboriginal sacred sites and other sites/areas of cultural significance. The pipeline route has been realigned in a number of locations to avoid Sacred Sites, and the current alignment does not directly impact on any known sites. Jemena formally applied to the AAPA for an Authority Certificate pursuant to the Aboriginal Sacred Sites Act (NT) in May 2016.

## ABORIGINAL ARCHAEOLOGICAL SITES

An archaeological survey of the Project footprint identified a suite of sites with variations in site abundance in different landforms. The vast majority of sites are stone artefact scatters, quarry sites, background scatters and isolated stone artefacts. Several major sites and site types were located along the pipeline ROW. The Draft EIS indicates that these sites will be managed through a combination of avoidance, and where this is not possible an application for Works Approval will be made under Section 72 of the Heritage Act (NT). All sites have been fully documented by qualified Archaeologists, and no disturbance will occur until approvals are secured from the NT Heritage Branch.

## SKELETAL REMAINS

There is potential that sub-surface archaeological material exists within the Project area which would not be identified by archaeological surveys, which focus on observation of the ground surface. Specifically in the Warumungu traditional land area there is potential for tree burials to exist. Skeletal material may also be buried in other areas, particularly sandy country. The risk of disturbing skeletal remains is LOW; however, the Draft EIS indicates that during the initial clearance of treed areas Traditional Owners will be engaged to join the clear and grade team ahead of construction and procedures will be put in place to manage the discovery of skeletal remains, or other sub-surface archaeological objects.

## CULTURAL HERITAGE MANAGEMENT PLAN

The Draft EIS contains a framework Cultural Heritage Management Plan (CHMP) and a commitment that the conditions of Authority Certificates (issued pursuant to the NT Aboriginal Sacred Sites Act) and Work Approval Permits (issued pursuant to the NT Heritage Act) will be incorporated into the CHMP prior to commencement of works. Procedures for implementation of the CHMP will be documented by the Construction Contractor in the Construction EMP prior to commencement of works. The risks to heritage values during the operations phase are LOW; however, the Operational EMP will contain controls relating to any land access or ground disturbance required for maintenance activities.

Permits will be sought for accessing Aboriginal land throughout the Project lifespan. Land access agreements will be developed with Traditional Owners and their representative Land Councils. These agreements will further outline specific land access requirements.

The controls documented in the Draft EIS are expected to reduce all heritage risks to LOW. The Project activities are not expected to cause any significant residual impact on heritage values.

## SOCIO-ECONOMIC ASPECTS

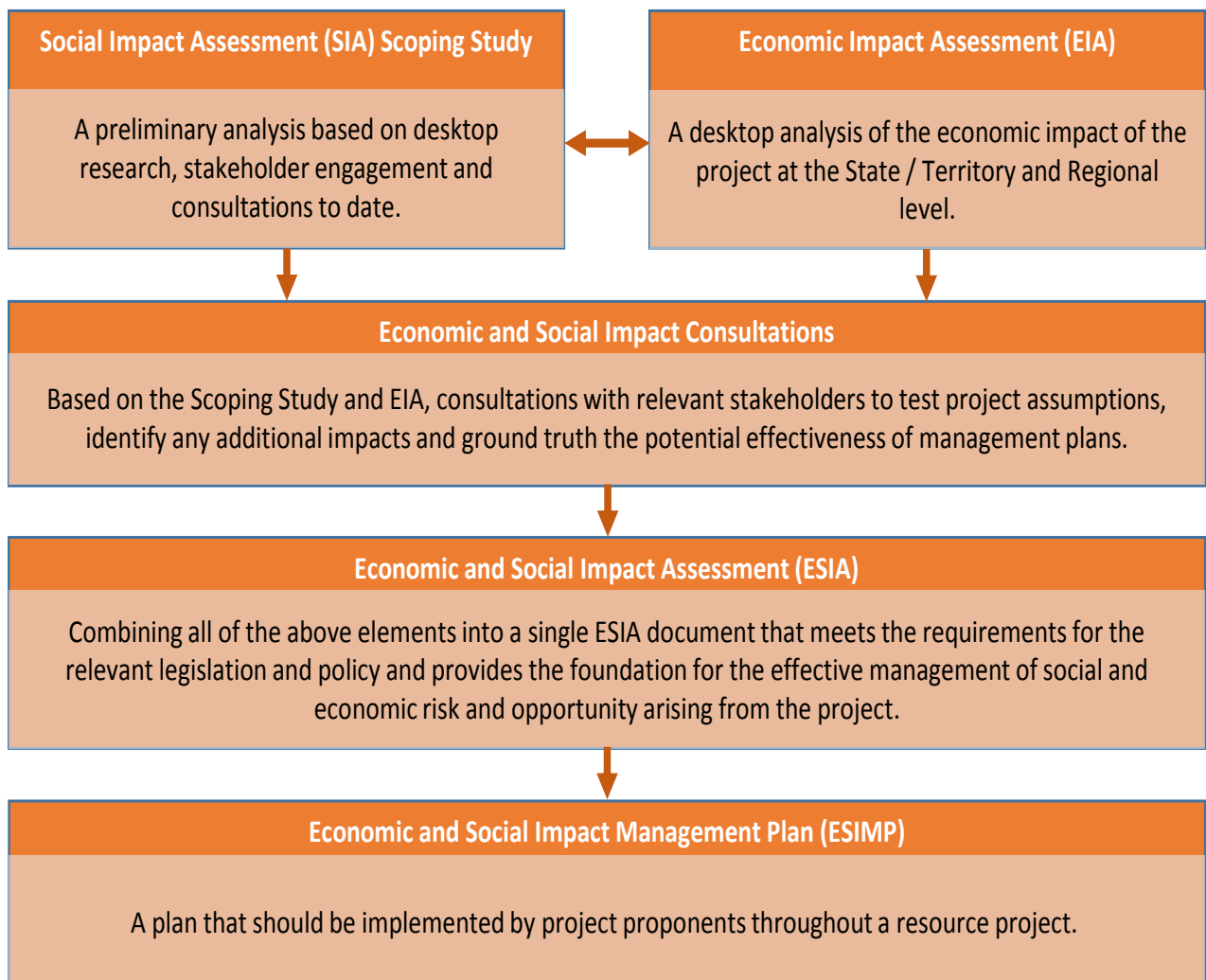
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The Draft EIS describes the economic and social characteristics of the regions, communities, and people that may be affected by the Project and summarises the potential social and economic impacts (both risks and opportunities) of the Project. Risks and opportunities associated with each potential impact were analysed and evaluated using an adapted risk assessment processes. In accordance with the NTEPA *Guidelines for the preparation of an Economic and Social Impact Assessment* the risk assessment sought to identify potential positive and negative impacts on local and regional residents and communities in terms of:

- safety
- business, training and employment opportunities
- housing and accommodation availability and affordability
- amenity
- service provision and potential for overloading services, especially in remote areas e.g. public transport, road networks, health services, education, police services
- recreational and cultural opportunities
- community cohesion and resilience.

The Draft EIS includes a Social Impact Assessment (SIA) Scoping Study that provides a detailed analysis of the socio-economic environment potentially impacted by the Project, a methodology for risk and opportunity assessment, a stakeholder consultation plan and a framework Economic and Social Impact Management Plan (ESIMP). This is complemented by an Economic Impact Assessment (EIA). The Draft EIS contains a commitment that following completion of ESIA stakeholder consultations, additional insights and impacts will be analysed and included in the final Economic and Social Impact Assessment Report, which will inform further updates to and implementation of the ESIMP.

The Project approach to economic and social impact assessment is illustrated in Figure 13. As the Draft EIS is to secure required Northern Territory environmental approvals it focuses on impacts and opportunities in the Northern Territory, while the approach to ESIA, as a matter of best practice includes the relevant Queensland communities and associated impacts.



**Figure 13. Economic and social impact assessment approach**

## SOCIO-ECONOMIC PROFILE

The Draft EIS provides an analysis of the existing social and economic landscape including key stakeholders, main towns and communities (Tennant Creek, Alpururulam, Camooweal, Mount Isa), key social and economic demographics and indicators (education, training, employment, life expectancy, income levels, etc.), industries, community cohesion and resilience. Given there is a large Aboriginal population within the Project footprint, insights into potentially affected Aboriginal communities, people, customs, culture and way of life are detailed. In addition, consideration is given to the pastoral stations and remote residents located in the region.

## POTENTIAL ECONOMIC BENEFITS

In terms of potential economic benefits from the Project, the EIA calculated the NGP Project could result in an increase in economic output of Australia by \$1.379 billion, the Northern Territory by \$213 million and the regions (Barkly and Mount Isa local government areas) by \$160 million.

Local benefits will occur through expenditure in the construction and operating phases on local contractors and local employees. Jemena estimates that 100 contracts with an estimated value of approximately \$84 million could be competitively tendered for and 309 full-time equivalent (FTE) jobs could be filled at the regional level during the construction phase. During the operations phase, Jemena is targeting 11 contracts with an estimated value of \$500,000 a year and 30 jobs, equivalent to approximately 9.6 FTE jobs. Jemena hopes to provide 42 contracts and 122 jobs for Indigenous employees over the Project life.

At the Territory level, Jemena is targeting 67 per cent of the 200 supply contracts for tender by Northern Territory businesses, with an estimated value of \$112m in the construction phase and \$0.5m during the operations phase. The company is hopeful that 63% of the potential 900 jobs could be filled from the Northern Territory labour market meaning a potential 386 FTE jobs. During the operations phase an estimated 38 out of 41 positions could be filled from the Northern Territory labour market, resulting in a potential 12 FTE.

## SOCIAL-HEALTH AND WELL-BEING

The Draft EIS identifies a variety of potential impacts to community social health and well-being that could arise from the Project. These relate to:

- land negotiations and agreements
- Aboriginal land and living areas
- community concerns about NT onshore gas Industry
- increased incomes
- community participation
- illegal activities and unauthorised access to project facilities
- workforce accommodation management in Tennant Creek
- visual amenity.

A number of these potential impacts were assessed as having potentially HIGH or SIGNIFICANT inherent risks i.e. before controls are in place. These relate to the potential impacts of the accommodation of the Phillip Creek Compressor Station construction workforce in or near Tennant Creek, and impacts associated with workforce behaviour management, the flow on social effects of local economic impacts and social cohesion.

The Draft EIS documents a range of controls that are expected to reduce most social health and well-being risks to LOW. There is a level of residual risk associated with the following potential impacts during the construction phase:

### ***Increased wages and benefits contributing to anti-social behaviour***

Experience on other large construction Projects in remote areas indicates that increased wages and benefits circulating in the community may cause an increased incidence in the use of alcohol and drugs, which in turn can result in increased anti-social behaviour/negative interaction with the health and criminal justice system. Even with the best intentions and good controls in place, these impacts can be difficult to manage. The framework ESIMP provided with the Draft EIS outlines various strategies that Jemena is committed to implementing to further reduce these risks.

***Traffic incidents***

There remains a level of risk associated with traffic incidents in Tennant Creek and along the Barkly and Stuart Highways. This risk will be managed through implementation of a Traffic Management Plan, including Traffic Guidance Schemes approved by local road authorities, for HIGH risk areas. Even with these controls in place there will remain a level of residual risk, because in the event of an incident serious injuries or fatalities could possibly occur.

**ECONOMY AND DEVELOPMENT**

One of the primary risks that was identified and sought to be addressed in the EIS ToR was the potential for the Project not to realise the social and economic benefits that were originally envisaged. Inherent in that overall risk is a variety of risks associated with economy and development relating to:

- procurement and contracting
- employment
- inflationary pressures, reduction in community supply
- labour displacement and local wage pressures
- competition between Mount Isa labour market vs Tennant Creek labour market
- workforce accommodation management in Tennant Creek
- agricultural productivity and existing land use
- gas supply to remote communities.

The Draft EIS documents a range of controls that are expected to reduce most economy and development risks to LOW. There is a level of residual risk associated with the following potential impact during the construction phase:

***Local people and businesses miss opportunities***

There will remain the risk that local people and businesses are not successful in obtaining jobs and contracts, that the Barkly labour market and business capacity is overshadowed by the much larger Mount Isa capacity and that the Project labour demand drains skilled workers from existing industries, including the pastoral industry, tourism, local government and other local businesses. Jemena will seek to obviate or mitigate these impacts through the implementation of the various capacity building programs, transparent implementation of its Regional Employment Plan, promotion of the SME Business Investment Fund and clear communication about labour demand through the proposed CRG. Fundamentally; however, Jemena cannot control the market, nor the choices of individual people and businesses, their desire and ability to be competitive.

**ECONOMIC AND SOCIAL IMPACT MANAGEMENT PLAN**

The Draft EIS includes a framework Economic and Social Impact Management Plan and a commitment that prior to commencement of works, the ESIMP will be updated with the full-suite of controls deemed necessary to minimise social and economic impacts and maximise opportunities. The key strategies documented in the Plan are listed below:

- Implementation of a Workers Accommodation Plan in Tennant Creek that minimises potential negative risks (e.g. displacing other accommodation users, impact to community amenity) while optimising the use of established providers.
- Implementing a Regional Employment Plan to maximise jobs opportunities on the Project for local and Indigenous people.
- Aboriginal participation measures to support employment outcomes.
- Implementing a Small to Medium Enterprise Business Growth Program to minimise the risk that local businesses miss out on contracts.
- Developing a social investment program during the construction phase that could focus on provision of communications technology to remote communities.
- Ongoing communications and stakeholder engagement to convey Project information and understand and respond to community concerns.
- Developing and delivering Aboriginal cultural awareness training for Project staff during the planning and construction phases
- Investment in community social programs during the operations phase.

## HUMAN HEALTH AND SAFETY

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The Draft EIS documents a preliminary assessment of community-related health risks (including risks to health services) associated with the Project. Workplace health and safety risks are not addressed in detail in the Draft EIS as these are governed by a national regulatory framework and pipeline industry standards which prescribe the processes and requirements to be applied during each Project phase.

In accordance with the legislation and industry standards, Jemena operates a Health, Safety and Environment Management System (HSEMS). This system requires the Project team and its contractors to establish and implement Health and Safety Management Plans and supporting documentation which meet or exceed the legislative and organisational requirements for the identification and mitigation of work health and safety risks through each Project phase.

### CONSTRUCTION PHASE

The health risk assessment process identified the following potential health hazards and impacts during the construction phase:

- increased traffic and use of road network – public safety issues due to road traffic incidents
- unauthorised access to the works area – public safety issues due to unauthorised entry to works areas
- exposure to particulate matter (including dust) emissions - respiratory issues
- exposure to noise emissions – reduced community well-being through increased noise levels
- exposure to contaminated land or water – poisoning or disease
- bushfire incidents
- increased burden on local health services – reduced access to services for local population
- anti-social and risk taking behaviour by Project workers accommodated in Tenant Creek and/or construction camps – reduced community health and well-being.

As the most significant potential impacts to community health and safety are associated with the Project construction phase, a number of stand-alone management plans are provided with the Draft EIS to provide clear guidance on how these risks will be managed:

- Traffic Management Plan
- Water Management Plan
- Social Impact Assessment Scoping Study
- Noise Management Plan
- Air Quality Management Plan.

The Construction Contractor will incorporate all controls into the Construction Management Plan (CMP) and Construction Environmental Management Plan (CEMP) and associated procedures, which will be finalised prior to the commencement of construction activities. In addition, the Draft EIS contains a commitment to develop the following specific management plans and procedures:

- Traffic Guidance Schemes



- Security Plans
- Blasting Management Plan (Noise)
- Dangerous Goods and Hazardous Substance Management Procedures
- Emergency Response Plans
- Worker Accommodation Plan.

The controls documented in the Draft EIS are expected to reduce most risks to LOW. There is a level of residual risk associated with the following potential impacts during the construction phase:

- public safety issues due to road traffic incidents
- public safety issues due to unauthorised entry to works areas
- bushfire incidents.

Mitigation measures can reduce the likelihood of incidents that may cause serious injuries or fatality, however, the residual risk rating is MODERATE due to the potential for serious injuries or fatality. To further reduce the potential consequences, Project emergency response planning will ensure adequate resources are available to respond to medical emergencies. Adequate emergency response may reduce the consequences by minimising the extent of permanent injuries and avoiding fatalities.

## OPERATIONS PHASE

The health risk assessment process identified the following potential health hazards and impacts during the operations phase:

- exposure to noise emissions from compressor stations and pipeline facilities – reduced community well-being through increased noise levels
- exposure to gas emissions from compressor stations and pipeline facilities – respiratory issues
- exposure to contaminated produced water from PCCS – poisoning or disease
- uncontrolled release of gas, fire or explosion caused by pipeline failure or third party interference – injury or fatality through exposure to fire or explosion.

A number of stand-alone management plans are provided with the Draft EIS to provide clear guidance on how these risks will be managed:

- Noise Management Plan
- Air Quality Management Plan
- Waste Management Plan.

Jemena will incorporate all controls into the Pipeline Management Plan (PMP) and Operations Environmental Management Plan (OEMP) and associated procedures, which will be finalised prior to the Operational phase. These are expected to reduce most risks to LOW.

There is a higher level of residual risk associated with the following potential impacts during the operational phase

- fire/explosion
- exposure to methane gas emissions.

NGP facilities shall be designed, constructed and operated in accordance with AS 2885. Given the prescribed safety requirements of this standard the likelihood of health impacts due to fire / explosion or methane gas exposure is considered to be very remote. Mitigation measures can reduce the likelihood of incidents; however, the residual risk rating is still MODERATE due to the potential for serious injury or fatality. Jemena will incorporate controls into the Operations Pipeline Management Plan and Emergency Response Plan which will be finalised prior to commencement of operations.

### EMERGENCY RESPONSE

Jemena and the Construction Contractor will make arrangements for emergency management scenarios in consultation with Police, Fire and Emergency Services and local health and emergency service providers. These arrangements will be detailed in the Project Emergency Response Management Plan (ERMP).

During the planning and operation phases of the Project, Jemena is responsible for emergency management. In these phases all emergency response will be conducted in accordance with the relevant Jemena ERMP as initiated by the Jemena Emergency Manager.

During the construction phase of the Project, the Construction Contractor is responsible for the preparation and implementation of an ERP relevant to its specific scope of work and agreed responsibility. In the event of a large scale incident where numerous persons require hospital treatment the evacuation/transportation plan will be in accordance with the directions of the responsible external response agency.

Consultation and coordination with Northern Territory Department of Health, Police, Fire and Emergency Services and local health and emergency service providers will be essential to establishing effective emergency response arrangements. The provision of training to personnel will also be important. Jemena and the Construction Contractor both have experience in developing and implementing ERMP's for pipelines and gas processing facilities. The approach proposed to developing emergency response measures is, based on experience on similar projects, and therefore expected to be effective in mitigating any impacts to emergency service provision in the region.

## AIR, NOISE AND VIBRATION

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The Draft EIS documents the results of air quality and noise assessments undertaken by specialist consultants. Background noise monitoring was conducted at seven locations to provide an indication of typical existing noise levels at the nearest noise sensitive receptors to the Project footprint. Background air quality data were derived from Bureau of Meteorology air quality monitoring stations. Modelling was used to assess the potential for the Project to cause air, noise and vibration impacts that exceed the relevant assessment criteria. The complete Air Quality and Noise Assessment Reports are provided as appendices to the Draft EIS.

### SENSITIVE RECEPTORS

The pipeline route traverses primarily through isolated rural areas, thus limiting the number of potentially affected sensitive receptors. Potential air quality impacts from projects of this type are generally limited to within a 5 km radius. A conservative radius of influence for noise impacts in a rural area with very low background levels may be considered to be 10 km.

In the Northern Territory, the closest residential areas (sensitive receptors) are an Aboriginal family outstation located 3.4 km from the pipeline route and a pastoral homestead located 3.5 km north of the pipeline route. All other receptors are located greater than 5 km from the pipeline route and therefore would not be within the potential zone of impact. The Phillip Creek Compressor Station is located a significant distance from sensitive receptors (at least 28 km) hence, no air quality impacts on the population are expected from operation of the facility.

In Queensland, there are sensitive residential receptors located closer to the Project. The nearest homestead is approximately 2.5 km from the Mount Isa Compressor Station, and 1 km from the pipeline route. The nearest houses in the Mt Isa city area are approximately 1.2 km north-east of the compressor station. Potential impacts on these receptors are assessed in the Air Quality Assessment and Noise Assessment Reports; however, impacts on Queensland receptors are not further discussed in the Draft EIS.

Threatened fauna species are also considered as sensitive receptors. The results of noise modelling were used to inform assessment of potential indirect impacts to threatened species in the Biodiversity and Matters of National Environmental Significance chapters of the Draft EIS.

### AIR QUALITY

The key air emission sources associated with construction include excavation activity generating dust, and diesel exhaust fumes from heavy machinery. Collectively, these sources have a potential to emit particulate matter (TSP, PM<sub>10</sub>, deposited dust), CO and NO<sub>2</sub>. Air dispersion modelling was undertaken utilising Ausplume to predict air emissions. The air quality assessment was undertaken against criteria defined in the NEPM Air (1998), which provides ambient air quality standards for the protection of human health and well-being and the ambient air quality criteria defined in the *Queensland Environment Protection Policy (EPP) (Air) 2008*.

#### ***Construction phase***

The results of the modelling demonstrate compliance with the ambient air quality goals for construction activities. Dust emissions from activities within the construction ROW and traffic movements on access tracks, whilst not anticipated to impact on sensitive receptors, will cause localised degradation of air quality. The construction workforce will receive the highest level of exposure to dust emissions; accordingly this risk will be specifically addressed through the Construction Constructor's Health and Safety Management System, which involves a series of risk assessment and mitigation procedures implemented

to ensure workplace health and safety requirements are met. People crossing the construction ROW and/or using the same access tracks as construction vehicles may also be exposed to dust emissions, however, due to the temporary nature of the exposure, impacts would be confined to nuisance and potential safety concerns associated with reduced visibility.

### ***Operational phase***

Operational air emissions from the Phillip Creek Compressor Station were considered in the air quality modelling. The compressor stations have the potential to emit CO, nitrogen oxides (N<sub>2</sub>O) and small amounts of CH<sub>4</sub> from gas processing. As the proposed equipment will be gas powered (as opposed to diesel powered), the potential for particulate emissions are expected to be negligible. Due to the remote location of the Phillip Creek Compressor Station and significant distance from the nearest receptor (over 28 km), air quality impacts are not expected.

### ***Air Quality Management Plan***

Although the inherent level of risk is LOW, the Air Quality Management Plan provided with the Draft EIS documents a range of routine air quality management measures that will be implemented to ensure air quality impacts (nuisance or health related) are minimised. The construction measures comprise dust suppression, speed limits on unsealed roads near sensitive receptors, requirements for covering loads which may emit dust during transport, and construction equipment maintenance programs. During operations, air emissions from the compressor stations will be through elevating emissions stacks at compressor stations and implementing an Inspection and Maintenance Program to ensure that all equipment operates efficiently and as per design. Routine monitoring and maintenance will be undertaken and recorded to track equipment operating parameters. The Draft EIS includes a commitment to undertake stack emissions testing as required by the applicable regulations.

## **GREENHOUSE GAS EMISSIONS**

Greenhouse gas emissions for the project are primarily categorised as Scope 1 emissions and are associated with land clearing, and diesel and gas combustion. Scope 2 emissions are associated with the operation of the EOL facility which will utilise mains power in the Mt Isa area. Reporting of GHG emissions is expected to be required, as emissions are estimated to be above the National Greenhouse and Energy Reporting thresholds for CO<sub>2</sub>-e emitted and energy consumed.

## **NOISE**

For the purposes of predicting impacts associated with noise on nearby sensitive receptors, noise predictions were undertaken for each stage of construction and operation. The predictive methods are in accordance with *ISO Standard 9613 (1996) Acoustics - Attenuation of sound during propagation outdoors*.

The modelling results were compared to relevant criteria for construction and operational noise outlined in the *Queensland Environmental Protection (Noise) Policy 2008*, *Northern Territory Environmental Protection Authority (EPA) Noise guidelines for development sites in the Northern Territory (2014)*, and *'Streamlined model conditions for petroleum activities' (2014)* published by the Queensland Department of Environment and Heritage Protection. The criteria applied to sensitive receptors in the Northern Territory were as follows:

- outstation 975 - 3.4 km from pipeline (30 dB(A) criteria)
- pastoral homestead - 3.5 km from pipeline (32 dB(A) criteria).

***Construction phase***

Construction noise predictions were completed for a range of receptor distances between 20 m and 20 km; noise levels at a distance 8 km from the source were found to be negligible and have not been reported. The results of the noise predictions indicate noise levels decrease to between 30 - 40 dB(A) at a distance of 2 km from the construction footprint. The modelling results indicate that noise from construction activities will comply with the above criteria, and therefore impacts are not expected to occur from general construction activities.

Whilst noise criteria are not exceeded, the noise assessment indicates that the pastoral homestead located 3.5 km from the pipeline route may experience some increase in noise levels because the unpaved road passing the homestead is not heavily trafficked, therefore construction traffic will increase traffic volumes and consequently noise at pastoral homestead during the day. Given the rapid rate of construction, the duration of impacts on the homestead would be minimal, and good communication with the residents will ensure the activities cause minimal disruption to their daily activities, health and well-being.

The potential for construction noise impacts on fauna is expected to be minimal given that the noisiest construction activities (excavation, drilling and blasting) will occur for relatively short periods of time in any given location; and the 65 dB(A) threshold screening criteria is only exceeded within 200 m of the construction activities. For permanent nesting, roosting or colony areas which may be more sensitive to noise, the conservative assessment criteria of 12 dB(A) above existing LAeq levels was applied. Based on these criteria, construction activities could cause disturbance of noise sensitive fauna within distance up to 1 km from the construction ROW. Noise sensitive fauna are more likely to be affected by continuous noise that occurs in proximity to nesting, roosting or colony areas over extended periods (days/weeks), as opposed to short-term noise events associated with activities such as blasting. The potential for noise impacts on threatened species is further considered in the Biodiversity and Matters of National Environmental Significance chapters of the Draft EIS.

***Operational phase***

Operational noise was modelled for the compressor station facilities (PCCS and MICS), and Main Line Valves (MLV) along the pipeline route. The flare and gas venting system at the PCCS were modelled at heights of 40 m and 15 m respectively, based on preliminary design details. The noise assessment report considered potential for noise impacts associated with general compressor and MLV operation, gas flaring and venting.

Review of the predicted noise levels from the PCCS indicate, reasonable and compliant noise levels beyond 2 km. There are no existing sensitive residential receptors within 28 km of the proposed PCCS facility and therefore noise impacts are not expected to occur from the facility. The nearest sensitive receiver to an MLV is a homestead in the Northern Territory located approximately 18 km west of MLV3. The noise assessment report predicted noise levels significantly below the adopted noise assessment criteria and fully compliant at the homestead.

Some potential influence on ecological receptors, associated with normal operations, is predicted at distances up to 1 km from the PCCS facility (criteria - 12 dB (A) above background). Potential impacts on biodiversity and threatened species are considered in the Biodiversity and Matters of National Environmental Significance chapters of the Draft EIS.

For the MICS, near Mount Isa, compliance with long term operating noise criteria is predicted for all identified sensitive receptors during normal operation of the facility. Elevated levels of noise could occur at nearby sensitive receptors during emergency and/or maintenance gas venting. Maintenance gas venting would only occur approximately once every six months for 15 minutes and would be restricted to daytime operation where possible to minimise potential noise impacts.

**Noise Management Plan**

The Noise Management Plan provided with the Draft EIS documents a range of routine noise management measures that will be implemented to ensure noise impacts (nuisance or health related) are minimised. The controls comprise strict management of night works (if required), regular liaison with potentially affected sensitive receptors, equipment selection and operating procedures. Traffic controls will be outlined in the Traffic Management Plan and will include avoidance of night time driving through populated places where possible, and selection of traffic routes away from sensitive receptors where available. All plant, machinery and equipment will be operated and maintained according to manufacturer's instructions to minimise noise emissions.

The Construction Contractors Construction EMP will include avenues for complaints or feedback from residents to allow investigation of opportunities to minimise noise impacts on sensitive receptors. All residents potentially impacted by construction noise emissions will be informed of the construction activities, operating hours and expected level and duration of noise emissions.

In relation to blasting noise emissions, the Draft EIS contains a commitment to develop and implement a Blasting Management Plan that will outline controls for blasting (e.g. drill patterns, safety, debris control), timing of blasting (e.g. day time only near sensitive receptors) and requirements for communication of blasting activities with nearby residents who may be impacted by noise generated from blasting. As the construction will progress along the construction ROW, all noise impacts on sensitive receptors as a result of blasting will be short term and it is expected that standard blasting controls and communication with sensitive receptors will adequately mitigate this risk.

**VIBRATION**

The predicted vibration levels from pipeline construction activities (excluding blasting – see below) indicate compliance with the continuous preferred and maximum vibration criteria for locations at a separation distance of 80-90 m and 50-60 m, respectively. Predicted sensitive receptors are all well above 100 m in separation from the proposed construction ROW. Based on the above predictions, mitigation measures and management procedures are not identified as necessary unless activities occur within 150 m of a sensitive receptor.

## MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

The Commonwealth Department of the Environment (DoE) has decided that the NGP Project is a controlled action requiring assessment and approval under the Environment Protection and Biodiversity Conservation Act (1999) (*Cth*) (EPBC Act) before it can proceed. The relevant controlling provision is listed threatened species and communities.

The Threatened Species Survey Report provided with the Draft EIS concludes that important populations of two EPBC-listed threatened fauna species are likely to occur within the Project footprint as follows:

- Carpentarian Antechinus in the rocky country between KP 609.5 and KP 620.5
- Plains Death Adder in the black soil country between KP 355 and KP 561.

Analysis of potential impacts with reference to the concluded that there are no 'important habitats' for, or 'ecologically-significant populations' of, migratory species proximate to the Project footprint.

### PLAINS DEATH ADDER

The Plains Death Adder is a species of snake that is listed as Vulnerable under the EPBC Act. Habitat mapping conducted at a scale of 1:10,000, verified by field based surveys, indicates that the Project footprint intersects approximately 820 ha of suitable habitat. The habitat is part of a continuous band of potentially-suitable habitat for the species which continues for many hundreds of kilometres to the north-west. The presence – within the Project footprint – of suitable habitat to that known to support Plains Death Adder indicates a reasonable likelihood that the species occurs. This would represent an extension (to the southwest) of the known range of an existing population this species.

### CARPENTARIAN ANTECHINUS

The Carpentarian Antechinus is a brown, mouse-sized, dasyurid marsupial that is listed as Vulnerable under the EPBC Act. Field surveys found Carpentarian Antechinus in rocky ridges north and south of Mica Creek (KP 617), and in a granite boulder outcrop to the west of those ridges (KP 610). A photo of an individual captured during the field surveys is shown in Figure 14. It is likely that

Carpentarian Antechinus occupy any suitable rocky outcrops, boulder piles and rocky ridges/hills occurring with some regularity between KP 606 and KP 620 of the construction ROW. This species is not expected to occur in the Northern Territory portion of the Project footprint as that area falls outside of the known Northern Territory distribution (the closest known population of the species in the Northern Territory is approximately 420 km to the north), and no suitable habitat is traversed. The Project footprint intersects approximately 4,369 ha of suitable habitat in Queensland.





**Figure 14. Photograph of Carpentarian Antechinus trapped at a survey**

## SIGNIFICANT IMPACT ASSESSMENT

The Draft EIS assesses the potential for the Project to have a significant impact on the Plains Death Adder and Carpentarian Antechinus with reference to the *EPBC Significant Impact Guidelines 1.1 Matters of National Environmental Significance*. The analysis concluded that the Project activities are not expected to cause any significant residual impact on either species.

## ENVIRONMENTAL MANAGEMENT

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The Draft EIS includes an Environmental Management Plan (EMP) addressing planning and design, construction and operation management requirements for the Project. The purpose of the EMP is to demonstrate the process by which environmental risks will be minimised throughout the Project, and ensure specific management measures are provided for higher risk activities identified through the EIS risk assessment. It provides a practical framework for establishing best-practice environmental management standards and guidelines to mitigate potential environmental harm for each activity undertaken for the Project, under which more specific management plans can be developed for each phase.

Each section of the EMP provides objectives, management actions, performance indicators, and monitoring requirements. General reporting, auditing and corrective actions are also outlined. The EMP is supported by a number of sub-management plans, which provide additional detail in relation to key areas of risk.

Specific Construction and Operational EMPs will be developed by the Construction Contractor and Jemena respectively. These will be guided by the content of the EMP, which details the overarching framework and targets of environmental management for the Project.

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