Jemena Northern Gas Pipeline Pty Ltd

Northern Gas Pipeline

Supplement to the Draft Environmental Impact Statement

MAIN REPORT

Public

November 2016

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Appendix B NT EPA comments on Draft EIS
Appendix C Environmental Commitments Register
Appendix D Economic and Social Impact Assessment

EXECUTIVE SUMMARY

The Northern Gas Pipeline Project (the Project) requires environmental assessment and approval pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act), Environmental Assessment Act (NT) (EA Act) and Environment Protection Act 1994 (Qld) (EP Act). The Project is being assessed collaboratively by the Northern Territory Environment Protection Agency (NT EPA) and Commonwealth Department of Environment and Energy (DoEE). In Queensland the Project does not trigger the requirement for an EIS, and will be approved by an Environmental Authority issued pursuant to the EP Act.

Jemena prepared a combined Draft Environmental Impact Statement (Draft EIS)/Public Environment Report (PER) for assessment under both the EPBC Act (Cth) and EA Act (NT). The documentation was submitted to the NT EPA and DoEE, and was released for public comment for a period of 6 weeks between Monday 29 August and Sunday 9 October 2016. During the public comment period a total of 48 submissions were received from the public, NT Government agencies and other interested persons or organisations.

The following stakeholder groups provided submissions:

- *General public (25 submissions)*
- *Non-Government organisations (9 submissions); including a combined submission received from Lock the Gate Alliance that collated comments from 798 individual submitters*
- *Indigenous groups and their representatives (1 submission)*
- *NT Government agencies (12 submissions)*
- *Others (1 submission).*

To respond to comments received, Jemena has prepared a combined Supplement to the Draft Environmental Impact Statement and Final Public Environment Report. The document is referred to as the Supplement.

The Supplement contains a summary of written comments received and how those comments have been addressed by Jemena. The Supplement also documents additional information that has become available, since publication of the Draft EIS. An updated Commitments Register has been included as an Appendix to the Supplement, for the purpose of documenting management actions that will be undertaken through the planning, construction and operational phases of the Project.

The Supplement, in combination with the Draft EIS, finalises Jemena's EIS/PER for the NGP Project. The NT EPA and DoEE will examine the EIS documentation. In the event that any of the information is considered deficient, additional information may be requested from Jemena. On completion of the assessment process, the NT EPA and DoEE will make recommendations to the relevant Minister's as to whether or not the Project should be approved, and where relevant, conditions attached to that approval.

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1. INTRODUCTION

This document is the combined Supplement to the Draft Environmental Impact Statement (the Supplement) and Final Public Environment Report (Final PER) prepared for the Northern Gas Pipeline (NGP) Project. It summarises and addresses comments received on the Draft EIS, which was available for public comment from the 29th September to 9th October 2016.

The document has been prepared for assessment under both the Environmental Assessment Act (*NT*) (EA Act) and the Environment Protection and Biodiversity Conservation Act (EPBC Act) (*Cth*). For ease of reference this document is referred to as the Supplement and the original submission is referred to as the Draft EIS.

The Supplement, in combination with the Draft EIS, finalises Jemena's submission to the Northern Territory Environment Protection Authority (NT EPA) and Commonwealth Department of Environment and Energy (DoEE) for the environmental approvals processes required in each jurisdiction. The NT EPA and DoEE will now examine the EIS and make recommendations to the relevant Minister's as to whether or not the Project should be approved, and where relevant, conditions attached to that approval.

1.1 PROJECT OVERVIEW

The NGP Project (the Project) was initiated by the Northern Territory Government, with the goal of facilitating the strong and sustainable development of the Northern Territory's gas sector by providing a link to new and growing demand in the eastern gas market. Jemena was selected to develop the Project by the Northern Territory Government following a competitive tender process in 2015. The Northern Territory Government has given the NGP 'Major Project' status, which is given to projects which are significant, complex and have strategic impact.

The Project will comprise a high pressure, underground gas pipeline (approximately 622 kilometres in length) and associated above-ground facilities. The pipeline will extend from Warrego, approximately 45 km north-west of Tennant Creek (NT), across the Northern Territory/Queensland border and connect to 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. Compressor stations will be located at each end of the pipeline. Other above-ground facilities will comprise mainline valves (MLV) and cathodic protection stations (CP) located at intervals along the pipeline.

The temporary construction footprint will comprise a 30 metre construction Right of Way (ROW) within which pipeline installation activities will occur. Additional laydown/works areas, access tracks and turn-around points, construction camps and water storage dams are also required. Following completion of construction activities, disturbed areas not required for operational activities will be progressively restored to their pre-construction land-use/condition[1].

Figure 1-1 provides an overview of the location of the NGP in relation to existing gas pipelines within Australia. A detailed description of the location of the Project and its main components is provided in Chapter 2 of the Draft EIS.

[1] Note some access tracks may remain at the request of landholders.

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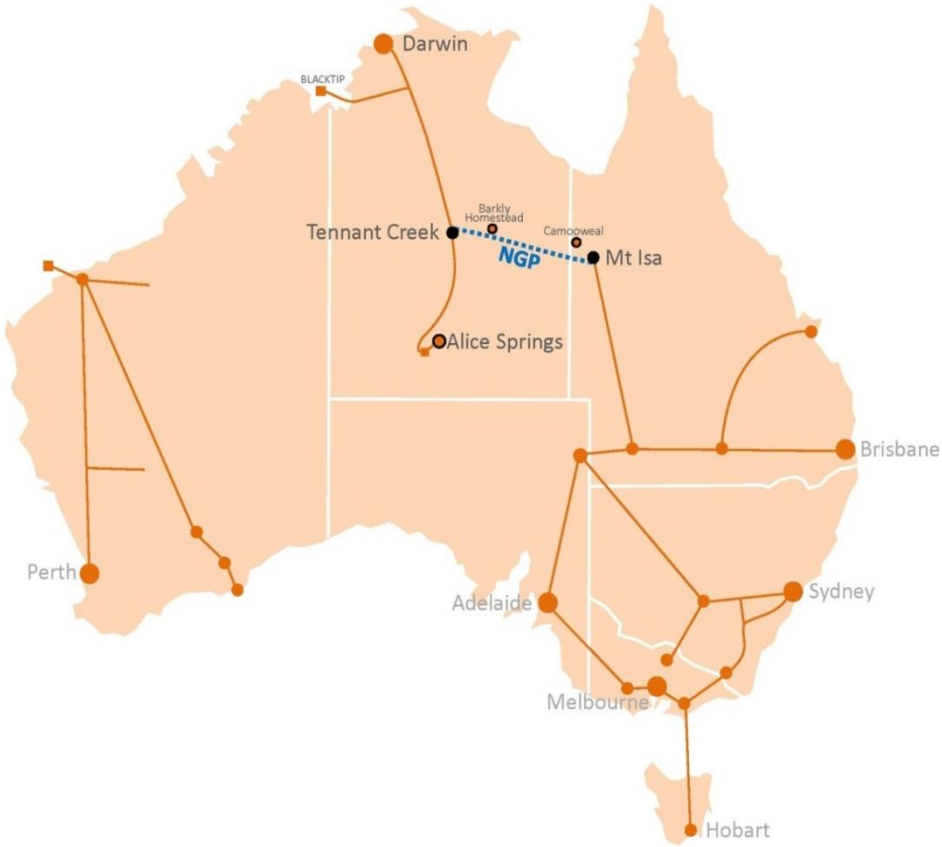

Figure 1-1. Location of Northern Gas Pipeline in relation to other gas pipelines in Australia

1.2 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The NGP Project requires environmental assessment and approval pursuant to the EPBC Act (*Cth*), EA Act *(NT)* and Environment Protection Act 1994 (*Qld*) (EP Act). The sections below provided a summary of the current status of the primary approvals, and the processes moving forward.

1.2.1 ASSESSMENT UNDER NORTHERN TERRITORY AND COMMONWEALTH LEGISLATION

Jemena submitted a Notice of Intent for the NGP Project to the NT EPA in September 2015. The NT EPA determined that the Project required assessment under the EA Act at the level of an Environmental Impact Statement (EIS).

Jemena referred the proposed action to the Commonwealth DoEE[2] for consideration under the EPBC Act. The delegate to the Commonwealth Minister for the Environment determined that the Project is a 'controlled action' which required assessment and approval under the EPBC Act by a Public Environment Report (PER). The relevant Matters of National Environmental Significance (MNES) are listed threatened species and communities (sections 18 & 18A).

Jemena was advised that the proposed action could not be assessed under the bilateral agreement between the Commonwealth and Northern Territory governments, as part of the proposed action falls within the Queensland jurisdiction. The NT EPA and DoEE proposed to assess the action collaboratively. To allow for this the Terms of Reference for Preparation of an EIS issued by the NT EPA, included matters relevant to the EPBC Act, to allow for collaborative assessment of the Project.

The Draft EIS/PER documentation was released for public comment for a period of 6 weeks between Monday 9 August and Sunday 9 October 2016. The NT EPA forwarded to Jemena a total of 48 submissions received from the public, NT Government agencies and other interested persons or organisations. On 17 October 2016 Jemena received a direction from the NT EPA to provide a Supplement to the Draft EIS, within 12 months.

The direction from the NT EPA advises that the Supplement and the Draft EIS are collectively referred to as the EIS on completion of the Supplement. The EIS should contain a summary of written comments received on the Draft EIS and how those comments have been addressed; and contain sufficient information to avoid the need to search out previous or additional, unattached reports.

The NT EPA and DoEE will each assess the components of the EIS documentation relevant to their jurisdiction. If any of the information provided is considered deficient, further information may be requested from Jemena. In accordance with the requirements of the EPBC Act, the documentation will be publically available for a period of time determined by DoEE.

The NT EPA will assess the complete documentation, and prepare and 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 *(NT)* and the conditions of any such grant. The NT EPA Assessment Report and Recommendations is expected to contain a range of recommendations in relation to further development, review and approval of management plans prior to commencement of Project activities. Also, it is anticipated there will be recommendations made in relation to the additional approvals, permits and licences that Jemena and/or the Construction Contractor are required to obtain.

[2] Previously Department of Environment (DoE)

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The DoEE will assess the complete documentation and 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. Jemena anticipates that the EPBC Act approval will contain conditions relevant to protection of threatened species, and specific monitoring and reporting requirements applicable to the Project construction activities. It is also anticipated that conditions will be imposed relating to sources of indirect impact on threatened species i.e. air and noise emissions and weeds.

1.2.2 ASSESSMENT UNDER QUEENSLAND LEGISLATION

The sections of the Project within Queensland (i.e. approximately 165 km of pipeline, Mount Isa Compressor Station and associated facilities) require approval by an Environmental Authority issued under the EP Act 1994 *(Qld).* The Project was deemed not to trigger the requirement for assessment at the level of an EIS in Queensland, because Project activities to be conducted in Queensland:

- do not involve greater than 300 km of gas pipeline
- will not result in more than 2,000ha of land clearing
- do not include a liquefied natural gas plant.

Jemena was granted an EA for the NGP in December 2015. The EA, granted by the Queensland Department of Environment and Heritage Protection (DEHP), is subject to a number of conditions. Jemena is currently preparing an application for amendment to the EA to address variations to the Project activities and footprint, which have occurred since the EA was issued.

1.3 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 or construction and operation of the NGP and associated facilities in Queensland is a Pipeline Licence pursuant to the Petroleum and Gas (Production and Safety) Act 2004 (*Qld*).

Jemena has applied for a Pipeline Licence in each jurisdiction. The outcomes of the Commonwealth and state/territory environmental impact assessment processes will be considered by the relevant agencies when determining whether or not to issue a licence, and associated environmental requirements and conditions.

1.4 PURPOSE AND STRUCTURE OF THIS DOCUMENT

The primary purpose of this Supplement is to provide a summary of comments received on the Draft EIS and how those comments have been addressed by Jemena. The Supplement also documents revisions and additions to the Draft EIS required to address comments received, and to present new information that has become available through the more detailed Project planning that has occurred since submission of the Draft EIS.

The Supplement is intended to be Jemena's final submission to the NT EPA as part of the EIS process required under the EA Act (*NT*) and to the DoEE as part of the PER process required under the EPBC Act. The complete EIS will be assessed by both the NT EPA and DoEE.

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The Supplement is structured as follows:

- Section 1: Overview of the Project, environmental approvals process and document structure.
- Section 2: Summary of submissions received on the Draft EIS, submitter details and the main issues/concerns that were raised in the comments provided.
- Section 3: Jemena's response to comments received.
- Section 4: Revisions and additions to the Draft EIS made to respond to comments, and/or to document new information that has become available subsequent to submission of the Draft EIS.
- Section 5: References.

The Supplement also includes a revised Environmental Commitments Register (Appendix C).

2. SUMMARY OF SUBMISSIONS RECEIVED

The Draft EIS was available for public comment for six weeks from 29 August to 9 October.

The public comment period was advertised in the Northern Territory News, Centralian Advocate, Tenant Creek and District Times, Mount Isa Northwest Star and Courier Mail.

Hardcopies of the Draft EIS document were made available for viewing at the NT EPA offices (Darwin), NT Library (Darwin), Mines and Energy Information Centre (Darwin) Mount Isa Library, Environment Centre NT (Darwin), Northern Land Council (Tenant Creek), Arid Lands Environment Centre (Alice Springs), Mount Isa Library, Queensland State Library (Brisbane).

The NT EPA received a total of 48 submissions, which were forwarded to Jemena for response. This section summarises the submissions received.

2.1 COMMENTS FROM THE PUBLIC, GOVERNMENT AGENCIES AND OTHER INTERESTED GROUPS

The following stakeholder groups provided submissions:

- General public (25 submissions)
- Non-Government organisations (9 submissions); including a combined submission received from Lock the Gate Alliance[3]
- Indigenous groups and their representatives (1 submission)
- NT Government agencies (12 submissions)
- Others (1 submission).

The submissions and submitter details are listed in Table 2-1 below.

Each submission was reviewed by Jemena and the comments provided across the submissions were grouped according to the issues raised. For each issue raised, the comments received are summarised and responded to in Section 3 of this document. Table 2-2 provides a summary of the issues raised, related submission numbers and the relevant section number of this document where a summary of the comments and Jemena's response can be found.

The full submissions are provided in Appendix A.

[3] The submission from Lock the Gate Alliance collated comments from 797 individual submitters.

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Table 2-1. Summary of submissions and submitter details

Submission number	Stakeholder
1-22[4]	Steve de Kretzer, Anna Boustead, Janine Schneider, Vanessa Spinelli, James Gazard, Simone McDean, Sue Matthews, Alexandria Jones, Phil Brannan, Robyn Liddle, Jess Abrahams, Greg Chapman, Diana Rickard, Melissa Bury, Ursula Kupfer, Peter Robson, Elissa Shuey, Liz Howells, Glenn Evans, Domonic Nicholls, Pauline Cass and Merilee Baker
23	Deborah Hall
24	Dianna Newham
25	Vicki Gordon
26	Central Australia Frack Free Alliance
27	Lock the Gate Alliance Northern Territory
28	Doctors for the Environment Australia
29	Darwin Rural Area Frack Free
30	Frack Free Darwin
31	Arid Lands Environment Centre
32	Institute for Energy Economics and Financial Analysis
33	Environment Centre NT
34	Central Land Council and Northern Land Council
35	Parks and Wildlife Commission NT
36	Power and Water Corporation
37	Department of the Chief Minister
38	Department of Trade, Business and Innovation
39	Heritage Branch
40	Department of Infrastructure, Planning and Logistics - Lands Planning
41	Department of Infrastructure, Planning and Logistics - Land Use Management, Transport Infrastructure Planning
42	Department of Primary Industry and Resources
43	Department of Health
44	Tourism NT
45	Police, Fire and Emergency Services
46	Department of Environment and Natural Resources
47	Supporters of Lock the Gate Alliance[5]
48	Central Petroleum

[4] Twenty-two of the public submissions provided comments using form text from the Environment Centre NT website (i.e. all 22 submitters provided the same comments).

[5] Submission #47 collates comments from 797 submitters, 738 provided comments using the form text provided on the website (i.e. all 738 submitters provided the same comments), and 59 submitters provided comments in addition to the form text.

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Table 2-2. Summary of issues raised in submissions and location of response in Supplement

Issue theme	Sub-themes	Submission numbers	Supplement Section
Project justification and viability	Economic and commercial Public consultation Stimulating gas exploration Competitively priced gas Regional development opportunities Foreign ownership	1 - 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 47, 48	3.1
Future development of unconventional onshore gas	Cumulative impacts ESD	1 – 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 42, 47	3.2
Project alternatives	Alternative uses of gas Demand Renewable energy	1 to 22, 25, 26, 27, 28, 29, 30, 47	3.3
Proponent environmental record	NA	47	3.4
Environmental assessment	Process	27, 31	3.5
Approvals, conditions and agreements	Pipeline approvals Application of EPBC Act Proponent obligations for rehabilitation	42, 47	3.6
Project details	Borrow pits	34	3.7.1
	Flaring	NTEPA	3.7.2
	Construction schedule	31	3.7.3
	Work hours	NTEPA	3.7.4
Project footprint	Habitat loss	1-22, 33, 34	3.8.1
	Construction camps	34	3.8.2
	Land clearing on Aboriginal land	34	3.8.3
Stakeholder engagement	Stakeholder engagement	1-22, 31, 33, 34, 47	3.9
Cumulative impacts	Water use	34, 47	3.10
Biodiversity	Biodiversity risk assessment	46, NT EPA	3.11.1
	Independence of surveys	47	3.11.2
	Aquatic biodiversity values	27	3.11.3
	Frogs	34	3.11.4
	Habitat fragmentation	47	3.11.5
	Introduced fauna	27, 34	3.11.6
	Sensitive habitat areas	26, 27, 29, 30, 34	3.11.7
	NT listed threatened species	34	3.11.8
	Trench management	27, 34, 47, NT EPA	3.11.9
Matters of National	Biodiversity risk assessment	46, NT EPA	3.12.1

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Issue theme	Sub-themes	Submission numbers	Supplement Section
Environmental Significance	Threatened species	1-22, 23, 26, 27, 29, 30, 31, 33, 47	3.12.2
	Survey effort for Greater Bilby and Gouldian Finch	31, 47	3.12.3
	Carpentarian Antechinus	34	3.12.4
	Plains Death Adder	34, NT EPA	3.12.5
	Painted Honeyeater	34	3.12.6
	MNES - Error	34	3.12.7
Weeds	Weeds	31, 33, 34, 42, 46	3.13
Water	Existing beneficial uses	34	3.14.1
	Watercourse crossings	26, 27, 29, 30, 31, 34, 47, NT EPA	3.14.2
	Health and safety impacts of wastewater disposal	28, 47	3.14.3
	Hydrostatic testing	26, 27, 29, 30, 31, 34, NT EPA	3.14.4
Wastewater management	Construction camps	34	3.14.5
	PCCS	1-22, 23, 26, 27, 29, 30, 31, 33	3.14.6
Water use and sources	Sustainability of groundwater extraction	1-22, 23, 26, 27, 28, 29, 30, 33, 34, 46, 47	3.15.1
	Application of the Water Act	23, 31	3.15.2
	Storage dams	34	3.15.3
Erosion and Sediment Control	Erosion and Sediment Control	34, 36	3.16
Heritage	Differentiation between Aboriginal and non-Aboriginal heritage	34	3.17.1
	Aboriginal Sacred Sites	33, 34, 47	3.17.2
	Heritage management	26, 27, 29, 30, 47	3.17.3
Socio-economic aspects	Aboriginal context	26, 27, 29, 30, 31	3.18.1
	Employment	34, 47	3.18.2
	Economic and Social Impact Assessment	26, 27, 29, 30, 31, 47	3.18.3
	Economic and Social Impact Management Plan	37	3.18.4
	Fly-In-Fly-Out Workers	47	3.18.5
	Regional business and tourism attractions	44	3.18.6
	Social and cultural impacts	34	3.18.7
	Social investment program	34	3.18.8
	Risks to tourism industry	47	3.18.9
Health and safety	Aboriginal people	34	3.19.1
	Air quality	34	3.19.2

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Issue theme	Sub-themes	Submission numbers	Supplement Section
	Bushfire	45	3.19.3
	Construction camps	34	3.19.4
	Traffic Incidents	28, 34, 41, 45	3.19.5
Noise	Noise	34	3.20
Air quality	Emissions from PCCS and MLV	34	3.21.1
	Air Quality Management Plan	31	3.21.2
Greenhouse gas emissions	Greenhouse gas emissions	1-22, 33	3.22
Emergency response	Emergency response	27, 31, 45	3.23
Environmental Management	Environmental Management Plan	34	3.24
	Construction camps	43	3.24.1
	Pre-clearing inspections	34	3.24.2
	Reinstatement acceptance criteria	27, 34	3.24.3
	Further information and construction contractor	NT EPA	3.24.4
	Road crossings waste management	NT EPA	3.24.5
Offsets	Offsets	33	3.25
Other	Disclaimers	31	3.26.1
	Road upgrades	33	3.26.2

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2.2 COMMENTS FROM NT ENVIRONMENT PROTECTION AGENCY

The NT EPA is an independent authority established under the Northern Territory *Environment Protection Authority Act*. The authority is responsible for assessing the environmental impact of development proposals through the administration of the *Environmental Assessment Act* to ensure that development decisions in the Northern Territory take environmental impact into consideration.

When assessing the impact of the NGP, the NT EPA will take into account Jemena's response to all stakeholder comments received in relation to the Draft EIS, including comments provided directly by the NT EPA. The NT EPA comments on the Draft EIS are provided in Appendix B.

Jemena has considered and responded to the NT EPA comments according to the issues raised. Table 2-3 provides a summary of the issues raised by the NT EPA, and the relevant section number of this document where a summary of the comments and Jemena's response can be found.

Table 2-3. Summary of issues raised by NT EPA and location of response/additional information in Supplement

Issue theme	Response section	Additional info section
Risk Assessment	3.11.1	na
Construction contractor and further information	3.24.4	4.0, 4.11.1
Watercourse crossings	3.14.2	4.6
Hydrostatic testing	3.14.4	4.8
Trenching and fauna management	3.11.9	4.4.1, 4.4.2
Reinstatement acceptance criteria	3.24.3	4.11.2
Road crossings (waste management)	3.24.5	4.11.3
Gas flaring	3.7.2	4.1.2
Hours of operation – noise and light impacts	3.7.4	4.4.3

2.3 COMMENTS FROM DEPARTMENT OF ENVIRONMENT AND ENERGY

Nil comments were received directly from the Department of Environment and Energy (DoEE). However, DoEE is responsible for assessing Jemena's response to submissions from other stakeholders in relation to Matters of National Environmental Significance (MNES) protected under the EPBC Act.

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3. RESPONSE TO COMMENTS

This section summarises and responds to comments provided in the 48 submissions received in relation to the Draft EIS. As discussed in Section 2, comments received have been grouped into themes. For each theme, the sections below provide:

- A summary of the relevant information presented in the Draft EIS
- Details of the submissions/submitters that provided comment in relation to the theme
- A brief summary of the issues and concerns raised
- Jemena's response.

A number of revisions and additions to the Draft EIS are necessary in order to address the comments provided in the public submissions and comments received from the NT EPA. Additions are also required to incorporate new information that has been finalised since the Draft EIS was submitted. Complete details of the revisions and additions to the Draft EIS are then documented in Section 4.

3.1 PROJECT JUSTIFICATION AND VIABILITY

Thirty-three public submissions comment on the justification for, and/or viability of, the NGP Project. The sections below summarise the issues and concerns raised and Jemena's responses. Jemena notes that many of the submissions raised concerns about the Project's potential link to future development of unconventional onshore gas reserves in the Northern Territory. Discussion of this matter is provided separately in Section 3.2.

The NGP Project will deliver a range of benefits to the Northern Territory, northern Australia and the broader Australian economy, by:

- stimulating gas exploration and production in the Northern Territory by opening up a new market for Northern Territory gas — promoting economic and infrastructure development opportunities and extensive employment opportunities in regional and remote areas
- providing a new source of competitively-priced gas to customers with growing needs in the eastern Australian gas market
- promoting economic and infrastructure development in regional areas through the construction of the Project itself and through Jemena's training and local industry capacity building initiatives
- providing a platform for Jemena's longer-term plan to facilitate the direct delivery of Northern Territory gas to Wallumbilla by introducing additional gas and competition into a key gas trading location in Australia's eastern and northern gas markets.

Jemena notes that the NGP Project was initiated by the Northern Territory Government, with the goal of facilitating the strong and sustainable development of the Northern Territory's gas sector by providing a link to new and growing demand in the eastern gas market. Jemena was selected to develop the Project by the Northern Territory Government following a competitive tender process in 2015. The Northern Territory Government's tender process provided the mandate for this Project to proceed.

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3.1.1 ECONOMIC AND COMMERCIAL VIABILITY

Five submissions comment on the economic/commercial feasibility of the NGP Project. Jemena notes these comments; however, advises that assertions that the Project is not viable are incorrect.

The NGP has been sized to match the Northern Territory's stated current surplus gas production. Gas in the Northern Territory is currently produced from the following two sources:

- the offshore conventional Blacktip gas field in the Bonaparte Basin — currently the Northern Territory's primary supply source
- the onshore conventional Mereenie and Palm Valley gas fields in the Amadeus Basin.

At a high level, Central Petroleum and Santos have approximately 232 PJ of proven and probable (2P) gas reserves and ENI has 860 PJ of proven and probable (2P) gas reserves to supply the Power and Water Corporation (PWC) and the Northern Territory's demand (22 PJ p.a.). This is sufficient to fill the NGP as currently designed, and Northern Territory demand, for 21 years.

Submission #27 and #32 made specific comment in relation to the viability of the Project without government subsidies and high tariffs. Jemena advises that the statements made in these submissions indicating that the NGP will charge the highest tariffs in Australia are incorrect.

The NGP will not be constructed with any Government subsidies.

Jemena's NGP tariffs are publicly available on our website. The tariffs were determined through an extremely competitive tender process run by the Northern Territory Government. The Australian Competition and Consumer Commission have acknowledged the competitive pricing of the Northern Gas Pipeline, as well as the benefits the pipeline will bring to east coast gas markets. At the time of pipeline operation, Jemena expects to have sufficiently filled the pipeline to cover costs and make a return on investment commensurate with the level of risk Jemena is undertaking in the delivery of this Project.

3.1.2 PUBLIC CONSULTATION

Submission #23 and #33 comment on a perceived lack of public consultation from the NT Government about the Project.

Jemena is of the view that concerns raised in relation to consultation undertaken by the Northern Territory Government prior to, or during, the tender process, should be directed to the Northern Territory Government. However, Jemena are responsible for obtaining approvals and land access, and it is Jemena's responsibility to consult to secure the mandate to build the NGP.

Jemena has undertaken a significant amount of stakeholder engagement over a two year period, during the bid phase and since being selected as the successful proponent. Jemena's engagement will continue until the Project is in the operations phase.

Jemena is responsible for, amongst other things, all regulatory approvals, environmental approvals, securing land access and appropriate consultation to facilitate securing the necessary consents to allow the pipeline to be built. This consultation has occurred with local communities, Traditional Owners, pastoralists, local businesses and governments in the Northern Territory and Queensland.

3.1.3 PROVIDING COMPETITIVELY PRICED GAS

Seven submissions included comment in relation to the stated demand for gas in the eastern Australian gas market that underpins the NGP Project. Submission #26, #27 and #29 raised specific concern that

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Northern Territory gas sourced from unconventional gas reservoirs would not be competitive in the eastern Australian gas market.

Jemena notes that the NGP has been sized to match the Northern Territory's stated current surplus gas production, which does not include any gas sourced from unconventional onshore gas reservoirs. The current surplus, without any unconventional gas, is sufficient to fill the NGP as currently designed and Northern Territory demand for 21 years.

The NGP will encourage the efficient use of gas transportation services throughout Australia's eastern gas market, with a view to minimising the delivered price of gas to customers in the face of tightening market conditions. As existing conventional sources of gas decline, domestic users in the eastern gas market are seeking competitively-priced supply and delivery point flexibility to manage their energy needs.

The NGP will facilitate this by allowing users in the northern part of the eastern market to access more gas from northern sources (including the Northern Territory), freeing up more gas from southern sources to supply customers in southern states. Queensland gas previously shipped to Mount Isa can be redirected to other customers in the eastern market. In addition to providing more supply to the eastern gas market, the NGP will reduce the need to transport gas over long distances across multiple pipelines, providing additional downward pressure on delivered gas prices for customers.

3.1.4 REGIONAL DEVELOPMENT AND EMPLOYMENT OPPORTUNITIES

Twenty-eight submissions provided comment about the regional development and employment benefits associated with the Project.

Jemena notes that the Project has committed to ensuring significant training, employment and contracting opportunities are available for Territorians, especially for indigenous people around the project regions. Jemena estimates the planning, construction, commissioning and operation of the NGP will result in 900 jobs, of which around 600 could be filled by Territorians and of those 162 by indigenous people.

Jemena's training program will be implemented in 2017 and will see more than 60 unskilled and semi-skilled people trained to be part of the construction team. During construction Jemena has stated a target to award up to 100 contracts worth approximately $112M to local and/or indigenous businesses. During operation, though less in scale, Jemena will have around 30 full time equivalent roles, with 10 as permanent Jemena employees in the field, located at both ends of the pipeline. Jemena also estimate around $500,000 per year of contracts for local businesses for the life of the pipeline. These direct economic impacts are specific to the current NGP. Additional jobs and contract works would be stimulated from upstream developers looking to supply gas to the pipeline, and then downstream for new starters looking to use gas and expand their operations. As demand continues to grow, additional construction and operation roles would be created on the NGP as the pipeline expands through potential additional pipeline looping and compression to service the future.

3.1.5 FOREIGN OWNERSHIP

Submission #31 and #47 raised concerns about foreign ownership of the NGP.

Jemena advises that the company has a long and proud history of ownership and operation of Australian energy assets providing reliable supply of gas, electricity and water to millions of Australian households and businesses. Jemena was a wholly Australian business until 2007 when it was purchased by Singapore Power. Since that purchase little has changed in the management and operation of the company. The business provides employment to over 1,500 Australians and all decisions related to the day-to-day management and operation of Jemena assets and businesses are made by their Australian executive and management team.

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Jemena notes that it is common practice for large construction assets to be owned and managed through a separate proprietary company. The NGP company is part of the Jemena tax consolidated group and the NGP project will contribute to the earnings of this income tax paying group. Jemena will effectively pay income tax at the corporate tax rate on its taxable income, which includes any contributions from the Project. Jemena will also pay state-based taxes such as payroll tax and stamp duty in relation to the Project.

In September 2015, Jemena implemented a capital restructure for commercial reasons such as protection of Jemena's credit rating. The company obtained a tax ruling from the Australian Taxation Office prior to this capital structure refinancing. Ownership and operation of the pipeline has been reviewed by the Australian Government Foreign Investment Review Board and no objections were raised.

Jemena pays tax on Australian generated revenue in accordance with Australian tax law. Jemena's financial reports are transparent and available on the Jemena website.

3.2 FUTURE DEVELOPMENT OF UNCONVENTIONAL ONSHORE GAS RESERVES

Thirty-five submissions comment on the role of the NGP in providing an incentive for future development of unconventional onshore gas reserves in the Northern Territory. One of these submissions collated comments from 797 individual submitters that were made through a website set up by the Lock the Gate Alliance. A further 25 submissions were received via an email portal set up by the Environment Centre NT (ECNT). This issue was also raised independently by submission #26, #27, #28, #29, #30, #31, #33, #34 and #42.

The main issues/concerns raised in the submissions are summarised below:

- The main concern raised was in relation to potential environmental and social impacts associated with hydraulic fracturing, and submitters expressed the view that cumulative impacts of future unconventional onshore gas development should be further considered prior to the NGP Project being approved. This issue is discussed in Section 3.2.1 below.

- A number of submissions stated a view that future development of unconventional onshore gas reserves in the Northern Territory is inconsistent with the principles of Ecologically Sustainable Development (ESD). This issue is discussed in Section 3.2.1 and 3.2.3 below.

- A number of submissions raised general opposition to any further development of fossil fuels and/or the use of hydraulic fracturing in the Northern Territory and Australia more broadly. Concerns were also raised that further gas exploration and production that may be stimulated by the NGP is inconsistent with Australia's commitments to reducing greenhouse gas emissions and achieving renewable energy targets. These comments are noted in this Supplement, but are not responded to specifically as the future role of natural gas in the Northern Territory and Australian energy markets is a Government policy matter.

- Four of the submissions referred to Coal Seam Gas (CSG), which is different to the shale-gas reserves that exist in the Northern Territory; however, Jemena has assumed that these submissions are intended to raise concern about potential future onshore shale-gas development.

Jemena notes that in response to public concern, the Northern Territory Government has imposed a moratorium on hydraulic fracturing of unconventional onshore gas reservoirs. Any future development will be dependent on the outcomes of the current *Scientific Inquiry into Hydraulic Fracturing of Unconventional Reservoirs Onshore within the Northern Territory* (the Inquiry). Until the findings of the Inquiry are finalised and considered by government, there is a high degree of uncertainty with respect to future development.

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3.2.1 SOURCES OF GAS FOR THE NGP

The NGP is not currently contracted to supply gas from any new unconventional sources and the Project is in a position to proceed without any future guarantee of future development of unconventional onshore gas reservoirs in the Northern Territory. As indicated in the Draft EIS the NGP has been sized to match the Northern Territory's stated current surplus gas production. Gas in the Northern Territory is currently produced from the following two sources:

- the offshore conventional Blacktip gas field in the Bonaparte Basin — currently the Northern Territory's primary supply source
- the onshore conventional Mereenie and Palm Valley gas fields in the Amadeus Basin.

At a high level, Central Petroleum and Santos have 232 PJ of proven and probable (2P) gas reserves and ENI has 860 PJ of proven and probable (2P) gas to supply the Power and Water Corporation (PWC) gas transport agreement and the Northern Territory's demand (22 PJ p.a.). This amount of gas is sufficient to supply the NGP and Northern Territory demand for 21 years. Further development of conventional onshore and offshore gas reserves may also occur over the life of the NGP.

3.2.2 CUMULATIVE IMPACTS

As stated previously there is a high degree of uncertainty with respect to future development of unconventional gas reservoirs in the Northern Territory. Any assessment of cumulative impacts by Jemena may be considered presumptive given that the findings of the Inquiry won't be available for some time. Further, the NGP is in a position to proceed without any guarantee of future unconventional onshore gas development.

At no stage will Jemena be involved in hydraulic fracturing for exploration or extraction of gas. Jemena as a business is a transporter of gas, and is not involved in any upstream developments now or previously. Jemena is not a technical expert in hydraulic fracturing and is not in a position to advise on the relative merits or otherwise, or provide a technical assessment.

A moratorium on the use of hydraulic fracturing for exploration and extraction of onshore gas in the Northern Territory has been implemented by the Northern Territory Government. The development of any further unconventional onshore gas reserves in the Territory will be determined if and when that moratorium is lifted.

Through its Northern Gas Pipeline, Jemena will transport gas from existing gas reserves – the same gas that is used to power most Territory homes. This EIS has been prepared to assess the impacts associated with this pipeline development. Any future hydraulic fracturing activity of gas producers, if and when the moratorium is lifted, would be subject to its own environmental assessment process and would be considered on its own merits. Jemena does not with certainty know where future gas is coming from, or how that gas would be extracted, to allow consideration with this submission.

Jemena is of the view that an assessment of the cumulative impacts of future onshore gas development in the Northern Territory is outside the scope of the EIS process. We anticipate that the Northern Territory Government Inquiry into the use of hydraulic fracturing in the Northern Territory will consider issues to do with cumulative impacts in making a decision as to whether or not future development of unconventional gas reservoirs can be undertaken sustainably. Future development proposals involving hydraulic fracturing would then be subject to environmental assessment and approvals processes.

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3.2.3 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The EIS ToR Section 2.6 required Jemena to demonstrate how the Project complies with and contributes to the principles of ESD. Jemena's address of this requirement is presented in Chapter 1, Section 1.9 of the Draft EIS.

The scope of the assessment undertaken by Jemena does not extend to consideration of the extent to which any future unconventional onshore gas development is consistent with the principles of ESD. We anticipate that the Northern Territory Government Inquiry into the use of hydraulic fracturing in the Northern Territory will consider the principles of ESD in making a decision as to whether or not future development of unconventional gas reservoirs should occur and under what conditions.

3.3 PROJECT ALTERNATIVES

Twenty-nine submissions comment on the consideration of alternatives to constructing the NGP. Submission #27 commented that there is an opportunity for the NT Government to utilize excess conventional gas from the Blacktip field in the Northern Territory for manufacturing expansions here, or for the East Coast gas demand to decrease in line with the current international gas glut. The remaining submitters commented that renewable energy should be considered as an alternative to developing gas reserves.

Jemena notes that in accordance with the EIS Terms of Reference, feasible alternatives considered in relation to the NGP are documented in Chapter 2, Section 2.18 of the Draft EIS. This section documents consideration of alternative route and facilities options, construction methods, sources of services, energy sources, and emergency and incident response.

When the Council of Australian Government (COAG) leaders supported the Northern Territory Government's bid in October 2014 to establish a competitive process for the private sector to develop and submit a proposal for the construction and operation of a pipeline, the intent was to connect the Northern Territory with the East Coast gas market. Jemena submitted a proposal to the competitive tender process and in 2015 was selected as the successful proponent.

Questions about alternatives to the NGP Project cannot be answered by Jemena and are outside the scope of this EIS process. Those questions should be directed to the Northern Territory Government.

3.4 PROPONENT ENVIRONMENTAL RECORD

Submission #47 included a comment from an individual submitter in relation to Jemena's past environmental performance.

Jemena notes that our company environmental history is documented in Chapter 1, Section 1.5.2 of the Draft EIS. As stated there are no proceedings against Jemena under Commonwealth, State or Territory law for the protection of the environment. Jemena is committed to complying with all regulatory requirements applicable to the NGP Project, and ensuring the compliance of our contractors is adequately monitored and maintained.

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3.5 ENVIRONMENTAL ASSESSMENT PROCESS

Submission #27 and #31 raised concerns about the adequacy of the environmental assessment processes required under the EPBC Act (*Cth*) and Environmental Assessment Act (*NT*).

Jemena considers the adequacy of these processes is a matter for government. Jemena will comply with all legislative requirements, and work on the NGP will not commence until all approvals, permits and licences are in place.

3.6 APPROVALS, CONDITIONS AND AGREEMENTS

Two submissions (#42 and #47) comment on the approvals, conditions and agreements that are applicable to the NGP Project.

The NGP Project falls within the legal jurisdiction of the Commonwealth, Northern Territory and Queensland governments. Chapter 3 of the Draft EIS provides a summary of requirements for approvals, permits and licences pursuant to the legislation within each jurisdiction.

The sections below respond to the specific issues raised.

3.6.1 PIPELINE APPROVALS

Submission #42 from the Department of Primary Industry and Resources (DPIR) Energy Directorate responsible for regulation of pipelines under the Energy Pipelines Act (*NT*), advises that the Minister for Primary Industry and Resources (the Minister) will take into consideration all representations and comments from stakeholders and the public, including any assessment by the NT EPA, in deciding whether to grant a licence for construction and operation of the NGP.

Jemena acknowledges that if a pipeline licence is issued for the NGP, there are processes in place under the *Energy Pipelines Act (NT)* that Jemena will need to comply with, to ensure that environmental impacts from the Project are kept as low as reasonably practicable. A description of those processes was provided in the DPIR submission and has been included in Section 4.2 of this Supplement.

3.6.2 APPLICATION OF THE EPBC ACT

Submission #47 includes a comment from an individual submitter that states, “Many sections of the EPBC Act (*Cth*), re - s.131AB, 505C-E will be compromised.”

The sections of the EPBC Act that are mentioned in the submission related to Coal Seam Gas and Large Coal Mining Development. The NGP has no link to CSG[6] or coal mining developments and therefore these sections of the EPBC Act are not applicable to the Project.

3.6.3 PROPONENT DECOMMISSIONING AND REHABILITATION OBLIGATIONS

Submission #47 includes comments from two individual submitters raising concerns about the contractual obligations that apply to Jemena for managing and rectifying any pollution and other environmental impacts that may occur during and after production, and the extent to which these are enforced by regulators.

[6] Territory Shale Gas is not the same as Coal Seam Gas. Shale gas is trapped in deep underground shale rock at a depth exceeding 1km with an average depth in the NT of 2.5km. Coal Seam Gas is gas trapped in coal typically much closer to the surface.

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Jemena notes that the approvals, licenses and permits that Jemena must obtain to construct and operate the NGP will contain conditions that impose ongoing responsibility to manage and rectify any environmental damage.

Jemena is committed to complying with all regulatory requirements and conditions put in place by Commonwealth, Northern Territory and Queensland government jurisdictions.

3.7 PROJECT DETAILS

Two submissions sought clarification in relation to Project details provided in Chapter 2 of the Draft EIS. In addition the NT EPA has requested clarification in relation to flaring and instances when work would occur outside of the hours 6 am to 6 pm. Each comment is summarised and responded to below.

3.7.1 BORROW PITS

Submission #34 commented that should it become necessary to open borrow pits then these areas should be nominated and surveyed prior to the commencement of construction.

Chapter 2, Section 2.13.8 of the Draft EIS states the following in relation to quarry materials:

“Requirements for borrow materials will depend on ground conditions, and will be determined following completion of further geotechnical investigations. Base materials required for permanent facility foundations will be obtained from approved quarries to meet specification requirements. Should new borrow pits be required for padding material or track maintenance, establishment will be discussed with the applicable landholder (and owner of the relevant material where that person is not the landholder) and regulators on a case-by-case basis, with approval from the regulatory authorities to be secured prior to the establishment of any new pit.”

Jemena has added the following commitment to the Project Commitments Register (refer Appendix C):

If additional quarry material is required for padding or track maintenance, applications and approvals will be sought from the landowner and relevant authorities as required

3.7.2 FLARING

The NT EPA provided comment that clarification is sought on whether gas flaring would occur at the MLV facilities.

Jemena notes that flaring will only occur at the PCCS. Flaring will not occur at the MLV or MICS facilities.

3.7.3 CONSTRUCTION SCHEDULE

Submission #31 provided comment that the construction timeline does not consider the variable and unpredictable climate of the Barkly, the risk of heavy rain impacting on the project is high.

Jemena notes that the Project has carefully considered the potential impact of wet and other extreme weather on the construction program. The program allows for the delays reasonably expected to be caused by both seasonal and unseasonal wet weather. In an extreme unforseen wet weather event some of the construction activities may be paused until conditions return to normal. Jemena has programmed pipeline construction to occur largely within dry season windows, and for the facilities which have easy road access and are hardstand, can be constructed over these wet seasons except when heavy rains prevent site access for safety reasons.

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3.7.4 WORK HOURS

The NT EPA requested Jemena provide clarification of work hours.

Jemena notes that Chapter 2, Section 2.10.1 of the Draft EIS states that the majority of the works would be undertaken between 6 am and 6 pm. However, it is noted that additional crews may be required with different operating hours under the following conditions:

- During non-destructive testing of facility welds.
- During hydrostatic testing of the pipeline, which will be conducted continuously over a minimum of 24 hour period for each of the proposed pipeline hydrostatic test sections.
- During the wet season months when the daytime temperature and humidity inhibit a safe and efficient work environment. This is only anticipated at the MICS and PCCS facilities.
- During pipeline commissioning when gas is being introduced into the pipeline.
- During facilities commissioning when gas is being introduced into the facilities and systems are being energised.
- Unanticipated activities arising.

In circumstances where work is conducted outside of daylight hours, lighting will be kept to a minimum but be sufficient to ensure activities can be carried out safely. Lighting plant and equipment may include:

- machine & vehicle lights
- trailer mounted lighting plant/s
- fixed lighting towers, as per design, at facilities sites
- personal torches and/or head lamps.

In the circumstances listed above, measures to mitigate the impact of noise and lighting impacts on sensitive receptors may include, but are not limited to the following:

- All residents potentially impacted by construction noise emissions will be informed of the construction activities, operating hours and duration of noise emissions.
- All plant, machinery and equipment will be operated and maintained according to manufacturer's instructions to minimise noise emissions.
- Lighting will be kept to a minimum but be sufficient to ensure activities can be carried out safely.
- Locating or orientating site plant and equipment to direct noise and light away from sensitive receivers.
- Use of materials and/or stockpiles to increase acoustic shielding.
- Periodic vehicle noise tests to ensure recommended background noise levels for plant are met; fixed plant will be provided with noise controls to comply with regulatory requirements.

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- Generally works have been planned to occur well away from sensitive receptors.

In the Northern Territory, the Project footprint is remote from communities and residences, and therefore any noise or light emissions associated with night time works would not be expected to impact on people. Some parts of the Project footprint near Mount Isa in Queensland are within proximity to sensitive receptors. In the event that night works are required in these areas, the conditions of the Environmental Authority issued for the Project in Queensland will be complied with.

Potential noise and lighting impacts on sensitive ecological receptors are considered in Section 4.4.3 of this Supplement.

3.8 PROJECT FOOTPRINT

Twenty-five submissions commented, or requested clarification, in relation to the land clearing required for the Project. These comments are summarised and responded to in the sections below.

3.8.1 HABITAT LOSS

Submission #1-22 and #33 commented that the clearing of 2,470 hectares represents significant disturbance and habitat loss, as well as an increase in carbon emissions. Submitter #33 also commented that replanting of the site post-construction will not support the same habitat values as the existing remnant vegetation. Submitter #34 commented that the Draft EIS does not provide analysis of the significance of clearing, or an analysis of options to reduce clearing.

With respect to the issue of habitat loss, Jemena notes that the principle of impact avoidance was adopted when selecting the NGP route. Therefore, potential impacts to biodiversity values have been minimised by avoiding known important habitat areas i.e. wetlands. Through the planning phase, options to reduce clearing are also routinely considered in accordance with the *Code of Environmental Practice – Onshore Pipelines (2013)*, and the Project footprint has been minimised by confining activities to a 30 m wide construction ROW and selecting to use existing access tracks wherever possible.

In the Draft EIS, three consequences associated with land clearing were considered when determining the risk of potential impacts to biodiversity values associated with these habitats. These are:

- Temporary loss of approximately 2,470 ha during construction – most of which will be progressively reinstated post-construction.
- Permanent loss of 102 ha that will remain cleared for operational purposes.
- Permanent reduction in habitat quality if reinstatement and rehabilitation are, to some significant degree, unsuccessful.

The risk assessment concluded that the risks to general biodiversity associated with habitat loss are low. Permanent land clearing associated with the Project is spread across 15 regionally-common and widespread vegetation communities, and constitutes a small fraction of those communities' regional areas of occurrence.

Risks to sensitive vegetation, specifically riparian areas, were also assessed as low. Temporary disturbance of a 30 m wide corridor at major watercourse crossings constitutes a small fraction of the vegetation types' regional area of occurrence.

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The narrow, linear nature of the land clearing required for this Project, traversing large areas of contiguous habitats with low levels of previous land clearing, indicates that habitat loss is unlikely to result in impacts at ecosystem levels.

Of the 2,470 hectares cleared for this development, all but 102 ha will be reinstated. The disturbed areas that are not required for operational purposes will be reinstated and rehabilitated to achieve the acceptance criteria specified in Section 4.11.2 of this Supplement.

The acceptance criteria applied to the Project acknowledge that there is likely to be some reduction in species richness in the reinstated areas compared to undisturbed areas. The criteria prescribe that some loss of species richness is acceptable, but to protect ecological values the loss must be no greater than 30%. Also, there must be no reduction in total ground cover and no increase in weed species. These criteria are expected to be effective in reducing the ecological impacts of the Project to as low as reasonably practicable.

3.8.2 CONSTRUCTION CAMPS, LAYDOWN AREAS AND TURNAROUNDS

Submission #34 comments that it is unclear why such a large area (12 ha) is required for the 300 person construction camps. The submitter commented that Jemena should make it clear if these areas will be used for material storage (e.g. pipe).

Jemena notes that Chapter 2, Section 2.9.1 of the Draft EIS, provides a detailed description of the proposed construction camp footprint and layout. The 300 person temporary camps consist of 8 ha of accommodation, kitchen and messing facilities, ablutions, generators and fuel storage, vehicle parking as well as storage. The other 4 ha is for treated wastewater discharge by irrigation. The camp layout is shown in Figure 3-1 below extracted from the Draft EIS.

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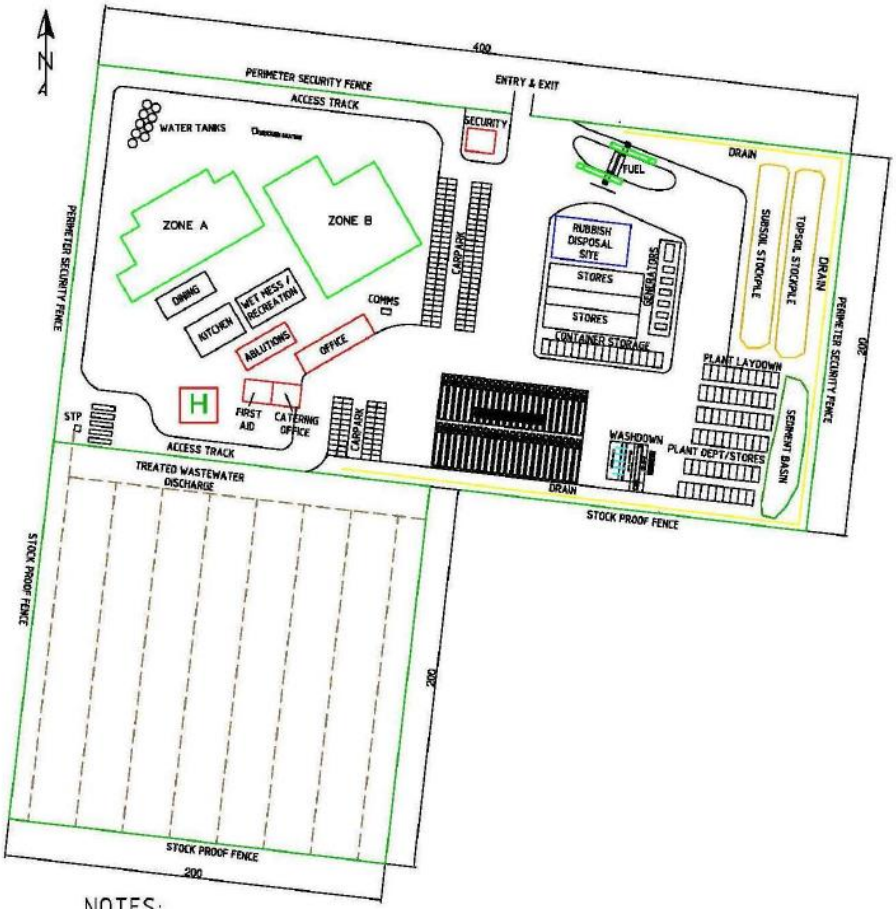

Figure 3-1. Proposed camp layout

Submission #34 further commented that clearing such a large area negates the need for separate laydown areas. The EIS also identifies that laydown and turnaround points will be required but does not identify locations of areas to be impacted.

Jemena acknowledges that the location of laydown and turnaround points have not been located in the EIS as they are still part of ongoing planning. A maximum of 60 ha of land will be required across all locations. These areas will be located immediately adjacent to the pipeline construction ROW, within the pipeline planning corridor that has been subject to assessment through the EIS process.

3.8.3 LAND CLEARING ON ABORIGINAL LAND

Submission #34 comments that it would be useful if the Draft EIS provided summary information regarding how much of the clearing footprint will be located on Aboriginal and native title land.

Jemena advises that approximately 34% of the NGP Project footprint is on NT Native Title Claim land, and approximately 11% is on Aboriginal land.

3.9 STAKEHOLDER ENGAGEMENT

Twenty-six submissions provided comment on the stakeholder engagement undertaken by Jemena in securing consent for the Project to proceed.

Jemena advises that comments made in submission #1-22, #31 and #33 asserting that Jemena has assumed consent for the Project to proceed without adequately engaging landholders and other stakeholders, and that the wishes of Traditional Owners and other landholders will be ignored, are incorrect. Jemena has undertaken an extensive consultation process with all landholders during all stages of the Project. Jemena has been fully open and transparent around its plans for the pipeline during almost 18 months of consultations, including formal consultations since March 2016.

Jemena is respectfully working towards entering into agreements with Traditional Owners. There are well established processes in the Northern Territory, through the Native Title Act 1993 (*Cth*) and the Aboriginal Land Rights (Northern Territory) Act 1976 (*Cth*) (ALRA), through which consultation and negotiation with Aboriginal Traditional Owners, is required to be undertaken. The ALRA provides Traditional Aboriginal Owners with a statutory form of Free, Prior and Informed Consent (FPIC). In addition, Aboriginal people's sacred sites and other areas of cultural significance in the NT are protected under the Northern Territory Sacred Sites Act 1978 and the Heritage Act. Through the Northern Territory Land Councils and directly with other Aboriginal organisations, Jemena has undertaken an extensive consultation process during all stages of the NGP and remains completely committed to listening to and working consultatively with all Traditional Owners.

Jemena is respectfully working towards agreements with pastoralists through options agreements, and with other private landholders and government landholders as necessary. The Project cannot be constructed until agreements are finalised and tenure for the pipeline is granted.

Submission #34 comments that Chapter 4 of the EIS refers to the International Association of Public Participation 1AP2 Spectrum of Public Participation; however, Jemena has not nominated which level of consultation and engagement it intends to adopt with each stakeholder.

Jemena notes that the SIA Scoping Study provided as Appendix R of the Draft EIS included an SIA Consultation Plan, which sets out the approach to be taken to stakeholder consultation and the levels of IAP2 consultation engagement which Jemena expected to be able to apply in relation to differing stakeholders. The approach to engagement with Aboriginal stakeholders is documented in Table 3-1

Table 3-1. Engagement methods and approach for Aboriginal stakeholder groups

Stakeholder group	Association with the project	Method of engagement	Approach
Aboriginal land owners	The pipeline and associated infrastructure intersects Aboriginal land trusts, Aboriginal owned Northern Territory freehold and determined and claimed Native Title areas. Jemena is negotiating formal land access arrangements with these groups outside of the ESIA consultation process.	SIA consultations will be held individually with the Boards of the land holding organisations and / or their representatives in Tennant Creek, Camooweal and Mount Isa. Also, many Aboriginal land owners are likely to be consulted during meetings with Aboriginal communities, outstations and town camps (see below) because this is their usual place of residence.	**Collaborate** Jemena will work hard to develop mutually beneficial solutions to social impacts with Aboriginal land owners.
Aboriginal communities, family outstations and town camps	The pipeline and associated infrastructure is situated in close proximity to several Aboriginal communities, outstations and town camps (community living areas) so they are potentially exposed to direct social impacts. Project	Depending on their preference, separate meetings with these groups will take place either at their community, outstations, town camps or in the regional centres close to these areas. Jemena will work with the Central Land Council in organising, planning and holding	**Involve** Jemena will seek to consider the concerns and aspirations this group in the design and

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Stakeholder group	Association with the project	Method of engagement	Approach
	employees will also likely be sourced from these communities, outstations and town camps.	these consultations. Consideration will be given to holding gender specific consultations with this stakeholder group and separate discussions with community elders if necessary. Traditional Owners who don't live at these communities and outstations but have responsibilities for these places will be invited to participate in the consultations.	execution of the Project.

Submission #34 also comments that Table 4.2 of the Draft EIS presents a confused delineation between Land Councils and Aboriginal Land Trusts. Jemena notes and accepts the Land Councils' observation regarding the differing categorisation of Aboriginal stakeholders. In response to this comment, Table 4.2 has been amended (refer Section 4.3).

The Land Councils consider that Chapter 4 could be improved by recognising Aboriginal people as the main stakeholders impacted by the Project. Jemena acknowledges this comment and notes that the SIA Scoping Study duly acknowledges Aboriginal people as a key stakeholder.

3.10 CUMULATIVE IMPACTS

The EIS ToR Section 5.3 requested an assessment of cumulative impacts that considers the potential impact of the Project in the context of existing developments, and reasonably foreseeable future developments, to ensure that any environmental impacts are not considered in isolation. This assessment is provided in the Draft EIS (Chapter 5, Section 5.4).

Thirty-five submissions raised concerns about potential cumulative environmental and social impacts associated with future onshore unconventional gas development in the Northern Territory. The submissions generally expressed the view that the NGP will enable/facilitate future development of unconventional onshore gas reservoirs, and therefore the cumulative impacts of such developments should be further considered in the EIS prior to the NGP Project being approved. This issue is responded to previously in Section 3.2.2 of this Supplement.

Cumulative impacts were also raised by submitter #34, specifically in relation to water use. The submitter is of the view that "the EIS would benefit by including an analysis of the cumulative impact of the NGP Project's water use on existing water sources in the Project Area." Jemena's response to this comment is provided below.

3.10.1 WATER USE

The amounts of water that will be used during construction and operation of the NGP are described in Chapter 2, Section 2.11 of the Draft EIS. During construction approximately 111 ML of water will be required over a 12 – 18 month period for potable water supply, dust suppression, wash downs and hydrostatic testing.

Operational water use at the PCCS was estimated to be 4,800 L/day in the Draft EIS. This has since been revised to an estimated 3,000 L/day during normal operation as Jemena have since improved site design

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to optimise facility operation. There may be limited circumstances where higher volumes are required, for example plant start-up after maintenance activities.

The main water users in proximity to the NGP are regional towns and small Aboriginal communities/outstations, and pastoral stations. Power and Water Corporation hold licences for extraction of up to 200 ML/yr from the Cabbage Gum aquifer and 2,000 ML/yr from the Kelly Well aquifer for the Tennant Creek town water supply. The public register of Water Extraction Licences does not list any approved licences in the Tennant Creek or broader Barkly regions of the Northern Territory. Jemena is not aware of other mining or petroleum activities in proximity to the Project in the Northern Territory that are likely to use large amounts of groundwater.

There is no publicly available information on existing water use across the Project footprint outside of the Tennant Creek town supply. Given the sparse nature of development across the region, absence of industrial activities and absence of any Water Extraction Licences for high water users i.e. horticulture, the groundwater resources would not appear to be highly developed.

The potential contribution of NGP construction water use to cumulative impacts on water resources is limited by the fact that the extraction will occur only over a 12 – 18 month period in areas where there is currently a low level of groundwater extraction. The Construction Contractor is currently progressing planning for selecting existing bores that may be further investigated as construction water sources. Preliminary testing of water quality in existing bores has been undertaken, and as planning progresses further assessments will be undertaken to confirm that each bore can sustainably yield the amount of water required over the 12 – 18 month construction period without impacting on existing water users or environmental flows.

The potential contribution of NGP operational water use to cumulative impacts on groundwater resources is also low, because the amount of water required for the PCCS is relatively small, and based on publically available information, there does not appear to be any large water users currently extracting water from the aquifer. The annual water use at the PCCS will be approximately 1.01 ML (refer Section 4.5.1.2), which is equivalent to the average amount of water used by six Australian households[7] or two Darwin households[8]. Furthermore, Jemena has committed to ensuring that the bore at the PCCS can sustainably yield the amount of water that is required.

3.11 BIODIVERSITY

Thirty-two submissions comment on the assessment and management of risks to biodiversity and Matters of National Environmental Significance (MNES) protected under the EPBC Act (*Cth*). The submissions raised a variety of issues that are summarised and responded to in the sections below.

3.11.1 RISK ASSESSMENT

Submission #47 from the NT Department of Environment and Natural Resources (DENR) commented that:

"*The draft EIS appropriately assesses the risks and potential impacts to biodiversity presented by the proposed project. No biodiversity issues have been identified as requiring supplementary information*."

Jemena acknowledges DENR's comment and appreciates the advice received from DENR staff throughout preparation of the Draft EIS in relation to target species and survey methods.

[7] Average household water use in Australia is 190,000L per year (0.19ML)
[8] Average household water use in Darwin is 540,000 L per year (0.54 ML)

Jemena also acknowledges comments from the NT EPA on the risk assessment process, especially as it has been applied in the Draft EIS to assessment of biodiversity risks. The comments provided by the NT EPA are specific to the consideration of the Plains Death Adder in the risk assessment; however, it was noted that the comments may also relate to other areas of the risk assessment. The following concerns were raised:

- Incorrect assumption of successful reinstatement of habitats made when assessing inherent risks.
- Sources of risk to threatened species are identified (i.e. clearing, dust, fire, weeds, entrapment, traffic) without undertaking any analysis of the level of risk from all sources of risk i.e. cumulative risk.
- False analysis of likelihood and consequences for Plains Death Adder (addressed in Section 3.12.5).

Response in relation to how the risk assessment process has been applied to the Plains Death Adder specifically is provided in Section 3.12.5. The extent to which these comments apply to other areas of the risk assessment is considered below.

Incorrect assumption of successful mitigation

The NT EPA commented that 'an appropriate risk analysis would assess risk without mitigation, in this case rectification of damage to habitat'. Successful rehabilitation cannot be assumed in determination of inherent risk.

Jemena's Environmental Consultants have reviewed the NT EPA's comments and agree that effective mitigation i.e. reinstatement and rehabilitation, should not be assumed when assessing inherent risks. The intent of the stated assumption was to indicate that the risk assessment takes into consideration the fact that the construction footprint will be reinstated, as opposed to the pipeline ROW being maintained indefinitely as a bare earth corridor. In this case it is reasonable to assume vegetation cover will re-establish which would reduce impacts to biodiversity, compared to maintaining a cleared corridor.

Review of the Environmental Risk Register provided as Appendix F1 of the Draft EIS, found that the assumption was stated a number of times when assessing risks to biodiversity and threatened species during the Project construction phase. This assumption was not made in relation to assessing the other categories of risk, or in relation to the risk assessment applied to the Project planning and operational phases.

Review of the relevant risks indicates that the inherent risk scores would not change if the assumption of reinstatement and rehabilitation of habitats is removed. This is because habitat disturbance will be restricted to a narrow area i.e. a 30 m wide corridor, with the highest level of disturbance occurring over a period of 12 months. Following completion of construction, the worst possible consequence for biodiversity and threatened species would be that the reinstatement and rehabilitation are not effective in reinstating habitat values. If this were to occur the risk would still be rated as Low, because a 30 m wide cleared corridor through vegetation types that are predominantly naturally 'open' habitats i.e. open woodland or open grassland, that occur contiguous with other similar habitats with a low level of disturbance, would not be expected to cause ecosystem level impacts to biodiversity.

Cumulative risk

To clarify, for the threatened species with important populations in the Project footprint i.e. Carpentarian Antechinus and Plains Death Adder, Chapter 12 of the Draft EIS, does present a cumulative analysis of risks to each species. The analysis is presented in the form of an assessment of the potential for significant impacts, undertaken in accordance with the *EPBC Significant Impact Guidelines,* the purpose of which is to assess the cumulative impact of all potential impacts on the species in questions – e.g. will project

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activities 'lead to a long-term decrease in the size of an important population'? The assessment of the potential for significant impacts was informed by the independent assessments of risk to the species from each identified source of impact.

3.11.2 INDEPENDENCE OF BIODIVERSITY SURVEYS

Submission #47 expressed concern that 'the majority of surveys being undertaken by mining companies with conflict of interest, rather than independent bodies'.

Jemena advises that where specific technical expertise and qualifications are required Independent consultants have been commissioned to undertake surveys. Australia-wide, the environmental impact assessment process is designed to place the costs of assessment upon the proponent. To assist with collecting the information necessary to address the information requirements of the relevant authorities, the proponent typically engages suitable-qualified experts. Those experts value their reputation and are aware that their reports will be placed under significant scrutiny during the public exhibition process, during which it is highly likely that any bias or misinformation will be exposed. This has not occurred for this Draft EIS.

3.11.3 AQUATIC BIODIVERSITY VALUES

Submission #27 expressed concern that the EIS does not contain a report that discusses the aquatic biodiversity or how it will be impacted.

Jemena notes that aquatic biodiversity was not assessed because the inherent risk of Project activities impacting upon aquatic ecosystems is very low; given the paucity of such habitat, the semi-arid climate of the region and because most works are scheduled for the dry season.

3.11.4 FROGS

Submission #34 expressed a concern that the Draft EIS states that frogs will not be encountered and that there also appears to be no consideration to burrowing species.

Jemena cannot find a reference within the Draft EIS to the effect that 'frogs will not be encountered'. It is agreed that frogs may be a regular occurrence during wet periods, although the inherent risk of Project activities impacting upon frogs is lowered because of the semi-arid environment and because trenching is scheduled for the dry season.

Section 6.5.3 of the biodiversity risk assessment addresses the potential impact of trench excavation on burrowing fauna, arguing that excavating a very narrow, linear trench may impact upon a few individual burrowing fauna but at such a small scale that impact will be negligible at an ecosystem level.

3.11.5 HABITAT FRAGMENTATION

Submission #47 included comments from three individual submitters regarding the potential for Project activities to lead to habitat fragmentation, with detrimental consequences to wildlife.

Habitat fragmentation is considered in this context to be the permanent process by which habitat loss results in the division of large, continuous habitats into smaller, more isolated remnants. Narrow, temporary clearance lines – which could lead to habitat fragmentation in vegetation types such as closed forests – are unlikely to cause habitat fragmentation within the vast and contiguous open woodlands or open grasslands that predominate within the region. This was addressed in Section 6.5.6 of Draft EIS, which concluded that:

> *The impact [*of habitat fragmentation*] is not likely to occur in this location. During construction this Project will divide – temporarily – the vegetation communities the construction footprint intersects.*

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> *As these vegetation communities are large, and as this impact will be temporary, such division cannot reasonably be considered fragmentation.*

It is important to note that in the comments on the Draft EIS received from Submitter #47 – the NT Department of Environment and Natural Resources – it is concluded that:

> *The risk of land clearing and habitat edge effects/fragmentation to the wider ecosystem is appropriately assessed as low, reflecting the widespread distribution of most of the impacted vegetation types and the linear nature of the project footprint.*

3.11.6 INTRODUCED FAUNA

Submission #27 disagreed with the Draft EIS assessment that the risk of increased predator access is low, arguing that 'a 620 km, 30m wide pipeline ROW and associated tracks are likely to provide new access to the area by introduced predators (cats, foxes) and dingos and could have a significant impact on small to medium sized mammals (dasyurids, mulgara, bilbies, native rats, wallabies) but also birds and other fauna during construction and operation, for example.'

Introduced predators – cats, dogs and possibly foxes – are highly likely to occur in the region. Given the extent of vehicle and cattle tracks, cleared fence and seismic lines, and cattle disturbance throughout the Project footprint, those predators are likely ubiquitous. Consequently, the temporary clearing for the ROW and associated tracks is unlikely to facilitate further dispersal of these species.

The management of fauna that has fallen into the trench is reviewed in Section 3.11.9 of this document. These proposed measures are proven and accepted, and should significantly reduce the opportunities for predation of fauna by introduced species.

3.11.7 SENSITIVE HABITAT AREAS

Submission #26, #27 and #34 commented that sensitive vegetation types — which are considered significant under the Northern Territory Vegetation Clearing Guidelines (DNTRES 2009) because they are either unique to the region and/or have inherently high biodiversity values – were not adequately assessed in the Draft EIS.

Jemena notes that Section 6.1.4 of the Draft EIS identifies that the region of the Northern Territory in which the Project footprint occurs contains two of these sensitive vegetation types – riparian vegetation and wetlands. The section goes on to confirm that there are no wetlands within the Project footprint. This is because wetlands have been deliberately avoided during the design phase.

There is riparian vegetation within the Project footprint. Riparian vegetation can have high biodiversity values, particularly in relation to providing ecological corridors and watercourse stability. However, as discussed in Section 6.1.4.1 of the Draft EIS, most of the riparian vegetation within the Project footprint is poor quality because of the impacts associated with grazing. Furthermore, the riparian vegetation intersected by this development tends to be narrow (a few trees' breadth) as opposed to wide riparian areas of larger river systems, which are widely known to support high biodiversity.

Section 6.5.1 of the Draft EIS states that:

> *As the Project will use open trenching techniques at watercourse crossings, riparian habitats within the 30m construction ROW will be directly impacted. No riparian vegetation will remain permanently cleared. Vegetation mapping indicates there are approximately 3.7 ha of riparian habitats occurring within the Project footprint.*

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Section 7.5.1 of the Draft EIS describes how, prior to construction, every watercourse crossing will be surveyed to inform the development of a site-specific, Progressive ESCP. Those ESCP's – together with the Reinstatement Management Procedure – will ensure bank stability until natural regeneration takes hold.

3.11.8 THREATENED SPECIES (NT LISTED)

A number of submissions comment on the adequacy of Threatened species surveys and assessments that were undertaken for the Draft EIS. Comments that relate specifically to Northern Territory listed Threatened species are summarised and addressed below. Comments that relate to Threatened species listed under the EPBC Act (i.e. MNES) are summarised and addressed in Section 3.12.

3.11.8.1 *Sporobolus latzii*

Submission #34 expressed a concern that the Draft EIS does not indicate what actions will be taken if *Sporobolus latzii* is found in the Project footprint.

It is very unlikely that *Sporobolus latzii* occurs within the Project footprint because wetland habitats have been avoided in the design of the ROW and tracks. A procedure has been developed as a contingency for if the species is found in the Project footprint – see Section 3.11.9.5.

3.11.8.2 *Austrobryonia argillicola*

Submission #34 expressed a concern that the EIS does not adequately assess the risk to *Austrobryonia argillicola*, possibly because the species may be de-listed in the future.

The assessment of *A. argillicola* was undertaken independent of its possible future status. The risk posed by Project activities to the population of this species is low because, as concluded in Section 6.2.7 of the Draft EIS:

> *Survey results suggest that A. argillicola is likely to be widespread in drainage habitat within the region, but is scarce (i.e. occurs in low densities) at each location. Given the large area of contiguous habitat and apparent abundance of this species when targeted in surveys, it seems reasonable to infer that there is a single population of A. argillicola dispersed throughout the river systems in the Mitchell Grass Downs area. Occurrences of this species within the Project footprint are not considered populations of this species, but individual members of a single population. The criteria for being an 'important' population (as defined in the EPBC Significant Impact Guidelines 1.1) are not satisfied.*

Submission #47 – the NT Department of Environment and Natural Resources – concur with this conclusion in their comments, stating that:

> *Tobermorey Melon (A. argillicola, Vulnerable, TPWC Act) was found to occur within the project area; however, the risk posed to its regional conservation status is correctly assessed as low, given its widespread occurrence in low-density subpopulations throughout the broader region.*

It is possible that individual *A. argillicola* will be disturbed by Project works – most likely during the clearing and removal of top soil by graders. However, the number of individuals that will be disturbed should be limited by the small area of overlap between the Project footprint and suitable habitat, and the natural sparseness of the species occurrence observed during surveys.

There will be standard management procedures in place to preserve the top-soil seed-bank, which will likely mean that any cleared *A. argillicola* will germinate from the seed-bank when topsoil is respread as part of the reinstatement procedures. The species appears to occur up and down drainage lines, and

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therefore it is expected that seed will also naturally re-establish in re-instated areas post-construction. For these reasons, no specific management actions are proposed for this species.

3.11.9 BIODIVERSITY MANAGEMENT

Submission #27, #34 and comments from the NT EPA requested additional detail regarding how the risk of fauna mortality due to exposure or predation because of trench entrapment would be managed.

In responding to these comments, the following contextual information should be noted:

- The pipeline trench is an average of 625 mm wide and 1200 mm deep. The ROW is generally in an east-west alignment and most construction will occur in the cooler time of the year. These factors reduce the risks to fauna associated with heat exposure in the semi-arid setting of the Project.
- The trench is considered 'open' from when the ditch is dug through to when the laid pipe is re-covered.
- Pipe will be covered same day it is lowered in. Prior to lowering in, the trench will be re-inspected for fauna. Padding will be immediately installed, which will ensure that there is no gap beneath the pipe within which fauna could hide.
- Each section of trench will be open for a period of 23 to 30 days. Regardless of the length and time any section of trench is open; the Construction Contractor will ensure that the Trench Inspection Procedure will be adhered to.
- The most likely feral fauna species to occur in the Project footprint is the Feral Cat, which is unlikely to become trapped in the trench due to its agility. In the unlikely event that Cane Toads are encountered, ethical disposal via freezing will be considered, if practical.

3.11.9.1 Species most susceptible to entrapment

The NT EPA requested information on what types of species are likely to become trapped in the open trench. Woinarksi et al. (2000) studied entrapment of fauna in a pipeline trench between Daly Waters and Borroloola in the NT (approximately 350 km to the north of the NGP). The habitat was predominately tropical savannah woodland. Construction was in the cooler, dry season. In that study, the most common types of fauna retrieved from the trench were geckos, pygopodids ('legless lizards'), dragons, snakes and rodents. These types of fauna are also expected to predominate in the NGP trench. In terms of the vulnerability of threatened species known or likely to occur in the Project footprint:

- It is unknown how proficient the Plains Death Adder would be at escaping from a trench; however, Phillips (pers. comm. 2016) suggests that the species may have an adversity to falling given his experience in failing to capture Plains Death Adders in pitfall trapping exercises. As snakes can generally survive for extended periods without food, trapped Plains Death Adders have a significant time-frame opportunity to escape from the trench. Moreover, trapped Plains Death Adders would be able to defend themselves from predation.
- In rocky country, where blasting is required, the sides of the trench will be blasted to create loose edges to assist the Carpentarian Antechinus with escaping. Carpentarian Antechinus are adept climbers (given their preference for rocky habitats) and it is anticipated they could generally escape under these conditions.

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3.11.9.2 Fauna spotter-catchers

To minimise the mortality of fauna due to exposure and predation, the number of fauna spotter-catcher teams (with 2 persons in each) employed at any one time to undertake trench inspections will be that appropriate for inspecting the length of open trench (including capturing and releasing trapped animals) within five hours of sunrise each day. In the event that fauna mortality in a trench section is higher than expected or fauna 'hotspots' are encountered (refer Section 4.4.2.3), additional fauna spotter-catcher teams may be employed.

Persons clearing the trench will be qualified animal handlers with requisite NT and Qld permits. Those permits will require animal ethics approval, which includes approval of euthanasia methods.

3.11.9.3 Trench Inspection Procedure

To address concerns contained within submission #27, #34 and comments from the NT EPA, a Trench Inspection Procedure has been developed and will be included as an Appendix to the Biodiversity Management Plan. The procedure is documented in Section 4.4.2 of this Supplement.

The Construction Contractor will be responsible for managing trench inspections. Trench inspection requirements will be covered in inductions, and includes the requirement that each species be identified and details recorded.

3.11.9.4 Management infrastructure

To address concerns contained within Submission #27, #34 and comments from the NT EPA, the Biodiversity Management Plan will be revised at the end of the approval's processes to state that trench ramps will be installed as follows:

- Wherever landowners requested them to facilitate stock crossing the trench
- Wherever the fauna spotter-catchers who are undertaking the trench inspections identify hotspots for fauna entrapment (refer Section 4.4.2.3)
- Otherwise, no more than 3 km apart.

Fauna shelters will be placed as follows:

- Wherever the fauna spotter-catchers who are undertaking the trench inspections identify hotspots for fauna entrapment
- Otherwise, at intervals not greater than 500 m.

3.11.9.5 Procedure if a threatened species is encountered

To address concerns contained within Submission #34, the Biodiversity Management Plan will also be updated at the end of the approval's processes to provide the procedure for the unlikely event that any listed threatened fauna species, including the Greater Bilby, Brush-tailed Mulgara, Carpentarian Antechinus and Plains Death Adder, are encountered during construction. In that situation the following actions will be taken:

1) The open trench in that vicinity will be treated as a 'hotspot' (refer Section 4.4.2.3) and will receive increased management.

2) DENR and DoEE will be notified.

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3) Sufficient fieldwork will be undertaken by an expert on those species to assess the significance of the occurrence and the degree to which Project activities will likely impact upon the species (i.e. whether there are burrows within the Project footprint).

4) An appropriate strategy for minimising any impact to the local occurrence of the species will be developed, in consultation with DENR, and implemented.

It is very unlikely that *Sporobolus latzii* occurs within the Project footprint because that species' habitat – wetlands – has been avoided in the design of the ROW and tracks. If it is found in the Project footprint:

1) DENR will be notified.

2) Sufficient fieldwork will be undertaken by an expert on the species to assess the significance of the occurrence and the degree to which Project activities will likely impact upon the species.

3) An appropriate strategy for minimising any impact to the local occurrence of the species will be developed – in consultation with DENR – and implemented.

3.11.9.6 Hydro-testing

As acknowledged in a comment from the NT EPA, there are sections of the trench that will remain open until hydro-testing is complete. Those sections of trench will have sloped sides to allow for human entry (and to facilitate fauna escaping).

3.11.9.7 Large rainfall event

Submission #34 raised concern about entrapment and drowning of fauna in the trench in the event of rainfall.

Jemena advises that in the event of a forecasted large rainfall event, it will not be possible to close the trench. Trench ramps and fauna shelters will remain in place, and may be used by fauna that become trapped in the trench. It is expected that unseasonal rain would rapidly soak into the dry ground.

In the interests of human safety, in the unlikely event that site evacuation occurs, no active management of fauna trapped in the trench will be undertaken. Trench inspections will resume when personnel can safely return to the site.

3.12 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

A number of submissions were received that either comment directly on EPBC listed Threatened species, or on sources of risk that are relevant to the consideration of impacts to MNES. No comments were received from the Commonwealth Department of the Environment.

Comments received that were considered relevant to assessing the potential for significant impacts to MNES, are summarised and responded to in the sections below. It should be noted that some of these comments were previously responded to in Section 3.11 of this Supplement; however, the relevant comments and responses are repeated in this section for assessment by the Commonwealth DoEE.

3.12.1 RISK ASSESSMENT

Submission #47 from the NT Department of Environment and Natural Resources (DENR) commented that:

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"*The draft EIS appropriately assesses the risks and potential impacts to biodiversity presented by the proposed project. No biodiversity issues have been identified as requiring supplementary information*."

Jemena acknowledges DENR's comment and appreciates the advice received from DENR staff throughout preparation of the Draft EIS in relation to target species and survey methods.

Jemena also acknowledges comments from the NT EPA on the risk assessment process, especially as it has been applied in the Draft EIS to assessment of biodiversity risks. The comments provided by the NT EPA are specific to the consideration of the Plains Death Adder in the risk assessment; however, it was noted that the comments may also relate to other areas of the risk assessment. The following concerns were raised:

- Incorrect assumption of successful reinstatement and rehabilitation of habitats made when assessing inherent risks.
- Sources of risk to threatened species are identified (i.e. clearing, dust, fire, weeds, entrapment, traffic) without undertaking any analysis of the level of risk from all sources of risk i.e. cumulative risk.
- False analysis of likelihood and consequences for Plains Death Adder (addressed in Section 3.12.5).

Response in relation to how the risk assessment process has been applied to the Plains Death Adder specifically is provided in Section 3.12.5 below. The extent to which these comments apply to other areas of the risk assessment is considered below.

Incorrect assumption of successful mitigation

The NT EPA commented that 'an appropriate risk analysis would assess risk without mitigation, in this case rectification of damage to habitat'. Successful rehabilitation cannot be assumed in determination of inherent risk.

Jemena's Environmental Consultants have reviewed the NT EPA's comments and agree that effective mitigation i.e. reinstatement and rehabilitation, should not be assumed when assessing inherent risks. The intent of the stated assumption was to indicate that the risk assessment takes into consideration the fact that the construction footprint will be reinstated, as opposed to the pipeline ROW being maintained indefinitely as a bare earth corridor. In this case it is reasonable to assume vegetation cover will re-establish which would reduce impacts to biodiversity, compared to maintaining a cleared corridor.

The assumption was stated a number of times when assessing risks to biodiversity and threatened species during the Project construction phase. This assumption was not stated in relation to assessing the other categories of risk, or in relation to the risk assessment applied to the Project planning and operational phases.

Review of the relevant risks indicates that the inherent risk scores would not change if the assumption of reinstatement and rehabilitation of habitats is removed. This is because habitat disturbance will be restricted to a narrow area i.e. a 30 m wide corridor, with the highest level of disturbance occurring over a period of 12 months. Following completion of construction, the worst possible consequence for biodiversity and threatened species would be that the reinstatement and rehabilitation are not effective in reinstating habitat values. If this were to occur the risk would still be rated as Low, because a 30 m wide cleared corridor through vegetation types that are predominantly naturally 'open' habitats i.e. open woodland or open grassland, that occur contiguous with other similar habitats with a low level of disturbance, would not be expected to cause ecosystem level impacts to biodiversity.

Cumulative risk

To clarify, for the threatened species with important populations in the Project footprint i.e. Carpentarian Antechinus and Plains Death Adder, Chapter 12 of the Draft EIS, does present a cumulative analysis of risks to each species. The analysis is presented in the form of an assessment of the potential for significant impacts, undertaken in accordance with the *EPBC Significant Impact Guidelines,* the purpose of which is to assess the cumulative impact of all potential impacts on the species in questions – e.g. will project activities 'lead to a long-term decrease in the size of an important population'? The assessment of the potential for significant impacts was informed by the independent assessments of risk to the species from each identified source of impact.

3.12.2 INADEQUATE CONSIDERATION OF MNES

Twenty-six submissions comment that MNES (and some NT-listed threatened species) were not properly considered. The concerns expressed are listed below:

- Some of the 'at risk' species likely to be in the area affected by the pipeline have not been detected.
- There is no mention of any further studies to be undertaken prior to commencement of construction.
- Common regionally significant and locally significant species are not considered at all.

This section summarises and addresses comments that relate to MNES. Comments that relate specifically to NT-listed threatened species were summarised and addressed previously in Section 3.11.8.

Jemena notes that a suitably qualified Environmental Consultant was engaged to undertake the threatened species assessments. Desktop and field surveys were undertaken by people with local experience of the region, using methodologies developed by, or in conjunction with, recognised experts on the threatened species being targeted. For some species, habitat assessments were undertaken as a surrogate for direct population surveys. This was done so in consultation with relevant government departments and/or on the advice of the abovementioned experts, and allows for an assessment of seasonal occurrences i.e. if there is no suitable habitat present, then the species is unlikely to occur, irrespective of season.

It is not correct to state that surveys for threatened species generally need to be undertaken at multiple times throughout the year. There are optimal times of the year for surveying some threatened species, and these were chosen for all such species apart from breeding Gouldian Finches. A breeding habitat assessment – developed by expert Sarah Legge – was adopted as the survey methodology for that species.

A number of submissions state that 'two species observed during surveys of the region over a twelve-month period, along with three species determined likely to be present, were considered to be at risk from the proposed development.' This is not correct. Out of five species known or likely to occur within the Project footprint, three of them were determined – with reference to the Commonwealth Government's Significant Impact Guidelines – as not at risk from the proposed development. It is also appropriate to conclude that, for species which are unlikely to occur within the Project footprint, Project activities have an inherently low risk of impacting upon them.

It is therefore the opinion of Jemena that threatened species are properly considered within the EIS. It is pertinent to note that in the comments on the Draft EIS received from Submitter #47 – the NT Department of Environment and Natural Resources – it is stated that:

> *The multi-stage assessment of threatened species initially identified (from desktop analysis) that eight species had a medium-to-high likelihood of occurrence within the Northern Territory portion of*

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the project footprint. However, further analysis, informed by targeted field surveys in appropriate habitats, reduced this to only four species. Finally, guided by expert advice, it was appropriately concluded that the project poses a risk to a significant population of one species only – Plains Death Adder.

Finally, it is important to note that the biodiversity risk assessment addressed risks to biodiversity at an ecosystem level for each relevant impact. This is the standard and appropriate level for assessing risks to biodiversity (other than threatened species), and is consistent with the objective stated in the EIS ToR prepared by the NT EPA.

For all of these reasons, no further biodiversity studies are considered necessary prior to commencement of construction.

3.12.3 SURVEY EFFORT FOR GREATER BILBY AND GOULDIAN FINCH

Submissions #31 and #47 commented that biodiversity surveys for Greater Bilby and Gouldian Finch were inadequate to assess the risk posed by Project activities to those species.

There are historic records of Greater Bilby in the region, but also a general consensus that the range of this species has contracted in many parts of the country, including the Wakaya Desert. The survey method adopted for this project was designed in conjunction with bilby expert Rick Southgate, and has been used successfully in other surveys previously. Because the survey focussed on signs of Greater Bilby presence – particularly burrows, which persist for months – any local seasonality in that species' presence is accounted for.

The Project footprint is south of the southern edge of the Gouldian Finch's known distribution (O'Malley 2006) and so the inherent likelihood of this species occurring within the Project footprint is low. Nevertheless, a breeding habitat assessment was designed by Sarah Legge – a known expert on the species and their conservation – who also assessed the results and concurred with the conclusion that there is very little likelihood that Gouldian Finches occur within the Project footprint, and negligible chance that the Project footprint contains breeding habitat.

3.12.4 CARPENTARIAN ANTECHINUS

Submission #34 raised a number of concerns regarding how the Carpentarian Antechinus was addressed in the EIS in regards to:

- whether the area of the species' critical habitat that is proposed to be cleared can be further reduced
- the scale of edge effects
- trench management
- impacts by introduced species.

A total of 1.04 ha of Carpentarian Antechinus critical habitat will be temporarily cleared. It is not possible to reduce that area because, in order to terminate at Mt Isa, the ROW cannot avoid traversing the rocky country that occurs in a band running north-south i.e. perpendicular to the pipeline route. The route has been selected to minimise the area of rock traversed.

Section 12.5.5 of the EIS addresses the potential impact of edge effects on Carpentarian Antechinus and concludes that:

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> *It is further assumed that the critical habitat of both threatened species is sparsely-vegetated, and so vegetation integrity is not an important ecological requirement for those species (as compared with, for instance, a forest-dwelling species). Therefore, edge effects on both threatened species are negligible and an inherent risk to threatened species for this potential impact has not been calculated.*

The potential impacts on Carpentarian Antechinus associated with trench excavation, are entrapment in the trench and disruption to breeding (including to dispersal). The Biodiversity Management Plan has specific measures for the section of the construction ROW proximate to Carpentarian Antechinus habitat (KP 609.5 and KP 622), whereby for every 50 m of rocky habitat and every 100 m of intervening habitat, hessian (or similar material) will be draped from the top of one side of the trench, down along the side and bottom of the trench, and up the other side to the top of the opposite side of the trench. This will allow trapped Carpentarian Antechinus to cross the trench and/or escape the trench.

Poisoning by ingestion of Cane Toads is a possible, but not demonstrated, threat to Carpentarian Antechinus. However, as acknowledged by TSSC (2015a), there are many records of Carpentarian Antechinus that post-date Cane Toad invasion. Moreover, as described in the EIS:

> *…the inherent likelihood of Cane Toad being introduced into area of the Project footprint within which it does not yet occur is either zero (because the species cannot occur there) or else possible, but largely inconsequential, because self-introduction was inevitable and likely to occur soon.*

The threat posed by feral cats is discussed in Section 3.11.6 of this document.

3.12.5 PLAINS DEATH ADDER

Submission #34 requested a more detailed risk analysis of Plains Death Adder because, in their opinion, the EIS does not discuss:

- the likelihood of mortality due to clearing and grubbing.
- degradation of habitat of the Plains Death Adder through means such as edge effects and introduction of weeds.

Jemena notes that Section 6.5.3 of the Draft EIS addresses the risks to Plains Death Adder associated with trench excavation. Key findings are summarised below:

> *In assessing the inherent risk of impacts on the Plains Death Adder, it is assumed that because Plains Death Adders often retreat into deep soil cracks during the Dry season, there is the possibility during that time that individuals may be injured or killed during trench excavation. However, the area of Plains Death Adder habitat that will be excavated is a trench 0.6 m wide extending for 206 km – a total of 12.4 ha. Although the density of Plains Death Adder in suitable habitat is unknown, it seems unlikely that more than one or two individuals of this species will occur within the excavation corridor. Moreover, those individuals may not necessarily be injured if excavated.*

Degradation of Plains Death Adder habitat is also addressed in Section 6.5.5 of the Draft EIS. Key findings are summarised below:

> *It is further assumed that because the critical habitat for Plains Death Adder is sparsely-vegetated vegetation integrity is not an important ecological requirement for this species (as compared with, for instance, a forest-dwelling species). Therefore, the risks associated with edge effects have not been further assessed as they are unlikely to impact on the species.*

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It is therefore the opinion of Jemena that this risk was properly considered within the Draft EIS. It is pertinent to note that Submitter #47 – the NT Department of Environment and Natural Resources – concur with this conclusion in their comments, stating that:

> *The EIS considers the most likely risks to Plains Death Adder (e.g. trench entrapment, land clearing, fauna strike) and justifiably ranks them as inherently low. Multiple mitigation measures that are appropriate and will likely help maintain the low risk status through all phases of the project are also included.*

3.12.5.1 Accuracy of risk assessment

The NT EPA comments that:

> *Sources of risk are identified without undertaking any analysis of the level of risk to the death adder from all sources of risk. This should include independent assessments of each source of impact (e.g. clearing, dust, fire, weeds, entrapment, and traffic), each without and with mitigation as appropriate, and then a cumulative assessment of all risk to the species.*

Tables 12-8 and 12-9 in the MNES chapter of the Draft EIS present a significant impact assessment for Carpentarian Antechinus and Plains Death Adder, respectively. The content of those tables is directly derived from the preceding risk assessment of each potential source of impact to those species. The significant impact assessments are against the criteria contained within the *EPBC Significant Impact Guidelines*, which have been developed in order to assess the cumulative impact of all potential impacts on the species in questions – e.g. will project activities 'lead to a long-term decrease in the size of an important population'?

Furthermore, the NT EPA comments that 'the draft EIS states that 11% of death adders are likely to suffer mortality from entrapment in the trench.'

This is incorrect. In Section 12.5.4 of the Draft EIS it is stated that:

> *In Daly Waters in the Northern Territory – about 400 km north of the Tennant Creek end of this Project – Woinarski et al. (2000) recorded along 74 km of trench, 349 individual vertebrates from 40 species, with 11 per cent mortality.*
>
> *…For the purpose of assessing the inherent risk (without controls), it is assumed that… no controls are in place to rescue or manage fauna – i.e. mortality will be approximately 11 per cent as per Woinarski et al. (2000).*

The 11 per cent mortality in this sentence related to all fauna, and was not meant to imply 11 per cent mortality of any species. It is actually likely that very few Plains Death Adders will perish in the trench because of their physiology and ecology. The inherent risk to Plains Death Adder from trench entrapment is low; the residual risk is arguably negligible because of the mitigation measures that will be put in place (particularly trench inspections by fauna spotter-catchers).

It is therefore the opinion of Jemena that the residual risks posed by Project activities to Plains Death Adder was properly concluded within the EIS to be 'low'. Again, it is pertinent to note that Submitter #47 – the NT Department of Environment and Natural Resources – concur with this conclusion in their comments, stating that:

> *The EIS considers the most likely risks to Plains Death Adder (e.g. trench entrapment, land clearing, fauna strike) and justifiably ranks them as inherently low. Multiple mitigation measures that are appropriate and will likely help maintain the low risk status through all phases of the project are also included.*

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3.12.6 PAINTED HONEYEATER

Submission #34 comments that 'despite the finding that the area is not an "important population" for the Painted Honeyeater under the EPBC Act, mitigation measures to reduce impact should still be presented, particularly for riparian woodland areas.'

Section 6.2.5 of the Draft EIS concludes that:

> *Given the presence of suitable habitat (although sub-optimal), and the existence of nearby historical records, it has to be assumed that the Painted Honeyeater may be an irregular, non-breeding visitor in riparian woodland within the Project footprint.*

Less than 10% of the ROW lies within the expert distribution of Painted Honeyeater. Therefore, because an insignificant area of Painted Honeyeater habitat will be temporarily cleared (and then reinstated during construction of the pipeline), the inherent risk to this species is very low; and thus specific mitigation measures are not required.

3.12.7 ERROR

Submitter #34 commented that Figure 12-2 has a missing legend item (blue star).

Jemena is unsure what figure this comment applies to as Figure 12-2 is a photograph without a legend or blue star. No changes have been made.

3.13 WEEDS

Five submissions provided comment in relation weeds. These comments are summarised and responded to in the sections below.

3.13.1 RISKS AND MANAGEMENT COSTS

Submission #31 comments that weeds are a significant risk, especially because the pipeline will be traversing areas that are currently largely inaccessible and as a result are relatively weed-free. Submission #33 comments that weeds will present an additional management cost for landholders as well as a threat to the ecological values of the region.

In response to these comments, Jemena notes that the risk assessment undertaken for the Draft EIS acknowledges that weed management is a significant risk requiring on-going attention throughout the Project construction and operational phases. Jemena is responsible for ensuring that disturbed areas are reinstated, including the specific criteria that there will be less than or equal to the pre-disturbance weed species richness, as prescribed in the acceptance criteria for the Project (refer Section 4.11.2). Consequently, there will be no impost on landholders regarding weed management.

3.13.2 WEED MANAGEMENT PLAN

Submission #34, #46 and #47 provide various comments in relation to specific aspects of, or omissions from, the Weed Management Plan, submitted as Appendix J to the Draft EIS. An overview of Jemena's approach to weed management is provided below, and specific comments are responded to in the relevant sub-sections.

The Weed Management Plan submitted with the Draft EIS outlines the survey methods that will be employed and the weed management measures that will be implemented through the Project construction

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phase. A weed survey of the Project footprint is scheduled to be undertaken during the early wet season (i.e. Nov-Dec), which is the most appropriate timing to ensure all existing weed infestations are identified and mapped.

The Weed Management Plan will be updated prior to commencement of construction to incorporate the outcomes from the weed survey, and to provide details of where site-specific weed management actions are required i.e. management of weed material in cleared vegetation and soil stockpiles, and weed hygiene stations. The updated Weed Management Plan will be provided to the Construction Contractor for implementation through their Construction Environmental Management Plan.

An Operational Weed Management Plan (OWMP) will also be developed towards the end of the Project's construction phase. Jemena acknowledges that the success of the weed management will only be known within the first few years after construction. Consequently, the OWMP will outline the ongoing monitoring program and species specific controls required in the event that new weed infestations are recorded in areas where there were previously no weeds.

3.13.2.1 Control measures

Submission #34 comments that the Weed Management Plan submitted with the Draft EIS did not provide sufficient detail regarding the control measures that will be employed to prevent the proliferation of existing weeds. The submission notes that effective control measures will need to be developed in consultation with DLRM.

Jemena notes that the Project Environmental Consultant has worked closely with the Weed Branch of the NT Department of Environment and Natural Resources (DENR) (previously DLRM) regarding weed survey techniques and priorities. Jemena will continue to work closely with the department regarding weed control measures.

3.13.2.2 Definition of weeds

Submission #34 commented that greater consideration should be given to the control of common fodder weeds such as buffel grass within the rehabilitated areas of the ROW.

In the Northern Territory, Jemena's Weed Management Plan will focus only on those species classified as Class A, B and C weeds in the Weeds Management Act. There are other plants in the region that are either non-native or naturalised that will not be part of Jemena's weed management program.

3.13.2.3 Weed monitoring, control and reporting

Submission #46 from the NT Government Department of Primary Industry and Resources (DPIR) comments that "there does not appear to be reference to the seasonal aspect of weed monitoring and control. Survey and treatment will have to be carried out in the early wet season and continued for two years after the use of construction areas has ceased."

Jemena acknowledges that the effectiveness of weed management will only be known some years after construction. Consequently, weed monitoring and associated management will be ongoing for the life of the project; there will be a particular focus on the few years after construction while weed seed is still viable and while areas are rehabilitating. The OWMP will explicitly include seasonality considerations regarding monitoring and control and outline a reporting process that captures weed control activities. This requirement has been recorded as a commitment in the Project Commitments Register (Appendix C).

Submission #47 from the DENR comments that there does not appear to be a structured process for treating and subsequent reporting on weed control activities as described in Section 5 of the Weed

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Management Plan (Appendix J). The Department acknowledges the extent of the processes to ensure weed is not introduced onto site; however, this is not always what occurs on-ground.

Following completion of the weed surveys, and prior to commencement of any significant land disturbance, the OWMP will be updated to include site specific performance indicators and corrective actions (i.e. weed treatment and control activities), and the requirement to maintain weed treatment records for the purpose of monitoring and reporting. Revisions to the Weed Management Plan will include the following for the purpose of addressing specific comments received from DENR:

Objective: No new weed species introduced

Performance indicator: Disturbed areas have less than or equal to the weed species present compared to the pre-clearing condition

Corrective Action: Treat new weeds prior to maturity and seed set

Recording and Reporting: Add 'Weed treatment records'

Objective: No proliferation of existing weeds as a result of construction

Performance indicator: Disturbed areas have less than or equal to the percentage cover of weed species present compared to the pre-clearing condition

Corrective Action: Treat new weed infestations prior to maturity and seed set

Recording and Reporting: Add 'Weed treatment records'

This requirement has been recorded as a commitment in the Project Commitments Register (Appendix C).

3.14 WATER

Thirty-three submissions commented on various aspects of water use, water sources and management actions required to protect surface water and groundwater resources from potential impacts associated with the NGP Project. Comments relating to existing beneficial uses of water resources, wastewater management and watercourse crossings are summarised and responded to in the in the relevant sections below. Water use and water sources are discussed further in Section 3.15.

3.14.1 EXISTING BENEFICIAL USES

Submission #34 comments that the importance of water in the Project Area is not adequately discussed, and the environmental values of watercourses acknowledged.

Jemena notes that the existing environment sections of Chapter 6 (Section 6.1) and Chapter 7 (Section 7.2) of the Draft EIS outline the environmental values of surface water in arid environments as it relates to riparian vegetation and habitat, wetlands, Sites of Conservation Significance, and the major watercourses traversed at the eastern end of the pipeline alignment. The environmental values of the more significant surface water features in the region are summarised below from the Draft EIS:

- Watercourses in the region are dry for much of the year, and sometimes for prolonged periods, but when they hold water (in the form of flowing water or remnant pools) they provide water and diverse habitat for a variety of flora and fauna. They also allow connectivity between various areas of habitat.

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- The arid environment in which they are located emphasises the importance of the few watercourses, wetlands and pools which do exist in the region (particularly in the west where there are few watercourses but many wetlands north and south of the pipeline alignment). Wetlands, swamps and watercourses in the region provide essential habitat for birds (breeding, feeding or roosting), plants (including the vulnerable *Sporobolus latzii*), fish (which often move around during periods of flow), invertebrates and terrestrial and amphibious vertebrates. This habitat is usually most valuable during periods of extensive rainfall and flooding when (for example) water birds may flock to wetlands to breed and roost. Refer to Duguid et al. (2005) for a summary of the ecological values of wetlands (and some watercourses) in the arid region of the NT.
- The watercourses provide water for agricultural and cultural use of the land, including grazing and hunting.
- Maintenance of water quality ensures that ecosystems remain healthy and water can be used by the flora and fauna which rely on it.
- Watercourses in the eastern end of the construction ROW are within the headwaters of the Lake Eyre Basin, and feed the Lake Eyre Basin during periods of significant rainfall. Lake Eyre Basin, and the watercourses that feed it, have may values including habitat for threatened or rare species, waterbird breeding sites, supply of water for agricultural purposes, supplementing groundwater aquifers and supporting Aboriginal cultural uses.
- Groundwater and surface water form part of a single connected water cycle. The points at which these systems interface are referred to as groundwater-surface water interactions. Examples of groundwater-surface water interactions include groundwater discharge areas (e.g. springs, soaks, permanent pools, base flow in rivers) and areas where surface water recharges the groundwater system (e.g. rivers which run over aquifer outcrop and sinkholes). Therefore, many of the watercourses in the region recharge the underlying groundwater aquifers, which in turn provide water for agricultural use and towns, and groundwater dependent ecosystems.

The above text from the Draft EIS acknowledges that there are a wide variety of environmental values related to watercourses in the region. These values have informed the risk assessment, and the development of specific management measure's and risk minimisation strategies, presented in the Draft EIS.

3.14.2 WATERCOURSE CROSSINGS

Seven submissions requested additional information about watercourse crossings. The information gaps and/or concerns raised in the submissions are listed below:

- Exact crossing locations, techniques and construction methods for all watercourses.
- Locations of permanent waterbodies.
- Potential impacts on watercourses if periods of higher water flow do occur.
- Minimisation of impacts on riparian vegetation – avoidance of large trees.
- Details of dam and pump crossing techniques proposed, including where the water will be pumped, how the dams will be constructed and where material will be sourced.

In addition, the NT EPA provided comment that it does not support the use of open trenching methods for any watercourse that is flowing, including base flow, or within close proximity to pools that support ecosystem function. The NT EPA requested that further information be provided in the Supplement to demonstrate that measures have been taken to avoid and mitigate risks associated with watercourses.

Jemena notes that at the time of submitting the Draft EIS there was some outstanding information required in relation to watercourse crossings. Further, it is acknowledged that the detail provided in the Draft EIS in relation to watercourse crossings is contained in various disparate sections, which may make it difficult for reviewers when making comment in relation to completeness and/or information gaps.

To address the comments received in submissions, and to make the watercourse information easier to review, relevant information has been compiled in Section 4.6 of this Supplement. The information is a combination of information summarised from various sections of the Draft EIS, and new information compiled subsequent to submission of the Draft EIS.

3.14.3 HEALTH AND SAFETY IMPACTS OF WASTEWATER DISPOSAL

Submission #28 and #47 commented on the direct health and safety impacts of wastewater disposal, the potential impacts of wastewater disposal on human consumption sources, and potential impacts on the viability of agricultural and tourism industries.

With respect to consideration of the health and safety impacts of wastewater disposal, Jemena notes that risks to human health and safety associated with contamination of land or water are discussed in the Draft EIS Chapter 10, Section 10.4.4. The information below, extracted from the Draft EIS, provides clarification in relation to assessment that was undertaken in the Draft EIS.

The Project will store, handle and transport potentially hazardous materials. Construction and hydrostatic testing of the pipeline, and nitrogen reduction at the PCCS, will produce waste products including bulk wastes, gas liquids, contaminated wastewater and chemical waste. There are a number of surface watercourses and discrete areas of potential shallow groundwater, which could (if exposed to pollutants) act as a pathway for human exposure. The potential for exposure of the local community is limited by the large separation distances between the Project works and sensitive receptors, and there are no groundwater bores that are used for domestic supply within the Project footprint.

For the purpose of assessing inherent risks to community health, it is assumed in the Draft EIS that the risk of hazardous substance entering surface or groundwater is low. This is because:

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- hazardous materials will be transported, stored and handled in accordance with the applicable legislation and Australian Standards
- waste will be stored onsite for a period of time but will be transported off site for disposal at an approved facility
- wastewater will be treated and disposed of by irrigation to land at designated irrigation areas near the construction camps in accordance with Department of Health Guidelines for Wastewater Works Design Approval requirements .

The main potential for soil and water contamination during the Project operational phase is at the PCCS. Operational activities will involve on-site storage and evaporation of produced water from nitrogen reduction, within a purpose built lined pond, designed to prevent overflow. The facility will also store hazardous substances, fuels and chemicals in accordance with the applicable legislation and Australian Standards. For the purpose of assessing inherent risks to community health, it is anticipated that the risk of hazardous substances entering surface or groundwater during the operational phase is low.

Due to the controls proposed in relation to management of wastes and wastewater, the residual risk of hazardous substances entering surface or groundwater was assessed as low for both the construction and operations phases of the Project. It is possible that contamination of surface or groundwater could occur; however, the impact on water quality is expected to be short-term and localised. The low risks of water quality impacts occurring indicate that any potential exposure to the community would also be limited. The large separation distance between the Project footprint and sensitive receptors indicate that any impact is unlikely; therefore, the inherent risk is assessed as low.

As the level of risk posed to community health is low, no additional controls are required. As long as the risk of water contamination occurring in the first place remains low, risks to community health will be prevented.

All controls outlined in the Draft EIS and relevant sections of this Supplement aim to minimise potential impacts of contamination due to wastewater disposal. Additionally, no wastewater of any kind will be discharged within 100 m of a watercourse, 200 m of a sinkhole, 200 m of a wetland or spring, or in areas where dolomite or limestone outcropping occurs. These buffer zones are in place to minimise the risk of contamination of receiving waters (including surface water bodies and groundwater aquifers), reducing potential impacts on existing or future users and industries.

3.14.4 HYDROSTATIC TESTING

Six submissions comment on the disposal of hydrostatic test water and potential for environmental impacts, particularly on water quality in receiving watercourses. Concerns broadly included a perceived lack of detail around management of hydrostatic test water, requirements for additives, and the mechanism for regulating discharges. Submission #31 raised concern that there was no Hydrostatic Test Water Management Plan submitted with the Draft EIS. Submission #34 comments that Jemena should consult the Land Councils in the event it proposes to discharge on Aboriginal land, native title land or on land proximate to sacred sites or Restricted Work Areas.

Since submission of the Draft EIS the Construction Contractor has made a number of advances in relation to planning the hydrostatic testing. This includes new information on potential water sources, source water quality, requirements for additives, and proposed treatment and disposal mechanisms. This additional information is provided in Section 4.8 of this Supplement.

Jemena notes that the Hydrostatic Test Water Management Plan has been drafted in accordance with the framework Environment Management Plan submitted with the Draft EIS. The Project Commitments Register (Appendix C) also includes the following commitment in relation to further development and finalisation of the plan:

- *Hydrostatic testing will be conducted in accordance with Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines (2013) and an approved Hydrostatic Testing Management Plan, which will include requirements for pre-cleaning, flushing, water storage, water quality monitoring and water disposal*.

The Energy Pipelines Regulations (*NT*) requires Jemena to apply for 'Consent to Construct' and 'Consent to Operate'. Final submission, regulator review and approval of the Hydrostatic Test Water Management Plan will occur through these processes.

With respect to discharge locations, there are no alternative discharge locations being planned on Aboriginal land or land proximate to Sacred Site Exclusion Zones or Restricted Work Areas. No discharge will occur along the pipeline route as any hydrotest water, once used in one section of the pipeline, would be stored in temporary holding dams for use in subsequent sections. Final discharge would be at the end of the line and would generally be to evaporation ponds.

Should water need to be released on Aboriginal land, land proximate to sacred sites or Restricted Work Areas, Jemena will consult with the relevant stakeholders beforehand.

3.14.5 WASTEWATER MANAGEMENT AT CONSTRUCTION CAMPS

Submission #34 comments that for Camp 3, consultation with the Land Councils and traditional Aboriginal owners in the siting, design and operating requirements of the associated waste treatment infrastructure will be essential.

Jemena notes that all temporary Project infrastructure for which the locations have not been specified in the Draft EIS, will be sited with reference to the Authority Certificates issued by the Aboriginal Areas Protection Authority, to ensure that sites of cultural significance to Aboriginal people are not impacted.

As detailed in Chapter 7, Section 7.6.4 of the Draft EIS, all camps will be constructed and managed in accordance with the relevant legislation and regulations, including NT Department of Health *Requirements for Mining and Construction Projects*. As requested by NT Department of Health in their comments provided in relation to the Draft EIS, the Project Commitments Register includes a commitment that:

- *DoH will be consulted prior to the commencement of construction in order to discuss the Department's Requirements for construction camps, such as the registration of food premises, provision of private water supply, solid waste management and on-site wastewater management.*

Wastewater will be treated onsite and irrigated in accordance with applicable Australian standards, and will require approval from Northern Territory Department of Health (DoH). Irrigation systems for treated wastewater will be designed and operated in accordance with the *Guidelines for Wastewater Works Design Approval of Recycled Water Systems* (DoH 2013) including obtaining a *Wastewater Works Design Approval* from DoH prior to installation of the systems, and undertaking a *Land Capability Assessment* for each site or assessing on-site soil characteristics.

Irrigation areas will be located away from watercourses and application rates will be in accordance with accepted standards. Irrigation will be designed and managed such that no surface water runoff will occur. No irrigation of treated wastewater will occur in areas of limestone or dolomite outcrop, or sinkholes.

The above commitments and controls are expected to be effective in managing any risks associated with wastewater treatment and disposal at construction camps.

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3.14.6 WASTEWATER MANAGEMENT AT PCCS

Twenty-nine submissions comment on the management of wastewater at the PCCS including lack of detail around wastewater quality and evaporation ponds, and concern about the volumes of wastewater to be managed. Impacts of rainfall inflow were also queried.

Since submission of the Draft EIS Jemena has made further advances in planning the PCCS, including aspects relevant to water use and wastewater management. This information is provided in Section 4.7.1 of this Supplement.

3.15 WATER USE AND SOURCES

3.15.1 SUSTAINABILITY OF GROUNDWATER EXTRACTION

Twenty-nine submissions comment on the volume of water proposed to be extracted, and concern around the sustainability of such extraction.

3.15.1.1 Construction water use

A total of 111 ML of water is required for construction purposes, including hydrostatic testing, potable and general construction uses such as dust suppression. This water is required over a short construction period and is considered a one-off use.

Sources

Current estimates indicate that the majority of construction and hydrostatic test water can be sourced from an existing dam near Phillip Creek (subject to landholder approval), and supplemented with groundwater from an existing bore near KP413. Additional sources may be required, and new groundwater bores may be required in areas where there are no existing sources available. The Construction Contractor is currently undertaking investigations into existing sources, and their water quality, to inform their water sourcing strategy.

Potable water is available for the project to support the temporary construction camps from the existing Mt Isa and Tenant Creek town supplies. Water will be sourced in the NT through agreement with Power Water.

Water quality

Submission #34 comments that Jemena should identify a contingency plan to secure quality construction and hydrostatic test water, in the event that only saline water is available. The Construction Contractor is currently collecting water samples from existing water sources to investigate their suitability for supplying hydrostatic testing. Refer to Section 4.8.3 for a summary of water quality data to date.

Existing users

Specific concerns were raised by submitter #34 about potential impacts of groundwater extraction on the communities of Pukalki and Purrukuwurru. The Project's investigations indicate there is minimal water available around the Pukalki area. Jemena is not relying on taking water from the Pukalki region. Jemena will not take surface water or construct new bores on Aboriginal Land Trust land unless via agreement with the landholders.

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Submission #47 raised concerns of impacts of water extraction on pastoralists. Jemena has been in consultation with pastoralists within the Project area and surrounding region and any water extraction from pastoral bores will be in accordance with agreements with the relevant pastoralist. Extraction within sustainable yields will ensure that there are no ongoing impacts on pastoralists as a result of groundwater extraction for Project needs. Any groundwater extraction on pastoral properties will be for a short time period (i.e. within the construction period of 12-18 months).

In conclusion, the potential contribution of NGP construction water use to cumulative impacts on water resources is limited by the fact that the extraction will occur only over a 12 – 18 month period in areas where there is currently a low level of groundwater extraction. The Construction Contractor is currently progressing planning for selecting existing bores that may be further investigated as construction water sources. Preliminary testing of water quality in existing bores has been undertaken, and as planning progresses further assessments will be undertaken to confirm that each bore can sustainably yield the amount of water required over the 12 – 18 month construction period without impacting on existing water users or environmental flows. As a contingency, new bores will be established to target different aquifers if existing bores cannot yield the amount of water that is required.

3.15.1.2 Operational water use

Submission #1-22, #23, #26, #27, #29, #30 and #33 queried the sustainability of the proposed groundwater extraction volumes for the operation of the PCCS. The concerns were particularly around the perception of water scarcity in the arid environment in which the Project is located. Submitter #23 also expressed concern about over extraction of groundwater limiting other development in the region, or impacting pastoral activities.

Jemena has been further developing the process and water needs for PCCS since the submission of the Draft EIS. This has since been revised to an estimated 3,000 L/day during normal operation as Jemena have since improved site design to optimise facility operation. There may be limited circumstances where higher volumes are required, for example plant start-up after maintenance activities. Additional information regarding this is presented in Section 4.5.1.2 of this Supplement.

The potential contribution of NGP operational water use to cumulative impacts on groundwater resources is also low, because the amount of water required for the PCCS is relatively small and based on publically available information there does not appear to be any large water users currently extracting water from the aquifer. The annual water use at the PCCS will be approximately 1.1 ML, which is equivalent to the average amount of water used by six Australian households[9] or two Darwin households[10]. Furthermore, Jemena has committed to ensuring that the bore at the PCCS can sustainably yield the amount of water that is required.

3.15.2 APPLICATION OF THE WATER ACT

Submission #31 comments that clarity needed as to whether this project is exempted from the Water Act as a petroleum activity.

Jemena notes that Section 7 of the *Water Act* (NT) lists a number of exemptions for mining or petroleum activities. The following sections **do not apply** to the NGP Project as it is a petroleum activity regulated under the *Energy Pipelines Act*:

- Section 15 – obstruction of or interference with a waterway prohibited.
- Section 16 – prohibition of pollution.

[9] Average household water use in Australia is 190,000L per year (0.19ML)
[10] Average household water use in Darwin is 540,000 L per year (0.54 ML)

- Part 5 – surface water (including prohibition of unauthorised works in a waterway and taking surface water without a permit).
- Part 6 – groundwater (including prohibition of unlicensed extraction of ground water).

These exemptions mean that Jemena is not required to obtain a permit granted under the *Water Act* to take surface or groundwater, or obstruct or interfere with a waterway. This does not mean the activities can be undertaken unregulated; they are regulated through permitting and licensing systems in place under the *Energy Pipelines Act*. The regulator takes into account the findings of the environmental assessment process when making decisions regarding the issue of Pipeline Licences and associated consents.

3.15.3 STORAGE DAMS

Submitter #34 commented that the water storage dams require lining, fencing and hazards for entrapment of fauna.

The Construction Contractor has confirmed that dams will be lined to prevent water seepage into surrounding soils. They will be fenced, have fauna ladders, and will be inspected daily for trapped fauna when empty.

This requirement has been included in the Project Commitments Register (Appendix C).

3.16 EROSION AND SEDIMENT CONTROL

Submission #34 and #47 discussed erosion and sediment control plans in relation to the management of erosion, contingencies for unexpected rainfall, and the process for development, assessment and auditing of Progressive ESCP.

Jemena notes that a Primary ESCP was submitted as Appendix P of the Draft EIS. This ESCP was developed in accordance with the IECA Best Practice Erosion and Sediment Control Guidelines 2008 (the IECA Guidelines). The guidelines describe a process for developing Progressive ESCP's relevant to linear developments. The application of this process to the NGP is outlined in Chapter 7 of the Draft EIS. The content is reiterated and clarified below in response to the comments received.

3.16.1 DEVELOPMENT OF PROGRESSIVE ESCP

The process for managing erosion and sediment control planning for the Project involves the development of a Primary ESCP which provides the overarching framework for management and the concepts of erosion and sediment control as relevant to the Project. Progressive ESCP's will be developed for high risk areas and will be informed by soil landscape mapping, identification of problematic soils, and assessment of watercourse crossings. The Progressive ESCP's will include specific controls for various construction areas and will be evolving documents that are adapted to the environmental conditions such as climate, water flow rates and slopes.

The Progressive ESCP's will include specific instructions on the controls to be implemented for soil management and watercourse crossings, and contingencies for rainfall or unexpected flow in watercourses. Examples of controls are presented in Section 4.6 of this Supplement.

The process of developing Primary and Progressive ESCP's is consistent with the IECA Guidelines, which are considered best practice. Specific controls have not been included in the Draft EIS or this Supplement as they need to be developed to be relevant to the site conditions at the time of disturbance (e.g. factoring

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in climate, construction activities and watercourse conditions). Consequently, the process for the development of more specific plans has been provided.

ESCPs will be developed, reviewed and approved by appropriately qualified people in accordance with the IECA Guidelines, and will be submitted to the NT DENR for approval (see Section 4.9). This process will ensure that the ESCPs contain sufficient information to minimise the risk of erosion.

Requirements for permanent controls and reinstatement inspections will be detailed in the Progressive ESCP's, which will include monitoring and maintenance requirements. This will include any specific provisions for watercourse crossing reinstatement, treatment of problematic soils, and permanent controls for high risk erosion areas. Erosion management will focus on appropriate reinstatement and drainage (i.e. preventative measures).

3.16.2 REINSTATEMENT OF WATERCOURSE CROSSINGS

Submission #34 comments that the EMP provides that watercourse crossings will be reinstated 'as soon as construction of crossing is complete' but that access across watercourses will not be rehabilitated until they are 'no longer required'. The EIS should provide specific detail on what is meant in relation to both of these matters.'

The primary function of the pipeline ROW is to provide access for construction vehicles and plant equipment to complete all aspects of pipeline construction. This includes reinstatement which occurs after all elements of the pipeline are installed.

For watercourse crossings, once the crossing itself has been completed, the bulk reinstatement of the crossing can occur. This will include re-instatement of the trench and all of the banks, except the section required as part of the ROW access track. Once access is no longer required (e.g. completion of construction) the balance of the reinstatement will occur; the bed and bank profile will be completely reinstated, topsoil and cleared vegetation respread, and erosion and sediment controls put in place. Once this has occurred, there will no longer be any access across the watercourse.

3.16.3 ADDITIONAL CONTROLS

Submission #34 comments that additional controls may be required at watercourses with significance to Aboriginal people.

Jemena acknowledges that watercourses have a range of social, cultural and environmental values that require protection during construction. All areas identified as Aboriginal Sacred Sites have been avoided in selecting the pipeline route. Further, Jemena and its contractors will comply with the conditions of the Authority Certificate issued for the Project pursuant to the Aboriginal Sacred Sites Act (*NT*).

The Primary ESCP submitted as Appendix P of the Draft EIS and the information presented in this Supplement documents a process for protection of watercourses that is in accordance with best practice. The controls proposed at watercourses will be developed, reviewed and approved by appropriately qualified people in accordance with the IECA Guidelines. This process will ensure that risks to watercourses are reduced to as low as reasonably practicable.

3.16.4 VEGETATION MANAGEMENT

Submission #34 comments that the material presented regarding vegetation management and the construction EMP do not provide confidence that controls presented in the Primary ESCP (Appendix P of the Draft EIS) will be adhered to.

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Jemena notes that Section 13.13 of Chapter 13 of the Draft EIS provided detailed management actions for the planning, construction and operational phases of the Project relevant to reinstatement and rehabilitation management. Those relevant to vegetation are provided below:

- Prior to construction, develop a Rehabilitation Plan that:
  - Meets landholder and stakeholder requirements (determined through consultation)
  - Details pre-construction land condition and establishes acceptance criteria, or reference sites in non-disturbed areas
  - Addresses the requirements of environmental approvals, legislation and industry standards
  - Provides transitional and final acceptance criteria
- Ensure reinstatement follows standard procedures outlined in the *Code of Environmental Practice: Onshore Pipelines* (APIA 2013).
- Develop ESCPs that identify specific requirements for soil management, major watercourse crossings, reinstatement requirements and final landform requirements, including level of cover to be achieved over disturbed soil.
- Each watercourse crossing profile is to be surveyed for levels prior to disturbance and these levels are to be used as a guide for reinstatement following construction. During clearing activities vegetation shall be cleared separately and stockpiled adjacent to the cleared area to facilitate re-spreading. Vegetation clearing should avoid damage to adjacent live vegetation.
- Prior to grading, soil management procedures (width and depth of topsoil stripping) are to be determined, and communicated to clearing operators.
- Topsoil is to be removed and stockpiled separately from subsoils along the side of the construction ROW, access tracks and temporary infrastructure.
- Construction ROW and all temporary facilities, tracks and work areas will be progressively reinstated during the construction phase. The entire construction footprint is to be reinstated, unless permanent access is required or landholders request that certain infrastructure remains.
- The trench is to be backfilled and topsoil respread along construction ROW within 3 months of construction. Progressive reinstatement of ROW must commence within 6 months of completion of construction activities.
- Topsoil is to be respread across the disturbed area, in the same location that it was originally cleared from. Topsoil must be the final ground cover layer, as it contains the seed stock.
- Vegetation cleared during the ROW construction will be spread back over topsoil as a ground cover.
- Temporary drainage, erosion and sediment controls will be installed and maintained in accordance with ESCPs to assist in diversion, stabilisation and management of anticipated surface water flows during site re-establishment; these will be removed once there is sufficient ground cover for the area to be stable (to be detailed in ESCP).
- Permanent drainage controls are installed in accordance with the ESCPs. As a minimum, diversion bunds will be installed at intervals along the ROW and at approaches to watercourses to avoid water flowing down the ROW, into watercourses and resulting in erosion, and sedimentation of watercourses. Permanent erosion controls will focus on ground cover in the form of natural revegetation.

Other controls relate to weed management, removal and reinstatement of temporary controls, and monitoring and maintenance requirements during the operational phase. As with all environmental controls and commitments presented in the Draft EIS, the implementation of these is ultimately the responsibility of Jemena and the Construction Contractor, and will be managed through their Environmental Management

Systems and incorporated into relevant management plans (as a minimum, the Construction and Operational Environmental Management Plans).

3.17 HERITAGE

Seven submissions provided comment in relation to the identification and protection of historic and cultural heritage.

Jemena notes that Chapter 8 of the Draft EIS presents a comprehensive assessment of risks to the following heritage places and items:

- Heritage places of items protected under the Heritage Act (*NT*)
- Aboriginal sacred sites protected under the Northern Territory Aboriginal Sacred Sites Act.

The assessment was informed by complete archaeological surveys of the Project footprint undertaken by qualified archaeologists, and Aboriginal Sacred Sites clearance surveys facilitated by the NLC and CLC. A framework Cultural Heritage Management Plan (CHMP) was submitted as Appendix Q of the Draft EIS.

The submission received from the NT Heritage Branch in relation to the Draft EIS (Submission #39) comments that:

- *All heritage and archaeological issues have been adequately addressed for this project, for the time being.*
- *Comprehensive archaeological surveys have been conducted of all the areas included in the pipeline footprint (including the compressor station sites, construction ROW, camp areas etc.) by appropriately qualified archaeologists/heritage consultants.*
- *The archaeological surveys result in reports that include mitigation and management strategies for specific archaeological places, sites and objects discovered. Mitigation strategies include avoidance of significant sites and realignment where possible.*
- *Regulatory requirements in relation to work approvals and permits have also been identified and recommendations for the ongoing monitoring of sites are also mentioned in the Draft EIS.*
- *The correct procedures for the discovery of skeletal remains are also referred to in the Draft EIS.*

Heritage Branch stated that “there is no further heritage or archaeological issue associated with this Draft EIS for the time being.

With respect to Aboriginal Sacred Sites, the submission received from the Land Councils (submission #34), comments that:

“the Land Councils have facilitated sacred site surveys with traditional owners and custodians of sacred sites in relation to the proposed NGP Project Area. The Land Councils have identified a significant number of sacred sites and other important cultural areas in the vicinity of the Project area where work must be restricted. The Land Councils anticipate that cultural heritage management as it relates to traditional owners will be managed by both contract and the Aboriginal Areas Protection Authority.”

Jemena considers that heritage matters have been adequately addressed in the EIS.

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3.17.1 DIFFERENTIATION BETWEEN ABORIGINAL AND NON-ABORIGINAL HERITAGE

Submission #34 states that the EIS could be improved by delineating between Aboriginal and non-Aboriginal cultural or heritage risks.

Jemena notes that the heritage risk assessment documented in Chapter 8 of the Draft EIS delineates two types of heritage; heritage places and items protected under the Heritage Act (*NT*) and Aboriginal Sacred Sites protected under the Northern Territory Aboriginal Sacred Sites Act. For the purpose of the risk assessment, sites protected under the Heritage Act (*NT*) are broadly considered as non-Aboriginal heritage, and sites protected under the Northern Territory Aboriginal Sacred Sites Act are Aboriginal heritage. However, there can be some overlap as discussed below.

It is noted that a site or object can have cultural heritage value both as an archaeological place and as a Sacred Site. The extent, to which Aboriginal and Macassan archaeological places and objects protected under the Heritage Act (NT) are classified as Aboriginal heritage, depends on the cultural importance of those sites to Aboriginal people. In the event that places and objects are of cultural significance to Aboriginal people, then the Northern Territory Aboriginal Sacred Sites Act provides for protection of these places and objects as Aboriginal Sacred Sites.

3.17.2 ABORIGINAL SACRED SITES

Submission #33 comments that ECNT is very concerned that no Authority Certificate has been granted by the Aboriginal Area Protection Authority (AAPA).

Jemena notes that an application for an Authority Certificate was made to the AAPA in May 2016 as a precursor to the completion of consultations, field surveys and negotiations with traditional owners and site custodians. The application and was based on the pipeline alignment identified through consultations via the Land Councils in 2015, to avoid impacts on Aboriginal Sacred Sites. Both the NLC and CLC facilitated sacred site surveys with traditional owners and custodians of sacred sites.

As the protection of Aboriginal Sacred Sites is an elemental part of any agreements for long term land access, it is appropriate that the issue of an Authority Certificate by the AAPA occurs once land agreements have been finalised. Consequently, the process for this aspect of social impact management, i.e. culture and heritage, does not necessarily sit neatly with an event like an EIS process. Accordingly, the Project Commitments Register (Appendix C) includes a commitment from Jemena that construction activities will not commence prior to the issue of an AAPA Authority Certificate. It is intended that an Authority Certificate will be obtained for the Project through negotiation with Traditional Owners and site custodians via the Land Councils and other Aboriginal organisations.

3.17.3 HERITAGE MANAGEMENT

Four submissions commented that a finalised copy of the CHMP should be provided in the Supplementary EIS submission, and should address the outstanding approvals required under the Northern Territory Aboriginal Sacred Sites Act (i.e. an Authority Certificate) and Heritage Act (*NT*) (i.e. Works Approvals).

Jemena notes that a framework CHMP was provided as Appendix Q of the Draft EIS. The CHMP is document that will evolve over time as Jemena works through obtaining an Authority Certificate and Works Approvals, which must be obtained prior to commencement of any significant land disturbance. The management framework provided in the CHMP acknowledges that heritage management will occur through the CEMP (prepared by the Construction Contractor) and the OEMP (prepared by Jemena).

The framework CHMP provides the guidance relevant to ensuring that protections are implemented on the ground during construction and operation. In acknowledgment of the importance of ensuring that all heritage management requirements are captured in Project management plans prior to the

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commencement of works, the Project Commitments Register (Appendix C) provides the following commitments:

- Conditions of Authority Certificates will be incorporated into the CEMP and OEMP
- All requirements of Works Approvals will be incorporated into the CEMP and OEMP.

3.18 SOCIO-ECONOMIC ASPECTS

Nine submissions provided comment in relation to the assessment of socio-economic aspects associated with the NGP Project.

Jemena notes that Chapter 9 of the Draft EIS documented a summary of the socio-economic profile of the Barkly region and assessed the social and economic risks and opportunities associated with the NGP Project. The information presented in the chapter was summarised from the SIA Scoping Study (Appendix R of the Draft EIS) and the Economic Impact Assessment (Appendix S of the Draft EIS).

The sections below summarise the comments received in relation to socio-economic aspects of the Project and Jemena's responses. Since submission of the Draft EIS, further SIA consultations have been undertaken and the ESIA has been completed. The ESIA is provided as Appendix D of this Supplement.

3.18.1 ABORIGINAL CONTEXT

Four submissions commented that the Aboriginal context provided in the Draft EIS fails to provide enough detail to establish a baseline for potential impacts. The submitters stated that more detail is required further to stating that "Traditional cultural practice is still conducted and Aboriginal languages are still spoken in the region."

Jemena notes that Chapter 9, Section 9.8 provides a detailed summary of the Aboriginal context relevant to assessing the social and economic impacts of the Project on Aboriginal people. The information in the chapter includes:

- An overview of Aboriginal land interests.
- Socio-economic indicators relevant to health, education and employment.
- Laws customs and culture, including an overview of Aboriginal society in the Barkly region today and at European arrival.

The information presented in Chapter 9 of the Draft EIS is a summary of the full Aboriginal context provided in the SIA Scoping Study, which was submitted as Appendix R of the Draft EIS. The context has been further adopted and referred to in the completion of the ESIA, which is now included as Appendix D to this Supplement.

3.18.2 EMPLOYMENT

Two submissions (#31 and #34) provided comment in relation to employment opportunities associated with the NGP during construction and operation. Submitter #31 raises the concern that "only 13 permanent jobs in the NT are forecasted."

Jemena notes that during operation, though less in scale, Jemena will have around 30 full time equivalent roles, with 10 as permanent Jemena employees in the field. Jemena also estimate around $500,000 per

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year of ongoing contracts for local businesses. The multiplier effect of these activities will result in significantly more indirect jobs and the development of both people and small business, particularly in the regions.

Submitter #34 made a number of specific comments that are responded to below:

"Jemena does not make any binding commitment to Aboriginal employment or business targets. The EIS also contains strong caveats such as 'the achievement of these estimates will be dependent on the competitiveness of individual businesses, individual interest and aspiration."

Jemena has stated public targets for Territory, local and Aboriginal participation based on sound assessments of the capacity of people and businesses in the region. The reality of the labour market and the business world is that individuals and businesses, despite all of the employment and contract opportunities and support incentives that are put on offer, associated with a project such as the NGP, have to decide whether they aspire to take up the opportunities and if so, they have to be competitive in doing so.

"Section 9.9.3 of the EIS states Jemena will select 60 people to participate in the Project Ready Training Program, comprised of 30 participants from the Barkly and 30 participants from Queensland. The Land Councils note that 64% of the 8,100 Barkly population is Aboriginal, the majority of whom are economically marginalised. It is critical that the Project Ready Training Program gives preference to local Aboriginal participants and appropriately support their applications and completion."

Jemena notes that the Project Ready Training Program is designed to achieve exactly what the Land Councils' comment seeks.

"The EIS makes inconsistent statements regarding Aboriginal employment. Section 9.5.7 provides that 162 jobs could be filled by Aboriginal people. However, section 9.5.10 provides that Jemena hopes that 122 jobs will be filled by Aboriginal people."

Jemena notes that the inconsistency referred to in the targets for Aboriginal employment relate to the estimated potential capacity (162 Aboriginal persons employed) versus Jemena's baseline target (122 Aboriginal persons employed).

"The Land Councils are also concerned that potential training and employment opportunities will be primarily made available through the site portal. Many local Aboriginal people do not have access to the Internet. This must not be the only means of communication to local Aboriginal people regarding training, employment and business opportunities. The EIS also does not consider language barriers that may present difficulties within training and employment. Consideration should be given as to how training programmes will be inclusive of non-English speaking people during the recruitment process. The Land Councils strongly recommend that Jemena provide support to the Central Land Council's Employment Unit to assist Jemena in the engagement of Aboriginal trainees, employees and businesses."

Jemena has always intended to engage directly with local Aboriginal communities in the recruitment phase for the project and is working closely with the Central Land Council's Employment Unit and other local agencies in the promotion of the training and employment opportunities. Jemena has also opened an office in Tennant Creek's main street in order to be available to assist local employment candidates.

While Aboriginal languages remain strong in the region the large majority of people, particularly those who might be able to aspire to employment on the Project, would all be standard Australian or Aboriginal English (Kriol) speakers, even if these are as second or third languages. In any event, the Project Ready Training Program will have workplace language and literacy modules designed to assist ESL speakers achieve success in the workplace.

To ensure these intentions are captured moving forward, the Project Commitments Register (Appendix C) has amended to include the following commitments:

- Jemena's Project Ready Training Program will give preference to local Aboriginal participants and appropriately support their applications and completion. The Program will have workplace language and literacy modules designed to assist ESL speakers achieve success in the workplace.

3.18.3 ECONOMIC AND SOCIAL IMPACT ASSESSMENT

Five submissions state that "conversations with key stakeholder groups including Aboriginal land owners, Aboriginal communities, and people from family outstations and town camps indicate they have yet to be involved in consultations about social impacts." The submitters consider that "given the importance of a comprehensive economic and social impact assessment being included in the EIS Jemena should ensure that consultations have been completed and the results incorporated into the ESIA and management plan to be included in a Supplementary EIS submission."

Jemena notes that following submission of the Draft EIS, the Project SIA consultants have undertaken further community consultations in relation to the predicted socio-economic impacts, risks and opportunities predicted in the SIA Scoping Study.

With respect to the submitters assertion that certain stakeholders have not been involved in consultations, it needs to be noted that stakeholder consultation is very often dependent upon the availability of stakeholders to participate and among other things, as noted in the SIA Scoping Study, means that SIA does not always necessarily sit neatly with approval events such as EIS processes. Consequently, social impact management should be seen as an ongoing process, rather than a one off event.

It is the view of the SIA consultants that sufficient community consultations were undertaken with communities in Tennant Creek through the support of local organisations. The consultations were deemed sufficient to allow for an accurate assessment of the SIA Scoping Study impact predictions, which were largely confirmed. The outcomes of the consultations contributed significantly toward the completion of the ESIA Report, which is now provided as Appendix D of this Supplement.

Notwithstanding the above, ongoing community consultation regarding identified and emerging impacts, both risks and opportunities, is recommended. This is being acted upon by Jemena through continued engagement, the establishment of a Community Reference Group and the opening of an office in Tennant Creek.

3.18.4 ECONOMIC AND SOCIAL IMPACT MANAGEMENT PLAN

Submission #37 commented that the Department of Chief Minister "would like to see the detailed Economic and Social Impact Management Plan, which discusses appropriate monitoring and reporting obligations, included in the Supplement to the EIS."

Jemena acknowledges the importance of the ESIMP in providing the framework for Jemena to monitor and report in relation to Project commitments. The ESIA has been finalised and is now submitted as Appendix D to this Supplement. The ESIMP will be completed after all of the land negotiations and consultations have been finalised, and discussions with community and government stakeholders furthered, particularly in relation to Government funding participation and impact measurement.

Jemena commits to further consultation with the Department of Chief Minister and other stakeholders in this regard. A commitment to this effect has been included in the Project Commitments Register (Appendix C).

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3.18.5 FLY-IN-FLY-OUT WORKERS

Submission #47 included a comment from an individual submitter about the potential damage to communities from Fly-In-Fly-Out (FIFO) workers.

The Project SIA Scoping Study submitted as Appendix R of the Draft EIS identified and assessed risks associated with accommodation of construction workers in towns and camps creating potential to increase anti-social behaviour, alcohol related issues and other risk taking activities. Such behaviour has been previously observed in relation to large scale construction and mining camps in remote areas. The health impacts affect not only the workers but the communities in which they reside and may include:

- stress-related illnesses
- physical injuries associated with violence
- sexually transmitted diseases
- alcohol or drug induced illnesses.

The establishment of the PCCS construction camp, located over 40 km away from Tennant Creek, will significantly reduce the risks that would have arisen had Jemena chosen to accommodate in excess of 200 people in either a workers' camp in Tennant Creek or in existing commercial accommodation.

Jemena and the Construction Contractor will establish a Worker's Accommodation Plan to manage the interaction between the community and work personnel. Workers are expected to comply with the Project's Drug and Alcohol Policy, Camp Rules and Code of Conduct, which will be strictly enforced to minimise anti-social behaviour. Recreational facilities and programs will be provided to offer options to workers for their recreational time. Healthy lifestyle campaigns (physical and mental) will be run to promote a healthy and happy workplace.

The extent to which the Worker's Accommodation Plan, and the associated policies and codes, are effective in mitigating impacts to the local community will depend on the controls put in place, monitoring and enforcement. It is acknowledged that other large-scale construction and mining projects in Australia have not effectively mitigation impacts to local communities associated with construction workforce interactions. The Construction Contractor has experience managing remote workforces and the plans will be developed through consultation with local stakeholders, both of which will contribute to maximising the effectiveness of the mitigation measures.

3.18.6 REGIONAL BUSINESS AND TOURISM ATTRACTIONS

Submission #43 from Tourism NT comments that the "Draft EIS would be improved by clearly mapping the presence of any regional businesses (i.e. outside townships) within a certain radius (e.g. 10km) of the pipeline corridor. This would include tourism attractions such as 'The Pebbles', and operators such as the Threeways Roadhouse."

Jemena acknowledges this comment. A map is provided as 'additional information' in Section 4.10.2 of this Supplement.

3.18.7 SOCIAL AND CULTURAL IMPACTS

Submission #34 commented that the Land Councils feel the NGP EIS could provide greater consideration of how the Project will impact on the lives of Aboriginal people and the measures that will be employed by Jemena and its contractors to avoid or reduce impacts. The Land Councils feel that it would be useful for

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Jemena to better address the impacts on social and cultural aspects of ecosystems as required under the definition of "environment" under both the EPBC Act and EA Act.

The SIA Scoping Study submitted as Appendix R of the Draft EIS documented an initial assessment of social and cultural risks and opportunities associated with the NGP Project. The Study was prepared by Jemena's SIA consultants, who have been involved in consultations with Aboriginal people that may be impacted by the NGP Project for the past 18 months. The Study was the first stage of the Economic and Social Impact Assessment (ESIA) being prepared for the Project (refer Appendix D).

The risk and opportunities assessment process undertaken as part of the ESIA provides for consideration of the social and cultural aspects of ecosystems, where stakeholders have identified those aspects as being of particular concern to them, or where the environmental assessment process has identified specific impacts on components of ecosystems that may be of concern to Aboriginal stakeholders. For example, the environmental risk assessment process undertaken as part of the EIS identified potential impacts to surface and groundwater resources, and impacts to ecosystems associated with the introduction and spread of weeds. Similarly, through consultations with the Land Councils, Traditional Owners have the opportunity to express any concerns that they have in relation to ecosystems values and these are the subject of discussions regarding land access, sacred site and heritage management. The social and cultural risks associated with these impacts have subsequently been considered as part of the ESIA.

3.18.8 SOCIAL INVESTMENT PROGRAM

Submission #34 comments that the Land Councils raise concerns regarding Jemena's capacity and expertise to develop and manage the proposed Social Investment Program.

Jemena notes that the services of a specialist consulting company, Circle Advisory, have been engaged to assist in the development and implementation of programs to optimise local social and economic development, and maintain relationships with local people. The Social Investment Program committed to by Jemena will be further developed through consultations with the relevant community organisations. As part of these consultations Jemena will consider how the Land Councils', alongside other NGOs working in the field of community development, may be able to participate in the development and implementation of its social investment program.

The Project Commitments Register (Appendix C) includes a commitment to develop the Social Investment Program. This commitment has been amended to include the following statement:

- The details of the Program will be further developed through consultations with the relevant community organisations, including Land Councils and other NGOs working in the field of community development.

3.18.9 RISKS TO TOURISM INDUSTRY

Submission #47 included a comment from an individual submitter that the NGP Project "threatens the tourism industry in the NT."

Jemena notes that the SIA Scoping Study submitted as Appendix R of the Draft EIS assesses the risks to the tourism industry associated with the NGP Project. The key identified risks are:

- The risk of existing commercial accommodation providers missing out completely in the event that Jemena established and operated its own workers camp in Tennant Creek or had all of the workers staying at the PCCS Construction Camp

- The risk of the Project significantly affecting the local economy through the displacement of other accommodation demand, resulting in a negative impact on other industries and services in the

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town, e.g. tourism, government services, other industry, particularly during times of significant annual events that bring revenue to the town, e.g. the Tennant Creek Annual Show.

These above risks were assessed as high before mitigations based on the assumption that an imbalanced accommodation strategy would have a noticeable negative impact on Tennant Creek in the form of disparity of distribution of economic benefits from accommodating the workforce and a significantly negative impact on the other parts of the local economy. As the above mitigations have been successfully implemented in other communities in Australia, the residual risk post mitigation has been assessed as low.

Impacts to visual amenity from the Stuart Highway and Barkly Highway tourist routes are assessed in Chapter 9, Section 9.11.8 of the Draft EIS. It was concluded that the main visual impact during the construction phase will be associated with vegetation clearing and earthworks, visibility of people, vehicles, plant and equipment, vehicle movements and stockpiles. Activities will be visible from the road, rail and track crossings, and for a short distance along the Barkly Highway. As the activities will be occurring in a remote area with limited other activity and development, there will be some impact on visual amenity for the occupants of vehicles moving through the areas. This impact is expected to be minor given the short distances over which the works will be visible i.e. people's exposure will be limited. Furthermore, the short duration of the construction phase and progressive reinstatement of the construction ROW will ensure there are minimal long-term impacts.

The PCCS is the main facility (in the Northern Territory) which will be visible from publicly accessible areas. The facility is located on Warrego Road, adjacent to an existing gas compressor station and the AGP. The infrastructure at PCCS will be of varying heights, with the height of the flare stack expected to be up to 40 m. The facility will be visible from the Warrego Road, which receives some local traffic, and the pilot flare is expected to be visible over larger distances at night. The facility infrastructure is not expected to be visible from the Stuart Highway, which is located approximately 39 km to the east of site, or the Mungalawurru Family Outstation, which is located approximately 28 north-west of site.

It is noted that Tourism NT (submission #44) comments on traffic and the location of the Project in relation to tourism businesses. These issues are addressed in Section 3.18.6 and 3.19.5 of this Supplement.

3.19 HEALTH AND SAFETY

Four submissions comment on health and safety. The submissions raised issues relating to Aboriginal health and safety, air quality, bushfires, alcohol at construction camps, gas flaring and venting and traffic incidents. The comments received are summarised and responded to in the sections below.

Jemena notes that community-related health and safety risks associated with the Project are considered in Chapter 10 of the Draft EIS. The assessment considers health risks in terms of health consequences to the community and also to health service provision. The information presented in Chapter 10 has been referred to in responding to specific comments below.

3.19.1 ABORIGINAL HEALTH AND SAFETY

Submission #34 commented that the EIS would be improved by identifying an engagement process which ensures local Aboriginal people's health, safety and amenity are protected.

Jemena acknowledges the importance of engagement with Aboriginal people, representative bodies and agencies responsible for service provision, and has been actively engaging on all aspects of the Project. The issues of health, safety and amenity, as they relate to Aboriginal people and other stakeholders, were specifically considered in the Social Impact Assessment (SIA) Scoping Study submitted as Appendix R of the Draft EIS. The document details the SIA Consultation Plan, which is designed to test project

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assumptions, identify any additional impacts (risks and opportunities) and consider the potential effectiveness of management plans. The consultation program provides for targeted engagement with:

Public Sector Stakeholders

These include the relevant Australian, NT and Queensland Government agencies that have responsibilities for and interests in education and training, business and industry development and the development of northern Australia, health and emergency services. The local government entities, the Barkly Regional Council and the Mount Isa City Council who provide a wide variety of services in the towns and communities are also key stakeholders from a social and economic development perspective.

Community Sector Stakeholders

In the community sector, key stakeholders include those Aboriginal organisations who have responsibilities for Aboriginal Land and Native Title or who hold land directly. They include the NT Land Councils, the Arruwurra Aboriginal Corporation and the two Native Title Body Corporates in QLD.

Education and training organisations and institutions such as the relevant universities, secondary and primary schools and those organisations responsible for the Remote Jobs and Communities Program.

There are a variety of other community organisations that are relevant in social and economic impact assessment and they include local arts and language centres, social enterprises, volunteering groups, sporting organisations and groups and other community organisations.

Private Sector Stakeholders

There are a variety of private sector stakeholder organisations that are important and these include the industry bodies for the oil, gas, pipeline and mining industries, the pastoral industry and the relevant chambers of commerce, including the Indigenous business organisations.

Cross Sectoral Stakeholder Organisations

Cross sectoral organisations exist in the regions and communities and relate to regional economic development, community advice and information, social health and well-being and community development.

People Living in Remote Communities

In addition to the above, consultation is planned to be held with Major Aboriginal Communities, Minor Aboriginal Communities, Aboriginal Family Outstations, those people living on pastoral stations and at the various roadhouses and other remote residences.

Subsequent to submission of the Draft EIS, social impact consultations have been undertaken with Aboriginal stakeholders. The consultation and further research has contributed to the full Economic and Social Impact Assessment (ESIA) Report, which is now provided as Appendix D of the Supplement. The ESIA Report also informs the development of the Project Economic & Social Impact Management Plan (ESIMP) that incorporates the variety of mitigation plans and strategies that will be implemented to minimise any impacts on Aboriginal people's health, safety and amenity.

3.19.2 AIR QUALITY

Submission #34 commented that the EIS does not provide any information regarding predicted frequency or volumes of gas to be vented, or an analysis of possible sensitive receptors to the PCCS and MLV facilities. The submitter also stated that the EIS should address flaring and venting activities, including

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specific detail should be provided in relation to the reasons for flaring, frequency of flaring, chemical makeup of emissions, potential impacts on health, amenity and environment.

Jemena notes that an Air Quality Assessment and Air Quality Management Plan for the NGP Project were submitted with the Draft EIS (as Appendix V and W respectively). These documents were prepared by specialist consultants Air Noise Environment. The air quality assessment considered potential air quality impacts on sensitive receptors during the construction and operational phase of the pipeline.

Emissions associated with flaring and venting from the PCCS and MLV facilities were modelled. Potential impacts on human health and ecological receptors were assessed.

To assess the potential for impacts, computational modelling was undertaken and results compared to criteria relevant to Queensland and Northern Territory, as presented in the following documents:

- Queensland Environmental Protection (Air) Policy 2008 (EPP Air)
- National Environment Protection Measure for Ambient Air Quality (Air NEPM).

A greenhouse gas assessment has also been undertaken in accordance with the National Greenhouse Energy and Reporting Act 2007 and using emission factors found in the Department of Climate Change and Energy Efficiency National Greenhouse Accounts Factors – August 2015.

Flaring and venting

At the PCCS, use of the gas vent and flare at will occur during commissioning, periodic testing, variations in incoming gas quality and in emergency situations. During operations minor flaring (0.8 kg/hr per flare) and gas venting will occur from the Nitrogen Reduction Unit. The PCCS has the potential to emit CO, nitrogen oxides (N_2O) and small amounts of CH_4. As the proposed equipment will be gas powered (as opposed to diesel powered), the potential for particulate emissions are expected to be negligible.

For gas venting at the PCCS facility, a total of 394.2 tonnes of methane is estimated to be released per year. The Air NEPM does not specify air quality guidelines for methane. Methane is not toxic to people below the lower explosive limit of 5% (50000 ppm)[11]. The main source of potential health risk associated with methane emissions is it's asphyxiate (displacement of oxygen) and explosive properties. The risk of asphyxiation and explosions are typically limited to confined spaces. As gas will be vented into the open atmosphere, the likelihood of asphyxiation or explosion is expected to be Rare.

At the MLV facilities there will be emergency and maintenance venting only. Emergency and maintenance venting at the MLV facilities is only expected to release small amounts of gas (i.e. 5 tonnes every few years). For the purposes of the air quality assessment, these emissions were assumed to be immaterial as they are likely to account for less than 5% of the overall emissions profile. Further, the 'Sensitive receptors' section below presents information from the Air Quality Assessment report that indicates that all MLV facilities are located a large distance away from sensitive receptors, and air quality impacts are not expected.

Sensitive receptors

Table 3-2 and Table 3-3 below, extracted from the Air Quality Assessment report, provide details of the location of sensitive receptors in relation to the pipeline route and facilities. Both the PCCS and MLV facilities are located a large distance from sensitive receptors. The nearest sensitive receptors to the PCCS facility are 28 km to the west. The nearest sensitive receptor to an MLV is a pastoral homestead located

[11] http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/methane/health_met.htm

18 km from MLV 3. At such a large separation distance, modelling shows that the receptors are not expected to be affected by any of the modelled air emissions.

Table 3-2. Summary of sensitive residential receptors within 20 km of NGP

Receptor	Distance from Pipeline Route	Distance from Nearest Pipeline Facility	Population / No. of Dwellings
Tennant Creek	16.5 km South	41.5 km south-east of SOL Facility 121 km west of MLV1	3,061
Family Outstation 952	6.8 km South	41.8 km south-east of SOL Facility 121 km west of MLV1	3 houses
Family Outstation 975	3.4 km South	60 km east of SOL facility 101 km north-west of MLV1	2 houses
Family Outstation 721	14.8 km north	73 km east of SOL facility 95 km north-west of MLV1	8 houses
Family Outstation 732	12.4 km south	44 km south-east of MLV1	4 houses
Pastoral Homestead	3.5 km north	18 km east of MLV3	3 houses and a school
Homestead South of Mt Isa	1 km east	2.5 km south of EOL facility	Single house
Mt Isa	1.2 km north-east	1.2 km north-east of EOL facility	Row of houses near power station

Table 3-3. Separation distances of pipeline facilities

Pipeline Facility	Distance to Nearest Residential Receptor
Start of Line Facility (PCCS)	28 km east of Family Outstation 248
End of Line Facility (MICS)	1.8 km south-west of nearest house in Mt Isa
MLV1	33 km south of Family Outstation 907
MLV2	88 km east of Family Outstation 732
MLV3	18 km west of a pastoral homestead

Ecological receptors

The NO_2 annual plots indicate an exceedance of the goal for ecosystem biodiversity and health in a small area surrounding the PCCS facility. The field-based ecological assessments undertaken for the EIS confirmed there are no sensitive flora ecosystems (for which the criteria is applicable) directly around the facilities. Furthermore, the prediction methodology of annual concentrations is highly conservative as it assumes that standby equipment is operating concurrent with other equipment. This provides greater certainty that the air quality impacts associated with the operation of the project are expected to be within the appropriate receptor air quality criterion for ecological receptors.

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3.19.3 BUSHFIRE

NT Police, Fire and Emergency Services (submission #44) commented that worker's accommodation areas are to be constructed with sufficient fire breaks around the perimeter for the protection of workers in the event of a bushfire.

Jemena acknowledges this requirement. The Commitments Register (Appendix C) includes the following commitment:

- *All workers accommodation will be constructed with sufficient fire breaks around the perimeter in accordance with regulatory requirements.*

3.19.4 CONSTRUCTION CAMPS

Submission #34 comments that there is limited information regarding the operation of workers' camps and stated the view that the EIS should consider specific risks to local communities through the non-compliance with internal alcohol policies. The EIS should identify that alcohol will not be permitted on site and the penalties for non-compliance.

The Construction Contractor has reviewed this comment and reiterates that alcohol will not be permitted to be brought onto the worker's camps nor will it be available for sale or permitted on any construction site. Any breach or non-compliance will result in disciplinary action.

Jemena notes that Section 13.9.2 of the framework EMP submitted with the Draft EIS documents management actions that will be implemented by the Construction Contractor to manage risks associated with alcohol consumption. These are listed below:

- All workers to comply with Project Code of Conduct, which includes instant dismissal for antisocial or illegal behaviour.
- All workers will be drug and alcohol tested during pre-employment medicals, daily onsite alcohol testing, and random drug testing.
- Personnel will be transported home for rostered breaks to avoid idle time in towns.
- Health and education campaigns will be run for the work personnel that will include sexual health, mental health, and physical health (diet and exercise).
- Recreational activities will be provided and encouraged.
- Construction camps will be dry camps, and all workers will comply with Camp Rules and Code of Conduct, which include instant dismissal for anti-social behaviour.

Further, the Commitments Register (Appendix C) commits:

- *All staff will be required to comply with the Project Code of Conduct, Camp Rules, and Drug and Alcohol Policy which will clearly stipulate behavioural expectations of the workforce, and include pre-employment and ongoing drug and alcohol testing for all workers. These will be strictly enforced and breaches may result in instant dismissal.*

3.19.5 TRAFFIC INCIDENTS

Four submissions comment on traffic. These comments relate to:

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- Traffic management legislation and policy in the NT
- The impact on local health services if there is an accident
- Accidents due to interaction between Project vehicles, the area's residents, livestock, native fauna and other traffic
- Risk of road crashes near Alpurrurulum Community.

Comments received are summarised and responded to in the sections below.

3.19.5.1 NT Traffic Management Framework

Submission #47, from NT Government Department of Infrastructure, comments that the Draft EIS and supporting documentation indicate that the proponent has not adequately understood the relevant Northern Territory legislation and policy framework.

Jemena notes that throughout the early and the current planning phase Jemena has continued to liaise with the Northern Territory Governments (NTG) Department of Transport (DoT) to ensure the construction of the project including all interactions with the road network satisfies the DoT conditions. Specific conditions that have been implemented into the projects planning and design following meetings with the DoT include:

- No road closures for the installation of the pipeline across NTG sealed roads
- Trenchless construction methods to be used to install the pipeline across all NTG sealed roads
- Any new access off a NTG sealed road shall be sealed to the property boundary
- Permits to work in road reserves will be required
- Proposed locations of new access tracks shall meet AusRoad guidelines with regards to line of sight.

Jemena welcomes the invitation to meet with the Department of Infrastructure Planning and Logistics (DIPL) to ensure the Project is aligned with the relevant Northern Territory legislation and policy framework.

Jemena acknowledges that to satisfy the conditions of the legislation as a minimum a Traffic Impact Assessment (TIA) will be required in accordance with the AUSTROADS *Guide to Traffic Management Part 12: Traffic Impacts of Development*. Jemena proposes to work closely with the department to define the scope of the TIA and amended existing transport and traffic management plans as required to ensure all risks associated with the project works that impact on the NTG roads are identified, assessed and managed accordingly.

3.19.5.2 Impact on health services

Submission #28 commented that the increased risk of traffic accidents causing injury and general increased burdens on local health services have been adequately addressed in the EIS.

Jemena notes that driving of light or heavy vehicles during the Project has been highlighted as one of the most prevalent hazards facing all Project personnel and the communities in the region of the Project covers. A detailed assessment of safety risks posed by additional traffic will be undertaken as part of the TIA that Jemena is required to prepare prior to commencement of works (see above).

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Chapter 10, Section 10.4.6 of the Draft EIS assesses the risks associated with increased burden on local health services. The following information is summarised from the Draft EIS:

- The presence of the construction workforce and conduct of construction activities has the potential to increase demand for access to regional health and emergency services to a large extent. If the locally available health services are subject to significant demand from the Project, this may result in a reduction of the availability of these services for the Tennant Creek community. Similarly, if the Project causes an increased demand on other emergency services, e.g. fire, rescue and police services then this could impact on the ability of these services to provide adequate response.

- Assuming that the services available in Tennant Creek would be operating at or near capacity, any increase in demand created by the Project is likely to impact on service delivery. This could have a flow on effect in terms of reduce health outcomes for local people, for example it could increase the incidence of hospital attendance due to reduced availability of GP services for preventative treatment. The inherent risk (without controls) was assessed as Moderate.

- Jemena has a crisis and emergency management structure in place across its business which links the organisation across the corporate, business function, operational and project levels to enable an effective response to an incident, emergency or crisis. The Project is included in the emergency management structure and extends the link to the Construction Contractor, who is responsible for establishing and implementing approved Project Emergency Response Plans relevant to their scope of work. The Project's impact on health services will be minimised through the implementation of Project-specific Health & Safety Management Plans and the provision of health and emergency response capability within the Project.

- Jemena and the Construction Contractor will manage the medical services demand initially through pre-employment fitness for duty assessments, best-practice workplace health and safety controls, and the provision of appropriate first aid facilities and support at the construction camps. The Safety Management Systems maintained by Jemena and the Construction Contractor aim to minimise workplace injury and illness, and mitigate the risk for the need for medical treatment.

- The Construction Contractor will provide appropriate medical services for personnel at the construction camps, and will do so in consultation with the Northern Territory Department of Health, Police, Fire and Emergency Services and local health and emergency service providers. In the event that an injury does occur, first aid facilities will be provided at construction camps with trained first aiders on duty. All vehicles and equipment will be equipped with first aid kits and workers will be trained in first aid to ensure that each work crew has at least one first aider. Any serious injury would require transport of the worker to Tennant Creek or Mount Isa with the transportation provided by the Project or external agencies, in accordance with the approved Project Emergency Response Plans.

- The Project Health & Safety Management Plans will establish medical support protocols with the relevant agencies in Tennant Creek and Mount Isa where required. Jemena and the Construction Contractor will liaise with regional health service providers regarding potential impact of any extra demand on existing services, so that adequate safeguards can be implemented. Similarly, Jemena will work with the Northern Territory Police Fire and Emergency Services to ensure alignment of the NGP Emergency Response Plan (ERP) and external response arrangements.

- 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 health service provision to the Project.

- Controls developed in consultation with regional and local health and emergency services providers are expected to be effective in responding to the local conditions. The monitoring and review procedures within the Project Health & Safety Management Plans, will ensure that any

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impacts on health services are identified and addressed early, so that any flow on effects in terms of reduced health outcomes are minimised. Jemena has and will continue to liaise with external response agencies across the Project footprint to ensure that agencies are aware of current activities, emergency response arrangements and that any requests for additional information from external agencies are met.

- Subject to effective engagement with regional and local health and emergency service providers in developing and implementing the Project Health & Safety Management Plans, the Project is not expected to result in reduced access to services for local people.

A safe driving environment shall be established for all project activities by implementing work practices and equipment standards which aim to eliminate vehicle incidents. A driver and vehicle safety risk assessment shall be conducted and a project driving procedure prepared and communicated to all project drivers with rules enforced to address specific driving hazards identified in the driver and vehicle risk assessment and general issues such as speed, seatbelt use, fatigue management, fitness for work, vehicle specification, driver competency and approval, and journey management plans.

The following minimum mandatory requirements shall also be met by personnel operating vehicles on the project:

- Light vehicle selection and equipment specification must be made subsequent to the driver and vehicle safety risk assessment.
- All light vehicles must meet the following minimum specification:
    - In Vehicle Monitoring System
    - 4WD
    - Air conditioned.
    - Traffic control equipment – safety triangles
    - First aid and Fire extinguisher
    - Terrain appropriate tyres.
- Drivers shall hold the appropriate licence for the vehicle being operated.
- Vehicles shall be operated within their legal load limits.
- Any load carried on, or within a vehicle, shall be restrained.
- Persons operating a specialist vehicle shall be trained e.g. 4WD.
- Vehicles shall have current registration in place.
- Vehicles shall be maintained and fit for purpose.
- Journey plans shall be in place for remote work, or where abnormal environmental conditions may be encountered.
- Drivers must complete daily pre-start vehicle inspections.

3.19.5.3 Accidents

Submission #34 comments that safety risks posed by additional traffic do not appear to have been addressed in detail. The submission notes that the EIS would benefit from a formal analysis of these risks and greater detail on how these potential impacts will be managed, including details on how injured animals will be managed and policies that reduce night-time driving. Jemena acknowledges that a formal analysis of safety risks posed by additional traffic will need to occur as part of a TIA in accordance with the AUSTROADS *Guide to Traffic Management Part 12: Traffic Impacts of Development*.

A Journey Management Plan has been developed for the project and specifically addresses the management of night driving and Wildlife/ Stock interactions. The Journey Management Plans requirements for all personnel operating a vehicle on the project include:

Night Driving

In respect to night driving (driving out of daylight hours) the current controls established for the Early Works Phase of the project have been determined through early works safety studies and documented in the NGP Driving SWMS which all vehicle operators for the Project must review and sign.

The SWMS notes that driving outside of daylight hours is to be avoided where practicable and is subject to risk assessment where required. It is expected that similar controls will be determined and implemented during the Construction Phase Driving Risk Assessment.

Driving at night or during dawn and dusk shall be minimized and be conducted only after the risks have been assessed.

Assessment can be made on, but not limited to the following:

- Defensive driving attitude
- Fatigue potential
- Weather conditions
- Vehicle checklist compliance
- Traffic level and direction
- Potential wildlife and stock encounter
- The potential of driving at sunset or sunrise when vehicles headlights are least effective.

Wildlife/Stock

The hazards associated with collision with livestock/wildlife have also been considered during the NGP Early Works safety study with the controls documented in the NGP Driving SWMS. Controls include the following for all vehicle operators for the Project:

- Observe local and project speed limits and livestock warnings
- Drive to the conditions at all times and slow down when the road verge is heavily vegetated and livestock and wildlife are not easily seen
- Alert other drivers, via radio or other means, when there is free roaming livestock on the roads

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- Advise the NGP Land Liaison officer if livestock is struck (injured / killed) – communicating the brand and or ear tag information and location
- Where possible and safe to do so remove or assist in the removal of dead wildlife or livestock from the road or report the hazard to police where it is not possible to remove the animal

Risk of road crashes near Alpurrurulum Community

Submission #45 from NT Police, Fire and Emergency Services comments that the risk for road crashes, particularly in the vicinity of Alpurrurulum Community should be further explored. Consideration should be made for facilitating the provisions of Road Safety Education to be delivered to Alpurrurulum community.

Jemena notes that a Road Safety Audit will be undertaken prior to main pipeline construction activities. There will be no public access to the construction right of way with measures in place where the pipeline crosses public roads including fencing and signage. Jemena will engage with the Alpurrurulum Community with respect to Road Safety Education prior to main pipeline construction activities in the region.

This requirement has been recorded as a new commitment in the Commitments Register (Appendix C).

3.20 NOISE

One submission (#34) made comment on the noise assessment. Submission #34 states that the locations of baseline noise monitoring sites should be provided in order to make meaningful interpretations.

Jemena notes that details of baseline noise monitoring locations are provided in the Noise Assessment Report submitted as Appendix T of the Draft EIS. For the purposes of the assessment, noise monitoring positions were chosen to provide an indication of typical existing noise levels at the nearest noise sensitive areas to the proposed pipeline facilities and construction along the pipeline.

Table 3-4, Figure 3-2 and Figure 3-3 below, extracted from the Noise Assessment Report, provide a summary of the monitoring positions selected for the assessment and the approximate distance of each of the positions to the proposed pipeline and facilities.

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Table 3-4. Noise monitoring locations

Monitoring Position	Distance to Pipeline/Facility	Descriptor	Receptor type
MP1	1.8 km	Phillip Creek Compressor Station area	Tennant Creek and surrounds
MP2	3.3 km	Aboriginal Community (975)	Rural Residential
MP3	3.5 km	Pastoral Homestead	Rural Residential
MP4	2.6 km	Mt Isa (North East of Diamantina and Leichardt Power Stations located on Powerhouse Road)	Urban Residential
MP5	4.9 km	Mt Isa Township (25 Dowsett Cr)	Urban Residential
MP6	930 m	Homestead south of Mt Isa	Rural Residential (adjacent major road)
MP7	1.6 km	Adjacent Diamantina and Leichardt Power Stations located on Powerhouse Road	Urban Residential (adjacent major infrastructure)

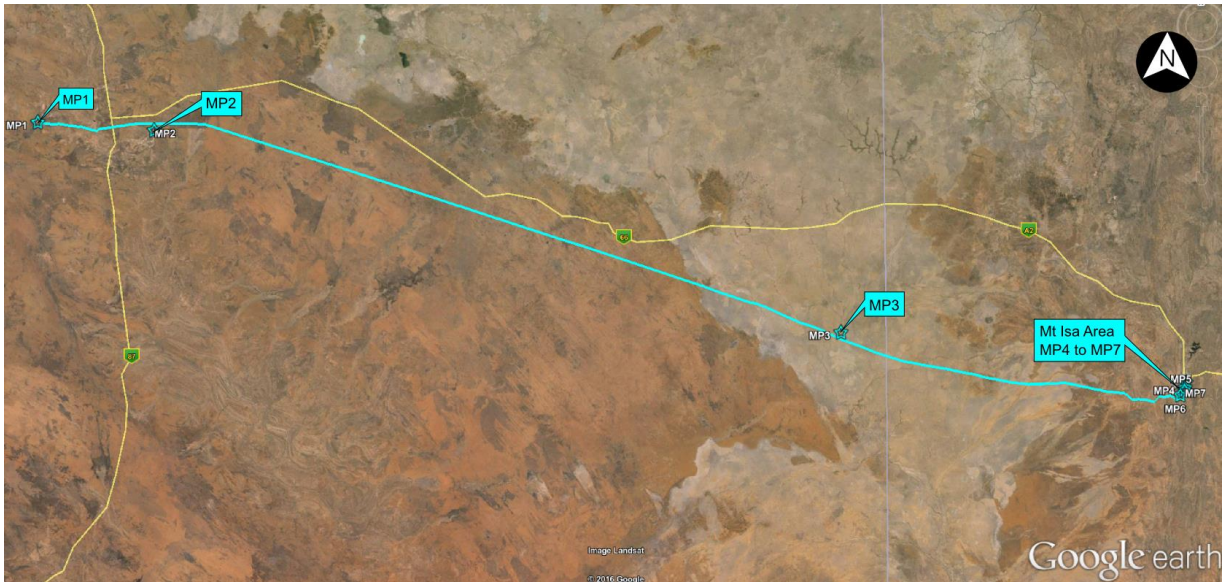

Figure 3-2. Map of noise monitoring locations

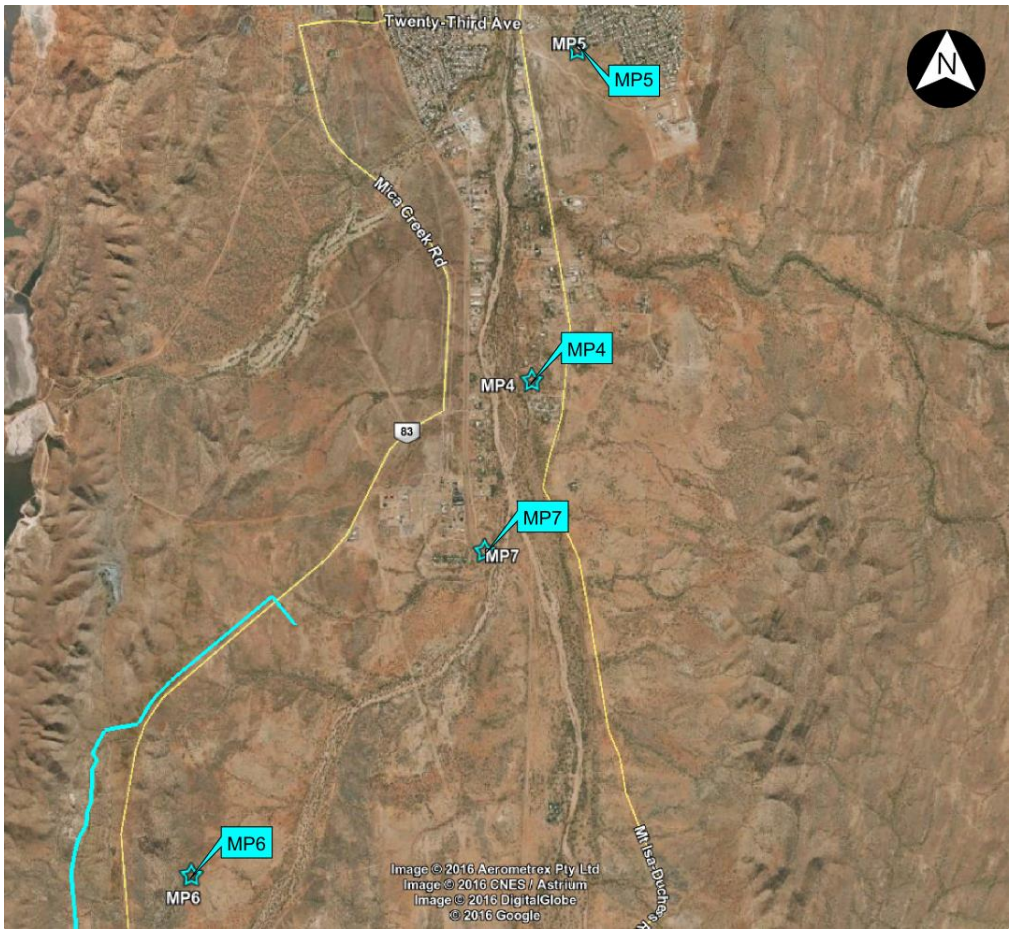

Figure 3-3. Detailed map of Mount Isa noise monitoring locations

3.21 AIR QUALITY

Submission #31 and #34 raised concerns relating to air quality. Submitter #34 comments that the Draft EIS does not provide any modelling of air emissions for the PCCS, flaring or venting from the MLVs, and does not provide guideline values for methane concentrations. The submission considers that air emissions from these sites could pose a risk to local Aboriginal people. Submitter #31 raised concerns that the Air Management Plans submitted with the Draft EIS are inadequate.

These concerns are responded to below with reference to information contained in the Air Quality Assessment and Air Quality Management Plan as submitted with the Draft EIS (as Appendix V and W respectively). These documents were prepared by specialist consultants Air Noise Environment.

3.21.1 EMISSIONS FROM PCCS AND MLVS

Modelling of air emissions from PCCS

The Air Quality Assessment Report documents methods and results of air dispersion modelling undertaken to assess the potential impacts of pipeline operations on sensitive receptors. The assessment models operational emissions from the PCCS, including emissions from gas flaring and continuous venting from the Nitrogen Reduction Unit. These sources have a potential to emit carbon monoxide and nitrogen oxides. As the proposed equipment will be gas powered (as opposed to diesel powered), the potential for particulate emissions are expected to be negligible. The modelling has also assumed flaring occurs under efficient combustion processes, therefore, particulate emissions are assumed to be negligible.

The key air quality indicators/pollutants modelled were carbon monoxide (CO) and nitrogen dioxide (NO2). Maximum predicted ground level concentrations (GLC) for each compound are shown in Table 3-5 extracted from the Air Quality Assessment.

Table 3-5. Phillip Creek Compressor Station – predicted maximum ground level concentrations

Compound	Maximum Predicted GLC Concentrations (µg/m3)			AVG Time	Criteria (µg/m3)
	Source Only	Background	Cumulative		
Modelling Domain					
CO	342.9	381.9	724.9	8-hour	11,000
NO2	236.4	14.4	250.8	1-hour	250
NO2	45.4	10.4	55.8	Annual	62

The highest predicted CO and NO_2 (average) concentrations across an 8 km by 8 km area around the PCCS facility are within the health-related criteria specified in the *National Environment Protection Measure for Ambient Air Quality* (*Air NEPM*). Predicted concentrations of NO_2 (1-hour) are marginally above the health-related criteria (0.3% above) at a location along Warrego Road, immediately north of the facility; however, no residential dwellings are located in this area. The predicted results in close proximity to the PCCS facility demonstrate that compliance is expected at the nearest sensitive receiver, an Aboriginal family outstation, located 28 km to the west of the site.

Modelling of air emissions from MLV sites

Air dispersion modelling has not been completed for the MLV facilities. Emergency and maintenance venting at the MLV facilities is only expected to release small amounts of gas (i.e. 5 tonnes every few years). For the purposes of the assessment, these emissions were assumed to be immaterial as they are likely to account for less than 5% of the overall emissions profile. Further, the MLV facilities are located a large distance away from sensitive receptors (the closest MLV3 is 18 km away from the nearest receptor).

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Guideline concentrations for methane

The *Air NEPM* does not specify air quality guidelines for methane. Methane is not toxic to people below the lower explosive limit of 5% (50000 ppm)[12]. The main source of potential health risk associated with methane emissions is it's asphyxiate (displacement of oxygen) and explosive properties. The risk of asphyxiation and explosions are typically limited to confined spaces. As gas from the PCCS and MLV sites will be vented into the open atmosphere, the likelihood of asphyxiation or explosion is expected to be Rare. It is also noted that flaring and venting would occur during commissioning, periodic testing and in emergency situations hence air emissions from these activities will occur on an infrequent basis.

3.21.2 AIR QUALITY MANAGEMENT PLAN

Overall, the Air Quality Assessment prepared by Air Noise Environment concluded that construction and operation of the NGP is expected to contribute to pollutant concentrations in the surrounding area; however, pollutant concentrations are predicted to be compliant with relevant air quality criteria (i.e. Air NEPM). Whilst compliance is achieved without any further mitigation, potential for air quality impacts will be further minimised by adopting the various air quality management measures outlined in the Air Quality Management Plan. As compliance with air quality criteria will be achieved without any further mitigation, Jemena is of the view that the controls documented in the Air Quality Management Plan are adequate and commensurate with the level of risk to air quality.

3.22 GREENHOUSE GAS EMISSIONS

Twenty-three submissions comment that the amount of greenhouse gas emissions generated by the project have not been measured or comprehensively assessed. Submission #33 also states that "it is highly concerning that the proponent has not proposed to offset its climate impact in any way."

Jemena notes that greenhouse gas emissions generated by the Project are discussed in Chapter 11, Section 11.6 of the Draft EIS. The Air Quality Assessment Report submitted as Appendix V of the Draft EIS provides an assessment of greenhouse gas emissions for the NGP Project. Estimations of annual greenhouse gas emissions during construction and operation have been estimated based on the methods outlined in the National Greenhouse Energy Reporting Act 2007 (NGER) and associated technical guidelines.

The table below, extracted from the Air Quality Assessment Report, presents a summary of the estimated total Scope 1 and 2 emissions during Year 1, Year 2 and for subsequent operations. Year 1 includes construction only. Year 2 includes construction and commissioning in the first half of the year and operations in the second half.

[12] http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/methane/health_met.htm

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Table 3-6. Estimated greenhouse gas emissions

Year of Project	Scope 1		Scope 2		Total Emissions (tonnes CO2-e)
	Energy Usage (GJ)	Emissions (tonnes CO2-e)	Energy Usage (GJ)	Emissions (tonnes CO2-e)	
Year 1	136,810	9,604	-	-	9,604
Year 2	929,093	72,229	19,656	4,313	76,542
Annual Operation	1,689,985	103,462	39,312	8,627	112,089

Based on the estimated emissions presented above, the proposed gas pipeline is expected to trigger the NGER reporting threshold for a single facility of 25 kilotonnes CO2-e (25,000 tonnes CO2-e) of greenhouse gases and 100,000 MJ of energy consumed. Jemena will monitor and report GHG emissions in accordance with legislative requirements.

3.23 EMERGENCY RESPONSE

Three submissions made comment in relation to emergency response requirements applicable to the Project. Clarification was sought in relation to bushfire response and protocols relevant to protection of flora, fauna and aquatic habitats during an emergency situation. The sections below respond to the comments received.

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 Plan (ERP).

3.23.1 BUSHFIRE

Submission #31 commented that there is a risk of wildfire spread during construction with only one fire truck in Tennant Creek and one fire trailer proposed. NT Police, Fire and Emergency Services (Submitter #44), require that regular consultation with emergency services be undertaken during days of High Fire Danger.

Jemena acknowledges these comments and has made a commitment to:

- Develop an Emergency Response Plan (ERP) for the construction and operational phases of the Project which will outline the requirements for likely emergency situations. Jemena will work with the NT Police, Fire and Emergency Services, Department of Health, and local health and emergency service providers, to ensure the ERP aligns with medical service requirements and external response arrangements.

The following commitment has been added to the Commitments Register (Appendix C):

- *Jemena (and its contractors) will undertake regular consultation with emergency services during days of High Fire Danger and will have water carts, dozers and graders available if required to supplement local resources.*

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3.23.2 ENVIRONMENTAL PROTECTION

Submission #27 commented that there should be an emergency protocol in place that focuses on flora, fauna and aquatic habitats.

Jemena notes that the main risks to flora, fauna and aquatic habitats during an emergency (during both the construction and operations phases) would relate to bushfire and uncontrolled release of hazardous materials, such as fuels, that could contaminate soil and water. The framework EMP submitted with the Draft EIS includes the following management actions relevant to ensuring any impacts to flora, fauna and aquatic habitats are minimised during an emergency:

- A Dangerous Goods and Hazardous Substances Management Procedure will be developed to ensure that all substances are transported, stored and handled in accordance with accepted Australian Standards
- A Spill Response Procedure will be developed and staff trained in spill response
- Management of contaminated materials/soil or potentially contaminated materials/soil will be in accordance with the Contaminated Land Management Procedure.

The Project ERP will document protocols for responding to bushfire incidents.

3.24 ENVIRONMENTAL MANAGEMENT

A framework Environmental Management Plan (EMP) for the NGP Project was submitted as Chapter 13 of the Draft EIS. The EMP comprises a series of management sub-plans which outline the specific measures to be applied to avoid and minimise environmental impacts relevant to the NGP Project. Objectives, performance criteria and monitoring requirements are outlined for each relevant sub-plan. Reporting requirements, corrective actions and responsibilities are also provided.

The EMP has been developed to support the EIS, and some of management sub-plans are necessarily conceptual. As the project progresses through the detailed design and implementation phases, there will be more specificity around aspects of project construction and operation, and the management plans will likewise become more detailed. Prior to commencement of work the framework EMP and management sub-plans will be updated to incorporate revisions and/or additions required in response to issues raised during the public comment period (refer Section 4 and Appendix C Commitments Register). Revisions will also address any recommendations contained in the final Assessment Report provided by the NT EPA and the EPBC approval conditions provided by the Commonwealth Environment Minister.

Submission #34 comments that the EMP is a high-level over-arching document that will need to be updated as the project progresses. Jemena acknowledges this requirement, and notes that the framework EMP submitted with the Draft EIS outlines the process for a specific Construction EMP and Operational EMP to be developed by the Construction Contractor and Jemena respectively. The CEMP and OEMP will be guided by the content of the framework EMP and management sub-plans, which establish the objectives and performance criteria against which environmental compliance will be measured.

3.24.1 CONSTRUCTION CAMPS

Submission #43 from the Department of Health - Environmental Health, requested that the Construction Contractor make contact with the Environmental Health Coordinator, prior to the commencement of the construction of the temporary camps to discuss requirements for the registration of food premises, provision of private water supply, solid waste management and on-site wastewater management.

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This requirement has been included as a new commitment in the revised table of commitments submitted as Appendix C of this Supplement.

3.24.2 PRE-CLEARING SURVEYS AND INSPECTIONS

Submission #34 raised concerns about the lack of detail surrounding environmental and heritage inspections that will be undertaken prior to clearing and grading of the construction ROW.

The Commitments Register (Appendix C) records Jemena's commitment to undertaking the following pre-construction surveys and monitoring:

- Soil survey to identify and map problematic soils (i.e. dispersive or contaminated).
- Weed survey to map the location and extent of existing weeds within the construction footprint.
- Watercourse crossing assessments for major watercourse crossings to inform the Progressive ESCP, including identifying the location of permanent pools on the Ranken, James and Georgina Rivers, and in relation to the construction ROW.
- Determine the sustainable yields of proposed groundwater sources, and use this information to inform groundwater extraction locations and volumes.
- Collect a snapshot of standing water levels in existing bores that will be used for construction water, to provide comparison data for water levels post extraction.
- Pre-construction environmental assessments, including photographs and GPS references, to establish as pre-construction baseline information and/or identify analogue sites for comparison during reinstatement and rehabilitation monitoring.
- Habitat quality surveys to inform specific requirements for construction activities.

With respect to inspections targeting flora and fauna, the Draft EIS documents the findings of desktop and field-based assessments undertaken to inform pipeline route selection and specific environmental management requirements. The NGP has been designed to avoid ecologically significant areas, and field-based assessments have been undertaken for Threatened species. The survey methods and findings are documented in the Draft EIS – refer Appendix G Threatened Species Survey Report and Appendix K Watercourse Crossing Survey Report. The threatened species surveys were undertaken by qualified zoologists, and advice in relation to suitable survey methods was sought from recognised Threatened species experts.

The Threatened Species Survey Report concluded that there are four Threatened species known or likely to occur within the Project footprint; these are the Carpentarian Antechinus, Plains Death Adder, Grey Falcon and the plant Tobermorey Melon. Following the field-based surveys it was concluded that the Gouldian Finch, Painted Honeyeater, Brush-tailed Mulgara, Latz's Grass and Greater Bilby, are unlikely to occur. No further threatened species surveys or inspections are proposed; however, further surveys of vegetation, weeds and watercourses will be undertaken as stated above.

The Biodiversity Management Plan submitted with the Draft EIS documents the management actions that will be implemented to minimise impacts on flora and fauna, including threatened species. An omission from that plan was the contingency actions that will be implemented in the event that a threatened species, or evidence of the species occurrence i.e. Bilby burrows, is observed at any time during construction. Whilst the field-based threatened species surveys undertaken during the planning phase indicate this is unlikely, contingency actions have been identified for inclusion in the Biodiversity Management Plan (refer Section 4.4.1 and 4.4.2).

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In relation to Aboriginal cultural heritage, i.e. sacred sites and Aboriginal archaeological heritage sites:

- The NGP has been designed to avoid all sacred sites identified in consultation with the Land Councils. To ensure protection of sacred sites, Exclusion Zones and Restricted Work Areas have been established with associated specific site protection conditions where necessary. These protections will form part of the project Authority Certificate pursuant to the Aboriginal Sacred Sites Act.

- Similarly, in relation to Aboriginal archaeological heritage sites, Jemena applied the Avoidance Principle, to the extent practicable while designing the pipeline route, including the completion of full archaeological surveys along the construction ROW. Sites have been avoided where possible and where not mitigation programs will be put in place in accordance with Works Approvals granted under the Heritage Act.

The Cultural Heritage Management Plan submitted as Appendix Q of the Draft EIS identifies contingency plans in the event that previously unrecorded heritage items are identified at any time during construction. No further heritage inspections are proposed.

3.24.3 REINSTATEMENT AND REHABILITATION

Three submissions provided comment in relation to reinstatement and rehabilitation of the Project footprint. These submissions raised concerns about there being a lack of detail in relation to objectives, methods, standards/guidelines to be applied, and ongoing monitoring requirements and obligations. Submitter #34 also made specific comment about how sand dunes will be managed (if they are present). The NT EPA has requested that the reinstatement acceptance criteria, and information on the typical time between pipe laying activities and when reinstatement activities would commence, be included in the Supplement.

Jemena acknowledges these comments. Additional information is now provided in Section 4.11.2.

Submission #34 raised concerns that the acceptance criteria, specifically the requirement for rehabilitated areas to have greater than or equal to 70% of native ground cover species richness compared to adjacent non-disturbed areas, is inadequate and the guidelines followed seem to be mainly those developed by the industry. Jemena notes that the acceptance criteria that will be adopted for the Northern Territory component of the Project footprint are the criteria prescribed by the Queensland Department of Environment and Heritage Protection (not industry). These criteria were developed by the Queensland regulators and have been adopted to provide for a consistent approach to reinstatement and rehabilitation across the entire Project footprint.

The acceptance criteria applied to the Project acknowledge that there is likely to be some reduction in species richness in the reinstated areas compared to undisturbed areas. The acceptance criteria prescribe that some loss of species richness is acceptable, but to protect ecological values the loss must be no greater than 30%. Also, there must be no reduction in total ground cover and no increase in weed species. These criteria are expected to be effective in reducing the ecological impacts of the Project to as low as reasonably practicable.

Jemena has made a commitment to prepare a detailed Rehabilitation Management Plan prior to the commencement of works (refer Chapter 14). The Plan will be developed by a ‘suitably qualified person’ and will include:

- Reinstatement and rehabilitation goals

- Procedures to be undertaken that will achieve the transitional and final acceptance criteria provided in Section 4.11.2.

- Appropriate monitoring and maintenance.

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Jemena notes that in accordance with the Environmental Authority for the NGP Project issued by the Queensland DEHP, the transitional and final acceptance criteria continue to apply for the life of the Project and beyond. Jemena is required to continually monitor the condition of reinstated areas, and apply corrective actions in the event that the acceptance criteria are not being achieved. Once acceptance criteria have been achieved, ongoing monitoring will be undertaken to ensure that the reinstated areas are being maintained, and if at any point the criteria are no longer being met, corrective actions will be implemented. As stated above, details of the monitoring program and corrective actions (maintenance) will be included in the Plan.

With respect to comments from Submitter #34 regarding reinstatement of sand dunes, Jemena advises that soil landscape mapping and field surveys have not identified any areas of sand dunes within the Project footprint. The soil landscapes present within the Project footprint are described and mapped in the Primary Erosion and Sediment Control Plan submitted as Appendix P to the Draft EIS. The ESCP has been developed in accordance with the International Erosion Control Association (IECA) Guidelines, and includes identification of areas within the Project footprint that have a high erosion risk. For these areas, the Construction Contractor will develop Progressive ESCP's that will include site specific detail in relation to the erosion control measures that will be implemented to stabilise the disturbed areas during and post construction.

3.24.4 FURTHER INFORMATION AND CONSTRUCTION CONTRACTOR

The NT EPA commented that concerted efforts should be made to:

- identify and address where information gaps exist
- clearly explain the roles and responsibilities of those involved in executing the NGP
- clearly explain how the construction contractor will take ownership of the EMP, and related documentation, and responsibility for commitments made by the Proponent during the EIA.

Jemena notes that Project planning has progressed since submission of the Draft EIS and new information has become available. Where this is the case, this new information is documented in Section 4 of this Supplement. Any outstanding information is acknowledged by inclusion of a commitment in the Project Commitments Register, which has been updated through the Supplement process and is provided at Appendix C.

Moving forward from the Project planning phase into the Project construction phase, Jemena appreciates the NT EPA is seeking some clarity around how environmental commitments will be enacted, and roles and responsibilities for environmental compliance. An overview of this process is provided in Section 4.11.1

3.24.5 ROAD CROSSINGS WASTE MANAGEMENT

The NT EPA comment that information on the muds, fluids, slurry or other potential wastes generated from boring or trenchless techniques, and management/handling requirements, should be provided in the Supplement.

Jemena notes that the Warrego Road, Stuart Highway and the Adelaide to Darwin railway line will be crossed using boring or trench-less techniques. Jemena advises that the NGP Construction Contractor plans to use auger bore method to complete the road and rail crossings. Generally auger bores don't require drill fluid and additives.

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Details requested by the NT EPA in relation to managing wastes produced by these construction methods, should they be required as a contingency, are provided as additional information in Section 4.11.3 of this Supplement.

3.25 OFFSETS

Jemena received 23 submissions commenting that no offsets have been proposed for the Project.

Offsets requirements applicable to the NGP Project have been assessed for each jurisdiction i.e. Commonwealth, Northern Territory and Queensland. There are no offset requirements applicable to the NGP under Commonwealth or Northern Territory legislation under which the EIS is being assessed. Further explanation of offsets in each jurisdiction is provided in the sections below.

Commonwealth

Under the EPBC Act (*Cth*), offsets can be proposed if a Project is likely to have a significant impact on any matters protected under the Act. The offsets are then considered by the Minister for Environment when deciding whether or not to approve an action that will have a significant impact on Matters of National Environmental Significance (MNES).

In order to determine if an offset is necessary under the EPBC Act, the impacts of a proposed action need to be fully understood. The Draft EIS Chapter 12 documents a detailed assessment of the potential impacts of the NGP on MNES protected under the Act. The assessment concluded that the NGP will not have a residual significant impact on any MNES; therefore, no offsets are required or proposed.

Northern Territory

There are no offset arrangements in place under Northern Territory legislation.

Queensland

Under a number of existing Queensland laws, offsets may be required for developments where there is an unavoidable impact on significant environmental values, and there will be a residual significant impact on Prescribed Environmental Matters. Jemena is in the process of completing ground-based assessments for the purpose of identifying offset requirements applicable to the Queensland component of the Project footprint. Preliminary desktop assessments indicate that some offsets will be required. These will be developed in accordance with the requirements of the Environmental Offsets Act 2014 (*Qld*) and will be subject to approval by the Qld regulators.

3.26 OTHER

3.26.1 DISCLAIMERS

Submission #31 comments “the EcOz Figures Volume 1 (2.2, 2.3, 2.4, 2.5, 2.6) all have disclaimers of warranty for every part of research they were involved in, yet the EIS is based on their work – who’s accountable?”

EcOz, the author of the figures, advises that the text at the bottom of the map is a disclaimer relating to geo-precision and is typical for mapping products that are for illustrative purposes, as opposed to for

navigation. Jemena will take ultimate accountability for the delivery of the NGP Project including compliance with the outcomes required for approvals.

3.26.2 ROAD UPGRADES

Submission #31 comments that ECNT contends that the cost of road upgrades resulting from increased traffic along the Barkly Highway should be borne by the proponent, Jemena, rather than the taxpayer.

Jemena advises that there are no planned upgrades on the Barkly Highway for the NGP Project. Jemena will pay for any direct damage caused by increased construction traffic.

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4. REVISIONS AND ADDITIONS TO THE DRAFT EIS

As part of Jemena's response to the comments received some revisions to the Draft EIS are necessary. Further, since Project planning has progressed since submission of the Draft EIS, additional information has become available. This section documents revisions and additions to the Draft EIS.

4.1 PROJECT DETAILS

The following Project details have been revised and/or clarified subsequent to submission of the Draft EIS.

4.1.1 WATER USE

Operational water use at the PCCS was estimated to be 4,800L/day in the Draft EIS but has been revised down to 3,000 L/day during normal operation as Jemena have since improved site design to optimise facility operation. There may be limited circumstances where higher volumes are required, for example plant start-up after maintenance activities. This includes maximising opportunities for re-use and recovery to minimise demands on the water supply bore.

4.1.2 FLARING

Comments received from the NT EPA sought clarification on whether gas flaring would occur at the MLV facilities. They advised that Section 10.4.3 of the Draft EIS states that '…during the operational phase, noise generated will be from compressor operation, and from gas venting and flaring at the compressor stations and MLV facilities'.

Jemena advises that flaring will not occur at the MICS or MLV sites. To provide clarity, Section 10.4.3 of the Draft EIS is amended as follows:

'…during the operational phase, noise generated will be from compressor operation, from gas venting and flaring at the compressor stations, and from gas venting at MLV facilities'.

4.2 APPROVALS, CONDITIONS & AGREEMENTS

The section below provides additional detail in relation to the processes in place under the Energy Pipelines Act (*NT*), to ensure that environmental impacts from the project are kept as low as reasonably practicable. This information supplements the content provided in Chapter 3 of the Draft EIS.

This process information was provided by the Department of Primary Industry and Resources. Jemena is required to comply with these processes post-submission of the EIS.

4.2.1 PIPELINE LICENCE – ENVIRONMENTAL MANAGEMENT PLAN

1) After a licence is granted, the licensee must obtain the Minister's consent to construct; and operate the proposed pipeline.

2) The Minister's consent to construct and subsequently consent to operate the proposed pipeline may only be achieved (inter alia) if:

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a) The licensee and the Minister have agreed on the matters about the activities that are to be described in the pipeline management plans required for construction and operation of the proposed pipeline.

b) The Minister has accepted the pipeline management plans as being appropriate for the nature and proposed use of the pipeline and in compliance with the Energy Pipelines Regulations.

3) Through the formal requirements of the Energy Pipelines Regulations, and the matters agreed between the licensee and the Minister, the contents of the pipeline management plans accepted by the Minister may cover one or all of the phases of the life cycle of a pipeline (i.e. design, construction, operation, modification and decommissioning) but will always address protection of health, safety and the environment.

4) The environmental aspects of these pipeline management plans are typically contained in a standalone environmental management plan that sets out:

a) the environment in which the pipeline will be constructed and operated

b) the results of any assessment carried out by the NT EPA, along with any other salient environmental considerations

c) the licensee's goals for protecting the environment (taking into account item b above)

d) broadly how the licensee will achieve the above goals

e) through a supporting submission: the whole body of detailed working plans, organizational structures, personnel qualifications, monitoring procedures, validations procedures etc. that give life to the processes noted in d.

The environmental management plans for construction and operation of the pipeline that Jemena will submit to the Department will not be informed solely by the findings of the formal assessment of the project by the NT EPA, but also by the input of independent and expert advisors and NT Government agencies with in-depth knowledge of the country, as well as by the considerable knowledge of pipeline industry and regulatory personnel involved with the project. This knowledge is brought out through a series of consultations, including a series of workshops being held on behalf of Jemena that are aimed at identifying: potential hazards from the proposed pipeline project; the risks posed by them; and appropriate changes (procedures, materials, routes etc.) that will ensure environmental impacts from these hazards are reduced to as low as reasonable practicable.

The Department emphasises that once an environmental management plan is accepted (as part of the overall pipeline management plan) it is not set in concrete but may be revised at any time where deficiencies are identified or significant changes take place in the construction or operational aspects of the pipeline. These changes may take place as a result of licensee initiatives or due to regulatory requirements and could result from such things as: inspections, analysis of data in reports, changes of technology, procedures, or basic understanding of the environment in which the pipeline is operating. Additionally, the Energy Pipelines Regulations require the licensee to revisit and revise the pipeline management plan every 5 years, thus ensuring that the environmental management plan remains current.

4.3 STAKEHOLDER ENGAGEMENT

In response to comments provided by NLC/CLC (Submission #34) the following revisions and additions are required to the information presented in Chapter 4 of the Draft EIS.

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Jemena acknowledges that Aboriginal people are key stakeholders potentially impacted by the NGP Project.

The NLC/CLC submission advised that Table 4.2 of the EIS contains a list of "Private Stakeholders" that includes Aboriginal stakeholders in two categories:

- Land Councils: Represent the interests of Traditional owners and Native Title Holders (and claimants) in the Northern Territory.
- Aboriginal Land Trusts: Own Land on which the Project will traverse.

The Land Councils consider this a confused delineation. Aboriginal Land Trusts have no independent function under the Land Rights Act and may only act upon the direction of the relevant Land Council. It would be more appropriate for the EIS to identify the "traditional Aboriginal owners" (as defined by the Land Rights Act) in the place of the Aboriginal Land Trusts. In these circumstances, it would also be appropriate to include "native title holders" (as defined by the Native Title Act).

Table 4-2 is amended as follows:

Table 4-1. Amended list of Aboriginal stakeholder groups

Stakeholder Organisation	Interest/need
Traditional Aboriginal Owners	Interest in land as defined by the Aboriginal Land Rights (Northern Territory) Act
Native Title Holders	Interest in land as defined by the Native Title Act
~~Aboriginal Land Trusts~~	~~Own land on which the Project will traverse.~~

4.4 BIODIVERSITY (INCLUDING MNES)

The sections below detail revisions and additions to the information provided in Chapter 6 and Chapter 12 of the Draft EIS (the biodiversity and MNES risk assessments), and the Biodiversity Management Plan. These revisions and additions are made for the purpose of addressing comments from various submitters relating to trenching and fauna management, and to address the NT EPA's request for the Supplement to assess the potential impacts of noise and light emissions associated with night time works during the construction phase.

4.4.1 REVISIONS TO THE CONSTRUCTION BIODIVERSITY MANAGEMENT PLAN

Content within the Construction Biodiversity Management Plan will be revised to include the following:

- A Trench Inspection Procedure which will be covered in inductions, and includes the requirement that each species be identified and details recorded.
- Trench ramps will be installed as follows:
  - Wherever landowners requested them to facilitate stock crossing the trench
  - Wherever the fauna spotter-catchers who are undertaking the trench inspections identify hotspots for fauna entrapment (refer Section 4.4.2.3)
- Otherwise, no more than 3 km apart.

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- Fauna shelters will be placed as follows:
  - Wherever the fauna spotter-catchers who are undertaking the trench inspections identify hotspots for fauna entrapment (refer Section 4.4.2.3).
  - Otherwise, at intervals not greater than 500 m.
- The procedure for the unlikely event that any listed threatened species, including the Greater Bilby, Brush-tailed Mulgara, Carpentarian Antechinus and Plains Death Adder, are encountered during construction. In that situation:

  1) The open trench in that vicinity will be treated as a 'hotspot' and will receive increased management (refer Section 4.4.2.3).

  2) DENR and DoEE will be notified.

  3) Sufficient fieldwork will be undertaken by an expert on those species to assess the significance of the occurrence and the degree to which Project activities will likely impact upon the species (i.e. whether there are burrows within the Project footprint).

  4) An appropriate strategy for minimising any impact to the local occurrence of the species will be developed, in consultation with DNER, and implemented.

- The procedure for the unlikely event that *Sporobolus latzii* is encountered during construction. In that situation:

  1) DENR will be notified.

  2) Sufficient fieldwork will be undertaken by an expert on the species to assess the significance of the occurrence and the degree to which Project activities will likely impact upon the species.

  3) An appropriate strategy for minimising any impact to the local occurrence of the species will be developed – in consultation with DNER – and implemented.

- There are lengths of the trench that will remain open until hydro-testing is complete. Those lengths of trench will have sloped sides to allow for human entry (and to facilitate fauna escaping).
- In the unlikely (given that trenching is scheduled for the dry season) event of a forecasted large rainfall event, it will not be possible to close the trench. It is expected that unseasonal rain will rapidly soak into the dry ground.

4.4.2 TRENCH INSPECTION PROCEDURE

The Construction Biodiversity Management Plan will be revised to include a new appendix containing the Trench Inspection Procedure. This procedure provides details on the process involved in checking for, and removing, fauna from the open trench by the fauna spotter-catchers (FSC's).

The objective of this procedure is to minimise harm to wildlife during trenching activities by promptly capturing and relocating healthy animals, and preventing the suffering of injured animals.

In the NT, the FSC will be required under the *Territory Parks and Wildlife Conservation Act* to hold a *Permit to Take or Interfere with Wildlife*. In Qld, the FSC is required to possess a Rehabilitation Permit under the

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Nature Conservation (Administration) Regulation 2006 to capture, release or undertake emergency euthanasia of wildlife.

4.4.2.1 Responsibilities

The Environmental Manager will:

- Ensure that sufficient FSC resources are provided so that the open length of trench can be checked each day within five hours of sunrise.
- Advise the FSC's about the location of daily trenching activities.
- Ensure that the requirements of this procedure are followed by all personnel, contractors and visitors to the site.
- Maintain records of daily trench inspections and compile Trench Inspection Reports.

The FSC's will:

- Conduct inspections of the open trench each day prior to the commencement of construction activities, including indirect observations (track, scats etc.). Each inspection will include checking the integrity of trench plugs, exit ramps and other fauna escape devices.
- Capture any wildlife entrapped within the open trench.
- Identify and assess potential habitat for the release of fauna that is removed from open trench.
- The FSC will assess the health of all captured wildlife to determine whether the animal is:
    - Suitable for relocation – all displaced but healthy fauna will be captured, recorded and released into appropriate habitat in a pre-determined release area.
    - Injured or orphaned – in which case the animal may need to be euthanised in-situ in accordance with the FSC's euthanasia procedures.
- Document information for inclusion in the Trench Inspection Report.

4.4.2.2 Daily trench inspections

- Each 20 km section of open trench will be assigned a team of two FSC's who will be responsible for inspecting the trench for trapped fauna, and capturing and releasing animals into suitable habitats.
- Each day, prior to commencement of works, the FSC's will inspect the trenches for fauna. The trench inspections will be scheduled and resourced so that they can be completed within five hours of sunrise each day. The number of FSC's will be adjusted as required to achieve this target.
- Trench inspections will be conducted from the end of the trench closest to where works will be commencing, towards the other trench end.
- Trench inspections will be completed by FSC's walking along the trench looking for trapped fauna. A FSC will walk along the trench to ensure that all areas are inspected.
- Any detected fauna will be captured using a modified pool-cleaning net or similar to enable capture without the FSC entering the trench.

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- For safety reasons, FSC's will not be permitted inside trenches and will make all attempts to remove fauna without entry into trenches. Entry to the trenches will only be permitted with the approval of a Health and Safety Manager and will be in the presence of an identified observer whilst no construction works are being undertaken in the vicinity.
- Fauna that are removed from the trench will be assessed for any injury, and uninjured animals will be immediately released into adjacent suitable habitats. The FSC's will be suitably qualified to assess the habitat requirements of each species so that they are released in areas where their survival potential is maximised. Release methods applicable to different types of fauna are specified in Section 4.4.2.5 below.
- In the event that the immediately adjacent habitat areas are deemed unsuitable for release of an animal, it will be temporarily contained in a catch bag until a suitable release site is identified. All trapped fauna will be released within 5 hours of sunrise each day.

4.4.2.3 Fauna hotspot inspections

The Trench Inspection Procedure will include a method used to determine that an area is a 'hotspot' for fauna entrapment. Identification of a fauna 'hotspot' will trigger an assessment of the requirement for additional management measures to be implemented.

A section of trench may be designated as a 'hotspot' for fauna entrapment based on the following criteria:

- Any recorded incidence of a listed threatened species being trapped.
- Higher than average numbers of small mammals and frogs, that are most susceptible to mortality by desiccation, being trapped in a designated section of trench on a daily basis.

Additional management measures that will be considered when a fauna 'hotspot' is identified are as follows:

- Provide additional fauna spotter-catchers as required to complete trench inspections and release captured fauna as early as possible each day, but in any case no later than five hours after sunrise.
- Install fauna shelters at more frequent intervals.

4.4.2.4 Extraordinary trench inspection

- If fauna is detected within the trench during works, then any works within the area which a FSC believes could impact the animal will cease.
- A FSC will be responsible for assessing the situation and removing the animal by the most appropriate means.
- Works will resume once the FSC indicates there is no longer a risk of impact to fauna from construction works.

4.4.2.5 General fauna handling

- Fauna will be handled in accordance with published standard operating procedures. The procedures which will be used as guidance are:

  - Terrestrial Vertebrate Fauna Survey Guidelines for Queensland – DSITIA (Eyre et al. 2014)
  - Standard Operating Procedure – Animal handling/restraint using soft containment (DEC 2009a)
  - Standard Operating Procedure – Hand restraint of wildlife (DEC 2009b)
- All fauna handling will be undertaken by a suitably-qualified and experienced FSC.
- All FSC will have suitable NT or Qld permits for handling fauna – and the associated ethics approvals – and will be required to report as required for each jurisdiction.
- All fauna interactions associated with trench inspections will be recorded and kept for the life of the project. These records will be shared with DENR and DoEE.
- A snake bite kit will be carried by each FSC whilst undertaking trench inspection activities.
- Bites from other animals – especially rodents and goannas – need to be treated immediately to prevent infections.

Snakes

- Unless species identification is immediately certain prior to handling, all snakes and legless lizards are to be treated as venomous.
- FSC's will assess the situation to identify the best capture method.
- Snakes will be caught using appropriate equipment, including:
  - Snake hooks
  - Extendable poles with attached catch bags suitable for venomous snakes (i.e. dead corners and clean material)
  - Gloves
  - Tie to secure catch bag closed
  - Holding container (if required).
- Snakes will be released downhill or onto flat ground, and towards suitable ground cover.

Small reptiles

- Small reptiles will be held at the base of the neck/upper back with firm pressure to restrain the animal but not cause injury. Handling the tail of skinks and geckos will be avoided.
- If the animal will not be immediately released, they will be placed in a catch bag and tied off. The animal will be stored in a cool dry place in a secure location for the shortest period possible.

Large reptiles

- Large reptiles such as dragons and monitors will be treated with extra care and may require additional force to restrain.
- Large reptiles will be ushered to the closest ramp (if it is close by). Otherwise, capture in the bag will be possible for most goannas in this area.

- Large reptiles will be handled whilst wearing gloves to avoid injury through bites or scratches. They can be held by grasping the base of the tail to restrain the animal; after which a heavy cloth bag is placed over the animal's head. This allows the FSC to take hold of the animal at the neck behind the head and at the base of the tail.
- Whilst carrying the animal, the FSC will tilt their head back slightly and hold the animal away from their body, with the feet facing away.
- If required to be held before release, large reptiles will be placed in a large heavy cloth or hessian sack, and the opening zip-tied. Claws may protrude through the fabric, and so the bag will be held away from the body when being carried.

Mammals

- Small mammal species will be captured in a dark bag on the end of an extendable pole.
- Small mammals will only be handled for identification purposes. Such handling will be in a firm but gentle manner.
- All FSC's will have past experience and will be adequately trained in small mammal handling.
- Handling small mammals will only be required to confirm species identification. If identification can be obtained via 'bag inspections', no handling is required and the animal can be released.
- Small mammals will be released in a timely manner to reduce stress.
- FSC's will release small mammals into a safe location for the species. Effort will be made to not expose them to predation from raptors and other predatory fauna (as most small mammals in the region will be nocturnal and will therefore be disoriented during daytime releases).
- Large mammals (such as kangaroo, wallaby and dingo) that cannot be safely captured in the catch bag will be ushered to the closest ramp.

4.4.2.6 Threatened species

If any threatened fauna or flora species are observed within the project area, the FSC will mark the location with a GPS and immediately contact Jemena. Jemena will notify the relevant government departments (DENR, DoEE and/or DEHP).

4.4.2.7 Reporting

For each trench inspection event, a FSC will prepare a Trench Inspection Report documenting:

- The KP's surveyed
- Number and species of fauna relocated or deceased
- Locations in which release occurred
- Recommendations (i.e. if more shelters / exit points are required).

4.4.3 NOISE AND LIGHT IMPACTS ASSOCIATED WITH NIGHT TIME WORK

As indicated in Section 3.7.4, night works may occasionally be required during the Project construction phase. The NT EPA requested that the Supplement indicate the lighting requirements and potential lighting

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and noise impacts on sensitive receptors associated with works to be conducted outside of normal hours i.e. night works. The sections below document an assessment of risks to ecological receptors associated with noise and light emissions from works undertaken at night.

Context and assumptions

Night time noise or light disturbance can cause temporary reduction in the quality of ecosystems and threatened species' habitats. It is difficult to quantify and measure noise and light disturbance to native fauna given that different species have different tolerances and different capacities to move away from a noise or light source.

Based on the Noise Assessment Report submitted as Appendix T of the Draft EIS, in assessing the inherent risk (without controls) of noise disturbance to ecological receptors it is assumed that:

- the 65 dB(A) threshold screening criteria for impacts on ecological receptors is only exceeded within 200 m of construction activities
- for species which may be more sensitive to noise and which have permanent nesting, roosting or colony areas (e.g. bats), the conservative assessment criteria of 12 dB(A) above existing LA_{eq} levels was applied meaning that construction activities have the potential to cause disturbance of noise-sensitive fauna up to 1 km from the construction ROW
- some species of bats can be expected to occur in the vicinity of the construction footprint; however, no roost habitats were identified in proximity to the Project footprint
- because construction will be progressive and night works will only be occasional, any noise impacts will be short-lived.

In assessing the inherent risk (without controls) of light disturbance associated with night works, it is assumed that:

- the natural environment is largely void of artificial light
- lighting will only be used if works are occurring at night
- light may attract insects and therefore nocturnal insectivores (particularly bats and raptors)
- light may also attract non-flying insectivorous mammals; however, it is expected that the noise associated with the works occurring in lit areas will deter mammals from entering the ROW
- because construction will be progressive and night works will only be occasional, any light impacts will be short-lived.

In assessing the inherent risk (without controls) of noise or light emissions associated with night works impacting on Carpentarian Antechinus it is assumed that the area of critical Carpentarian Antechinus habitat that will be disturbed is small (a few hectares out of the estimated 4 369 ha).

With regards to Plains Death Adder, in assessing the inherent risk (without controls) of noise or light emissions associated with night works, it is assumed that the species has a vast and contiguous extent of occurrence within which to temporarily retreat (if necessary).

Inherent risk – biodiversity

There is a **LOW** risk that, without controls, noise or light emissions associated with night works would cause a level of disturbance to fauna that would result in impacts at the ecosystem level. The likelihood and consequences of this impact occurring are discussed below.

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Risk component	Ranking	Explanation
Consequence	Serious	An occasional, short-lived noise and light disturbance constitutes a minor effect at an ecosystem level.
Likelihood	Rare	It would be an exceptional circumstance in which such a temporary and localised disturbance had an impact at an ecosystem level.

Inherent risk – Plains Death Adder and Carpentarian Antechinus

There is a **LOW** risk that, without controls, noise or light emissions associated with night works would cause a level of disturbance to Plains Death Adder and Carpentarian Antechinus. The likelihood and consequences of this impact occurring are discussed below.

Risk component	Ranking	Explanation
Consequence	Minor	An occasional, short-lived noise and light disturbance over a small area of critical habitat constitutes a temporary reduction in the quality of < 0.01 per cent of critical habitat for Carpentarian Antechinus or Plains Death Adder.
Likelihood	Rare	It would be an exceptional circumstance in which such a temporary and localised disturbance had an impact on the population of Carpentarian Antechinus or Plains Death Adder.

Controls

Notwithstanding the low inherent risk to biodiversity associated with noise emissions from night time works, the routine controls documented in the Noise Management Plan submitted as Appendix U of the Draft EIS, will minimise noise impacts.

In the unlikely event that light attracts mammals towards the ROW and thereby leads to increased fauna entrapment, there is a Trench Inspection Procedure which details the process involved in checking for, and removing, fauna from the open trench by the fauna spotter-catchers. The objective of this procedure is to minimise harm to wildlife during trenching activities by promptly relocating healthy animals, and preventing the suffering of injured animals.

Assessment of effectiveness

The noise controls that will be implemented are best-practice in accordance with the *Code of Environmental Practice for Onshore Pipelines* (APIA 2013) and regulatory requirements included in the Environment Authority for the Project issued pursuant to the EP Act in Queensland. The Construction Contractor has Standard Operating Procedures for management of noise, and experience implementing these procedures on other pipeline projects.

A Trench Inspection Procedure is now standard procedure for pipeline projects in accordance with the *Code of Environmental Practice for Onshore Pipelines* (APIA 2013) and has been shown to reduce to in-trench mortality to less than 1 per cent (see Swan and Wilson 2012). The Construction Contractor has experience implementing these procedures on other pipeline projects.

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Residual risk

The residual risks to biodiversity associated with noise and light emissions from night time works, without any additional controls, is assessed as **LOW**. The routine controls are expected to ensure that the risk remains low for the duration of the construction phase.

4.5 WATER USE AND SOURCES

The sections below detail revisions and additions to the information provided in Chapter 7 of the Draft EIS (the Water risk assessment), and the Construction Water Management Plan. These revisions and additions are made for the purpose of addressing comments from various submitters relating to the sustainability of groundwater extraction, and to provide additional information in relation to how the water storage dams will be managed to prevent entrapment of fauna.

4.5.1 DETERMINING SUSTAINABLE YIELDS

The Draft EIS stated that groundwater extraction, if required, will be within the sustainable yields of the aquifer. A number of submissions expressed concern about the sustainability of groundwater extraction for the Project. In response to this, the process for determining sustainable yields has been outlined below. This process will be followed for all groundwater extraction to ensure that any Project water needs can be met without impacts on other users, or environmental values and needs.

The following process will be followed to determine the sustainable yield of groundwater extraction for the Project:

- Identify specific groundwater extraction bores to assess:
  - Groundwater resource
  - Existing users and extraction volumes
- Develop and implement controls to ensure extraction is within sustainable yield
- Where a new bore is required a driller licenced under the Water Act (*NT*) will be engaged to drill and construct the bore in accordance with relevant legislation and guidelines.
- Undertaken monitoring and recording of extraction rates, and standing water levels
- Consult with landholders and Land Councils where relevant.

The Construction Contractor is currently progressing planning for selecting existing bores that may be further investigated as construction water sources. Preliminary testing of water quality in existing bores will be undertaken as planning progresses. Further assessments will be undertaken to confirm that each bore can sustainably yield the amount of water required over the construction period without impacting on existing water users or environmental flows.

4.5.1.1 Construction

Since the Draft EIS was submitted, the Construction Contractor has been undertaking further investigations into potential water sources for construction purposes.

- Potable water can be sourced from existing supplies at Tennant Creek (i.e. Power and Water) and Mount Isa respectively.
- Hydrostatic test water and construction water will mainly be sourced from an existing dam supplied by overland flows (located near KP0), and an existing bore (located near KP413). Additional sources may be required, and new groundwater bores may be required to

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supplement existing groundwater bores in areas where there are no existing sources available.

In response to concerns about impacts of water use on the communities of Pukalki and Purrukuwurru, Jemena has made the following commitments that are additional to those presented in the Draft EIS:

- Jemena will not take surface water or construct new bores on Aboriginal Land Trust land unless via agreement with the landholders.

4.5.1.2 Operations

The demand for water has changed since the submission of the Draft EIS as there have been process efficiencies and optimisation incorporated into the design of the water system to reduce overall water demand. This includes maximising opportunities for re-use and recovery to minimise demands on the water supply bore. The anticipated bore water consumption during normal operation for the Philip Creek Compressor Station is 3,000 L/day. This is the equivalent of the amount of water used by six average Australian households, and only two average Darwin households.

Water use of 3,000 L/day is the equivalent of approximately 2 L/second. A groundwater assessment undertaken for Phillip Creek Station by the NT Government (see Sumner 2008) assessed the groundwater resources in the south west and north-west regions of Phillip Creek Station, within which PCCS is located. The study found that bores around the old Warrego Mine, which is located just west of the proposed PCCS site, yielded between 0.6 and 2.5 L/s in sandstone aquifers. The old Wiso Pumping Station bore, located 25 km west of the old Warrego Mine, yielded 10 L/s. The higher yielding formations were within the Montejinni Limestone, which is more common in the north-west of the station, and commonly yields between 2-4 L/s. Groundwater was struck at depths around 50 m below ground level, but standing water levels ranged between 30 to 50 m below ground level. Water quality was generally good, with low to moderate total dissolved solids and salinity, and circum-neutral to slightly alkaline pH. The study indicates that there are groundwater resources in the region surrounding the PCCS that could provide the required yield of 2 L/s, subject to an assessment of sustainability of the resource.

The sustainable yield of the bore will be determined in accordance with the steps outlined in Section 4.5.1 to ensure that extraction is sustainable and will not result in impacts on other users or the environment. This includes ensuring that groundwater is not over extracted such that other industries would be at a disadvantage. This will be assessed and performed in accordance with Territory and Commonwealth environmental requirements.

4.5.2 STORAGE DAMS

One submitter queried the water storage dams in relation to lining, fencing and hazards for entrapment of fauna. In response to this query, the following additional information has been provided.

Dams will be lined to prevent water seepage into surrounding soils. They will be fenced, have fauna ladders, and will be inspected daily for trapped fauna when empty.

4.6 WATERCOURSE CROSSINGS

This section provides watercourse crossing information that addresses comments received from various submitters in relation to information gaps in the Draft EIS. The information presented in this section is a combination of information previously provided in the Draft EIS, and new additional information compiled in response to comments received. This section is intended to clarify and expand the management

framework for watercourse crossings that was provided in the Draft EIS Chapter 7 (Water), Chapter 13 (EMP) and Appendix O (Water Management Plan).

4.6.1 RIVER AND CREEK CROSSINGS

Approximate watercourse crossing locations were presented in Chapter 7 of the Draft EIS. Further planning of the construction footprint has allowed more specific watercourse crossing locations to be determined, which are provided in Table 4-2 below.

Table 4-2. Location of watercourse crossings

Location (KP)	Watercourse name	Latitude	Longitude	Stream order	Catchment
Northern Territory					
260	Unnamed	-19.9989	136.2272	1	Barkly
383	Ranken River	-20.3635	137.3437	5	Georgina river
384	Ranken River tributary	-20.3635	137.3480	2	Georgina river
387	Ranken River tributary	-20.3745	137.3768	1	Georgina river
389	Ranken River tributary	-20.3797	137.3911	1	Georgina river
394	Ranken River tributary	-20.4014	137.4428	1	Georgina river
396	Ranken River tributary	-20.4063	137.4533	1	Georgina river
397	Ranken River tributary	-20.4118	137.4663	1	Georgina river
410	James River	-20.4597	137.5807	5	Georgina river
412	James River tributary	-20.4631	137.5932	1	Georgina river
417	James River tributary	-20.4803	137.6453	1	Georgina river
424	Georgina River tributary	-20.5032	137.7005	2	Georgina river
431	Georgina River	-20.5331	137.7638	5	Georgina river
443	Blue Bush Creek tributary	-20.5701	137.8707	2	Georgina river
451	Blue Bush Creek	-20.5988	137.9426	5	Georgina river
452	Blue Bush Creek tributary	-20.6023	137.9541	4	Georgina river
Queensland					
465	Redbank Creek*	-20.6256	138.0687	5	Georgina river
472	Mingera Creek	-20.6364	138.1387	5	Georgina river
505	Polygonum Creek	-20.6744	138.4545	4	Georgina river
509	Polygonum Creek	-20.6807	138.4932	5	Georgina river
531	One Mile Creek	-20.6944	138.7007	1	Georgina river
537	Lily Hole Creek	-20.6914	138.7557	2	Georgina river
544	Templeton River*	-20.7178	138.8177	5	Georgina river
586	Yaringa Creek tributary	-20.8034	139.1974	3	Georgina river
590	Yaringa Creek	-20.8246	139.2339	5	Georgina river
598	Yaringa Creek tributary	-20.8299	139.3040	2	Georgina river
602	Yaringa Creek	-20.8307	139.3431	2	Georgina river
603	Yaringa Creek tributary	-20.8250	139.3498	1	Georgina river
607	Templeton River	-20.8134	139.3815	1	Georgina river

Location (KP)	Watercourse name	Latitude	Longitude	Stream order	Catchment
608	Templeton River tributary	-20.8125	139.3919	1	Georgina river
610	Mica Creek tributary	-20.8120	139.4032	1	Leichhardt River
612	Mica Creek tributary	-20.8089	139.4206	3	Leichhardt River
614	Mica Creek tributary	-20.8227	139.4369	3	Leichhardt River
614	Mica Creek tributary	-20.8194	139.4355	3	Leichhardt River
615	Mica Creek	-20.8251	139.4467	3	Leichhardt River
616	Mica Creek tributary	-20.8249	139.4557	3	Leichhardt River
617	Mica Creek	-20.8216	139.4600	4	Leichhardt River

4.6.1.1 Riparian vegetation at crossings

In accordance with the *Code of Environmental Practice – Onshore Pipelines (2013),* maintaining riparian ecosystem integrity is one of the potential constraints considered when determining suitable watercourse crossing methods. In the case of the NGP, surveys undertaken at the major river and creek crossings have revealed that the riparian habitats are typically sparse, compared to those present on the larger permanent river systems present in the Top End.

The Draft EIS assessed risks to riparian vegetation and threatened species associated with open cut watercourse crossings. Clearing of a 30m wide corridor through these riparian zones, will result in the loss of some trees, but is not expected to cause any significant impacts to fauna that utilise these areas as refuge habitats because the disturbed areas are inherently sparsely vegetated, and occur adjacent to riparian habitats that will not be disturbed. The residual risk to riparian vegetation was rated as Low, and therefore the use of alternative methods, such as boring and drilling, was not further considered.

4.6.1.2 Watercourse hydrology

As noted in comments from the NT EPA, the Ranken River, James River and Georgina River all displayed evidence of surface water flows in May 2016 when field-based assessments of these crossings were undertaken. The NT EPA requested further information in relation to the typical period that these rivers would be classed as ‘dry’ and the conditions that would be considered suitable for open trenching methods.

A review of stream gauging data for gauging stations near the Project footprint (as available on the NT Water Data Portal [NTG 2016]) indicates that:

- Toward the Tennant Creek end of the NGP flows are generally recorded in March and April, but in wet years can be recorded between April and May.
- Cease to flow conditions are usually recorded between May/June and February the following year.
- In the James and Georgina Rivers (i.e. toward the Queensland border) stream gauging stations recorded no flow in most years
- In the Ranken River, the main stream gauging station (G0010005) recorded flows in most years, whilst other stations recorded no flow in most years
- Water flows are usually recorded in March or April, sometimes over longer periods (i.e. February to May) depending on the year.

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- Very rarely, water flows were recorded in August, September or December (i.e. in unusually wet years).

The stream gauging data indicates that:

- Flows in watercourses in the region fluctuate significantly depending on the year
- Flows are usually recorded in the late wet season months (i.e. March through to May)
- In some years, no flows are recorded at all
- Cease to flow conditions are usually recorded between May/June and February of the following year i.e. in most years there will be at least eight months during which there is no flow
- Occasionally, flows are recorded in late dry season or early wet season months; usually in relation to a particular rainfall event, unseasonal rainfall, or a large wet season.

Construction of the pipeline will commence at Tennant Creek, which will result in the construction spread progressing to the major watercourses in the mid to late dry season. This is expected to coincide with periods of no flow. However, it is acknowledged that unseasonal rainfall could result in flows in these watercourses, and therefore contingency methods for crossings under low flow conditions are discussed in the sections below. Watercourse crossings will not be constructed under high flow conditions, and the construction schedule provides adequate flexibility to delay construction of the crossings until flows recede to low or no flow conditions.

4.6.1.3 Locations of permanent waterbodies

A literature review undertaken to inform the Draft EIS indicated that some reaches of the Ranken, James and Georgina rivers support permanent pools. It is assumed that these permanent pools are connected to groundwater (i.e. springs) and that they are important habitat features in an otherwise dry landscape, providing refuge for a variety of flora and fauna. A review of aerial imagery available for the watercourse crossings on the NGP route does not indicate any signs of permanent pools in the vicinity of the proposed crossing locations.

Surveys of the Ranken, James and Georgina Rivers will be undertaken upstream and downstream of the proposed crossing location prior to construction. The survey is currently planned to occur in November 2016 and is expected to confirm that there are no permanent pools in proximity to the construction ROW.

In the event that permanent pools are identified, it is acknowledged that they can provide important temporary refugia and/or drinking water sources for remnant aquatic biota and other native and agricultural animals.

Open trench techniques will allow for a watercourse crossing to be constructed and reinstated once the crossing itself has been completed, which will minimise the duration of disturbance. Conversely, directional drilling would typically take 3-4 weeks at each crossing, and whilst this method would avoid direct disturbance of the riparian and aquatic habitats, it could be expected that the disturbance and noise associated with the construction activities would cause fauna to temporarily avoid using the area for that period.

As a contingency, where pools of water are present at the watercourse crossings, a dam and pump crossing technique will be employed to minimise impacts on water flows and water quality. The dam and pump method is further discussed in the section below.

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4.6.2 CROSSING TECHNIQUES

Open trench crossing techniques are proposed to be used for all watercourses. This method is a standard industry technique that is considered suitable for watercourses under no or low flow conditions, and where there are low banks and a relatively narrow zone of riparian vegetation. This method is not suited to high flow conditions, and in the event that these are experienced during construction of the NGP, construction of the crossing will be delayed until flows recede. There are no watercourses along the NGP that experience year-round flows.

Directional drilling or boring underneath watercourse crossings is not being considered as a crossing technique for the NGP. In accordance with the *Code of Environmental Practice for Onshore Pipelines (2013) a*n important factor in consideration of construction methodology is the efficiency of construction, and the Code notes that often the least environmental impact during the construction of minor watercourse crossings is achieved by open cut trenching techniques - as they can often be completed in a shorter time frame when compared to alternatives. This is an important consideration for the NGP, which is planned to be constructed over a single dry season. Open trench techniques will allow for a watercourse crossing to be constructed and reinstated once the crossing itself has been completed. Directional drilling would typically take 3-4 weeks at each crossing.

Further, with respect to using directional drilling as a way to address concerns about minimising impacts on watercourses, it should be noted that the footprint for directional drilling can be larger than for standard trenching or dam and pump crossings. Significant extra clearing would be required for pipe stringing and access across both sides of the crossing. The technique also introduces additional environmental impacts associated with management and disposal of drilling muds, and an extended period of disturbance and noise that is likely to cause fauna to avoid using the area for longer than would be the case for open trench crossings.

There are two types of crossing technique that may be employed at watercourse crossings on the NGP, depending on whether there is any flow present. Standard open trenching methods will be used for all dry crossings. As a contingency, where low flows are present, a dam and pump technique will be used to establish a dry work area for installation of the pipeline.

The criteria for using different watercourse crossing techniques are provided in Table 4-3, and have been informed by the *Code of Environmental Practice for Onshore Pipelines (2013)*.

Table 4-3. Criteria for selection of watercourse crossing

Crossing technique	Criteria	Alternatives if criteria is not met
Open cut trench	• No water flow present • No large pools present • No impending rainfall or anticipated flow	• Wait until water flows cease • Detour around large pool, to select an area away from pool or where pool is shallow and narrow • Construct a dam and pump crossing if watercourse will be flowing for a significant period of time.
Dam and pump	• Water is flowing in watercourse • Watercourse is a creek or river (stream order 3+) • A pump is available to allow water to be pumped at a similar rate to flows, and provide for a dry work area.	• Nil – wait until flows recede

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4.6.3 CROSSING DESIGN DETAILS

Each individual watercourse crossing will be assessed immediately prior to construction to inform the selection of crossing technique and the development of specific Progressive Erosion and Sediment Control Plans (ESCP's). The Progressive ESCP's will include details on crossing methods and reinstatement and rehabilitation as it applies to stabilising the watercourse crossing and minimising the risk of erosion or sedimentation of the watercourse. The Progressive ESCP's will be developed by a suitably qualified person and assessed by an accredited person (refer to Section 3.16).

Specific watercourse crossing designs will be incorporated into Progressive ESCP's based on the outcomes of the pre-construction assessment. Standard designs for watercourse crossings are provided below. These have been sourced from the industry best practice guidelines (AGPA 2013 and IECA 2008).

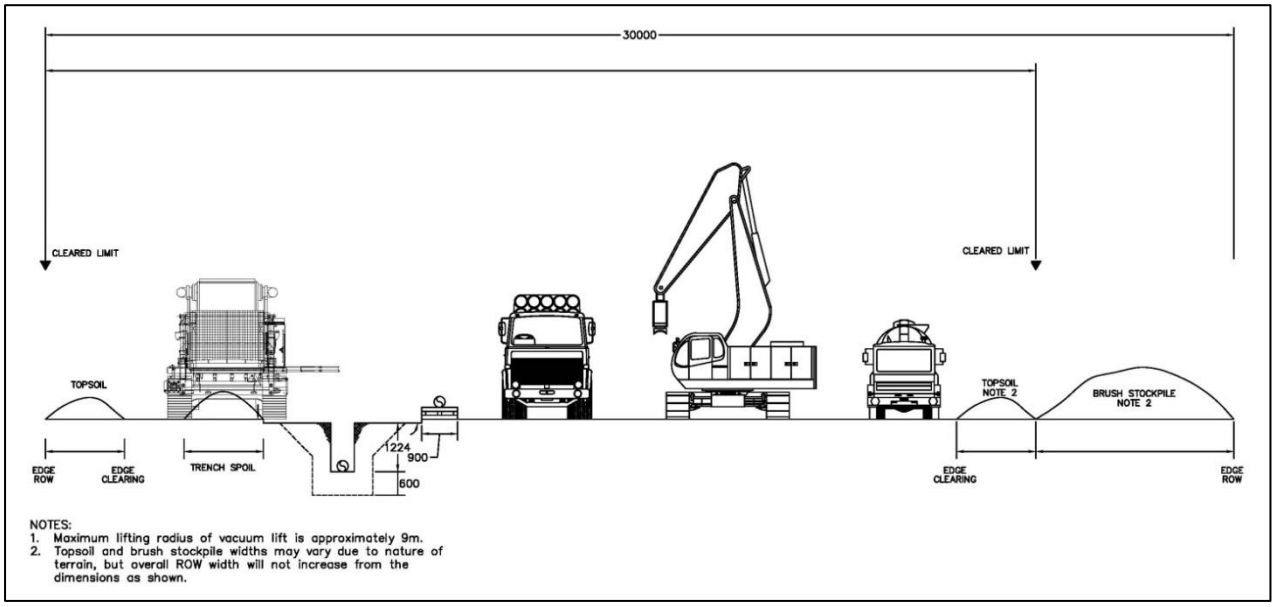

Figure 4-1. Standard construction ROW method

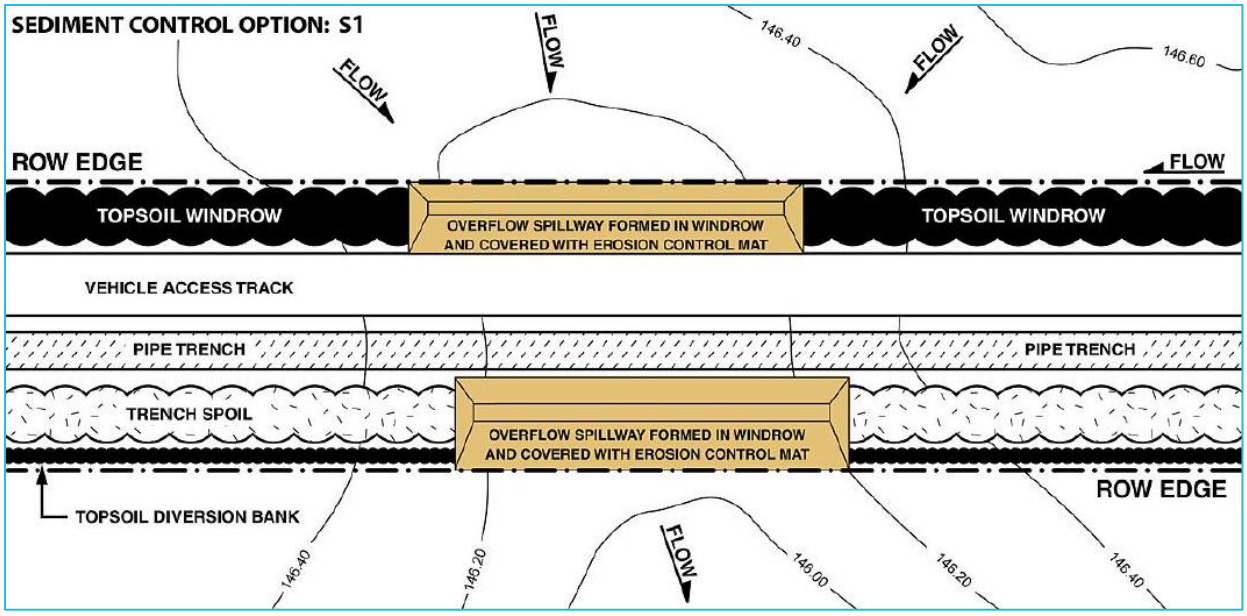

Figure 4-2. Example diagram of typical minor watercourse crossing (Source: IECA 2008)

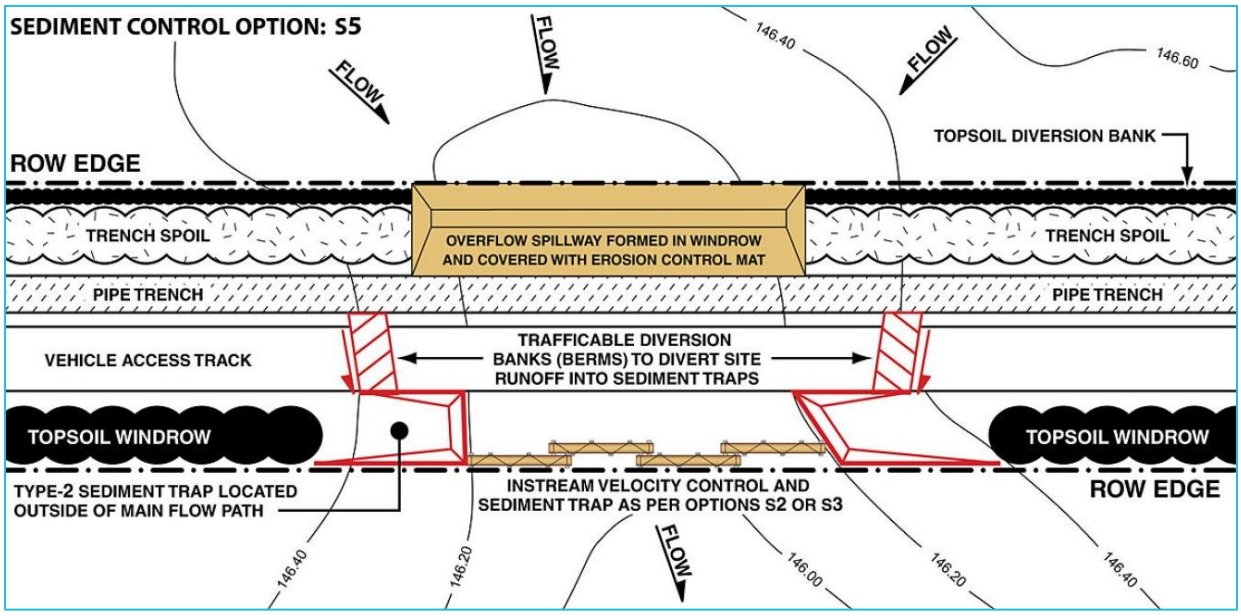

Figure 4-3. Example of watercourse crossing layout if rainfall is predicted (Source: IECA 2008)

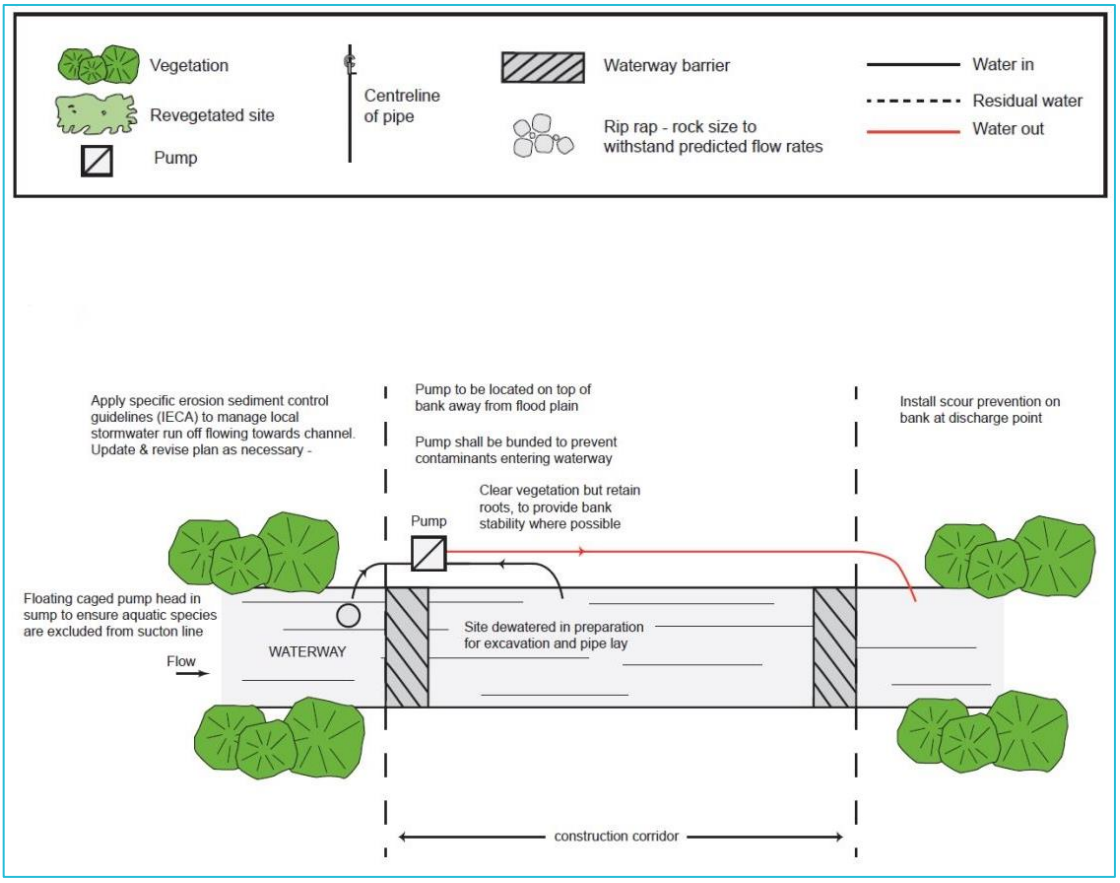

Figure 4-4. Example of a dam and pump watercourse crossing (Source: APIA 2013)

4.6.4 CONSTRUCTION METHODS

Assuming that no water is present in the watercourse, the crossings will be constructed as open trenches, consistent with the method use for the entire construction ROW. Trenches will be constructed perpendicular to the watercourse, using the shortest possible distance across the watercourse to minimise the length of disturbance.

Crossing crews will be with the front-end crew to prepare watercourse crossings ahead of time and install any required erosion and sediment controls and other infrastructure. Clearing and disturbance of major watercourses will not be undertaken until immediately prior to trenching and pipe installation to minimise the duration of watercourse disturbance.

Standard open cut trenching involves in-stream excavation of a trench in the standard manner, using bucket wheel trenchers, rock saws and excavators as appropriate. Trenching will be deeper for watercourse crossings (1,200-2,000 mm) to allow for more cover over the pipeline, and minimise the risk of scour around the pipeline. The prefabricated pipe is placed across the waterway, lowered in and the trench backfilled immediately. Soils are replaced in the order that they were removed in, and stream bed material (e.g. rocks) will be replaced as the final layer (in the same way that topsoil is replaced as the final layer in general reinstatement).

If low flows are occurring, a dam and pump system may be used. This involves constructing temporary dams (with earthen banks) upstream and downstream of the crossing, and dewatering the area within these dams to provide a dry work area (refer Figure 4-4). The intention is for the dams to be constructed using pre-existing materials from excavations in the area avoiding using imported materials. Flows from

upstream are pumped around the crossing area and discharged directly downstream, maintaining watercourse flows while the crossing is being constructed. The crossing will be constructed using the same open cut trenching method. Once the crossing is reinstated and stabilised, the dams are removed to re-establish natural flows.

Weather conditions and impending rainfall will be monitored during construction (via the Bureau of Meteorology online climate data, rain radars and forecasts). In the event of forecast rainfall, or an unexpected rainfall event, construction staff will ensure all drainage, erosion and sediment controls are installed (these will be detailed in the Progressive ESCP). As a minimum, this will include:

- Ceasing watercourse crossing works and stabilising work area.
- Installing temporary controls if the watercourse cannot be completed and stabilised prior to rainfall and flows. This may include installing flow diversion banks, dam and pump systems to divert flows around the open trench segment and disturbed area, sediment fences, and ground cover (e.g. geofabric).
- Delaying a planned watercourse crossing until such time as flows have receded.

No works will be undertaken in watercourse crossings during times of peak flow, and watercourse crossing works will cease until flows recede. Following rainfall, all erosion and sediment controls will be inspected, and maintenance undertaken as required to ensure they are functioning as designed.

4.6.5 MANAGEMENT OF WATERCOURSE CROSSINGS

The potential environmental impacts associated with constructing watercourse crossings will be managed through implementation of the Water Management Plan submitted as Appendix O of the Draft EIS and erosion and sediment control requirements prescribed in the Primary ESCP submitted as Appendix P of the Draft EIS.

Further detail on management measures is provided below in response to a number of comments received on the Draft EIS:

- Each watercourse crossing will be surveyed (top of bank, toe of bank, edge of bed, slope of bank) prior to disturbance.
- Reinstatement will be undertaken to return the disturbed area to these pre-disturbance conditions.
- Restrict vehicle and machinery movements to within the construction ROW
- Delineate the 100 m buffer zone around watercourses, within which only activities essential for pipeline installation can occur.
- Vegetation clearing will be restricted to the minimum width required for safe working space. Pruning of large trees will be considered over clearing. Cleared vegetation will be retained and stockpiled outside of the bed and bank area, for use in bank stabilisation and reinstatement.
- Excavated soils will be stockpiled separately, including the separation of bed and bank material, and topsoils and subsoils, and will be replaced back to their original location, in the order that they were removed. Where the stream bed consists of rocks, pebbles or coarse gravel, this material shall be removed and stockpiled separately and replaced as part of crossing reinstatement.
- Within the bed, trench spoil will be stockpiled next to the trench to allow for rapid backfill and reinstatement. Bank soils will be stockpiled outside of the watercourse.

- The pipe section designated for the crossing shall be fabricated prior to trenching, to enable rapid installation.
- Advanced clearing and disturbance of watercourses will be minimised, and the trench will be backfilled and watercourse reinstated as soon as the possible after pipe-laying to minimise the duration of disturbance of the watercourse.
- All temporary and permanent controls stipulated in the Progressive ESCP will be installed, maintained and removed within the timeframes outlined in the ESCP.
- Information on the nature, location, extent and timing of watercourse crossings works in the Northern Territory will be submitted to DENR prior to works commencing. If watercourse flows commence during works in the Northern Territory a Permit to Construct or Alter Works will be sought from DENR. Conditions of this permit will be incorporated into the construction plan.

Reinstatement

Watercourse crossings will be reinstated as soon as possible after the pipeline is installed. The specific reinstatement requirements will be outlined in Progressive ESCP's. General reinstatement steps are as follows:

- Once the pipe is installed, the trench will be backfilled, and soils will be replaced in the location and order that they were removed in. Any rocks or gravel removed from the surface of the bed will be reinstated as the final layer.
- The bed and banks will be re-contoured and compacted to match the pre-disturbance condition and surrounding landform.
- Any loose material and debris will be removed from the beds and banks to avoid modifying flows.
- Any vegetation cleared will be spread along the construction ROW at the approach to watercourses to provide ground cover, but in such a manner that it provides low risk of washing into the watercourse.
- Depending on the size of the watercourse, steepness or erosion risk, the banks will be stabilised by anchoring cleared vegetation, using geo-fabric or rock battering (riprap), or planting vegetation. Terracing or flow diversion banks may also be installed down the bank to reduce flow velocity and minimise scouring
- Flow diversion banks will be installed at the top of banks to shed water away from the recently reinstated banks. This will minimise the risk of flows running down the reinstated ROW and watercourse approaches and scouring the bank.

Reinstatement inspections will be undertaken by the construction Environmental Manager and a Certified Professional in Erosion and Sediment Control (CPESC) as required by the Progressive ESCP to ensure that reinstatement is stable and in accordance with the ESCP requirements.

The overarching aim of reinstatement is to return watercourses, including bed and banks, to as close to their pre-disturbance condition, without any impediments to watercourse flow or aquatic species passage when water is present, while ensuring the reinstated bed and banks are stable (in terms of erosion).

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Monitoring

Each major watercourse crossing (i.e. creeks and rivers) will be surveyed prior to disturbance, with notes made in accordance with Table 4-4 (consistent with the survey information presented in Appendix K of the Draft EIS). Photographs will be taken upstream, downstream, and across the watercourse prior to disturbance and following reinstatement. The photographs will provide a visual baseline for reinstatement works, and will also allow reinstatement works to be assessed. Environmental audits will be undertaken throughout construction, and will specifically target the first watercourse crossings so that the requirements for reinstatement can be clearly outlined early in the construction phase.

Table 4-4. Pre-disturbance survey notes of watercourse crossings

Location							
Crossing name						Location (KP)	
Watercourse name						GPS points GDA 1994, Zone 53/54	
General							
Stream order		Channel type		No. of channels		Surrounding landform	
Geometry							
Bank height	m	Channel width	m	Bank slope 1 Note side	%	Bank slope 2	%
Bed width	m	Bed slope	%	Bed type		Bank type	
Stability							
Erosion presence		Location				Type	
Possible contributing factors						Severity	
Habitat							
Riparian vegetation							
In-stream habitat				Presence of water or signs of wetted embankment			
General notes							
Sketch of cross sectional profile							
Photos							

Water quality monitoring will only be undertaken if water is present. If there is water flowing at the time of the watercourse crossing, water samples will be collected upstream and downstream of that crossing. This will allow comparison of water quality results from an undisturbed site (upstream) and a disturbed site (downstream). Samples will be collected just prior to, during and after construction from the same two sites. Sample collection will be undertaken in accordance with the Queensland Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 (DEHP 2009) and will be consistent with relevant Australian Standards and ANZECC Guidelines. The monitoring requirements are outlined in Table 4-5 below, as presented in Appendix O of the Draft EIS.

Table 4-5. Watercourse crossing monitoring program

Monitoring type and sites	Sites	Frequency	Measurements/Analytes
Water quality All major watercourse crossings Only when water is flowing	**Upstream:** One site 20m upstream of construction zone **Downstream:** One site 20m downstream of construction zone	**Pre-construction:** Once prior to any disturbance **During construction:** Weekly field measurements One laboratory sample event **Post construction:** Once post construction, following reinstatement of bed and bank	**Field measurements and observations:** • Stream flow rate (visual estimate). Records to indicate whether flowing or pooling water is present. • Temperature, pH, oxidation-reduction potential (ORP), electrical conductivity (EC), total dissolved solids (TDS), dissolved oxygen (DO) and turbidity. **Laboratory analyses:** • Total suspended solids (TSS) • Major anions (Cl, SO4, CO3/HCO3, andNO3) and cations (Ca, Mg, Na and K) • Dissolved metals (Al, As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Zn and Fe) • Ammonia and nutrients (NO2, NO3, TKN, Total N and Total P) • Hydrocarbons (TPH and BTEXN)
Physical condition: All major watercourse crossings To be conducted for every crossing, regardless of flow.	**Upstream:** One site 20m upstream of disturbed construction zone **In Construction ROW:** One site within construction disturbance area **Downstream:** One site 20m downstream of disturbed construction zone	**Pre-construction:** Once prior to any disturbance **During construction:** Daily **Post construction:** Once post construction, following reinstatement of bed and bank	**Stream condition:** • Presence/absence of water • Presence/absence of erosion or sedimentation • Vegetation condition, extent of clearing within construction ROW • Presence/absence of pollution (rubbish, waste, surface scum or sheen, soil staining) • Presence/absence of weeds • Signs of discharges to watercourse • Record of location and treatment of spoil and cleared vegetation • Ensure buffer in place – only linear construction activities within 100m of watercourse • Photographs at each location

Water quality will be compared between upstream and downstream sites:

- a variation of +/- 10 % between upstream and downstream water quality will be considered acceptable
- >10 % will trigger investigation into the cause of this variation
- >25 % will trigger an internal incident report
- >50 % variation from upstream to downstream sites will trigger reporting to the NT EPA

On-going monitoring of watercourse crossings will be undertaken as part of the reinstatement monitoring, to assess the stability of the reinstated watercourses, presence of erosion, presence of weeds, and re-

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vegetation success. The specific requirements for reinstatement monitoring will be outlined in a Reinstatement Management Plan, including corrective actions for erosion, weed or re-vegetation management.

4.7 WASTEWATER MANAGEMENT

4.7.1 WASTEWATER MANAGEMENT AT PCCS

The following additional information is provided in relation to wastewater management at the PCCS.

Approximately 30 L/hr of wastewater is expected to be produced by the Philip Creek Compressor Station. This has been reduced since submission of the Draft EIS through process design optimisation and maximising opportunities for re-use and recovery. The source of the discharge water will be the demineralised water plant; therefore, the wastewater will be brine only. All wastewater will be stored in an appropriately sized and lined evaporation pond to prevent any discharge to the environment including leakages below ground.

It is confirmed that sizing of the evaporation pond will account for rainfall, evaporation and flood events, and will be designed by Jemena's engineering consultant ensuring full compliance with all regulatory requirements. The evaporation pond will be lined and leak detection systems will be installed. The site design will include installation of stormwater drainage to divert runoff around the evaporation ponds, to avoid capturing additional water in the evaporation ponds.

Evaporation is enhanced by weather conditions low in relative humidity, high in solar radiation, with constant wind speeds and high daily average temperatures (O'Reilly 2009). A review of climate data for Tennant Creek (see BoM 2016) indicates that it has weather ideal for evaporation; with mean maximum temperatures ranging from 24.5-37.1°C; mean daily sunshine hours ranging from 9.1-10.6 hours (with few cloudy days even in the wet season months); and humidity generally ranging from 17 % to 54 % (humidity is higher in the mornings and the wet season months). Wind speed varies seasonally but is predominately easterly to south-easterly with speeds mostly ranging from 10-30 km/hour.

4.8 HYDROSTATIC TESTING

Hydrostatic test planning by the Construction Contractor has further progressed since submission of the Draft EIS. The following information is provided in addition to that provided in Chapter 7 and Appendix O of the Draft EIS.

4.8.1 REGULATING DISCHARGES

The Draft EIS stated that a Waste Discharge Licence (WDL) would be sought for any discharges of hydrostatic test water in the NT. As no hydrostatic test water will be discharged into, or near, a watercourse, a WDL will not be required. Additionally, no discharges are currently planned to occur in the Northern Territory; all water is planned for discharge at the end of the line in Queensland.

The Construction Contractor is in the process of confirming their hydrostatic test plans. They currently plan to commence hydrostatic testing at the Tennant Creek end of the pipeline, and dispose of all hydrostatic test water in Queensland, once all testing is complete. The release of hydrostatic test water will be regulated by the conditions of the Queensland Environmental Authority (as provided in Table 4-6).

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Table 4-6. Environmental Authority conditions for disposal of hydrostatic test water

EA Reference	Condition
E8	Pipeline waste water may be released to land provided that it: a) Can be demonstrated to meet acceptable standards for release to land b) Is released in a way that does not cause visible scouring or erosion
E9	If hydrostatic testing water quality does not or cannot be treated to meet the requirements of condition (E8), it must be managed in accordance with conditions C13 or C14
C13	For waste fluids that can be stored in a container that is other than a low consequence dam, the container must either be an above ground container or a structure which contains the wetting front.
C14	Waste, including waste fluids, must be transported off-site for lawful re-use, remediation, recycling or disposal unless the waste is specifically authorised by conditions of the environmental authority to be disposed of or used on-site.
Schedule H – definitions	"acceptable standards for release to land" means wastewater of the following quality as determined by monitoring results or by characterisation: a) Electrical conductivity (EC) not exceeding 3000µS/cm b) Sodium absorption rate (SAR) not exceeding 8 c) pH between 6.0 and 9.0 d) heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10 – Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) 2000 e) does not contain biocides.

The Construction Contractor is currently drafting a Hydrostatic Test Management Plan, which will detail the methods of hydrostatic testing, management of hydrostatic test water, and requirements for additives. The key details of the management plan are summarised below, and the process is displayed diagrammatically in Figure 4-5.

4.8.2 TEST SECTIONS

Ten test sections are currently planned, the locations of which are shown in Table 4-7. Between test sections, water will be stored in temporary water storage dams. Water will be reused as much as possible to reduce the need to source water along the construction ROW; however volumes may need to be replenished to replace water lost to evaporation.

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Table 4-7. Hydrostatic test sections

Test Section	KP start	KP end	Test Section	KP start	KP end
1	0	79.5	6	356	413
2	79.5	163	7	413	487
3	163	222	8	487	555
4	222	292	9	555	591
5	292	356	10	591	621

4.8.3 SOURCE WATER QUALITY

Water quality samples were collected in August 2016 from the existing dam near Phillip Creek, and groundwater bores from three stations traversed by the construction ROW. Results from this indicate that pH was circum-neutral (6.88-7.37) and electrical conductivity was low (<100 µS/cm) indicating low salinity and total dissolved solids. Results for total metals indicate that most metals were below laboratory detection limits (i.e. not detected). Those that were detected were significantly below the ANZECC guideline values for primary industry, short term irrigation values (i.e. the acceptable standard for discharge water quality under the Qld EA). Sulfate reducing bacteria (SRB) was detected in relatively high concentration in the samples from the existing dam near Phillip Creek, at 1,200 and 2,700 MPN/100mL for each. SRB was also detected in relatively low concentrations in all groundwater bores (< 10 MPN/100mL). The SRB results mean that biocides will be required for hydrostatic test water to minimise the risk of corrosion of the pipeline as a result of testing (details provided below).

Additional testing of source water quality is currently being undertaken by the Construction Contractor.

4.8.4 WATER STORAGE

Current estimates indicate that six dams will be required for holding hydrostatic test water. The proposed size and location of these dams is summarised in Table 4-8, and a draft dam design is provided in Figure 4-6. Note that the locations and sizing of dams may alter slightly depending on the construction schedule and water availability.

Table 4-8. Summary of water storage dams for hydrostatic testing

Dam No.	Location	Latitude	Longitude	Size	Purpose	Test sections
1	KP0	-19.4505	133.8561	15 ML	Filling dam – to fill from an existing dam (15 ML of water)	Supply test sections 1 and 2
2	KP163	-19.7153	135.3601	15 ML	Holding dam – store water from previous test sections, and supply water to next test sections.	Test sections 1 and 2 to dewater into dam 2. Supply test sections 3 and 4.
3	KP292	-20.0950	136.5491	15 ML	Holding dam – store water from previous test sections, and supplies water to next test sections.	Test sections 3 and 4 to dewater into dam 3. Supply test sections 5 and 6.

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Dam No.	Location	Latitude	Longitude	Size	Purpose	Test sections
4	KP413	-20.4696	137.6073	15 ML	Filling dam – to replenish volumes if required[13]. Will also store water from previous test sections, and supply water to next test sections	Test sections 5 and 6 to dewater into dam 4. Supply test sections 7 and 8.
5	KP554	-20.7348	138.9240	15 ML	Holding and discharge dam. Some water may be discharged from this dam (following neutralisation of biocides and validation testing of water quality).	Test sections 7 and 8 will dewater into dam 5. Supply test sections 9 and 10.
6	KP591	-20.8252	139.2389	8 ML	Holding and discharge dam. Water will be discharged from this dam (following neutralisation of biocides and validation testing of water quality).	Test sections 9 and 10 to dewater into dam 6.

All dams will be constructed to ensure that they are low consequence dams, in accordance with the Queensland *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DEHP 2013). The dams will be lined with a single layer of Canvacon 5000E, a woven HDPE polyfabric.

Dam locations will be surveyed via pre-construction walk-throughs to assess ground conditions, presence of declared weeds or erosion, rock or other problematic conditions, proximity to drainage lines and other environmental considerations. Verification checklists will be kept. If required, dam locations will be moved to a more favourable location nearby; alternatively, construction methods will be tailored to the site conditions.

Construction of dams will be undertaken as follows:

- Survey of site and installation of boundary pegs to inform machinery operations
- Earthmoving plant and equipment will excavate and form the pit, batter slopes, and pit area as directed by the site supervisor. Excavated soils will form earth embankments to be used as boundaries around the dam, and will be returned to the pit during reinstatement.
- The area will be prepared free from irregularities, protrusions, vegetation, excessive water, loose soil and abrupt changes in grade. Drainage will be established to ensure that they do not capture overland flows. The dam floor and embankments will be compacted.
- Once earthworks are completed the dams will be lined with an impermeable HDPE geo-membrane, which will be seam welded onsite.
- Once the lining is installed the Site Supervisor will assess the dam and pass it if it has been constructed as per the approved plans.
- Safety measures will be installed including signage, perimeter fencing, escape ramps (knotted ropes in each corner) and life buoys.

Once the dam is no longer required (i.e. hydrostatic testing is completed for the relevant sections) the dam will be decommissioned unless requested otherwise by the landholder. The liner material, including any

[13] It is expected that there will be some losses due to evaporation.

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residual sedimentation within the dam, will be removed off site for disposal at an approved facility. Earthmoving equipment will be utilised to move the earth embankments into the used dam area, with tracked compaction being applied every 300mm lift. The process will be repeated until the area has been returned to its original contours and ground condition. Topsoil will be replaced as the final layer, and then any cleared vegetation replaced to act as a ground cover.

4.8.5 BIOCIDES

The proposed biocide additive is Bactron B1710 or Bactron AUK-550, with a recommended dosage rate of 150 PPM (or 0.15 ml/L). The active ingredients in Bactron B1710 are Tetrakishydroxylmethylphosphonium sulphate and sodium hydroxide, which control bacterial and organic growth (including SRB). Although toxic to aquatic organisms, the product is biodegradable and does not bioaccumulate.

The biocide will be neutralised with another additive, Hydrosure DA-4070, with a recommended dosage rate of 180 PPM (or 0.18 ml/L). The active chemical ingredient in Hydrosure DA-4070 is hydrogen peroxide. Water treated with biocides will be dosed with the deactivating agent as it is discharged from the pipeline test section being dewatered. This water will then be held in temporary holding dam(s) to allow the deactivating agent to neutralise the biocide. Trials of biocide deactivation show that neutralisation is faster in warmer temperatures and more neutral-alkaline pH waters. Regardless, the majority of deactivation is achieved within 15 minutes (Nalco 2012). The trials indicate that, subject to adequate dosage rates, temperature and treatment time, deactivation of all biocide product is possible.

Water treated with Hydrosure DA-4070 will be tested to ensure that it meets the acceptable standards for release to land (as per the Qld EA conditions) prior to release to land; specifically, no biocides detected (i.e. neutralisation has been successful).

4.8.6 OXYGEN SCAVENGER

The proposed oxygen scavenger is Nalco 780 with a recommended dosage rate of 150 PPM (or 0.15 ml/L). The oxygen scavenger reacts with dissolved oxygen, reducing the oxygen available for corrosion reactions in the test section. Oxygen scavengers degrade rapidly when expelled from the pipeline, as the water is oxygenated during this process. Additional aeration will be undertaken during disposal (via evaporative sprayers) to ensure that the oxygen scavengers are adequately degraded. The CSIRO study of hydrostatic test water (CSIRO 2005) stated that unreacted oxygen scavenger remaining in hydrostatic test water after testing can be neutralised by aeration, and it is therefore expected that all oxygen scavenger will be neutralised prior to disposal.

All products will be transported, stored and handled in accordance with specific requirements of their respective Safety Data Sheets (SDS). Standard precautions implemented for all chemicals and hazardous substances required during the Project will also apply; products will be stored in bunded, covered areas, with appropriate spill response material available, and will not be stored or handled within 100 m of a watercourse, or 200 m of a sinkhole. All controls will be outlined in the Dangerous Goods and Hazardous Substance Management Procedure, and volumes, SDS and records of use will be maintained in the Dangerous Goods and Hazardous Materials Register.

4.8.7 FLOCCULANT

Where required, a flocculant will be added to water to remove suspended solids prior to using it for hydrostatic testing. Dosage will occur in the holding dams, at a rate of between 10 and 50 PPM (0.01-0.05 ml/L), but rates will be confirmed with onsite trials. The flocculant proposed for use is ECOFLOC C0125S, which is not classified as hazardous, and has no known significant health effects or ecological impacts. Despite its low hazard ranking, it will be stored and handled in accordance with the standard precautions detailed above to minimise the risk of any spills or loss of product.

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4.8.8 DISCHARGE OF HYDROSTATIC TEST WATER

Hydrostatic test water will be discharged from the holding dams located near KP555 and KP591 (in Queensland).

Water quality will be sampled in accordance with *DEHP's Monitoring and Sampling Manual (2009)* prior to release to ensure compliance with the conditions in Table 4-6. Where water has not been treated with biocides, the test water will be discharged via a spreader tee bar or irrigation spray system (as depicted in Figure 4-5). Discharge will be via a break-tank fitted with a filter screen to filter water, removing suspended solids and any other particulate matter in the water.

Water treated with biocides will be treated with neutralising agent at the recommended dosing rate, and held in the dam for a sufficient retention period until water quality sampling verifies that the biocides have been neutralised. Once biocides have been neutralised the water will be released in the same manner as outlined above.

Disposal volumes will be monitored and logged with flow meters. Release will be to land, at least 100 m from any watercourse. The release location will be visually monitored by the hydrotest crew, and inspected by the construction Environmental Advisors, to ensure that no erosion or scouring occurs as a result of discharges.

If discharges are not occurring in accordance with the conditions of the EA (e.g. if erosion and scouring is occurring) the issue will be rectified, or works will cease until such time as a resolution is implemented.

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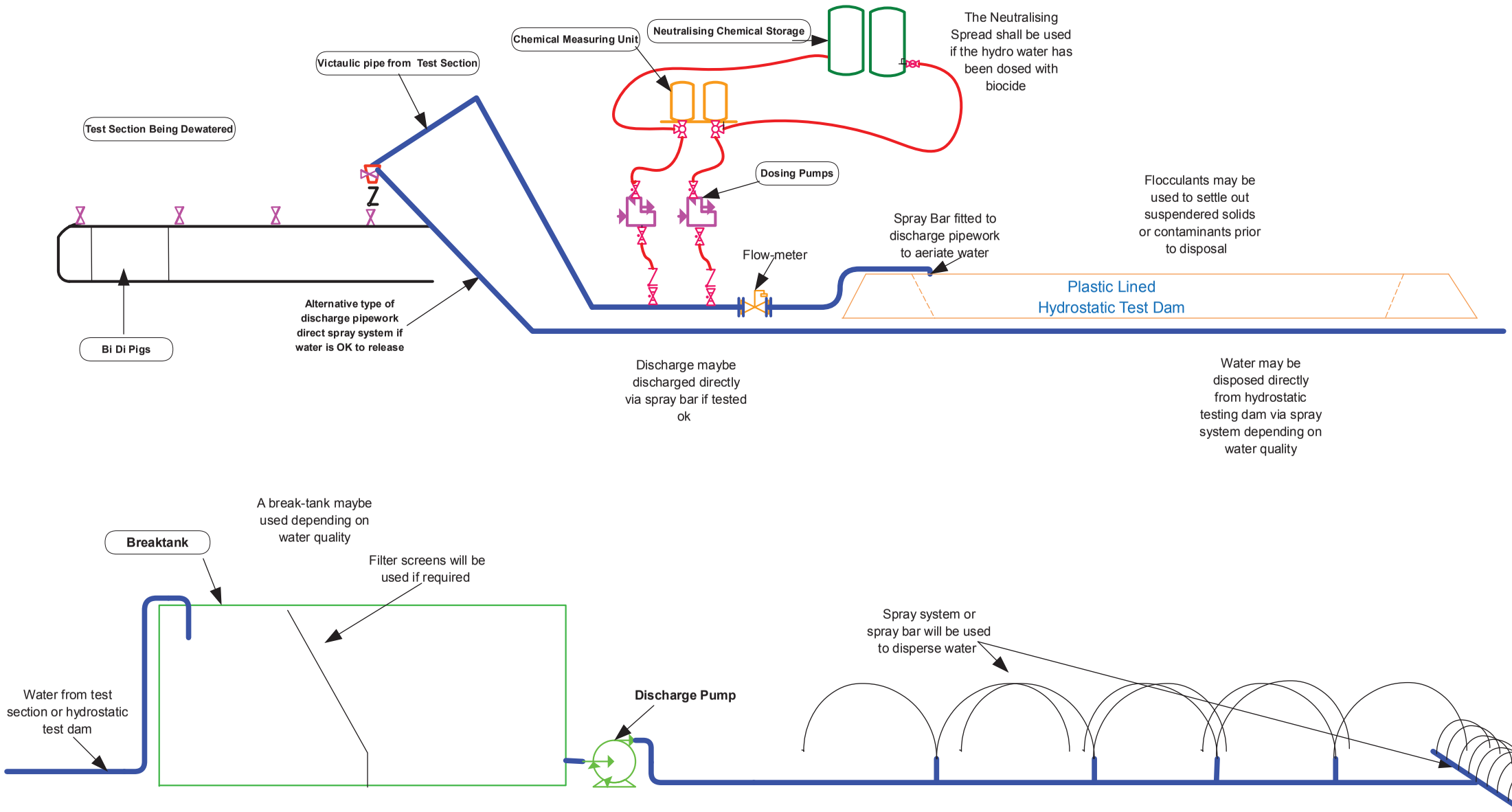


Figure 4-5. Diagram of hydrostatic testing and discharge process

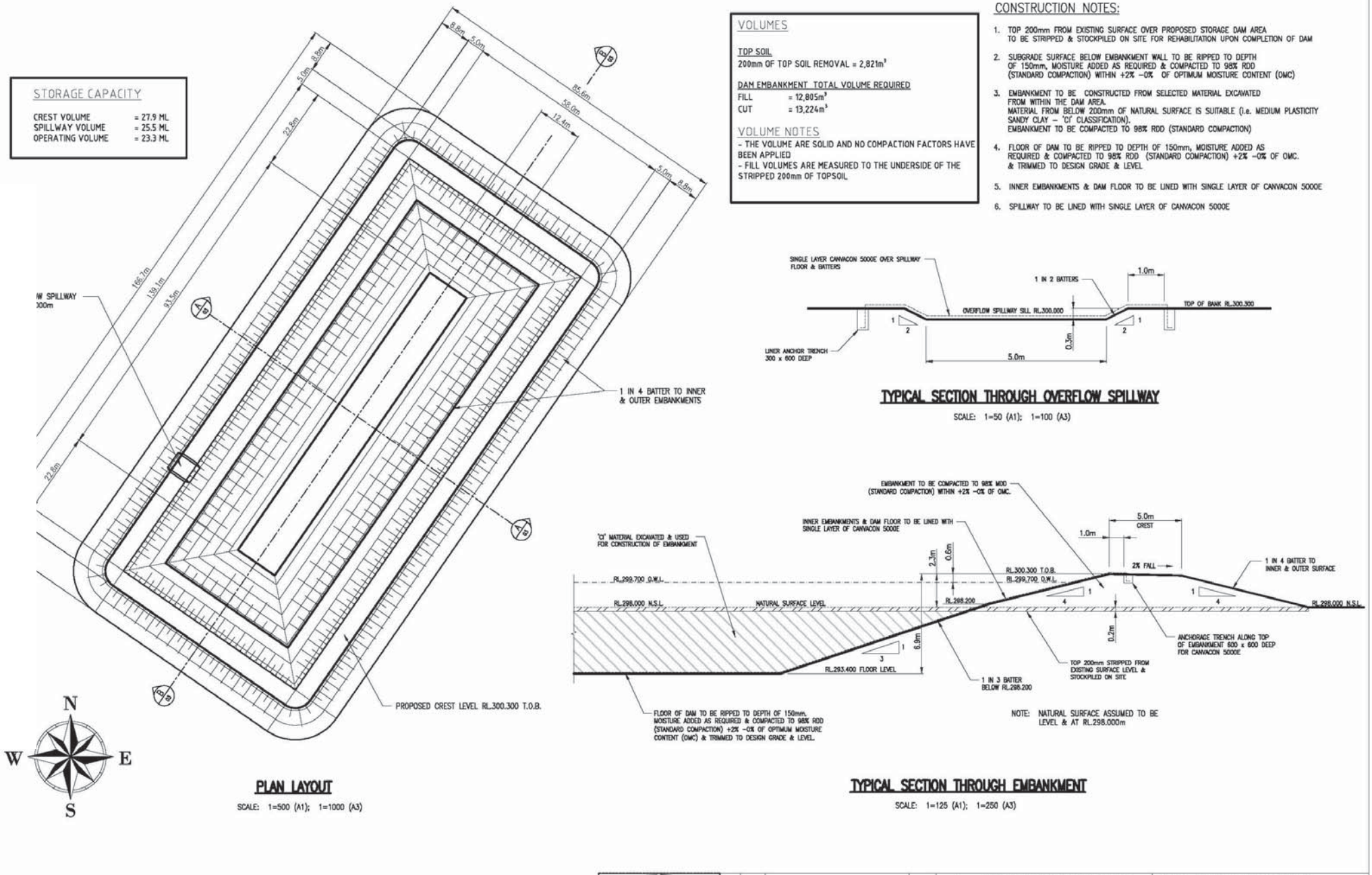


Figure 4 6. Draft dam design

4.9 EROSION AND SEDIMENT CONTROL

In response to the submission received from the NT Department of Environment and Natural Resources (#47) the following additional controls will be implemented in relation to erosion and sediment control planning and implementation.

- All Progressive ESCP's will be reviewed and approved by a person suitably qualified in erosion and sediment control and auditing (i.e. a Certified Professional in Erosion and Sediment Control [CPESC]).
- The review and approval of plans will be undertaken to the satisfaction of DENR (formerly DLRM).
- Evidence of the auditor's knowledge and experience in relation to erosion and sediment control planning, monitoring and management will be provided to DENR, as will copies of the approved ESCP's.
- The regime of environmental auditing that will be undertaken throughout the construction phase will incorporate inspections of works by the approving CPESC and provision of approval, in writing, that works were undertaken on site in accordance with the approved plan. This will include approval that that the associated management and monitoring procedures and remedial actions (if required) were undertaken in accordance with the approved plan, and are effective.

4.10 ECONOMIC AND SOCIAL ASPECTS

4.10.1 ECONOMIC AND SOCIAL IMPACT ASSESSMENT

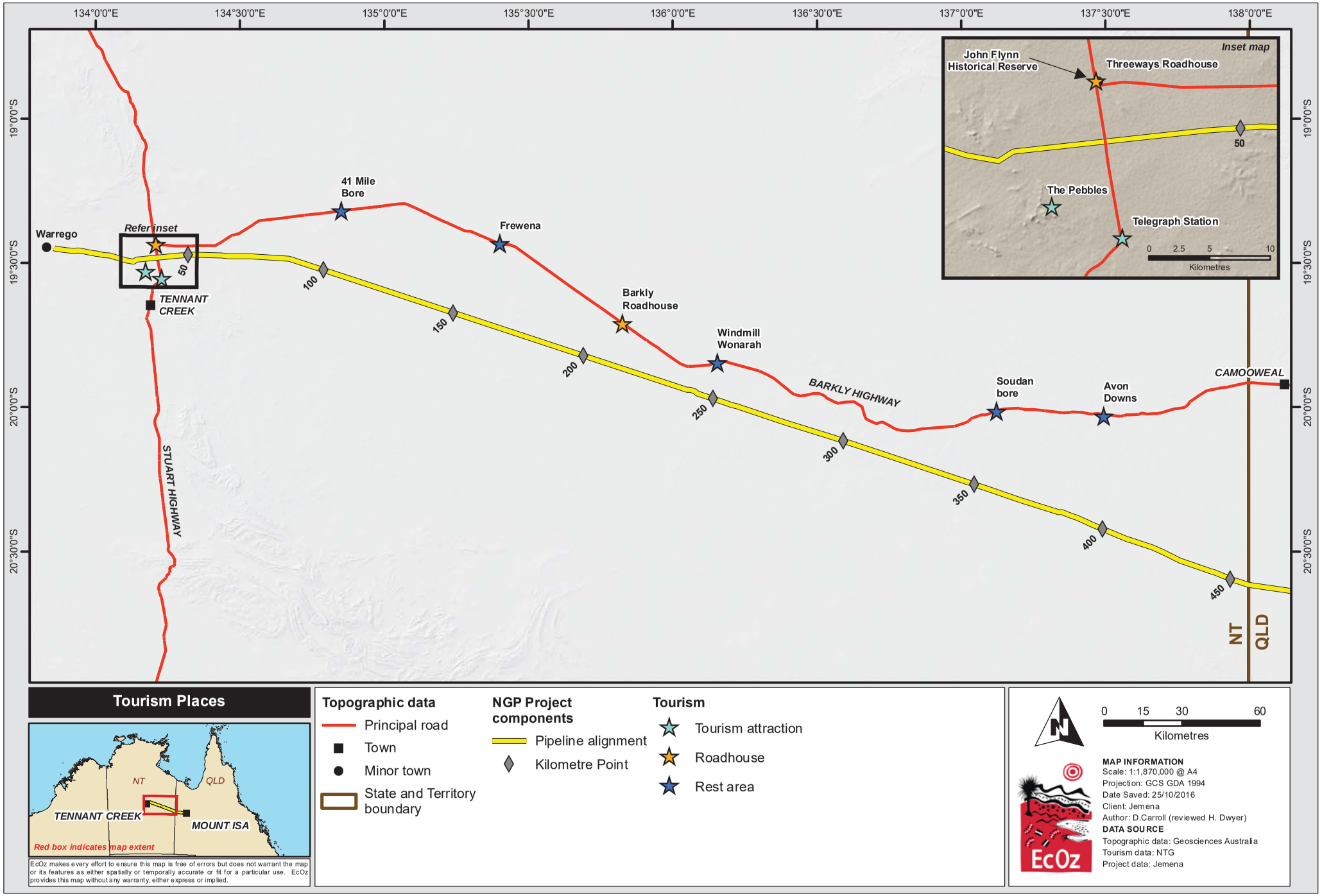
Since the development of the initial Economic Impact Assessment (EIA) and the Social Impact Assessment (SIA) Scoping Study, Jemena completed a range of activities to inform the final Economic & Social Impact Assessment (ESIA) Report, which is included as Appendix D to this Supplement.

The ESIA draws on the initial EIA and SIA Scoping Study, further desktop research, interviews with key stakeholders, data from other studies commissioned for Jemena's Northern Gas Pipeline Environmental Impact Statement, Jemena background documents and feedback from general consultation by Jemena.

Jemena acknowledges the importance of the ESIMP in providing the framework for Jemena to monitor and report in relation to Project commitments. The ESIMP will be completed after all of the land negotiations and consultations have been finalised, and discussions with community and government stakeholders furthered, particularly in relation to Government funding participation and impact measurement.

4.10.2 MAPPING OF TOURISM BUSINESSES

Submission #43 from Tourism NT commented that the "Draft EIS would be improved by clearly mapping the presence of any regional businesses (i.e. outside townships) within a certain radius (e.g. 10km) of the pipeline corridor. This would include tourism attractions such as 'The Pebbles', and operators such as the Threeways Roadhouse."



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\JEMENA\EIS (NT)\01 Project Files\Supplementary EIS Maps\Map of tourist sites within 20km of the pipeline alignment, NT v2.mxd

Figure 4-7 - Map of tourism places and existing regional businesses within 20km of NGP

4.11 ENVIRONMENTAL MANAGEMENT

A framework EMP was submitted as Chapter 13 of the Draft EIS. The sections below provide clarification where required in response to comments received.

4.11.1 ROLES AND RESPONSIBILITIES

As the NGP Project moves forward from the Project planning phase into the Project construction phase in 2017, Jemena appreciates that the NT EPA are seeking some clarity around how environmental commitments will be enacted, and roles and responsibilities for environmental compliance. Specifically, the NT EPA requested that Jemena:

- Clearly explain the roles and responsibilities of those involved in executing the NGP
- Clearly explain how the construction contractor will take ownership of the EMP, and related documentation, and responsibility for commitments made by the Proponent during the EIA.

Jemena is responsible for over-arching compliance monitoring and reporting in accordance with the primary environmental approvals and pipeline licences. Following, completion of the environmental approvals processes, Jemena's Environmental Consultant will update the EMP and relevant sub-plans, and the Commitments Register (Appendix C), to incorporate approval conditions and recommendations. Jemena will be required to submit the EMP and relevant sub-plans as part of its Pipeline Management Plan required to gain Consent to Construct and Consent to Operate pursuant to the Energy Pipelines Act (*NT*). Environmental compliance will be monitored and reported against the approved EMP and sub-plans, and the Commitments Register.

The Construction Contractor and any sub-contractors will be responsible for complying with the approved EMP and sub-plans, and Commitments Register (some planning phase components and all construction phase components), as provided by Jemena. The Construction Contractor will develop their own Construction EMP (CEMP) and supporting procedures, which meets or exceeds the expectations of the approved EMP and relevant sub-plans. The CEMP will be reviewed and approved by Jemena prior to commencement of the works

Prior to commencement of operations, Jemena will develop an Operational EMP (OEMP) which will detail operational environmental management requirements prescribed in the approved EMP and sub-plans. Jemena will submit the OEMP as part of its Pipeline Management Plan to gain Consent to Operate pursuant to the Energy Pipelines Act (*NT*).

4.11.2 REHABILITATION ACCEPTANCE CRITERIA

Jemena will engage a suitably qualified person to prepare a Rehabilitation Plan. The plan will include:

- Reinstatement and rehabilitation goals
- Procedures to be undertaken that will:
    - Achieve the transitional and final acceptance criteria prescribed in the sections below
    - Provide for appropriate monitoring and maintenance.

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4.11.2.1 Transitional acceptance criteria

Significantly disturbed areas that are no longer required for the on-going petroleum activities will be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:

- contaminated land resulting from petroleum activities is remediated and rehabilitated
- the areas are:
    - non-polluting
    - a stable landform
    - re-profiled to contours consistent with the surrounding landform
- surface drainage lines are re-established
- top soil is reinstated; and
- either:
    - groundcover, that is not a declared pest species, is growing
    - an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

4.11.2.2 Final acceptance criteria

All significantly disturbed areas which are not being or intended to be utilised by the landholder or overlapping tenure holder, will be reinstated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

- greater than or equal to 70% of native ground cover species richness
- greater than or equal to the total per cent of ground cover
- less than or equal to the per cent species richness of declared plant pest species; and
- where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

4.11.3 WASTE MANAGEMENT

The NT EPA requested additional information on the waste generated from the use of boring or trenchless crossing techniques at road crossings. Jemena advises that the NGP Construction Contractor plans to use auger bore method to complete the road and rail crossings. Generally auger bores don't require drill fluid and additives.

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Although the use of methods that require drill fluids is not anticipated to be required; it is acknowledged that should it become a requirement it introduces additional environmental considerations such as drill site sediment control (including drilling fluids) and waste management.

Environmental standards for the potential aspects and impacts associated with the installation activities and environmental management controls for the execution of boring or trenchless crossing works associated with the Project are to be outlined in detailed management plan (only if these techniques are required).

Bentonite, water and additional non-toxic chemical additives may be used in these boring methods. Careful management of these drilling muds will ensure that no release to water or land occurs and all products are contained within pits, sumps and containers onsite. The contractor will generally have a Mud Engineer or competent person onsite to oversee the process in the case HDD is required to complete the crossing construction.

4.12 COMMITMENTS

To provide a single stand-alone record of all commitments, the Commitments Register provided with the Draft EIS has been updated to include the commitments made throughout this Supplement. The complete revised Commitments Register is provided at Appendix C.

All changes made to the register are highlighted yellow.

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