Jemena

North East Gas Interconnector

Notice of Intent

Prepared for:

SGSP (Australia) Assets Pty Ltd (SGSPAA)

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Recipients are responsible for eliminating all superseded documents in their possession.

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Acronyms

AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
BoM	Bureau of Meteorology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DLRM	Department of Land Resource Management
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPBC	Environment Protection and Biodiversity Conservation Act
NEGI	North East Gas Interconnector
NOI	Notice of Intent
NT	Northern Territory
NTEPA	Northern Territory Environmental Protection Authority
NTNRM	Northern Territory Natural Resource Management
QLD	Queensland
RFFP	Request For Fee Proposal
Construction ROW	Construction Right Of Way
SOBS	Sites of Botanical Significance
SOCS	Sits of Conservation Significance
TPWC	Territory Parks and Wildlife Conservation Act
WONS	Weeds of National Significance

1 Project Details

1.1 Project overview

SGSP (Australia) Assets Pty Ltd ABN 60 126 327 624 (referred to in this NOI as **Jemena**) is an energy infrastructure company that builds, owns and operates a combination of major gas, electricity and water assets across Australia. SGSP (Australia) Assets Pty Ltd comprises two distinct operating businesses – an assets business (Jemena) and a service business (Zinfra). A special purpose vehicle has been established to deliver the NEGI project for Jemena; Jemena Northern Gas Pipeline Pty Ltd ACN 607 928 790 (an indirectly wholly owned subsidiary of SGSP (Australia) Assets Pty Ltd). Environmental approvals for the QLD section of the proposed NEGI pipeline will be submitted by Jemena Queensland Gas Pipeline (1) Pty Ltd and will later be transferred to Jemena Northern Gas Pipeline Pty Ltd.

In 2014, the NT Government (Territory) sought proposals for the development of a gas pipeline connecting the northern and eastern gas markets to be known as the North East Gas Interconnector (NEGI). The NEGI will connect gas fields in northern Australia with customers in the eastern gas market.

Jemena has been shortlisted as one of the companies to build, own and operate the NEGI and is currently going through the competitive process with three other companies. By the end of September 2015, all four companies are required to submit their respective final proposals to the Territory, with one eventually being selected as preferred proponent by the Territory.

Jemena is seeking to submit a firm tariff offer to the Territory, which requires a degree of both price and project timing certainty. The timeframes to deliver the project are short with an expectation that the pipeline would be in operation by mid-2018. The approvals for the project are on the critical path for meeting this date. To assist with defining timing certainty and to help meet the early gas operation date, Jemena is aiming to have its overarching environmental approvals including EPBC Referral, NOI for the NT and Environmental Authority for QLD submitted before the end of September 2015. The proposed project delivery timeline requires final environmental approvals to be granted by December 2016.

Broadly, the NEGI project involves the planning, construction and operation of a 622 km buried high-pressure gas pipeline from the Amadeus Gas Pipeline near Tennant Creek in the NT to the Carpentaria Gas Pipeline near Mount Isa in QLD along with associated above ground facilities at various locations along the pipeline (Figure 1). Initially two Compressor Stations will be required, one at Warrego (near Tennant Creek) and the other at Mount Isa along with three Mainline Valves (MLV's) and one Scraper Station at various intervals along the pipeline. Any required future compression stations for gas supply will be located at the MLV and Scraper Station locations in the NT. Temporary construction camps and support facilities will also be required along the pipeline route during the construction phase.

This NOI provides details of the NEGI project proposed by Jemena should the company be selected by the Territory as the project proponent.

1.2 Contact details:

1.2.1 Proponent

The key contact for Jemena is:

Jonathan Spink

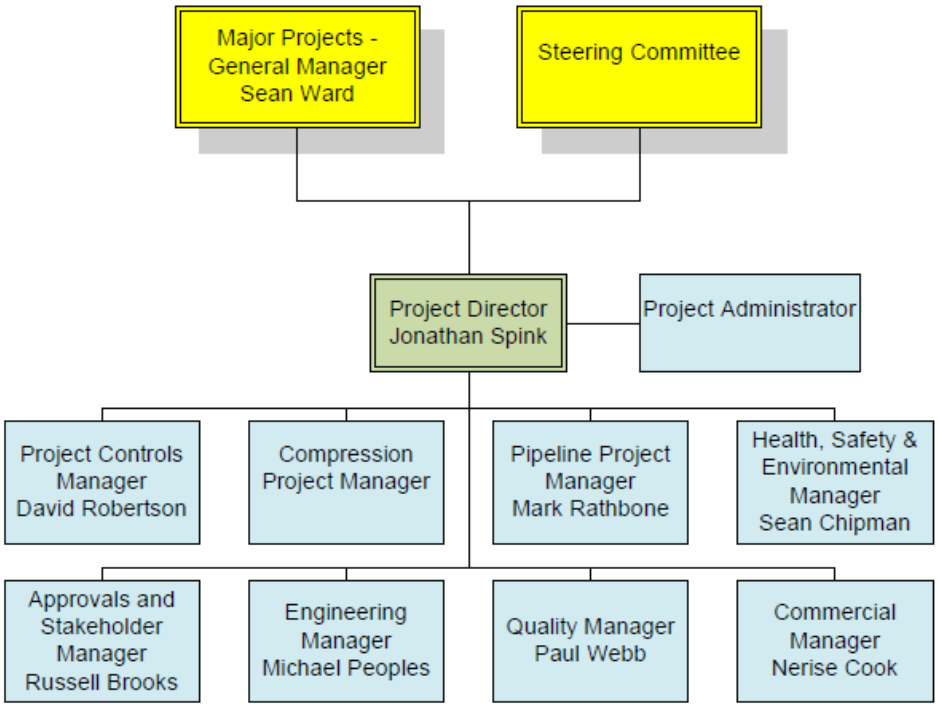
Jemena Northern Gas Pipeline Pty Ltd

Locked Bag 7000 Mount Waverley VIC 3149

03 8544 9000

jonathan.spink@jemena.com.au

The Project org chart is shown below:



1.2.2 Consultant

EcOz Environmental Consultants has been engaged to provide environmental consulting services to Jemena. The key contact for the consultant is:

Jeff Richardson

Principal Consultant

EcOz Environmental Consultants

GPO Box 381

Darwin, NT 0801

T: 08 8981 1100

E: jeff.richardson@ecoz.com.au

1.3 Location

The 622 km NEGI pipeline proposed by Jemena will commence at Warrego, approximately 45km north-west of Tennant Creek in the NT and will terminate five km south of Mount Isa in QLD where it will connect to the existing Carpentaria Gas Pipeline. The NT section of the pipeline being referred for assessment in this NOI is 457 km long; and extends from Warrego to the NT border.

Preliminary pipeline route selection has been informed by collation and review of desktop information and mapping data; which has informed selection of a preferred pipeline route. A 20 km wide planning corridor (Planning Corridor) has been established around the preferred pipeline route within which changes to the alignment may be made in response to landholder / Aboriginal land interests requirements and to reduce impacts to the environment. The proposed alignment and Planning Corridor is shown in Figure 1 and coordinates of the pipeline start and end points; and each direction change, are provided in Table 1.

Table 1. Proposed pipeline route location

Point	Longitude (Deg, Min Sec)	Latitude (Deg, Min Sec)
1	133° 51' 9.48 " E	19° 26' 53.3 "S
2	133° 51' 12.19 " E	19° 26' 53.74 "S
3	133° 52' 44.24 " E	19° 27' 8.03 "S
4	133° 53' 48.93 " E	19° 27' 20.51 "S
5	133° 55' 8.76 " E	19° 27' 24.51 "S
6	133° 55' 34.1 " E	19° 27' 26.53 "S
7	133° 56' 24.84 " E	19° 27' 25.85 "S
8	133° 59' 58.24 " E	19° 28' 6.34 "S
9	134° 0' 6.84 " E	19° 28' 0.87 "S
10	134° 2' 50.47 " E	19° 28' 30.85 "S
11	134° 2' 58.46 " E	19° 28' 27.24 "S
12	134° 7' 11.89 " E	19° 29' 40.55 "S
13	134° 7' 37.69 " E	19° 29' 40.18 "S
14	134° 12' 54.42 " E	19° 29' 12.37 "S
15	134° 20' 12.32 " E	19° 28' 25.70 "S
16	134° 40' 16.80 " E	19° 29' 6.81 "S
17	136° 27' 25.33 " E	20° 4' 41.69 "S
18	136° 28' 59.94 " E	20° 5' 6.80 "S
19	136° 33' 10.03 " E	20° 6' 13.02 "S
20	136° 40' 1.91 " E	20° 8' 29.52 "S
21	136° 45' 30.65 " E	20° 10' 29.37 "S
22	136° 52' 32.16 " E	20° 12' 37.46 "S
23	137° 11' 36.97 " E	20° 18' 58.32 "S
24	137° 20' 13.31 " E	20° 21' 54.45 "S
25	137° 21' 26.64 " E	20° 22' 2.70 "S
26	137° 34' 19.26 " E	20° 27' 27.70 "S
27	137° 35' 3.27 " E	20° 27' 23.77 "S
28	137° 46' 11.38 " E	20° 32' 6.54 "S
29	137° 51' 57.52 " E	20° 34' 20.96 "S
30	137° 52' 33.45 " E	20° 34' 25.38 "S

The land to be traversed by the NEGI pipeline comprises mainly pastoral leases dominated by cattle grazing over open downs country supporting Mitchell, Buffel and other grasses across large sections of black soil plains and lighter sandy country. There are existing gas and power facilities at both the NT and QLD ends of the NEGI alignment. Outback tourism including gem fossicking, camping, bird watching and sightseeing are mainly associated with the main regional centres of Tennant Creek and Mount Isa. Camooweal is the closest town and 78km north of the NEGI alignment. There are three small Aboriginal communities in the NT being Purrukuwurru (13.6 km south of NEGI alignment), Wonara community (15km north of NEGI alignment) and Alpurrurulam (45km south of the NEGI alignment). There are four pastoral homesteads within the vicinity of the NEGI alignment, these are:

- Barkly Roadhouse 16.3 km north
- Avon Downs 38 km north
- Austral Downs 3.5 km north
- Lake Nash 39.5 km south

Land tenure and ownership details of land traversed by the proposed NEGI are provided in Table 2.

Table 2. Lot numbers and tenure along the NT part of proposed alignment

Land Parcel	Registered Proprietor/Controlling Agency	Title Reference	Land Description (all land in title)	Tenure
000//00408/	Charles John Warby & Judy-Anne Warby	CT 740/673	NT Portion 408 plan CP005047	Perpetual Pastoral Lease 00946
000//05691/	AustralAsia Railway Corporation	CT 754/364	NT Portion 5476 plan S98/186A-E, NT Portion 5691 plan S98/37	Crown Lease Term 01880
000//03723/	Warumungu Aboriginal Land Trust	CT 792/461	NT Portion 3723 plan S89/296	Freehold under ALRA
000//01075/	Gordon Ford, Joan Suzanne Ford, Gregory Joseph Ford & Ken Gerard Ford	CT 787/851	NT Portion 494, NT Portion 1075, NT Portion 5843 plan S98/34F, NT Portion 5845 plan S98/34H, NT Portion 5847 plan S98/34J, NT Portion 5849 plan S98/34L, NT Portion 5851 plan S98/34O&P	Perpetual Pastoral Lease 01142
000//04469/	Dept Lands, Planning & the Environment 141212	No Current Title Issued	NT Portion 4469 plan S921090	Vacant Crown Land
000//00773/	Baldy Bay Pty Ltd as trustee for the Long Yard Trust	CT 770/820	NT Portion 773 plan CP005208	Perpetual Pastoral Lease 00988
000//03976/	Wakaya Aboriginal Land Trust	CT 390/071	NT Portion 1414 plan S72/199, NT Portion 3976 plan S91/78A-F	Freehold under ALRA
000//03747/	Arruwurra Aboriginal Corporation	CT 211/054	NT Portion 3747 plan S89/164A	NT Enhanced Freehold.

Land Parcel	Registered Proprietor/Controlling Agency	Title Reference	Land Description (all land in title)	Tenure
000//03753/	Arruwurra Aboriginal Corporation	CT 211/060	NT Portion 3753 plan S89/164C	NT Enhanced Freehold
000//03752/	Arruwurra Aboriginal Corporation	CT 211/059	NT Portion 3752 plan S89/164C	NT Enhanced Freehold
000//03751/	Arruwurra Aboriginal Corporation	CT 211/058	NT Portion 3751 plan S89/164C	NT Enhanced Freehold
000//03750/	Arruwurra Aboriginal Corporation	CT 211/057	NT Portion 3750 plan S89/164B	NT Enhanced Freehold
000//00002/	The North Australian Pastoral Company Pty Ltd	CT 699/625	NT Portion 2 plan CP004314	Perpetual Pastoral Lease 00914
000//03757	Arruwurra Aboriginal Corporation	CT 211/064	NT Portion 3757 plan S89/164C	NT Enhanced Freehold
000//03758	Arruwurra Aboriginal Corporation	CT 211/065	NT Portion 3758 plan S89/164C	NT Enhanced Freehold
000//03759	Arruwurra Aboriginal Corporation	CT 211/066	NT Portion 3759 plan S89/164C	NT Enhanced Freehold
000//00004/	The North Australian Pastoral Company Pty Ltd	CT 699/624	NT Portion 4 plan CP004314	Perpetual Pastoral Lease 00916
000//00298/	Australian Agricultural Company Limited	CT 738/069	NT Portion 298 plan CP004303	Perpetual Pastoral Lease 00926
000//01605/	Waxahachie Pty Ltd	CT 738/071	NT Portion 1605 plan CP005053	Perpetual Pastoral Lease 00922

There are also a number of mineral and petroleum tenements that are intersected by the proposed pipeline alignment. These are detailed in Table 3.

Table 3. Mineral and petroleum tenements intersected by the proposed pipeline alignment

Tenement No.	Tenement Holder
EL23846	Prosperity Resources (Tennant Creek) Pty Ltd
EL28603	Giants Reef Exploration Pty Ltd
EL30488	Giants Reef Exploration Pty Ltd
EL28777	Giants Reef Exploration Pty Ltd
EL29336	Central Land Council
EL30447	ACH Exploration Pty Ltd
EL23767	Minemakers Australia Pty Ltd
EL24607	Minemakers Australia Pty Ltd
EL29840	Minemakers Australia Pty Ltd
EL29841	Minemakers Australia Pty Ltd
EL30516 (Application)	Giants Reef Exploration Pty Ltd
EL30614 (Application)	Giants Reef Exploration Pty Ltd
EP260	Territory Gas Aust Pty Ltd
EP261	Territory Gas Aust Pty Ltd
EP202	Wiso Oil Pty Ltd
EP203	Wiso Oil Pty Ltd
EP204	Wiso Oil Pty Ltd
EP177	Armour Energy Pty Ltd
ML27244	Minemakers Australia Pty Ltd

In addition to the above there are registered and determined native title claims over various parcels of land as follows:

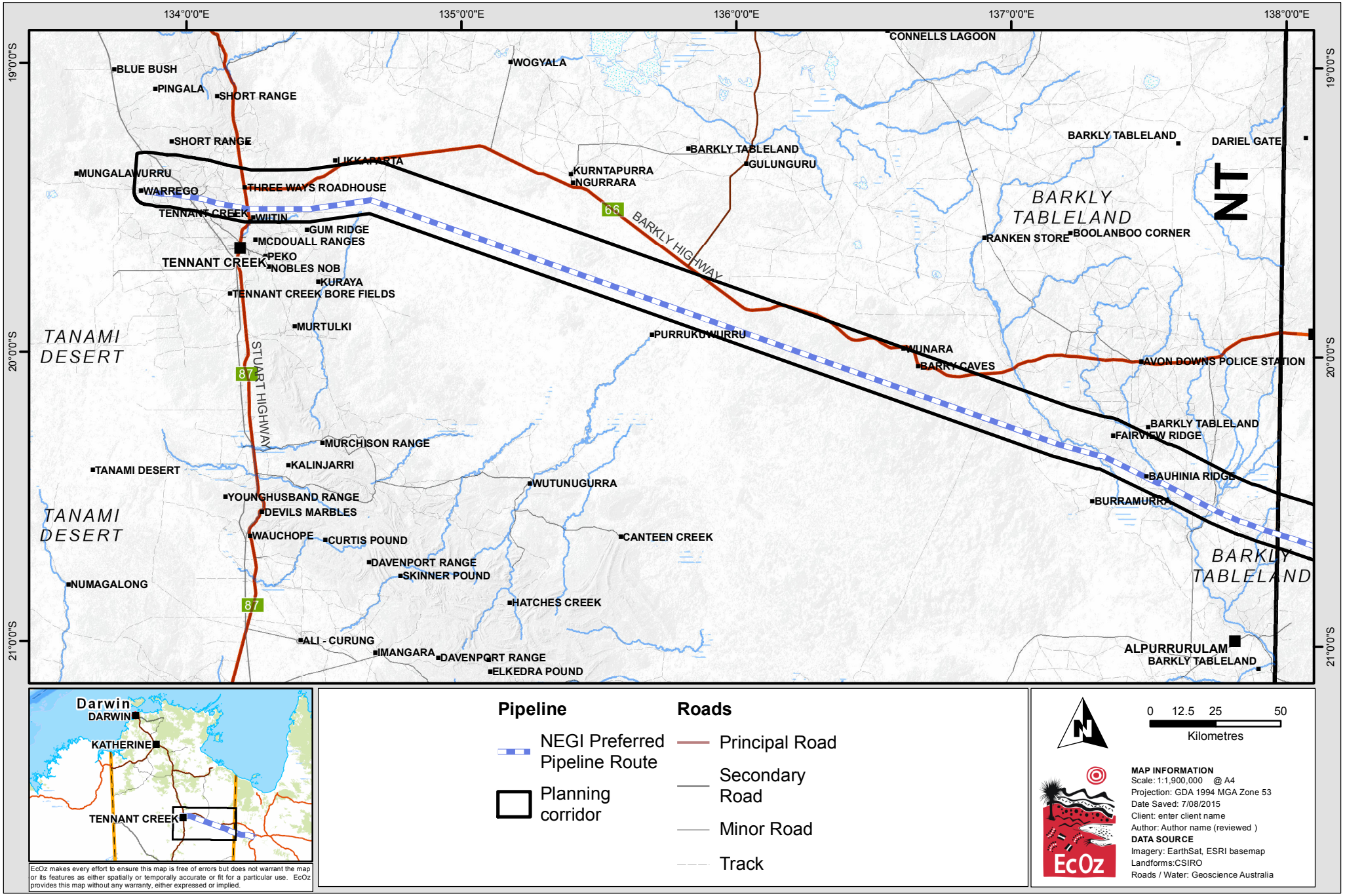
- Land parcel 000//00408/: Phillip Creek Pastoral Lease native title claim (DC2014/009).
- Land Parcel 000//00002/: Dalmore Downs native title claim ((DC2001/030) and the Dalmore Downs South native title claim (DC2002/002).
- Land Parcels 000//00004/, 000//00298/ and 000//01605/: the Burramurra native title claim (DC2002/0152).

Jemena has initiated engagement with the Northern Land Council (NLC), the Central Land Council (CLC) and the Arruwurra Aboriginal Corporation (AAC) as representatives of Aboriginal Land Trust landowners, native title claimants and Aboriginal land owners of land traversed by the NEGI pipeline alignment.

The two major towns nearest to the NEGI route are Tennant Creek (NT) and Camooweal (Qld). Tennant Creek has a police station, fire station and a hospital. Camooweal has a police station, fire station and a small health centre, with the nearest hospital being at Mt Isa which is 190 km to the east along the Barkly Highway.

The NT section of this development is located in the Barkly Regional Council area and the Council contact who has been consulted by Jemena is Edwina Marks – CEO.

In this isolated area there are no high level strategic plans. However, it is acknowledged that individual landholders along the route may have specific land use management plans and this will be discussed during the engagement process.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ15209 - Jemena NOI\01 Project Files\Report Maps\Location.mxd

Figure 1. Map of project location

2 Regulation

The NEGI project will be approved, constructed and operated in accordance with relevant NT and Commonwealth environment and heritage legislation listed in Table 4. Construction and operational environmental management will be governed by the Australian Pipelines and Gas Association (APGA)[1] *Code of Environmental Practice Onshore Pipelines 2013*.

The primary approval required for the project in the NT is a Pipeline Licence (PL) issued pursuant to the *NT Energy Pipelines Act*. In considering an application for a Pipeline Licence, section 15 of the Act requires that the Minister shall have regard to a number of matters; the list of which includes public interest; and environment and heritage interests, which are considered in this NOI in accordance with the requirements of the *Environmental Assessment Act*. Agreements with landholders and native title claimants are also required for issue of a PL.

Any environmental approvals required under the *Environmental Assessment Act* or *EPBC Act* are also considered primary approvals as they will need to be obtained prior to the issue of a Pipeline Licence under the *NT Energy Pipelines Act*. This NOI and the EPBC Referral submitted to the Commonwealth Department of Environment will provide for determination of requirements for assessment and approval.

A number of subordinate approvals (permits and licences) may also be required and these are summarised in Table 4. These typically relate to activities that will occur in the 2016 project planning phase: and construction and operational activities. As they are task / site specific, relatively quick to acquire and applications will need to be based on information that will be obtained during the 2016 planning phase; the required permits will be applied for by the project Environmental Consultants or Construction Contractors as the project planning progresses.

[1] APGA was formerly known as to Australian Pipelines Industry Association (APIA)

Table 4. Relevant NT and Commonwealth legislation

Legislation	Relevance to project
Federal	
Aboriginal Land Rights (Northern Territory) Act	The pipeline traverses Aboriginal Land in the NT. Jemena is required to negotiate land access agreements with the relevant Land Councils on behalf of Traditional Owners of land in order for access to the land to be granted and for a Pipeline Licence to be issued.
Australian Jobs Act 2013	The Australian Jobs Act 2013 requires proponents of major projects in excess of AU $500 million capital expenditure must submit an Australian Industry Participation (AIP) Plan to the AIP Authority for approval. The purpose of the Act is to create Australian participation in major projects in Australia by ensuring full, fair and reasonable opportunity to Australian suppliers.
Environmental Protection and Biodiversity Conservation Act (EPBC Act)	Assessment under this Act is required for actions that are likely to have a significant impact on a matter of national environmental significance. If the NEGI pipeline project is declared a controlled action the level of assessment required will be determined by the Commonwealth Minister. A Referral has been submitted to the DoE.
Native Title Act	The pipeline route traverses land under native title claims. Jemena is required to negotiate agreements with native title interests in order for a Pipeline Licence to be issued.
NT	
Aboriginal Land Act (NT)	Individual permits are required for persons to enter Aboriginal land, in accordance with the ALA.
AustralAsia Railway (Special Provisions) Act	Rights of Entry to the rail corridor for survey, construction or on-going maintenance of non-rail infrastructure allowed under this Act or other Acts are subject to the requirement not interfere with railway use. Entry permits will be event specific.
Crown Lands Act	Easements and other tenure on Crown Land may only be issued by the Crown. If there is already an existing lease, then the terms of that lease must not prohibit the issue of easements by the Crown.
Dangerous Goods Act & Dangerous Goods Regulations	There are no specific licencing requirements, however all fuel storages must meet Australian Standard 1940 Storage and Handling of Flammable and Combustible Liquids. Authorisation is required to import, possess and deal with explosives. Authorisation must be requested under Regulation 82.
Environmental Assessment Act & Environmental Assessment Administrative Procedures (EAAP)	If the NT EPA consider the NEGI project has potential to cause a significant impact to the environment, the project will require the preparation of an EIS or PER.
Energy Pipelines Act & Energy Pipeline Regulations	The *Energy Pipelines Act & Energy Pipeline Regulations* requires that the survey, construction, testing and operational activities of the pipeline be permitted or licenced.

Legislation	Relevance to project
Heritage Act	All sites on the NT Heritage Register and archaeological sites are protected under the *Heritage Act*. If the project will impact on archaeological sites a Work Approval is required. No listed heritage sites will be impacted by the project.
Northern Territory Aboriginal Sacred Sites Act	Aboriginal Sacred Sites must be identified and protected in accordance with the Act. The final pipeline alignment will be determined through consultation with Traditional Owners through the CLC, NLC and AAC, to ensure that sacred sites are protected. An Authority Certificate will be sought from the Aboriginal Areas Protection Authority (AAPA) in order to ensure the protection of sacred sites throughout the Project.
Northern Territory Fisheries Act	A permit is required to survey fish and other aquatic life as part of the biological survey program that will occur during the 2016 dry season.
Northern Territory Parks and Wildlife Conservation Act	The *Northern Territory Parks and Wildlife Conservation Act* protects native wildlife. A permit is required to survey wildlife as part of the biological survey program that will occur during the 2016 dry season. A permit will be required for removal of animals during pipeline trenching operations. It may also be required if any threatened plants or animals need to be relocated pre-clearing.
Pastoral Lands Act	Any agreement by a Pastoral Lessee to sub-let or transfer portion of the land (including for an easement) requires Ministerial consent. If the land use is going to change from (say) pastoral lease to "supply or conveying energy utilities" then the Minister's consent to the change is also required
Traffic Act	A Permit is required where construction activities will occur within the Territory road reserve. All works will require a Development Approval and Traffic Management Plan
Soils Conservation and Land Utilisation Act	Provides for the prevention of soil erosion and for the conservation and reclamation of soil. Erosion and Sediment Control Plans will be required to facilitate compliance with the general provisions of the *Soils Conservation and Land Utilisation Act*.
Waste Management and Pollution Control Act	Disposal of domestic (solid) waste produced at construction camps and other construction wastes is regulated by the *Waste Management and Pollution Control Act*. No specific approval or licensing requirements apply to management of domestic or construction wastes that will be produced by the project. For wastes that are removed for off-site disposal, waste management contractors engaged by the project and facilities accepting listed wastes must be licensed under the *Waste Management and Pollution Control Act*.

Legislation	Relevance to project
Water Act	A bore construction permit is required to construct a groundwater bore for the purpose of monitoring or extraction. If groundwater is identified as a water supply for construction or operation; or monitoring of groundwater is required, a bore construction permit will be applied for. The *Water Act* requires a licence be obtained for the taking of surface water. It is not anticipated that surface water will be required for the NEGI pipeline project.
Weeds Management Act	This legislation declares certain plants to be weeds, classifies weeds according to management requirements, and places obligations on land owners and occupiers to manage weeds. A Weed Management Plan will be required for the NEGI project to facilitate compliance with the *Weeds Management Act*.

The *Code of Environmental Practice Onshore Pipelines 2013* will be used as the minimum acceptable standards to be applied to the pipeline construction, operation and decommissioning phases. It is APGA's view that application of the standards in the Code enable's onshore pipeline proponents to exceed Commonwealth and State regulatory requirements, with the result that the consistent application of the Code across the pipeline industry will generate a lasting legacy of sustainability for existing projects and will help generate a positive reception for new pipeline projects.

3 Project Description

The NEGI project involves the planning, construction and operation of a 622 km buried high-pressure gas pipeline; 457 km of which will be located within the borders of the NT. Following selection of the preferred proponent by the Territory, the proponent will be responsible for finalising (planning) the pipeline alignment, obtaining approvals, construction, testing (commissioning) and operation. Project components and activities are described in the sections below.

3.1 Overview of project components and footprint

The project construction phase components will comprise a 30m pipeline construction Right Of Way (**Construction ROW**), temporary construction camps and support facilities, construction access tracks, turnarounds and laydown areas; and turkey's nest dams for provision of dust suppression water. The project components are identified in Table 5; which indicates a total construction project area of 1484 ha. The pipeline Construction ROW and all temporary facilities, tracks and work areas will be progressively rehabilitated through the construction phase with approximately 3% of the total disturbance area remaining for operational requirements.

The components of the permanent project footprint are identified in Table 5, which indicates a total operational project area of approximately 46 ha. Operational above-ground facilities will initially comprise of two Compressor Stations, one in the NT at Warrego (near Tennant Creek) and the other at Mount Isa; and two Mainline Valves (MLV's), 3 Cathodic Protection Stations and one Scraper Station will be located at intervals along the pipeline. For future increased capacity additional compressor stations will be installed at the two MLV stations and one scraper station sites in the Northern Territory. If required, a Nitrogen Reduction Skid (**NRS**) will be constructed as part of the Compressor Station near Warrego. Seven permanent access tracks will be required to provide access to each of the above-ground facilities; however, no permanent access is required along the pipeline Construction ROW, which will be progressively rehabilitated through the construction phase of the project and operational inspection and maintenance requirements will be performed using helicopter access.

Table 5 below summarises the disturbance and rehabilitation footprint of the project area within the NT. Table 6 shows the access track location descriptions and the disturbance areas.

Table 5. Disturbance and rehabilitation footprint (NT)

TEMPORARY FOOTPRINT		
Component	**Disturbance footprint (ha)**	**Area rehabilitated (ha)**
Construction ROW	457 km x 30m =1,371 ha	1,371 ha
Temporary Construction camps x 4	250 m x 350 m = 8.75 ha 4 sites = 35 ha total	35 ha
Access tracks (new - temporary)	51.6 ha	51.6 ha
Access track turn-off Barkly Highway	30 m x 30 m at start each track	1 ha
Access track turnoff to Construction ROW	30 m x 30 m at each track end	1.62 ha
Vehicle turnarounds	35 m x 35 m = 0.1 ha AND 15 m x 15 m = 0.02 ha Every 5 km along Construction ROW	12.1 ha
Explosives storage areas x 5	15 m x 15 m = 0.02 ha	0.08 ha

TEMPORARY FOOTPRINT		
Component	**Disturbance footprint (ha)**	**Area rehabilitated (ha)**
	4 sites = 0.08 ha	
Extra workspace outside sensitive crossing zones (see); Existing access tracks (116 of) Sealed Road Crossing (bore) (4 of) Rail Crossing (bore) (1 of) Major Water Course crossing (11 of) Minor Water Course crossing (58 of) Fence crossing (24 of) Buried Pipeline crossing (2 of)	 Each 10m x 30m Each 25m x 50m Each 25m x 50m Each 25m x 50m Each 10m x 30m Each 10m x 30m Each 25m x 50m	 3.48 ha 0.5 ha 0.5 ha 1.38 ha 1.74 ha 0.72 ha 0.25 ha
Low Hazard Water bore dams (small) 3ML (4 of)	Each 50 m x 50 m	1 ha
Low Hazard Water bore dams (large) 8ML (2 of)	Each 80 m x 80 m	1.28 ha
TOTAL AREA	**1484 ha**	**1484 ha**
PERMANENT FOOTPRINT		
Component	**Disturbance footprint (ha)**	**Area rehabilitated (ha)**
Access tracks (new - permanent)	25 ha	-
Phillip Creek Compressor Station (NT)	300 m x 300 m = 9 ha	-
MLV's x 2 and Scraper Station x 1 (NT) To be upgraded to compressor stations in the future	200 m x 200 m = 4 ha 3 sites = 12 ha total	-
Cathodic Protection Station x 3 (NT)	20 m x 20 m = 0.04 ha 3 sites = 0.12 ha total	-
TOTAL AREA	**46.12 ha**	-

Table 6. Access tracks (dated 4th August 2015)

Location		Existing	New	Perm	Temp	Length (km)	Disturbance Area (ha)	Feature	Property Description	Location description
KP	20	X				0	0	Warrego HWY	Phillip Creek Pastoral Lease	Intersection at Warrego Highway
KP	40	X				0	0	Stuart HWY	Road Reserve	Intersection at Stuart Highway
KP	50		X		X	12	6	Camp	Tennant Creek Station	East-West to Stuart Highway
KP	80	X		X		18	9	CP1/ Private Track	Tennant Creek Station	North-South to Barkly Highway
KP	105		X		X	26	13		Vacant Crown Land	North-South to Barkly Highway
KP	130		X		X	38	19		Vacant Crown Land	North-South to Barkly Highway
KP	165		X	X		35	17.5	MLV1 & Camp	Vacant Crown Land	North-South to Barkly Highway
KP	188		X		X	31	15.5		Dalmore Downs	North-South to Barkly Highway
KP	210	X		X		19	9.5	CP2	Dalmore Downs South	North-West to Barkly Highway
KP	240		X		X	10	5		Wakaya Aboriginal Land Trust	North-South to Barkly Highway
KP	270		X		X	17	8.5		Arruwurra Aboriginal Corporation	North-South to Barkly Highway
KP	290		X	X		15	7.5	MLV2	Arruwurra Aboriginal Corporation	North-South to Barkly Highway
KP	310		X		X	12	6	Camp	Dalmore Downs	North-South to Barkly Highway
KP	340	X			X	16	8		Arruwurra Aboriginal Corporation /West Ranken	North-South to Barkly Highway
KP	340		X		X	9	4.5		Arruwurra Aboriginal Corporation Soudan Station	North-West to Existing Track
KP	360	X		X		33	16.5	CP3	Soudan Station	North-South to Barkly Highway
KP	385	X			X	47	23.5		Avon Downs Station	North-South to Barkly Highway
KP	410	X			X	58	29	Existing Track	Avon Downs Station	North-South to Barkly Highway
KP	430	X		X		0	0	MLV3/Existing Road	Austral Downs Station	Road Intersection

Location		Existing	New	Perm	Temp	Length (km)	Disturbance Area (ha)	Feature	Property Description	Location description
KP	453	X			X	28	14	Camp/Existing Track	Austral Downs Station	Existing North-South track to Barkly Highway
KP	480	X			X	38	19	Existing Track	Austral Downs Station	North-West to Urandangi Road
KP	505	X			X	0	0	Existing Road	Barkly Downs Station	to Urandangi Road
KP	535	X			X	7	3.5	CP4/ Existing Track	Barkly Downs Station	North-East to Urandangi Road
KP	555	X			X	68	34	Existing Track	Barkly Downs Station	North-East to Urandangi Road
KP	577	X			X	51	25.5	Camp	Ardmore Station	to Diamond Developmental Rd
KP	595	X			X	26	13	Existing Track	May Downs Station	to Diamond Developmental Rd
KP	615	X		X		0	0	MLV4/Existing Road	Glencoe Station	to Diamond Developmental Rd

3.2 Schedule

Jemena aims to have all environmental approvals obtained by December 2016, with the construction phase to commence in January/ February 2017, commissioning of the pipeline is planned for February 2018 and the pipeline is expected to be operational by 1 July 2018.

3.3 Alternatives

As Jemena is responding to the Territory requirements, no alternatives to taking the proposed action or alternative timeframes have been considered; however, alternative locations for the final pipeline alignment will be considered within the planning corridor in order to reduce impacts to landholders, Aboriginal interests; and environment and heritage values.

Through the initial planning phase, Jemena considered four alignments that the pipeline could take: Tennant Creek to Mount Isa, Ali Curung to Boulia, Alyuen to Moomba and Hermannsburg to Moomba. Through a desktop analysis of environmental and heritage values, impact to landholders, and Indigenous interests it was concluded that the Tennant Creek to Mount Isa alignment minimises the potential for impacts to these interests.

3.4 Planning phase

The pipeline alignment proposed by Jemena was determined through desktop assessment of land tenure, geology/soils, roads and the location of Indigenous communities. A 20 km wide Planning Corridor has been established around the preferred pipeline route within which changes to the alignment can be made to reduce impacts to landholders and the environment. The assessment of the environment and potential impacts presented in this NOI is based on this Planning Corridor.

Using the initial alignment as the basis, the process for selection of the final alignment on which the pipeline will be constructed is as follows:

1. Definition of a 1 km wide Alignment Corridor within which all pipeline construction activities can occur through desktop review of environment and heritage information and land owner / land council consultations (**Alignment Corridor**).
2. Selection of a 30m pipeline Construction ROW through on-ground surveys to verify constructability; and avoidance of environment and heritage constraints.

The Alignment Corridor will be confirmed through discussions and negotiations with landholders and Aboriginal land interests. Cultural heritage (archaeological and ethnographic) and ecological surveys will be undertaken over the Alignment Corridor to identify any constraints to pipeline construction and for the purposes of obtaining the relevant approvals and agreements, particularly relating to areas where the pipeline traverses Aboriginal Land and / or land under native title.

Within the Alignment Corridor the 30m wide Construction ROW will be defined through on-ground survey. Additional areas for access tracks, crossings, temporary workers camps; and pipe and equipment laydown, will also be sited through on-ground surveys.

3.5 Construction phase

The proposed pipeline will be constructed in accordance with *AS 2885 and the Code of Environmental Practice – Onshore Pipelines (APGA 2013)*. The construction phase activities are described below.

Pipeline Right of Way

The proposed pipeline route will require a 30 m Construction ROW to support construction activities including clearing and grading, digging the pipeline trench, spoil placement, stringing and welding the pipeline (laying the pipe sections end to end and welding the lengths together), lowering-in and then backfilling the trench. On the Construction ROW vegetation and topsoil will be cleared and stockpiled to each side for later reuse in rehabilitation of the Construction ROW. The pipeline will be laid in a trench with a minimum depth of cover of 750 mm. At watercourse crossings, the minimum depth of cover will be increased to at least 1,200mm. The proposed pipeline will be designed, constructed and operated in accordance with the Australian Standard (AS) 2885 series. A typical Construction ROW layout will be used as illustrated in Figure 2 from the *APGA Code of Environmental Practice 2013* (Appendix F).

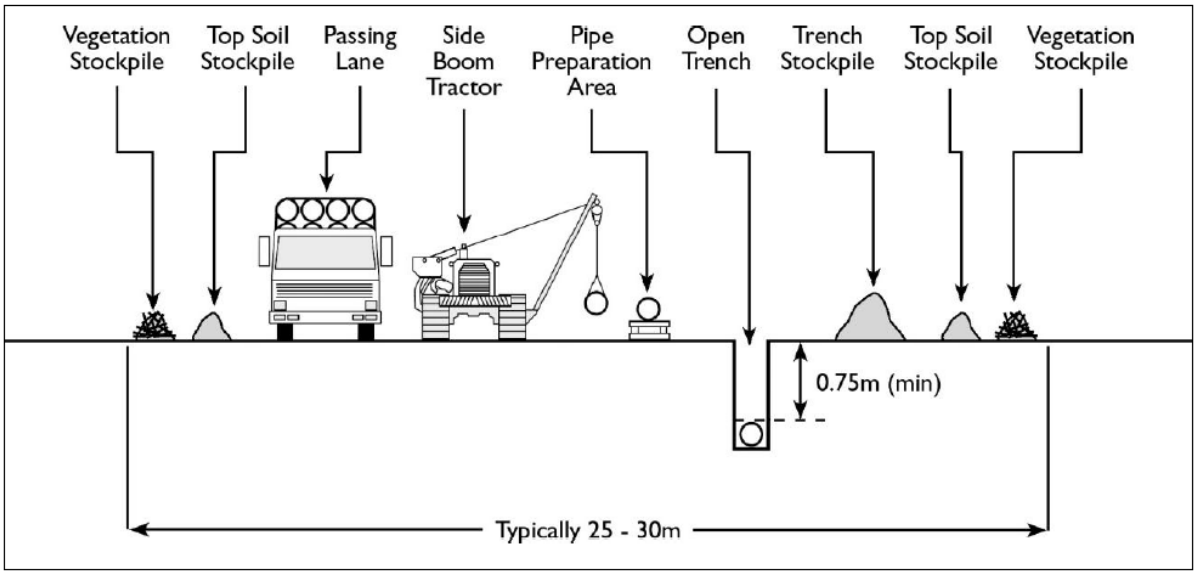


Figure 2. Corridor layout for Construction Phase (Source: APGA)

After returning soil to the trench, the Construction ROW will be rehabilitated replacing excavated soil, contouring the soil surface to the surrounding land surface and then re-spreading the stockpiled vegetation and topsoil across the disturbed areas. Other areas used in construction (such as truck turnarounds and temporary camps) will be rehabilitated as soon as practical after the area's construction activities are completed.

Watercourse crossings

The proposed pipeline crosses numerous small ephemeral creeks and gullies as well as some larger ephemeral creeks; the latter are shown in Table 7 below for the NT section of the project. No permanent rivers / creeks are crossed.

Table 7. Larger ephemeral creeks to be crossed by pipeline

Name	Hierarchy	Hydrology
Blue Bush Creek	Major	Non Perennial
Georgina River	Major	Non Perennial
Gosse River	Major	Non Perennial
James River	Major	Non Perennial
James River	Minor	Non Perennial
Jimmy Creek	Minor	Non Perennial
Kurundi Creek	Major	Non Perennial
Poison Creek	Minor	Non Perennial
Ranken River	Major	Non Perennial
Tennant Creek	Major	Non Perennial
Whistleduck Creek	Major	Non Perennial

Pipeline installation activities involving trenching through rivers and creeks will only occur in the dry season; and when constructing in riparian areas the width of vegetation cleared will be reduced to the minimum possible to allow for trenching, pipeline installation and vehicle movement. To allow for narrowing of the Construction ROW through river and creek crossings, additional temporary work and laydown areas required for pipeline assembly will be established outside of the riparian zone,

River and stream banks will be rehabilitated to the standard acceptable by the regulatory authorities prior to the onset of the wet season. As all construction will occur within a single dry season, rehabilitation of all crossings prior to the onset of the wet season will be achievable.

Above-ground facilities

A compressor station will be installed at Warrego (near Tennant Creek) with additional compressor stations also proposed for future expansion at each of the MLV and Scraper station sites in the NT. Construction of the compressor station will require clearing of 9 ha and construction of the MLV's and scraper station will each require clearing of 4 ha (12 ha across 3 locations).

The compressor station will comprise two Solar Taurus 60 gas turbine driven compressor units (or equivalent). Whilst it is proposed that power be supplied by two duty/standby gas engine alternators (**GEA**) at each site, with fuel supplied from the gas pipeline, Jemena is also exploring the three-phase power availability to reduce the reliance on GEA's. The compressor station will also have a permanently manned office, control room, workshop and amenities.

If required, a Nitrogen Reduction Skid (NRS) will be constructed as part of the compressor station at Warrego Creek. Appendix G gives a flow schematic showing the Philip Creek Compressor Station with the NRS in the lower left hand side of the drawing. The NRS consists of the following key pieces of skidded equipment:

- A molecular sieve dehydration skid,
- A mercury removal unit,
- An N2 removal skid including nitrogen separation columns and heater units,
- Recovery compressor packages, similar to the other compressors located at the compressor station, however, smaller in size.

The function of the NRS is to separate excess nitrogen from the inlet gas stream to ensure the delivered gas into the NEGI meets the requirements of the east coast gas specification. The separated nitrogen/methane stream will be used as fuel gas for the onsite compressor package turbines and for onsite power generation. A flare stack will be installed to assist in managing fuel gas pressure, and absorb flow rate fluctuations in the separated waste gas stream, which is influenced by incoming gas quality and flow rate. Operation of the flare is not designed to be a normal operational mode, further work on this is required during plant detailed design. Another expected by-product of this process will be a minimal amount of water, estimated at somewhere between 90 and 360 litres per day which will be discharged into a small evaporation pond on site.

The site also includes a molecular sieve and mercury removal bed, both of which contain active absorbent material with a finite service life of between ten and thirty years, this will be dependent on the levels of filtering and mercury present in the incoming gas, in conjunction with statutory pressure vessel inspections. This material will be exchanged and disposed of according to the manufacturer's recommendations and in accordance with the relevant statutory requirements.

It is envisaged that the addition of the NRS will not increase the footprint of the development as it will be within the area of the compressor station as outlined above.

Access tracks

Temporary access tracks will also be established to provide construction access to the Construction ROW, apart from the small number of these that will remain in place for permanent access to the above ground facilities, the majority will be rehabilitated after pipeline construction activities are completed.

To minimise land disturbance, existing roads and tracks will be used wherever possible and all vehicular movements will be confined to the roads, tracks and extra work space areas that are approved for the project. The main sealed access roads that will be utilised during construction are the Warrego Road, the Barkly Highway and the Diamantina Development Road. Other local roads that connect these main roads and private property access tracks approved by landholders will also be used.

The access track requirements for the project are documented in Table 5 and Table 6. Where practicable existing access tracks have been used rather than new access tracks developed. Of the 27 access tracks that will be used during the construction phase, 10 are new tracks that will be established and 17 are existing private access tracks for which Jemena has obtained permission to use from the land owners. As only 7 access tracks are required during the operational phase of the project; rehabilitation of temporary construction access tracks will be done in consultation with landholders.

Temporary workers' accommodation camps

It is expected that there will be four temporary workers' accommodation camps located along the proposed pipeline route for workers to live in during the construction phase of the project; of which it is expected that only three will be operational at any one time. These will be removed and relocated as the pipeline construction progresses along the route.

It is anticipated that there will be a maximum of 300 people in any one camp. The camps will include living quarters, a kitchen and recreational areas and will be located close to the proposed pipeline

route, within the alignment corridor. Construction depots including plant and equipment storage areas and fuel storage areas will typically be co-located with the camps.

Each temporary workers accommodation camp will be self-contained and will have its own power generation and sewage treatment; and will require the clearing of approximately 8.75 ha of vegetation (250 m x 350 m). Potable water will be trucked in from Mt. Isa, Camooweal or Tennant Creek.

The following principles from the *APGA Code of Environmental Practice 2013* (Appendix F) will be adopted to avoid and/or reduce environmental impacts when identifying the construction camp locations:

- Nearby to Construction ROW to minimise crew driving distances
- No significant species, potential habitat for threatened species or cultural heritage values (as determined through survey)
- Away from water bodies either ephemeral or permanent
- Suitable soil type that will readily rehabilitate
- Low erosion potential (either soil type or slope)
- Sited in previously disturbed areas (where available)
- Areas of mature, healthy vegetation will be avoided
- Away from areas of intact mature vegetation.

Vegetation clearing of the areas for the accommodation camps will follow a similar process to the Construction ROW; both topsoil and seed source material will be stockpiled for use in rehabilitation. On completion all construction, materials will be removed from site, the land surface will be re-contoured to surrounding levels and topsoil and vegetation will be re-spread across the area.

The proposed locations of camps will be determined in the planning phase with the final location being confirmed after the cultural heritage and ecological survey work is completed (approximately May 2016).

Water supply

Water for dust suppression and hydrostatic testing will be sourced from temporary dams supplied by bore water. In the NT two large dams are required for the hydrostatic testing and four smaller ones for construction (dust suppression) water. The area covered by each dam is approximately 1 – 1.3 ha. The location of these dams (and the associated regulatory approvals) will be further developed during the planning phase in 2016.

As mentioned previously, potable water for use in NT construction camps will be transported to site from Tenant Creek or Camooweal.

Fuel storage and handling

Construction camps will have fuel storage of up to 252,000L (three fuel tanks (75,000L)) and 3 Fuel Tankers (9,000L) peak fuel capacity. Fuel will be used to supply construction plant, equipment and vehicles; and accommodation camp generators.

The fuel will be stored and transported in accordance with the *Dangerous Goods Act*, *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act*, Dangerous Goods Regulations and Transport of Dangerous Goods by Road and Rail (National Uniform legislation) Regulations.

Explosives storage and handling

Explosives may be required for rocky areas. Explosives will be stored in small fenced and locked facility nearby to each campsite; but outside of the safety zone required around camp facilities.

Sewerage treatment and disposal

Sewage from temporary construction camps will be treated through use of septic or transportable treatment units. After thorough treatment, effluent will be irrigated to land in accordance with the *Code of Practice for On-site Wastewater Management*. Wastewater disposal systems will be approved by the Department of Health prior to installation.

Solid waste disposal

Disposal of domestic (solid) waste produced at construction camps and other construction wastes will be stored at construction camps and removed for off-site disposal by waste management contractors. All contractors engaged by the project and facilities accepting listed wastes will be appropriately licensed under the *Waste Management and Pollution Control Act*.

Emissions to air

The main emissions to the atmosphere likely to occur during the construction of the pipeline are from vehicles and machinery exhausts as well as combustion emissions from power generation at temporary accommodation camps. During the construction and commissioning phases of the project, dust generation is also likely to be an issue. Activities that are likely to cause dust generation include:

- Clearing of vegetation
- Earthmoving and excavation activities
- Blasting and trenching activities
- Trench padding
- Backfill and land sculpting activities
- Vehicle movements along the unsealed corridor and access tracks

Noise emissions

Noise is expected to be emitted to varying degrees during construction of pipeline and above ground facilities.

There are three noise sensitive receptors within the Planning Corridor; the very small old mining township of Warrego approximately 2km from the western end of the NEGI pipeline , Three Ways roadhouse approximately 8.5 km north of the proposed pipeline route and Austral Downs Station approximately 3.5km north east of the pipeline.

Outside of the Planning Corridor there are a few more noise sensitive receptors, Tennant Creek is approximately 10km outside the Planning Corridor, Barkly Homestead Wayside Inn approximately 2km, Soudan Station is approximately 7km, Ranken approximately 24km and Avon Downs Station approximately 25km.

The Barkly Highway also passes through the Planning Corridor in a few different areas and has various road side rest areas that fall outside of the Planning Corridor by approximately 10 to 20 km.

Noise emissions from the various stages of pipeline construction include:

- Clearing of vegetation
- Grading
- Blasting
- Rock hammering
- Trenching
- Welding
- Hydrostatic testing and dewatering
- Earth moving activities
- Restoration and rehabilitation

- Commissioning

Vibration may be caused by mechanical equipment such as generators, vehicles and earth-moving equipment that are will be operating during the construction phase.

Where dictated by the ground conditions, blasting will be used to assist during trench construction and will cause noise and vibration.

Hydrostatic testing

During the construction phase the integrity of the pipeline will be tested by filling it with water and pressurising it to above the operating pressure. Hydrostatic testing procedures, including water sourcing and disposal, will be determined during the project planning and construction phase. It is estimated that 15ML of water will be required for this testing and it will be sourced from bores and stored in turkey's nest dams.

At least one month prior to commencement of hydrostatic pressure testing activities a Hydrostatic test Water Management Plan (**HTWMP**) will be submitted to the relevant authorities. The HTWMP will include the following details:

- Volume and source of test water
- Proposed method and location of reuse and / or disposal
- Proposed management measures to avoid or minimise environmental impacts including sourcing, storage, treatment, reuse and / or disposal of test water.

Hydrotest water will be disposed of at a suitable land disposal area; and will not be directly released into any watercourse. Options for disposal include:

- Release and drain
- Dust control
- Evaporation ponds
- Irrigation.

3.5.1 Commissioning phase

Emissions to air

During commissioning, atmospheric emissions are likely to be similar to those generated during the construction phase, but will also include emissions associated with the start-up procedures when the compressor is purged with natural gas; and pipeline and above ground facility venting is required.

Noise emissions

During commissioning there will be noise generated from the start-up of the compressor stations and above ground facilities. 'Gas fill' of the pipeline and facilities is likely to provide the most significant noise sources, as air and nitrogen will be vented. The noise will be emitted over short period of time during the commissioning phase and as emissions will occur in areas remote from sensitive receptors is not expected to be a nuisance to anyone outside of the commissioning workforce who will be protected through the use of PPE.

3.5.2 Operational phase

Pipeline operations will transport gas from the existing Amadeus Pipeline at Warrego near Tenant Creek through to Mt Isa where it will transfer into the Carpentaria Gas Pipeline. The operation of the pipeline will be in accordance with approval documentation, a specific Operational Environmental Management Plan (OEMP), and relevant standards and codes.

The proposed Phillip Creek Compressor Station at Warrego will have a permanently manned office, control room, workshop and amenities; and small quantities of lube oil will be stored at the site for maintenance purposes. Potable water for facility operations staff will be trucked from Tenant Creek; and sewage will be managed through a standard septic system. All domestic waste and maintenance wastes will be removed from site by licenced contractors.

Operational activities at the above-ground facilities will involve monitoring of system performance and mechanical maintenance. Small quantities of lube oil will be stored for day to day maintenance purposes.

Day to day operation of the pipeline is not expected to result in any significant emissions of air pollutants or noise. Venting of the pipeline will be required during maintenance at main line valves or compressor stations.

3.5.3 Decommissioning

When, and if, the proposed pipeline is no longer required, it will be decommissioned in accordance with the legislative and regulatory requirements and accepted environmental best practices and standards applicable and relevant at that time. Currently, decommissioning procedures require the removal of all above ground infrastructure (including all scraper station plant, pipeline valves and metering stations) and the restoration of associated disturbed areas. For a guide to current decommissioning practices used by the industry see Appendix F .

3.6 Public consultation

Jemena has commenced consultation with both the business community and the general public, undertaking project briefings in Darwin, Alice Springs, Tennant Creek and Mount Isa. In addition, Community Open Houses were held in Tennant Creek, Camooweal and Mount Isa. This engagement will continue throughout the project.

Jemena is undertaking a broad public consultation program targeting a range of key stakeholders including:

- Landholders & Occupiers
- Local Government Authorities
- State and Territory Government Authorities
- Road Authorities
- Rail Authorities
- Mining & Petroleum Tenement Holders
- Easement Holders
- Native Title Claimants
- Indigenous Landholders.

All landholders and occupiers directly or indirectly impacted by the proposed alignment have been consulted with and where possible, face to face meetings have been held (on a number of occasions in some cases). Landholders and occupiers have been provided with an overview of Jemena, the NEGI project and a briefing on the timeframes and process moving forward. The proposed alignment together with access tracks, station locations and other features of the project have been discussed with landholders and occupiers.

Input has been provided from these key stakeholders and the alignment altered in some instances taking account of the feedback obtained. Where applicable, Jemena has entered into access agreements with landholders to access land for survey purposes. Comprehensive records of all discussions, communications and correspondence have been maintained throughout the consultation program.

Jemena has undertaken consultations with the Central Land Council (CLC), the Northern Land Council (NLC), the Arruwarra Aboriginal Corporation (AAC) in the NT; and in Queensland, the Indjalandji-Dhidhanu Native Title Body Corporate and the Kalkadoon Native Title Body Corporate. Discussions with these Aboriginal stakeholders have been both positive and constructive and arrangements are well underway for the conduct of cultural heritage surveys and short and long term access to land.

Jemena has also met representatives of the two local government authorities and provided a briefing to each on the project. Similarly, meetings have been held with the relevant state and territory government authorities to discuss the project in their capacity as landholders and custodians of the land in some cases or as the authority administering land tenure. These meetings have been invaluable in gathering important information relevant to the overall land access strategy.

State road authorities have been consulted to discuss specifications relevant to the crossing of state owned and controlled roads as well as discussions around use of roads for transport and logistics required for a project of this magnitude.

The project also intersects a rail corridor accommodating the Adelaide to Darwin railway. Meetings have been held with the CEO of the railway owner, AustralAsia Railway Corporation and a briefing provided and specific requirements gathered. Operators of the rail corridor, Genesee and Wyoming have also been consulted as has NextGen who own and operate cable infrastructure within the rail corridor.

Importantly, Jemena has consulted with mining and resource tenement holders directly impacted by the NEGI project. Jemena has consulted with representatives of Minemakers Australia Pty Ltd (**Minemakers**) who hold a mining lease which is intersected by the proposed pipeline alignment. Consultation with Minemakers has been constructive and they are amenable to the pipeline alignment passing through the lease area they hold.

Any parties holding a registered easement have been provided with information pertaining to the project and been provided with an opportunity for comment.

All consultation, without exception, has been very well received and the co-operation received has been excellent. Jemena believe the effort to consult thoroughly with the public and the continued efforts to do so have set the foundations for positive relations for the remainder of the project.

4 Existing Environment

4.1 Land use history

The land that will be used for the NEGI project has mostly been used for broad pastoral operations and Indigenous uses. It is expected that the land will have some natural degradation such as soil loss in some areas; and weed infestations are likely to be present. It is not anticipated that there is any contaminated sites present within the Alignment Corridor. Surveys of the project area scheduled for the 2016 dry season will document the current condition of the land for the purpose of informing environmental management plans; and defining rehabilitation objectives.

There are no registered contaminated sites within the Alignment Corridor.

4.2 Climate

The climate across the area the Planning Corridor traverses is typical of southern NT, being characterised by a wet season from October to April and a dry season from May to September. Tennant Creek (NT) and Camooweal (QLD) have been used in the climate description as they are the closest towns to the NEGI route with climate data available on the BoM site.

At the western end of the NEGI pipeline, Tennant Creek has a mean annual rainfall of 470.7 mm with February being the wettest month with a mean record of 123.7 mm. At the eastern end of the NEGI pipeline Camooweal has a mean annual rainfall of 401 mm with January being the wettest month with a mean record of 99.2 mm (see Figure 3 below).

Temperatures for the region follow the seasonal patterns typical of the NT wet and dry seasons. At Tennant Creek, the hottest month is December with a mean maximum of 37.1 °C and the coolest month with a mean minimum of 12.3 °C is July. In Camooweal the hottest month is also December with a mean maximum of 38.1 °C and the coolest month is also July with a mean minimum of 8.8 °C see Figure 4 below.

Much of the Planning Corridor receives a high amount of rainfall and flooding occurs; therefore the NEGI project will need to respond to these conditions and pipeline construction activities will occur only during the dry season.

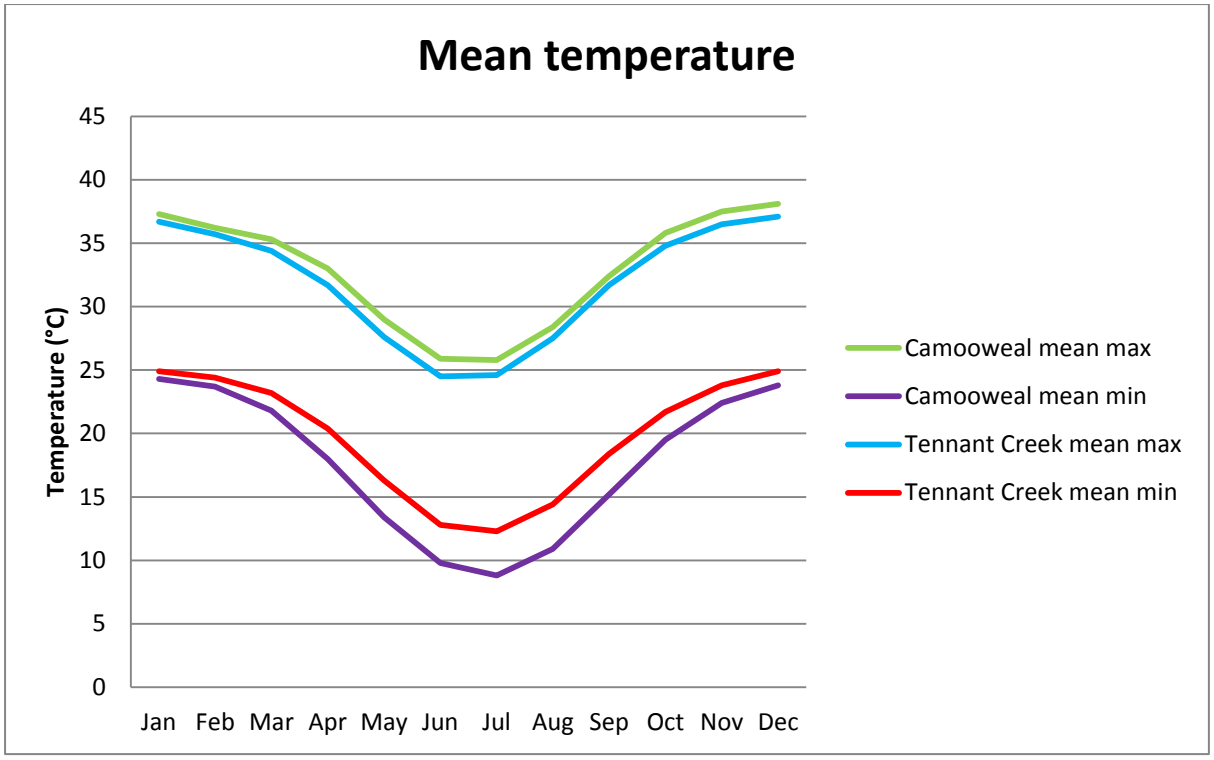


Figure 3. Graph of the mean temperature for Tennant Creek and Camooweal (BOM 2015)

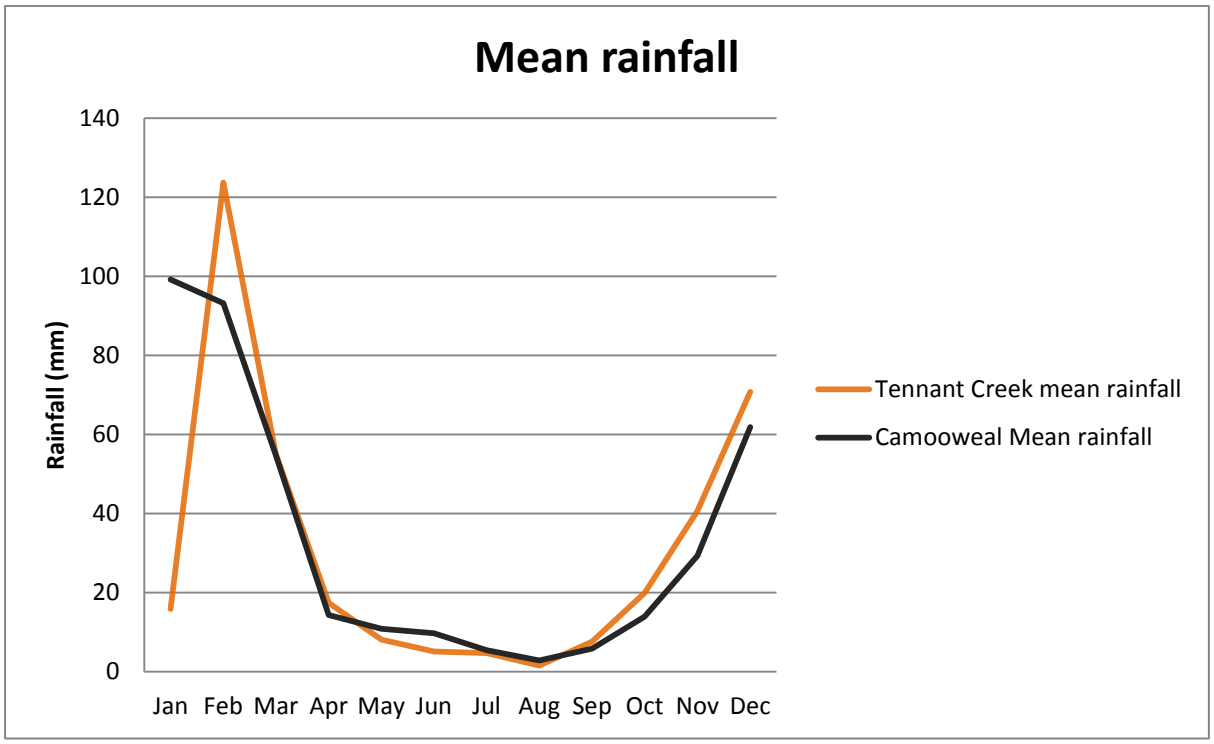


Figure 4. Graph of the mean rainfall for Tennant Creek and Camooweal (BOM 2015)

4.3 Geology, soils and land form

The majority of the Planning Corridor geology mapping consists of Cainozoic sand plains. Towards the eastern end of the Planning Corridor there is mostly Quaternary residual black, dark grey or brown clayey soils (Qrlb). There are various deposits of other materials from basalt, limestone, dolostone, calcrete, lateritic duricrust, sand, silcrete, dolerite, gabbro, tuff, siltstone, granite, gneiss, ignimbrite, tephra, sandstone, arenite, greywacke, siltstone, alluvial sediment, sand, Aeolian, soil and mud. See Table 8 for lithology types and descriptions for all of the geological units mapped in the Planning Corridor (refer Figures 5 – 8).

The land forms traversed by the NT section of the pipeline route are shown in Figure 9. The largest section of the Planning Corridor is the alluvial plains land form. This section runs from the intersection of the Stuart Hwy and the Barkly Hwy along the pipeline route for approximately180 km and another smaller 25 km section after the rocky plains section in the middle. Soils in this land form are described as gently undulating plains slightly elevated above the adjoining cracking clay plains; some narrow ridges and hills with rocky outcrop and some shallow depressions.

In the middle section of the Planning Corridor, the pipeline route traverses the rocky plains land form unit (See Figure 9). This unit is characterised by undulating ridge and slope terrain on lateritized sediments; some rock outcrops and sandy soils with large amounts of gravel (See Figure 10).

At the western end of the pipeline corridor near Tennant Creek there is the rocky hills landform (See Figure 9). Soils in this area are described as flat-topped but often steep-sided hills and ranges on sandstones, siltstones, and shales; many rock outcrops; some gently sloping areas and valleys: main soils on the hill slopes are stony sands and loams (See Figure 10).

At the eastern end of the pipeline there is the black soil plains land form (See Figure 9), and soils are described as alluvial plains with numerous braided stream channels: dominant soils are deep grey and brown cracking clays (See Figure 10).

Based on the CSIRO ASRIS mapping, the majority of the Planning Corridor passes through areas of low to medium erodibility. The section across the black soil plains is an area of high erodibility (see Figure 9 for location of black soil plains).

Table 8. Lithology type and descriptions for geology maps for the NT section

Geology map symbol	Lithology type	Lithology description
Cbkh	basalt	Weathered vesicular basalt; minor felsic volcanic and volcaniclastic rocks; pebble conglomerate and lithic arenite.
Clba	limestone, dolostone	Silicified limestone, dolostone, dolomitic limestone, calcareous and dolomitic siltstone and fine-grained sandstone, calcimudstone; ferruginous, fine-grained siliciclastic sandstone to mudstone, chert
Clbc	dolostone	Dolostone, dolomitic limestone, planar microbial dololaminite with nodular chert; minor marl; basalt intraclast and ooid dolograinstone, oncoid dolofloatstone, quartzic dolostone and quartz sandstone
Clbg	limestone	Grey, partially dolomitised massive, ribbon, bioclast, lithoclast and minor onkoid limestone, minor cryptomicrobial dololaminite and grey siliciclastic mudstone; brown-maroon siltstone at base; recessive outcrop pervasively chertified and lateritised
Clbw	limestone, dolostone	Chertified limestone and mudstone, dolostone (silty dolostone, dolosparstone, calci/dolomudstone-siliciclastic mudstone interbeds); siliceous concretions; minor intraclast and bioclast wacke- to grainstone, oncoid pack- to grainstone, siltstone and sands

Geology map symbol	Lithology type	Lithology description
Czia	limestone	Limestone: cherty and chalcedonic
Czk	calcrete	Calcrete, travertine; calcareous cementing of bedrock and transported materials
Czl	lateritic duricrust	Ferruginous duricrust, laterite, may include massive to pisolitic ferruginous subsoil, mottled clays
Czs	sand, unknown origin	Sand plain, may include some residual alluvium; sand dominant, gravel, clay
Czz	silcrete	Silcrete, silicified gravel
Ld	dolerite, gabbro	Dolerite, gabbro, norite; dykes, sills, small intrusions; may be metamorphosed or partly metamorphosed to amphibolite
Lfow	tuff, siltstone	Chert (silicified tuff), tuff; siltstone, shale, fine-grained lithic arenite/wacke
Lg	granite, gneiss	Undifferentiated granitic rocks, some gneissic
Lgdw	granite, granodiorite	Equigranular, muscovite-biotite and corundum-bearing, granite/granodiorite; pegmatitic segregations
Lgtt	granite	Biotite-bearing granite; seriate porphyritic to equigranular; rapakivi texture; blue ovoid quartz; locally abundant enclaves, minor xenoliths; foliated, sheared in part, and locally gneissic
Lso	ignimbrite, tuff	Undifferentiated felsic ignimbrite, tuff, lapilli tuff and lava; chert; sublithic and lithic arenite and wacke; shale and mudstone; pebble beds and conglomerate
Lsob	tuff, ignimbrite	Felsic crystal-lithic tuff, lapilli tuff, ignimbrite, probable lava, chert; siltstone, shale, fine-grained lithic arenite/wacke
Lsom	tephra, sandstone	Rhyolitic and rhyodacitic tephra, tuffaceous/volcaniclastic sandstone, siltstone
Lsou	arenite, sandstone	Lithic/volcanilithic/tuffaceous arenite; heavy mineral-bearing sandstone; felsic tuff
Lsow	arenite, siltstone	Sublithic/lithic arenite and siltstone, shale; minor tuff, chert (silicified tuff); rhyolitic lava and ignimbrite, tuff and chert (silicified tuff)
Lswr	greywacke, siltstone	Undifferentiated tuffaceous arenite/wacke ('metagreywacke') and siltstone; shale, including argillaceous banded ironstone ('haematite shale'); slate
Qa	alluvial sediment	Channel and flood plain alluvium: sand, silt, clay; alluvial terrace deposits; some black soil and sandy soil
Qd	sand, aeolian	Dunes, sandplain with dunes; may include numerous interdune claypans
Qrlb	soil	Residual black, dark grey or brown clayey soil
Qt	mud	Lake and swamp deposits; mud, silt, evaporites, limestone and minor sand.

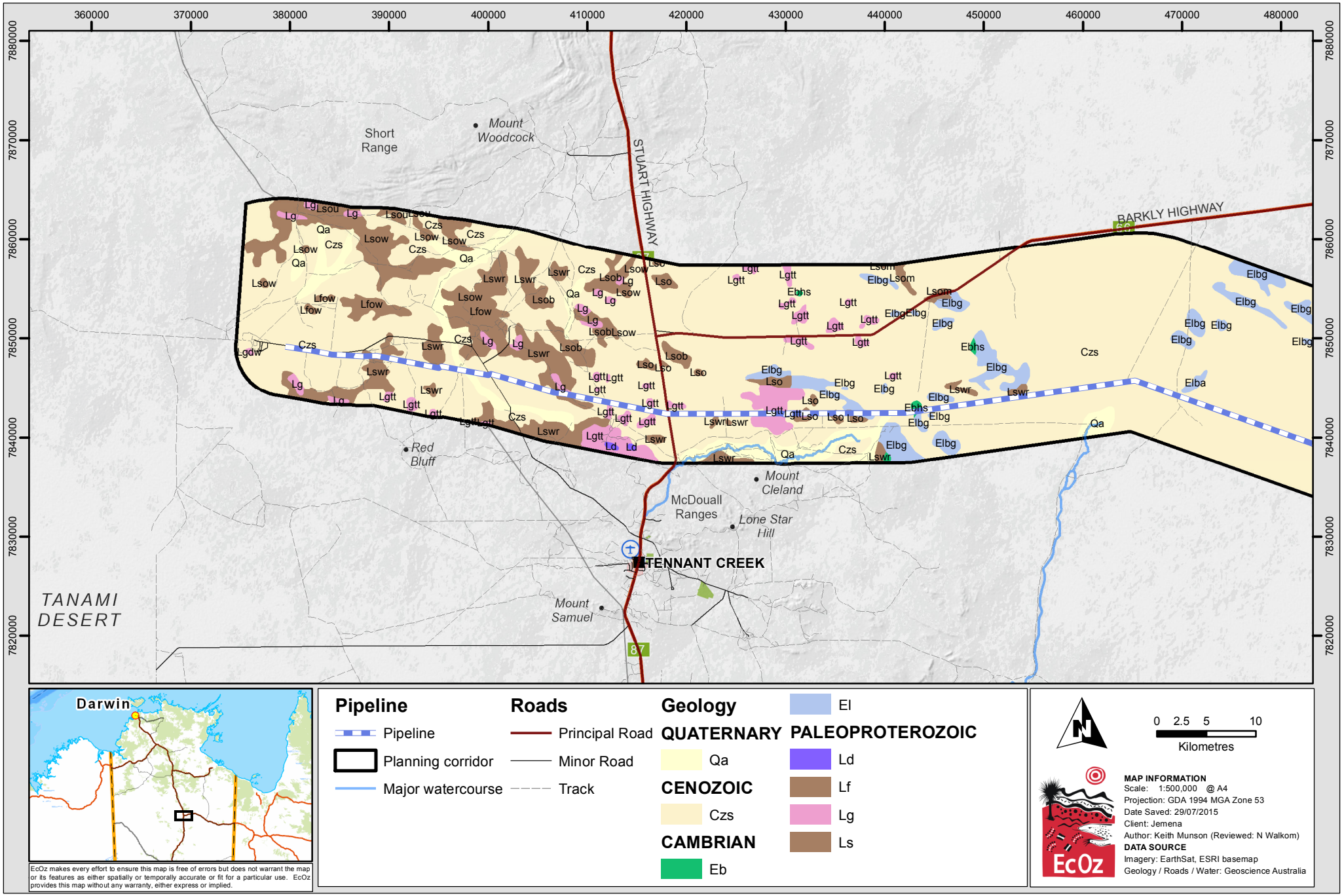


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Figure 5. Map 1 of 4 of Geology

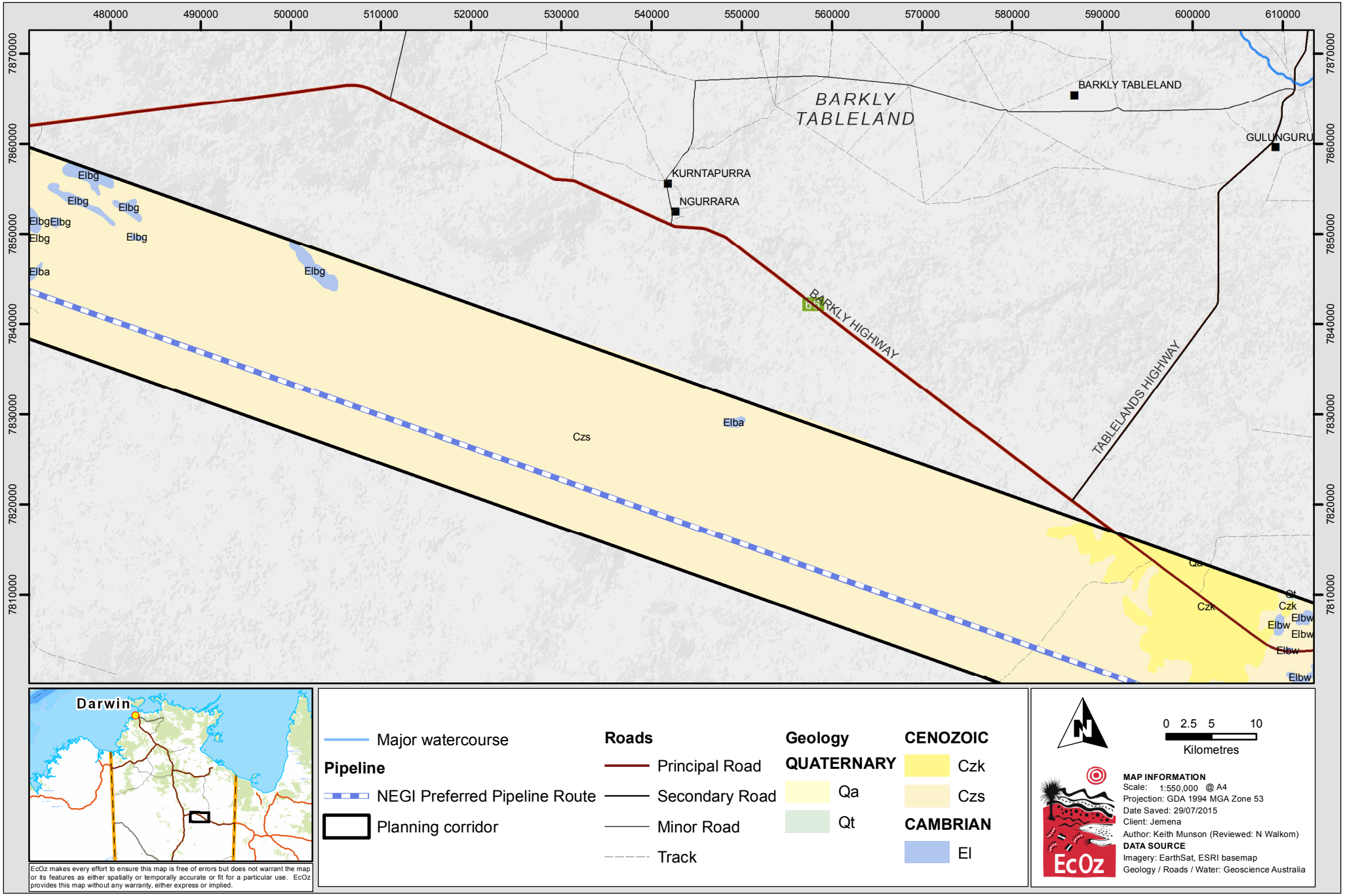

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Figure 6. Map 2 of 4 of Geology

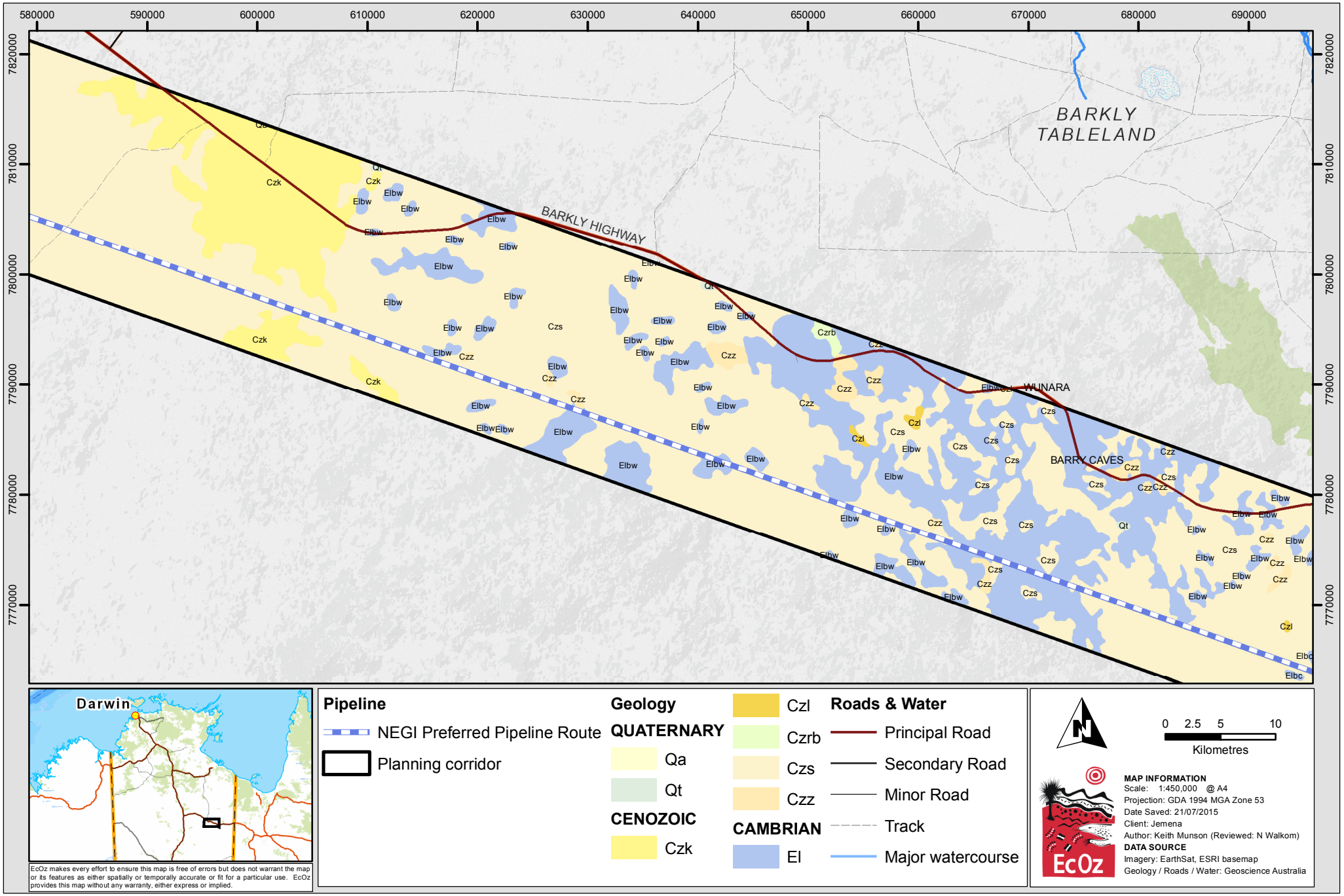

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Figure 7. Map 3 of 4 of Geology

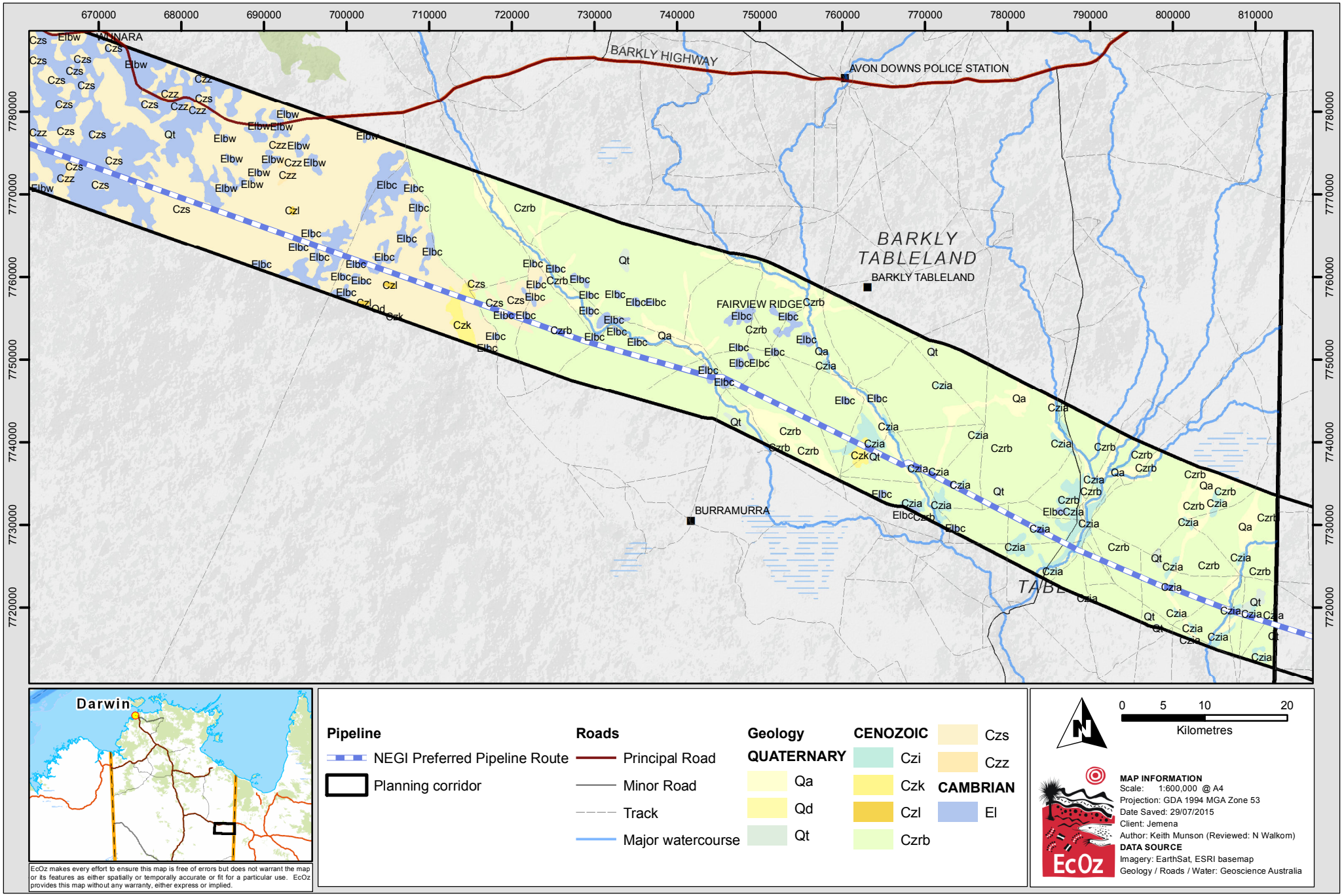

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Figure 8. Map 4 of 4 of Geology

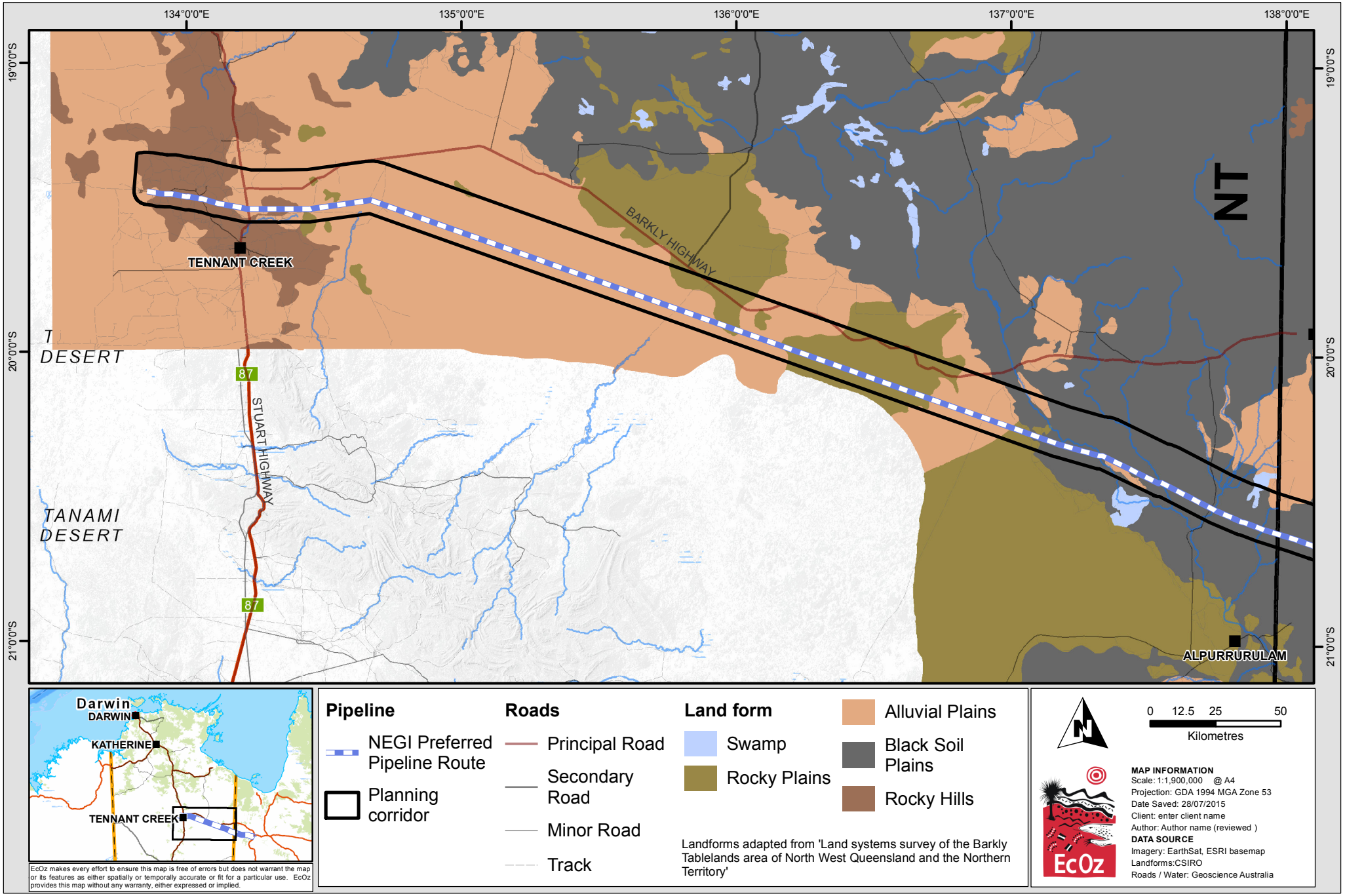

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Figure 9. Map of Land forms

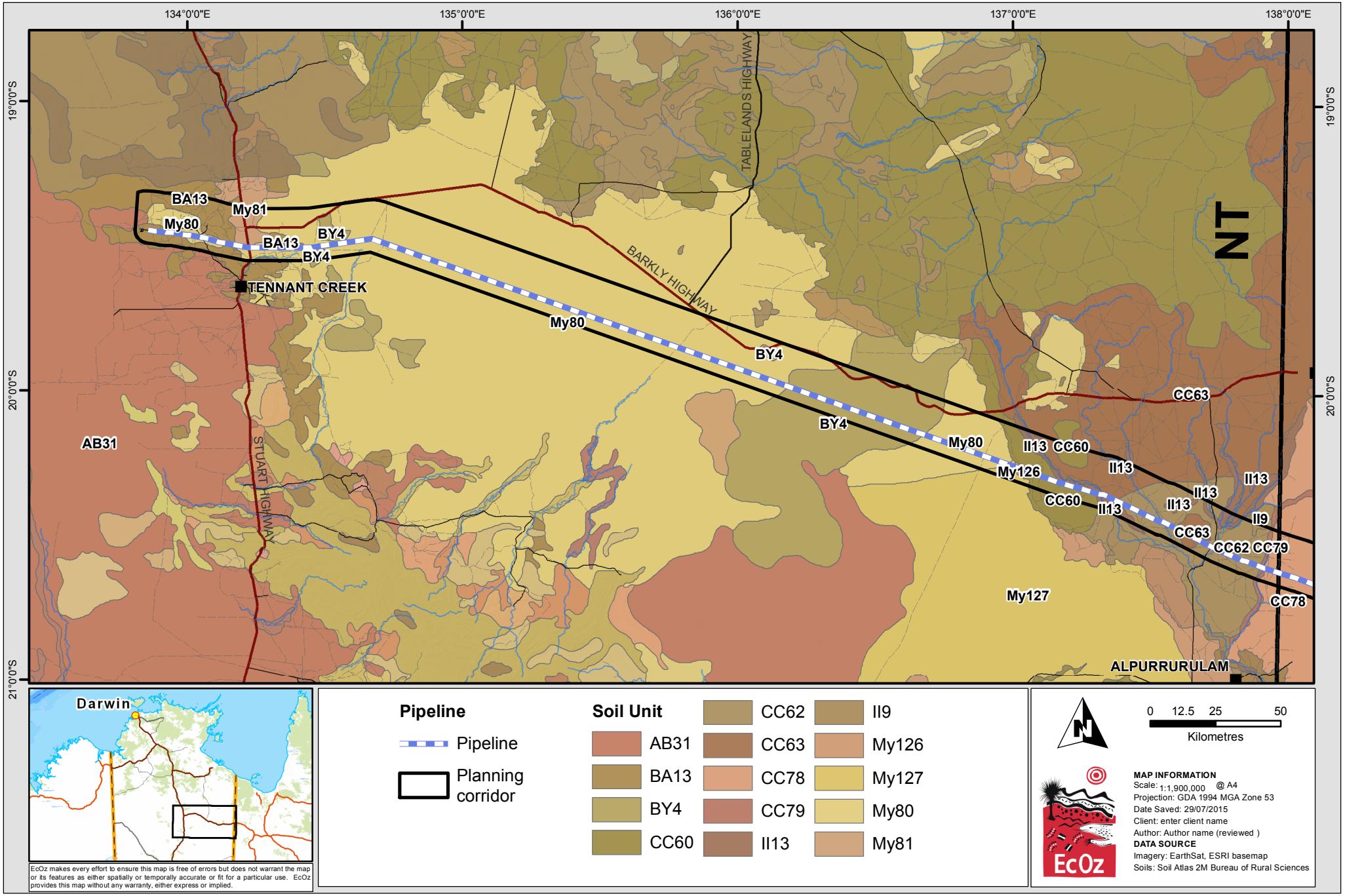

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Figure 10. Map of soil types

4.4 Surface and groundwater hydrology

4.4.1 Surface Water

The pipeline Planning Corridor traverses two drainage basins: Western Plateau and Lake Eyre. Within these, there are two smaller river basins: Georgina River Basin and Barkly Internal Drainage Basin. The western end of the Planning Corridor enters the edge of the Wiso basin with the Western Plateau Drainage Basin. Water courses intersected by the alignment are shown in Figure 11.

The Georgina, Ranken and James Rivers are the only streams in the Georgina River Basin which normally contain permanent waterholes (DND 1962). All three of these waterways are crossed by the proposed pipeline route. Whilst the rivers are ephemeral and will not be flowing during the dry season construction phase, the field surveys scheduled to occur during the 2016 dry season project planning phase will assess whether permanent waterholes are present at the proposed crossing locations. The Construction ROW may be realigned to avoid permanent waterholes within the Alignment Corridor if necessary.

The Barkly Internal Drainage Basin is virtually lacking in surface water through the dry season; it contains fewer permanent water and semi-permanent waterholes then the Georgina River Basin.

4.4.2 Groundwater

Within the NT the majority of the Alignment Corridor through aquifers of fractured and karstic rocks or fractured and weathered rocks. There are small sections of fracture and weathered rocks with minor groundwater resources towards the western end of the NEGI route.

Bore density within the Planning Corridor is low (1-20 bores per 10 km^2). There are more bores around Tennant Creek.

Groundwater is not expected to be an issue for this project as excavations for the pipeline trench will be shallow (less than 2 m). In regards to the use of groundwater resources, the project will extract groundwater for use during construction (dust suppression) and hydrostatic testing. The locations of extraction will be determined during the 2016 planning phase. Due to extraction occurring over a single dry season impacts to other users of groundwater are not expected.

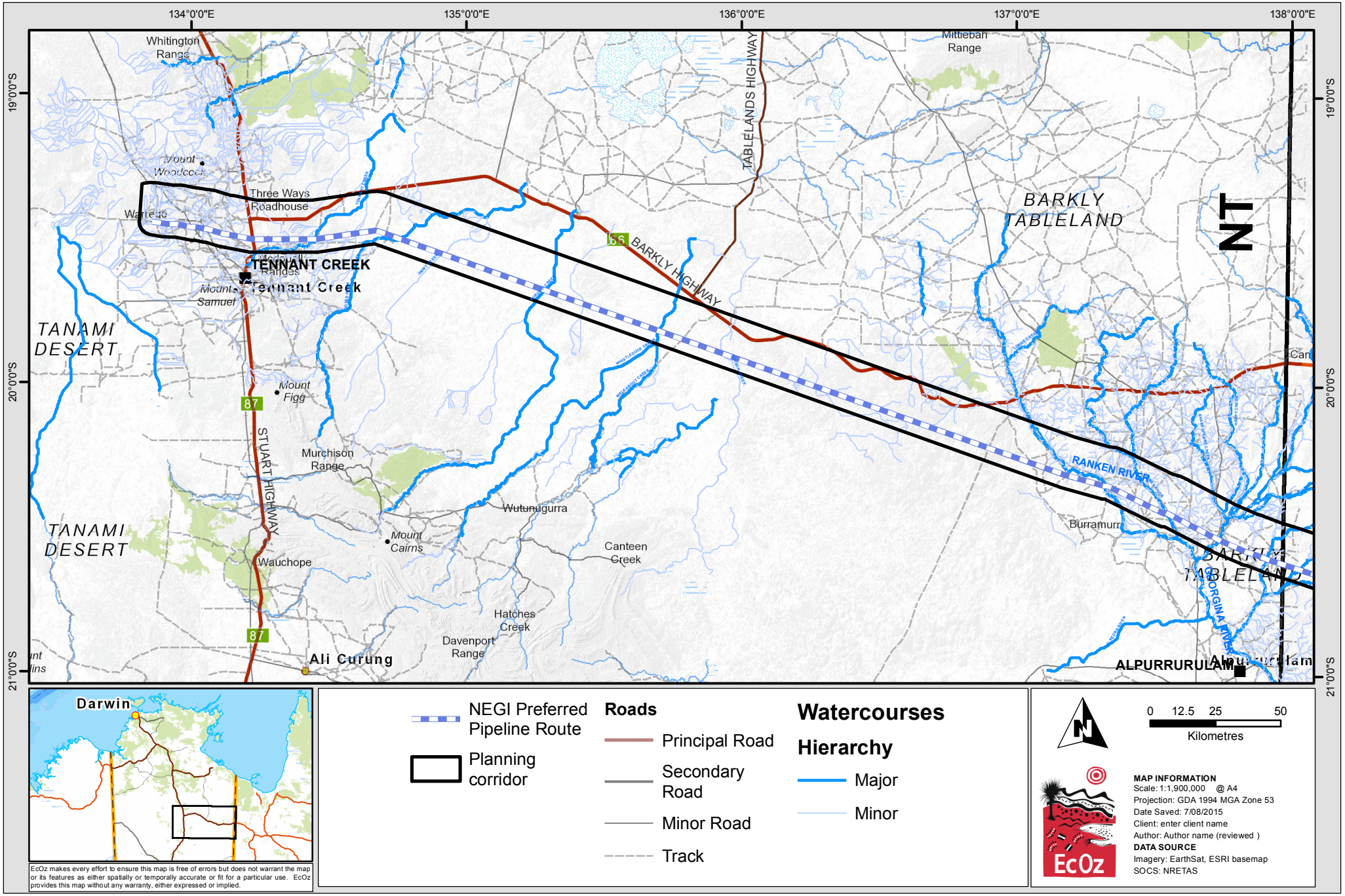

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Figure 11. Map of water courses along the pipeline alignment

4.5 Flora and fauna

The Planning Corridor passes through three bioregions shown on Figure 12:

- Davenport Murchison Ranges – This bioregion is comprised of low but rugged rocky hills. Vegetation includes hummock grasslands and low open woodland dominated by *Acacia* species. Within this bioregion the pipeline runs through the Ashburton Range and Barkly sub-bioregions.
- Tanami – This bioregion is comprised of sandplains bisected by hills and rocky ranges (Fisher *et al*. 2002). Vegetation includes hummock grasslands and *Acacia* shrub lands on the rocky ranges. Within this bioregion the pipeline runs through the Sandover sub-bioregion.
- Mitchell Grass Downs – This bioregion is comprised of grassland plains on cracking clay soils, with some intermittent lakes. Vegetation includes a variety of grasslands dominated by Mitchell Grasses (*Astrebla* spp.). Within this bioregion the pipeline runs through the Barkly Tablelands sub-region.

The Planning Corridor includes sections of three Sites of Botanical Significance (**SOBS**); Wonarah Beds, James River Waterholes, and Georgina River (Figure 13). SOBS are sites which contain special botanical values and are considered in need of protecting. The Wonarah Beds SOBS contains the only known population of *Sporobolus latzii*, which is a threatened species (listed as Vulnerable) under the *TPWC Act* (NT). *S. latzii* is confined to swamp margins and the population will be avoided by the final pipeline alignment if the species is detected during the pipeline route surveys.

The Rocky Hills habitat at either end of the Planning Corridor has the potential to provide habitat for a number of threatened fauna species (Section 5.4). The riparian zones of ephemeral rivers / creeks traversed by the pipeline route may provide regionally important refugia habitats for some species. A likelihood of occurrence analysis for threatened species is provided in Appendix E

There are no Sites of Conservation Significance (**SOCS**) within the pipeline Planning Corridor. The nearest SOCS are; Frew River Floodout Swamps which are 25 km from the Planning Corridor and Davenport and Murchison Ranges which are 53 km from the corridor. See Figure 14.

4.5.1 Vegetation communities

Vegetation communities were mapped using the National Vegetation Information System (NVIS) 4.1 mapping system. There are five different vegetation communities that the NEGI pipeline planning corridor passes through (see Figure 15). The majority of the corridor is characterised by sparse eucalypt woodlands. The second most abundant vegetation community along the planning corridor is tussock grassland. There are very small areas of arid spinifex grasslands and acacia shrublands.

In addition to those vegetation communities identified in the broad-scale vegetation mapping available for the Barkly region, it is known that the Alignment Corridor traverses a number of ephemeral rivers and creeks (Section 3.5), the riparian zones of which can be expected to provide regionally important habitat .

4.5.2 Threatened species

Desktop searches were undertaken using the NTNRM Infonet database and the EPBC Protected Matters Search Tool (PMST) to determine a list of potential threatened species occurring within the Planning Corridor. There is a total of 20 threatened fauna species that potentially occur within the Planning Corridor. Of these there are 17 threatened fauna species protected under the *TPWC Act* and 16 threatened fauna species protected under the *EPBC Act*. There are two threatened flora species potentially within the Planning Corridor; both are protected under the *TPWC Act*.

A likelihood of occurrence assessment was undertaken for each threatened species and is provided in Appendix E The assessment results are summarised below.

Of the 20 threatened fauna species potentially occurring within the Planning Corridor, only three of these were considered likely to occur based on the presence of suitable habitat; Masked Owl (Northern) (*Tyto novaehollandiae kimberli)*, Grey Falcon (*Falco hypoleucos*) and Plains Death Adder (*Acanthophis hawkei)*. Both of the flora species were also considered likely to occur within the Planning Corridor; *Austrobryonia argillicola* and *Sporobolus latzii*.

The presence / absence of suitable habitat for each of the 3 threatened fauna species and 2 threatened flora species within the pipeline Planning Corridor; and at locations proposed for above-ground facilities and temporary construction requirements, will be assessed during the planning surveys scheduled to occur during the 2016 dry season. If populations of the threatened flora species are found, the final pipeline route will avoid these populations. If suitable habitats for threatened fauna are identified, species specific management plans will provide guidance for construction activities in these areas. Operational activities are not expected to affect threatened species.

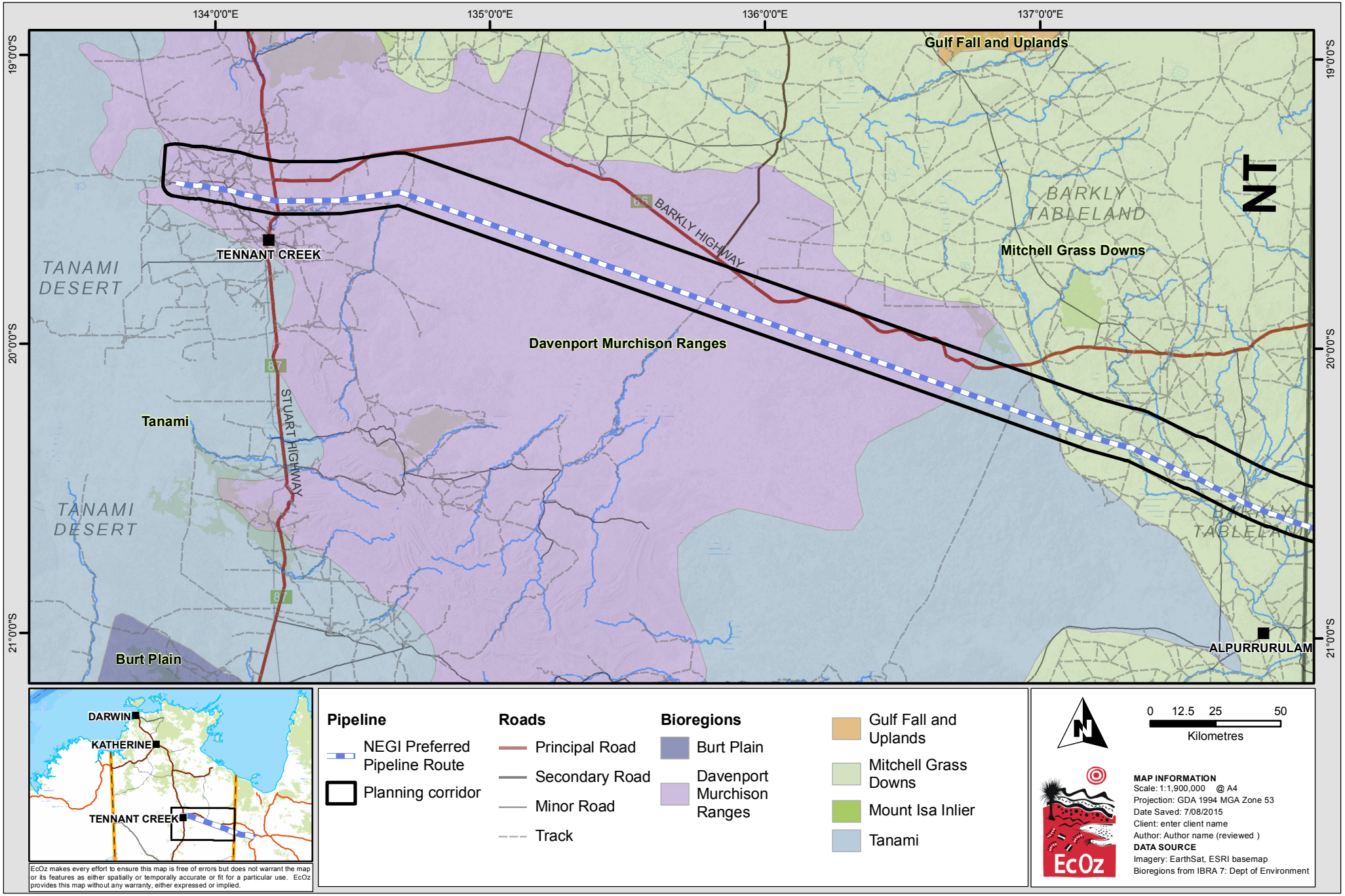

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Figure 12. Map of bioregions

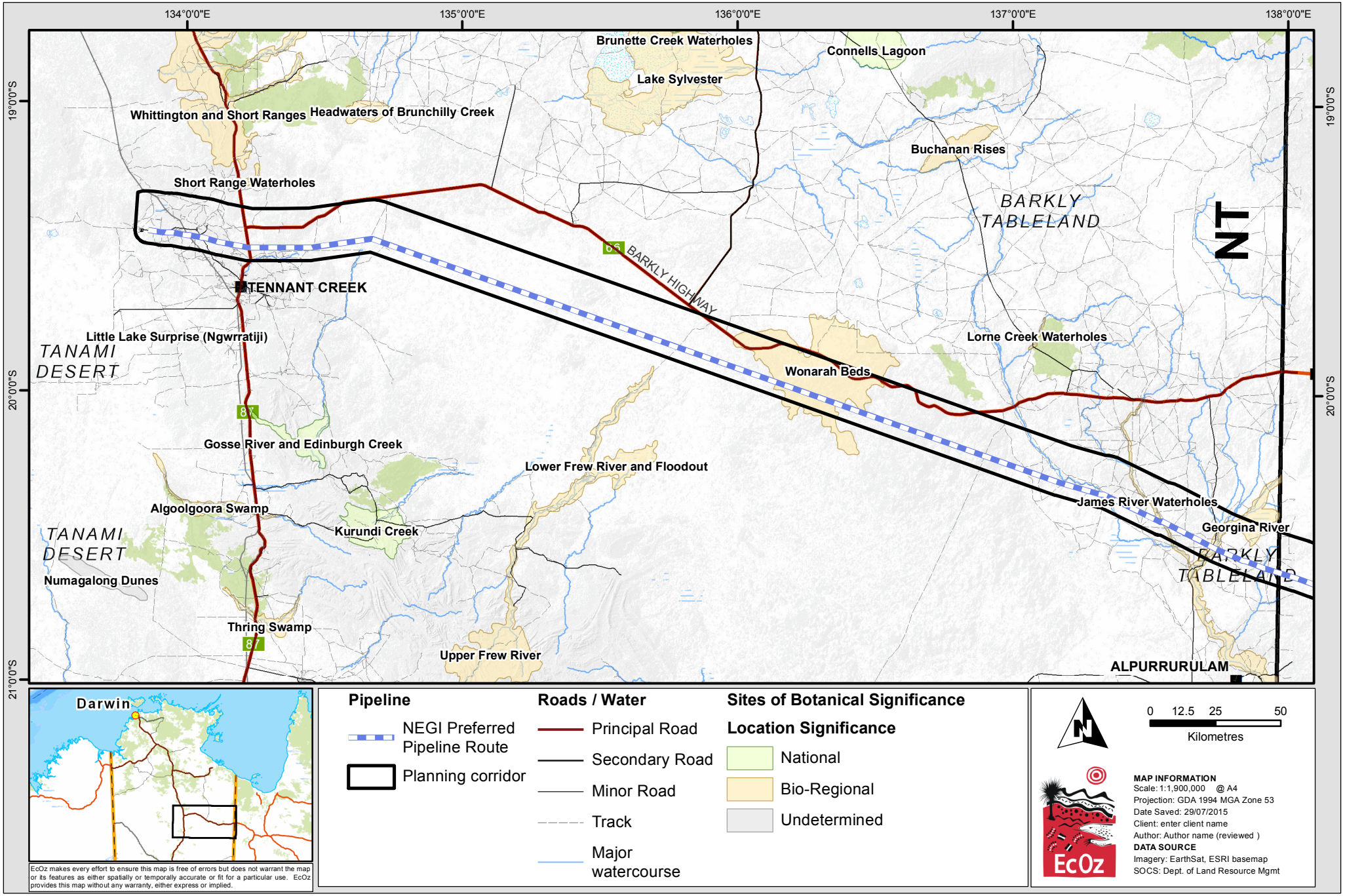

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Figure 13. Map of Sites Of Botanical Significance (SOBS)

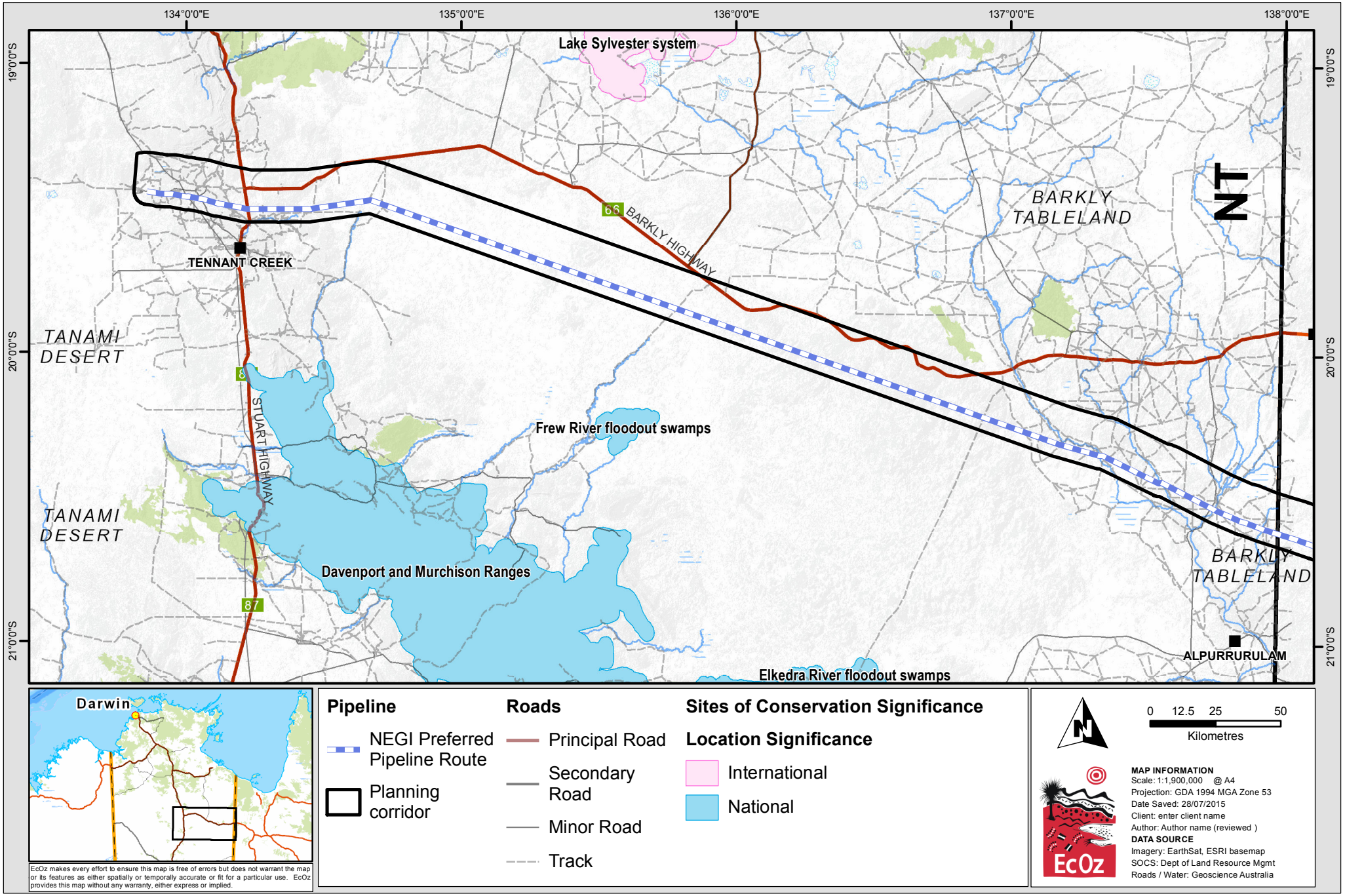

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Figure 14. Map of Sites Of Conservation Significance (SOCS)

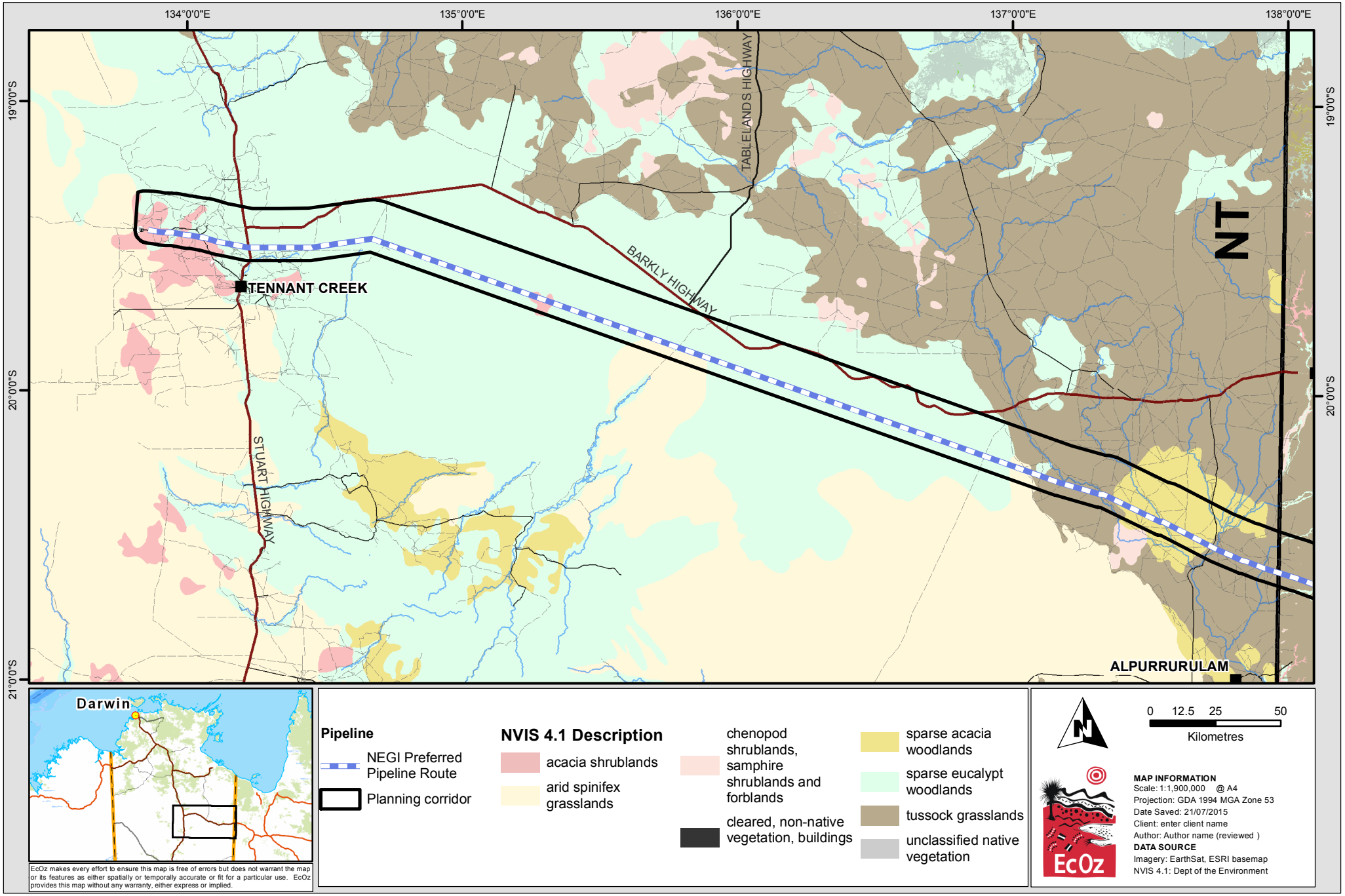

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Figure 15. Map of vegetation communities

4.5.3 Weeds

For the purpose of the NOI plants considered weeds are those species that are declared under the NT *Weeds Management Act*.

Weed records data for Weeds of National Significance (WONS) and Class A and Class B weeds declared under the NT *Weeds Management Act (2001)* was clipped to the NT bioregions through which the Planning Corridor passes. A list of potential weed species along the Planning Corridor was generated.

From the desktop assessment a list of 118 potential weed species was generated; of these 17 species were classified as WONS. The full list of potential weed species can be found in Appendix B .

Not all of these weeds will be found in the areas through which the Planning Corridor passes, nor will all of them be likely to spread to other areas associated with the project. However, this list incorporates all those weed species known to occur in the region and will be used to guide the field based assessments. Weed identification and mapping within the project area will occur during the planning surveys scheduled for the 2016 dry season.

A Draft Weed Management Plan has been developed (for both NT and QLD - Appendix C) outlining general weed management protocols that will be applied to control and manage weeds. The plan will be updated with location / property specific weed control requirements following completion of the weed mapping in the 2016 dry season and prior to commencement of construction.

4.6 Significant sites or features

4.6.1 National parks and conservation reserves

No national parks are traversed by the Alignment Corridor and there are no National Parks within the Planning Corridor. The closest National Park is Davenport and Murchinson Ranges, which occurs approximately 45 km south of the Alignment Corridor. See Figure 14.

4.6.2 Register of the National Estate

There are no places listed on the Register of the National Estate that will be traversed by the Alignment Corridor. Tennant Creek Telegraph Station Complex is listed on the Register of the National Estate and is within the Planning Corridor (See Figure 16); however this site is located 5 km south of the Alignment Corridor. The location of this site is known and it will not be impacted by the final pipeline alignment or any associated above-ground facilities or access tracks.

4.6.3 Marine parks or reserves

There are no marine parks or reserves located within the Planning Corridor.

4.6.4 Sites of Conservation Significance

There are no Sites of Conservation Significance (**SOCS**) within the Planning Corridor. The nearest SOCS are; Frew River Floodout Swamps which are 25 km from the Planning Corridor and Davenport and Murchison Ranges which are 53 km from the Planning Corridor. See Figure 14.

4.6.5 World and Natural Heritage places

There are no World or Natural Heritage places within the NEGI Planning Corridor.

4.6.6 Public/private reserves

There is one historical reserve within the Planning Corridor; The John Flynn Historic Reserve, this reserve is located 8 km from the Planning Corridor.

4.6.7 Conservation zones under a planning scheme

There are no conservation zones under a planning scheme within the Planning Corridor.

4.6.8 Sites of Botanical Significance

There are three Sites of Botanical Significance (SOBS) within the Planning Corridor see Table 9. The proposed pipeline alignment currently crosses all three of the SOBS see Figure 13.

Table 9. Sites of botanical significance

Name	Bioregion	Description
Wonarah Beds	Tanami	This distinctive undulating desert landscape is unique to this area of the Wakaya desert. The only known collection of *Sporobolus latzii* has been made from this site. In addition, the site is the type location for *Acacia drepanocarpa subsp. latifolia*.
James River Waterholes	Mitchell Grass Downs	This site is the series of semi-permanent waterholes along the channel of the James River between the Barkly Highway and its confluence with the Georgina River
Georgina River	Mitchell Grass Downs	The site includes the corridor of the Georgina River and also the low dolomite and limestone hills around Lake Nash Homestead. It also includes a large bluebush (*Chenopodium auricomum*) swamp, which lies to the east of Monkey Point Waterhole.

4.6.9 RAMSAR Wetlands

There are no places listed as Wetlands of International Importance (Ramsar) within the Planning Corridor.

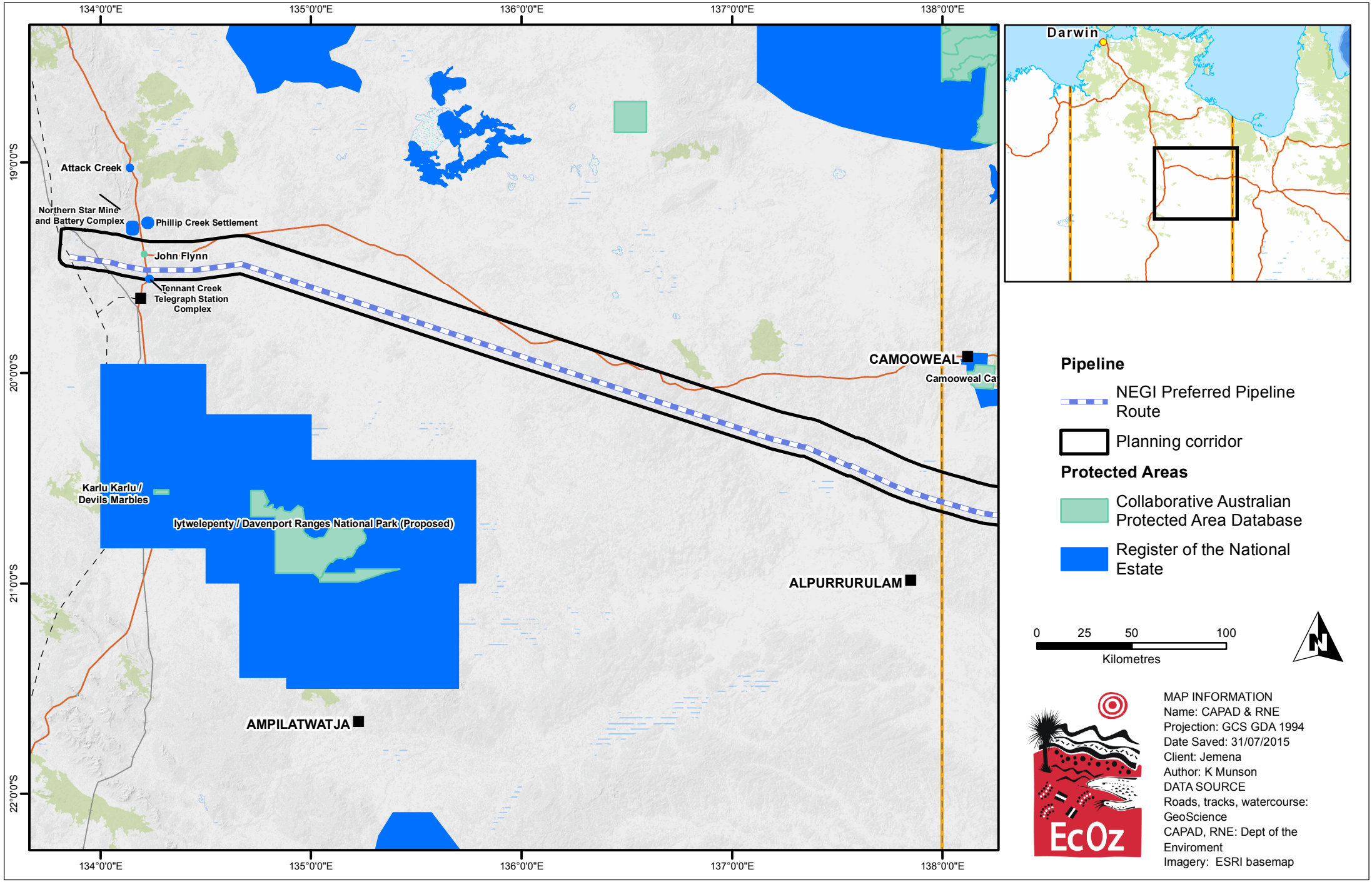

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Figure 16. Map of places on RNE and CAPAD

4.7 Cultural heritage environment

Preliminary searches of the NT Heritage Register (refer Table 10) and the Sacred Sites Register have been undertaken. These reveal that while there a number of sites in these registers none are likely to be impacted by the construction of the pipeline.

In relation to sites under the *Heritage Act*, there are two registered heritage sites within the Planning Corridor. Tennant Creek Telegraph Station Complex is located 5 km south of the Alignment Corridor and John Flynn Historical Reserve is 8 km north of the proposed pipeline route. Their locations are known and they will be avoided by the final pipeline alignment.

In relation to sites under the *Aboriginal Sacred Sites Act*, there are a number of sacred sites within the vicinity of the Planning Corridor whose locations are known and they will be avoided through on-ground cultural heritage surveys during the Planning Phase when defining the final pipeline alignment.

Jemena has a Survey Agreement in place with the Central Land Council (CLC) and a Sacred Sites Clearance Certificate for its preferred route within the CLC's jurisdiction. In addition, geotechnical surveys were undertaken on the pipeline route within the CLC area in accordance with the Survey Agreement and as a part of this process Jemena's preferred NEGI pipeline route was realigned in order to avoid impact on sacred sites.

Jemena has commenced discussions with the Northern Land Council (NLC) and the Arruwurra Aboriginal Corporation (AAC) in the NT regarding cultural heritage agreements and surveys in the Planning Phase of the Project. Similar discussions have been held with the Indjalandji-Dhidhanu and Kalkadoon people's in Queensland.

Full cultural heritage surveys for both ethnographic and archaeological sites will be conducted during the Planning Phase and Jemena will undertake these surveys in accordance with the agreements reached.

Jemena adopts an avoidance principle in relation to cultural heritage values and will work closely with the relevant organisations and Government agencies in relation to determining a final pipeline corridor and project footprint that avoids completely or minimises any impacts to cultural heritage values.

Table 10. Places with heritage values

Name	Distance from Planning Corridor	Type
Tennant Creek Telegraph Station Complex	Within corridor - 5km south of proposed alignment	Historical Reserve
Phillip Creek Settlement	8.5 km	Historical Reserve
North Star Mine Battery Complex	3.2 km	Historical Reserve
Attack Creek Historical Reserve	35 km	Historical Reserve
John Flynn Historical Reserve	Within corridor – 8km north of proposed alignment	Historical Reserve

4.8 Social and economic environment

The NEGI pipeline project is located in an area that is remote and sparsely populated. The nearest large regional town to the pipeline route is Tennant Creek, which is located 15 km to the south.

Tennant Creek has a police station, fire station and a hospital; and small accommodation and food outlets. The NEGI project will provide all construction accommodation and mess requirements in purpose built construction camps; and will have its own first aid facilities.

There are three small Aboriginal communities near the proposed pipeline alignment; Purrukuwurru (13.6 km south of NEGI alignment), Wonara community (15 km north of NEGI alignment) and Alpurrurulam (45 km south of the NEGI alignment). There are also four pastoral homesteads within the vicinity of the NEGI alignment; Barkly Roadhouse 16.3 km north of alignment, Avon Downs 38 km north of NEGI alignment, Austral Downs 3.5 km north of Alignment Corridor and Lake Nash 39.5 km south of Alignment Corridor. The construction process has the potential to cause some impact to these settlements due to increased traffic, noise, dust and minor restrictions on land use.

During the Planning Phase of the Project Jemena will undertake an Economic and Social Impact Assessment of the Project, in accordance with the NT EPA Guidelines in order to fully identify and manage any impacts, i.e. risk and opportunities that arise from the Project.

The major economic activity within the region covered by the Alignment Corridor is broad-scale pastoral operations. Pipeline construction activities will involve temporary increases in traffic on the Barkly Highway and land disturbance on pastoral properties traversed by the Alignment Corridor; and temporary water sources (dams) will also be established.

In relation to pastoral properties, Jemena will negotiate landholder agreements that will minimise impacts to landholders during the Construction Phase. As the pipeline Construction ROW will be rehabilitated progressively through the Construction Phase long-term negative impacts to pastoral operations are not expected to occur. The development of the pipeline offers potential opportunities for future pastoral station management.

In relation to impacts on the Barkly Highway road traffic, Jemena will prepare a Traffic Management Plan as a part of the Project Execution Plan, in consultation with the relevant stakeholders. This plan will also include a communications program to road users during the Construction Phase.

The pipeline construction and operational activities are not expected to significantly impact on any waterways used for recreational fishing or Indigenous land use, e.g. for hunting and / or fishing.

Jemena is in discussions with all of the Indigenous representative organisations in the NT, i.e. the CLC, the NLC and the AAC in relation to land agreements for the Project. These agreements, as well as the risk mitigation and opportunity enhancement strategies to be implemented through the Economic and Social Impact Management Plan (ESIMP), will manage any potential impact on Indigenous communities and people as a result of the Project.

5 Matters of National Environmental Significance

Jemena has prepared an EPBC Referral for submission to the Commonwealth Department of Environment (DoE) (Appendix D). Potential impacts of the NEGI project on Matters of National Environmental Significance (MNES) protected under the *EPBC Act* are summarised below from the EPBC Referral. The Referral concludes that the NEGI project is unlikely to have a significant impact on matters protected under the *EPBC Act*; and Jemena believes that the project is not a 'controlled action'.

5.1 World heritage properties

There are no world heritage places within a 50 km buffer of the proposed Alignment Corridor. Consequently, this development will not affect these areas.

5.2 National heritage places

There are no national heritage places within a 50 km buffer of the proposed Alignment Corridor. Consequently, this development will not affect these areas.

5.3 Ramsar wetlands

There are no wetlands of international importance within the Planning Corridor nor do any rivers that intersect the Alignment Corridor flow into any Ramsar wetland. Consequently, this development will not affect these areas.

5.4 Listed threatened species and ecological communities

The EPBC Protected Matters Search Tool (PMST) was used to generate a list of Commonwealth Threatened species and Threatened Ecological Communities within a 50 km buffer area around the Alignment Corridor. A number of listed threatened species were returned as 'known' or 'likely' to occur in the search area; however, no Threatened Ecological Communities were identified.

For each threatened species the likelihood of occurrence within the 20 km pipeline Planning Corridor was determined using the scientific literature and desktop information of species distribution and habitat requirements. The results of the assessment are summarised in Table 11 and the complete assessment is documented in Appendix E.

Four EPBC listed threatened species are considered 'Likely' to occur within the pipeline Planning Corridor across the NT and QLD; the Gouldian Finch (*Erythrura gouldiae*), Masked Owl (Northern) (*Tyto novaehollandiae kimberli*), Plains Death Adder (*Acanthophis hawkei*) and Carpentarian Antechinus (*Pseudantechinus mimulus*). Only the Masked Owl and Plains Death Adder are considered likely to occur in the parts of the project area located within the NT. The potential impacts to each of these species are considered in Section 6.1.2 and also in Section 3.1 of the EPBC Referral.

Table 11. Summary of threatened species likelihood analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood	EPBC status
Likely	Gouldian Finch	*Erythrura gouldiae*	Known	EN
	Carpentarian Antechinus	*Pseudantechinus mimulus*	Known	VU
	Masked Owl (Northern)	*Tyto novaehollandiae kimberli*	Known	VU
	Plains Death Adder	*Acanthophis hawkei*	Known	VU
Unlikely	Red Goshawk	*Erythrotriorchis radiata*	May	VU
	Night Parrot	*Pezoporus occidentalis*	Likely	EN
	Australian Painted Snipe	*Rostratula australis*	Likely	EN
	Greater Bilby	*Macrotis lagotis*	Known	VU
	Southern Marsupial Mole	*Notoryctes typhlops*	Likely	EN
	Black-footed Rock-wallaby (MacDonald Ranges Race)	*Petrogale lateralis (MacDonald Ranges Race)*	May	VU
	Gulf Snapping Turtle	*Elseya lavarackorum*	Known	EN
	Great Desert Skink	*Liopholis kintorei*	May	VU
	Freshwater Sawfish	*Pristis pristis*	Likely	VU

Status: EN = Endangered, VU = Vulnerable,
PMST likelihood: Known = species or species habitat known to occur within area, Likely = species or species habitat likely to occur within area, May = species or species habitat may occur within area; from Protected Matters Search Tool output, Appendix B of Appendix D

5.5 Listed migratory species

The *EPBC Act* PMST identified 19 migratory species within the 50 km buffer area around the Alignment Corridor. One species, the Australian Painted Snipe (*Rostratula australis*) is listed as 'Endangered' under the *EPBC Act* but is considered unlikely to occur in the Planning Corridor (refer Table 11). All the listed migratory species are birds and can be broadly grouped into; non-shorebird species (eight species) and shorebird species (11 species).

The likelihood of each migratory species occurring within the 20 km pipeline Planning Corridor was determined using the scientific literature and desktop information of species distribution and habitat requirements. The results of the assessment are summarised in Table 12 and Table 13; and the complete assessment is documented in Appendix E.

Six non-shorebird species are considered as either 'Known' or 'Likely' to occur within the Planning Corridor. None of the migratory shorebird species were likely to occur within the 20 km Planning Corridor due to the absence of suitable habitat.

The potential impacts to the migratory species 'Known' or 'Likely' to occur are discussed in Section 3.1 of the EPBC Referral; which concludes that the project is unlikely to have significant impacts on listed Migratory species.

Table 12. Summary of migratory (non-shorebird) species analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood
Known	Rainbow Bee-eater	*Merops ornatus*	May
	Great Egret	*Ardea alba*	Known
	Cattle Egret	*Ardea ibis*	May
Likely	Fork-tailed Swift	*Apus pacificus*	Likely
	Oriental Plover	*Charadrius veredus*	Known
	Oriental Pratincole	*Glareola maldivarum*	Known
Unlikely	White Bellied Sea Eagle	*Haliaeetus leucogaster*	Known
	Eastern Osprey	*Pandion cristatus*	Known

Key
PMST likelihood: Known = species or species habitat known to occur within area, Likely = species or species habitat likely to occur within area, May = species or species habitat may occur within area.

Table 13. Summary of migratory (shorebird) species analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood
Unlikely	Sharp-tailed Sandpiper	*Calidris acuminata*	Known
	Curlew Sandpiper	*Calidris ferruginea*	Known
	Wood Sandpiper	*Tringa glareola*	Known
	Marsh Sandpiper	*Tringa stagnatilis*	Known
	Red-necked Stint	*Calidris ruficollis*	Known
	Black-tailed Godwit	*Limosa limosa*	Known
	Little Curlew	*Numenius minutus*	Known
	Pacific Golden Plover	*Pluvialis fulva*	Known
	Lesser Sand Plover	*Charadrius mongolus*	Known
	Bar-tailed Godwit	*Limosa lapponica*	Known
	Whimbrel	*Numenius phaeopus*	Known

Key
PMST likelihood: Known = species or species habitat known to occur within area

5.6 Commonwealth marine areas

The Planning Corridor and its surrounds are not located nearby to any Commonwealth marine areas nor do any rivers that intersect the Alignment Corridor flow into any marine areas. Consequently, this development will not affect these areas.

5.7 Commonwealth land

The EPBC PMST indicated that there are seven areas of Commonwealth Land within the 50 km buffer of the Alignment Corridor. None of these areas is crossed by the proposed Alignment Corridor. The areas of Commonwealth Land are properties located in Mount Isa or Tennant Creek and are not expected to be impacted by the proposed action.

5.8 The Great barrier Reef Marine Park

The NEGI project is well inland from the Great Barrier Reef Marine Park and rivers that intersect the Alignment Corridor do not flow into the Pacific Ocean.

5.9 A water resource, in relation to coal seam gas development and large coal mining development

Not applicable.

6 Potential Impacts

The *APGA Code of Environmental Practice 2013* documents the activities associated with pipeline construction and operation; and the potential impacts of these activities on the environment. This section provides an overview of the potential impacts of the NEGI pipeline project in the context of the existing environment traversed by the pipeline Planning Corridor.

6.1 Construction activities

6.1.1 Access to site

During construction, access to the pipeline Construction ROW, work and camp sites, is required on a regular basis. Key potential environmental impacts relating to site access are listed below:

- Soil compaction, erosion and sediment release to land and water
- Disturbance of problematic soils such as dispersive, acid sulphate or contaminated soils
- Potential modification to surface water flows (drainage lines and streams)
- Potential for site run-off into drainage lines and watercourses
- Disturbance of significant flora or wildlife habitat
- Introduction of disease, weeds, vermin or destructive influences to the site
- Damage to agricultural production or other land uses
- Temporary disruption to landowners (access, noise and dust)
- Degradation of existing road infrastructure
- Increased safety hazard resulting from increases in traffic volume
- Unauthorised access track proliferation.

The NEGI project will utilise a number of existing tracks and will also create a number of new access tracks to provide access to the Construction ROW. The track locations and details are provided in Table 6. The proposed tracks will not directly impact on any known Threatened species habitats, significant sites or listed heritage sites.

All routes proposed for new access tracks will be surveyed prior to commencement of construction with the following objective:

- identify appropriate locations for low impact river / creek crossings
- identify and avoid (by re-routing track) any threatened species habitats that could be adversely impacted by disturbance by construction traffic
- identify and map areas of high erosion risk or transport constraints (such as black soil) so that these areas can be avoided and / or impacts reduced through track design and erosion and sediment control.

As high levels of traffic will occur only over a period of up to ten months during the construction phase; and all construction access tracks (except those that were pre-existing and the seven required for operational access) will be rehabilitated following construction, long-term impacts are not expected to occur.

Air pollutants from construction would arise from vehicle and mobile equipment exhausts as well as combustion emissions from power generation at camps; and dust emissions.

6.1.2 Clearing

Within the Alignment Corridor a cleared 30 m Construction ROW will support key construction activities. Clearing of the pipeline Construction ROW involves trimming or removal of trees, shrubs,

stumps and other obstacles, followed by stripping of groundcover and topsoil, to provide unobstructed and safe construction access. Cleared vegetation and topsoil is stockpiled along the edges of the Construction ROW for later use in rehabilitation.

Key potential environmental impacts relating to clearing are listed below:

- Soil erosion
- Sediment release to land or water
- Removal of significant flora and wildlife habitat
- Fragmentation of wildlife habitat and dislocation of wildlife corridors
- Increased potential for feral animal movement along new corridors
- Increased potential for weed species introduction
- Disturbance to heritage sites
- Potential impacts to visual amenity
- Unauthorised third party access to previously inaccessible areas.

Clearing of vegetation within the 30 m wide Construction ROW through the sparse Eucalyptus and Acacia woodlands and tussock grassland communities traversed by the pipeline alignment is not expected to cause any long-term impact to these communities. The potential for introduction and spread of weeds could impact the health of vegetation communities through competition and increased risk of fire; however, the combination of controls in the project Weed Management Plan (see Appendix C) and rehabilitation of the pipeline Construction ROW following construction is expected to mitigate any long term impacts to vegetation.

There are three threatened fauna species; and two threatened plant species identified as potentially occurring along the proposed pipeline route. The ecological surveys scheduled to occur in the 2016 dry season will confirm the presence / absence of suitable habitat for these species. Given the pipeline construction corridor is only 30 m wide, the likelihood that the Threatened plant species *Austrobryonia argillicola* and *Sporobolus latzii* would be intercepted is considered to be low; and given the specified habitat requirements are associated with creeks and seasonal swamps these areas can and will be avoided when siting above-ground infrastructure and construction camps.

Suitable habitats for the Threatened fauna species Masked Owl (Northern) (*Tyto novaehollandiae kimberli*), Grey Falcon (*Falco hypoleucos*) and Plains Death Adder (*Acanthophis hawkei*) are widespread and will likely be traversed by the Alignment Corridor and / occur in areas where above-ground facilities and construction camps will be sited. The main potential impact on the bird species would be associated with removal of in-use nest trees, which is unlikely given the species occur in low densities through habitat that is wide spread; and of which only a 30 m wide Construction ROW will be cleared. Furthermore, the nesting period for the Masked Owl is outside of the construction phase (Oct-Dec).

The removal of tall trees within a 30 m wide Construction ROW within riparian zones, which are potential nesting habitats for the Grey Falcon; is not expected to remove an amount of habitat that would impact on the future breeding success of this species. Potential nest trees for the Masked Owl occur in Eucalyptus woodland, which is widespread; and therefore removal of trees in a 30 m wide Construction ROW is not expected to impact the future breeding success of the species.

The Plains Death Adder (*Acanthophis hawkei*) occurs on cracking-clay floodplains, which may be traversed by the pipeline route. If the snake were to occur within the Alignment Corridor, as a mobile species it could utilise similar suitable habitats outside of the construction ROW for the duration of the construction period. The project is not expected to have any long-term impact on habitats utilised by this species.

As a result of the initial searches of both the NT Heritage Register, the Register of Sacred Sites and consultations undertaken by the Central Land Council and the Arruwurra Aboriginal Corporation to date, there are no sacred sites or heritage sites that will be impacted by the Project. It is possible;

however, that Aboriginal archaeological sites protected under the NT Heritage Act will occur within the project area. The field surveys scheduled to occur in the in the 2016 dry season will include ethnographic surveys where required and archaeological surveys for the full area of proposed Project disturbance.

In relation to Aboriginal archaeological sites, Jemena will first seek to avoid these but where this is not possible a Works Approval will be sought under the Heritage Act to allow for site salvage and disturbance. The protection of Aboriginal sacred sites will be undertaken through Jemena's consultations with the CLC, the NLC and the AAC and once completed an Authority Certificate will be applied for under the Aboriginal Sacred Sites Act (NT).

A Cultural Heritage Management Plan will be put in place for the Project and will form a part of the Construction Environment Management Plan (CEMP).

6.1.3 Grading

Grading involves the removal of topsoil and, in some instances, subsoil from the pipeline Construction ROW and associated work and camp sites. Grading is required where:

- construction is likely to unduly damage topsoil and inhibit rehabilitation or primary production activities
- the topography does not permit safe and practical access to the pipeline Construction ROW or work sites
- the soil conditions cannot accommodate construction activities.

Generally, topsoil is removed to the next soil horizon (i.e. sub-soil). The extent and depth of topsoil removal from the pipeline Construction ROW (e.g. full stripping or partial stripping) shall be determined on the basis of best practice for the specific site, in consultation with landowners, the project CEMP and relevant regulatory authorities.

Key potential environmental impacts relating to grading are listed below:

- Soil erosion and sediment release to land or water
- Degradation of soil structure through soil mixing, compaction and topsoil loss
- Disturbance of problematic soils such as Acid Sulphate Soil, dispersive soil or contaminated soil and consequent release of acid or contaminated leachate
- Removal of wildlife habitat
- Disturbance to Cultural Heritage
- Increased potential for the spread of weeds and pathogens
- Potential impacts to visual amenity
- Unauthorised third party access to previously inaccessible areas
- Potential temporary disruption to existing land uses.

Grading has potential to cause erosion, especially where the Alignment Corridor crosses the highly erodible black soil plains and at watercourse crossings. The project activities are not expected to cause any significant erosion due to the following factors:

- All clearing and grading will occur during the dry season
- Ground disturbance is temporary, occurring over a period of ten months
- Rehabilitation of disturbed areas will occur before the onset of the wet season.

6.1.4 Stringing, coating and joining

Key potential environmental impacts relating to stringing, coating and jointing are listed below:

- Dust and noise emissions resulting from pipe transport
- Temporary obstruction of other land uses

- Damage to existing road networks
- Potential fire hazard associated with construction welding and grinding
- Appropriate management of waste materials
- Pipe stringing impeding emergency vehicles, landowner access or fauna movements including stock
- Hazardous waste generation from abrasive blasting
- Waste from spent rods, spray paint etc.

Stringing, coat and joining produces waste products including mild steel offcuts and defective pipe, metal filings, timber skids and sandbags, chemical containers (such as epoxy coating cans), abrasive blasting residue and welding residue (such as welding rod scraps, welding stubs, electrode butts, radiography chemicals and packaging). As all wastes will be contained and removed for off-site disposal at a licensed facility, the wastes produced are not expected to cause any long-term contamination.

6.1.5 Trenching

The pipeline will be laid in a trench with a minimum depth of cover of 750 mm. At watercourse crossings, the minimum depth of cover will be increased to at least 1,200mm. Key potential environmental impacts relating to trenching are listed below:

- Soil erosion and sedimentation of land and water (including discharge waters)
- Problematic soils (Acid Sulphate Soil) or contaminated soil disturbance
- Potential for stock and wildlife entering the open trench
- Disturbance to sub-surface artefacts, heritage sites or skeletal remains
- Disturbance to root structures of mature vegetation
- Temporary obstruction of other land uses
- Potential impact to water sources (groundwater and surface water).

The Alignment Corridor does not traverse any areas where there are potential acid sulphate soils; and widespread pre-existing soil contamination is considered unlikely to be associated with the pastoral land-use.

Trenching through watercourses and areas of highly erodible black soil floodplains has potential to cause erosion. As previously mentioned the project activities are not expected to cause any significant erosion or sedimentation due to the following factors:

- All clearing and grading will occur during the dry season
- Ground disturbance is temporary, occurring over a period of ten months
- Rehabilitation of disturbed areas will occur before the onset of the wet season.

A number of ground-dwelling fauna are likely to fall into the open sections of trench, which is a temporary barrier to movement of fauna. To assist fauna that falls into the open trenches, ramps at various distances along the open section of trench will be installed to assist fauna out of the trench. Fauna deaths are also minimised through the use of full-time trench fauna clearing teams of experienced fauna handlers who check the open trench each day removing trapped fauna; and the trenches are inspected prior to backfilling. Whilst some deaths will occur, the mitigation is expected to ensure that a relatively small number of animals die in the trench.

6.1.6 Blasting

In ground where the use of conventional excavation or ripping equipment is not feasible, it may be necessary to use controlled blasting. Along the NT section of the Alignment Corridor this may be a requirement in the rocky areas that occur around Tenant Creek. In the NT the handling, storage and use of explosives is governed by the *Dangerous Goods Act* and the *Transport of Dangerous Goods*

By Road and Rail (National Uniform Legislation) Act. Shotfirer will also need to hold a blasting license.

Key potential environmental impacts relating to blasting are listed below:

- Impacts on terrestrial and aquatic fauna
- Noise disturbance
- Vibration disturbance
- Dust generation
- Appropriate management of debris
- Infrastructure damage.

Depending on the location of blasting activities in relation to areas of human habitation, the activities could cause nuisance noise, dust and vibration. As the blasting activities will be managed in accordance with standard pipeline construction procedures prescribed in the *APGA Code of Environmental Practice 2013* (Appendix F); and will occur over a short period of time, the impacts on people are not expected to be more than a temporary nuisance.

Blasting will remove some rocky outcrops that provide refuge habitat for fauna. There are no Threatened species known to rely on the rocky habitats around Tenant Creek that occur within the pipeline Planning Corridor.

Blasting will cause noise and vibration that will cause fauna to move away from the construction area. As the activity over a short period of time this impact will be temporary and long-term habitat avoidance is considered unlikely.

6.1.7 Construction camps and worksites

Key potential environmental impacts relating to construction camps and worksites are listed below:

- Soil erosion, sediment release to land and water
- Removal of significant flora and wildlife habitat
- Dust and noise emissions
- Potential impacts on visual amenity
- Temporary obstruction of other land uses
- Site rehabilitation
- Waste Management and disposal
- Increased traffic volumes entering and leaving site

The proposed locations of camps will be determined in the planning phase with the final location being confirmed after discussions with landholders and the cultural heritage and ecological survey work is completed (approximately May 2016). This process will ensure that the camps do not directly impact on threatened species habitats, are located away from watercourses and seasonal wetland areas and do not impact on any historic or cultural heritage sites. Furthermore, impacts to the community associated with high levels of traffic, dust and noise emissions and any potential impacts on visual amenity will be limited due to the remote location, land-use and sparse population.

No water extraction is required to provide potable water; which for NT construction camps will be transported to site from Tenant Creek or Camooweal.

Fuel storage and handling could result in leaks and spills that contaminate surface water and groundwater. As the fuel storage areas will be AS1940 compliant and will be temporary, and used during the dry season only, potential for contamination is considered to be low.

Sewerage treatment and disposal could cause contamination of surface and groundwater if not appropriately sited and maintained. Sewage from temporary construction camps will be treated through use of septic or transportable treatment units, and effluent will be irrigated to land in accordance with the *Code of Practice for On-site Wastewater Management* following approval by the

Department of Health. Given this governance process and the short-term disposal requirements at each campsite (i.e. for a few months during the dry season), potential for contamination is considered to be low.

6.1.8 Watercourse crossings

There are a few small ephemeral creeks, streams and waterways that will be crossed by the Alignment Corridor using a standard 'open cut' trenching method. This method involves in-stream excavation of a trench. Excavators or backhoes are generally used for this technique, enabling trench spoil to be stockpiled away from the stream bed.

The pipeline is placed across the waterway, lowered in and the trench backfilled immediately. This method is often applied in dry or shallow, low flow watercourses, but may also be applied in sensitive watercourses where rapid construction is considered the best means of minimising environmental impacts.

Key potential environmental impacts relating to watercourse crossings are listed below:

- Soil erosion and sedimentation of land and water
- Bank degradation
- Flood events
- Impacts on riparian and aquatic flora and fauna
- Disturbance to heritage sites
- Temporary obstruction of other land users.

Removal of vegetation and bank disturbance will make watercourse crossings highly susceptible to erosion. Subject to implementation of standard erosion and sediment controls the project activities are not expected to cause any significant erosion due to the following factors:

- All clearing and grading will occur during the dry season
- Ground disturbance is temporary, occurring over a period of ten months
- Rehabilitation of disturbed areas will occur before the onset of the wet season.

The riparian zone of watercourses provides a refuge habitat for fauna. The most important habitat areas in the semi-arid zone traversed by the pipeline route will occur where permanent or semi-permanent pools occur, as in a very dry landscape these habitats will be rare. If the Alignment Corridor does intersect pools of water that persist late into the dry season this would be identified through the ecological surveys scheduled for the 2016 dry season; and the final pipeline route may be realigned to avoid these habitats. If realignment is not possible then disturbance of any pools may result in making the habitat unsuited for many species to use for a single dry season; however, long-term impacts are considered unlikely as the crossing will be less than 30 m wide and will be reinstated prior to the onset of the wet season.

6.2 Pipeline testing and commissioning

Hydrostatic testing is undertaken on pipelines at the completion of backfill operations. Key potential environmental impacts relating to hydrostatic testing are listed below:

- Potential impacts on aquatic and terrestrial fauna and flora from discharged hydrotest water
- Modification of water quality
- Use of chemical additives (e.g. test medium corrosion inhibitors, biocides)
- Disposal of hydrostatic testing water
- Soil contamination, erosion and sedimentation from hydrotest water discharge

Hydrostatic testing procedures, including water sourcing and disposal, will be determined during the project planning and construction phase. It is estimated that 15 ML of water will be required for this testing and it will be sourced from bores and stored in turkey's nest dams.

The extraction of 15 ML of water from bores established along the Alignment Corridor is not expected to cause any long-term impact to groundwater availability.

Disposal of the hydrotest water to land has potential to cause contamination of soils, groundwater; and potentially surface water, should runoff occur from contaminated disposal areas during the wet season. Hydrotest water will be disposed of at a suitable land disposal area; and will not be directly released into any watercourse. Options for disposal include:

- Release and drain
- Dust control
- Evaporation ponds
- Irrigation.

At least one month prior to commencement of hydrostatic pressure testing activities a Hydrostatic test Water Management Plan (**HTWMP**) will be submitted to the relevant authorities. Subject to an approved HTWMP hydrostatic testing activities are not expected to cause any significant impact to the environment.

Minor emissions of air pollutants from vehicles and mobile equipment would occur during the commissioning phase. Additional emission sources of air pollutants would occur from compressor station start up when the compressor is purged with natural gas; and from pipeline and above ground facility venting operations. These sources would result in the emission of the following:

- Nitrogen gas from gas purging
- Natural gas from pipeline venting.

6.3 Pipeline operation

Pipeline operations will transport gas from the existing Amadeus Gas Pipeline near Tenant Creek through to Mt Isa where it will transfer into the Carpentaria Gas Pipeline. The operation of the pipeline will be in accordance with approval documentation, a specific Operational Environmental Management Plan (**OEMP**), and relevant standards and codes. The activities involved in pipeline operation are generally non-intrusive, minor surveillance, monitoring and maintenance activities, which will have minimal environmental impact.

Pipeline surveillance is an essential activity in the operation of every pipeline, and is covered in AS2885.3. Any surveillance activity requiring land access will be undertaken in consultation with the landowner. Surveillance activities are non-intrusive and are not expected to cause environmental impact.

The pipeline easement will pass through leasehold land that is mainly used for other activities. Agreements will be negotiated with landowners, allowing the landowners continued use of their land whilst the pipeline operator retains a right of access to the pipeline easement to operate and maintain the pipeline and its associated easement. It is not expected that operational activities will disturb existing land uses or landowners / users.

Day to day operation of the pipeline is not expected to result in any significant emissions of air pollutants or noise. Venting of the pipeline will be required during maintenance at main line valves or compressor stations. This will result in the release of gases that in small amounts in a very remote area are unlikely to result in pollutant levels that exceed NEPM assessment criteria.

Any major maintenance or repairs may require minor re-clearing of rehabilitated areas; and the use of heavy equipment and hazardous materials. As these works will be site specific and managed in accordance with an OEMP, they are not expected to cause any significant impact to the environment.

6.4 Decommissioning

Decommissioning of pipelines requires careful assessment of the economic, risk, social and environmental situation and close communication with regulators and other stakeholders. The *APGA Code of Environmental Practice 2013* (Appendix F) provides detailed guidance on the minimum acceptable environmental management standard to be adopted once the decision to decommission has been taken. If and when decommissioning of the NEGI pipeline is proposed a Decommissioning Plan will be developed in accordance with the code for approval by regulatory authorities.

7 Measures to avoid or reduce impacts

The *APGA Code of Environmental Practice 2013* documents a framework for managing the environmental impacts of pipeline construction, operation and decommissioning activities in Australia. The Code follows the impact minimisation hierarchy of avoid, minimise, rehabilitate and offset. As a member of the APGA, Jemena is committed to complying with the standards and guidelines established in the Code.

The Code of Practice is a well-established document that provides measures applicable to all pipeline projects. It is the industry standard for environmental management; and it documents measures that are proven to be feasible and effective in minimising impacts to the environment. A copy of the Code is provided at Appendix F and its application to the NEGI project is further described below.

7.1 Measures to avoid impacts

The linear nature of the NEGI pipeline development allows for impact avoidance measures to be implemented early during the project planning phase. The pipeline alignment proposed by Jemena was determined through desktop assessment of land tenure, geology/soils, roads and the location of Indigenous communities. This first pass assessment provided for impact avoidance by:

- identifying the shortest constructible route
- identifying previously disturbed land and pre-existing access tracks that may be used
- minimising the number of land tenures and properties traversed
- avoiding known protected areas, sites of conservation significance, environmentally sensitive areas; and cultural and heritage sites
- avoiding permanent waterholes mapped on available topographic mapping data
- avoiding difficult terrain where more intrusive construction techniques are required or where soils are susceptible to erosion.

A 20 km wide planning corridor has been established around the preferred pipeline route within which changes to the alignment can be made to avoid or reduce impacts to landholders and the environment. The pipeline alignment, access track routes, locations for above-ground facilities and temporary construction camp sites will only be finalised following ground-based environment and heritage surveys, which are schedule to occur in the 2016 dry season.

The initial alignment for the proposed pipeline was determined through desktop assessment of land tenure, geology / soils, roads, the location of Indigenous communities and landholder and Indigenous community consultation. Using the initial alignment as the basis, the process for selection of the final alignment on which the pipeline will be constructed is as follows:

1. Identification of a 20km wide Planning Corridor.
2. Definition of a 1km wide Alignment Corridor within which all pipeline construction activities can occur (**Alignment Corridor**).
3. Selection of a 30m Pipeline Construction ROW.

The Alignment Corridor will be confirmed through discussions and negotiations with landholders and Aboriginal land interests. Cultural heritage (archaeological and ethnographic) and ecological surveys will be undertaken over the Alignment Corridor to ensure that there are no constraints to pipeline construction activities and for the purposes of obtaining the relevant approvals and agreements, particularly relating to cultural heritage.

Within the Alignment Corridor the Construction ROW will be 30m wide with additional extra workspace as required. Areas for temporary workers camps and pipe and equipment laydown will also be

determined during the planning phase and will be within the Alignment Corridor. Where possible, access to the Construction ROW will be via existing roads and tracks and temporary workers camps will be located on already disturbed land. Access tracks and temporary workers camps will be removed and rehabilitated following completion of construction, excepting those tracks that were pre-existing unless agreements with landholders require otherwise. Each of these steps provides opportunities for impact avoidance.

7.2 Measures to minimise impacts

The standards in the *APGA Code of Environmental Practice 2013* (Appendix F) will be used as a basis for the development of a NEGI project specific Construction Environmental Management Plan (**CEMP**) and Operational Environmental Management Plan (**OEMP**). Both of these documents will be required for compliance with the conditions of the pipeline licence issued for the NEGI.

The Code documents standards in relation to the following Key Aspects:

- Flora Management
- Fauna Management
- Biosecurity Management
- Heritage Management
- Aboriginal Cultural Heritage Management
- Soils Management
- Drainage, Erosion and Sedimentation Management
- Water Management
- Waste Management
- Noise Management
- Dust and Air Emissions Management
- Traffic Management.

The standards identified in the code will be directly applied to the construction and operation of the NEGI pipeline through a project specific CEMP and OEMP; and these documents will also include details in relation to environmental management roles / responsibilities, permit and approval requirements, environmental awareness training of personnel and monitoring / reporting.

Site specific measures will be required to address environment and heritage issues unique to the NEGI pipeline and/or to specific locations along the pipeline route. These requirements will be developed following the field surveys scheduled for the 2016 dry season. Project specific requirements for the NEGI will include the following as a minimum:

- Construction activities will occur during the dry season; and reinstatement and installation of erosion and sediment controls is to occur prior to the onset of the wet season.
- Erosion and sediment control requirements applicable to the pipeline Construction ROW, access tracks, above-ground facilities and construction camp locations will be documented in Erosion and Sediment Control Plans, which will be developed in accordance with the ESCP guidance provided by the NT Department of Land Resource Management.
- Large trees within Eucalyptus forest habitats and riparian zones that are being utilised as nesting trees by the Threatened birds species Masked Owl (Northern) (*Tyto novaehollandiae kimberli)*, Grey Falcon (*Falco hypoleucos*) will be identified during pre-clearing surveys and, where practicable, marked for avoidance

- If populations of the Threatened flora species *Austrobryonia argillicola* and *Sporobolus latzii* are found, the final pipeline route will avoid these populations.
- Pre-clearing surveys will be undertaken by qualified ecologists and archaeologists who will walk ahead of the bull-dozers and mark sites and areas identified as significant and to be avoided as a result of the 2016 dry season surveys.
- Weed hygiene measures will be implemented at designated locations along the Construction ROW. Requirements will be prescribed in the project Weed Management Plan, which will be developed following completion of weed mapping during the 2016 dry season.
- Disposal of hydrostatic testing wastewater and sewage wastewater from construction camps will occur to land-based disposal areas in accordance with management plans approved by the relevant regulatory authorities.
- All domestic waste, construction waste and contaminated waste will be removed from site for disposal at a facility licenced under the *Waste Management Pollution Control Act* to accept the waste.
- Any archaeological sites identified during the field surveys will either be preserved in-situ or a works approval will be obtained under the *NT Heritage Act*
- An Authority Certificate issued pursuant to the *Aboriginal Sacred Sites Act* will be required prior to commencement of construction; and all conditions must be implemented.

7.3 Measures to rehabilitate

The pipeline Construction ROW and all temporary facilities, tracks and work areas will be progressively rehabilitated through the construction phase with approximately 3% of the total disturbance area remaining for operational requirements. Seven permanent access tracks will be required to provide access to each of the above-ground facilities; however, no permanent access is required along the pipeline Construction ROW.

After returning soil to the trench, the soil surface within the Construction ROW will be contoured to the surrounding land surface and then stockpiled vegetation and topsoil will be respreads across the disturbed areas. Other areas used in construction (such as truck turnarounds and temporary camps) will be rehabilitated as soon as practical after the area's construction activities are completed. As construction will occur during a single dry season, it is expected that the seed bank in the re-spread topsoil will remain viable and vegetation will naturally commence regeneration during the wet season.

River and stream banks will be rehabilitated to the standard acceptable by the regulatory authorities prior to the onset of the wet season. As all construction will occur within a single dry season, rehabilitation of all crossings prior to the onset of the wet season will be achievable. Erosion and sediment controls will be installed to ensure that soil stability is maintained, allowing vegetation to re-establish on the river / creek banks.

Rehabilitation of watercourse crossings is a routine activity undertaken during pipeline construction and as the area disturbed is relatively small (less than 30 m wide) rehabilitation by re-spreading topsoil, re-contouring and installation erosion and sediment controls is likely to be sufficient to ensure no significant degradation of the riparian zone following construction. Rehabilitation of the Construction ROW and watercourse crossings in particular is addressed in detail in the *APGA Code of Environmental Practice 2013* (Appendix F).

8 Proponent's statement of whether significant impacts are likely

The proposed NEGI pipeline project is not expected to cause a significant impact to the environment in the NT for the following reasons:

Route planning – impact avoidance

- The route planning and site selection process for the NEGI pipeline provides for impact avoidance during the early project planning phases. The Alignment Corridor has been chosen based on minimising impacts to landholders; and known environment and heritage values. The pipeline alignment will be finalised following on-ground surveys scheduled to occur in the 2016 dry season, which will provide finer-scale data to inform further impact avoidance.

Landscapes and soils

- Any erosion caused by the project is expected to be minor and localised for the following reasons:
    - Excavations for the pipeline trench will be shallow (less than 2 m) and there is no requirement for importation of fill material
    - Clearing of vegetation and excavation will occur only during the dry season
    - Reinstatement of cleared areas will occur prior to the onset of the wet season
    - Erosion and sediment control requirements applicable to the pipeline Construction ROW, access tracks, above-ground facilities and construction camp locations will be documented in Erosion and Sediment Control Plans, which will be developed in accordance with the ESCP guidance provided by the NT Department of Land Resource Management.
- The project is not located in an area where acid sulphate soils would occur.

Surface water and groundwater

- The Alignment Corridor does not traverse any permanent water courses; and all watercourse crossings will be constructed during the dry season during no-flow conditions.
- Surveys scheduled for the 2016 dry season will confirm the presence / absence of any permanent waterholes at watercourse crossing locations; and realignment of the pipeline will occur to avoid impacts on these regionally important habitats if they are present.
- Changes to hydrology will be localised and temporary as the pipeline Construction ROW and construction work areas will be reinstated prior to the onset of the wet season; and erosion and sediment controls will be established in accordance with ESCP's as stated above.
- Fuel storages, sewage wastewater disposal and waste management will be temporary requirements during the dry season only; and will be managed in accordance with established standards, guidelines and approvals as detailed through this NOI.
- There is no requirement for extraction of surface water identified.
- Groundwater extraction for construction dust suppression and hydrotest water will occur over a single dry season only; and extraction of the amounts required are considered unlikely to cause any long-term impact to groundwater resources.

Flora

- Clearing of vegetation within a 30 m wide Construction ROW through the sparse Eucalyptus and Acacia woodlands and tussock grassland communities traversed by the Alignment Corridor is not expected to cause any long-term impact to these communities.
- Given the pipeline Construction ROW is only 30 m wide, the likelihood that the Threatened plant species *Austrobryonia argillicola* and *Sporobolus latzii* would be intercepted is considered to be low; and given the specified habitat requirements are associated with creeks and seasonal swamps these areas can be surveyed during finalisation of the pipeline alignment; and will be avoided when siting above-ground infrastructure and construction camps.
- The project is not expected to cause proliferation of weeds due to the combination of controls in the project Weed Management Plan (see Appendix C) and rehabilitation of the pipeline Construction ROW following construction.

Fauna

- Fauna deaths in the open trench will be minimised through the use of full-time trench fauna clearing teams of experienced fauna handlers who walk the entire length of open trench each day removing trapped fauna; and the trenches will be inspected prior to backfilling. The mitigation is expected to ensure that a relatively small number of animals die in the trench.
- The main potential impact on the threatened bird species Masked Owl (Northern) (*Tyto novaehollandiae kimberli*) and Grey Falcon (*Falco hypoleucos*) would be associated with removal of in-use nest trees, which is considered unlikely given the species occur in low densities through habitat that is widespread; and of which only a 30 m wide corridor will be cleared. Furthermore, the nesting period for the Masked Owl is outside of the construction phase (Oct-Dec).
- The removal of tall trees within a narrow Construction ROW (30 m wide or less) within riparian zones which are potential nesting habitats for the Grey Falcon; is not expected to remove an amount of habitat that would impact on the future breeding success of this species.
- Potential nest trees for the Masked Owl occur in Eucalyptus woodland, which is widespread; and therefore removal of trees in a 30 m wide Construction ROW is not expected to impact the future breeding success of the species.
- The Plains Death Adder (*Acanthophis hawkei*) as a mobile species that occurs in low densities is unlikely to be found in the Planning Corridor during the construction period. If it were present, as a mobile species it could utilise similar suitable habitats outside of the Construction ROW for the duration of the construction period; and death through being caught up in the land clearing or trench will be mitigated by the use of fauna spotter-catchers for the duration of clearing and trenching activities. The project is not expected to have any long-term impact on the cracking-clay habitats utilised by this species.
- Off-site impacts to water quality are not expected to occur and therefore any listed Threatened species that utilise the aquatic environments downstream of the Alignment Corridor will not be impacted.

Air emissions

- Air pollutants from construction activities will be temporary and due to the remoteness from sensitive receptors is unlikely to cause more than temporary nuisance impacts to people moving through the areas under construction.

- Day to day operation of the pipeline is not expected to result in any significant emissions of air pollutants. The release of gases in small amounts in a very remote area is unlikely to result in pollutant levels that exceed NEPM assessment criteria.

Protected Areas, Sacred Sites and Heritage

- The project will not impact on any sites listed on the NT Heritage Register, Register of Sacred Sites, NHL, WHL or CHL.
- Archaeological surveys will be undertaken during the route surveys scheduled for the 2016 dry season. Any archaeological heritage sites identified will either be avoided through re-routing of the pipeline or for sites of low significance work permits will be obtained pursuant to the *NT Heritage Act* prior to land clearing.
- Aboriginal Sacred Sites will be avoided through consultations, where required, with the Traditional Owners through the CLC, NLC and AAC who can participate in the pipeline route surveys. The final pipeline alignment will be chosen based on these consultations.

People and communities

- During the Planning Phase of the Project Jemena will undertake an Economic and Social Impact Assessment of the Project, in accordance with the NT EPA Guidelines in order to fully identify and manage any impacts, i.e. risk and opportunities that arise from the Project.
- Jemena will develop and implement an Economic and Social Impact Management Plan for this purpose

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Appendix A NTNRM Infonet Report

Territory Natural Resource Management

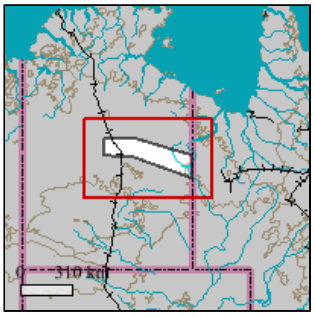
Northern Territory Government

CHARLES DARWIN UNIVERSITY

Custom area

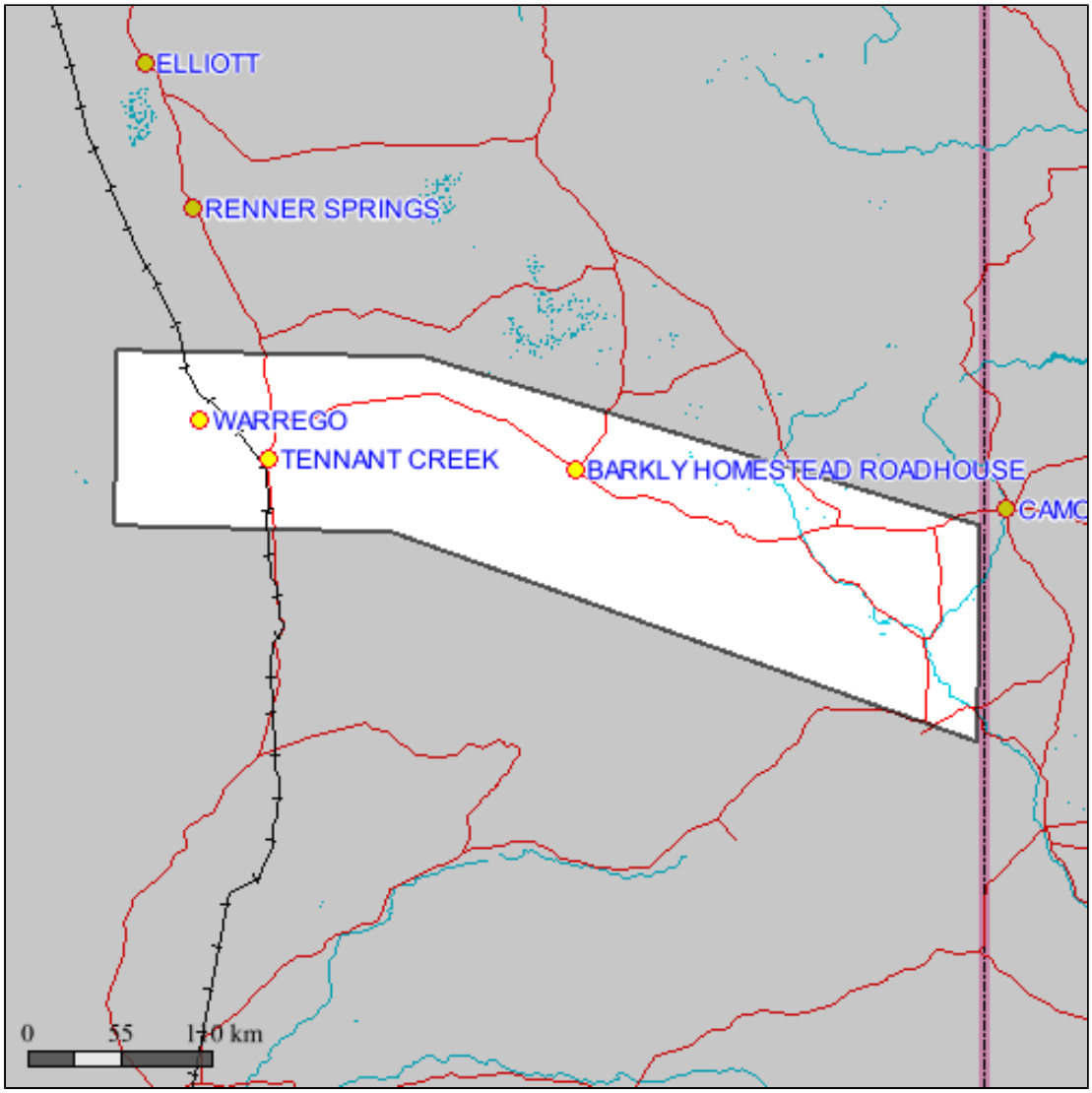
NT NRM Report

Custom area



Custom area encompasses an area of 54363.78 sq km extending from 19 deg 4.0 min to 21 deg 9.0 min S and 133 deg 22.0 min to 137 deg 58.0 min E.
Custom area is located in the Mitchell Grass Downs, Tanami, Davenport Murchison Ranges, bioregion(s)

Location of Custom area

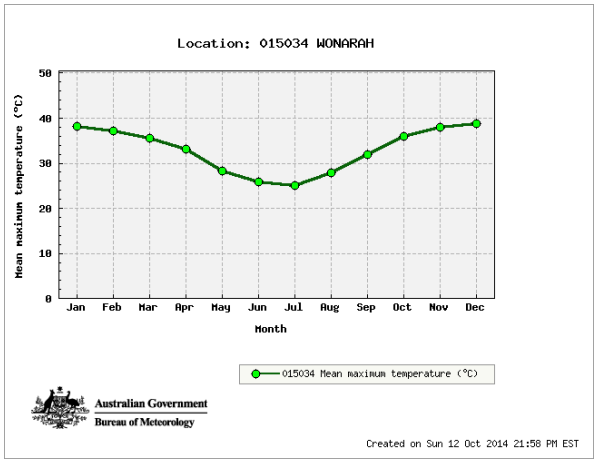


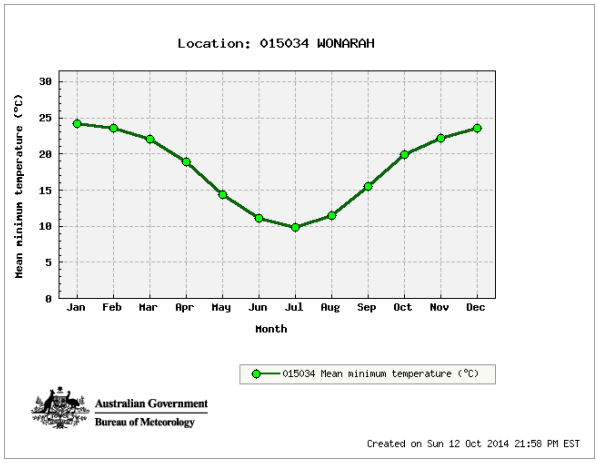
Custom area Climate

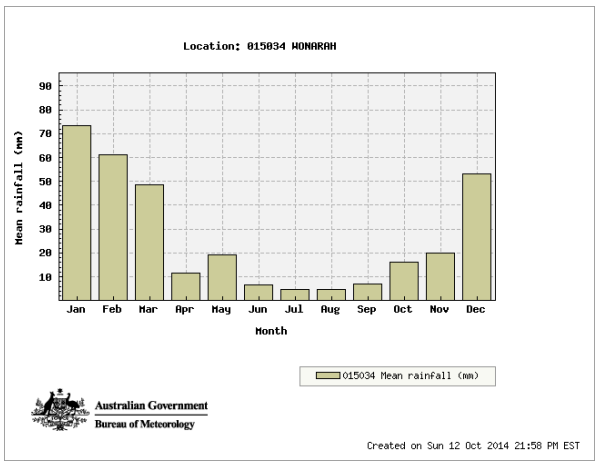
The closest long-term weather station is WONARAH (19 deg 53.0 min S, 136.3358E)
73 km E of the center of selected area

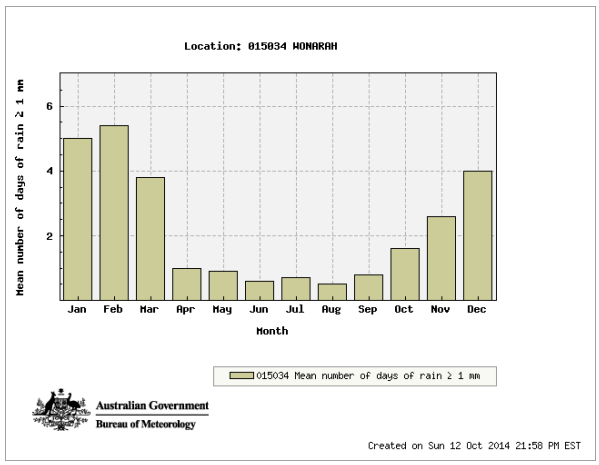
Statistics	Annual Values	Years of record
Mean max temp (deg C)	32.9	23
Mean min temp (deg C)	18.1	23
Average rainfall (mm)	322.7	28
Average days of rain	26.9	28

Climate summaries from Bureau of Meteorology (www.bom.gov.au)



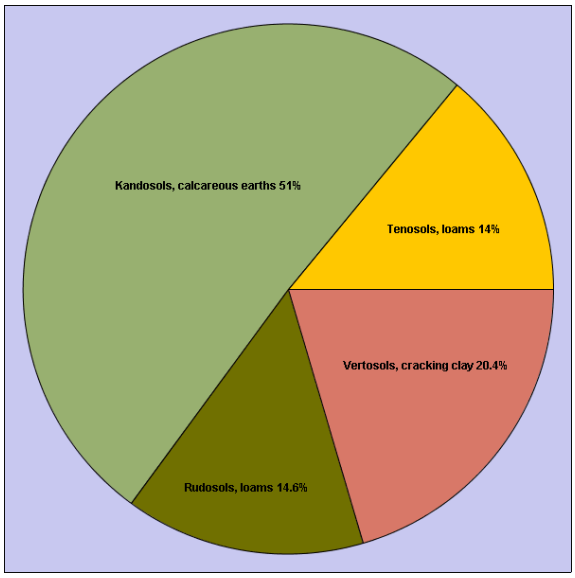






Custom area Soils

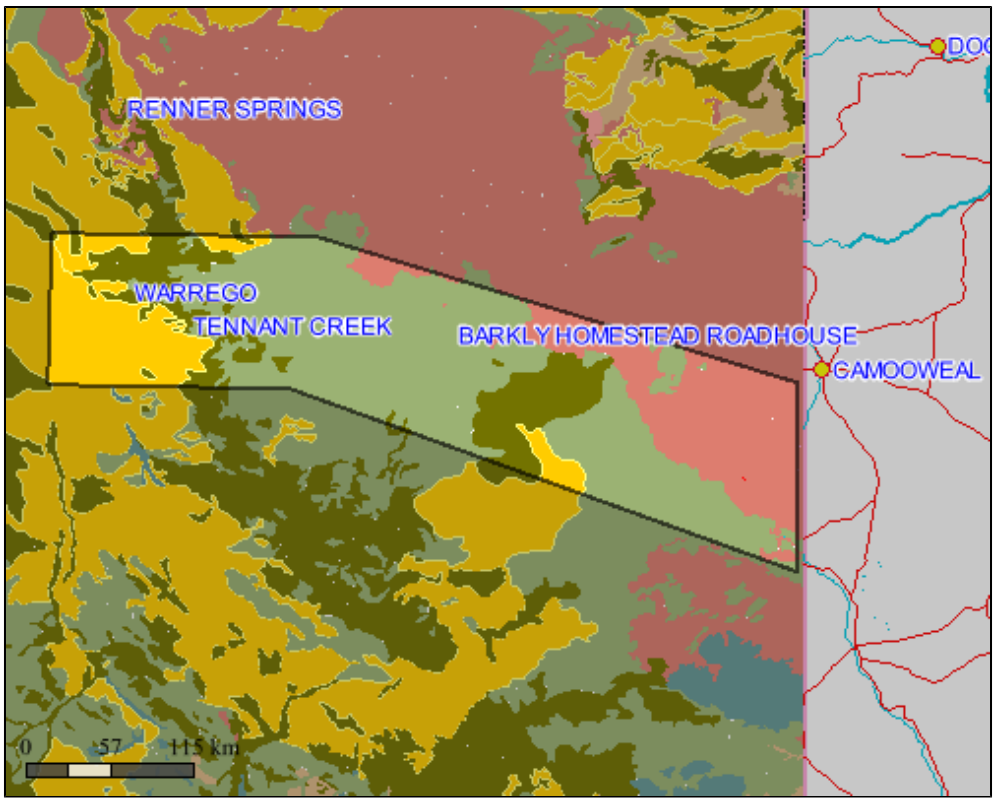
Soil Types



Area of soil types (Northcote Factual Key)

Category	Area sq km	Area%
Kandosols, calcareous earths	27723.63	51.00
Vertosols, cracking clay	11113.16	20.44
Rudosols, loams	7936.05	14.60
Tenosols, loams	7590.94	13.96

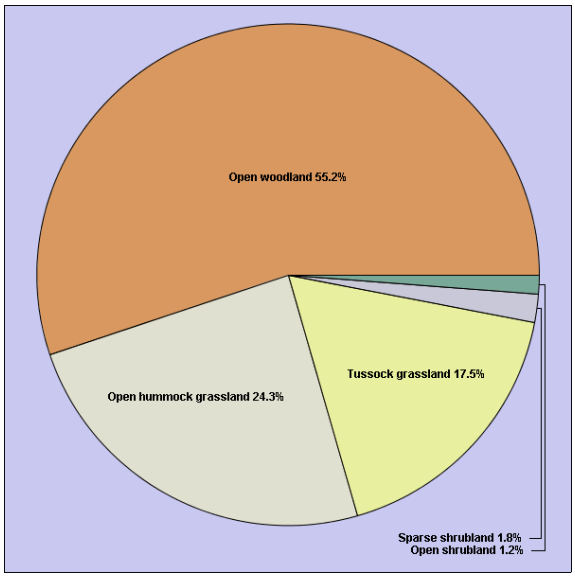
Soil Types



Soils 1:2M Layer is a copy of the NT portion (1:2,000,000 scale dataset) of the CSIRO Atlas of Australian Soils - K.H. Northcote et al. Data scale: 1:2,000,000 ANZLIC Identifier: 2DBCB771205D06B6E040CD9B0F274EFE
More details: Go to www.lrm.nt.gov.au/nrmapsnt/ and enter the ANZLIC identifier in the Spatial Data Search

Custom area Vegetation

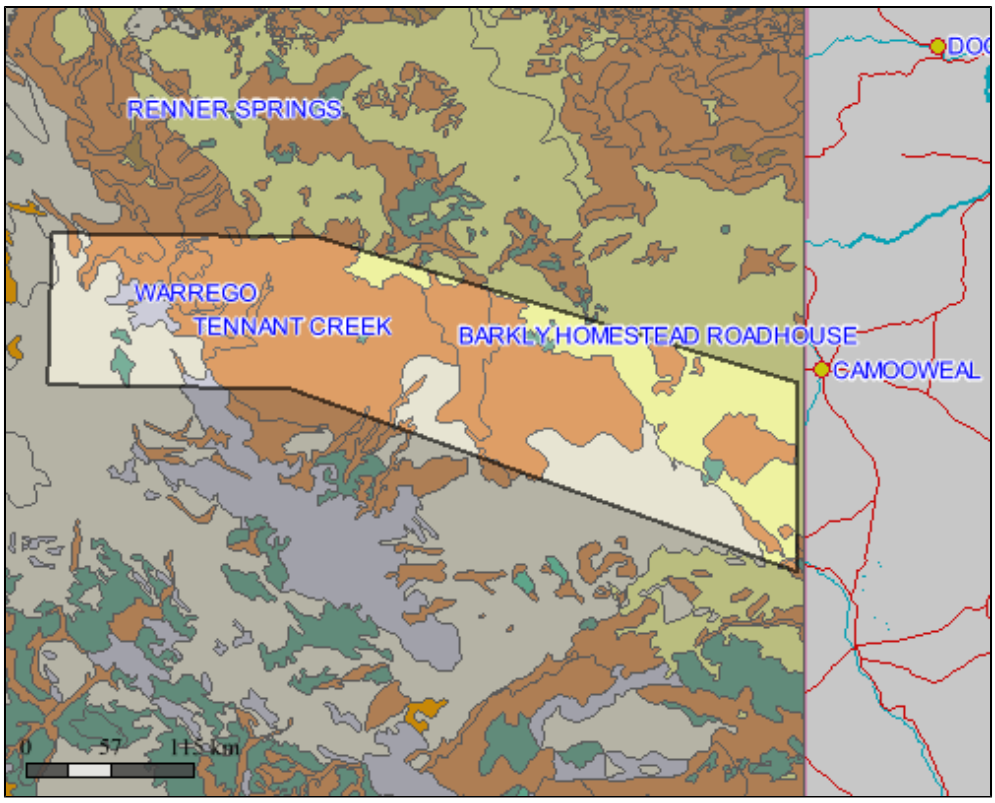
Vegetation Communities



Area of vegetation communities

Category	Area sq km	Area%
Open woodland	30002.43	55.19
Open hummock grassland	13196.61	24.27
Tussock grassland	9516.90	17.51
Sparse shrubland	983.48	1.81
Open shrubland	664.37	1.22

Vegetation Communities

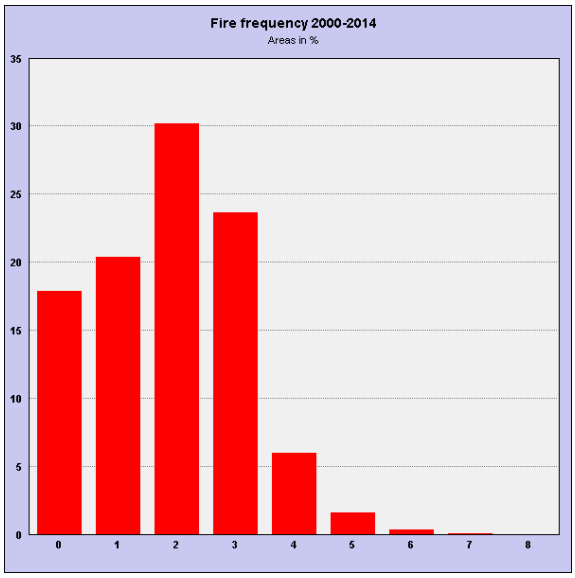


The NVIS 2005 Layer is compiled from a number of vegetation and land unit survey maps that were recoded and re-attributed for the National Vegetation Information System (NVIS)
Data scale variable depending on location. ANZLIC Identifier:2DBCB771207006B6E040CD9B0F274EFE
More details:Go to www.lrm.nt.gov.au/nrmapsnt/ and enter the ANZLIC identifier in the Spatial Data Search

Custom area Fire History

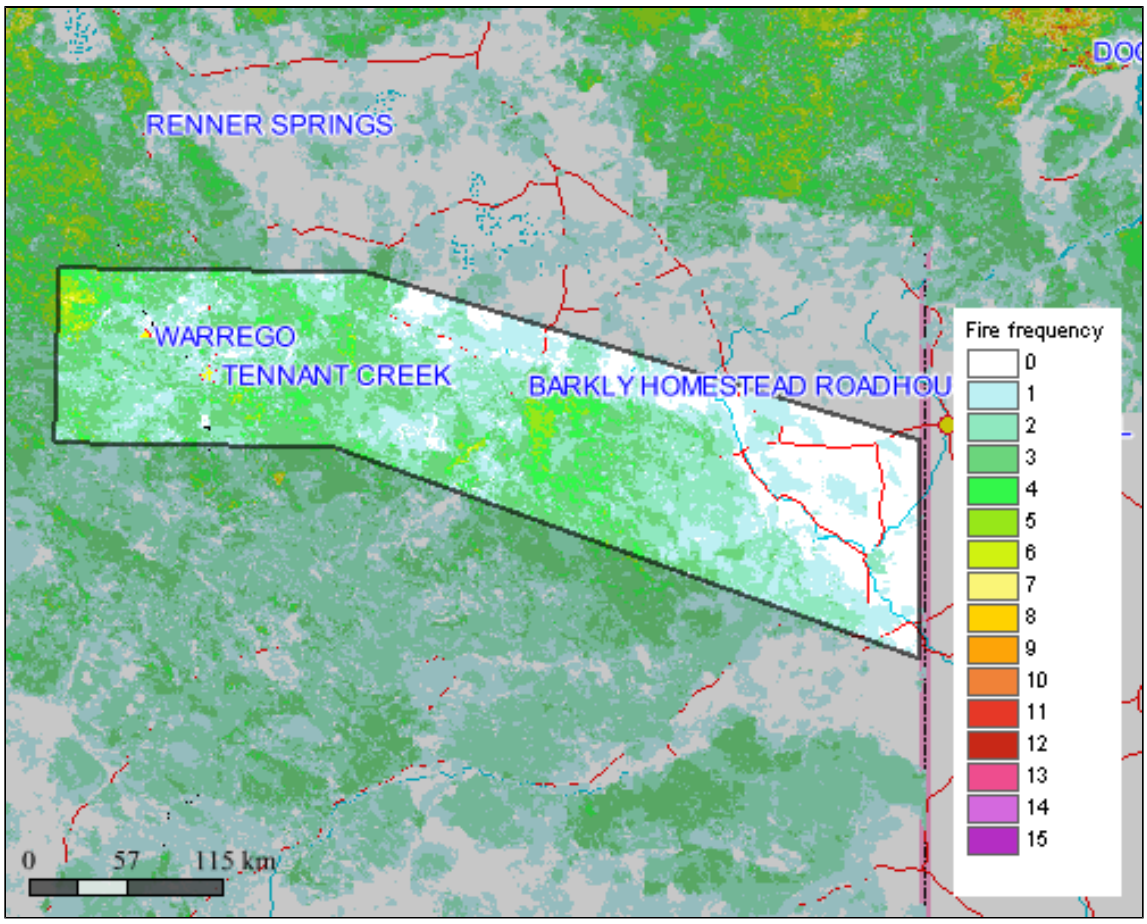
Years burnt 2000-2014

and area burnt in each category



Category	Area sq km	Area%
0	9724.48	17.89
1	11071.93	20.37
2	16410.37	30.19
3	12847.01	23.63
4	3245.32	5.97
5	862.27	1.59
6	176.56	.32
7	24.82	.05
8	1.01	.00

Years burnt 2000-2014



The fire frequency(250m) Layer is derived from satellite imagery sourced from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the NASA Terra satellite
Spatial Resolution: 250m x 250m pixels (at Nadir).

Custom area Threatened Species

Threatened species recorded in Custom area (Records Updated: Sept 2013)

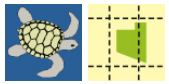
Group	Common Name	Scientific Name	NT Status	National Status	ID	#Observations (Latest)	#Specimens (Latest)	#Surveys (Latest)
Flowering Plants	Sporobolus	*Sporobolus latzii*	VU	.	.	0 (Unknown)	1 (1993)	0 (Unknown)
Flowering Plants	Tobermorey Melon	*Austrobryonia argillicola*	VU	.	257219	0 (Unknown)	0 (Unknown)	0 (Unknown)
Snails	Spencer's Land Snail	*Bothriembryon spenceri*	VU	.	351895	0 (Unknown)	0 (Unknown)	0 (Unknown)
Reptiles	Plains Death Adder	*Acanthophis hawkei*	VU	VU	.	0 (Unknown)	1 (1978)	0 (Unknown)
Birds	Grey Falcon	*Falco hypoleucos*	VU	.	.	4 (2010)	0 (Unknown)	0 (Unknown)
Birds	Masked Owl (northern mainland)	*Tyto novaehollandiae kimberli*	VU	VU	594609	1 (2001)	0 (Unknown)	0 (Unknown)
Mammals	Brush-tailed Mulgara	*Dasycercus blythi*	VU	VU	351695	3 (1993)	2 (1901)	0 (Unknown)
Mammals	Crest-tailed Mulgara	*Dasycercus cristicauda*	VU	EN	351695	0 (Unknown)	3 (1905)	0 (Unknown)
Mammals	Golden Bandicoot	*Isoodon auratus*	EN	VU	176421	8 (1969)	16 (1936)	0 (Unknown)
Mammals	Greater Bilby	*Macrotis lagotis*	VU	VU	177125	12 (1994)	2 (1969)	2 (2004)
Mammals	Common Brushtail Possum (southern)	*Trichosurus vulpecula vulpecula*	EN	.	177146	2 (1969)	3 (1901)	0 (Unknown)
Mammals	Black-footed Rock-wallaby	*Petrogale lateralis*	.	VU	351635	3 (1988)	0 (Unknown)	0 (Unknown)

EX = Extinct
EW = Extinct in the Wild
ER = Extinct in the NT
EN = Endangered
EN/VU = One Endangered subspecies/One Vulnerable subspecies
VU=Vulnerable
VU/- = One or more subspecies vulnerable EN/- = One or more subspecies endangered

Survey = this category refers to data collected using systematic survey methodology
Specimen = this category refers to museum or other records where a specimen has been collected and lodged
Observation = this category refers to all other incidental recordings where systematic methodology may not have been used consistently.

More species info: Go to www.landmanager.org.au/view/index.aspx?id=####
where #### is the ID number from the tables above for the species of interest.

Custom area Threatened Species Grid



Threatened species recorded in the grid cell(s) in which Custom area occurs (Records Updated: Sept 2013)

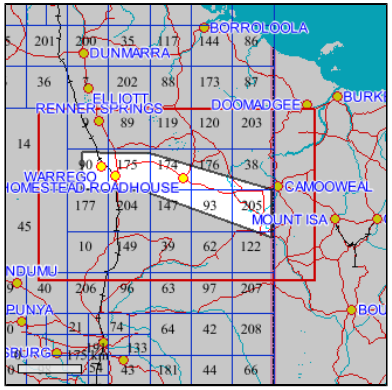
Group	Family Name	Scientific Name	Common Name	NT Status	National Status	#Observations	Latest Observation Date	#Specimens	Latest Specimen Date	#Surveys	Latest Survey Record
Flowering Plants	Poaceae	*Sporobolus latzii*	Sporobolus	VU		0	Unknown	1	1993	0	Unknown
Flowering Plants	Cucurbitaceae	*Austrobryonia argillicola*	Tobermorey Melon	VU		0	Unknown	0	Unknown	0	Unknown
Snails	Bulimulidae	*Bothriembryon spenceri*	Spencer's Land Snail	VU		0	Unknown	0	Unknown	0	Unknown
Reptiles	Varanidae	*Varanus panoptes*	Yellow-spotted Monitor	VU		0	Unknown	1	Unknown	0	Unknown
Reptiles	Elapidae	*Acanthophis hawkei*	Plains Death Adder	VU	VU	0	Unknown	22	1985	0	Unknown
Birds	Falconidae	*Falco hypoleucos*	Grey Falcon	VU		9	2010	0	Unknown	0	Unknown
Birds	Tytonidae	*Tyto novaehollandiae kimberli*	Masked Owl (northern mainland)	VU	VU	1	2001	0	Unknown	0	Unknown
Birds	Meliphagidae	*Grantiella picta*	Painted Honeyeater	VU		1	1981	0	Unknown	0	Unknown
Mammals	Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara	VU	VU	13	1998	2	1901	0	Unknown
Mammals	Dasyuridae	*Dasycercus cristicauda*	Crest-tailed Mulgara	VU	EN	1	1998	3	1905	0	Unknown
Mammals	Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	CR	EN	2	1903	0	Unknown	0	Unknown
Mammals	Dasyuridae	*Pseudantechinus mimulus*	Carpentarian Antechinus		VU	2	1969	0	Unknown	0	Unknown
Mammals	Peramelidae	*Isoodon auratus*	Golden Bandicoot	EN	VU	11	1969	16	1936	0	Unknown
Mammals	Thylacomyidae	*Macrotis lagotis*	Greater Bilby	VU	VU	48	2009	4	1969	2	2004
Mammals	Phalangeridae	*Trichosurus vulpecula vulpecula*	Common Brushtail Possum (southern)	EN		7	1969	3	1901	0	Unknown
Mammals	Macropodidae	*Petrogale lateralis*	Black-footed Rock-wallaby		VU	14	1992	0	Unknown	2	2004
Mammals	Notoryctidae	*Notoryctes typhlops*	Southern Marsupial Mole	VU	EN	1	1990	0	Unknown	0	Unknown

EX = Extinct
EW = Extinct in the Wild
ER = Extinct in the NT
EN = Endangered
EN/VU = One Endangered subspecies/One Vulnerable subspecies
VU=Vulnerable
VU/- = One or more subspecies vulnerable EN/- = One or more subspecies endangered

Survey = this category refers to data collected using systematic survey methodology
Specimen = this category refers to museum or other records where a specimen has been collected and lodged
Observation = this category refers to all other incidental recordings where systematic methodology may not have been used consistently.

More species info: Go to www.landmanager.org.au/view/index.aspx?id=####
where #### is the ID number from the tables above for the species of interest.

Species listed in the table above were recorded from all the grid cells shown below (red/blue line) that overlap Custom area



Custom area Weeds and Potential Weeds

Introduced plants recorded in the grid cell(s) in which Custom area occurs and that have been identified as problem weeds in one or more locations in northern Australia. Occurrence based on Northern Territory Government databases.

Family Name	Scientific Name	Common Name	NT Status	National Status	Other Status	#Surveys	Latest Record
Asteraceae	*Acanthospermum hispidum*	Starburr	*B C*			2	2001
Amaranthaceae	*Alternanthera pungens*	Khaki Weed	*B C*		*DEU NSW SA*	0	Unknown
Meliaceae	*Azadirachta indica*	Neem			*MP K1 C&E G&M CYP WeedsAus*	0	Unknown
Poaceae	*Bothriochloa pertusa*	Indian Bluegrass			*DEU*	0	Unknown
Apocynaceae	*Calotropis procera*	Rubber Bush	*B C (S of 16 5 deg S)*		*WA1 WA2 G&M*	0	Unknown
Poaceae	*Cenchrus biflorus*	Gallon`s Curse			*NSW*	2	2001
Poaceae	*Cenchrus ciliaris*	Buffel Grass			*MP Gr G&M DEU*	0	Unknown
Poaceae	*Cenchrus echinatus*	Mossman River Grass	*B C*		*NSW*	0	Unknown
Poaceae	*Cenchrus pedicellatus subsp. unispiculus*	Mission Grass (annual)			*WeedsAus*	0	Unknown
Poaceae	*Cenchrus setiger*	Birdwood Grass			*DEU*	0	Unknown
Poaceae	*Chloris barbata*	Purpletop Chloris			*DEU*	0	Unknown
Poaceae	*Chloris virgata*	Feathertop Rhodes Grass			*DEU*	0	Unknown
Cucurbitaceae	*Citrullus lanatus*	Camel Melon			*G&M*	0	Unknown
Brassicaceae	*Coronopus didymus*	Lesser Swinecress			*G&M*	0	Unknown
Cucurbitaceae	*Cucumis melo*	Ulcardo Melon			*DEU*	28	2001
Solanaceae	*Datura ferox*	Fierce Thornapple	*A C*		*WA1 WA3 WA4 G&M*	0	Unknown
Solanaceae	*Datura leichhardtii*	Native Thornapple	*C*		*WA1 WA3 WA4*	0	Unknown
Poaceae	*Echinochloa colona*	Awnless Barnyard Grass			*DEU*	11	2001
Poaceae	*Eragrostis tenuifolia*	Elastic Grass			*DEU*	0	Unknown
Amaranthaceae	*Gomphrena celosioides*	Gomphrena Weed			*DEU*	1	2001
Lamiaceae	*Hyptis suaveolens*	Hyptis	*B C*		*G&M*	0	Unknown
Euphorbiaceae	*Jatropha gossypiifolia*	Bellyache Bush	*B C*	*WONS*	*K2 WA1 WA4 Q2 C&E G&M CYP DEU*	0	Unknown
Fabaceae	*Leucaena leucocephala subsp. leucocephala*	Coffee Bush			*MP C&E G&M CYP*	0	Unknown
Fabaceae	*Macroptilium atropurpureum*	Siratro			*C&E*	0	Unknown
Malvaceae	*Malvastrum americanum*	Spiked Malvastrum			*DEU*	39	2003
Malvaceae	*Malvastrum coromandelianum*	Prickly Malvastrum			*DEU*	0	Unknown
Poaceae	*Melinis repens*	Red Natal Grass			*DEU*	0	Unknown
Oxalidaceae	*Oxalis corniculata*	Creeping Wood-sorrel			*NSW*	0	Unknown

Family Name	Scientific Name	Common Name	NT Status	National Status	Other Status	#Surveys	Latest Record
Fabaceae	*Parkinsonia aculeata*	Parkinsonia	*B C*	*WONS*	*MP K2 WA1 WA4 Q2 G&M CYP DEU NSW SA*	14	2001
Fabaceae	*Prosopis pallida*	Mesquite	*A C*	*WONS*	*K2 WA1 WA2 WA4 Q2 G&M NSW SA*	1	2001
Fabaceae	*Senna occidentalis*	Coffee Senna	*B C*		*G&M DEU*	1	2001
Malvaceae	*Sida acuta*	Spiny-head Sida	*B C*		*WA1 G&M*	0	Unknown
Malvaceae	*Sida cordifolia*	Flannel Weed	*B C*		*WA1 G&M DEU*	0	Unknown
Malvaceae	*Sida spinosa*	Spiny Sida			*DEU*	57	2001
Poaceae	*Sporobolus africanus*	Parramatta grass			*Q2 G&M*	0	Unknown
Poaceae	*Sporobolus coromandelianus*	Madagascar Dropseed			*DEU*	0	Unknown
Fabaceae	*Stylosanthes hamata*	Caribbean Stylo			*DEU*	0	Unknown
Fabaceae	*Stylosanthes humilis*	Townsville Lucerne			*DEU*	1	2003
Zygophyllaceae	*Tribulus terrestris*	Caltrop	*B C*		*CYP SA*	8	1996
Poaceae	*Urochloa mosambicensis*	Sabi Grass			*DEU*	0	Unknown
Fabaceae	*Vachellia farnesiana*	Sweet Acacia			*DEU*	26	2001
Fabaceae	*Vachellia nilotica*	Prickly Acacia	*A C*	*WONS*	*MP K2 Q2 G&M DEU NSW*	0	Unknown
Asteraceae	*Xanthium strumarium*	Noogoora Burr	*B C*		*MP WA1 WA2 WA4 DEU NSW SA*	19	2001

Status Codes:

1. NATIONAL STATUS CODES

Alert, Alert List for Environmental Weeds (Please call Exotic Plant Pest Hotline 1800 084 881 if you think you have seen this weed)
Sleeper, National Sleeper Weed
Target,Targeted for eradication. (www.landmanager.com.au/view/index.aspx?id=449837)
WONS, Weeds of National Significance

2. NT STATUS CODES

A, NT Class A Weed (to be eradicated)
B, NT Class B Weed (growth & spread to be controlled)
C, NT Class C Weed (not to be introduced) (www.landmanager.com.au/view/index.aspx?id=449869)

3. OTHER STATUS CODES

C&E, Csurhes, S. & Edwards, R. (1998) Potential Environmental Weeds in Australia. Candidate Species for Preventative Control. Environment Australia, Canberra (www.landmanager.com.au/view/index.aspx?id=394504)
CYP, Draft Cape York Peninsula Pest Management Plan 2006-2011 (www.landmanager.com.au/view/index.aspx?id=371200)
DEU, Plants listed as environmental weeds by the Desert Uplands Strategic Land Resource Assessment (www.landmanager.com.au/view/index.aspx?id=332123)
G&M, Grice AC, Martin TG. 2005. The Management of Weeds and Their Impact on Biodiversity in the Rangelands. Cooperative Research Centre (CRC) for Australian Weed Management and CSIRO Sustainable Ecosystems. Commonwealth Australia (www.landmanager.com.au/view/index.aspx?id=163572)
Gr, Groves et al. 2003. Weed categories for natural and agricultural ecosystem management. Bureau of Rural Sciences (www.landmanager.com.au/view/index.aspx?id=388018)
K0, High Priority Weeds not yet established in the Katherine region
K1, High Priority Weeds posing environmental threats in the Katherine region
K2, High Priority Weeds posing existing threats in the Katherine region, as described in the Katherine Regional Weed Management Strategy 2005-2010 (www.landmanager.com.au/view/index.aspx?id=130286)
MP, Northern Territory Parks & Conservation Masterplan (www.landmanager.com.au/view/index.aspx?id=144141)
NAQS, North Australian Quarantine Strategy Target List (www.landmanager.com.au/view/index.aspx?id=449416)
NSW, Declared Noxious Weed in NSW (www.landmanager.com.au/view/index.aspx?id=449983)
Q1, QLD Class 1 Weed (not to be introduced, kept or supplied-
Q2, Class 2 Weed (eradicate where possible, not to be introduced, kept or supplied)
Q3, Qld Class 3 Weed (to be controlled near environmentally sensitive areas- not to be supplied/sold without a permit) (www.landmanager.com.au/view/index.aspx?id=190714)
SA, Declared Plant in South Australia (www.landmanager.com.au/view/index.aspx?id=449996)
WeedsAus, Listed as a significant weed by Weeds Australia (www.landmanager.com.au/view/index.aspx?id=14576)
WA1, WA Weed Class P1 (movement prohibited)
WA2, WA Weed Class P2 (aim to eradicate)
WA3, WA Weed Class P3 (control infestations)

WA4, WA Weed Class P4 (prevent spread)
WA5, WA Weed Class P3 (control infestations on public land) (www.landmanager.com.au/view/index.aspx?id=449884).

Survey = this category refers to data collected using systematic survey methodology
Specimen = this category refers to museum or other records where a specimen has been collected and lodged
Observation = this category refers to all other incidental recordings where systematic methodology may not have been used consistently.

More species info: Go to www.landmanager.org.au/view/index.aspx?id=####
where #### is the ID number from the tables above for the species of interest.

Plants listed in the table above were recorded from all the grid cells shown below (red/blue line) that overlap Custom area

Custom area Pest and Potential Pest Animals


Animals with pest potential recorded in the grid cell(s) in which Custom area occurs. Occurrence based on Northern Territory Government databases.

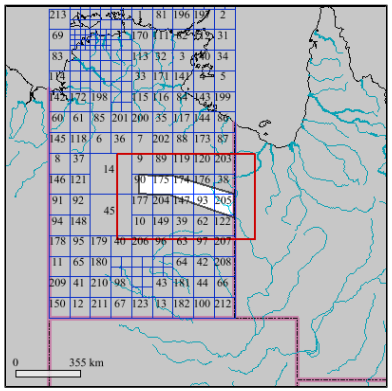
Common Name	Scientific Name	NT Status	National Status	ID	#Observations (Latest)	#Specimens (Latest)	#Surveys (Latest)
Asian House Gecko	*Hemidactylus frenatus*	P	.	188964	1 (1991)	4 (2000)	0 (Unknown)
Rock Dove	*Columba livia*	P	.	183336	2 (2001)	0 (Unknown)	0 (Unknown)
Red-tailed Black-cockatoo	*Calyptorhynchus banksii macrorhynchus*	N	.	223765	3 (1998)	0 (Unknown)	2 (2004)
Sulphur-Crested Cockatoo	*Cacatua galerita*	N	.	223772	1 (1998)	0 (Unknown)	1 (1995)
House Sparrow	*Passer domesticus*	P	.	183322	28 (2004)	16 (Unknown)	0 (Unknown)
House Mouse	*Mus musculus*	P	.	187720	31 (1996)	32 (1996)	3 (2011)
Black Rat	*Rattus rattus*	P	.	183236	0 (Unknown)	2 (1960)	0 (Unknown)
Dingo / Wild dog	*Canis lupus*	N	.	183280	37 (2009)	59 (1970)	15 (2011)
Fox	*Vulpes vulpes*	P	.	183294	10 (2009)	0 (Unknown)	2 (2011)
Cat	*Felis catus*	P	.	183259	41 (2010)	4 (1980)	9 (2011)
Rabbit	*Oryctolagus cuniculus*	P	.	187331	14 (1996)	0 (Unknown)	0 (Unknown)
Donkey	*Equus asinus*	P	.	183287	18 (2009)	0 (Unknown)	3 (2004)
Horse	*Equus caballus*	P	.	183315	16 (1999)	0 (Unknown)	0 (Unknown)
Pig	*Sus scrofa*	P	.	183329	12 (1999)	0 (Unknown)	0 (Unknown)
Camel	*Camelus dromedarius*	P	.	183210	4 (2009)	0 (Unknown)	0 (Unknown)
Cattle	*Bos taurus*	P	.	183266	11 (2010)	0 (Unknown)	29 (2011)

NT STATUS CODES:
Int, Introduced species (all non-prohibited vertebrates, and all other exotic species (www.landmanager.com.au/view/index.aspx?id=280771)
N, Native species with pest potential.
P, Prohibited species (all exotic vertebrates except those listed as non-prohibited (www.landmanager.com.au/view/index.aspx?id=450509)

Survey = this category refers to data collected using systematic survey methodology
Specimen = this category refers to museum or other records where a specimen has been collected and lodged
Observation = this category refers to all other incidental recordings where systematic methodology may not have been used consistently.

More species info: Go to www.landmanager.org.au/view/index.aspx?id=####
where #### is the ID number from the tables above for the species of interest.

Potential pest animals listed in the table above were recorded from all the grid cells shown below (red/blue line) that overlap Custom area



Soils and vegetation graphs and tables refer to area of soils and vegetation only. Fire graphs and tables refer to entire selected area including sea if present. Calculations are derived from map images or vector data, and should be taken as a guide only. Accuracy cannot be guaranteed. For small areas, figures should be rounded to the nearest whole number.

Appendix B – Identified weed species

Common name	Scientific name	WoNS	NT Class	NT
Mimosa bush	Acacia farnesiana			Y
Prickly acacia	Acacia nilotica		Class A	Y
Star burr	Acanthospermum hispidum		Class B	Y
Ruby dock	Acetosa vesicaria			Y
Kapok	Aerva javanica			Y
Alligator Weed	Alternanthera philoxeroides	Y	Class A	
Khaki weed	Alternanthera pungens		Class B	Y
	Alysicarpus ovalifolius			Y
	Amaranthus viridis			Y
Mexican poppy	Argemone ochroleuca		Class B	Y
	Avena fatua			Y
	Bidens pilosa			Y
	Bothriochloa pertusa			Y
	Brassica tournefortii			Y
Cabomba	Cabomba caroliniana	Y	Class A	
Rubber bush	Calotropis procera		Class B	Y
	Cenchrus biflorus			Y
Buffel grass	Cenchrus ciliaris			Y
	Cenchrus clandestinus			Y
Mossman river grass	Cenchrus echinatus		Class B	Y
Mission grass - annual	Cenchrus pedicellatus			Y
Cloncurry Buffel	Cenchrus pennisetiformis			Y
Mission grass - perennial	Cenchrus polystachios		Class B	Y
Cavalcade	Centrosema pascuorum			Y
	Chamaecrista rotundifolia			Y
	Chloris barbata			Y
	Chloris gayana			Y
	Chloris virgata			Y
	Citrullus colocynthis			Y
	Citrullus lanatus			Y
	Clitoria ternatea			Y
	Conyza bonariensis			Y
	Corchorus olitorius			Y
	Corchorus trilocularis			Y
Rubber Vine	Cryptostegia grandiflora	Y	Class A	
	Cucumis myriocarpus			Y
Coral cactus	Cylindropuntia fulgida var. mamillata	Y		
Devil's Rope Cactus	Cylindropuntia imbricata	Y		

Common name	Scientific name	WoNS	NT Class	NT
Hudson Pear	Cylindropuntia rosea	Y		
Couch grass	Cynodon dactylon			Y
	Cyperus compressus			Y
	Cyperus involucratus			Y
	Dactyloctenium aegyptium			Y
Longspine thornapple	Datura ferox		Class A/ Class C	Y
Sheda grass	Dichanthium annulatum			Y
Crab grass - bicornis	Digitaria bicornis			Y
Summer grass	Digitaria ciliaris			Y
	Echinochloa colona			Y
Patterson's curse	Echium plantagineum		Class A	Y
Water Hyacinth	Eichhornia crassipes	Y	Class A	
	Eleusine indica			Y
	Eragrostis amabilis			Y
Pitted lovegrass	Eragrostis barrelieri			Y
	Eragrostis cilianensis			Y
	Eragrostis cylindriflora			Y
	Eragrostis mexicana			Y
	Eragrostis minor			Y
	Eragrostis tenuifolia			Y
Milk weed	Euphorbia heterophylla			Y
	Euphorbia hirta			Y
	Euphorbia hyssopifolia			Y
	Euphorbia prostrata			Y
	Gomphrena celosioides			Y
	Grewia asiatica			Y
	Guilleminea densa			Y
Hyptis	Hyptis suaveolens		Class B	Y
Bellyache bush	Jatropha gossypiifolia	Y	Class A	Y
	Lactuca serriola			Y
	Lepidium africanum			Y
African Boxthorn	Lycium ferocissimum	Y	Class A	
	Macroptilium atropurpureum			Y
	Macroptilium lathyroides			Y
	Malva parviflora			Y
	Malvastrum americanum			Y
	Malvastrum coromandelianum			Y
Red natal grass	Melinis repens			Y
	Merremia dissecta			Y
	Oenothera stricta			Y

Common name	Scientific name	WoNS	NT Class	NT
	Oldenlandia corymbosa			Y
Prickly Pear	Opuntia stricta	Y	Class B	
Velvet tree pear	Opuntia tomentosa	Y	Class B	
	Oxalis corniculata			Y
Parkinsonia	Parkinsonia aculeata	Y	Class B	Y
Parthenium	Parthenium hysterophorus	Y	Class A	Y
	Passiflora foetida			Y
	Polypogon viridis			Y
	Portulaca oleracea			Y
	Portulaca pilosa			Y
Mesquite	Prosopis pallida	Y	Class A	Y
Velvet Mesquite	Prosopis velutina	Y	Class A	
Castor oil plant	Ricinus communis		Class B	Y
Salvinia	Salvinia molesta	Y	Class B	
Sicklepod	Senna obtusifolia		Class B	Y
Coffee senna	Senna occidentalis		Class B	Y
	Setaria verticillata			Y
Sida	Sida acuta		Class B	Y
Sida	Sida cordifolia		Class B	Y
Sida	Sida rhombifolia		Class B	Y
	Sisymbrium erysimoides			Y
	Sisymbrium orientale			Y
	Solanum americanum			Y
	Solanum nigrum			Y
Sow thistle	Sonchus oleraceus			Y
	Sorghum almum			Y
	Sorghum bicolor			Y
Giant rats tail grass	Sporobolus africanus			Y
Giant rats tail grass	Sporobolus coromandelianus			Y
Giant rats tail grass	Sporobolus pyramidalis			Y
	Stylosanthes hamata			Y
	Stylosanthes humilis			Y
Athel pine	Tamarix aphylla	Y	Class B	Y
	Taraxacum officinale			Y
	Trianthema portulacastrum			Y
Caltrop	Tribulus terrestris		Class B	Y
	Tridax procumbens			Y
Sabi grass	Urochloa mosambicensis			Y
Para grass	Urochloa mutica			Y
Noogoora burr	Xanthium strumarium		Class B/C	Y

Appendix C Weed Management Plan

Jemena's NEGI
Weed Management Plan

Prepared for: Jemena Northern Gas Pipeline Pty Ltd (Jemena)

Prepared by: EcOz Environmental Consultants

2015

www.ecoz.com.au

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1 Introduction

1.1 Purpose

The purpose of the Jemena NEGI Weed Management Plan (WMP) is to outline how weeds will be managed and controlled during construction of the proposed NEGI pipeline from Tennant Creek to Mount Isa. The WMP is applicable to all construction activities associated with the pipeline including employees, contractors and any other personnel involved in on-ground planning or construction activities.

1.2 Scope

The WMP covers all planning and construction activities associated with Jemena's proposed NEGI pipeline project. It will provide general weed management protocols to be implemented by all on ground personnel involved in the project. It provides a baseline desk based assessment of weeds and allows for the addition of information.

1.3 Objectives and performance criteria

Objective

1. To prevent the introduction and spread of weed species throughout areas associated with the construction of Jemena's NEGI pipeline project.
2. To prevent the spread of weed species between properties through which the pipeline will pass.

Performance criteria

1. No new infestations of weed species in any areas associated with the project including Construction Right Of Way (**Construction ROW**), access tracks, laydown areas, storage areas, quarries etc.
2. No spread of weeds from infested areas to weed free areas associated with the project.
3. No net increase in weed species found in the Alignment Corridor.
4. Control and treatment of infested areas associated with the project.
5. Construction Right of Way (ROW) restored to a state post construction that will prevent the establishment and spread of weed species.

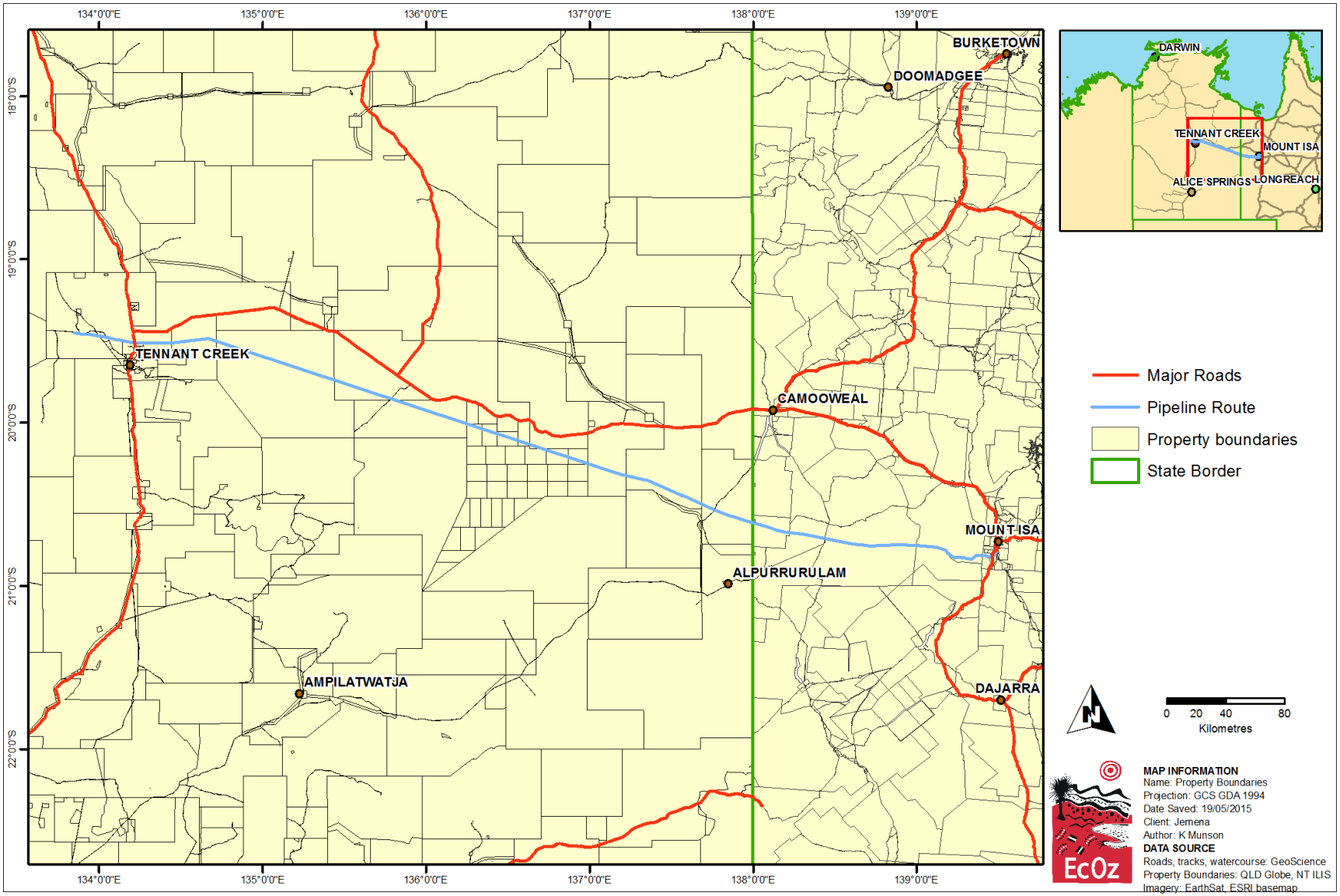

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Figure 1-1. NEGI pipeline route and property boundaries

2 Background

2.1 Weed background

Weeds can be variously defined depending on both the intended use and the geographical location of the land. Native grasses can be classified as weeds in instances where pasture grass is the desired land use, whereas native grasses are a desired environmental asset in the correct native ecosystem. For the purpose of this report plants considered weeds are those species that are declared under legislation as weeds in each jurisdiction.

2.1.1 Legislation

Northern Territory

Weed Management Act 2001 Provides for certain species of plant to be declared weeds. All declared weeds must be managed according to their classification and all attempts must be made to prevent the introduction of weeds on to and off site. This is the responsibility of the landowner.

Queensland

Land Protection (Pest and Stock Route Management) Act 2002 identifies three classes under which a plant species can be declared a weed. Land holders or land managers must undertake varying control actions depending on the declared class of weed on the land.

2.1.2 Weed classes

Weeds of National Significance

Federal and state governments have agreed on the declaration of 32 Weeds of National Significance (**WoNS**) based on the species' invasiveness, potential for spread and environmental, social and economic impacts. Landholders and managers are responsible for the control and management of WoNS with state and territory governments being responsible for legislation, regulation and administration.

Within QLD and the NT weeds are classified and managed slightly differently and under differing legislation. However, in both jurisdictions weeds are classified based on their potential to impact economic, environmental or social values and their level of prevalence within the state or territory. All weeds of national significance are declared weeds when found within either QLD or the NT. Additionally, other plants declared weeds within each jurisdiction are listed under the classification system.

Northern Territory

In the NT the *Weeds Management Act (2001)* identifies species of plants as weeds and requires these species to be controlled, eradicated or prevented from entering the NT. Weeds are classified into one of three categories:

Table 2-1. Description of Northern Territory weed classes

Weed Class	Definition
Class A declared plant	To be eradicated
Class B declared plant	Growth and spread to be controlled
Class C declared plant	Not to be introduced into the NT

Queensland

The *Land Protection (Pest and Stock Route Management) Act (2002)* identifies three classes under which a plant species can be declared a weed. Land holders or land managers must undertake varying control actions depending on the declared class of weed on the land.

Table 2-2. Description of Queensland weed classes.

Weed Class	Definition
Class 1 declared plant	A plant that: • Is not commonly present in QLD and, if introduced, would cause an adverse economic, environmental or social impact. • Are subject to eradication from the state Landowners must take reasonable steps to keep land free of Class 1 weeds. It is a serious offence to introduce, keep or supply a Class 1 pest without a permit issued by the Department of Primary Industries and Fisheries
Class 2 declared plant	A plant that: • Is established in QLD and have, or could have, an adverse economic, environmental or social impact • Requires coordination and are subject to programs led by local government, community or landowners Landowners must take reasonable steps to keep land free of Class 2 weeds. It is a serious offence to introduce, keep or supply a Class 2 pest without a permit issued by the Department of Primary Industries and Fisheries
Class 3 declared plant	A plant that: • Is established in QLD and has, or could have, a substantial adverse economic, environmental or social impact. Landowners may be required to manage Class 3 weeds in or near environmentally significant areas such as protected areas, important habitats for threatened species or areas of interest only.

2.2 Weed background

2.2.1 Desk assessment method

The data on weeds that supports desktop assessments is by no means comprehensive however it does provide a basis for project planning and on ground works. Additionally, different weeds have different levels of priority. For example, Class 3 weeds are deemed common in QLD and only require management action by the land holder/manager if they are a threat to an adjacent environmentally significant area.

A spatial data set exists for the weeds in the NT; this data was clipped to the NT bioregions through which the Planning Corridor passes. This spatial constraint combined with the significance criteria outlined above was used to compile the final list of potentially threatening weeds for the NT.

No spatially available data set was readily available for the QLD section of the project. A weed list was identified for the Bioregions through which the Planning Corridor passed. This initial list was filtered for the weeds deemed to fall in the significant categories as outlined above. These species formed the list of potentially threatening weeds for Queensland.

2.2.2 Identified weeds

From the desk assessment process, a list of 157 potential weed species was generated; of these 17 species were classified as Weeds of National Significance. The full list of potential weed species can be found in Appendix A.

Not all of these weeds will be found in the areas through which the pipeline passes nor will all of them be likely to spread to other areas associated with the project. However this list incorporates all those known to occur in the region. Additionally, by utilising this larger list the weed management actions developed will be applicable to any potential weeds that are not identified in the desk assessment.

2.2.3 Survey rationale

At this stage of the project, on ground weed surveys are both impractical and add little value to the management protocols. The weed list developed through desktop assessment is comprehensive and the only value added by on ground surveys may be to gather localized area information. This however becomes far less important (to irrelevant) if the weed management protocols are applied in a manner that doesn't require site specific changes. As such this WMP will outline general weed management protocols that can be applied to control and manage weeds without the need for on ground surveys. Given this on ground weed surveys are not planned at this stage of the planning process (surveys may be implemented subsequently if the monitoring and report deems them necessary).

2.3 Project background

2.3.1 Pipeline alignment

The proposed NEGI project covers approximately 622 km from west of Tennant Creek, NT to Mt Isa, QLD (Figure 1-1). The pipeline runs south of the Barkley Highway and north of the Sandover Highway. The proposed alignment crosses four bioregions and multiple parcel boundaries comprising multiple land tenure types. To access the Construction ROW, access tracks will be used from both the Barkly and Sandover Highways. Some of these access tracks are existing, some will be extended to reach the Construction ROW.

2.3.2 Planning and Construction activities

With regard to weed management, planning and construction activities can be divided into two broad categories; on road vehicle activities, off road vehicle activities. The risk of weed spread associated with each of these types of activities varies greatly. Vehicles travelling solely on road (either the highway or access roads) introduce little risk of transferring weeds between sites. Vehicles travelling along the pipeline Construction ROW (i.e. off road travel) will have high potential to transport weeds to different areas. This is especially important when vehicles are crossing between land parcels as it has the potential to spread weeds from an infested property to a clean property and introduce a burden onto another land holder. Property boundaries are identified in Figure 1-1.

3 Weed management

This WMP outline 5 specific performance criteria Jemena has outlined as measures of success for weed management associated with the NEGI project. Weed management protocols have been developed to meet these performance criteria and thus ensure weed management best practice.

A more tailored approach to weed management could have been implemented. This would involve designating 'dirty' and 'clean' weed management zones; dirty zones would require more weed management than clean zones (blow downs etc). However for this project the weed management protocols essentially designate all areas to be dirty weed management zones; there is assumed to be weed species at all work areas. By adopting this approach weeds can be controlled without requiring specific management actions for individual sites. This approach will also minimize confusion surrounding management actions.

3.1 Weed management Protocols

Only those vehicles travelling off established roadways were determined to pose a threat of spreading weeds. As such only vehicles that have been travelling off established roadways will be subject to weed management protocols.

3.1.1 General protocols

The following protocols shall be implemented as part of the Jemena WWP.

- All personnel are to be trained on applicable vehicle or machinery blow down protocols, location of blow down facilities and reporting requirements.
- Prior to any construction activities, blow down facility locations will be identified and mapped.
- Vehicle and heavy machinery operators shall remain on roads and tracks to the greatest extent possible. All operators shall avoid driving through weeds to the greatest extent possible.

3.1.2 Infrastructure provision

- Blow down stations shall be established at required locations to be determined after weed mapping has been completed. Signage at each blow down station shall be established indicating the station and requirements for blow down practices.
- Blow stations will be inspected as required when being used for operational purposes. Any damage or malfunction with the blow down facility shall be reported and repaired immediately.
- Where possible these blow down facilities will be located such that:
    - There is grass cover under the blow down area to prevent creation of mud; grass also helps out compete any potential weed species.
    - The site is easily identifiable.
- All blow down facilities shall be established to enable the efficient movement of vehicles whilst enabling the removal of organic material that may lead to the introduction or spread of weeds.
- No hay bales or other organic material shall be used for erosion or sediment control as part of the project.

3.1.3 General vehicles

General vehicles are those such as any cars and four-wheel drive vehicles that are used for general transport on transport of small equipment or machinery. The term general vehicles will also incorporate any trailers, quad bikes, buggies and other equipment that they may be towing or carrying.

General vehicles that are travelling on non-road areas (i.e. Construction ROW) shall be subject to the following:

- All vehicles used for any survey or construction activities associated with the project shall be inspected and where necessary cleaned prior to transport to site.
- As required vehicles will be blowed down to remove all organic material and inspected to be clean prior to leaving the blow down area.
- Vehicle operators are responsible for ensuring vehicles are blowed down and clean of organic matter prior to inspection.
- Inspectors (either vehicle operators or separate inspectors) are responsible for ensuring vehicles are clean of organic matter following blow down procedure.
- Maps of blow down locations, Construction ROW, fence lines and access tracks shall be provided to staff within each vehicle.
- Vehicle blow down should follow the following guidelines
    - Clean any areas required to be cleaned with an air compressor first.
    - Clean the underbody and guards then do the upper body and the cabin.
    - Move the vehicle carefully to avoid recontamination. Blow any wheels or tracks as required.
    - Record blow down in vehicle log.

3.1.4 Heavy machinery

Heavy machinery includes all construction equipment not deemed to be a general vehicle or associated equipment. Examples of heavy machinery include any grader, front end loader, bobcat, tractor, or excavator.

Heavy machinery is not expected to move on and off the Construction ROW at high frequency. Although travel along the Construction ROW has potential to spread weeds to adjacent areas spread between non-adjacent areas is minimized. This is reinforced through the implementation of the following management protocols.

- All heavy machinery shall be blown down and inspected to ensure that no organic matter is present, prior to transport to site.
- Heavy machinery will be blowed down as required when crossing between parcel boundaries. Heavy machinery will be blowed down to remove all organic material and inspected to be clean before leaving blow down area.
- Machinery operators are responsible for ensuring vehicles are blowed down and clean of organic matter prior to inspection.
- Inspectors (either machinery operators or separate inspectors) are responsible for ensuring vehicles are clean of organic matter following blow down procedure.
- Maps of relevant property boundaries, Construction ROW, fence lines and access tracks shall be provided to operators of each piece of heavy machinery.
- Heavy machinery blow down should follow the following guidelines
    - Clean any areas required to be cleaned with an air compressor first.

- Clean the underbody and guards then do the upper body and the cabin.
- Move the vehicle carefully to avoid recontamination. Blow any wheels or tracks as required.
- Record blow down in vehicle log.

3.1.5 Record keeping

As part of the quality control procedure the following record management and inspection protocols shall be implemented and followed.

- All vehicles and heavy machinery shall be equipped with a blow down log. The blow down log must be completed every time the vehicle is blowed down as per the vehicle protocols. An example of the blow down log can be found as Appendix b.
- Blow down logs should be check as part of any routine vehicle check. Any absence of blow down information should be reported.
- Upon initial blow down prior to entering Construction ROW, each inspected vehicle shall be fitted with a compliance sticker. Compliance sticker may be permanent for heavy machinery or temporary for general vehicles. Each time a vehicle leaves the ROW a new inspection sticker is required following the blow down and inspection procedure.
- No sticker shall be fitted to any vehicle with contaminating organic material.

4 Weed treatment

Despite best practice weed management protocols, new weed infestations can still occur; these infestations need to be treated. Additionally, the higher intensity use of the area for a short period provides opportunity to identify and treat weed infestations. The following protocols provide detail on the steps that will be taken to identify and treat weed infestations.

4.1 Identification of infestations

Weed infestations shall be identified to minimize vehicle mediated spread and to control additional infestations. The following protocols will be followed to identify weed infestations:

- Weed surveys will be conducted in active construction areas within the Construction ROW. Weed surveys shall be undertaken as required
- Identified weeds shall be recorded in project GIS database and submitted to relevant agencies for incorporation into state records.
- Once a section of pipeline is completed one survey will be undertaken at the beginning of the wet season following the completion of that section of pipeline.

4.2 Treatment of infestations

Treatment of infestations halts or slows the spread of weed species and minimizes further infestation. The following protocols outline the process for treating identified weed infestations along the Construction ROW.

- Any new infestation or existing infestation of weeds identified within the Construction ROW shall be treated by an approved contractor. Treatment regime shall be approved with consultation between Jemena and contractor.
- If required a weed treatment management plan will be developed for particular infestations of weeds.
- Identified and treated weed infestation shall be monitored annually until the completion of the project and the rehabilitation of the Construction ROW. Treatment shall continue as required in line with any agreement between Jemena and the approved contractor.
- Spraying of weeds shall occur before weed seeding where possible and shall not occur during periods of rainfall to avoid contamination of waterways.

5 Acronyms and References

5.1 Acronyms

DLRM	Department of Land Resource Management
DME	Department of Mines and Energy
EIA	Environmental Impact Assessment
EPBC	Environment Protection and Biodiversity Conservation Act
NOI	Notice of Intent
pa	Per Annum
Construction ROW	Construction Right of Way
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities
TPWC	Territory Parks and Wildlife Conservation Act

5.2 References and resources

Department of Agriculture, Fisheries and Forestry, 2014. *Vehicle and machinery checklists: clean-down procedures 2014*. State of Queensland. Accessed online on 19/05/2015. https://www.daf.qld.gov.au/__data/assets/pdf_file/0011/58178/IPA-Cleandown-Procedures.pdf

Appendix A – Identified weed species

					Detected	
Common name	Scientific name	WoNS	QLD Class	NT Class	QLD	NT
Mimosa bush	Acacia farnesiana				Y	Y
Karoo Thorn	Acacia karroo				Y	
Prickly acacia	Acacia nilotica		Class 1	Class A		Y
Prickly Acacia	Acacia nilotica subspecies indica				Y	
Star burr	Acanthospermum hispidum			Class B	Y	Y
Ruby dock	Acetosa vesicaria				Y	Y
Kapok	Aerva javanica				Y	Y
Alligator Weed	Alternanthera philoxeroides	Y	Class 1	Class A	Y	
Khaki weed	Alternanthera pungens			Class B	Y	Y
	Alysicarpus ovalifolius					Y
	Amaranthus viridis					Y
Annual Ragweed	Ambrosia artemisiifolia		Class 2	Class C	Y	
Perennial Ragweed	Ambrosia psilostachya			Class C	Y	
Yellow Burweed	Amsinckia species				Y	
Capeweed	Arctotheca calendula				Y	
Mexican poppy	Argemone ochroleuca			Class B	Y	Y
	Avena fatua					Y
Kochia	Bassia scoparia		Class 1	Class C	Y	
	Bidens pilosa					Y
	Bothriochloa pertusa					Y
	Brassica tournefortii					Y
Mother-of-Millions	Bryophyllum delagoense		Class 2		Y	
Cabomba	Cabomba caroliniana	Y	Class 2	Class A	Y	
Rubber bush	Calotropis procera			Class B	Y	Y
Ward's Weed	Carrichtera annua				Y	
Saffron Thistle	Carthamus lanatus			Class B	Y	
	Cenchrus biflorus					Y
Buffel grass	Cenchrus ciliaris				Y	Y
	Cenchrus clandestinus					Y
Mossman river grass	Cenchrus echinatus			Class B	Y	Y
Mission grass - annual	Cenchrus pedicellatus					Y
Cloncurry Buffel	Cenchrus pennisetiformis					Y
Mission grass - perennial	Cenchrus polystachios			Class B		Y

Cavalcade	Centrosema pascuorum					Y
	Chamaecrista rotundifolia					Y
Fat hen	Chenopodium album				Y	
	Chloris barbata					Y
	Chloris gayana					Y
	Chloris virgata					Y
	Citrullus colocynthis					Y
	Citrullus lanatus					Y
	Clitoria ternatea					Y
	Conyza bonariensis				Y	Y
	Corchorus olitorius					Y
	Corchorus trilocularis					Y
Rubber Vine	Cryptostegia grandiflora	Y	Class 2	Class A	Y	
Rubber vine (2)	Cryptostegia madagascariensis		Class 3	Class A	Y	
	Cucumis myriocarpus					Y
Golden dodder	Cuscuta campestris				Y	
Coral cactus	Cylindropuntia fulgida var. mamillata	Y	Class 1/ Class 2		Y	
Devil's Rope Cactus	Cylindropuntia imbricata	Y	Class 2		Y	
Hudson Pear	Cylindropuntia rosea	Y	Class 1		Y	
Artichoke Thistle	Cynara cardunculus				Y	
Couch grass	Cynodon dactylon					Y
	Cyperus compressus					Y
	Cyperus involucratus					Y
	Dactyloctenium aegyptium					Y
Longspine thornapple	Datura ferox			Class A/ Class C	Y	Y
Downy Thornapple	Datura inoxia			Class C	Y	
Common Thornapple	Datura stramonium			Class C	Y	
Sheda grass	Dichanthium annulatum					Y
Crab grass - bicornis	Digitaria bicornis					Y
Summer grass	Digitaria ciliaris					Y
	Echinochloa colona					Y
Patterson's curse	Echium plantagineum			Class A	Y	Y
Water Hyacinth	Eichhornia crassipes	Y	Class 2	Class A	Y	
Parodi Spike Rush	Eleocharis parodii				Y	
	Eleusine indica					Y
Elodea	Elodea canadensis			Class C	Y	
Spiny emex	Emex australis			Class B	Y	
	Eragrostis amabilis					Y
Pitted lovegrass	Eragrostis barrelieri					Y
	Eragrostis cilianensis					Y
	Eragrostis cylindriflora					Y

	Eragrostis mexicana					Y
	Eragrostis minor					Y
	Eragrostis tenuifolia					Y
Milk weed	Euphorbia heterophylla					Y
	Euphorbia hirta					Y
	Euphorbia hyssopifolia					Y
	Euphorbia prostrata					Y
Galenia	Galenia pubescens				Y	
	Gomphrena celosioides					Y
	Grewia asiatica					Y
	Guilleminea densa					Y
Harrisia Cactus	Harrisia martinii		Class 2		Y	
Blue Heliotrope	Heliotropium amplexicaule				Y	
Common heliotrope	Heliotropium europaeum				Y	
Kidneyleaf Mudplantain	Heteranthera reniformis				Y	
Hydrocotyle	Hydrocotyle ranunculoides				Y	
Coolatai Grass	Hyparrhenia hirta				Y	
Hyptis	Hyptis suaveolens			Class B		Y
Bellyache bush	Jatropha gossypiifolia	Y	Class 2	Class A	Y	Y
	Lactuca serriola				Y	Y
	Lepidium africanum					Y
African Boxthorn	Lycium ferocissimum	Y	Class 2	Class A	Y	
	Macroptilium atropurpureum					Y
	Macroptilium lathyroides					Y
	Malva parviflora				Y	Y
	Malvastrum americanum					Y
	Malvastrum coromandelianum					Y
Devil's Claw	Martynia annua			Class A	Y	
Guinea Grass	Megathyrus maximus				Y	
Red natal grass	Melinis repens					Y
	Merremia dissecta					Y
Parrot’s Feather	Myriophyllum aquaticum			Class A	Y	
Eurasian Watermilfoil	Myriophyllum spicatum		Class 1	Class C	Y	
	Oenothera stricta				Y	Y
	Oldenlandia corymbosa					Y
Prickly Pear	Opuntia stricta	Y	Class 2	Class B		
Velvet tree pear	Opuntia tomentosa	Y	Class 2	Class B	Y	
	Oxalis corniculata				Y	Y
Parkinsonia	Parkinsonia aculeata	Y	Class 2	Class B	Y	Y
Parthenium	Parthenium hysterophorus	Y	Class 2	Class A		Y
	Passiflora foetida					Y

Longstyle feather grass	Pennisetum villosum				Y	
Date Palm	Phoenix dactylifera				Y	
Madras Thorn	Pithecellobium dulce		Class 1		Y	
	Polypogon viridis					Y
	Portulaca oleracea					Y
	Portulaca pilosa					Y
Mesquite	Prosopis pallida	Y	Class 2	Class A	Y	Y
Velvet Mesquite	Prosopis velutina	Y	Class 2	Class A	Y	
Castor oil plant	Ricinus communis			Class B	Y	Y
Salvinia	Salvinia molesta	Y	Class 2	Class B	Y	
Sicklepod	Senna obtusifolia		Class 2	Class B		Y
Coffee senna	Senna occidentalis			Class B	Y	Y
	Setaria verticillata					Y
Sida	Sida acuta			Class B	Y	Y
Sida	Sida cordifolia			Class B		Y
Sida	Sida rhombifolia			Class B	Y	Y
	Sisymbrium erysimoides					Y
	Sisymbrium orientale					Y
	Solanum americanum					Y
	Solanum nigrum				Y	Y
Sow thistle	Sonchus oleraceus				Y	Y
	Sorghum almum					Y
	Sorghum bicolor					Y
Giant rats tail grass	Sporobolus africanus		Class 2		Y	Y
Giant rats tail grass	Sporobolus coromandelianus					Y
Giant rats tail grass	Sporobolus pyramidalis		Class 2			Y
Witchweed	Striga asiatica		Class 1	Class C	Y	
	Stylosanthes hamata				Y	Y
	Stylosanthes humilis					Y
Athel pine	Tamarix aphylla	Y	Class 3	Class B	Y	Y
	Taraxacum officinale					Y
Grader grass	Themeda quadrivalvis			Class B	Y	
Water Caltrop	Trapa natans		Class 1	Class C	Y	
	Trianthema portulacastrum					Y
Caltrop	Tribulus terrestris			Class B	Y	Y
	Tridax procumbens					Y
Sabi grass	Urochloa mosambicensis					Y
Para grass	Urochloa mutica					Y
Noogoora Burr	Xanthium occidentale			Class B/C	Y	
Bathurst Burr	Xanthium spinosum			Class B/C	Y	
Noogoora burr	Xanthium strumarium			Class B/C		Y
Chinee Apple	Ziziphus mauritiana		Class 2	Class A	Y	

Appendix B – Example blow down log

Vehicle/plant ID number:					
Date	Time (hh:mm)	Operator	Blow down location	Sticker added (Y/N)	Signature
19/05/2015	14:30	John Smith	Blow down ID/location description	Y	

Appendix D EPBC Referral

Australian Government

Department of the Environment

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister or the Minister's delegate. (Further references to 'the Minister' in this form include references to the Minister's delegate.) To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be undertaken. These decisions are made within 20 business days, provided sufficient information is provided in the referral.

Who can make a referral?

Referrals may be made by or on behalf of a person proposing to take an action, the Commonwealth or a Commonwealth agency, a state or territory government, or agency, provided that the relevant government or agency has administrative responsibilities relating to the action.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Commonwealth marine environment (sections 23 and 24A)
- Great Barrier Reef Marine Park (sections 24B and 24C)
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
- The environment, if the action involves Commonwealth land (sections 26 and 27A), including:
    - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
    - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth (section 28)
- Commonwealth Heritage places outside the Australian jurisdiction (sections 27B and 27C)

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure. This will provide a greater level of certainty that Commonwealth assessment requirements have been met.

To help you decide whether or not your proposed action requires approval (and therefore, if you should make a referral), the following guidance is available from the Department's website:

- the Policy Statement titled Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Additional sectoral guidelines are also available.

- the Policy Statement titled Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies.
- the Policy Statement titled Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources.
- the interactive map tool (enter a location to obtain a report on what matters of NES may occur in that location).

Can I refer part of a larger action?

In certain circumstances, **the Minister may not accept a referral for an action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act).** If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the Referrals Gateway (1800 803 772).

Do I need a permit?

Some activities may also require a permit under other sections of the EPBC Act or another law of the Commonwealth. Information is available on the Department's web site.

Is your action in the Great Barrier Reef Marine Park?

If your action is in the Great Barrier Reef Marine Park it may require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If a permission is required, referral of the action under the EPBC Act is deemed to be an application under the GBRMP Act (see section 37AB, GBRMP Act). This referral will be forwarded to the Great Barrier Reef Marine Park Authority (the Authority) for the Authority to commence its permit processes as required under the Great Barrier Reef Marine Park Regulations 1983. If a permission is not required under the GBRMP Act, no approval under the EPBC Act is required (see section 43, EPBC Act). The Authority can provide advice on relevant permission requirements applying to activities in the Marine Park.

The Authority is responsible for assessing applications for permissions under the GBRMP Act, GBRMP Regulations and Zoning Plan. Where assessment and approval is also required under the EPBC Act, a single integrated assessment for the purposes of both Acts will apply in most cases. Further information on environmental approval requirements applying to actions in the Great Barrier Reef Marine Park is available from http://www.gbrmpa.gov.au/ or by contacting GBRMPA's Environmental Assessment and Management Section on (07) 4750 0700.

The Authority may require a permit application assessment fee to be paid in relation to the assessment of applications for permissions required under the GBRMP Act, even if the permission is made as a referral under the EPBC Act. Further information on this is available from the Authority:

Great Barrier Reef Marine Park Authority

2-68 Flinders Street PO Box 1379
Townsville QLD 4810
AUSTRALIA

Phone: + 61 7 4750 0700
Fax: + 61 7 4772 6093

www.gbrmpa.gov.au

What information do I need to provide?

Completing all parts of this form will ensure that you submit the required information and will also assist the Department to process your referral efficiently. If a section of the referral document is not applicable to your proposal enter N/A.

You can complete your referral by entering your information into this Word file.

Instructions

Instructions are provided in blue text throughout the form.

Attachments/supporting information

The referral form should contain sufficient information to provide an adequate basis for a decision on the likely impacts of the proposed action. You should also provide supporting documentation, such as environmental reports or surveys, as attachments.

Coloured maps, figures or photographs to help explain the project and its location should also be submitted with your referral. Aerial photographs, in particular, can provide a useful perspective and context. Figures

should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Please ensure any attachments are below three megabytes (3mb) as they will be published on the Department's website for public comment. To minimise file size, enclose maps and figures as separate files if necessary. If unsure, contact the Referrals Gateway (email address below) for advice. Attachments larger than three megabytes (3mb) may delay processing of your referral.

Note: the Minister may decide not to publish information that the Minister is satisfied is commercial-in-confidence.

How do I pay for my referral?

From 1 October 2014 the Australian Government commenced cost recovery arrangements for environmental assessments and some strategic assessments under the EPBC Act. If an action is referred on or after 1 October 2014, then cost recovery will apply to both the referral and any assessment activities undertaken. Further information regarding cost recovery can be found on the Department's website.

Payment of the referral fee can be made using one of the following methods:

- **EFT Payments can be made to:**

  BSB: 092-009
  Bank Account No. 115859
  Amount: $7352
  Account Name: Department of the Environment.
  Bank: Reserve Bank of Australia
  Bank Address: 20-22 London Circuit Canberra ACT 2601
  Description: The reference number provided (see note below)

- **Cheque** - Payable to "Department of the Environment". Include the reference number provided (see note below), and if posted, address:

  The Referrals Gateway
  Environment Assessment Branch
  Department of the Environment
  GPO Box 787
  Canberra ACT 2601

- **Credit Card**

  Please contact the Collector of Public Money (CPM) directly (call (02) 6274 2930 or 6274 20260 and provide the reference number (see note below).

Note: in order to receive a reference number, submit your referral and the Referrals Gateway will email you the reference number.

How do I submit a referral?

Referrals may be submitted by mail or email.

Mail to:

Referrals Gateway
Environment Assessment Branch
Department of Environment
GPO Box 787
CANBERRA ACT 2601

- If submitting via mail, electronic copies of documentation (on CD/DVD or by email) are required.

Email to: epbc.referrals@environment.gov.au

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- **Follow up with a mailed hardcopy including copies of any attachments or supporting reports.**

What happens next?

Following receipt of a valid referral (containing all required information) you will be advised of the next steps in the process, and the referral and attachments will be published on the Department's web site for public comment.

The Department will write to you within 20 business days to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is required. There are a number of possible decisions regarding your referral:

The proposed action is NOT LIKELY to have a significant impact and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any other Commonwealth, state or local government requirements).

The proposed action is NOT LIKELY to have a significant impact IF undertaken in a particular manner

The action can proceed if undertaken in a particular manner (subject to any other Commonwealth, state or local government requirements). The particular manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the particular manner to the Department.

The proposed action is LIKELY to have a significant impact and does NEED approval

If the action is likely to have a significant impact a decision will be made that it is a *controlled action*. The particular matters upon which the action may have a significant impact (such as World Heritage values or threatened species) are known as the *controlling provisions*.

The controlled action is subject to a public assessment process before a final decision can be made about whether to approve it. The assessment approach will usually be decided at the same time as the controlled action decision. (Further information about the levels of assessment and basis for deciding the approach are available on the Department's web site.)

The proposed action would have UNACCEPTABLE impacts and CANNOT proceed

The Minister may decide, on the basis of the information in the referral, that a referred action would have clearly unacceptable impacts on a protected matter and cannot proceed.

Compliance audits

If a decision is made to approve a project, the Department may audit it at any time to ensure that it is completed in accordance with the approval decision or the information provided in the referral. If the project changes, such that the likelihood of significant impacts could vary, you should write to the Department to advise of the changes. If your project is in the Great Barrier Reef Marine Park and a decision is made to approve it, the Authority may also audit it. (See "*Is your action in the Great Barrier Reef Marine Park,"* p.2, for more details).

For more information

- call the Department of the Environment Community Information Unit on 1800 803 772 or
- visit the web site http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999

All the information you need to make a referral, including documents referenced in this form, can be accessed from the above web site.

Referral of proposed action

Project title: Jemena NEGI pipeline

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) and associated geographic information system (GIS) vector (shapefile) dataset showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(i).

1.1 **Short description**

Use 2 or 3 sentences to uniquely identify the proposed action and its location.

This project involves the construction and operation of a 622 km buried high-pressure gas pipeline from Tennant Creek in the Northern Territory to Mount Isa in Queensland along with associated above ground facilities at various locations along the pipeline. Construction activities will be conducted in a 30 m wide Right-of-way (**Construction ROW**). There will also be additional areas required for pipe and equipment laydown, vehicle turn-around, access tracks, temporary construction camps and pipeline infrastructure (compressor stations, mainline valves and cathodic protection). The majority of construction areas including the Construction ROW, temporary construction camps and most access tracks will be progressively rehabilitate. A small area for mainline valves, compressor stations and cathodic protection (see Section 2) will comprise the permanent footprint of the project.

The final alignment needs to have traditional owner and other landholder consent and ecological surveys completed prior to construction (pursuant to legislation in both the Northern Territory and Queensland). To ensure any adjustments between the proposed and final alignments do not alter the assessment of impact, a 20 km Planning Corridor (**Planning Corridor**) is used in this assessment. The final pipeline alignment, on reaching consent and completing surveys, will be determined by June 2016.

The proposed pipeline will be constructed in accordance with *AS 2885 and the Australian Pipeline and Gas Association Code of Environmental Practice – Onshore Pipelines* (APGA 2013).

1.2 **Latitude and longitude**

Latitude and longitude details are used to accurately map the boundary of the proposed action. If these coordinates are inaccurate or insufficient it may delay the processing of your referral.

Table 1. Coordinates of each pipeline turning point

Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	19°	26'	53.30" S	133°	51'	9.48" E
2	19°	26'	53.74" S	133°	51'	12.19" E
3	19°	27'	8.03" S	133°	52'	44.24" E
4	19°	27'	20.51" S	133°	53'	48.93" E
5	19°	27'	24.51" S	133°	55'	8.76" E
6	19°	27'	26.53" S	133°	55'	34.14" E
7	19°	27'	25.85" S	133°	56'	24.84" E
8	19°	28'	6.34" S	133°	59'	58.24" E
9	19°	28'	0.87" S	134°	0'	6.84" E
10	19°	28'	30.85" S	134°	2'	50.47" E
11	19°	28'	27.24" S	134°	2'	58.46" E
12	19°	29'	40.55" S	134°	7'	11.89" E
13	19°	29'	40.18" S	134°	7'	37.69" E
14	19°	29'	12.37" S	134°	12'	54.42" E
15	19°	28'	25.70" S	134°	20'	12.32" E
16	19°	29'	6.81" S	134°	40'	16.80" E
17	20°	4'	41.69" S	136°	27'	25.33" E

18	20°	5'	6.80" S	136°	28'	59.94" E
19	20°	6'	13.02" S	136°	33'	10.03" E
20	20°	8'	29.52" S	136°	40'	1.91" E
21	20°	10'	29.37" S	136°	45'	30.65" E
22	20°	12'	37.46" S	136°	52'	32.16" E
23	20°	18'	58.32" S	137°	11'	36.97" E
24	20°	21'	54.45" S	137°	20'	13.31" E
25	20°	22'	2.70" S	137°	21'	26.64" E
26	20°	27'	27.70" S	137°	34'	19.26" E
27	20°	27'	23.77" S	137°	35'	3.27" E
28	20°	32'	6.54" S	137°	46'	11.38" E
29	20°	34'	20.96" S	137°	51'	57.52" E
30	20°	34'	25.38" S	137°	52'	33.45" E
31	20°	36'	21.30" S	137°	57'	28.74" E
32	20°	38'	46.02" S	138°	5'	21.44" E
33	20°	39'	6.30" S	138°	7'	25.22" E
34	20°	39'	19.85" S	138°	8'	23.55" E
35	20°	42'	16.28" S	138°	27'	7.51" E
36	20°	42'	52.09" S	138°	28'	27.74" E
37	20°	44'	27.22" S	138°	36'	38.89" E
38	20°	45'	1.77" S	138°	41'	46.47" E
39	20°	45'	11.98" S	138°	42'	15.05" E
40	20°	44'	42.21" S	138°	56'	16.18" E
41	20°	44'	54.29" S	138°	59'	40.78" E
42	20°	45'	36.81" S	139°	7'	12.41" E
43	20°	46'	30.48" S	139°	10'	24.61" E
44	20°	47'	45.49" S	139°	11'	15.82" E
45	20°	47'	47.00" S	139°	11'	16.81" E
46	20°	47'	49.55" S	139°	11'	23.40" E
47	20°	48'	7.59" S	139°	11'	46.07" E
48	20°	49'	4.82" S	139°	12'	51.00" E
49	20°	49'	28.59" S	139°	13'	27.16" E
50	20°	49'	25.86" S	139°	15'	45.52" E
51	20°	49'	31.32" S	139°	17'	13.68" E
52	20°	49'	48.67" S	139°	18'	13.48" E
53	20°	49'	51.48" S	139°	18'	43.18" E
54	20°	50'	7.74" S	139°	20'	1.61" E
55	20°	50'	8.05" S	139°	20'	11.81" E
56	20°	49'	51.61" S	139°	20'	33.44" E
57	20°	48'	42.20" S	139°	21'	47.62" E
58	20°	48'	42.84" S	139°	22'	41.62" E
59	20°	48'	48.08" S	139°	22'	52.18" E
60	20°	48'	48.81" S	139°	23'	44.11" E
61	20°	48'	43.84" S	139°	23'	51.24" E
62	20°	48'	43.01" S	139°	23'	52.65" E
63	20°	48'	42.30" S	139°	23'	56.06" E
64	20°	48'	43.13" S	139°	24'	0.88" E
65	20°	48'	44.77" S	139°	24'	7.80" E
66	20°	48'	39.29" S	139°	24'	55.39" E
67	20°	48'	35.73" S	139°	25'	4.43" E
68	20°	48'	36.26" S	139°	25'	11.76" E

69	20°	48'	37.59" S	139°	25'	23.91" E
70	20°	48'	39.54" S	139°	25'	37.10" E
71	20°	48'	42.80" S	139°	25'	44.53" E
72	20°	48'	54.71" S	139°	26'	0.86" E
73	20°	49'	3.80" S	139°	26'	11.67" E
74	20°	49'	11.67" S	139°	26'	21.64" E
75	20°	49'	22.87" S	139°	26'	24.72" E
76	20°	49'	30.01" S	139°	26'	32.92" E
77	20°	49'	31.45" S	139°	27'	33.14" E
78	20°	49'	30.92" S	139°	27'	37.30" E
79	20°	49'	26.14" S	139°	27'	43.42" E
80	20°	49'	12.27" S	139°	27'	42.03" E
81	20°	49'	7.99" S	139°	27'	43.39" E
82	20°	48'	47.75" S	139°	27'	55.71" E
83	20°	48'	41.92" S	139°	27'	58.71" E
84	20°	48'	35.70" S	139°	28'	0.38" E
85	20°	48'	32.42" S	139°	28'	2.06" E
86	20°	48'	23.43" S	139°	28'	16.04" E
87	20°	47'	29.41" S	139°	28'	49.23" E
88	20°	47'	25.01" S	139°	28'	53.25" E
89	20°	47'	22.29" S	139°	28'	57.12" E
90	20°	47'	13.66" S	139°	28'	56.86" E

If the proposed action is linear (eg. a road or pipeline), provide coordinates for each turning point.
If the proposed action is linear (eg. a road or pipline) please provide a polyline layer (refer to GIS data supply guidelines at Attachment A).
Do not use AMG coordinates.

1.3 **Locality and property description**

Provide a brief physical description of the property on which the proposed action will take place and the project location (eg. proximity to major towns, or for off-shore projects, shortest distance to mainland).

The end of line terminal points for this 622 km pipeline will be located at a connection to the existing Amadeus Gas Pipeline at Warrego, approximately 45 km north-west of Tennant Creek in the Northern Territory and just south of Mount Isa in Queensland where it will connect to the existing Carpentaria Gas Pipeline at the Mica Creek Meter Station. The majority of land traversed by the proposed pipeline route is semi-arid pastoral land used for grazing cattle. Besides the rocky hills at either end of the pipeline route, the countryside is generally flat. The pipeline crosses ephemeral waterways, creeks and gullies. The land affected by this development is outlined in Section 1.6 below. The location of the proposed NEGI alignment is shown in Figure 1 (figures are attached in Appendix A1, Appendix A2 and Appendix A3). Properties through which the proposed alignment passes are shown in Figure 2.

1.4 **Size of the development footprint or work area (hectares)**

The components of the development footprint are outlined in Table 2. This table also shows the area to be rehabilitated.

Topsoil and cleared native grasses and shrubs will be stockpiled and placed back over the Construction ROW progressively during the construction process. The entire Construction ROW will be rehabilitated back to native grass and shrub cover on completion of construction activities and operational inspection and maintenance requirements will be performed using helicopter access. Construction camps and the majority of access tracks will also be rehabilitated on completion of the construction phase. Approximately 3 % of the total disturbance area will remain for operational requirements, which represents the land area required for the compressor stations, Mainline Valve (MLV) sites, scraper station sites and two new permanent access tracks.

Table 2. Proposed disturbance and rehabilitation footprint (for the entire route)

PROPOSED TEMPORARY FOOTPRINT		
Component	**Disturbance footprint (ha)**	**Area rehabilitated (ha)**
Construction ROW	622 km x 30m =1,866 ha	1,866 ha
Temporary Construction camps x 5	250 m x 350 m = 8.75 ha 5 sites = 43.75 ha total	43.75 ha
Access tracks (new - temporary)	77.5 ha	77.5 ha
Access track turn-off Barkly Highway	30 m x 30 m at start each track	1.6 ha
Access track turnoff to Construction ROW	30 m x 30 m at each track end	2.43 ha
Vehicle turnarounds	35 m x 35 m = 0.1 ha AND 15 m x 15 m = 0.02 ha Every 5 km along Construction ROW	18.2 ha
Explosives storage areas x 5	15 m x 15 m = 0.02 ha 5 sites = 0.1 ha	0.1 ha
Extra workspace outside sensitive crossing zones; Existing access tracks (174) Sealed Road Crossing (bore) (6) Rail Crossing (bore) (2) Major Water Course crossing (20) Minor Water Course crossing (88) Fence crossing (34) Buried Pipeline crossing (2)	 Each 10m x 30m Each 25m x 50m Each 25m x 50m Each 25m x 50m Each 10m x 30m Each 10m x 30m Each 25m x 50m	 5.22 ha 0.75 ha 0.25 ha 2.5 ha 2.64 ha 1.02 ha 0.25 ha
Low Hazard Water bore dams for dust suppression and Construction ROW (small) 3ML (6 of)	Each 50 m x 50 m	1.5 ha
Low Hazard Water bore dams for hydrotesting (large) 8ML (2 of)	Each 80 m x 80 m	1.28 ha
TOTAL AREA	**2025 ha**	**2025 ha**

PROPOSED PERMANENT FOOTPRINT		
Component	**Disturbance footprint (ha)**	**Area rehabilitated (ha)**
Access tracks (new - permanent)	25 ha	-
Mount Isa Compressor Station (QLD)	300 m x 300 m = 9 ha	-
Phillip Creek Compressor Station (NT)	300 m x 300 m = 9 ha	-
MLV's x 2 and Scraper Station x 1 (NT) To be upgraded to compressor stations in the future	200 m x 200 m each 3 sites = 12 ha total	-
MLV x 1 (QLD)	50 m x 50 m = 0.25	
Cathodic Protection Station x 4	20 m x 20 m = 0.04 ha 4 sites = 0.16 ha total	-
TOTAL AREA	**55.41 ha**	-

1.5	**Street address of the site**	N/A

1.6 **Lot description**

Describe the lot numbers and title description, if known.

The land affected by this development is outlined in Table 3 for the Northern Territory and Table 4 for Queensland.

Table 3. Lot numbers and tenure along Northern Territory part of proposed alignment

Land Parcel	Registered Proprietor/ Controlling Agency	Title Reference	Land Description (all land in title)	Tenure
000//00408/	Charles John Warby & Judy-Anne Warby	CT 740/673	NT Portion 408 plan CP005047	Perpetual Pastoral Lease 00946
000//05691/	AustralAsia Railway Corporation	CT 754/364	NT Portion 5476 plan S98/186A-E, NT Portion 5691 plan S98/37	Crown Lease Term 01880
000//03723/	Warumungu Aboriginal Land Trust	CT 792/461	NT Portion 3723 plan S89/296	Freehold under ALRA
000//01075/	Gordon Ford, Joan Suzanne Ford, Gregory Joseph Ford & Ken Gerard Ford	CT 787/851	NT Portion 494, NT Portion 1075, NT Portion 5843 plan S98/34F, NT Portion 5845 plan S98/34H, NT Portion 5847 plan S98/34J, NT Portion 5849 plan S98/34L, NT Portion 5851 plan S98/34O&P	Perpetual Pastoral Lease 01142
000//04469/	Dept Lands, Planning & the Environment 141212	No Current Title Issued	NT Portion 4469 plan S921090	Vacant Crown Land
000//00773/	Baldy Bay Pty Ltd as trustee for the Long Yard Trust	CT 770/820	NT Portion 773 plan CP005208	Perpetual Pastoral Lease 00988
000//03976/	Wakaya Aboriginal Land Trust	CT 390/071	NT Portion 1414 plan S72/199, NT Portion 3976 plan S91/78A-F	Freehold under ALRA
000//03747/	Arruwurra Aboriginal Corporation	CT 211/054	NT Portion 3747 plan S89/164A	NT Enhanced Freehold.
000//03753/	Arruwurra Aboriginal Corporation	CT 211/060	NT Portion 3753 plan S89/164C	NT Enhanced Freehold
000//03752/	Arruwurra Aboriginal Corporation	CT 211/059	NT Portion 3752 plan S89/164C	NT Enhanced Freehold
000//03751/	Arruwurra Aboriginal Corporation	CT 211/058	NT Portion 3751 plan S89/164C	NT Enhanced Freehold
000//03750/	Arruwurra Aboriginal Corporation	CT 211/057	NT Portion 3750 plan S89/164B	NT Enhanced Freehold
000//00002/	The North Australian Pastoral Company Pty Ltd	CT 699/625	NT Portion 2 plan CP004314	Perpetual Pastoral Lease 00914
000//03757	Arruwurra Aboriginal Corporation	CT 211/064	NT Portion 3757 plan S89/164C	NT Enhanced Freehold

000//03758	Arruwurra Aboriginal Corporation	CT 211/065	NT Portion 3758 plan S89/164C	NT Enhanced Freehold
000//03759	Arruwurra Aboriginal Corporation	CT 211/066	NT Portion 3759 plan S89/164C	NT Enhanced Freehold
000//00004/	The North Australian Pastoral Company Pty Ltd	CT 699/624	NT Portion 4 plan CP004314	Perpetual Pastoral Lease 00916
000//00298/	Australian Agricultural Company Limited	CT 738/069	NT Portion 298 plan CP004303	Perpetual Pastoral Lease 00926
000//01605/	Waxahachie Pty Ltd	CT 738/071	NT Portion 1605 plan CP005053	Perpetual Pastoral Lease 00922

Table 4. Lot numbers and tenure along Queensland part of proposed alignment

Land Parcel	Registered Proprietor/ Controlling Agency	Title Reference	Land Description (all land in title)	Tenure
2799/ SP276507	Waxahachie Pty Ltd	17666033 – PH 13/2799	Lot 2799 Survey Plan 276507	Rolling Term Lease - No purpose defined
42/ CP847157	Australian Cattle and Beef Company Pty Ltd	17665245 – PDH 8/42	Lot 42 Crown Plan 847157	Rolling Term Lease - No purpose defined
3/ SP117500	Venlock Pty Ltd	40020668 – PH 0/212277	Lot 3 Survey Plan 117500	Rolling Term Lease - Pastoral
24/ SP265794	James Lyne Lord & Marjorie Annette Lord	17666019 – PH 13/2324	Lot 24 Survey Plan 265794	Rolling Term Lease - No purpose defined
1/ RD243	Argylla Mountains Pastoral Pty Ltd as Trustee for Campbell Family Trust	17740120 – SL 13/52818	Lot 1 Crown Plan RD243	Rolling Term Lease - Primary Industry (Grazing)
265/ FTY1762	The State of Queensland (represented by Department of National Parks, Recreation, Sport & Racing)	47552008	Lot 265 Crown Plan FTY1762	Estate in Forest Estate
575/ SP110102	Argylla Mountains Pastoral Pty Ltd as Trustee for Campbell Family Trust	17662192 – OL 13/573	Lots 572, 574 and 575 Crown Plan 857742, Lot 573 Survey Plan 110102	No Term Lease - No purpose defined
10/ SP240553	The State of Queensland (represented by Department of Natural Resources & Mines - Land Act)	47038916	Lot 10 Survey Plan 240553	Estate in Unallocated State Land
1/ CPMPH4518	Patrick Denis Donovan & Yvonne Hagglund	17765163	Lot 1 Crown Plan MPH4518	Freehold

In addition to the above there are registered and determined native title claims over various parcels of land as follows:

Northern Territory

1. Land parcel 000//00408/: Phillip Creek Pastoral Lease native title claim (DC2014/009).

2. Land Parcel 000//00002/: Dalmore Downs native title claim ((DC2001/030) and the Dalmore Downs South native title claim (DC2002/002).

3. Land Parcels 000//00004/, 000//00298/ and 000//01605/: the Burramurra native title claim (DC2002/0152).

Queensland

4. Land Parcels 2799/SP276507 and 42/CP847157: the Indjalandji-Dhidhanu Aboriginal Corporation determined native title area.

5. Land Parcels 24/SP265794, 1/RD243, 265/FTY1762, 575/SP110102, and 10/SP240553 the Kalkadoon #4 determined native title area.

1.7 **Local Government Area and Council contact (if known)**

If the project is subject to local government planning approval, provide the name of the relevant council contact officer.

This action sits across two Local Government Areas (LGA's):

Table 5. LGA's of the development

LGA	State	Contact
Barkly Regional Council	NT	Edwina Marks – CEO
Mt Isa City Council	QLD	Emilio Cianetti - CEO

1.8 **Time frame**

Specify the time frame in which the action will be taken including the estimated start date of construction/operation.

Jemena aims to have all environmental approvals obtained by December 2016, with the construction phase to commence in January/ February 2016, commissioning of the pipeline is planned for February 2018 and the pipeline is expected to be operational by 1 July 2018.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?	X	No. The NEGI project is a Northern Territory Government initiative that is required to meet specified timeframes and deliverables. The project will be completed in consultation with both Governments of the Northern Territory and Queensland.
			Yes, you must also complete section 2.2
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?	X	No. The NEGI project is a Northern Territory Government initiative that is required to meet specified timeframes and deliverables. In order to meet the requirements of the project, the timelines specified in section 1.8 are required. The project will be completed in consultation with both Governments of the Northern Territory and Queensland.
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.11	**State assessment** Is the action subject to a state or territory environmental impact assessment?		No
		X	Yes, you must also complete Section 2.5
1.12	**Component of larger action** Is the proposed action a component of a larger action?	X	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals** Is the proposed action related to other actions or proposals in the region (if known)?	X	No
			Yes, provide details:
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	X	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	X	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.7.

2.1 Description of proposed action

This should be a detailed description outlining all activities and aspects of the proposed action and should reference figures and/or attachments, as appropriate.

Information and Background

SGSP (Australia) Assets Pty Ltd ABN 60 126 327 624 (referred to in this application as **Jemena**) is an energy infrastructure company that builds, owns and operates a combination of major gas, electricity and water assets across Australia. SGSP (Australia) Assets Pty Ltd comprises two distinct operating businesses – an assets business (Jemena) and a service business (Zinfra). A special purpose vehicle (an indirectly wholly owned subsidiary of SGSP (Australia) Assets Pty Ltd) has been established to deliver the NEGI project for Jemena; Jemena Northern Gas Pipeline Pty Ltd ACN 607 928 790. Environmental approvals for the Queensland section of the proposed NEGI pipeline will be submitted by Jemena Queensland Gas Pipeline (1) Pty Ltd and will later be transferred to Jemena Northern Gas Pipeline Pty Ltd

In 2014, the Northern Territory Government (**Territory**) sought proposals for the development of a gas pipeline connecting the northern and eastern gas markets to be known as the North East Gas Interconnector (**NEGI**). The NEGI will connect gas fields in northern Australia with customers in the eastern gas market.

Jemena has been shortlisted as one of the companies to build, own and operate the NEGI and is currently going through the competitive process with three other companies. By the end of September 2015, all four companies are required to submit their respective final proposals to the Territory, with one eventually being selected as preferred proponent by the Territory.

Jemena is seeking to submit a firm tariff offer to the Territory, which requires a degree of both price and project timing certainty. The timeframes to deliver the project are short with an expectation that the pipeline would be in operation by mid-2018. The approvals for the project are on the critical path for meeting this date. To assist with defining timing certainty and to help meet the early gas operation date, Jemena is aiming to have its overarching environmental approvals including EPBC Referral, Notice of Intent for the Northern Territory and Environmental Authority for Queensland submitted before the end of September 2015. The proposed project delivery timeline requires final environmental approvals to be granted by December 2016.

Broadly, the NEGI project involves the planning, construction and operation of a 622 km buried high-pressure gas pipeline from the Amadeus Gas Pipeline near Tennant Creek in the Northern Territory to the Carpentaria Gas Pipeline near Mount Isa in Queensland along with associated above ground facilities at various locations along the pipeline (Figure 1). Initially two Compressor Stations will be required, one at Warrego (near Tennant Creek) and the other at Mount Isa along with three Mainline Valves (**MLV's**) and one Scraper Station at various intervals along the pipeline. For future increased capacity additional compressor stations will be installed at each of the MLV and Scraper station sites in the Northern Territory. Temporary construction camps and support facilities will also be required along the pipeline route during the construction phase.

Detailed description of proposed action

The project will involve the construction and operation of an approximately 622 km high-pressure gas pipeline between Tennant Creek in the Northern Territory (NT) and Mount Isa in Queensland; 165 km in Queensland and 457 km in the NT. At Tennant Creek the pipeline will connect to the Amadeus Gas Pipeline, in Mt. Isa the pipeline will connect to the Carpentaria Gas Pipeline. The NEGI pipeline will transport gas from the Amadeus Gas Pipeline to the Carpentaria Gas Pipeline.

The land to be traversed by the NEGI pipeline comprises mainly pastoral leases dominated by cattle grazing over open downs country supporting Mitchell, Buffel and other grasses across large sections of black soil plains and lighter sandy country. There are existing gas and power facilities at both the Northern Territory and Queensland ends of the NEGI Alignment Corridor. Outback tourism including gem fossicking, camping, bird watching and sightseeing are mainly associated with the main regional centres of Tennant Creek and Mount Isa.

Camooweal is the closest town and 78 km north of the NEGI Aignment Corridor. There are three small Aboriginal communities in the Northern Territory being Purrukuwurru (13.6 km south of NEGI Alignment Corridor.),Wonara community (15 km north of NEGI Alignment Corridor) and Alpurrurulam (45 km south of the NEGI Alignment Corridor).

The pipeline will be laid in a trench with a minimum depth of cover of 750 mm. At watercourse crossings, the minimum depth of cover will be increased to at least 1,200mm. A 30m wide Construction ROW will be established for construction and fully rehabilitated after construction is complete. The proposed pipeline will be designed, operated and constructed in accordance with AS 2885 and the Australian Pipeline and Gas Association Code of Environmental Practice – Onshore Pipelines (APGA 2013).

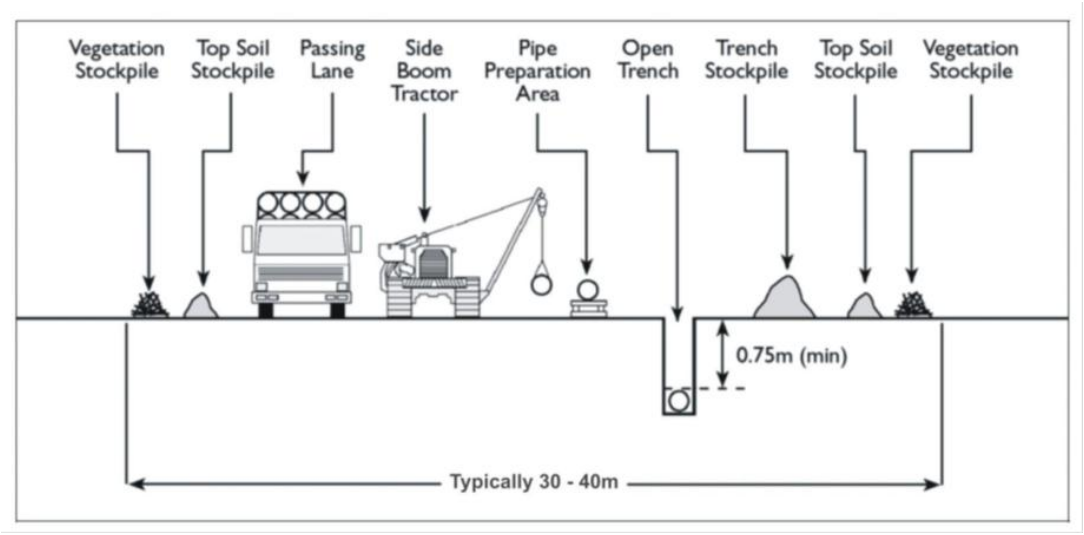
Planning Phase

The initial alignment for the proposed pipeline was determined through desktop assessment of land tenure, geology / soils, roads, the location of Indigenous communities and landholder and Indigenous community consultation. Using the initial alignment as the basis, the process for selection of the final alignment on which the pipeline will be constructed is as follows:

1. Identification of a 20km wide Planning Corridor.
2. Definition of a 1km wide Alignment Corridor within which all pipeline construction activities can occur (**Alignment Corridor**).
3. Selection of a 30m Pipeline Construction ROW.

The Alignment Corridor will be confirmed through discussions and negotiations with landholders and Aboriginal land interests. Cultural heritage (archaeological and ethnographic) and ecological surveys will be undertaken over the Alignment Corridor to ensure that there are no constraints to pipeline construction activities and for the purposes of obtaining the relevant approvals and agreements, particularly relating to cultural heritage.

Within the Alignment Corridor the Construction ROW will be 30m wide with additional extra workspace as required. Areas for temporary workers camps and pipe and equipment laydown will also be determined during the planning phase and will be within the Alignment Corridor. Where possible, access to the Construction ROW will be via existing roads and tracks and temporary workers camps will be located on already disturbed land. Access tracks and temporary workers camps will be removed and rehabilitated following completion of construction, excepting those tracks that were pre-existing unless agreements with landholders require otherwise. Layout of the Construction ROW is shown in diagram below.



Source: APGA

Construction Phase

Gas Pipeline

The proposed pipeline route will require the Construction ROW to support key construction activities including clearing and grading the Construction ROW, digging the pipeline trench, spoil placement, stringing and welding the pipeline (laying the pipe sections end to end and welding the lengths together), lowering-in and then backfilling the trench. On the Construction ROW vegetation topsoil will be cleared and stockpiled along the edge of the Construction ROW for later reuse. After returning soil to the trench, the Construction ROW will be rehabilitated by replacing excavated soil, contouring the soil surface to the surrounding land surface and then re-spreading the stockpiled vegetation and topsoil across the disturbed areas. Other areas used in construction (such as truck turnarounds and temporary camps) will be rehabilitated as soon as practical after the area's construction activities are completed.

Temporary access tracks will also be established to provide construction access to the Construction ROW, apart from the small number of these that will remain in place for permanent access to the above ground facilities, the majority will be rehabilitated after pipeline construction activities are completed.

Watercourse crossings

While one of the considerations for route selection was to avoid major river crossings, the proposed pipeline crosses numerous small ephemeral creeks and gullies as well as some larger ephemeral creeks; the latter are shown in the table below. Pipeline installation activities will only occur in the dry season to minimise impacts to watercourses.

When constructing in riparian areas the width of vegetation cleared will be reduced to the minimum possible to allow for trenching, pipeline installation and vehicle movement. River and stream banks will be carefully and quickly rehabilitated to the standard acceptable by the regulatory authorities in Northern Territory and Queensland.

Table 6. Intersected watercourses

Name	Hierarchy	Hydrology	State
Blue Bush Creek	Major	Non Perennial	NT
Georgina River	Major	Non Perennial	NT
Gosse River	Major	Non Perennial	NT
James River	Major	Non Perennial	NT
James River	Minor	Non Perennial	NT
Jimmy Creek	Minor	Non Perennial	NT
Kurundi Creek	Major	Non Perennial	NT
Mica Creek	Minor	Non Perennial	QLD
Mingera Creek	Major	Non Perennial	QLD
One Mile Creek	Minor	Non Perennial	QLD
Poison Creek	Minor	Non Perennial	NT
Polygonum Creek	Major	Non Perennial	QLD
Ranken River	Major	Non Perennial	NT
Redbank Creek	Major	Non Perennial	QLD
Templeton River	Major	Non Perennial	QLD
Templeton River	Minor	Non Perennial	QLD
Tennant Creek	Major	Non Perennial	NT
Whistleduck Creek	Major	Non Perennial	NT
Yaringa Creek	Major	Non Perennial	QLD
Yaringa Creek	Minor	Non Perennial	QLD

Access Tracks

To minimise land disturbance, existing roads and tracks will be used wherever possible and all vehicular movements will be confined to the roads, tracks and extra work space areas that have been approved for the project. The main sealed access roads for the project will be the Warrego Road, the Barkly Highway and the Diamantina Development Road. Other local roads that connect these main roads along with approved landholder access tracks will also be used. Where practicable, existing access tracks will be used rather than new access tracks developed. If new access tracks are required they will be identified in consultation with landholders and planned to either avoid or minimise any impacts to environmental and culturally sensitive areas. Rehabilitation of temporary access tracks will be done in consultation with landholders. The proposed location of these tracks will be determined in the planning phase with the final location being confirmed after the cultural heritage and ecological survey (approximately May 2016).

Temporary workers' accommodation camps

It is expected that there will be five temporary workers' accommodation camps located along the proposed pipeline route for workers to live in during the construction phase of the project; of which it is expected that only three will be operational at any one time. These will be removed and relocated as the pipeline construction progresses along the route. It is anticipated that there will be a maximum of 300 people in any one camp. The camps will include living quarters, a kitchen and recreational areas and will be located close to the proposed pipeline route, within the Planning Corridor.

Construction depots will typically be co-located with the camps to minimise disturbance to the environment.

Each temporary workers accommodation camp will be self-contained and will have its own power generation and sewage treatment and will require the clearing of vegetation of approximately 250 x 350. Potable water will be trucked in from Mount Isa, Camooweal or Tennant Creek.

The following principles to avoid and / or reduce environmental impacts will be utilised when identifying the construction camp locations:

(i) Nearby to Construction ROW to minimise crew driving distances.

(ii) No significant species, potential habitat for threatened species or cultural heritage values (as determined through survey).

(iii) Away from water bodies either ephemeral or permanent.

(iv) Suitable soil type that will readily rehabilitate.

(v) Low erosion potential (either soil type or slope).

(vi) Where at all possible they will be sited in previously disturbed areas.

(vii) Areas of mature, healthy vegetation will be avoided.

(viii) Away from areas of intact mature vegetation.

Vegetation clearing of the areas for the accommodation camps will follow a similar process to the Construction ROW: both topsoil and seed source material will be stockpiled. On completion all construction materials will be removed from site, the land surface will be re-contoured to surrounding levels and topsoil and vegetation will be re-spread across the area.

The proposed location of these camps will be determined in the planning phase with the final location being confirmed after the cultural heritage and ecological survey work (approximately May 2016).

Water

Water for dust suppression and hydrostatic testing will be required to be sourced from temporary dams; the number and area disturbed for each dam is shown in Table 2. The location of these dams (and the associated regulatory approvals) will be further developed during the planning phase in 2016.

Hydrostatic Testing

The integrity of the pipeline will be tested by filling it with water and pressurising it to above the operating pressure. Hydrostatic testing procedures, including water sourcing and disposal, will be determined during the design and construction phase. It is estimated that 15ML of water will be required for this testing.

At least one month prior to commencement of hydrostatic pressure testing activities, a hydrostatic test water management plan (**HTWMP**) will be submitted to the relevant authorities in the Northern Territory and Queensland.

The HTWMP will include the following details:

- Volume and source of test water;
- Proposed method and location of reuse and / or disposal; and
- Proposed management measures to avoid or minimise environmental impacts including sourcing, storage, treatment, reuse and / or disposal of test water.

Compressor stations

Compressor Stations will be installed at the Tennant Creek and Mt. Isa ends on the pipeline with three additional compressor stations to be constructed at each of the MLV and Scraper station sites in the Northern Territory in the future if required; these will be readily accessible from existing permanent roads after the other temporary construction access tracks are rehabilitated.

The compressor stations are proposed to be similar in design. Each station will comprise two Solar Taurus 60 gas turbine driven compressor units (or equivalent). Whilst it is proposed that power be supplied by two duty/standby gas engine alternators (**GEA**) at each site, with fuel supplied from the gas pipeline, Jemena is also exploring the three-phase power availability at Tennant creek and Mt Isa to reduce the reliance on GEA's. Each station will also have a permanently manned office, control room, workshop and amenities. Small quantities of lube oil will be stored at each end for maintenance purposes.

Fuel Storage

Camps will have fuel storage of up to peak fuel capacity of 252,000L (three fuel tanks (75,000L)) and 3 Fuel Tankers (9,000L). The fuel will be stored and transported according to appropriate legislation and standards in each jurisdiction.

Sewerage

It is proposed that sewage from temporary construction camps be treated on site through use of septic or transportable treatment units. After thorough treatment, effluent may be irrigated to land in accordance with licensed effluent discharge limits.

Explosives Storage

Explosives may be required for rocky areas. Explosives will be stored in small fenced and locked facilities nearby to each campsite.

Operation Phase

The operation of the pipeline will be in accordance with approval documentation, a specific Environmental Management Plan (EMP), and relevant standards and codes.

All inspections along the pipeline route will be performed by helicopter allowing the Construction ROW to be completely rehabilitated.

Decommissioning

When, and if, the proposed pipeline is no longer required, it will be decommissioned in accordance with the legislative and regulatory requirements and accepted environmental best practices and standards applicable and relevant at that time. Currently, decommissioning procedures require the removal of all above ground infrastructure (including all scraper station plant, pipeline valves and metering stations) and the restoration of associated disturbed areas.

2.2 Alternatives to taking the proposed action

This should be a detailed description outlining any feasible alternatives to taking the proposed action (including not taking the action) that were considered but are not proposed (note, this is distinct from any proposed alternatives relating to location, time frames, or activities – see section 2.3).

N/A

2.3 Alternative locations, time frames or activities that form part of the referred action

If you have identified that the proposed action includes alternative time frames, locations or activities (in section 1.10) you must complete this section. Describe any alternatives related to the physical location of the action, time frames within which the action is to be taken and alternative methods or activities for undertaking the action. For each alternative location, time frame or activity identified, you must also complete (where relevant) the details in sections 1.2-1.9, 2.4-2.7, 3.3 and 4. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, time frames or activities that are identified here may be subject to environmental assessment and a decision on whether to approve the alternative.

N/A

2.4 Context, planning framework and state/local government requirements

Explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Commonwealth or state legislation or policies under which approvals are required or will be considered against.

The NEGI pipeline is subject to environmental approvals and resource project licencing in both the Northern Territory and Queensland. Within the Northern Territory (NT) a Notice of Intent will be submitted to the NT Government under the *Environmental Assessment Act*, it is expected that this will lead to an Environmental Impact Statement process. The construction and operation of the pipeline will be licenced under the *Energy Pipelines Act* through Jemena obtaining a pipeline licence. Within Queensland, environmental approvals will be secured through the submittal of an Environmental Authority under the *Environmental Protection Act (1994)*. The construction and operation will be licenced under the *Petroleum and Gas (Production and Safety) Act (2004)* through Jemena securing a Petroleum Pipeline Licence.

In addition to environmental approvals and licencing for a resource project, the project is subject to both federal and state cultural heritage, workforce participation, land access, environment protection and work health and safety requirements. Examples of permits and plans that meet these requirements include, industry participation plan, s19 Grant under the Aboriginal land Rights Act, Indigenous Land Use Agreements, waterway crossing permits, water extraction and use permits and permits to interfere with wildlife. Through the planning process Jemena has developed a comprehensive list of legislation and approvals applicable to the project. A list a relevant legislation that may apply to the project is provided below.

Commonwealth

The Commonwealth legislation governing the primary approvals for the project is listed below:

- *Environment Protection and Biodiversity Conservation Act 1999;*
- *Aboriginal Land Rights (Northern Territory) Act 1976;*
- *Native Title Act 1993; and*
- *Australian Jobs Act 2013*

Northern Territory
The Northern Territory section of the Planning Corridor passes through sections of pastoral land, freehold and vacant land. Approvals to construct the pipeline are subject to the requirements under:

- *Environmental Assessment Act 1982* (EA Act)*;*
- *Environmental Assessment Administrative Procedures* 1984 (EAAP).
- *Energy Pipeline Act 1981 & Energy Pipeline Regulations 2001*

In addition to the above legislation governing primary approvals processes, approvals may be required (and will be considered against the following legislation:

- *Territory Parks and Wildlife Conservation Act 1976;*
- *Fisheries Act 1988;*
- *Water Act 1992;*
- *Traffic Act 1987;*
- *Heritage Act 2011;*
- *Aboriginal Land Act (NT) 1980;*
- *Northern Territory Aboriginal Sacred Sites Act 1989;*
- *Crown Lands Act 1992;*
- *Pastoral Lands Act 1992;*
- *Planning Act 1999;*
- *Dangerous Goods Regulations 1985;*
- *AustralAsia Railway (Special Provisions) Act 1999.*

Queensland
The primary approvals for the Queensland section of the project are:

- *Environmental Protection Act 1994;*
- *Petroleum and Gas (Production and Safety) Act 2004;* and
- *Aboriginal Cultural Heritage Act 2003.*

In addition to the primary approvals required under the above legislation there are secondary approvals and planning considerations. At a state level approvals may be required and will be considered against the following legislation:

- *Sustainable Planning Act 2009;*
- *Nature Conservation Act 1992;*
- *Water Act 2000.*
- *Transport Infrastructure Act 1994;*
- *Land Act 1994;*
- *Transport Operations (Road Use Management) Act 1995;*
- *Queensland Heritage Act 1992;*
- *Work Health and Safety Act 2011;*
- *Land Titles Act 1994;*
- *Forestry Act 1959;*
- *Explosives Act 1999;*
- *Electrical Safety Act 2002;*
- *Environment Protection (Waste Management) Policy 2000;*
- *Survey and Mapping Infrastructure Act 2003;* and
- Any Regional Council Subordinate Local Laws.

Mount Isa sits within the area covered by the North West Regional Plan 2010-2031. This plan provides policies on planning issues for the central western Queensland belt running from Mount Isa Council to Flinders Council. The Planning Corridor is entirely located within the Mount Isa City Local Government area, situated within far western Queensland.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

If you have identified that the proposed action will be or has been subject to a state or territory environmental impact statement (in section 1.11) you must complete this section. Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals. Where possible, provide contact details for the state/territory assessment contact officer.

Describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

Jemena has completed a desktop assessment of ecological values and potential impacts along the pipeline route. This Referral is, in part, based on this information.

Both Queensland and the Northern Territory have processes to assess the environmental impacts of this action. Jemena has commenced the environmental approvals process in both Queensland and the Northern Territory. The approvals process for each jurisdiction is outlined below.

Northern Territory:

- A Pipeline Permit was submitted to the Northern Territory Department of Mines and Energy for the purposes of a geotechnical survey of the route.
- Pursuant to the Northern Territory *Environmental Assessment Act* (EA Act) *& Environmental Assessment Administrative Procedures* (EAAP) a Notice of Intent (**NOI**) is currently being prepared to be submitted to the Northern Territory Environment Protection Authority (**NTEPA**). The NOI is the formal notification to the NTEPA of the project and starts the Northern Territory assessment process.
- It is expected that the NTEPA will require that the project is assessed as either an Environmental Impact Statement (**EIS**) or a Public Environmental Report (PER).

Discussions regarding environmental approvals for this project in the Northern Territory have included:

Department of Mines and Energy

Gibson Porkime gibson.porkime@nt.gov.au

Northern Territory Environment Protection Authority

Roderick Johnson Roderick.Johnson@nt.gov.au
Paul Purdon Paul.Purdon@nt.gov.au and Alana Mackay alana.mackay@nt.gov.au - NOI pre-submission meeting

Queensland:

- A Pipeline Survey Licence (**PSL**) and associated Environmental Authority (**EA**) has been issued by the Queensland Government for the purposes of surveying the Queensland section of the NEGI pipeline; the EA for the PSL was approved on 14 July 2015.
- The proposed action does not meet any of the criteria for the project to be declared an EIS in Queensland and, after discussion with the Queensland Government Departments of Environmental and Heritage Protection (DEHP) and Natural Resource and Mines (DNRM) an application for Pipeline Licence and associated Environmental Authority (EA) will be submitted in September 2015.
- It is expected that the EA will be conditionally granted within 2 calendar months of submission.

Discussions regarding environmental approvals for this project in Queensland have included:

Department of Environment and Heritage Protection

- Kylie Breaker Kylie.Breaker@ehp.qld.gov.au (phone conference 3 July 2015, face-to-face in Brisbane on the 7 July 2015)
- Kim Shaw, Manager (Assessment), Kim.SHAW@ehp.qld.gov.au (phone conference 3July 2015)
- Philip Rowland, Manager, EIA Petroleum, Gas and Agriculture, Philip.Rowland@ehp.qld.gov.au (face to face meeting Brisbane 16 June 2015)
- Carole Rayner, Principal Impact Assessment Officer (Biodiversity), Carole.Rayner@ehp.qld.gov.au (face to face meeting Brisbane 16June 2015)
- Phillip Ottens, A/Team Leader Petroleum and Gas (Assessment), Phillip.Ottens.ehp.qld.gov.au (pre-submission meeting 27 August 2015)

Office of the Coordinator General

Steven Tarte, Project Manager, Coordinated Project Delivery, Steven.Tarte@coordinatorgeneral.qld.gov.au (face to face meeting Brisbane 16June 2015)

Department of Natural Resources and Mines

John McCormack Registrar – Petroleum and Gas, john.mccormack@dnrm.qld.gov.au (face-to-face 8 July 2015)
John McCormack Registrar – Petroleum and Gas, john.mccormack@dnrm.qld.gov.au (Petroleum Pipeline Licence pre-submission meeting 27 August 2015)

Department of State Development

- Karen Wiik, Director, Industry Case Managers, Industry Development karen.wiik@dsd.qld.gov.au
- Isabelle Gabas, Industry Case Manager, Industry Development Isabelle.Gabas@dsd.qld.gov.au

2.6 Public consultation (including with Indigenous stakeholders)

Your referral must include a description of any public consultation that has been, or is being, undertaken. Where Indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with Indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Where appropriate include copies of documents recording the outcomes of any consultations.

Jemena has commenced public consultation with both the business community and the general public, undertaking project briefings in Darwin, Alice Springs, Tennant Creek and Mount Isa. In addition, Community Open Houses were held in Tennant Creek, Camooweal and Mount Isa. This engagement will continue throughout the project.

All consultation, without exception, has been very well received and the co-operation received has been excellent. Jemena believes the effort to consult thoroughly with the public and the continued efforts to do so have set the foundations for positive relations for the remainder of the project.

Jemena is undertaking a broad public consultation program targeting a range of key stakeholders including;

- Landholders & Occupiers
- Local Government Authorities
- State and Territory Government Authorities
- Road Authorities
- Rail Authorities
- Mining & Petroleum Tenement Holders
- Easement Holders
- Native Title Claimants
- Indigenous Landholders

Landholder consultation

All landholders and occupiers directly or indirectly impacted by the proposed alignment have been consulted with and where possible, face to face meetings have been held (on a number of occasions in some cases). Landholders and occupiers have been provided with an overview of Jemena, the NEGI project and a briefing on the timeframes and process moving forward. The proposed alignment together with access tracks, station locations and other features of the project have been discussed with landholders and occupiers also. Input has been provided from these key stakeholders and the alignment altered in some instances taking account of the feedback obtained. Where applicable, Jemena has entered into access agreements with landholders to access land for survey purposes. Comprehensive records of all discussions, communications and correspondence have been maintained throughout the consultation program.

Aboriginal Representative Bodies, Aboriginal Landowners and Native Title Holders

The proposed pipeline traverses land on which a range of known Aboriginal interests exist. These interests are set out in the table below:

KP	Tenure Type & Aboriginal Interests	Representative Body
0-38	Pastoral Lease with Native Title claim. Phillips Creek Native Title Claim (DC2014/009)	Central Land Council (CLC).
39-63	Aboriginal Land. Warrumungu Aboriginal Land Trust.	CLC.
173 - 193	Pastoral Lease with native title claim. Dalmore Downs Native Title Claim (DC2001/030).	Northern Land Council (NLC)
194-213	Pastoral Lease with native title claim. Dalmore Downs South Native Title Claim (DC2002/002).	NLC
213-262	Aboriginal Land. Wakaya Aboriginal Land Trust.	CLC
262-305	NT Enhanced Aboriginal Freehold held by the Arruwurra Aboriginal Corporation (AAC).	AAC
306-313	Pastoral Lease with native title claim. Dalmore Downs Native Title Claim (DC2001/030).	NLC
314-343	NT Enhanced Aboriginal Freehold held by the Arruwarra Aboriginal Corporation.	AAC
344-457	Pastoral Lease with native title claim. Burramurra Native Title Claim (DC2002/0152).	NLC
458-565	Determined native title over pastoral lease. Indjalandji-Dhidhanu Native Title Prescribed Body Corporate (PBC) (IDAC)	IDAC
606-622	Determined native title over pastoral lease. Kalkadoon Native Title Prescribed Body Corporate (PBC) Aboriginal Corporation (KNTAC)	KNTAC

The relevant legislation for approvals for the project relating to Aboriginal interests includes:

1. *Aboriginal Land Rights (Northern Territory) Act 1976 (Cth) (ALRA)*
2. *Native Title Act 1993 (Cth) (NTA)*
3. *Aboriginal Land Act (NT) (ALA)*
4. *Northern Territory Aboriginal Sacred Sites Act 1978 (NT) (ASSA)*
5. *Heritage Act 2011 (NT) (HA)*
6. *Aboriginal Cultural Heritage Act 2003 (Qld) (ACHA)*

Commencing in early June 2015 Jemena engaged in consultations with the Central and Northern Land Council, the Indjalandji-Dhidhanu Aboriginal Corporation and the Kalkadoon Native Title Aboriginal Corporation. More recently in July 2015, Jemena commenced consultations with the Arruwurra Aboriginal Corporation (AAC) after being advised that this organisation wished to deal directly with Jemena, rather than through the CLC.

From May through September a number of meetings, telephone discussions and communications have occurred between the Jemena and the Aboriginal parties. The subject of discussions to date has been associated with putting in place:

1. Two-way confidentiality agreements – to protect each other's interests during the NEGI competitive phase.
2. Land access for geotechnical surveys and the protection of cultural heritage values.
3. Cultural Heritage Survey Agreements for full cultural heritage surveys during the Planning Phase.

At the time of this referral, the status of the discussions is summarised as follows:

#	Agreement Type	Aboriginal Organisation / Status of Agreement Making				
		CLC	NLC	AAC	IDAC	KNTAC
1	Confidentiality agreement	Y	Y	Y	Y	N
2	Geotechnical surveys access.	Y	NYR	Y	Y	Y
3	Heritage Survey Agreement	Y	NYR	NYR	NYR	NYR
4	Land Agreement	NYR	NYR	NYR	NYR	NYR

Y: Yes; N: No; NYR: Not Yet Required; NR: Not Required

Discussions with these Aboriginal stakeholders have been both positive and constructive and arrangements are well underway for the conduct of full cultural heritage surveys and short and long term access to land should Jemena be appointed as the successful proponent to build, own and operate the NEGI pipeline. When this occurs, Jemena will commence more substantive discussions with the Aboriginal parties in relation to land agreements, cultural heritage and also through the develop of an Economic and Social Impact Assessment (ESIA) for inclusion with the relevant environmental approvals.

Business and general community stakeholders

Jemena's normal practice for projects is to engage with identified stakeholders including the wider community and the approach taken for the NEGI Project is consistent with this. During the week commencing 20 July 2015, Jemena undertook a regional roadshow to engage with the both the business community and the community more broadly in the regional towns where the project will be located.

The following table summarises the consultation events:

Event	Location / # people attending / inquiring				
	Darwin	Alice Springs	Tennant Creek	Camooweal	Mount Isa
Business Briefings	210	38	19	x	64
Community Open Houses	n/a	na* see note below	31	16	17

Business Briefings

Business stakeholders from Camooweal attended the Mount Isa event. The purpose of the road show was firstly to introduce Jemena and its main construction contractor, McConnell Dowell, to stakeholders in the Northern Territory and specifically to the Barkly and Mount Isa regions where the project will be located. The second and equally important purpose was to begin to gauge the level of capacity that exists in the regions to support the project and to commence Jemena's understanding of any concerns and aspirations about the project within the associated communities.

The business briefings on the road show included presentations from:

- Jemena;
- McConnell Dowell;
- the ICN Northern Territory and Queensland;
- Indigenous Business Network Northern Territory (Darwin only);
- AusIndustry, regarding the Entrepreneurs Infrastructure Programme;
- the Department of Education and Training, regarding the Industry Skills Fund;
- the Northern Territory Department of Business (Darwin excepted); and,
- the Queensland Department of State Development (Mount Isa).

Each business session was ended with a closing address from the Chamber of Commerce Northern Territory (in the Northern Territory) and Commerce North West (Mount Isa).

In summary the business briefings were very useful for both Jemena and the participants and allowed for a significant amount of information sharing and contacts for future discussions to be made.

Community Open House Sessions

The Community Open houses were run in Tennant Creek at the local Food Barn; Camooweal at the Town Hall and Hotel; and at Mount Isa at the Kmart Plaza. These comprised setting up a small display to disseminate information about the project and to talk to people in the communities about who Jemena is and what its involvement in the project is.

Since Jemena commenced involvement in the NEGI project it has prepared and disseminated two project newsletters to stakeholders in the Northern Territory and Mount Isa area. Pictorial booklets about the process for pipeline construction and operations were also disseminated. These publications are attached for reference.

While running the Alice Springs business session at the Central Australian Development Office a small protest led by the Central Australian Frack Free Alliance was held outside the building. In a non-confrontational way Jemena approached and discussed the NEGI project with the group. Many questions asked by the Alliance were answered and copies of the Jemena NEGI project newsletter were provided. The Alliance now has the relevant Jemena contacts and is included on the Jemena stakeholder database for future consultation.

At all Community Open House sessions Jemena engaged with a cross section of local communities, Indigenous and non-Indigenous.

The matters of interest raised by the people encountered were varied and included:

- the job opportunities that might be available on the project, for women as well as men;
- where the pipeline would be located in relation to traditional Aboriginal country;
- the need for Jemena to work to understand the local culture in order to ensure successful local participation in the project;
- the opportunities available for local businesses; and,
- the construction method particularly in the different ground types common in the region.

A NEGI project inquiry email address has been established for stakeholders to contact Jemena and a number of inquiries about the project have started to be received through this avenue.

Future Consultations and Engagement

Throughout the engagement referred to above Jemena gathered a large amount of information that will be very useful in future consultations and engagement.

Jemena recognises that the consultation activities undertaken to date are just the beginning of the process and that as time moves on then there will no doubt be more matters raised as stakeholders become more involved in the process, particularly through consultations associated with the Economic and Social Impact Assessment.

Other stakeholder engagement

Jemena has also met representatives of the two local government authorities and provided a briefing to each on the project. Similarly, meetings have been held with the relevant state and territory government authorities to discuss the project in their capacity as landholders and managers of the land in some cases or as the authority administering land tenure. These meetings have been invaluable in gathering important information relating to land through which the pipeline passes; this information has assisted Jemena in developing the land access strategy.

State road authorities have been consulted to discuss specifications relevant to the crossing of state owned and controlled roads as well as discussions around use of roads for transport and logistics required for a project of this magnitude.

The project also intersects a rail corridor accommodating the Adelaide to Darwin railway. Meetings have been held with the CEO of the railway owner, AustralAsia Railway Corporation and a briefing provided and specific requirements gathered. Operators of the rail corridor, Genesee and Wyoming have also been consulted as has NextGen who own and operate cable infrastructure within the rail corridor.

Importantly, and particularly around Mount Isa, Jemena has consulted with mining and resource tenement holders directly impacted by the NEGI Project. Jemena has met with representatives of Mount Isa Mines and provided a project briefing and discussed possible sub-leases of their mining lease to locate end of line facilities.

Any parties holding a registered easement have been provided with information pertaining to the project and been provided with an opportunity for comment.

2.7 A staged development or component of a larger project

If you have identified that the proposed action is a component of a larger action (in section 1.12) you must complete this section. Provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (eg. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

N/A

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest.

Your assessment of likely impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties and National Heritage places and the ecological character of Ramsar wetlands;
- profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species policy statements available on the web site, as relevant.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The Minister has prepared four marine bioregional plans (MBP) in accordance with section 176. It is likely that the MBP's will be more commonly relevant where listed threatened species, listed migratory species or a Commonwealth marine area is considered.

Note that even if your proposal will not be taken in a World Heritage area, Ramsar wetland, Commonwealth marine area, the Great Barrier Reef Marine Park or on Commonwealth land, it could still impact upon these areas (for example, through downstream impacts). Consideration of likely impacts should include both direct and indirect impacts.

3.1 (a) World Heritage Properties

Description

There are no world heritage places within the Alignment Corridor. The closest world heritage property is Australian Fossil Mammal Sites (Riversleigh); approximately 190 km from the Alignment Corridor.

Nature and extent of likely impact

Consequently, this development will not affect these areas

3.1 (b) National Heritage Places

Description

There are no national heritage places the Alignment Corridor.

Nature and extent of likely impact

Consequently, this development will not affect these areas.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

There are no wetlands of international importance within the Planning Corridor nor do any rivers that intersect the pipeline flow into any Ramsar wetland.

Nature and extent of likely impact

Consequently, this development will not affect these areas.

3.1 (d) Listed threatened species and ecological communities

Description

The EPBC Protected Matters Search Tool (PMST was used to generate a list of Commonwealth listed threatened species that may, are likely or known to occur within a 50 km buffer area around the Alignment Corridor (see Appendix B). The likelihood of each species occurring within the 20 km pipeline Planning Corridor was then determined using the scientific literature and desktop information of species distribution and habitat requirements (see Appendix C for detailed methods and results of this analysis). The PMST returned no Threatened Ecological Communities within the 50 km buffer.

The analysis in Appendix C categorised the PMST threatened species into either likely or unlikely as summarised in Table 7. Only four threatened species are 'Likely' to occur within the pipeline Planning Corridor. The potential impacts to each of those species are addressed in the sections below. Species that were determined unlikely to occur within the Planning Corridor were excluded from further analysis.

Table 7. Summary of threatened species likelihood analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood	EPBC status
Likely	Gouldian Finch	*Erythrura gouldiae*	Known	EN
	Carpentarian Antechinus	*Pseudantechinus mimulus*	Known	VU
	Masked Owl (Northern)	*Tyto novaehollandiae kimberli*	Known	VU
	Plains Death Adder	*Acanthophis hawkei*	Known	VU
Unlikely	Red Goshawk	*Erythrotriorchis radiata*	May	VU
	Night Parrot	*Pezoporus occidentalis*	Likely	EN
	Australian Painted Snipe	*Rostratula australis*	Likely	EN
	Greater Bilby	*Macrotis lagotis*	Known	VU
	Southern Marsupial Mole	*Notoryctes typhlops*	Likely	EN
	Black-footed Rock-wallaby (MacDonald Ranges Race)	*Petrogale lateralis (MacDonald Ranges Race)*	May	VU
	Gulf Snapping Turtle	*Elseya lavarackorum*	Known	EN
	Great Desert Skink	*Liopholis kintorei*	May	VU
	Freshwater Sawfish	*Pristis pristis*	Likely	VU

Status: EN = Endangered, VU = Vulnerable,
PMST likelihood: Known = species or species habitat known to occur within area, Likely = species or species habitat likely to occur within area, May = species or species habitat may occur within area; from Protected Matters Search Tool output, Appendix B

Nature and extent of likely impact

Gouldian Finch *(Erythrura gouldiae)*

The Gouldian Finch is found in woodland of Eucalyptus trees especially E. tintinnans, E. brevifolia and E. leucophloia, which typically occur amongst rocky hills. Where there is suitable Eucalyptus spp. present for nesting the Gouldian Finch also requires annual and perennial grasses, especially Sorghum, in the surrounding landscape but has also been observed to occur in woodland with the grasses Chrysopogon fallax, Triodia bitextura and Alloteropsis semialata (DOE 2015). The species also requires access to a water source. The Gouldian Finch appears to be a resident and probably largely sedentary species that disperses from breeding areas to nearby sites (up to about 20 km away) during the wet season in response to local changes in the availability of food (DOE 2015).

Within the Northern Territory section of the Planning Corridor, vegetation consists of grasslands over black soil

plains, shrubland and eucalyptus open woodland. The low open woodland vegetation is the only potential habitat within the Planning Corridor for the Gouldian Finch however this is outside the range of the species. Given that the only potential habitat for the species in the Northern Territory is outside of the species range it is highly unlikely that the Gouldian Finch will be found within the Northern Territory section of the Planning Corridor.

Regional Ecosystems (**RE**) are mapped by the Queensland Government and provide information that can be used to broadly assess for the presence of preferred habitat types in the areas where Gouldian Finch could occur. Small sections of pipeline west of Mount Isa passes through RE which contain Eucalyptus leucophloia, E. tintinnans or E. brevifolia, which are the preferred nesting tree species for Gouldian Finches (Figure 3, Figure 4). Although no RE within the Planning Corridor are characterised by the presence of the species' preferred food source, Sorghum spp., there are RE that contain Triodia spp. and Chrysopogon spp in the understorey which could potentially be utilised by the species.

In Queensland, records of the species have been unpredictable and records of the species have not reoccurred from the same location (O'Malley 2006). Additionally, there are no recent breeding records from anywhere within Queensland (Garnett et al. 2011). There are very few records of the species from within the region; one record from east of Lake Moondarra and another from Lady Loretta Mine Road approximately 50 km north of the Alignment Corridor (These are the closest two records to the Alignment Corridor shown in Figure 4). Given the scarcity of records and the lack of ideal habitat, the Planning Corridor is not core habitat for the species. However, based on this broad habitat information and the existence of a few recent Gouldian Finch sightings from the area around Mount Isa, the potential presence of habitats utilised by the species cannot be discounted until biological surveys are completed in 2016.

If field surveys indicate that the Gouldian Finch does, or is likely to, breed within habitats traversed by the Alignment Corridor it is still unlikely that this development will significantly affect the species as the impact corridor is narrow (30 m), the length of habitat intersected by the pipeline is 28.28 km (84.84 ha), the habitat is sparse trees (thus only a few trees, if any, will be impacted) and construction will be during the dry season which is outside the breeding season for the species (which is when they would use this woodland habitat). Affected areas of nesting habitat (maximum 85 ha) comprise a small section of potential nesting habitat within the Planning Corridor (49,431 ha); as such disturbance associated with pipeline construction activities is unlikely to impact on the Gouldian Finch population.

Disturbance of potential dry season feeding habitats in the lowland areas is less likely to impact on any regional population (if present) as the disturbance will be confined to a 30 m wide corridor and the construction process from vegetation clearing to re-instatement will occur over a single season. Whilst the birds may avoid feeding in close proximity to the construction activities, it is not expected that the disturbance will substantially restrict the use of feeding areas more broadly. On completion of construction the Construction ROW will be rehabilitated with soil returned to the trench and topsoil, previously stockpiled, spread back over the site to promote regeneration of the grass species. Whilst trees present within the 30 m footprint will be removed, the absence of these trees is unlikely to affect the species utilisation of the area, as the species is frequently observed nearby previously disturbed areas such as roads, borrow pits and dams (Welch pers. comm. 2015).

Apart from habitat alteration the main threats to the Gouldian Finch are altered fire regimes, aviculture and parasites (DOE 2015). Although the project will not directly alter fire regimes there is the potential for indirect alteration due to the introduction of weeds. Weeds have the potential to both increase and decrease the frequency of fire within a landscape. An increase in fire regimes is a potential threat to the Gouldian Finch which could be caused by the introduction of weed species to the area. In order to avoid and minimize the establishment of weeds along the pipeline footprint, the area will be progressively backfilled and levelled with local topsoil to encourage the establishment of native grasses. To avoid the transport of weeds to the site through construction activities a weed management plan will be developed. General procedures for weed prevention include the use of vehicle blow down stations. The weed management plan will be tailored to meet the environmental objectives and management measures outlined in the APA Code of Environmental Practice for Onshore Pipelines (APGA 2013). Following the industry best practice for weed management it is expected that the introduction of weeds will be minimized and thus fire regimes will not be significantly altered along the pipeline corridor. The parasite *Sternostoma tracheacolum* may have a negative effect on the Gouldian Finch. This is thought to increase during times of food stress. The small area of disturbance will have little impact on food availability and is thus unlikely to increase the instance (or spread) of parasite infection.

Carpentarian Antechinus *(Pseudantechinus mimulus)*

Within the Northern Territory the Carpentarian Antechinus is only known from the Sir Edward Pellew group of Islands (Kitchener 1991; Johnson & Kerle 1991; Taylor et al. 2004) and is not distributed within the Planning Corridor. In Queensland the species is only known from around Mount Isa (Woinarksi 2004). There are no records of the species within the 20 km Planning Corridor, but likely and possible distribution of the species (see Figure 5) is intersected by the Planning Corridor. Carpentarian Antechinus has a mainland range restricted to the areas around Mount Isa. The few records of this species show a preference for the rocky hills habitat that occurs in this area. Within Queensland, the records come from rocky habitat with open woodland dominated by Eucalyptus leucophloia, E. normantonensis and Corymbia terminalis. The sandstone hills and boulders to the west of Mount Isa within the Planning Corridor potentially constitute suitable habitat for the species. Little is known about microhabitat requirements for the species; however, breeding is thought to occur during a short period between August and October (DOE 2015).

There are no records of the species within the Planning Corridor. There are three records in the vicinity of Mount Isa within the ALA database (ALA, 2015) (Figure 5). Given the distribution of the species, and the presence of potential habitat, it is assumed that this species may occur in the rocky hill areas that will be traversed by approximately 15 km of the proposed pipeline west of Mount Isa. Whilst rocky hills will be avoided where at all possible in final route selection due to the high cost of construction; this is unavoidable near Mt. Isa so some small sections of the pipeline will traverse rocky areas. The presence / absence of the preferred Carpentarian Antechinus habitats in the areas traversed by the Alignment Corridor will be determined during the field surveys in 2016.

Pipeline construction could have a direct impact on the species if construction occurs through inhabited areas. Construction activities are unlikely to result in the death of individuals sheltering in rock-crevices or inadvertently captured in the open trench subject to the implementation of effective mitigation measures during construction (Section 4). Construction (clearing and blasting) through rocky areas will create noise and vibration; which could cause the Carpentarian Antechinus (if present) to avoid using the areas over the construction period. As the potentially impacted habitats occur contiguously with other suitable habitat areas, it is expected that the species could readily utilise habitats outside of the construction corridor in the short-term. The removal of trees within the 30 m wide corridor is not expected to cause long-term change to habitat suitability; and reinstatement with native grasses should ensure the corridor does not provide a barrier to movement or dispersal of the species.

The threats to the Carpentarian Antechinus are largely unknown; however, potential threats include feral cats, increased fire regimes impacting on prey, and Buffel grass invasion (DOE 2015). Feral cats are already distributed throughout Australia (DOE 2004) including the entire Planning Corridor. The pipeline will be a linear disturbance and construction will be for a short period. This is unlikely to increase the abundance of feral cats within the area.

Buffel Grass (Cenchrus ciliaris) is a potential weed species within the Mount Isa Inlier Bioregion and is well established in the area (AVH 2015). The continued invasion of the species may pose a threatening process to the Carpentarian Antechinus through increasing fire frequency along ridgelines where the grass has invaded. Construction activities and vehicle transport along the Construction ROW have the potential to spread Buffel Grass and thus impact the ecology of the area where the species occurs. In order to avoid and minimize the establishment of weeds along the pipeline footprint, the area will be progressively backfilled and levelled with local topsoil to encourage the establishment of native grasses. To avoid the transport of weeds to the site through construction activities a weed management plan will be developed. General procedures for weed prevention include the use of vehicle blow down. The weed management plan will be tailored to meet the environmental objectives and management measures outlined in the APA Code of Environmental Practice for Onshore Pipelines (APGA, 2013). Following the industry best practice for weed management it is expected that the introduction and spread of weeds will be minimized along the pipeline corridor.

Masked Owl (Northern) *(Tyto novaehollandiae kimberli)*

The Masked Owl (Northern) occurs sparsely within its broad range across northern Australia. Its general distribution is well north of the Planning Corridor. Despite the Planning Corridor being south of the species commonly accepted range, there is a single isolated record of the species from south of the Planning Corridor. The record is within the search area and is located north of Alpurrurulam.

The species prefers tall open Eucalyptus forests and will forage in more open vegetation types including grasslands (Woinarski and Ward 2006). Tall open Eucalyptus woodland is not a dominant vegetation community of the Planning Corridor; low open woodland, shrubland or grassland is more common; which constitute potential foraging habitat for the species. The Masked Owl is broad ranging with pairs having large home ranges (DOE 2015); nests occur 7 to 8 km apart. Other subspecies of Masked Owl have home ranges of 5 to 10 km2 (Kavanagh and Murray 1996).

Given the large home range, temporary disturbance caused by pipeline construction activities over a single dry season is not expected to affect the survivability of any pairs whose home range is traversed. Considering a square home range of 500 ha (5 km2) and allowing for a 30 m wide pipeline footprint pipeline construction activities would disturb approximately 9 ha (or 1.8 %) of the potential home range. Noise and vibration may cause the species to avoid utilising areas within close proximity to the construction corridor for a short period of time due to prey species for the Masked Owl temporarily avoiding using these habitats (although small rodents such as mice may prefer disturbed soil and regularly frequent the site) . The broader availability of foraging habitats in the surrounding areas should provide for the species habitat requirements in the short-term. As indicated above, the presence of suitable nesting habitats is expected to be limited by the minor extent of tall open Eucalyptus woodland and therefore impacts to nesting birds are considered unlikely.

The threats to the Masked Owl are largely unknown but it is thought to be affected by changing fire regimes, grazing livestock and the introduction of pasture grasses (DOE 2015); all of which have caused a decline in the small mammal population across northern and central Australia. This reduction in the small mammal population has reduced the potential food source of the Masked Owl. The project will not directly modify fire regimes however there may be indirect impacts to fire regimes (and direct impacts to mammal populations) through the introduction and/or spread of weeds within the Planning Corridor. In order to avoid and minimize the establishment of weeds along the pipeline footprint, the area will be progressively backfilled and levelled with local topsoil to encourage the establishment of native grasses. To avoid the transport of weeds to the site through construction activities a weed management plan will be developed. General procedures for weed prevention include the use of vehicle blow down stations. The weed management plan will be tailored to meet the environmental objectives and management measures outlined in the APA Code of Environmental Practice for Onshore Pipelines (APGA, 2013). Following the industry best practice for weed management it is expected that the introduction and spread of weeds will be minimized and thus fire regimes will not be significantly altered along the pipeline corridor.

Reducing numbers of hollow bearing trees could also potentially affect the species; such trees are used for roosting and breeding. Although not typical of the vegetation within the Planning Corridor large hollow bearing trees are likely to be scattered across certain sections of the pipeline. Although not always possible, where at all possible the final alignment of the pipeline will avoid large hollow bearing trees. As it may not always be possible to avoid large hollow bearing trees consideration need to be given to the potential impact of removing these trees.

Information of the number of hollows per hectare of woodland within the Planning Corridor is not known however there have been estimates made of other woodland communities which can give a general idea of tree hollow numbers. Relatively high densities of hollows were found within E. miniata and E. tetrodonta woodland where mean density of hollows greater than five centimetres in diameter was 68 per hectare (Woinarski & Westaway 2008). This may be an overestimation for Eucalyptus communities within the Planning Corridor as the woodlands from Woinarski and Westaway's study were in higher rainfall areas of the Northern Territory. An alternate estimate found densities of tree hollows to be 7-17 per hectare (including small hollows) within undisturbed woodland communities (Gibbons & Lindenmayer 2002). Considering the previously determined area of disturbance (9 ha) the maximum number of hollow bearing trees would be 153 per 5 ha home range. This is a small proportion of the total 8500 hollow bearing trees per 5 ha home range. This small disturbance is not expected to have a significant impact on the species.

Plains Death Adder *(Acanthophis hawkei)*

The Plains Death Adder occurs sporadically across mainland northern Australia; it is known from floodplains of the Adelaide, Mary and Alligator Rivers as well as the Barkly Tableland on the Northern Territory (NT)/Queensland (QLD) border. There is a single record within the search area from 1978 of the Plains Death Adder occurring on tussock grasslands near Avon Downs (Figure 6). The species is occurs on floodplains and cracking clay soil plains (vertosols) (Webb et al. 2002) which are distributed through the eastern section of the Planning Corridor and extend northwards across the Barkly Tablelands. This area contains a number of old records from outside the Planning Corridor north of the Barkly Highway.

The advance of Cane Toads is the greatest threat facing the species (Ward and Phillips 2012). The current distribution of toads encompasses the entire black soil plains habitat in the Planning Corridor through which the Plains Death Adder could potentially be found (DOE 2010). The Cane Toad requires wet conditions for survival and the distribution is restricted by climate conditions in the central and southern portions of Australia. Creation of new permanent water sources that persist through the dry season (which then become inhabited by Cane Toads) could have a potential impact on the Plains Death Adder by providing suitable (and more permanent) conditions for Cane Toads. The project will not be creating any permanent or large inundated areas that could be used by the Cane Toad.

Any impact on the species is unlikely; no further impact mitigation measures have been detailed for this species.

3.1 (e) Listed migratory species

Description

Within the project area and its surrounds, the EPBC Act Protected Matters Search Report (Appendix B) lists 19 migratory species that were not also listed as threatened species. One species, the Australian Painted Snipe (Rostratula australis) is listed as 'Endangered' under the EPBC Act and is discussed in the threatened species section above. All migratory species are birds and can be broadly grouped into two groups; non-shorebird species (eight species) and shorebird species (11 species).

The likelihood of each migratory species occurring within the 20 km pipeline Planning Corridor was determined using the scientific literature and desktop information of species distribution and habitat requirements (see Appendix D for detailed methods and results of this analysis).

The analysis in Appendix D categorised the PMST migratory species into either likely or unlikely as summarised in Table 8. Only six non-shorebird species emerge as either 'Known' or 'Likely' to occur within the Planning Corridor.

That analysis determined that no migratory shorebird species were likely to occur within the 20 km Planning Corridor due to the absence of suitable habitat Figure 7 in Appendix A1).

The potential impacts to the migratory species 'Known' or 'Likely' to occur are discussed below; it is unlikely that any of these migratory species will be impacted by construction of the pipeline.

Table 8. Summary of migratory (non-shorebird) species analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood
Known	Rainbow Bee-eater	*Merops ornatus*	May
	Great Egret	*Ardea alba*	Known
	Cattle Egret	*Ardea ibis*	May
Likely	Fork-tailed Swift	*Apus pacificus*	Likely
	Oriental Plover	*Charadrius veredus*	Known
	Oriental Pratincole	*Glareola maldivarum*	Known
Unlikely	White Bellied Sea Eagle	*Haliaeetus leucogaster*	Known
	Eastern Osprey	*Pandion cristatus*	Known

Key
PMST likelihood: Known = species or species habitat known to occur within area, Likely = species or species habitat likely to occur within area, May = species or species habitat may occur within area.

Table 9. Summary of migratory (shorebird) species analysis

Likelihood from our analysis	Common name	Scientific name	PMST likelihood
Unlikely	Sharp-tailed Sandpiper	*Calidris acuminata*	Known
	Curlew Sandpiper	*Calidris ferruginea*	Known
	Wood Sandpiper	*Tringa glareola*	Known
	Marsh Sandpiper	*Tringa stagnatilis*	Known
	Red-necked Stint	*Calidris ruficollis*	Known
	Black-tailed Godwit	*Limosa limosa*	Known
	Little Curlew	*Numenius minutus*	Known
	Pacific Golden Plover	*Pluvialis fulva*	Known
	Lesser Sand Plover	*Charadrius mongolus*	Known
	Bar-tailed Godwit	*Limosa lapponica*	Known
	Whimbrel	*Numenius phaeopus*	Known

Key
PMST likelihood: Known = species or species habitat known to occur within area

Nature and extent of likely impact

Fork-tailed swift (*Apus pacificus)*

Fork tailed Swift is an exclusively aerial species that feeds by catching insects on the wing. Given its wide distribution and high motility it is likely that the species will be forage in the sky above the Planning Corridor. Given its aerial nature it is highly unlikely that the species would be impacted by the proposed pipeline development.

There are no known threatening processes documented for this species. As mentioned previously it is solely an aerial species within Australia and is unlikely to be impacted by the Alignment Corridor.

Rainbow Bee-eater (*Merops ornatus)*

The Rainbow Bee-eater is a widely distributed species that uses a range of habitat types, including woodlands, shrublands, and various cleared and semi-cleared habitats (Simpson and Day 2004). It is likely that some of the vegetation communities within the Planning Corridor constitute suitable foraging habitat for the Rainbow Bee-eater. Nesting burrows are created in the banks of creeks, rivers, dams, gravel pits, and in cliffs.

There are no specific threats to this species in Australia or elsewhere in the world. The Construction ROW will have a narrow footprint. This footprint will clear a small section of each representative habitat within the Planning Corridor that has the potential to be used by the Rainbow Bee-eater. Each vegetation community affected by construction of the pipeline construction is well represented outside of the footprint area. The areas will only be disturbed for a short period during pipeline construction, after which will be rehabilitated. Given the range of habitats occupied by the Rainbow Bee-eater, including cleared and semi-cleared areas, it is expected that this development will have no impact on the species.

Oriental Plover (*Charadrius veredus)*

The species has a wide distribution and uses a range of habitat types. After spending time on coastal flats, the Oriental Plover moves inland and inhabits flat, open, dry grasslands where there is bare ground such as clay pans, recently burnt areas, or playing fields etc. Whilst in Australia the species does not maintain territories or home ranges (DOE 2015).

There are no specific threats to this species (Marchant & Higgins 1993). Destruction or modification of large areas of grasslands could impact the species. Given the linear nature of the pipeline development only a small area will be disturbed within large areas of contiguous grassland. This is not expected to impact the feeding ability of the species. Birds may avoid the pipeline footprint and surrounds during construction activities due to increased noise and/or dust however given the contiguous nature of the grasslands and ability of the birds to move (given the lack of home ranges and territories) avoidance of this area is not expected to impact the Oriental Plover. Thus it is expected that this development will have no impact on the species.

Oriental Pratincole (*Glareola maldivarum*)

The species is distributed across the north west of Australia during the non-breeding season (October – March) and before moving to south east Asia for the breeding period. The species uses a broad range of grasslands and flat plains with sparse grass cover and open space.

Although the species is likely to be found within the Planning Corridor the timing of the species residence within Australia makes it highly unlikely that it will be impacted by planning or construction of the proposed pipeline. Pipeline planning and construction will occur during the northern Australia dry season (April – October), during which time there will be no Oriental Pratincole within the Planning Corridor.

Destruction or modification of large areas of grasslands could impact the species. Given the linear nature of the pipeline development only a small area will be disturbed within large areas of contiguous grassland. This is not expected to impact the feeding ability of the species. Birds may avoid the pipeline footprint and surrounds during construction activities due to increased noise and/or dust however given the contiguous nature of the grasslands and ability of the birds to move (given the lack of home ranges) avoidance of this area is not expected to impact the Oriental Plover. Thus it is expected that this development will have no impact on the species.

Egret spp. (*Ardea alba & Area ibis*),

These species are widespread across Australia, individuals of the species occupy large areas and utilise a variety of inundated areas without strong preference for vegetation type. In some areas the species is considered a pest and is actively removed from certain locations through trapping, shooting and netting.

The main threat associated with pipeline construction activities would be the destruction or degradation of habitat. Pipeline construction will disturb riparian edges for a short period of time within the Construction ROW. The disturbance will happen during the dry season when watercourses in the area are dry and not being utilised by these species. The area of disturbance will be progressively rehabilitated and it is not expected to impact the species.

The Planning Corridor does not include any internationally important wetlands or wetlands of national significance. The black soil plains area at the southern-most extent of the Barkly tablelands region will contain inundated areas during the wet season which is outside of construction times. These areas may be used by both Egret species however given the linear nature of the proposed pipeline construction activities will only cause a small area of disturbance within the large contiguous areas of potentially inundated plains. These areas will be disturbed during the dry season and progressively rehabilitated to the same contours and revegetated using the soil seed bank.

Lake Moondarra is the only important wetland habitat area for these species which is approximately 20 km north-east of the Alignment Corridor and will not be intersected by the Alignment Corridor meaning there is no direct impact to fringing vegetation. The Alignment Corridor does intersect streams that feed Lake Moondarra; increased sedimentation in these streams has the potential to impact on the Lake Moondarra habitat and thus indirectly on the Egret species. This impact could be in the form of impact to fringing vegetation or impact to fish used as the food source for the species. However these feeding streams are ephemeral and are thus dry for a significant portion of the year. Construction activities will occur during the dry season when no water is present or, if water is present, are experiencing minor flows. If flow is present within streams appropriate sedimentation control practices will be employed to avoid increased sedimentation downstream. As such, it is not expected that pipeline construction activities will have an impact on these species.

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

The project area and its surrounds are not located nearby to any Commonwealth marine areas nor do any rivers that intersect the Alignment Corridor flow into any marine areas.

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth marine area.

Consequently, this development will not affect these areas.

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

If the action will affect Commonwealth land also describe the more general environment. The Policy Statement titled *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed. If applicable, identify any potential impacts from actions taken outside the Australian jurisdiction on the environment in a Commonwealth Heritage Place overseas.

The EPBC protected matters search indicated that there are seven areas of Commonwealth Land within the 50 km buffer of the Alignment Corridor. None of these areas is crossed by the proposed pipeline alignment. The areas of Commonwealth land are either in Mount Isa or Tennant Creek and are not expected to be impacted by the action.

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth land. Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

None

3.1 (h) The Great Barrier Reef Marine Park

Description

This development is well inland from the Great Barrier Reef Marine Park and rivers that intersect the Alignment Corridor do not flow into the Pacific Ocean.

Nature and extent of likely impact

Address any impacts on any part of the environment of the Great Barrier Reef Marine Park.

Note: If your action occurs in the Great Barrier Reef Marine Park you may also require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If so, section 37AB of the GBRMP Act provides that your referral under the EPBC Act is deemed to be an application under the GBRMP Act and Regulations for necessary permissions and a single integrated process will generally apply. Further information is available at www.gbrmpa.gov.au

This development will not affect the Great Barrier Reef Marine Park.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

If the action is a coal seam gas development or large coal mining development that has, or is likely to have, a significant impact on water resources, the draft *Policy Statement Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources* provides further details on the type of information needed.
Not applicable.

Nature and extent of likely impact

Address any impacts on water resources. Your assessment of impacts should refer to the draft *Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources*.
Not applicable.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

You must describe the nature and extent of likely impacts (both direct & indirect) on the whole environment if your project:

- is a nuclear action;
- will be taken by the Commonwealth or a Commonwealth agency;
- will be taken in a Commonwealth marine area;
- will be taken on Commonwealth land; or
- will be taken in the Great Barrier Reef marine Park.

Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

3.2 (a)

Is the proposed action a nuclear action?	X	No
		Yes (provide details below)
If yes, nature & extent of likely impact on the whole environment		

3.2 (b)

Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?	X	No
		Yes (provide details below)
If yes, nature & extent of likely impact on the whole environment		

3.2 (c)			
	Is the proposed action to be taken in a Commonwealth marine area?	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		

3.2 (d)			
	Is the proposed action to be taken on Commonwealth land?	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))		

3.2 (e)			
	Is the proposed action to be taken in the Great Barrier Reef Marine Park?	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))		

3.3 Other important features of the environment

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed above). If at Section 2.3 you identified any alternative locations, time frames or activities for your proposed action, you must complete each of the details below (where relevant) for each alternative identified.

3.3 (a) Flora and fauna

This region has a warm desert climate receiving approximately 450 mm of rainfall annually, of which most falls in the summer months (December to March) due to monsoon trough influences from the north. Summer maximum temperatures reach the mid 40's and winter minimums drop to around 10 oC.

The Alignment Corridor passes through four bioregions (Figure 8):

- Davenport Murchison Ranges – This bioregion is comprised of low but rugged rocky hills. Vegetation includes hummock grasslands and low open woodland dominated by *Acacia* species. Within this bioregion the pipeline runs through the Ashburton Range and Barkly sub-bioregions.
- Tanami – This bioregion is comprised of sandplains bisected by hills and rocky ranges (Fisher *et al*. 2002). Vegetation includes hummock grasslands and *Acacia* shrublands on the rocky ranges. Within this bioregion the pipeline runs through the Sandover sub-bioregion.
- Mitchell Grass Downs – This bioregion is comprised of grassland plains on cracking clay soils, with some intermittent lakes. Vegetation includes a variety of grasslands dominated by Mitchell Grasses (*Astrebla* spp.). Within this bioregion the pipeline runs through the Barkly Tablelands sub-region.
- Mount Isa Inlier – This bioregion is comprised of rugged hills and ranges bisected by undulating valleys. Vegetation is open woodland with a spinifex hummock grassland understorey

Regional Ecosystem (**RE**) mapping for the Queensland section of the Planning Corridor provides detail on the vegetation communities near and along the pipeline alignment; of note are RE with a threatened biodiversity status. Within the polygons, five specific REs with a threatened biodiversity status are crossed by the proposed pipeline alignment; REs 1.3.4, 1.3.6, 1.5.9 and 4.3.3 are classified as 'Of Concern', and RE 1.3.7 is classified as "endangered". The potential impact to these REs will be assessed through the Queensland approvals process.

The Planning Corridor includes sections of three Northern Territory Sites of Botanical Significance (**SOBS**); Wonarah Beds, James River Waterholes, and Georgina River (Figure 9). SOBS are sites which contain special botanical values and are considered in need of protecting but the protection of these sites is not legislated. The Wonarah Beds SOBS contains the only known population of *Sporobolus latzii*, which is a threatened species

(listed as Vulnerable) under the *TPWC Act* (Northern Territory). *S. latzii* is confined to swamp margins and the population will be avoided by the final pipeline alignment. The impact to SOBS, and *S. latzii*, will be assessed through the NT approvals process.

The Davenport and Murchison Ranges Site of Conservation Significance (**SOCS**) is located adjacent to the southern end of the 50 km buffer (Figure 9). SOCS are sites within the Northern Territory which contain special biodiversity values that are considered in need of protecting but do not have legislated protection. The Davenport and Murchison Ranges SOCS is well outside the Planning Corridor and will not be impacted by the pipeline alignment.

The Rocky Hills habitat at either end of the Planning Corridor has the potential to provide habitat for a number of threatened fauna species. This section of the Planning Corridor is potential habitat for the, Carpentarian Grasswren (*Amytornis dorotheae*) (listed as Near Threatened in Queensland), Purple-necked Rock-wallaby (*Petrogale purpureicollis*) (listed as Vulnerable in Queensland), Northern Leaf-nosed Bat (*Hipposideros stenotis*) (listed as Vulnerable in Queensland) and the Orange Leaf-nosed Bat (*Rhinonicteris aurantia*) (listed as Vulnerable in Queensland).

3.3 (b) Hydrology, including water flows

Surface Water

The Planning Corridor is predominately located in two drainage divisions Western Plateau and Lake Eyre. Within these the Planning Corridor is largely within two river basins: Georgina River in the Lake Eyre drainage and Barkly within the Western Plateau Drainage. The western end of the Planning Corridor enters the Wiso Basin within the Western Plateau Drainage. The very eastern end of the Planning Corridor enters the Gulf of Carpentarian Drainage Basin and within that only enters the Leichardt River Basin. Two sections of the Planning Corridor enter this drainage and river basin, the area of which totals 11,320 ha. Of the proposed pipeline alignment approximately 13.5 km lies within the Carpentarian Drainage Basin.

No watercourses within the Planning Corridor are perennial. Due to the long linear nature of the pipeline project the proposed pipeline alignment does cross a number of major watercourses (Table 10). All of these water courses will flow through the wet season and then stop flowing early in the dry season. A map of all water courses intersected by the alignment is shown in Figure 10.

Table 10. Major watercourses intersected by the proposed pipeline alignment

Name	Hierarchy	Hydrology	State
Blue Bush Creek	Major	Non Perennial	NT
Georgina River	Major	Non Perennial	NT
Gosse River	Major	Non Perennial	NT
James River	Major	Non Perennial	NT
Kurundi Creek	Major	Non Perennial	NT
Mingera Creek	Major	Non Perennial	QLD
Polygonum Creek	Major	Non Perennial	QLD
Ranken River	Major	Non Perennial	NT
Redbank Creek	Major	Non Perennial	QLD
Templeton River	Major	Non Perennial	QLD
Tennant Creek	Major	Non Perennial	NT
Whistleduck Creek	Major	Non Perennial	NT
Yaringa Creek	Major	Non Perennial	QLD

Groundwater

Based on Bureau of Meteorology mapping, the Planning Corridor passes over two general ground water areas; the fractured and karstic rocks of the Georgina Basin which contain regional scale aquifers (>50 km), and Palaeozoic and Precambrian fractured rock with low permeability potentially containing local scale aquifers (< 5 km) (Figure 11). The salinity classification within these aquifers ranges from Fresh 2 (500-1500 mg/L) and Saline 1 (3000-300,000 mg/L).

3.3 (c) Soil and Vegetation characteristics

Within the Northern Territory part of the corridor the soils mainly consist of Kandosols/calcareous earths (51 %), with Vertosols/cracking clay, Rudosols/loams and Tenosols/Loams (Appendix E). Within the Queensland section of the Planning Corridor the soil types are Vertosols, Kandosols and Rudosols with a small area of Chromosols associated with the rocky hills habitat near Mt Isa.

Based on the CSIRO ASRIS mapping, the majority of the Planning Corridor passes through areas of low to medium erodibility. The section across the black soil plains is an area of high erodibility (Figure 12 for location of black soil plains). Additionally, the vast majority of the Planning Corridor has an extremely low or low probability of acid sulfate soils occurring.

Much of the Planning Corridor passes through homogenous open woodland or grassland habitat. Rocky habitat exists at either end of the Planning Corridor; near Tennant Creek and Mt Isa. The eastern end of the Planning Corridor contains a greater area of Eucalyptus woodland habitat and contains a greater number of water courses and associated riparian vegetation

3.3 (d) Outstanding natural features

The majority of the region of the proposed pipeline is relatively homogenous transitioning across the broad habitat types from rocky ranges at the Tennant Creek end of the pipeline through Mitchell Grass and Acacia shrublands terminating near Mount Isa in rocky ranges.

3.3 (e) Remnant native vegetation

The area within the Planning Corridor is an area of contiguous vegetation. Although it has been used for pastoral purposes it is largely remnant vegetation. The vegetation within the Planning Corridor is described in other sections within this report.

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The area is flat or has low relief with the occasional undulating surface. The rocky hills landform at either end of the Planning Corridor has greater gradient (Figure 13). The maximum slope at either end of the Planning Corridor is approximately 5 %. However the proposed pipeline alignment follows a gentler gradient by following gullies through the rocky hills land forms (Figure 14). The proposed pipeline alignment reaches a maximum elevation of 440 masl at the eastern end of the alignment and falls to a low point of 200 masl across the area of black soil plains in the Mitchell Grass Downs Bioregion.

3.3 (g) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops.

Land uses within the Planning Corridor are predominately pastoral with other areas of government land. The area is without significant infrastructure development including roads.

Weeds

Of the 32 listed Weeds of National Significance (WoNS), 17 species have been recorded in the four bioregions through which the Planning Corridor passes. A survey of weed species within the Planning Corridor will be conducted prior to the commencement of construction activities.

Table 11. WoNS found within project bioregions

Common name	Scientific name	QLD Class	NT Class
Alligator Weed	*Alternanthera philoxeroides*	Class 1	Class A
Cabomba	*Cabomba caroliniana*	Class 2	Class A
Rubber Vine	*Cryptostegia grandiflora*	Class 2	Class A
Coral cactus	*Cylindropuntia fulgida var. mamillata*	Class 1/Class 2	
Devil's Rope Cactus	*Cylindropuntia imbricata*	Class 2	
Hudson Pear	*Cylindropuntia rosea*	Class 1	
Water Hyacinth	*Eichhornia crassipes*	Class 2	Class A
Bellyache bush	*Jatropha gossypiifolia*	Class 2	Class A
African Boxthorn	*Lycium ferocissimum*	Class 2	Class A
Prickly Pear (common)	*Opuntia stricta*	Class 2	Class B
Velvet tree pear	*Opuntia tomentosa*	Class 2	Class B
Parkinsonia	*Parkinsonia aculeata*	Class 2	Class B
Parthenium	*Parthenium hysterophorus*	Class 2	Class A
Mesquite	*Prosopis pallida*	Class 2	Class A
Velvet Mesquite	*Prosopis velutina*	Class 2	Class A
Salvinia	*Salvinia molesta*	Class 2	Class B
Athel pine	*Tamarix aphylla*	Class 3	Class B

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

There are no Heritage Places or other place recognised as having heritage values that will be crossed by the pipeline. Table 12 lists the places close to the project area that have heritage value, which are shown in Figure 15.

Table 12. Places with heritage values

Name	State	Distance from alignment	Type
Tennant Creek Telegraph Station Complex	NT	5 km	Historical Reserve
Phillip Creek Settlement	NT	24 km	Historical Reserve
North Star Mine Battery Complex	NT	20 km	Historical Reserve
Attack Creek Historical Reserve	NT	54 km	Historical Reserve
John Flynn Historical Reserve	NT	10 km	Historical Reserve
Casa Grande	QLD	5 km	Indicative Place
Mt Isa Underground hospital	QLD	5 km	Historical Place

3.3 (i) Indigenous heritage values

Cultural heritage values in the Northern Territory and Queensland are protected under the following legislation:

NT	QLD
The *Northern Territory Aboriginal Sacred Sites Act 1989* (NT) (ASSA) The *Heritage Act 2011* (NT) (HA)	*Aboriginal Cultural Heritage Act QLD* (2003) (ACHA) *Queensland Heritage Act* 1992 (QHA)

Preliminary searches of the heritage registers in each of the jurisdictions and in relation to the cultural heritage values protected under each of the Acts have been undertaken. These searches have established that while there are some cultural heritage sites within the vicinity of the Alignment Corridor, these are expected to be able to be avoided during fine tuning of the pipeline alignment through on-ground cultural heritage surveys during the Planning Phase.

Full cultural heritage surveys for both ethnographic and archaeological sites will be conducted during this phase and Jemena has commenced discussions regarding the arrangements for these with the Aboriginal organisations aforementioned. For example, the CLC has commenced consultations with traditional Aboriginal owners and site custodians for the areas of the NEGI alignment within their jurisdiction and discussions with the NLC, the Arruwarra, Indjalandji-Dhidhanu and Kalkadoon are in progress.

Jemena adopts an avoidance principle in relation to cultural heritage values and will work closely with the relevant organisations and Government agencies in relation to determining a final pipeline corridor and project footprint that avoids completely or minimises any impacts to cultural heritage values.

3.3 (j) Other important or unique values of the environment

Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

N/A

3.3 (k) Tenure of the action area (eg freehold, leasehold)

Table 3 and Table 4 present the tenure for land crossed by the proposed alignment in the Northern Territory and Queensland respectively. As seen from these tables most of the land is pastoral lease.

3.3 (l) Existing land/marine uses of area

N/A

3.3 (m) Any proposed land/marine uses of area

None Known

4 Measures to avoid or reduce impacts

Note: If you have identified alternatives in relation to location, time frames or activities for the proposed action at Section 2.3 you will need to complete this section in relation to each of the alternatives identified.

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

For any measures intended to avoid or mitigate significant impacts on matters protected under the EPBC Act, specify:
- what the measure is,
- how the measure is expected to be effective, and
- the time frame or workplan for the measure.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

Provide information about the level of commitment by the person proposing to take the action to implement the proposed mitigation measures. For example, if the measures are preliminary suggestions only that have not been fully researched, or are dependent on a third party's agreement (e.g. council or landowner), you should state that, that is the case.

Note, the Australian Government Environment Minister may decide that a proposed action is not likely to have significant impacts on a protected matter, as long as the action is taken in a particular manner (section 77A of the EPBC Act). The particular manner of taking the action may avoid or reduce certain impacts, in such a way that those impacts will not be 'significant'. More detail is provided on the Department's web site.

For the Minister to make such a decision (under section 77A), the proposed measures to avoid or reduce impacts must:
- clearly form part of the referred action (eg be identified in the referral and fall within the responsibility of the person proposing to take the action),
- be must be clear, unambiguous, and provide certainty in relation to reducing or avoiding impacts on the matters protected, and
- must be realistic and practical in terms of reporting, auditing and enforcement.

More general commitments (eg preparation of management plans or monitoring) and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, if your proposal proceeds to these stages).

4.1 Threatened species

Table 13. Potentially impacted species

Species	Potential Impact
Gouldian Finch (*Erythrura gouldiae*)	Clearing of suitable Eucalyptus habitat
Masked Owl (Northern) (*Tyto novaehollandiae kimberli*)	Disturbance of vegetation
Carpentarian Antechinus (*Pseudantechinus mimulus*)	Direct disturbance of rocky habitat Introduction of spread of Buffel Grass.

Gouldian Finch (*Erythrura gouldiae*)

Given the reliance of the species on specific Eucalyptus habitat and requirement for feeding grasses these vegetation communities are the focus of impact mitigation.

The proposed pipeline alignment does pass through habitat that is potentially breeding and/or feeding habitat for the species. However, the development is linear and will only disturb small areas of Eucalyptus habitat. This small area of disturbance is unlikely to have an impact on the species. In order to minimize impacts to Gouldian Finch the species specific mitigation measures (along with general mitigation measures) will be employed to avoid and minimise any impact to the species.

- Pre-construction surveys will be conducted within areas of potential Gouldian Finch habitat to determine if the species is present. Surveys will follow EPBC Survey Guidelines for Australia's Threated Birds (Commonwealth of Australia, 2010).
- Construction activities will be conducted during the dry season to avoid breeding season of the Gouldian Finch.
- Protocols outlined in the weed management plan (to be developed) shall be followed by all personnel within the Planning Corridor to avoid introduction of weed species and thus potentially modify fire regimes.

Masked Owl (*Tyto novaehollandiae kimberli*)

Given the large home ranges, the linear nature of disturbance and low numbers of large hollow bearing trees it is unlikely that the species will be impacted. However, in order to minimize impacts to the Masked Owl the species specific mitigation measures (along with general mitigation measures) will be employed to avoid and minimise any impact to the species.

- Pre-construction call play back surveys will be conducted in areas of potential Masked Owl habitat to determine the presence of Masked Owls. Surveys will follow EPBC Survey Guidelines for Australia's Threated Birds (Commonwealth of Australia, 2010).
- If species are detected within construction areas, a species specific management plan will be developed for the species.
- Protocols outlined in the weed management plan (to be developed) shall be followed by all personnel within the Planning Corridor to avoid introduction of weed species which can impact the food source of the Masked Owl. The weed management plan will be developed in accordance with the standards specified in the APGA Code of Environmental Practice-Onshore Pipelines.

Carpentarian Antechinus (*Pseudantechinus mimulus*)

It is unlikely that the Carpentarian Antechinus will be impacted by the project. The potential impacts to the species are disturbance through noise and vibrations of construction activities and the spread/introduction of Buffel Grass. As discussed in (Section 3) it is unlikely the project will impact the species through these potentially threatening processes, however, the following impact mitigation measures (in addition to general measures outlined below) will be applied to avoid and reduce impacts to the species.

- Pre-construction surveys will be conducted in rocky hills habitat areas near Mount Isa to locate populations of Carpentarian Antechinus. Surveys will follow EPBC Survey Guidelines for Australia's Threated Mammals (Commonwealth of Australia, 2011).
- If individuals are detected along the proposed Alignment Corridor, a species specific management plan will be developed to manage any impacts.
- Blasting will be kept to the minimum area required to minimise potential noise and vibration impacts to the species.
- Protocols outlined in the weed management plan (to be developed) shall be followed by all personnel within the Planning Corridor to avoid introduction of weed species which can impact the food source of the Carpentarian Antechinus. The weed management plan will be developed in accordance with the standards specified in the APGA Code of Environmental Practice-Onshore Pipelines.
- Any new infestations of Buffel Grass will be eradicated by appropriately qualified personnel.
- Construction will be timed to begin at the Mount Isa end of the pipeline at the beginning of the dry season and progress west. As such there will not be any construction activities occurring within potential breeding habitat at the onset of the breeding season.

4.2 General measures

Flora and Fauna

Management of impacts to flora and fauna will be through the following:

- Where practicable, the pipeline route has been chosen using the principles of avoiding and minimising impacts to fauna habitats;
- Where possible access tracks will use existing tracks;
- Vegetation clearing will only include a width of 30 m along the Construction ROW, extra work space as required and in the areas for accommodation camps if they can't be situated in clear areas;
- The pipeline corridor will be rehabilitated progressively during the construction phase;
- While open trenches will be checked daily by fauna spotters, and any fauna in the trench will caught, checked and released in appropriate habitat nearby;
- Native fauna will not be captured, taken or fed without the appropriate permits;
- Vehicle speed limits on site will be set and enforced;
- Any injuries or fatalities to fauna will be reported to the Site Environmental Manager and recorded;
- Fires will not be permitted on site without appropriate approvals and safety precautions;
- Vehicle inspections will be carried out particularly when leaving areas with a high occurrence of weed species and into areas with low weed numbers or significant species/habitat; and
- Site personnel will be provided with training to raise awareness, particularly with regard to identification of Weeds of National Significance.
- Disturbed areas will be progressively rehabilitated with local species that provide suitable habitat for native fauna;
- A Weed Management Plan will be developed. This plan will be informed by the weed survey occurring in early 2016. Broadly, the plan will ensure that no new weeds are introduced and current weeds will not be dispersed.

Surface water

Surface water impacts will be managed through the following:

- Pre-existing access tracks will be used where possible to minimise interference to natural drainage;
- Any new disturbance areas will be located to avoid drainage lines and designed for minimal impact on surface drainage as far as practicable;
- Surface water diversion structures that enable non-contaminated water to be directed around disturbance areas will be designed, installed and managed;
- Erosion and sediment control structures will be installed downstream of disturbance areas;
- Where surface water is present, vegetation removal on adjacent areas of relief will be delayed as long as possible to avoid erosion and sedimentation;
- Cleared vegetation and topsoil will be stockpiled away from watercourses and in discrete stockpiles to avoid any interference to surface flows; and
- Chemicals and hydrocarbons will be stored in accordance with relevant legislation and standards.

Air, noise and dust

Dust generation associated with construction activities is expected to be temporary and localised to the areas adjacent to the Construction ROW. Given the remote location of the Planning Corridor and the existing land uses in the region (including pastoral, petroleum production and transport), air quality impacts associated with pipeline construction are considered negligible. The areas where there is the greatest potential for impact are those closest to Mount Isa.

Generally construction activities result in a temporary increase in noise levels, impacts from noise will be temporary and confined to construction activities near Mount Isa and Tennant Creek. Noise impacts from construction activities are considered to be temporary and are unlikely to have significant impact. Other potential noise impacts arise from the operation of the compressor stations near Mount Isa and Phillip Creek. Considering the compressor station near Mount Isa is located adjacent to existing gas and power facilities, noise impacts are considered negligible. The compressor station near Phillip Creek is not near large population areas and is not expected to cause significant noise impacts.

Despite the relatively low likelihood of significant impacts from noise, dust and emissions, air quality issues will be managed through comprehensive community and stakeholder engagement. During the planning phase noise and emissions modelling will be undertaken to obtain baseline data. A Consultation Plan will facilitate opportunities for residents to have any issues heard and dealt with in relation to any potential impacts from mining operations including dust and noise.

Management will be continuously refined and strengthened in response to any community or other stakeholder concerns. To mitigate potential air, noise and dust impacts:

- All vehicles will be required to stay on defined tracks and roads unless otherwise authorised;
- Dust suppression measures will be used such as water trucks;
- Speed limits will be set and enforced;
- The extent of exposed areas susceptible to wind erosion will be minimised;
- Rehabilitation will be undertaken progressively to minimise exposed soil;
- High dust-generating activities will be limited during adverse weather conditions;
- Design of construction and operations to incorporate methods to minimise vehicle movements and duplication of activities to reduce cost, greenhouse gas emissions and increase efficiency;
- Vegetation clearing will be minimised where practicable;
- Blasting and rock hammering will be minimised where practicable and only during daylight hours and low wind conditions;
- Progressive rehabilitation of open areas will result in partial offsets of emissions over the life of the project; and
- All vehicles and plant will be maintained in accordance with manufacturer's instructions and the site maintenance schedule.
- Air quality modelling for the Mt Isa compressor station will be conducted using the AUSPLUME dispersion model.
- Noise modelling at the Mt Isa compressor station site will be conducted to ensure that the *Environmental Protection (Noise) Policy* (EPP (Noise)) threshold will not be exceeded.

5 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

5.1 Do you THINK your proposed action is a controlled action?

X	No, complete section 5.2
	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts on a matter protected under the EPBC Act.

From the likelihood of occurrence analysis and potential impact assessment three species were determined to be potentially impacted by the project (Table 13). The potential impact to threatened species is expected to be minor, however mitigation and management measures detailed in Section 4 outline how any potential impact will be further avoided and minimized. Following the application of the mitigation and management measures, the potential for significant impact was assessed for each species (below). It is not anticipated that the project will have a significant impact on any threatened species. The bases for this conclusion are addressed species-by-species below.

Endangered species

Gouldian Finch (*Erythrura gouldiae*)

The Gouldian Finch could potentially occur in Eucalyptus vegetation communities towards the Mt. Isa end of the Planning Corridor. The linear nature and the small footprint of the pipeline project means that a small area of potential habitat will be disturbed. The small area that will be disturbed is not core habitat for the species. The mitigation and management measures further reduce the potential impact to the species; as such the project is unlikely to have a significant impact on the species.

Table 14. Gouldian Finch Impact Analysis

Gouldian Finch Significant Impact Analysis	
Impact criteria	**Impact determination**
Lead to a long-term decrease in the size of a population	**UNLIKELY**. The small linear area of disturbance will only affect a small area of potential habitat (for a short period of time) which will be rehabilitated following construction. The small affected area is unlikely to have a long-term impact on the species.
Reduce the area of occupancy of the species	**UNLIKELY**. The small linear area of disturbance will only affect a small area of potential habitat which will be rehabilitated following construction. The small affected area is unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	**UNLIKELY**. The Alignment Corridor does not traverse any known populations of the species. The temporary nature of the disturbance is unlikely to fragment a population if the species is detected in surveys.
Adversely affect habitat critical to the survival of a species	**UNLIKELY**. The small area of potential habitat affected is well away from major populations and is a small percentage of similar vegetation within the immediate vicinity.
Disrupt the breeding cycle of a population	**UNLIKELY**. Breeding of the Gouldian Finch occurs in the wet season which is outside of construction period. The small area of vegetation removed will not impact the available breeding sites of the species.

Gouldian Finch Significant Impact Analysis	
Impact criteria	**Impact determination**
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**UNLIKELY**. The small area of potential habitat affected is well away from major populations and is a small percentage of similar vegetation within the immediate vicinity. The affected area is unlikely to cause the species to decline.
Result in invasive species that are harmful to an endangered species becoming established in the endangered or species habitat	**UNLIKELY**. Progressive rehabilitation of the site and the weed management plan will minimise the spread of weeds.
Introduce disease that may cause the species to decline	**UNLIKELY**. The project is unlikely to increase the infection of *Sternostoma tracheacolum* and thus unlikely to have an impact on the species.
Interfere with the recovery of the species	**UNLIKELY**. The disturbance of the small area of potential habitat is unlikely to interfere with the recovery of the species.

Vulnerable species

Carpentarian Antechinus (*Pseudantechinus mimulus*)

The Carpentarian Antechinus was determined to be likely to occur at locations in the rocky hills habitat at the eastern end of the Planning Corridor. However the potential impact to the species from noise and vibrations and the introduction of weed species is low. In addition, by following the mitigation measures described in Section 4 the project is unlikely to have a significant impact on the Carpentarian Antechinus.

Table 15. Carpentarian Antechinus Impact Analysis

Carpentarian Antechinus Significant Impact Analysis	
Impact criteria	**Impact determination**
Lead to a long-term decrease in the size of an important population of a species	**UNLIKELY**. Activities within the Alignment Corridor will disturb a small portion of the species mapped potential habitat. If species are found in pre-construction surveys it is unlikely that they will be impacted by the project.
Reduce the area of occupancy of an important population	**UNLIKELY**. Construction activities will disturb a small area of potential habitat and be progressively rehabilitated.
Fragment an existing important population into two or more populations	**UNLIKELY**. Construction activities will disturb a small area of potential habitat and be progressively rehabilitated.
Disrupt the breeding cycle of an important population	**UNLIKELY**. Construction activities will begin in April at the eastern end of the pipeline and work west. Construction activities will be completed within any potential breeding habitat before the onset of the breeding season.
Adversely affect habitat critical to the survival of a species	**UNLIKELY**. Construction activities within the Alignment Corridor will disturb a small portion of the mapped potential habitat for the Carpentarian Antechinus. The area will be progressively rehabilitated.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**UNLIKELY**. Construction activities within the Alignment Corridor will disturb a small portion of potential habitat for the Carpentarian Antechinus and it is unlikely that this will cause the species to decline. All disturbed areas will be rehabilitated following construction activities.

Carpentarian Antechinus Significant Impact Analysis	
Impact criteria	**Impact determination**
Result in invasive species that are harmful to the species becoming established in the species' habitat	**UNLIKELY**. Buffel Grass is currently present in the potential habitat area of the Carpentarian Antechinus near Mt Isa. Development and implementation of the weed management plan will minimise the spread of Buffel Grass. New infestations of Buffel Grass will be eradicated. The area will be progressively rehabilitated following construction activities to help avoid weed infestation.
Introduce disease that may cause the species to decline	**UNLIKELY**. There is no known correlation between a development such as this and a disease that affects this species.
Interfere substantially with the recovery of the species.	**UNLIKELY**. The disturbed area will be a small portion of potential habitat and will not interfere with the recovery of the species.

Masked Owl (Northern) (*Tyto novaehollandiae kimberli*)

Occurrence of the Masked Owl (Northern) is sparse and the species is broad ranging with large home ranges making significant impact from linear project unlikely. The measures to avoid impact to the species as described in Section 4 further reduce the potential impact to the species; as such the project is unlikely to have a significant impact on the Masked Owl (Northern).

Table 16. Masked Owl (Northern) Impact Analysis

Masked Owl (Northern) Significant Impact Analysis	
Impact criteria	**Impact determination**
Lead to a long-term decrease in the size of an important population of a species	**UNLIKELY**. Any disturbance to vegetation will constitute a small portion of any pairs' home range and is unlikely to have an impact on the species.
Reduce the area of occupancy of an important population	**UNLIKELY**. Any disturbance to vegetation will constitute a small portion of any pairs' home range and is unlikely to have an impact on the species.
Fragment an existing important population into two or more populations	**UNLIKELY**. There are no known populations of the species that will be intersected by the Alignment Corridor.
Disrupt the breeding cycle of an important population	**UNLIKELY**. Construction activities will begin in April at the eastern end of the pipeline and work west. Construction activities will be completed within any potential breeding habitat before the onset of the breeding season.
Adversely affect habitat critical to the survival of a species	**UNLIKELY**. The small area of disturbed vegetation within each potential home range is unlikely to affect the survival of the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**UNLIKELY**. The small areas of vegetation disturbed within each home range are unlikely to lead to a decline in species number.
Result in invasive species that are harmful to the species becoming established in the species' habitat	**UNLIKELY**. Progressive rehabilitation of the site and the weed management plan will minimise the spread of weeds.
Introduce disease that may cause the species to decline	**UNLIKELY**. There is no known correlation between a development such as this and a disease that affects this species.
Interfere substantially with the recovery of the species.	**UNLIKELY**. The disturbed area will be a small portion of any home range and will not affect the persistence of breeding pairs or the establishment of new home ranges.

5.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) protected under the EPBC Act that you think are likely to be significantly impacted. (The 'sections' identified below are the relevant sections of the EPBC Act.)

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

Specify the key reasons why you think the proposed action is likely to have a significant adverse impact on the matters identified above.

6 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** Jemena is committed to reducing its environmental footprint. The company abides by best practice environmental management and processes. It is the policy of Jemena to comply with all relevant legal and other environmental requirements and provide employees and contractors with the necessary training and tools to maintain its assets in compliance to such requirements. Jemena has duly reported to state/territory based environmental authorities when environmental incidents have occurred. In some cases, such incidents have resulted in Jemena having voluntary or mandated action plans or clean up actions under the direction of state/territory based environmental authorities, to rectify the issue and ensure it does not recur.	X	
6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details** Jemena has never been fined nor have actions been taken against Jemena under the Federal EPBC Act. Jemena has never been taken to court or been issued with a Penalty Infringement Notice (PIN) fine under applicable State or Territory laws relating to the protection of the environment or the conservation and sustainable use of natural resources. Jemena has duly reported to state/territory based environmental authorities when environmental incidents have occurred. In some cases, such incidents have resulted in Jemena having voluntary or mandated action plans or clean up actions under the direction of state/territory based environmental authorities, to rectify the issue and ensure it does not recur.		X

6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework** Jemena has an Environment Policy (dated August 2015) and an Environmental Management System (EMS) based on ISO/IEC 14001:2004 requirements that forms an integral part in the management of our utility assets and forms part of the Health, Safety, Environment and Quality (HSEQ) group of activities. The EMS provides a framework to: systematically manage environmental risks; legal and other obligations; implement objectives and targets to improve environmental outcomes; identify sufficient resources for EMS implementation; raise environmental awareness and provide targeted environmental training; implement workable environmental controls and review the overall performance of the EMS to enable continual environmental improvement.	X	
6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** Jemena Northern Gas Pipeline Pty Ltd (the party taking the action) has not previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act. Since the Jemena group was formed in August 2007, only Jemena Limited has referred an action under the EPBC Act. EPBC Act Referrals have however been made by Agility Management Pty Ltd, which is now Jemena Asset Management Pty Ltd. **Provide name of proposal and EPBC reference number (if known)** <u>Jemena Limited Referral:</u> East Gippsland Pipeline Compressor Station, Newmerella, Victoria: 2014/7390 <u>Agility Management Pty Ltd referrals:</u> Sydney Primary Loop Gas Pipeline: 2006/2622 Gas Main Installation from Eastern Creek to Erskine Park: 2005/2235	X	

7 Information sources and attachments

(For the information provided above)

7.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

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7.2 Reliability and date of information

For information in section 3 specify:

- source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- any uncertainties in the information.

The information provided within this referral document has been prepared by environmental scientists from EcOz Environmental Consultants. The findings are the result of desk assessment using the latest available information and data sources. All data sources were checked at the time of preparation of this referral and are thus considered to be reliable and recent for use in this referral.

7.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Appendix A1, Appendix A2 & Appendix A3
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	n/a	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	n/a	
	copies of any flora and fauna investigations and surveys (section 3)	n/a	
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)		Appendices B,C,D,E,F
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		See Section 2.6 of main document

8 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[1].

Project title: Jemena NEGI pipeline

8.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[2], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[3].

1. Name and Title:	Jonathan Spink
2. Organisation:	Jemena Northern Gas Pipeline Pty Ltd
3. EPBC Referral Number (if known):	
4: ACN / ABN:	607 928 790
5. Postal address	Locked Bag 7000 Mount Waverley VIC 3149
6. Telephone:	03 8544 9000
7. Email:	Jonathan.Spink@jemena.com.au
8. Name of designated proponent (if not the same person at item 1 above and if applicable):	

[1] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Gateway (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

[2] *If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A,* EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

[3] *If a person other than the person proposing to take action is to be nominated as the proponent, please contact the Referrals Gateway(1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

9. ACN/ABN of designated proponent (if not the same person named at item 1 above):

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

□ an individual; OR

□ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR

□ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

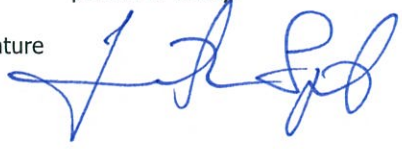
COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

□ not applicable.

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature 

Date 23/9/15

8.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	Jeff Richardson
Title	Principal Consultant
Organisation	EcOz Pty Ltd
ACN / ABN (if applicable)	81 143 989 039
Postal address	GPO Box 381
Telephone	08 8981 1100
Email	ecoz@ecoz.com.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	 Date 23/09/2015