APPENDIX 2-1-V1.4

CSM WATER SUPPLY PIPELINE ROUTE SELECTION REPORT

Wandoan Coal Project
Route Selection Report
Gas supply pipeline

August, 2008

Wandoan Joint Venture

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Date: August, 2008.....

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Executive summary

Parsons Brinckerhoff (PB) has been commissioned by the Wandoan Joint Venture (WJV) to undertake a route selection for a proposed gas supply pipeline between the Wandoan Coal Project area and the Peat-Scotia Gas Line located approximately 20 km to the east of Wandoan.

The Wandoan Coal Project proposes to develop thermal coal resources situated immediately west of the Wandoan township, located in the Dalby Regional Council area. The mining of the coal resources will be developed using a combination of truck, shovel, dozer and dragline mining equipment. Coal will be mined at a rate of around 30 million tonnes per annum (Mt/a) run of mine coal and may be increased to 40 Mt/a in the future. The coal will be crushed, sized and washed before being transported by rail to the Port of Gladstone.

Due to the existing condition of the power grid in the area compared to power demands of the Wandoan Coal Project, on-site power generation is being considered as a power supply option. Gas from the existing Peat-Scotia Gas Line, has been identified as a potential fuel source for proposed on-site power generation which may be constructed as part of the Wandoan Coal Project.

The purpose of this report is to investigate potential route alignment options for the proposed Wandoan Coal Project gas supply pipeline and specifically to:

- assess potential pipeline route options in the study area based on a selection of identified regulatory, planning, environmental, social and economic criteria
- comparatively assess and analyse the alternative route options
- utilising agreed assessment criteria, identify the preferred pipeline route alignment for further detailed studies in the forthcoming environmental impact statement.

Investigations of potential pipeline route options involved a review of available desktop information and data sources. Potential pipeline route options were assessed by considering a range of issues or selection criteria that could be interpreted from this information. Potential selection criteria were categorised as regulatory, planning, environmental, social and economic criteria. Each selection criterion was then reviewed to determine whether it would add value to the assessment of corridor options. Where selection criteria would not add value to the assessment process, they were not included in the comparative assessment of options.

Three proposed pipeline options were considered for analysis. Of the options considered, Option 1 has the least impact to mapped regional ecosystems, least number of waterways to be crossed and affects the least amount of good quality agricultural land. Option 1 is the second longest pipeline option and therefore the second most costly option.

Option 2 is generally similar to Option 1 for a number of the selection criteria. Option 2 would potentially affect the greatest area of mapped regional ecosystems and is also the longest pipeline option. This option, however, affects the least amount of private properties yet may potentially affect the second largest area of good quality agricultural land.

Option 3, which is proposed to be co-located with the proposed Surat Basin Rail Line, is the shortest pipeline option but may potentially affect the second largest area of regional ecosystems.

Co-location of infrastructure is considered to create opportunities to reduce associated impacts of these types of projects on a regional scale. For example, co-locating the proposed gas supply pipeline with the Surat Basin Rail Line will not impact on any additional landowners or properties within the study area, will not create any further land severance issues, will not affect any additional areas of good quality agricultural land, will create opportunity to centralise ancillary infrastructure such as access points and maintenance tracks and will reduce the potential impacts associated with construction such as interference with property accesses and traffic control and delays on local roads.

Based on the desk-top information reviewed, Options 1 and 3 resulted in favourable outcomes against the greatest number of performance measures. However, the opportunities and benefits created by co-location of infrastructure are considered to further support Option 3 over Option 1 and therefore Option 3 is recommended as the preferred option for the proposed Wandoan Coal Project gas supply pipeline. However, it should be noted that this recommendation is subject to:

- discussions with infrastructure providers (such as the Department of Main Roads, Queensland Rail, local councils, gas producers, electricity providers, and other easement holding parties)
- discussions and negotiations with landowners potentially affected by the proposed Project
- discussions and agreements associated with indigenous cultural heritage groups
- clarification of any associated Native Title issues.

1. Introduction

As part of the assessment of the Wandoan Coal Project on behalf of the Wandoan Joint Venture (WJV), Parsons Brinckerhoff (PB) has been commissioned to undertake a route selection for a proposed gas supply pipeline from the existing Peat-Scotia Gas Line located approximately 20 km to the north-east of the Wandoan Coal Project area. The Project locality is shown in Figure 1-1.

1.1 Background

1.1.1 Project description and need

The Wandoan Coal Project proposes to develop thermal coal resources situated immediately west of the Wandoan township, located in the Dalby Regional Council area (former Taroom Shire). The Wandoan Coal Project site is located approximately 350 km north-west of Brisbane and 60 km south of Taroom as shown in Figure 1-1. The coal reserves for the Wandoan Coal Project exist within the area of three mining lease applications, MLA 50229, 50230 and 50231 and will be developed by open cut mining and associated infrastructure. The Wandoan Coal Project covers an area of approximately 32,000 ha.

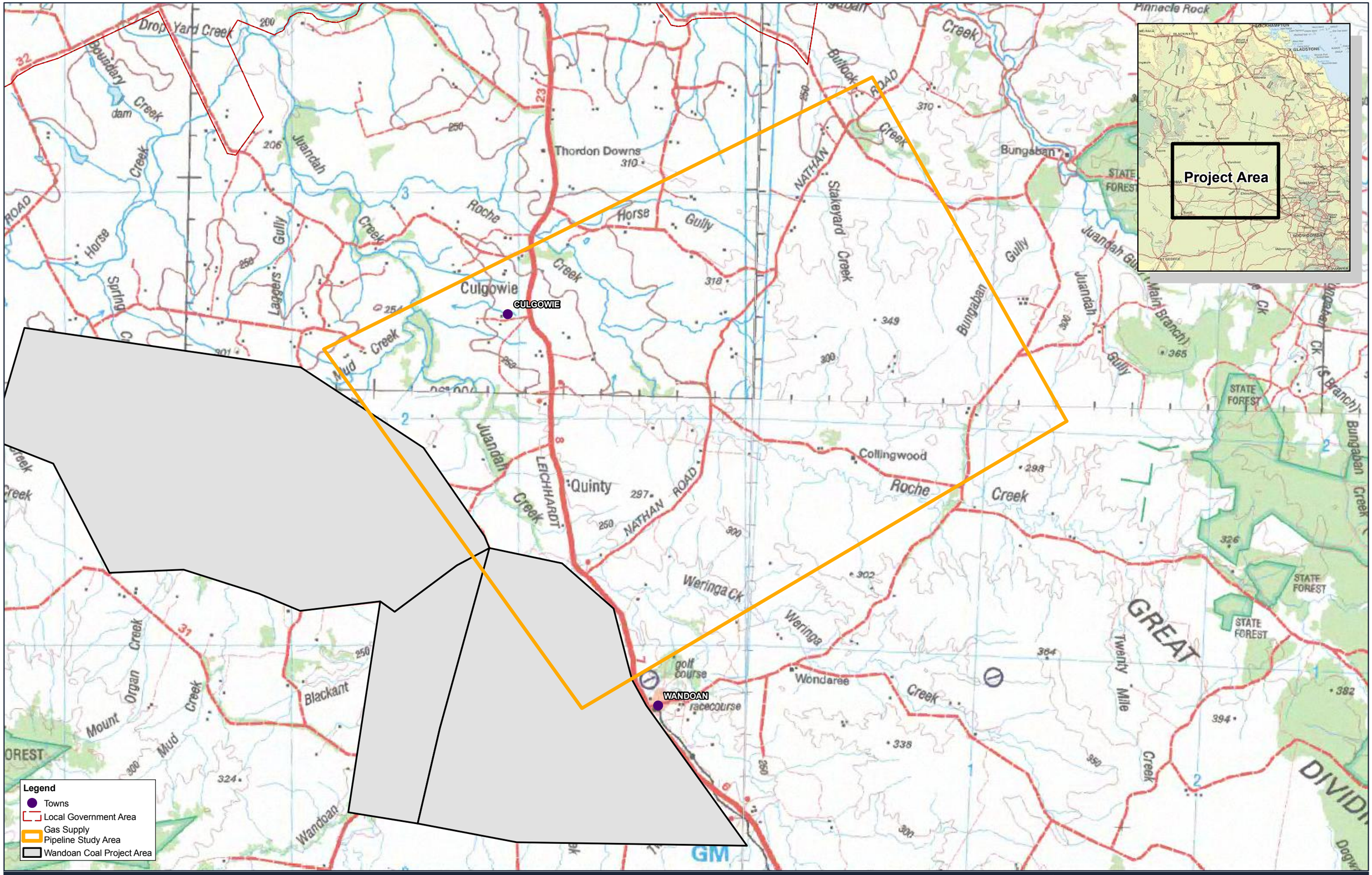
The mining of the coal resources will be developed using a combination of truck, shovel, dozer and dragline mining equipment. Coal will be mined at a rate of around 30 million tonnes per annum (Mt/a) run of mine (ROM) coal, with the potential for expansion to 40 Mt/a. The coal will be crushed, sized and washed before being transported by rail to the Port of Gladstone.

Due to the existing condition of the power grid in the area compared to power demands of the Wandoan Coal Project, on-site power generation is being considered as a power supply option. Gas from the nearby Peat-Scotia Gas Line has been identified as a potential fuel source for proposed on-site power generation which may be constructed as part of the Wandoan Coal Project.

This report addresses route selection for the proposed gas supply pipeline and does not address the design, construction or statutory approvals which may be required for the on-site power generator. These issues will be addressed as part of the environmental impact statement (EIS) undertaken for the Wandoan Coal Project.

A number of initial design concepts have been investigated and indicate that the pipeline will be approximately 25 to 30 km in length. The gas supply pipeline will generally be located underground with 500-700 mm depth of cover and constructed through a section trench and backfill method.

A study area between the Wandoan Coal Project site and the Peat-Scotia Gas Line has been identified (refer Figure 1-1) and preliminary pipeline route alignments have been investigated. A referral to the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA), for determination on whether the Project is a 'controlled action' pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* has been undertaken on this study area as part of the greater Wandoan Coal Project.



Project locality and gas supply pipeline study area

Source: 1:250,000 Topographic Map, GeoScience Australia 2001
1:2.5 million General Reference Map, GeoScience Australia 2001.

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1.2 Purpose of this report

The purpose of this report is to investigate potential route alignment options for the Wandoan Coal Project gas supply pipeline and specifically to:

- assess potential pipeline route options in the study area based on a selection of identified regulatory, planning, environmental, social and economic criteria
- comparatively assess and analyse the alternative route options
- identify the preferred pipeline route alignment for further detailed studies based on agreed assessment criteria.

The assessment aims to identify sensitive areas and recommend a preferred pipeline alignment for further detailed assessment during preparation of the EIS for the Wandoan Coal Project.

1.3 Route assessment methodology

Investigations of potential pipeline route options involved a review of available desktop information and data sources. Potential pipeline route options were assessed by considering a range of issues that could be interpreted from this information.

In order to assess the potential environmental, planning and social constraints associated with these routes, a range of selection criteria were identified. These selection criteria covered all relevant issues that are regularly addressed in environmental assessments of pipeline routes.

Potential selection criteria were categorised as regulatory, planning, environmental, social and economic criteria. Each selection criterion was then reviewed to determine whether it would add value to the assessment of alignment options. Where selection criteria would not add value to the assessment process they were not included in the comparative assessment of options. This occurred in cases where:

- there was little or no variation in the selection criterion across the study area, making differentiation between the merits of route options difficult to assess or negligible
- paucity of available information made differentiation between the merits of the different corridor options too difficult to assess without undertaking significant additional studies.

Where it was determined that selection criteria were relevant (either due to relevance to the study area or variation between the route options), performance measures were identified to measure the criteria. Consideration was also given to the balance between selection criteria to ensure that no single criterion received a higher priority than others. As a result, some performance measures provide a measure for more than one criterion. For example, the performance measure ‘number of properties affected’ provides an assessment for a number of criteria including visual impacts, social receptors and potential construction phase noise and air quality impacts or nuisance issues. The selection criteria that were chosen for the initial assessment were given an equal weighting. This method is used to avoid creating subjective criteria.

The comparison of route options was carried out using a comparative assessment approach where each criterion was compared for each route option. A ranking system has been used to provide a comparative measure of how each option meets the relative performance measures. A ranking of 1 indicates the least impact, while 3 represents the greatest impact. The option with the lowest numbers identifies the route with the least impact and highest compliance with performance measures (and therefore criterion). However, a straight numerical comparison of criteria of this sort is considered potentially misleading. To overcome this, judgement was used to differentiate between options, and a reason for the choice is provided.

1.4 Regulatory framework

The design, construction and development approval process for the proposed gas supply pipeline project will trigger requirements and/or need with regard to Commonwealth, State and local legislation, policies etc. This legislation will require a number of approvals, licences and permits to be obtained by the proponent prior to and during the development of the Project. This section of the report summarises the relevant legislation and associated approvals, licences and permits for the Project.

1.4.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects matters of national environmental significance which include: World Heritage areas/places, Ramsar wetlands, listed threatened species and communities, listed migratory species, nuclear actions and the Commonwealth marine environment.

Where a project or action is believed to potentially cause a significant impact on a matter of national environmental significance it is to be referred to the DEWHA for their assessment as to whether Commonwealth approval is required for the proposed action. Where an action requires Commonwealth approval a formal assessment process is undertaken.

A search of the study area using the DEWHA online Protected Matters Search Tool was undertaken on 13 May 2008 and Table 1-1 summarises the search results with regard to presence of Matters of National Environmental Significance which may be present within the study area.

Table 1-1: Online Protected Matter Search Tool results for the study area

World Heritage areas/places
Nil recorded within the study area
National Heritage Places
Nil recorded within the study area
Wetlands of International Significance
Nil recorded directly within the study area. However, Shoalwater and Corio Bays are located within the same catchment area, although approximately 400km downstream to the north.
Commonwealth Marine Areas
Nil recorded within the study area

Threatened Ecological Communities
Community of brigalow (*Acacia harpophylla* dominant and co-dominant) is known to occur within the study area. This community has a conservation status of 'endangered'
Community of semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar regions is likely to occur within the study area. This community has a conservation status of 'endangered'
Threatened species
Six threatened bird species may or are likely to have habitat occur within the study area
Two mammal species may have habitat occur within the study area
One ray-finned fish species may have habitat occur within the study area
Four reptile species may or are likely to have habitat occur within the study area
Five plant species may or are likely to have habitat occur within the study area
Migratory species
Four migratory terrestrial species may or are likely to have habitat occur within the study area
Five migratory wetland bird species may have habitat occur within the study area
Three migratory marine bird species may have habitat occur within the study area
Nuclear actions
The Project does not involve nuclear actions, neither do any occur within the study area.

A referral to the DEWHA, for determination of whether or not the Project is a 'controlled action' pursuant to the EPBC Act has been undertaken on this study area as part of the Wandoan Coal Project. The Department has advised that the Project constitutes a 'controlled' action and therefore, approval pursuant to the EPBC Act will be required.

Heritage legislation

Indigenous and non-indigenous cultural heritage is protected by Commonwealth legislation in the form of the *Australian Heritage Council Act 2003*. The regime under this Act has created the National Heritage List and Commonwealth Heritage List. The listing of a place on the National Heritage List is defined as a matter of national environmental significance under the EPBC Act. Other associated acts include:

- *Environment and Heritage Legislation Amendment Act (No. 1) 2003*
- *Australian Heritage Council (Consequential and Transitional Provisions) Act 2003*.

Categories of places, sites and precincts that may be included on the Register of the National Estate include the historic environment (the built environment), modified landscapes and archaeological sites. The records of the Australian Heritage Council also include the natural environment and the indigenous environment (archaeological sites, and features of the natural landscape that are culturally significant).

A review of the Australian Heritage Database identified that the proposed pipeline is in proximity to the following heritage place:

- Waaje Area, approximately 30 km east of Wandoan, within State Forest 302 (indicative place).

However, no items or places of heritage significance are located along or immediately adjacent to the proposed pipeline route options.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

Indigenous cultural heritage is also protected by Commonwealth legislation in the form of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*. This Act provides for interim and final orders to be made protecting Aboriginal Cultural Heritage, including tangible and intangible items. Any Aboriginal or Torres Strait Islander person or organisation may apply to the Minister for a temporary or permanent 'Stop Order' for protection of threatened areas or objects of significant indigenous cultural heritage. The Commonwealth Act 'overrides' State legislation if the Commonwealth Minister is of the opinion that the State legislation (or undertaken process) is insufficient to protect the threatened areas or objects. In the event that an application is made to the Commonwealth Minister for a Stop Order, the Commonwealth Minister will, as a matter of course, contact the Queensland Environmental Protection Agency (EPA) to ascertain what protection is being imposed by the State and/or what mitigation procedures have been proposed by the land user/developer. No specific action is required by the development proponent in this instance.

Native Title Act 1993

The *Native Title Act 1993* recognises Native Title rights and provides the government ways in which to validate or legitimise past or intermediate acts, such as granting of leases. The registered Native Title claimants for the study area are the Iman People with the associated active Native Title claim being claim QC97/55 Iman People #2 filed on 30 October 1997. Where required, WJV will undertake any necessary action regarding Native Title claims and the proposed gas supply pipeline.

1.4.2 State legislation

Petroleum and Gas (Production and Safety) Act 2004

The *Petroleum and Gas (Production and Safety) Act 2004* (PG Act) provides regulation for petroleum exploration, extraction and pipeline licensing.

With specific regard to the proposed gas supply pipeline, the holder of a petroleum tenure is permitted to carry out reasonably necessary, ancillary or authorised activities, including works associated with gas pipelines. The lease holder is issued with a specific authority to construct a gas pipeline on the lease. An additional petroleum survey licence and petroleum pipeline licence would be required for the proposed gas supply pipeline.

The gas supply pipeline will require two key approvals from the Department of Mines and Energy (DME), being:

- pipeline survey licence under Section 395 of the PG Act:
  - the survey licence allows the holder to investigate and survey potential land for the construction and operation of pipelines to identify possible pipeline route or access routes.
- pipeline licence under Section 409 of the PG Act for either:
  - an area pipeline licence over a stated area
  - point to point pipeline licence for a pipeline from one stated point/points to another point/points.

Section 400 of the PG Act details that where a proposed pipeline licence is located in an existing mining lease area, the authorised activity for the licence may only be carried out on land where the mining lease holder has agreed in writing that the activity may be carried out. The WJV would be required to grant approval for the pipeline to enter the Wandoan mine lease area.

The gas supply pipeline would be defined as a transmission pipeline under the PG Act, being:

'a pipeline operated, or to be operated, for the primary purpose of conveying petroleum directly to a market after it has been processed, whether or not it is subsequently processed or reprocessed.'

Integrated Planning Act 1997

The *Integrated Planning Act 1997* (IPA) governs development in Queensland. The Act applies to development approval (material change of use, reconfiguration of a lot, or operational, building, plumbing or drainage works) outside the scope of the *Petroleum Act 1923* or the PG Act.

All development is assumed to be exempt development under the IPA unless otherwise declared self-assessable or assessable development through either Schedule 8 of the IPA or the local government planning scheme.

Schedule 9, Table 5 details that all aspects of development authorised under the *Petroleum Act 1923* or the PG Act (other than an activity relating to the construction and operation of an oil refinery) is exempt from assessment against the planning scheme. Exempt development does not require a development application and there are no codes or standards which apply to the proposal.

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) provides the key legislative framework for environmental management and protection in Queensland. The Act was introduced to protect Queensland's environment while allowing for economic development, consistent with the principles of ecologically sustainable development.

The EP Act further provides for 'general environmental duty' (Section 319) which stipulates that:

> *'A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm'*

Additionally, Section 320 of this Act requires that a person must notify the administering authority (the EPA) if they become aware that serious or material environmental harm is caused or threatened by conducting an activity. Failing to notify environmental harm in accordance with the provisions of the Act may lead to a penalty or prosecution by the administering authority.

An Environmental Authority (EA) would be required for a petroleum survey licence and petroleum pipeline licence under Chapter 4A of the EP Act. The EA for these activities would include the Environmentally Relevant Activity 21C (ERA 21C) for a new transmission pipeline as described below.

Environmental Protection Regulation 1998

Pursuant to the Environmental Protection Regulation 1998, activities that will, or have the potential to, release contaminants into the environment and which may cause environmental harm are defined as Environmentally Relevant Activities (ERAs). ERAs are assessable development under the IPA and require development approval.

The proposed gas supply pipeline would constitute ERA 21C (level 1), *construction of a new transmission pipeline under a pipeline licence issued under any of the petroleum legislation*.

Chapter 4A of the EP Act provides for the issuing and related dealings for an environmental authority for petroleum activities.

Where the proposed gas supply pipeline is to be constructed through or under a watercourse and this requires removal of material from the bed and banks of the watercourse, it is also possible that ERA 19 (Dredging) will be triggered and an approval to undertake these works will be required from the EPA.

It is anticipated that all materials will be pre-fabricated and that no actual product manufacture (e.g. concrete batching) will occur along the proposed pipeline route. In this case, it is not anticipated that the proposed gas supply pipeline will trigger any other ERAs. However, if it were found that as the Project progresses an ERA is required, it would be necessary to submit a development application.

Environmental Protection (Water) Policy 1997

The Environmental Protection (Water) Policy (EPP (Water)) is a policy under the EP Act which defines and protects environmental values of Queensland waterways.

Under Section 32 of the EPP (Water) it is an offence to allow sand, silt or mud to accumulate in a waterway or where it could wash into a waterway unless it is permitted by an Environmental Authority. A number of waterways, which will have to be crossed by the pipeline, exist within the study area and therefore, appropriate management strategies will need to be implemented in order to ensure compliance with the provisions of the EPP (Water).

Environmental Protection (Air) Policy 1997

The purpose of this policy is to achieve the objectives of the EP Act with regard to Queensland's air environment. The policy provides a framework for:

- identifying air quality values to be enhanced or protected
- specifying air quality indicators and goals to protect the environmental values
- providing processes which manage the air environment and involve the community in achieving air quality goals that best protect Queensland's air environment.

Potential impacts to local air quality may be associated with construction of the gas supply pipeline, such as dust and construction machinery emissions. Management and mitigation strategies may require implementation however, this will be further investigated and reported as part of the EIS for the Wandoan Coal Project.

Environmental Protection (Noise) Policy 1997

The purpose of this policy is to achieve the objectives of the EP Act in relation to Queensland's acoustic environment. The policy provides a framework for:

- identifying the acoustic (including vibration) values to be enhanced or protected
- specifying the Project's acoustic quality objective
- providing processes to protect Queensland's acoustic environment such as dispute resolution and facilitating the development of noise management programs.

Potential impacts to acoustic quality may be associated with construction of the gas supply pipeline and also pump station operation (if required), dependent on design. Management and mitigation strategies may require implementation however this will be further investigated and reported as part of the EIS for the Wandoan Coal Project.

Water Act 2000

The purpose of the *Water Act 2000* is to provide for the sustainable management of water and other resources. Under Section 266 of the *Water Act 2000*, a riverine protection permit is required from the Department of Natural Resources and Water (NRW) to:

- destroy vegetation in a watercourse
- excavate in a watercourse
- place fill in a watercourse.

The proposed pipeline route options traverse a number of watercourses, including but not limited to Stakeyard Creek, Roche Creek and Juandah Creek and therefore, it is likely that approvals will be required under the *Water Act 2000* for pipeline crossings of watercourses. The number of waterway crossings may also have implications for the Project in terms of project approvals timeframes and project costs.

Additionally, where waters are to be taken from a watercourse, lake, spring or underground water, for example for use in dust suppression during construction works, a permit may be required pursuant to S. 237 of the *Water Act 2000*.

Transport Infrastructure Act 1994

The *Transport Infrastructure Act 1994* includes provisions relating to interference with railways (proposed Surat Basin rail corridor) and State controlled roads (Leichhardt Highway).

Where the pipeline corridor and either existing or future rail corridors cross or otherwise interact, the requirements of the Act must be complied with. The conditions of the rail corridor head lease, if applicable, and any existing sublease agreements will have to be considered, where relevant.

Section 50 of the *Transport Infrastructure Act 1994* details the requirements for an ancillary works and encroachments approval from the Chief Executive to construct, maintain, operate or conduct ancillary works and encroachment on a State controlled road reserve (Leichhardt Highway). This requirement applies to all three pipeline options.

Land Act 1994

The *Land Act 1994* provides a framework for the allocation of state land as either leasehold, freehold or other tenure. Permits may be acquired under this Act from NRW for the occupation of a reserve, road or unallocated state land.

Under Chapter 4, Part 4 of the Act, a permit to occupy will be required from the Chief Executive of NRW where the proposed pipeline and ancillary works is developed on unallocated state land, a reserve or a road.

Land Protection (Pest and Stock Route Management) Act 2002

The *Land Protection (Pest and Stock Route Management) Act 2002* is intended to provide a framework for developing pest management plans for various land types.

At a local government level, the former Taroom Shire has prepared a Pest Management Plan, which has been endorsed by the Ministers, but is yet to be adopted by the local government area. The Plan is intended to provide guidance to landowners and stakeholders on appropriate pest control measures.

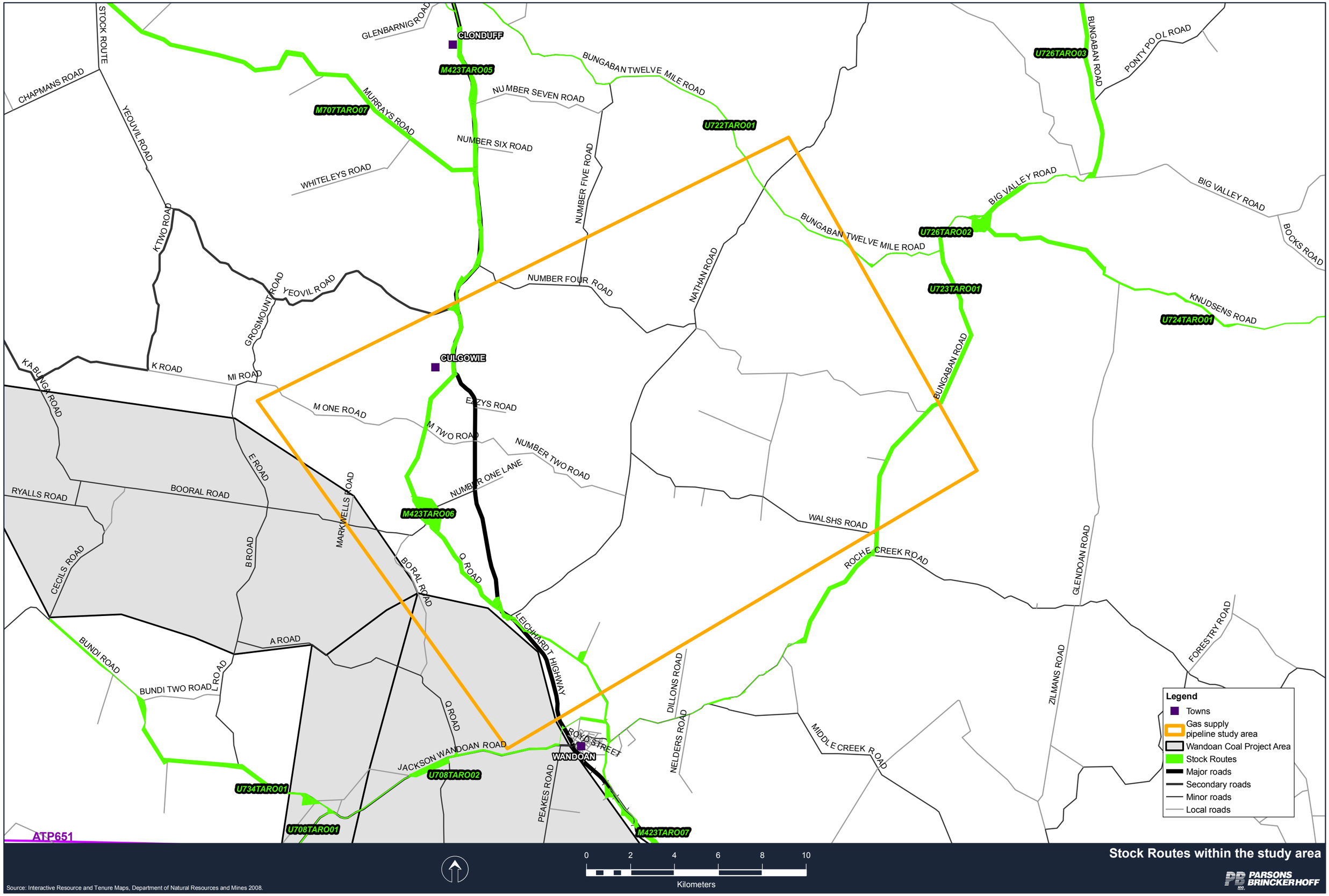
Section 77 of the Act outlines that landowners (for a mining claim or lease under the *Mineral Resources Act 1989* — the holder of the claim or lessee), unless they possess a declared pest permit, have an obligation to undertake reasonable steps to maintain the land free of class 1 and class 2 pests and stop the spread of declared pests to other areas.

Section 78(1)(b) of the Act also states that it is not necessary for landowners to control class 3 pests, unless the land is in or adjacent to an environmentally significant area, which is not the case for lands along the proposed gas supply pipeline alignment options.

Declared plants have, or could have, serious economic, environmental or social impacts. Landholders can be required to control these pests if they occur next to 'environmentally significant areas', such as national parks or reserves, but only if the reserve is still free of the pest.

Under the Act, the maintenance of stock routes must also be considered. Under Chapter 3, Part 3 of the Act, the former Taroom Shire Council has prepared the Stock Route Network Management Plan 2005 to 2009. The management plan is intended to *'improve the management of the stock route network so that the impacts of stock on the resources of the network are minimised. Stock route network management does not encompass the overall management of the road corridors where the stock routes are located, it is simply the management of impacts from and to stock.'*

A minor stock route travels south to north through the Wandoan Township, adjacent the Leichhardt Highway (Route M423) (refer Figure 1-2).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WALSHS ROAD
ROCHE CREEK ROAD
MIDDLE CREEK ROAD
GLENDOAN ROAD
ZILMANS ROAD
FORESTRY ROAD
Legend
Towns
Gas supply pipeline study area
Wandoan Coal Project Area
Stock Routes
Major roads
Secondary roads
Minor roads
Local roads
0 2 4 6 8 10
Kilometers
Stock Routes within the study area
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Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.
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Vegetation Management Act 1999

The purpose of the *Vegetation Management Act 1999* is to regulate the clearing of vegetation on freehold and leasehold land except where exemptions exist under the *Land Act 1994* and the *Forestry Act 1959*. In addition, the *Vegetation Management Act 1999* aims to:

- preserve vegetation in areas of high nature conservation value
- maintain or increase biodiversity
- maintain ecological processes
- allow for ecologically sustainable land use.

A development permit is not required for the clearing of vegetation that is directly associated with, facilitates or supports mining under the *Mineral Resources Act 1989* once the Mining Lease is granted. However, for vegetation clearance in areas of the Project that are located outside the Mining Lease, such as the proposed pipeline route, a vegetation clearing permit is required under the *Vegetation Management Act 1999*. Therefore, if the pipeline alignment proposes to traverse any remnant vegetation areas, an approval for vegetation clearing is required to be sought from NRW.

Nature Conservation Act 1992

The purpose of the *Nature Conservation Act 1992* is to provide for the conservation of nature including important natural areas as well as flora and fauna. A Wildlife Clearing Permit is required where the following activities are proposed:

- taking, using, keeping or interfering with a protected plant, other than under a conservation plan applicable to the plant or under exemption under a regulation
- taking, using, keeping or interfering with cultural or natural resources of a protected area other than under interim or declared management intent for the area or a conservation agreement for the area
- taking, using, keeping or interfering with a protected animal other than under a conservation plan or exemption
- taking, using, keeping or interfering with wildlife (animal or plant) that is not protected, but is found in an area identified as a critical habitat or an area of major interest by a conservation plan
- clearing of a protected plant.

Based on desktop information reviewed for the Project (e.g. Wildlife Online study area search results) there is potential for the proposed pipeline routes to impact on flora and fauna species listed under this Act and therefore, permits may be required in relation to the above. However, it is recommended that this be further assessed during the detailed studies conducted as part of the EIS for the Wandoan Coal Project.

Soil Conservation Act 1986

The *Soil Conservation Act 1986* provides for the preparation of plans that outline works and measures that may be used to contain soil erosion. There is no requirement on a landholder to actually implement works unless a Notice or Order has been issued requiring compliance with the approved plan. Further, there are provisions in this Act to allow a landholder to seek

an amendment to an approved plan, or to have the approval revoked. Plans may show a preferred, or recommended, layout of soil conservation works used to control erosion, principally on cultivation land; however, the plans may not necessarily reflect what has actually been implemented. Any construction activities or maintenance activities (including access requirements and subsequent maintenance operations) will need to recognise the existence of any of the implemented soil conservation works.

Information provided by the Toowoomba office of NRW indicate that there are 14 properties within the study area that are subject to soil conservation plans approved under the *Soil Conservation Act 1986*. These are identified and described in Section 2.4.2.

Queensland Heritage Act 1992

Queensland cultural heritage derives state protection pursuant to the *Queensland Heritage Act 1992*. This legislation protects those areas that are considered to be of state significance and are placed on the 'Queensland Heritage Register', which is administered by the Heritage Council. For these areas, approval of the Heritage Council is required if any development is proposed. A search of the Register indicates that the gas supply pipeline study area is in close proximity to the following significant heritage places:

- Leichhardt Tree, Yalwyn Street, Taroom
- The Glebe Homestead, Taroom-Cracow Road, Taroom.

However, no places, objects or sites listed on the Queensland Heritage Register are located directly within the study area or along or immediately adjacent to the proposed pipeline route options.

Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* provides for the protection of significant Aboriginal cultural heritage, including the establishment of a register of Aboriginal cultural heritage and processes for addressing land use impacts. The Cultural Heritage Coordination Unit of NRW implements this legislation.

A search of the register of Aboriginal cultural heritage administered by NRW has been requested for the study area. The results of this request indicate that two Aboriginal cultural heritage sites, places and/or objects are recorded within the study area. The details of the sites and relevance to the proposed Project are further discussed in Section 2.5.3 of this report.

WJV is responsible for carrying out activities with reasonable and practical measures to ensure it meets its Duty of Care established under the Act. Where necessary, the WJV will implement a Cultural Heritage Management Plan in consultation with the traditional owners of the pipeline route area.

Native Title (Queensland) Act 1993

The objective of the *Native Title Act 1993* (Queensland) is to achieve consistency with the *Native Title Act 1993* (Commonwealth). It validates past Acts that were invalidated because of the existence of Native Title and confirms various rights conferred by those Acts. Additionally, the Act aims to ensure the protection of Native Title and establishes ways in which future dealings regarding Native Title may proceed.

The registered Native Title claimants for the study area are the Iman People with the associated active native title claim being claim QC97/55 Iman People #2 filed on 30 October 1997.

1.4.3 State planning policies

State planning policies (SPP) are statutory planning instruments that relate to matters of Queensland state interest.

The Minster for Local Government and Planning has identified that the following SPPs were adequately addressed in the former Taroom Shire Planning Scheme:

- SPP 1/92 – Development and Conservation of Agricultural Land (where land is included within the Rural Zone – Rural B precinct only)
- the bushfire and landslide components of SPP 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.

The relevance of the SPPs to the Project are assessed below. Hence, the discussion below refers to the Overlay Maps contained in the Planning Scheme.

State planning policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide

The purpose of this policy is to set out the State government's interests with regard to natural hazards of flood, bushfire and landslide and ensure these matters are adequately addressed when carrying out development assessment.

The construction of the proposed gas supply pipeline will not limit potential access to ground based fire fighting vehicles and the design (i.e. underground) is unlikely to impose restrictions upon existing bushfire management techniques.

The proposed gas supply pipeline will generally be located underground, constructed through a section trench and backfill operation. Therefore, it is expected that the pipeline will be compatible with the impacts of the potential natural hazards. Due to the nature of the proposal being an underground pipeline it is anticipated that the Project would not significantly compromise the intent of this SPP.

- Bushfire: Bushfire Hazard mapping prepared by the Queensland Rural Fire Service indicates the bushfire hazard areas in the former Taroom Shire. All three gas supply pipeline options are predominately beneath land identified as areas of low bushfire hazard, with small areas of medium bushfire hazard. The design is unlikely to impose restrictions upon existing bushfire management techniques; however, the proposal will potentially improve access for ground-based fire fighting vehicles by providing an adequate access road along the easement. The underground pipeline would not be impacted by normal fire events.
- Flooding: The proposed pipeline it is unlikely to adversely affect flood events or contribute to increased flood events as it is located underground, and will be constructed using a section trench and backfill operation.

- Landslide: The project would not involve land containing slopes greater than 6% (refer Figure 2-5). In accordance with the SPP, a natural hazard management area is defined as a slope exceeding 15%. As such, the Project would not affect any land in a natural hazard management area.

As such, the proposed development will not compromise the SPP outcomes.

State planning policy 1/92 Development and conservation of agricultural land, 1992

This SPP addresses the conservation of good quality agricultural land (GQAL) and provides guidance to local authorities on how this issue should be addressed when carrying out their range of planning duties. Local authorities, the Planning and Environment Court and the Government are required to have due regard to this Policy when carrying out their planning functions.

The SPP makes allowances for developments on high quality agricultural land where the project provides an overriding public benefit and there are no other suitable sites for the purpose.

The SPP 1/92 is largely focused on local government, and requires local governments to include maps of GQAL in their planning schemes.

Four classes of land have been defined for Queensland. These are Classes A, B, C and D, as described in Table 1-2.

Table 1-2: Land classes within the study area

Class	Description
Class A	Crop Land — land suitable for current and potential crops with limitations to production that range from none to moderate levels. All crop land is considered to be GQAL.
Class B	Limited Crop Land — land that is marginal for current and potential crops due to severe limitations and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for pasture cropping. Land marginal for particular crops of local significance is considered to be GQAL.
Class C	Pasture Land — land suitable only for improved or native pastures due to limitations that preclude continuous cultivation for crop production; but some areas may tolerate a short period of ground disturbance for pasture establishment. There are two types of Class C land, being: Class C1: suitable for improved pasture Class C2: Suitable for native pasture.
Class D	Non-agricultural Land — land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values, or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrops or poor drainage.

These land classes are based on an assessment of the suitability of the land for specified agricultural uses that involve rating the ability of the land to maintain a sustainable level of productivity using soils, topographic and climatic factors that determine sustainable productivity.

NRW describes pastoral uses along the pipeline easement as Class A, B and C1 GQAL.

All route options traverse land identified as GQAL being predominately Class A, with small areas of Class B to the east of the Wandoan Township and along the Leichhardt Highway road reserve.

Furthermore, the SPP makes allowances for developments on high quality agricultural land where the project provides an overriding public benefit and there are no other suitable sites for the purpose.

This matter and any potential implications for the Project are discussed in further detail in Section 2.3.5 of this report.

Development in the vicinity of certain airports and aviation facilities — SPP 1/02

This SPP sets out broad principles concerning development in the vicinity of airports and aviation facilities considered essential for the State's transport infrastructure or national defence system. This SPP sets out broad principles for protecting airports and associated aeronautical facilities from encroachment by incompatible developments, in the interest of maintaining operational integrity and community safety. Tall physical structures have the potential to pose a hazard to aircraft operations if they protrude through the relevant obstacle limitation surface (OLS). This policy also applies to development that has the potential to create adverse effects on the functioning of aviation facilities caused by the following:

- physical 'line of sight' obstructions
- electricity or electro-magnetic emissions
- structures containing a reflective surface.

There are no airports of State significance in the former Taroom local government area.

An off-airport facility (non-directional beacon and VHF omnidirectional range) is identified in the guideline for the SPP 1/02 for the former local government area of Taroom. The facility is located along the Leichhardt Highway. The three proposed options do not exceed the minimum development constraint as the Project is for an underground pipeline.

Planning and managing development involving Acid Sulfate Soils — SPP 2/02

The Acid Sulfate Soils SPP applies to certain coastal areas of Queensland where the natural ground level is less than 20 m Australian Height Datum (AHD) and soil below 5 m AHD is disturbed by the proposed works.

No areas under 5 m AHD or underlain by estuarine sediments are traversed by the proposed pipeline options, and the requirements of the SPP are therefore not considered relevant as a corridor selection criterion in this instance.

Protection of extractive resources — SPP 2/07

The purpose of this policy is to set out the State's interests with regard to extractive resources and protect the Key Resource Areas (KRA) from incompatible development as a result of poor land use decisions. It is intended that this policy maintains the long-term availability of extractive resources in KRA. The SPP came into effect on 3 September 2007.

No KRA mapping exists for the former local government area of Taroom Shire.

State Coastal Management Plan

Under the *Coastal Protection and Management Act 1995*, the State Coastal Management Plan and subsequent Regional Management Plans have the status of a SPP for the purposes of making and amending planning schemes and assessing and deciding development applications. The State Coastal Management Plan provides a framework to address and manage pressures on the coastal zone and as part of its core topics, emphasises that development should occur in an ecologically sustainable manner. The State Coastal Management Plan applies to the coastal zone defined in Section 11 of the Act.

The State Coastal Management Plan is not relevant to the three proposed route options as the subject area:

- is physically distant from coastal environments with the pipeline being located in an inland area
- is generally a modified low-density rural area
- does not contain significant physical features, ecological or natural processes or human activities that affect, or have the potential to affect, the coast or coastal resources or a significant high order stream
- irrespective of whether being a catchment or not, does not comprise proposed development that would have the ability to significantly impact on coastal resources or waters (due to the minor development 'footprint'). As there is no link with the coast or coastal resources, the State Coastal Management Plan is not considered to be applicable to the proposed development.

As such, this SPP is not relevant to the proposed gas supply pipeline.

Housing and residential development — SPP 1/07

This SPP seeks to ensure that large, higher growth local governments identify their community's housing needs and analyse, and modify if necessary, their planning schemes to remove barriers and provide opportunities for housing options that respond to identified needs. SPP 1/07 is supported by a Guideline that provides information and advice on interpreting and implementing the Policy.

Annex 1 of the SPP does not identify the Dalby Regional Council as an area to which this SPP applies. Consequently this SPP is considered not applicable.

1.4.4 Regional and local planning instruments

Central Queensland Regional Growth Management Framework 2002

The Central Queensland Regional Growth Management Framework 2002 is a joint government, community and industry project to develop a long-term strategic plan to guide management, growth and development of the region over the following 20 years.

The Regional Growth Management Framework was prepared under Part 5 of the IPA. Local governments are required to develop or amend their planning schemes to reflect the intentions of the Regional Growth Management Framework.

The Regional Growth Management Framework seeks to make Central Queensland the most diverse and prosperous region in Australia through economic growth that is ecologically sustainable and where people and industry work in harmony with the environment for the benefit of both present and future generations whilst respecting the diversity of our past.

Further discussion regarding the association between the Regional Growth Management Framework and the proposed Wandoan Coal Project will be provided in the EIS.

2. Route option evaluation

2.1 Information sources

Information sources used in researching the constraints for each of the proposed corridors include those listed in Table 2-1.

Table 2-1: Desktop review information sources

Potential constraint	Information and data sources
Commonwealth threatened species	*Environment Protection and Biodiversity Conservation Act 1999* online 'Protected matters search tool'
Commonwealth listed migratory species	*Environment Protection and Biodiversity Conservation Act 1999* online 'Protected matters search tool'
Commonwealth threatened ecological communities	*Environment Protection and Biodiversity Conservation Act 1999* online 'Protected matters search tool'
State listed threatened species (*Nature Conservation Act 1992*)	Wildlife On-line (EPA)
State listed conservation significant vegetation communities (*Vegetation Management Act 1999*)	Remnant vegetation and Regional Ecosystem mapping (current version 5.0 with the addition of any certified changes) produced by the EPA.
Watercourses	Land, Vegetation and Water Packaged Digital Data produced by NRW
Water catchments and water resource planning	Water Resource (Fitzroy Basin) Plan 1999 produced by NRW
Mining and petroleum tenements	Department of Mines and Energy on-line interactive mapping tool
Coal seam methane wells	Department of Mines and Energy on-line interactive mapping tool
State controlled roads	Department of Main Roads South Western District 4 map
Railways	Network system information produced by Queensland Rail
Land tenure	Land, Vegetation and Water Packaged Digital Data produced by NRW
Good quality agricultural land	Dalby Regional Council: Planning Scheme for Taroom Shire 2006
Town planning land designation	Dalby Regional Council: Planning Scheme for Taroom Shire 2006
Topography	SRTM data sets produced by the National Aeronautics and Space Administration and the National Imagery and Mapping Agency
Geology	Land, Vegetation and Water Packaged Digital Data produced by NRW
Soils	Digital Atlas of Australian Soils produced by CSIRO
Properties subject to approved Soil Conservation Plans	Information provided by NRW, Toowoomba office

Potential constraint	Information and data sources
Local authority roads	Land, Vegetation and Water Packaged Digital Data produced by NRW
Key/future resource areas	Department of Mines and Energy on-line interactive mapping tool
Properties, residences	1:250,000 Digital Topographic Data produced by Geosciences Australia
Existing infrastructure (e.g. pipelines, powerlines etc)	Department of Mines and Energy on-line interactive mapping tool Planning Scheme for Taroom Shire 2006
Fire hazard	Rural Fire Service bushfire hazard mapping for local government areas
Cost to construct (indicative)	Pipeline designers (PB)
Native title	National Native Title Tribunal mapping and Register information
Cultural Heritage (non-indigenous)	Queensland Heritage Register, National Heritage List, Commonwealth Heritage List
Cultural heritage (indigenous)	Register of Aboriginal cultural heritage (NRW), National Heritage List, Commonwealth Heritage List

It should be noted that whilst all of the above potential constraints were identified and information collated, not all of these potential constraints were considered as principal determining criteria in the route selection study. For example, local topography within the study area may influence pipeline design and construction however, this criteria is expected to render a similar constraint level for all potential pipeline route options. Therefore, not all of the above listed constraints have been utilised in the route option evaluation and comparative assessment.

2.2 Selection of assessment criteria

The issues typically addressed in environmental impact assessments are also relevant to the comparison of alternatives in a route option evaluation, and can be used to develop suitable criteria for selecting a preferred alignment. The criteria can be broken into regulatory, planning, environmental, social and economic categories. These criteria typically consist of:

Regulatory criteria

- provisions of relevant Commonwealth legislation
- provisions of relevant state legislation and policies.

Regulatory provisions, as they relate to this Project, are generally associated with the use, development or potential impact to environmental, planning, social and economic criteria. Therefore, whilst noteworthy that these criteria exist, in the context of this assessment, regulatory criteria will be considered in conjunction with relevant environmental, planning, social and economic assessment criteria.

Planning assessment criteria

- Land use and tenure.
- Location of petroleum and mining leases.
- Location of resource (e.g. coal, petroleum, mineral) areas.
- Local governments and planning schemes.
- Location of existing infrastructure such as pipelines, roads (local and state controlled), railway lines, dams/water infrastructure etc.

Environmental assessment criteria

- Topography.
- Geology and soils.
- Watercourses and wetlands.
- Fire risk.
- Flora and vegetation communities.
- Fauna and habitat values.

Social assessment criteria

- Proximity of residences and other sensitive receptors to the proposed development.
- Properties and landholders affected.
- Visual amenity.
- Cultural heritage (indigenous and non-indigenous).

Economic assessment criteria

- Indicative pipeline cost.

Sections 2-3 to 2-6 (inclusive) describe how these assessment criteria were considered in developing the performance measures, against which each option will be assessed. As mentioned above, in some cases it is possible to establish that a particular criterion will not be useful in the assessment process and therefore no further analysis will be undertaken. A summary of the selection criteria and relevance to the proposed Project is provided in Table 2-4.

2.3 Planning assessment criteria

2.3.1 Land use and tenure

Existing land uses within the study area are predominantly agricultural and resource based (refer Figure 2-1). The proposed Wandoan Coal Project area is located to the west of the study area, covering approximately 32,000 ha. The existing Peat-Scotia Gas Line is located within the north-east portion of the study area and the township of Wandoan is located to the south-west of the study area. The balance of the land within the study area is predominantly utilised for agricultural purposes, including grazing and cropping activities. Reserves such as state forests and national parks are not present within the study area. The Leichhardt Highway (Wandoan-Taroom section) traverses the western portion of the study area in a north-south direction and links the towns of Wandoan (to the south) and Taroom (to the north).

In terms of future land uses, the Central Queensland Regional Growth Management Framework provides a strategic vision for the Central Queensland Region, including the previous Taroom Shire local government area. The Central Queensland Regional Growth Management Framework indicates that the following future uses are to be provided for along or within close proximity to the gas pipeline study area:

- present and future tourist routes
- potential future mining expansion
- key agricultural areas/major cultivation areas
- mineral and extractive resources
- key conservation areas
- Brigalow Belt Bioregion
- major highway (Leichhardt Highway)
- major urban centre (Wandoan Township).

It should also be noted that the Surat Basin rail line is proposed to traverse the study area almost diagonally. This is discussed further in Section 2.3.4. Sensitive land uses such as schools, community facilities, cemeteries and land uses associated with temporary or permanent infrastructure or equipment (i.e. gas fields, centre pivot irrigation etc) have been considered during the route selection process and avoided where identified. Therefore, there is no variation in the selection criterion across the study area, making differentiation between the merits of route options negligible. Land use and tenure will not be utilised as a determining criteria for pipeline route alignment and will not be considered in the comparative assessment of options undertaken in Section 4.

Figure 2-1

CLONDUFF
CULGOWIE
WANDOAN
SANDS ROAD
CHAPMANS ROAD
STOCK ROUTE
YEOUVIL ROAD
PERRETTS ROAD
K TWO ROAD
WHITELEYS ROAD
MURRAYS ROAD
NUMBER SIX ROAD
NUMBER SEVEN ROAD
BUNGABAN TWELVE MILE ROAD
NUMBER FIVE ROAD
NATHAN ROAD
BUNGABAN ROAD
PONTY POOL ROAD
BIG VALLEY ROAD
KNUDSENS ROAD
GROSMOUNT ROAD
YEOVIL ROAD
NUMBER FOUR ROAD
KABUNGARO AD
K ROAD
MI ROAD
M ONE ROAD
BIZYS ROAD
M TWO ROAD
NUMBER TWO ROAD
NUMBER ONE LANE
E ROAD
RYALLS ROAD
BOORAL ROAD
MARKWELLS ROAD
CECILS ROAD
B ROAD
BORAL ROAD
Q ROAD
LEICHHARDT HIGHWAY
WALSHS ROAD
ROCHE CREEK ROAD
GLENDOAN ROAD
FORESTRY ROAD
ZILMANS ROAD
DILLONS ROAD
NELDERS ROAD
MIDDLE CREEK ROAD
DASCOMBES ROAD
ROYD STREET
JACKSON WANDOAN ROAD
PEAKES ROAD
BUNDI ROAD
BUNDI TWO ROAD
L ROAD
A ROAD
CUSTER LANE

Legend

- Towns
- Gas supply pipeline study area
- Wandoan Coal Project Area

Zoning

- Commercial
- Industrial
- Mixed Use
- Open space and Recreation
- Residential
- Rural
- Rural Residential
- Urban

0 2 4 6 8 10
Kilometers

Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.

Landuse within the study area

PARSONS BRINCKERHOFF

File: J:\A442-ENG\PROJ\21330O6C__Wandoan_prefea\10_GIS\Projects\Water\Route selection Report\EW Options\Figure3_2_Mining.mxd Author: GL Print Date: 04/05/2008

2.3.2 Mining and petroleum leases

Mining

Reference to the Department of Mines and Energy interactive online search tool (conducted 22 May 2008) indicates that there are no Mining Leases (MLs) or Mineral Development Licences (MDL's) within the study area apart from those associated with the Wandoan Coal Project located to the west of the study area. Therefore, occurrence of ML's or MDL's will not be utilised as a performance measure in the comparative assessment of options.

Petroleum

Reference to the Department of Mines and Energy interactive online search tool (conducted 22 May 2008) indicates that the following Petroleum Leases (PLs) are located within the study area:

- PL 176 held by Santos QNT Pty Ltd (granted status)
- PL 101 held by Origin Energy CSG Limited (granted status).

These PLs constitute the Peat-Scotia coal seam gas fields operated by Origin and Santos and from which the gas supply for the Wandoan Coal Project is proposed to be sourced (refer Figure 2-1). All of the pipeline options propose to cross the western portion of PL 176. Where pipeline options propose to traverse PLs, discussions with the PL holders will be required in order to negotiate an appropriate alignment across the PL areas. Given that all of proposed alignment options will traverse PL areas, there is considered to be no distinct or material difference between the options in this regard and therefore, this criterion has not been considered further in the comparative assessment included in Section 4.

Resource areas

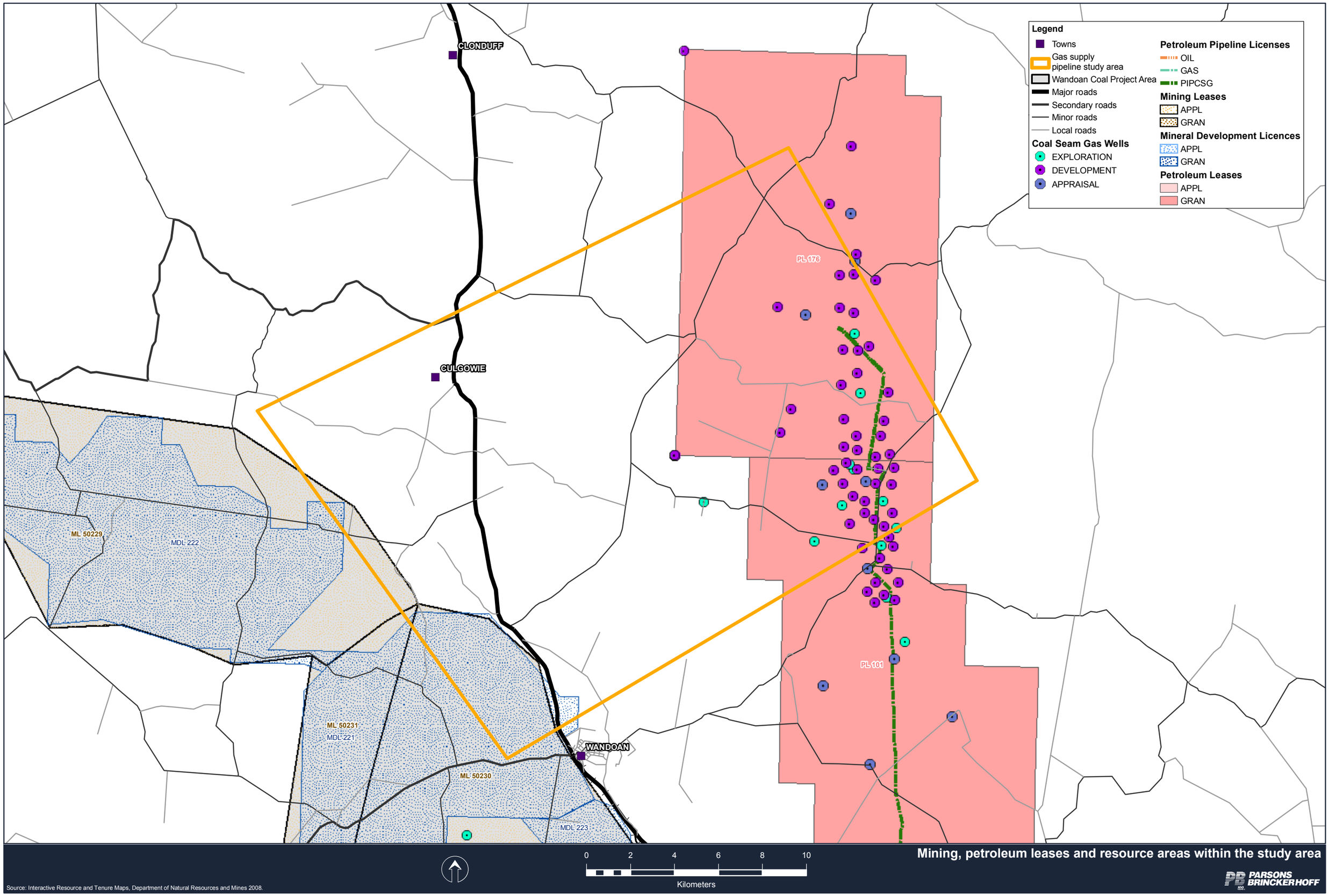
Reference to the Department of Mines and Energy interactive online search tool (conducted 22 May 2008) indicates that three coal resource areas (outside of the proposed Wandoan Coal Project MLA) have been identified within the study area. These areas are located predominantly within the central portion of the study area (refer Figure 2-2). The pipeline alignment options have been designed to avoid identified coal resource areas and therefore, avoid potential sterilisation of resources. Given this, there is no variation in this selection criterion across the study area, making differentiation between the route options negligible. Therefore, this criterion has not been considered further in the comparative assessment undertaken in Section 4.

2.3.3 Local governments and planning schemes

Local authority planning schemes

The gas supply pipeline study area is located wholly within the Dalby Regional Council area. Due to recent local government authority amalgamations that have occurred, the study area remains subject to the Planning Scheme for Taroom Shire 2006.

Figure 2-2



Mining, petroleum leases and resource areas within the study area

Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.

PARSONS BRINCKERHOFF

File: J:\A442-ENG\PROJ\2133006C__Wandoan_prefea\10_GIS\Projects\Water\Route selection Report\EW Options\Figure3_2_Mining.mxd Author: GL Print Date: 04/05/2008

The gas supply pipeline would trigger a requirement to obtain a survey pipeline licence and pipeline licence under the PG Act. As such, the development approval exemption under Schedule 9, Table 5 of the IP Act would apply to the development where all aspects of development authorised under the *Petroleum Act 1923* or the PG Act (other than an activity relating to the construction and operation of an oil refinery) is exempt development.

Exempt development does not require a development application and there are no planning scheme codes or standards which apply to the proposal. As such, the provisions of the planning scheme are not applicable to the proposed pipeline and further assessment of the planning scheme is not deemed applicable.

However, where associated works (i.e. pump stations and buildings) are to be developed above ground, a building works approval would be required from Council.

Local laws

There are no local laws identified under the Dalby Regional Council for the former local government area of Taroom.

2.3.4 Existing and proposed infrastructure

Local government roads

A number of local government roads are located within the study area for the proposed gas supply pipeline and propose to be utilised by the proposed pipeline options. The length of pipeline within road reserves may have implications for the Project in terms of negotiating with local government authorities to receive approval for utilisation of the road reserve and removing and replacing existing road surfaces (e.g. subgrade and asphalt) where road crossings are required. Therefore, the length of proposed pipeline route within the road reserve has been included as criterion in the comparative assessment of options.

State controlled roads

State controlled road number ‘26B Leichhardt Highway (Taroom-Miles)’ traverses the western portion of the study area. Due to the location of the Leichhardt Highway within the study area, all pipeline route options will be required to cross this state controlled road (refer Figure 2-3). Additionally, various sections of the pipeline route options are proposed to be located within the existing road reserve of the Leichhardt Highway and will require approval/agreement by the Department of Main Roads. Therefore, the length of proposed pipeline route within road reserves is considered important to route selection and has been included as a criterion in the comparative assessment of options.

Rail infrastructure

No Queensland Rail network infrastructure currently exists within the study area. The nearest existing Queensland rail infrastructure is an arm of the single track western network system which connects Miles and Wandoan and is located to the south of the study area. Therefore, pipeline route options will not cross existing Queensland Rail infrastructure and consequently, no further consideration of this criterion will be undertaken in the comparative analysis of options.

CLONDUFF

CULGOWIE

WANDOAN

K TWO ROAD

YEOVIL ROAD

KABUNGA ROAD

K ROAD

LEICHHARDT HIGHWAY

JACKSON WANDOAN ROAD

ROAD

Legend

- Towns
- Rail
- Gas supply pipeline study area
- Proposed Surat Rail
- Major roads
- Secondary roads
- Minor roads
- Local roads
- Wandoan Coal Project Area

0 2 4 6 8 10

Kilometers

Existing and Proposed Infrastructure within the study area

Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.

PARSONS BRINCKERHOFF

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It should be noted however that indicative designs and alignments imply that the Surat Basin rail line, which will provide service to the Wandoan Coal Project, will be located in a north-south alignment across the study area (refer Figure 2-3). Land acquisition will be undertaken in order to facilitate implementation of the rail line and therefore, opportunities exist for co-location of the pipeline and rail line. Co-location is a means by which to, on a regional scale, reduce or minimise constraints and impacts resulting from provision of infrastructure such as number of landowners impacted and severance of properties. Therefore, co-location is included as a criterion in the comparative assessment of options of the proposed gas supply pipeline.

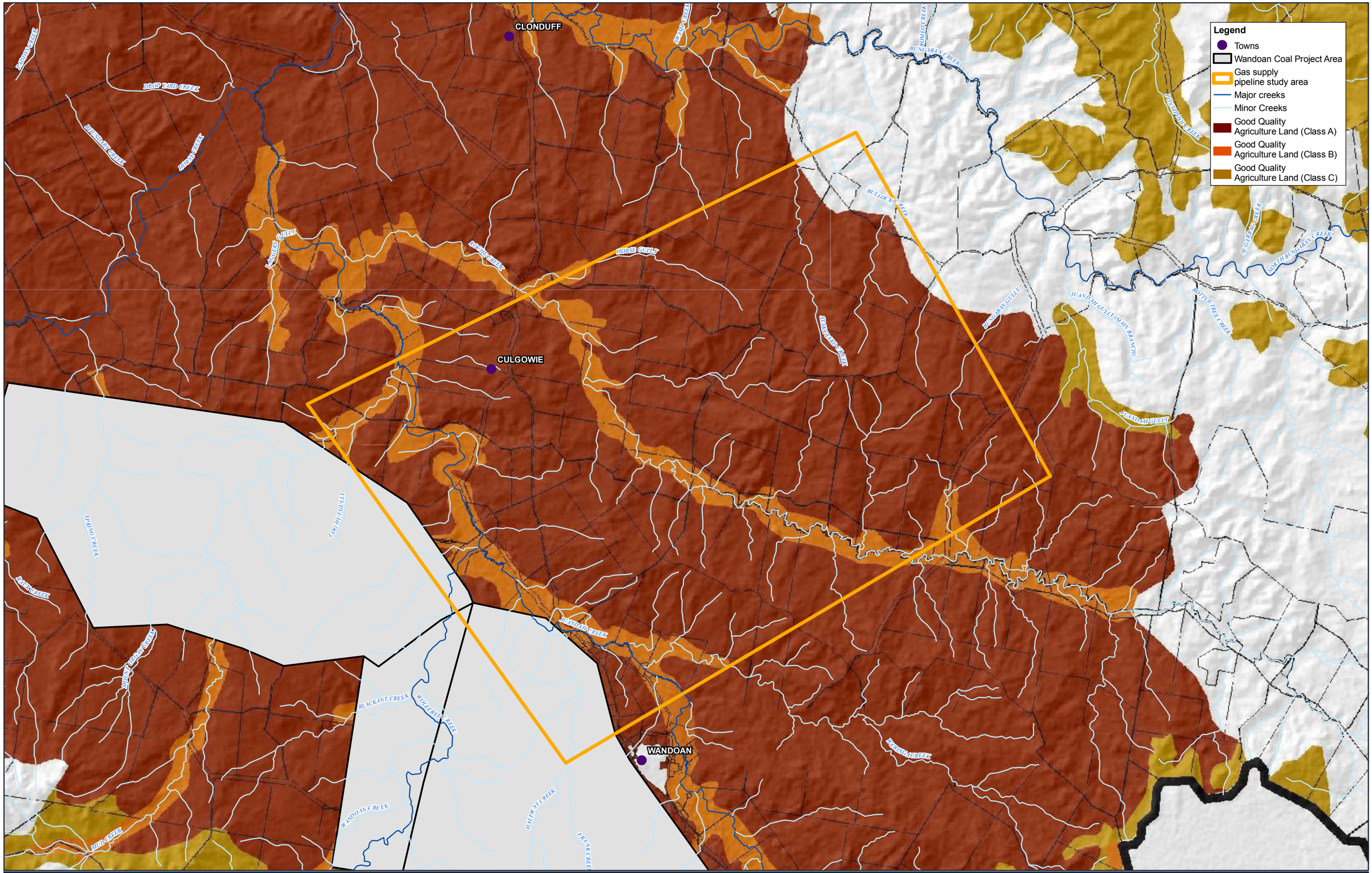
Existing pipelines, powerlines etc and other infrastructure

Apart from the existing Peat-Scotia Gas Line, from which the Wandoan Coal Project gas supply is proposed to be sourced, other pipeline infrastructure has not been identified within the study area. Existing high voltage powerlines have also not been identified within the study area.

However, if during field assessments, pipeline easements are identified, approval from the relevant authority will be required, including sign off on the proposed pipeline standard to be used. However, given that all pipeline options will intersect with the Peat-Scotia Gas Line, impacts or issues associated with this criterion are considered consistent across the options and therefore, this criterion will not be utilised in the comparative assessment of options.

2.3.5 Good quality agricultural land

Good quality agricultural land is mapped as occurring throughout the study area. Specifically, the proposed pipeline options traverse areas mapped as Class A and Class B good quality agricultural land (refer Figure 2-4). Whilst the pipeline options are proposed to be constructed predominantly underground, an easement will be required over the pipeline and terms and conditions of the easement agreement may limit (in some cases) or restrict the land use activities which can be conducted within the easement area, thereby potentially affecting a landowners use of the easement area and good quality agricultural land. Therefore, the imposition of the pipeline easement over good quality agricultural land is considered important to route selection and has been included as a criterion in the comparative assessment of options.



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Source:
Department of Natural Resources and Mines
Department of Mines and Energy

Good quality agricultural land within the study area

PARSONS BRINCKERHOFF

Figure 2-5

CLONDUFF

CULGOWIE

WANDOAN

Legend

- Towns
- Gas Supply Pipeline Study Area
- Major creeks
- Minor Creeks
- Wandoan Coal Project Area

DEM

Elevation

High : 443

Low : 199

CONTOUR

- 120 - 200
- 201 - 260
- 261 - 320
- 321 - 360
- 361 - 400
- 401 - 460
- 461 - 520
- 521 - 580
- 581 - 660
- 661 - 760

0 2 4 6 8 10

Kilometers

Source: SRTM datasets, National Aeronautics and Space Administration (NASA) and the National Imagery and Mapping Agency (NIMA), 2008

File: J:\A442-ENG\PROJ\213306C__Wandoan_prefeia\10_GIS\Projects\Water\Route selection Report\EW Options\Figure3_5_Topography.mxd Author: GL Print Date: 14/05/2008

Topography within the study area

PARSONS BRINCKERHOFF

2.4 Environmental assessment criteria

2.4.1 Topography

Generally, topographical relief across the study area occurs in north-south bands, associated with the presence of watercourses (refer Figure 2-5). Slight elevation to approximately 340 m AHD occurs within the eastern extent of the study area in the vicinity of the Peat-Scotia coal seam gas field. Within the central portion of the study area, associated with Roche Creek, low lying alluvial plains are present with an elevation of 240 to 260 m AHD. Elevation then increases again slightly to 300 m AHD and then decreases toward the western extent of the study area and the location of the Leichhardt Highway. All proposed pipeline options will traverse a similar route in terms of topography and terrain and therefore, relevance of topography as a determining criterion for pipeline route alignment is considered to be consistent across route options and will not be considered in the comparative assessment of options undertaken in Section 4.

2.4.2 Geology and soils

The study area comprises a number of different geological units which generally occur in north-south bands across the study area (refer Figure 2-6). These geological units include:

- Gubberamunda sandstone (arenite) comprising sandstone, minor conglomerate and siltstone
- Injune Creek Group (sedimentary rock) comprising calcareous lithic sandstone, siltstone, mudstone, coal, conglomerate
- Hutton Sandstone (arenite) comprising pale brown to pale grey, poorly sorted, medium-grained, feldspathic sublabile sandstone (at base) and fine-grained, well-sorted quartzose sandstone (at top); minor dark grey carbonaceous siltstone, mudstone and rare pebble conglomerate.

Given that these geological units generally occur in north-south bands across the study area, all proposed pipeline options will traverse similar geology and therefore, relevance of geology as a determining criterion for pipeline route alignment is considered to be consistent across route options and will not be utilised in the comparative assessment of options undertaken in Section 4.

Similar to geology, soils units within the study area are varied and generally occur in north-south bands across the study area (refer Figure 2-7). These soils units (and their association with general topography) include:

- Gentle to moderately undulating or rolling lands where the dominant soils are of moderate to shallow depth and include grey clays but with important areas of dark or brown clays. A slight gilgai microrelief may occasionally be present and local surface accumulations of silcrete gravel may occur. Associated soils are mainly loamy duplex soils.

- Small stream flood-plains that rise gradually to moderately undulating marginal valley slopes where the dominant soils of the level areas are loamy duplex soils. Associated are smaller areas of similar soils and local occurrences of clays. Some stream levees have deep sand soils.
- Undulating or moderately undulating lands with occasional low hilly areas comprising a complex range of soils. On moderate slopes loamy-surfaced duplex soils are dominant whereas on more gentle slopes there may be areas of cracking clays, associated duplex soils and small areas of friable earths.

All proposed pipeline options will traverse similar soils units and therefore, relevance of soils as a determining criterion for pipeline route alignment is considered to be consistent across route options and will not be utilised in the comparative assessment of options undertaken in Section 4.

Figure 2-6

CLONDUFF

WANDOAN

CULGOWIE

Ji

Qa

Je

Jh

Jg

Q

Legend

- Towns
- Gas Supply Pipeline Study Area
- Wandoan Coal Project Area

Geology

MAP_SYMBOL, ROCK_U_NAM

- Je, Evergreen Formation
- Jg, Gubberamunda Sandstone
- Jh, Hutton Sandstone
- Ji, Injune Creek Group
- Q, Q-NSB
- Qa, Qa-NSB

0 2 4 6 8 10

Kilometers

Source: Surface geology of Australia 1:1,000,000 scale, Queensland, Geoscience Australia

Geological Units of the study area

PARSONS BRINCKERHOFF

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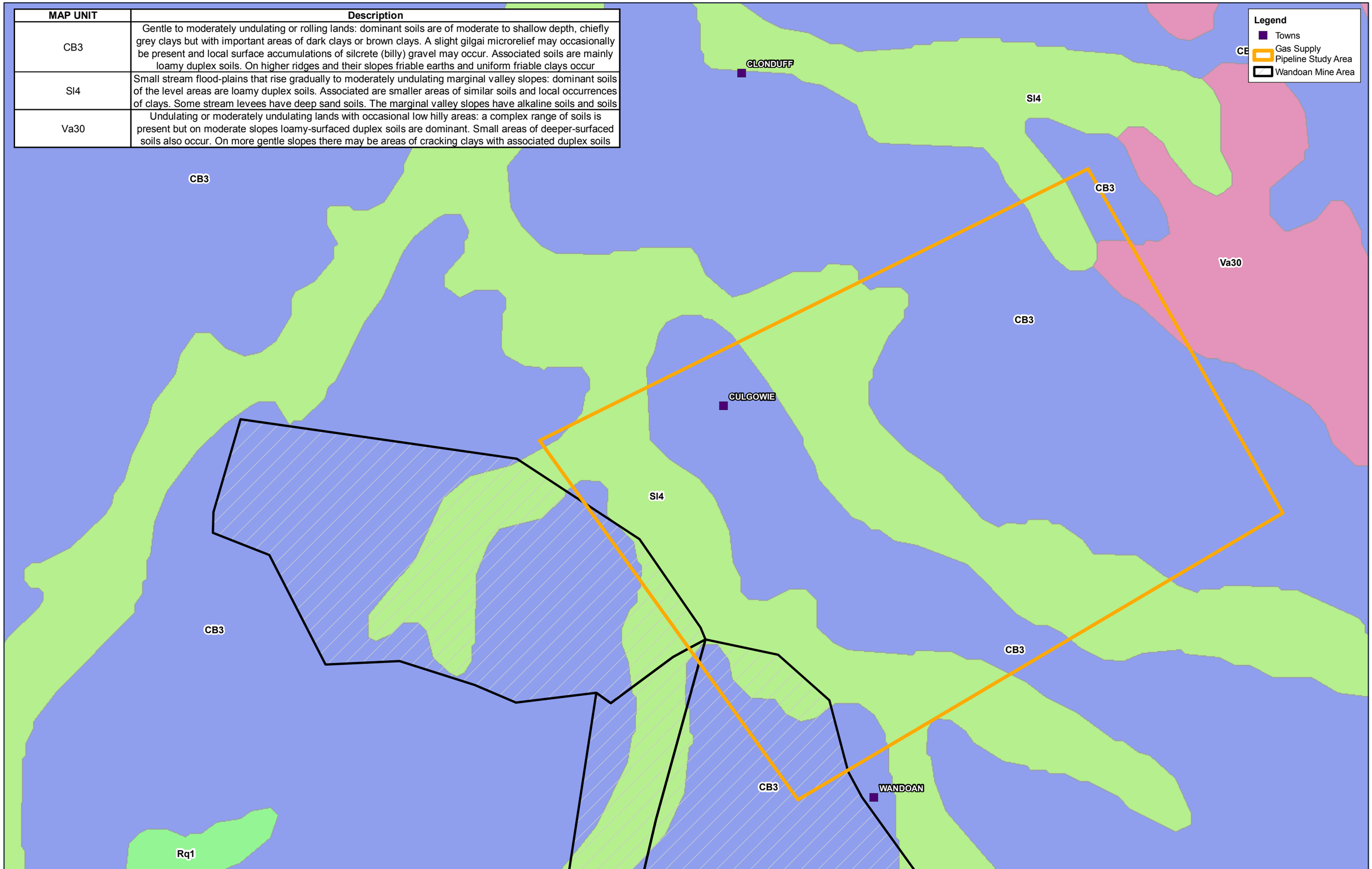
Figure 2-7

MAP UNIT	Description
CB3	Gentle to moderately undulating or rolling lands: dominant soils are of moderate to shallow depth, chiefly grey clays but with important areas of dark clays or brown clays. A slight gilgai microrelief may occasionally be present and local surface accumulations of silcrete (billy) gravel may occur. Associated soils are mainly loamy duplex soils. On higher ridges and their slopes friable earths and uniform friable clays occur
SI4	Small stream flood-plains that rise gradually to moderately undulating marginal valley slopes: dominant soils of the level areas are loamy duplex soils. Associated are smaller areas of similar soils and local occurrences of clays. Some stream levees have deep sand soils. The marginal valley slopes have alkaline soils and soils
Va30	Undulating or moderately undulating lands with occasional low hilly areas: a complex range of soils is present but on moderate slopes loamy-surfaced duplex soils are dominant. Small areas of deeper-surfaced soils also occur. On more gentle slopes there may be areas of cracking clays with associated duplex soils



Source of Digital Atlas of Australian Soils: Bureau of Rural Sciences after Commonwealth Scientific and Industrial Research Organisation (1991).

Soil Units within the study area

PARSONS BRINCKERHOFF

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Soil Conservation Plans

As mentioned above in Section 1.4.2, discussions with the NRW Toowoomba office indicate that a number of properties within the study area are subject to approved Soil Conservation Plans.

Table 2-2 indicates that 14 properties in the study area are subject to approved soil conservation plans approved under the *Soil Conservation Act, 1986*. Figure 2-8 identifies the location of these properties.

For the plans that have been approved under the *Soil Conservation Act 1986*, the Act provides for the preparation of plans that outline works and measures that may be used to contain soil erosion. There is no requirement on a landholder to actually implement works unless a Notice or Order has been issued requiring compliance with the Approved Plan. No Notices or Orders have been issued relevant to any of the Approved Plans listed in Table 2-2. Further, there are provisions in the Act to allow a landholder to seek an amendment to an approved Plan, or to have the approval revoked.

Table 2-2: Properties subject to approved Soil Conservation Plans within the study area

Soil conservation plan no.	Lot/plan description	Soil conservation plan no.	Lot/plan description
SC345061	Lot 63 on FT960	SC345075	Lot 361 on SP143626
SC345079	Lot 41 on FT603	SC345103	Lot 99 on FT815
SC345109	Lot 76 on RP895260	SC3451121	Lot 58 on FT520
SC345112	Lot 64 on FT525	SC345114	Lot 62 on FT833
SC345116	Lot 64 on FT516	SC345120	Lot 60 on FT904
SC345130	Lot 5 on FT1004	SC345138	Lot 7 on FT941
SC345138	Lot 88 on FT894	SC345154	Lot 66 on FT517

Discussions with NRW suggest that it is likely that soil conservation works may also have been implemented on properties besides those presented in Table 2-2 for which NRW does not hold specific plans. Such works may be legitimate and quite effective, having been laid out by NRW officers in the past but for which there had been no need to present plans that were required to be co-ordinated with neighbouring properties or utilities.

Any pipeline construction or maintenance activities will need to recognise the existence and reinstatement of any implemented soil conservation works. This would include construction access along the final easement alignment and subsequent maintenance operations. Therefore, the presence of properties subject to Soils Conservation Plans either adjacent or directly traversed by the proposed pipeline options has been considered as a criterion in the comparative assessment.

Figure 2-8

CLONDUFF

CULGOWIE

WANDOAN

Legend

- Towns
- Gas Supply Pipeline Study Area
- Soil Conservation Plans
- Wandoan Coal Project Area

0 2 4 6 8 10

Kilometers

Properties subject to approved soils conservation plans within the study area

Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.

PARSONS BRINCKERHOFF

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2.4.3 Climate

The township of Taroom is located in close proximity to the study area and therefore, climate data for this locality has been included (refer Table 2-3). In general, the Taroom region receives summer rainfall and summer temperatures are typically hot. Annual rainfall drops quickly west of the Great Dividing Range to an annual median of about 700 mm. Average temperatures during summer months are in the mid 30's. Winters are dry and cold at night with morning frosts not uncommon. Humidity is generally moderate throughout the year.

Table 2-3: Climate data for Taroom

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean max. temp	33.7	32.9	31.7	28.7	24.5	21.4	20.9	22.9	26.7	29.9	31.8	33.4	28.2
Mean min. temp	20.6	20.4	18.2	14.2	9.8	6.3	5.0	6.4	10.3	14.7	17.4	19.6	13.6
Mean rainfall	98.9	87.1	62.1	35.2	40.9	36.4	33.5	28.2	30.9	55.4	75.0	89.4	673.0
Mean 9:00 am relative humidity	64	67	66	67	72	76	74	67	58	56	57	60	65
Mean 3:00 pm relative humidity	41	45	42	40	43	45	42	38	33	34	37	38	40

Source: Bureau of Meteorology (downloaded 28 April 2008)

The general climatic conditions are not expected to differ substantially across the study area and between gas supply pipeline route options. Therefore, this criterion is not considered to be a significant determinant in alignment of the pipeline route and will not be considered in the comparative assessment of options undertaken in Section 4.

2.4.4 Watercourses

For water resource planning purposes, the study area is located in the greater Fitzroy River Basin which includes (but is not limited to) the Dawson, Fitzroy, Mackenzie and Comet River systems. A number of smaller watercourses which are tributaries of the Dawson River system, traverse the study area (refer Figure 2-9). These include (but are not limited to) Roche Creek, Stakeyard Creek and Juandah Creek.

Disturbance of watercourses (e.g. disturbance to bed and banks, removal of vegetation, excavation or placement of fill) generally require statutory approval under the *Water Act 2000* and possibly the Environmental Protection Regulation 1998 (Environmentally Relevant Activity 19 – Dredging). The number of watercourses crossed and the number of regulatory approvals required may have implications for project timelines and costs. Therefore, the number of watercourse crossings is considered important to route selection and have been included as a criterion in the comparative assessment of options.

CLONDUFF

CULGOWIE

WANDOAN

PADDYS CREEK
DROP YARD CREEK
BOUNDARY CREEK
HORSE CREEK
LAGGERS GULLY
ROCHE CREEK
SWAMP CREEK
ROMEO CREEK
BUNGABAN CREEK
PINE CREEK
PONYPOOL CREEK
SUGARBAG CREEK
NORTH BUNGABAN CREEK
BOTTLE TREE CREEK
BULLOCKIC REEK
HORSE GULLY
STAKEYARD CREEK
BUNGABIN GULLY
JUANDAH GULLY (MAIN BRANCH)
JUANDAH GULLY
JUANDAH CREEK
WERINGA CREEK
SPRING CREEK
LOG HUT GULLY
BACK CREEK
MOUNT ORGAN CREEK
BLACKANT CREEK
WOLFEBERG CREEK
WANDOAN CREEK
HALFWAY CREEK
FRANK CREEK
MUD CREEK

Legend

- Towns
- Gas Supply Pipeline Study Area
- Wandoan Coal Project Area
- Major creeks
- Minor Creeks
- Drainage basins

0 2 4 6 8 10

Kilometers

Source: Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2008.

Watercourses within the study area

PARSONS BRINCKERHOFF

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2.4.5 Noise

Limited noise data is currently available for the study area. Background noise levels in the existing environment would be typical of most rural areas and would vary from 30–40 dB(A) at night to 50–60 dB(A) during the day depending on the extent of traffic, machinery operations and general activity in the area. No extensively populated areas such as towns are located within the study area.

Potential impacts to the acoustic environment associated with construction and operation of the proposed pipeline are expected to be consistent across the different pipeline route options and therefore, are not considered to be a significant determining criterion between the different options. Given the nature of the proposed pipeline, operational acoustic emissions are expected to be minimal. Therefore, no further consideration of potential acoustic impacts has been included in the comparative analysis undertaken in Section 4. Detailed acoustic studies will be completed as part of the EIS for the Wandoan Coal Project and appropriate management strategies to limit any potential impact to noise sensitive receivers will be identified for implementation where considered necessary.

2.4.6 Fire risk

Bushfire risk analysis mapping prepared by the Queensland Rural Fire Service indicates that bushfire risk is consistent across the study area. The elevated eastern portion of the study area is allocated a medium bushfire hazard, whilst the central and western portions of the study area are allocated a low bushfire hazard. Given that the bushfire hazard trend is consistent across the study area and route options, this criterion is not considered to be a significant determinant between route options and therefore, will not be considered further in the comparative analysis undertaken in Section 4.

2.4.7 Air quality

Limited air quality data is currently available for the study area however the study area is expected to encompass the typical characteristics of a rural air shed. Local air quality is expected to vary from time to time and associated with land use activities such as machinery operations (ploughing etc).

Localised impacts to air quality may occur as a result of construction of the proposed pipeline however, negligible impacts are expected during the operation phase due to the nature and design (i.e. underground) of the proposed development. Potential impacts to the local air environment associated with construction and operation of the proposed pipeline are expected to be consistent across the different pipeline route options and therefore, no further consideration of potential air quality impacts has been included in the comparative analysis undertaken in Section 4.

Air quality studies will be completed as part of the EIS process and appropriate management strategies to limit any potential impact to nearby sensitive receivers will be identified for implementation where considered necessary.

2.4.8 Flora and fauna

Historical land use practices within the study area have resulted in the majority of the study area having been cleared of native vegetation. However, reference to EPA Regional Ecosystem mapping (version 5.0) indicates that there are a number of 'of concern' and 'endangered' regional ecosystems remaining within the study area, predominantly being riparian vegetation associated with waterways (refer Figure 2-10) and vegetation retained in road reserves. Additionally, reference to the DEWHA Protected Matters Search Tool indicates that a number of threatened ecological communities and species are known, may or are likely to occur within the study area. Given the regulatory provisions at both the state and Commonwealth level which apply to use or development of these resources, consideration of protected flora and fauna values is considered to be important to route selection and therefore have been included as a criterion in the comparative assessment of options.

2.5 Social, culture and heritage assessment criteria

2.5.1 Houses and properties

The study area generally comprises large rural allotments utilised for predominantly agricultural land use activities including live-stock grazing. A number of homesteads (residences) and associated out-buildings have been identified within the study area utilising desk-top information (refer Figure 2-11). The proposed pipeline alignment options have been situated in order to ensure that the existing residences are not directly impacted by the proposed development.

Acquisition of, or easements over, private property for construction of infrastructure can introduce issues such as increased cost for the project, increased community anxiety and increased complexity in the acquisition or easement process if a large number of property owners are involved. Sections of the proposed pipeline options have been located within local and State administered road reserves in order to reduce potential impact to local landholders and reduce complexity, landholder impact and cost issues associated with land acquisition. However, a number of the proposed pipeline options still propose to traverse private land and therefore, the number of properties impacted by the proposed pipeline is still considered to be an important selection criterion and has been included in the comparative assessment which has been undertaken in Section 4.

2.5.2 Visual amenity

The proposed pipeline infrastructure is proposed to generally be constructed underground and therefore, is not expected to contribute to on-going visual amenity impacts. However, vegetation clearing will be required in order to facilitate construction of the pipeline and such works may have visual amenity impacts. The extent of vegetation clearing is assessed under the impact on mapped regional ecosystems and therefore is not considered again here.

CLONDUFF
CULGOWIE
WANDOAN
PADDYS CREEK
DROP YARD CREEK
BOUNDARY CREEK
HORSE CREEK
LAGGERS GULLY
ROCHE CREEK
HORSE GULLY
SWAMP CREEK
ROMEO CREEK
BUNGABAN CREEK
BULLOCK CREEK
STAKEYARD CREEK
BUNGABAN GULLY
PINE CREEK
PONYPOOL CREEK
SUGARBAG CREEK
NORTH BUNGABAN CREEK
JUANDAH GULLY (MAIN BRANCH)
BOTTLE TREE CREEK
JUANDAH GULLY
SPRING CREEK
LOG HUT GULLY
BACK CREEK
MOUNT ORGAN CREEK
BLACKANT CREEK
HOLE BEEN CREEK
JUANDAH CREEK
WANDOAN CREEK
HALFWAY CREEK
FRANK CREEK
MUD CREEK
WERINGA CREEK

Legend

- Towns
- Gas Supply Pipeline Study Area
- Wandoan Coal Project Area
- Major creeks
- Minor Creeks

Regional Ecosystem Mapping V5.0

- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Not Of Concern

Source: Vegetation Communities and Regional Ecosystems of Queensland, Ver 5.0, Environmental Protection Agency 2006. Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2007. Essential habitat info sourced from the Environmental Protection Agency.

0 2 4 6 8 10
Kilometers

Regional Ecosystems Mapping within the study area

PARSONS BRINCKERHOFF

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CLONDUFF

CULGOWIE

WANDOAN

Legend

- Towns
- House Location
- Wandoan Coal Project Area
- Gas Supply Pipeline Study Area
- Cadastre

Source: Digital Cadastral Data Base, Department of Natural Resources and Mines 2005.
Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2007.

0 2 4 6 8 10

Kilometers

House and property boundary locations within the study area

PARSONS BRINCKERHOFF

File: J:\A442-ENG\PROJ\21330060__Wandoan_prefeas\10_GIS\Projects\Water\Route selection Report\EW Options\Figure3_10_House_Property.mxd Author: GL Print Date: 04/05/2008

2.5.3 Cultural heritage

Indigenous cultural heritage

A search of NRW's register of Aboriginal cultural heritage was undertaken for the study area. The search results revealed that two sites, places and/or artefacts of Aboriginal cultural heritage significance are located within the study area. It should be noted that one of these sites occurs within close proximity to the current termination point of the Peat-Scotia Gas Line within the study area and was likely identified as a result of cultural heritage surveys conducted as a part of the Peat-Scotia Gas Line project. The gas supply pipeline options which are the subject of this report are all proposed to commence at the current termination point of the Peat-Scotia Gas Line and therefore, in close proximity to a recorded Aboriginal cultural heritage site, place and/or artefact. Therefore, the risk of potential impact to Aboriginal cultural heritage is considered to be consistent across the pipeline options and therefore this criterion will not be further considered in the comparative analysis of options undertaken in Section 4.

It is to be noted that the accuracy of the locations of the sites as provided by NRW has not been verified, and the results represent only known sites on the register that have been identified through surveys undertaken as part of other infrastructure development projects. Accordingly, there is potential for further cultural heritage sites to be present in the study area, particularly in the vicinity of watercourses and permanent or semi permanent waterholes or natural springs or locations with outstanding landscape features such as rock outcrops or caves. Therefore, it is recommended that appropriate cultural heritage investigations and surveys be undertaken as part of the EIS for the Wandoan Coal Project.

Non-indigenous cultural heritage

As mentioned above in Section 1, no places, objects or sites listed on the Queensland Heritage Register or Register of the National Estate are located along or immediately adjacent to the proposed pipeline route options. Therefore, minimal impacts to non-indigenous cultural heritage values are anticipated and this criterion will not be considered further in the comparative assessment of options.

2.5.4 Native title

A Native Title claim, the Iman People No. 2, was lodged on 30 October 1997 and is registered. The National Native Tribunal No. for this claim is QC97/55. Given the presence of a Native Title claim over the entire study area, this matter will apply to all pipeline route options and is not dependent upon route selection. Therefore, this criterion will not be further considered in the comparative analysis of options undertaken in Section 4.

2.6 Economic criteria

For commercial in confidence reasons, an analysis of costs associated with the various pipeline options is not included within this assessment.

2.7 Summary of assessment criteria

Table 2-4 indicates how these assessment criteria were considered in developing the performance measures, against which each option will be measured. As mentioned above, in some cases it is possible to establish that a particular criterion will not be useful in the assessment process and therefore no further analysis will be undertaken.

Table 2-4: Assessment of potential selection criteria

Assessment criteria	Relevance	Is criteria relevant?	Performance measures
Regulatory			
Commonwealth legislation (commensurate with flora and fauna criteria below)	*Environment Protection and Biodiversity Conservation Act 1999*	Yes	▪ Approximate area of threatened ecological communities to be cleared
State legislation (commensurate with flora and fauna criteria below)	*Vegetation Management Act 1999*	Yes	▪ Approximate area of mapped regional ecosystems to be cleared
Planning			
Land use	Land uses associated with temporary or permanent infrastructure or equipment i.e. gas fields, irrigation etc. Sensitive land uses such as schools, community facilities, cemeteries etc.	No	N/a
Land tenure	Land tenure across the study area is consistent (i.e. Rural A, Rural B, road reserve) and does not vary significantly between pipeline options.	No	N/a
Good Quality Agricultural Land	Good quality agricultural land (including Classes A, B and C) has been identified in the study area.	Yes	▪ Area of good quality agricultural land traversed
Petroleum and mining leases	Approval from lease holders required for all options. MLs and MDLs have not been identified in the study area.	No	N/a
Resource areas	Resource areas have been identified for future development within the study area. Pipeline route options have been designed to avoid or minimise sterilisation of these resources.	No	N/a
Local government planning schemes	The proposed pipeline is considered to be exempt development in	No	N/a

Assessment criteria	Relevance	Is criteria relevant?	Performance measures
schemes	relevant planning schemes.		
Existing/proposed infrastructure	Pipeline within existing/proposed infrastructure easement etc will require approval from administering authority. Implications for property access, traffic control during construction. Opportunities for co-location of infrastructure.	Yes	▪ Length of pipeline within existing and proposed infrastructure easements/tenures (e.g. road reserves rail line etc)
Environment			
Topography	The general terrain is generally consistent across the study area and varies from relatively flat alluvial plains to elevated.	No	N/a
Geology and soils	All pipeline options will traverse a similar route in terms of soils and geology. Therefore, the overall relevance of this criterion to options assessment and comparison is considered to be negated. However, properties subject to Soil Conservation Plans are located within the study area and these will be considered in the comparative assessment.	Yes	▪ Number of properties subject to Soil Conservation Plans adjacent to or traversed by the pipeline alignments
Watercourses	Crossing waterways and wetlands may have implications such as application of regulatory provisions and increased costs for design and construction. Therefore, the number of crossings may influence the route selection.	Yes	▪ Number of waterways to be crossed
Fire risk	Bushfire fire risk mapping indicates that the study area varies between low and medium bushfire hazard. Fire risk does not vary significantly between options.	No	N/a
Flora and fauna values	Potential impacts on threatened vegetation communities could differentiate between route options and may influence route selection.	Yes	▪ Approximate area of mapped regional ecosystems to be cleared
Social			
Residences and sensitive receptors	Existing residences and associated buildings will be identified and avoided during the detailed design process.	No	N/a
Properties and landholders	The pipeline route options may traverse privately owned and leased land. This may have implications for project consultation and cost.	Yes	▪ Number of properties affected
Visual amenity	The proposed pipeline will be located underground and therefore, operational visual amenity is expected to be minimal.	No	N/a

Assessment criteria	Relevance	Is criteria relevant?	Performance measures
	Construction impacts through clearance of vegetation may be evident, however, this will be assessed under flora and vegetation criteria.		
Indigenous cultural heritage	Registered Aboriginal cultural heritage sites, places and/or objects are identified within the study area. Risk considered consistent across options.	No	N/a
Non-indigenous cultural heritage	Non-indigenous places, sites, objects etc have not been identified within the study area. Therefore, limited impact to these cultural resources is expected.	No	N/a
Economic			
Indicative pipeline cost	Length of pipeline, number of pump stations (if relevant) etc are all factors which may influence the cost of the proposed pipeline.	Yes	N/a

3. Option development

Based on desk-top information, data sources and basic design and construction principles, three potential pipeline route alignments were identified, to which the selection criteria detailed in Section 2 have been applied and a comparative assessment undertaken (refer Section 4). A description of the proposed pipeline alignments is included in the following sections and the proposed alignments are displayed in Figure 3-1.

3.1 Description of options

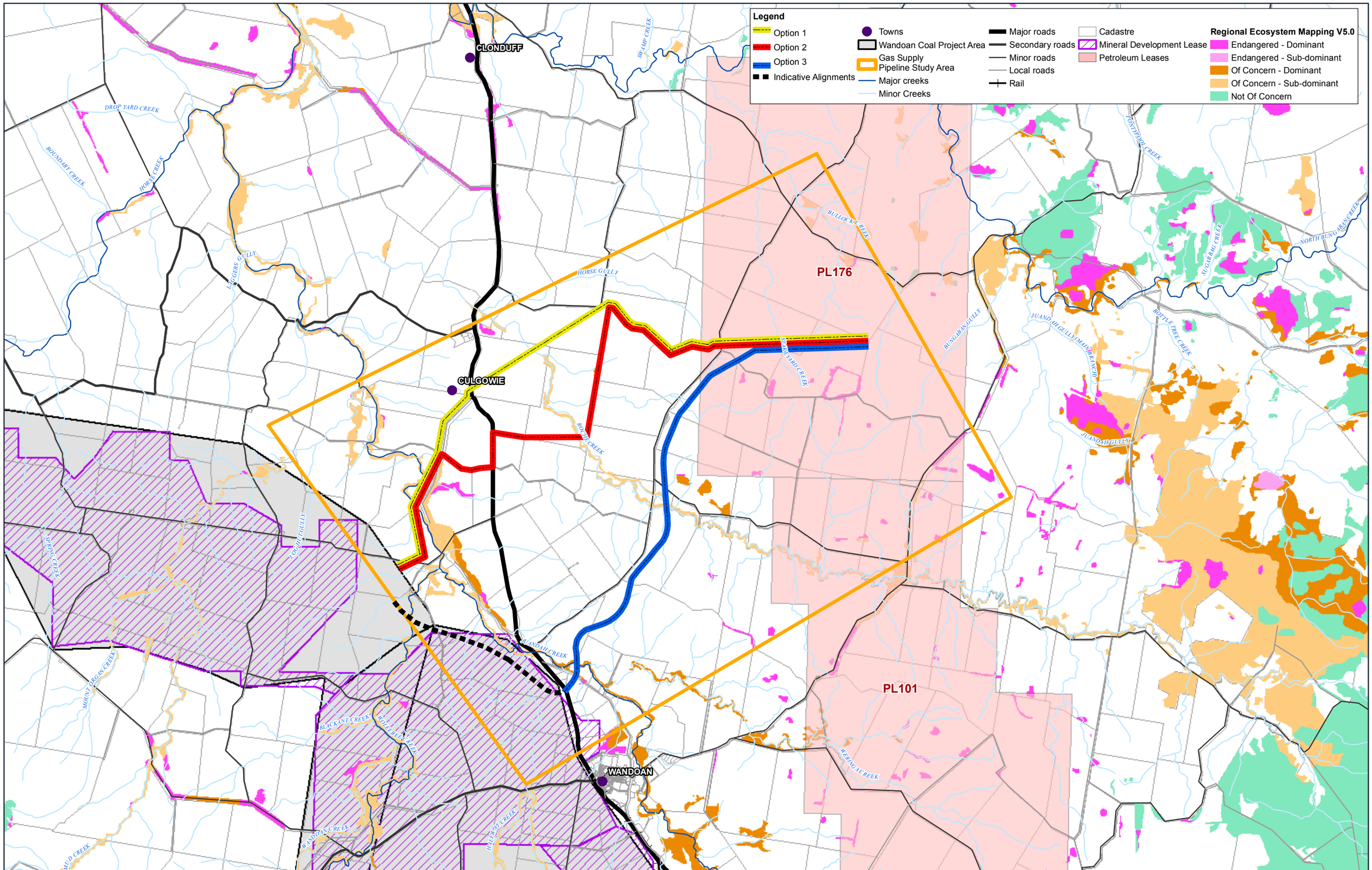
3.1.1 Option 1

Option 1 begins at the Peat-Scotia Gas Line in the vicinity of the north-east corner of Lot 22 on plan RP847424 and travels in a westerly direction until it intersects with Nathan Road. Within the PL area, the pipeline is to be preferably aligned with existing fence lines so as to minimise disruption to existing land use practices. From Nathan Road, this option is proposed to be located within the Number Four Road road reserve and travel in a north-westerly direction until meeting the north-easterly corner of Lot 88 on FT894. From this point, the proposed alignment turns south-west and traverses Lot 88 on FT894 and Lot 76 on plan 895260 until it meets the road reserve of the state controlled Leichhardt Highway. The Leichhardt Highway is then crossed and the proposed alignment continues in a south-westerly direction along an un-named road reserve which begins adjacent to Lot 37 on plan FT440. At the intersection of this un-named road reserve and the M Two Road, the proposed alignment veers from the road reserve and traverses Lot 47 on plan FT508 and Lot 50 FT508 until its proposed end point at the MLA boundary near Booral Road. The pipeline alignment within the MLA boundary and to the site of the proposed power generation facility has not yet been determined and will depend on finalisation of the mine layout. Option 1 is 28.76 km in length.

3.1.2 Option 2

Option 2 is similar to Option 1 and begins at the Peat Scotia Gas Line in the vicinity of Lot 22 on plan RP847424 and travels in a westerly direction until it intersects with Nathan Road. As with Option 1 the pipeline is to be preferably aligned with existing fence lines so as to minimise disruption to existing land use practices. From Nathan Road, this option is proposed to be located within the Number Four Road road reserve and travel in a north-westerly direction until meeting the north-easterly corner of Lot 88 on FT894. A turn to the south is then made and the alignment is located along the common boundaries of Lot 64 on FT516 and Lot 88 on FT894, Lot 62 on FT815 and Lot 77 on FT565, Lot 61 on FT515 and Lot 77 on FT565. A turn to the west is made with the alignment traversing the southern portion of Lot 77 FT565 to meet with Ezzys Road. The proposed alignment then utilises the road reserve of Ezzy's Road until it meets the Leichhardt Highway where it makes a turn in a southerly direction and continues to the intersection of the Leichhardt Highway and M Two Road. From this point, the alignment travels in a westerly direction following the M Two Road road reserve, until it meets the un-named road reserve, in the vicinity of Lot 47 on plan FT508. From here, the Option 2 alignment follows the alignment proposed for Option 1 until its end point at the MLA boundary near Booral Road. Option 2 is 32.47 km in length.

Figure 3-1



Source: Vegetation Communities and Regional Ecosystems of Queensland, Ver 5.0. Environmental Protection Agency 2006. Interactive Resource and Tenure Maps, Department of Natural Resources and Mines 2007. Essential habitat info sourced from the Environmental Protection Agency.

0 2 4 6 8 10
Kilometers

Proposed gas supply pipeline route options

PARSONS BRINCKERHOFF

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3.1.3 Option 3

The majority of Option 3 is proposed to be co-located along the future Surat Basin Rail line which diagonally traverses the study area in a north-south direction. Option 3 begins at the Peat Scotia Gas Line in the vicinity of Lot 22 on plan RP847424 and travels in a westerly direction until it meets the eastern edge of the proposed Surat Basin Rail route easement on Lot 6 FT801. Throughout the PL area, the pipeline is to be preferably aligned with existing fence lines so as to minimise disruption to existing land use practices. From this point, the pipeline is proposed to be aligned on the southern/eastern side of the Surat Basin Rail route easement until meeting the north-eastern boundary of the Wandoan Coal Project area. The following allotments will be traversed: Lot 48 on FT815, Lot 99 on FT815, Lot 41 FT603, Lot 40 FT329, Lot 22 FT746, Lot 2 RP170076, Lot 5 FT349, Lot 5 FT349, and Lot 160 FT990. Option 3 is the shortest pipeline option at 24.03 km in length.

4. Comparative assessment of options

This section provides a comparative assessment of pipeline route options according to performance criteria identified in Section 2. A ranking approach has been used. These rankings relate to the extent the option results meet performance criteria, taking into consideration level of impact and other aspects discussed in Section 2. The ranking system ranges from 1 (least impact or preferred option), represented by green colouring, to 3 (greatest impact or least preferred), indicated by red. It should be noted that more than one option can be awarded the same ranking should assessment against the performance criteria be equal or comparative. An assessment is made based on professional judgement if necessary as to whether any difference between options is significant for the purpose of this coding. An option with all 1's, or green colouring, is preferred over an option with one or more 3's (red colouring). Otherwise, for the purpose of this assessment the preferred option is generally the option with fewer rankings of 3.

Where a simple comparison of rankings for the options under consideration might be misleading because of the relative importance of the criteria being considered, an assessment has been made based on the professional judgement of relevant specialists and commentary provided on the assessment table. Table 4-1 shows the three options that have been comparatively assessed to determine the optimal pipeline route alignment. These tables are intended as a visual tool only, and a description of the assessment against each performance criteria is discussed in Section 4.1.

It should be noted that a pipeline corridor width of 50 m has been used in calculations prepared for Table 4-1. Whilst it is expected that the actual pipeline and access track will likely only have a construction footprint of 10 to 20 m width, designs are still in preliminary stages and it would be inappropriate to fix the width at this stage. Additionally, adopting a pipeline corridor width of 50 m will allow for realignment of the pipeline in some areas where additional environmental values may be observed on-the-ground as part of field studies conducted during the EIS. The calculations in Table 4-1 do not include any areas for stockpiling or layover of equipment. It is assumed that existing and suitable cleared areas will be found for this purpose during construction works. The only land requirement will be the area of any future easement which will only be known once the detailed design has been completed.

Table 4-1: Comparative assessment of options (for pipeline corridor width of 50 m)

Performance measure	Option 1	Option 2	Option 3
Properties			
Number of properties affected	2	2	2
Existing and proposed infrastructure			
Length of pipeline within existing and/or proposed infrastructure easements/tenures	3	3	1
Good quality agricultural land			
Area of good quality agricultural land traversed	1	2	3
Soil Conservation Plans			
No. of properties with approved Soil Conservation Plans which are traversed	3	3	1
Waterways			
Number of waterways to be crossed	1	1	3
Approximate area mapped of mapped regional ecosystems to be cleared			
Total area of all regional ecosystems along option alignment	1	3	2

4.1 Review of criteria

4.1.1 Number of properties affected

Table 4-2 outlines the number and area (ha) of privately owned properties which would be affected by each proposed pipeline alignment option. The area calculation is based on a potential corridor width of 50 m.

Table 4-2: Comparison properties affected across pipeline route options

Route option	Total number of properties affected	Total area of properties affected (ha)
Option 1	11	112
Option 2	10	105
Option 3	13	119

All identified pipeline options would affect a similar number of privately owned properties and there is little or no variation in this selection criterion across the study area. Therefore differentiation between the route options is deemed negligible in this regard.

In terms of this performance criteria all pipeline options are equally preferred.

4.1.2 Co-location of infrastructure

Table 4-3 outlines the length of the pipeline options which are proposed to be co-located with existing and/or proposed infrastructure within the study area namely local government and state controlled roads and the proposed Surat Basin Rail Line. Co-location of infrastructure is considered to be beneficial and to create opportunities on a regional scale for reducing or minimising potential impacts associated with provision of infrastructure.

Table 4-3: Comparison of pipeline lengths associated with existing and/or proposed infrastructure reserves or easements

Route option	Length of pipeline (km)	Length within road reserve (km)	Length adjacent to rail easement (km)	Total % existing infrastructure
Option 1	28.75	9.67	—	33.6%
Option 2	32.47	11.91	—	36.6%
Option 3	24.03	0.24	17.93	75.6%

Approximately one-third of the total length of pipeline Options 1 and 2 are located within existing road reserve areas whilst approximately three-quarters of the length of Option 3 is located within existing road reserves and adjacent to proposed infrastructure easements/tenures, predominantly the future Surat Basin Rail Line corridor. As mentioned in preceding sections, the study area contains a large amount of productive and intensive land uses as well as resource based land uses. Location of a pipeline across these land uses of resources may actually sterilise areas of land to these uses, thereby reducing production opportunity for local landowners. For this reason, those pipeline routes which have the greatest length within or immediately adjacent to existing or proposed infrastructure easements/tenures are expected to render the least potential for sterilisation of land use and therefore are preferred.

In terms of this performance measure, Option 3 is considered to be the preferred option.

4.1.3 Good quality agricultural land

All three options traverse land mapped as Class A and Class B good quality agricultural land (Table 4-4). Whilst all pipeline options are proposed to be constructed underground, an easement will be required over the pipeline and terms and conditions of the easement agreement may limit (in some cases) or restrict the land use activities which can be conducted within the easement area, thereby potentially affecting a landowner's use of the easement area and good quality agricultural land.

In terms of this criterion, Option 1 is preferred in that it traverses the least amount of good quality agricultural land.

Table 4-4: Comparison of good quality agricultural land potentially impacted by pipeline options

Route option	Total GQAL (ha)
Option 1	95.74
Option 2	111.36
Option 3	119.66

4.1.4 Properties subject to Soils Conservation Plans

Information provided by NRW indicates that 14 properties in the study area are subject to approved soil conservation plans approved under the *Soil Conservation Act, 1986*. Table 4-5 shows how these properties are affected by the proposed pipeline alignments.

Table 4-5: Comparison of properties subject to approved Soil Conservation Plans potentially impacted by pipeline options

Route option	Number of properties subject to Soils Conservation Plans traversed and adjacent
Option 1	5
Option 2	5
Option 3	2

Any pipeline construction or maintenance activities will need to recognise the existence of properties subject to Soil Conservation Plans and any associated implemented soil conservation works. This would include construction access along the final easement alignment and subsequent maintenance operations. If necessary, liaison with NRW officers will be undertaken during negotiations with landholders where soil conservation works exist or are proposed.

4.1.5 Number of waterway crossings

The waterways potentially impacted by the proposed pipeline development include (but are not limited to) Roche Creek, Stakeyard Creek, Juandah Creek and Weringa Creek. As detailed in Table 4-6, Options 1 and 2 traverse a similar and smaller number of watercourses across their total length whilst Option 3 traverses a greater number of watercourses along its total length.

In terms of this performance criteria Options 1 and 2 are equally preferred.

Table 4-6: Comparison of waterway and wetland crossings across pipeline route options

Route option	Total number of waterway crossings
Option 1	6
Option 2	7
Option 3	11

4.1.6 Approximate area of mapped Regional Ecosystems within pipeline corridor

Calculations prepared for this comparative assessment of options indicate that all three proposed pipeline alignment options will traverse or involve clearing of some mapped regional ecosystem areas, as shown in Table 4-7.

Initial ecological field assessments of the proposed pipeline alignments have not yet been conducted and therefore, potential inaccuracies in the regional ecosystem mapping may exist which have not yet been indentified. It is recommended that areas of mapped regional ecosystems are considered during the detailed assessment for the Wandoan Coal Project EIS, and where required, mitigation measures developed to minimise any impacts.

Table 4-7: Comparison of regional ecosystem areas to be crossed

Route option	Area of 'of concern – dominant' regional ecosystem (ha)	Area of 'of concern – subdominant' regional ecosystem (ha)	Total area of regional ecosystem areas to be crossed (ha)
Option 1	0	0.99	0.99
Option 2	2.42	1.91	4.33
Option 3	1.06	1.59	2.65

Note: 'endangered – dominant', 'endangered – subdominant', and 'not of concern' mapped regional ecosystems will not be affected by the proposed pipeline alignments and therefore, are not listed in the above table.

Option 1 has the potential to impact the least amount of mapped regional ecosystems within the pipeline corridor including the least amount of 'of concern – dominant' regional ecosystem type. Option 2 has the potential to impact the greatest amount of mapped regional ecosystem areas including the greatest amount of both 'of concern – dominant' and 'of concern – sub-dominant'. Option 3 will potentially affect a moderate amount of mapped regional ecosystem area.

Given that the calculations contained in Table 4-7 are based on a 50 m wide corridor, it may be possible to adjust the proposed pipeline alignment within the corridor to avoid both 'of-concern – dominant' and 'of concern sub-dominant' remnant vegetation and therefore, reduce any impacts associated with clearing of remnant vegetation. It is recommended that final positioning of the pipeline within the corridor be further investigated as part of the EIS being prepared for the Wandoan Coal Project and only be undertaken after field inspections have been conducted to ratify the accuracy of the regional ecosystem mapping.

Based on potential overall impact to mapped regional ecosystems Option 1 is the preferred alignment option followed by Option 3.

4.1.7 Indicative pipeline cost

For commercial in confidence reasons, an analysis of costs associated with the various pipeline options is not included within this assessment.

4.2 Conclusion

Three options were considered for analysis for a proposed pipeline route to supply the Wandoan Coal Project with a gas supply from the Peat-Scotia Gas Line, approximately 20 km to the north-east of the Wandoan Coal Project area. Of the options considered, Option 1 has the least impact to mapped regional ecosystems, least number of waterways to be crossed and affects the least amount of good quality agricultural land. Option 1 is the second longest pipeline option.

Option 2 is generally similar to Option 1 for a number of the selection criteria. Option 2 would potentially affect the greatest area of mapped regional ecosystems and is also the longest pipeline option. This option however, affects the least amount of private properties yet may potentially affect the second largest area of good quality agricultural land.

Option 3, which is proposed to be co-located with the proposed Surat Basin Rail Line, is the shortest pipeline option and may potentially affect the second largest area of regional ecosystems.

Co-location of infrastructure is considered to create opportunities to reduce associated impacts of these types of projects on a regional scale. For example, co-locating the proposed gas supply pipeline with the Surat Basin Rail Line will not impact on any additional landowners or properties within the study area, will not create any further land severance issues, will not affect any additional areas of good quality agricultural land, will create opportunity to centralise ancillary infrastructure such as access points and maintenance tracks and will reduce the potential impacts associated with construction such as interference with property accesses and traffic control and delays on local roads.

Based on the desk-top information reviewed, Options 1 and 3 resulted in favourable outcomes against the greatest number of performance measures. However, the opportunities and benefits created by co-location of infrastructure are considered to further support Option 3 over Option 1 and therefore Option 3 is recommended as the preferred option for the proposed Wandoan Coal Project gas supply pipeline. However, it should be noted that this recommendation is subject to:

- discussions with infrastructure providers (such as the Department of Main Roads, Queensland Rail, local councils, gas producers, electricity providers, and other easement holding parties)
- discussions and negotiations with landowners potentially affected by the proposed Project
- discussions and agreements associated with indigenous cultural heritage groups and
- clarification of any associated Native Title issues.

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