MAJOR PROJECT ASSESSMENT:
Liddell North-South Gas Pipeline Project
Liddell Power Station

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

June 2009

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EXECUTIVE SUMMARY

In February 2008, Macquarie Generation (the Proponent) submitted a Project Application to the Department of Planning and a preliminary environmental assessment for the construction and operation of a proposed coal seam methane gas pipeline along a north-south route in the Hunter Valley, NSW to provide a fuel source to the Liddell Power Station. This provided information about the Project and its potential environmental impacts to enable the Department to issue Director-General Requirements for a detailed Environmental Assessment under the provisions of Part 3A of the New South Wales *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Assessment for the Project was submitted to the Department in February 2009.

The Liddell North-South Gas Pipeline Project (the Project) comprises the construction and operation of a proposed 51kilometre long coal seam gas pipeline, which will effectively collect coal seam methane gas from mines within the Hunter Valley and deliver the gas to Liddell Power Station for use as boiler fuel. Ancillary facilities include a pig launching/receiving station, condensate drainage valves and mainline valves. A second proposed gas pipeline, referred to as the Liddell East-West Gas Pipeline, has also been submitted to the Department by the Proponent as a separate project application. Interactions between the two proposed pipelines have been considered. The combined total fuel saving for both the Liddell North-South gas pipeline and the Liddell East-West gas pipeline is approximately 5% of the current coal demand. Further, an estimated saving of up to 270,000 tonnes per year (or 5 million tonnes of CO_2 equivalent) of greenhouse gas emissions will result, as a combined total for the North-South and East-West Liddell Power Station Gas Pipeline projects.

The benefits of the Project, as detailed in the Environmental Assessment, are significant. Firstly, the Project will provide Hunter Valley coal mines with the means to dispose of coal seam gas, usually a waste stream. Secondly, the Project offsets greenhouse gas production in response to the NSW Greenhouse Gas Reduction Scheme (GGAS) obligations, and thirdly it reduces fuel demand in the Liddell Power Station. The Project represents an innovative use of coal seam gas in coal-fire boilers through this first large scale implementation of supplementary gas combustion in coal-fired boilers in Australia.

The project has a stated capital investment value of $16 million. A total of 15 construction jobs over a three to four month construction period and one fulltime equivalent job for operation and maintenance will be generated.

Assessment of the Project lies under the provisions of Part 3A of the EP&A Act as it is a Major Project, as defined under Schedule 1 of *State Environmental Planning Policy (Major Projects) 2005*, being "development for the purposes of a pipeline in respect of which a licence is required under the *Pipelines Act 1967*". A licence is required under section 11 of the *Pipelines Act 1967*. *State Environmental Planning Policy (Infrastructure) 2007* also applies to the Project due to the proposed changes in fuel at the Liddell Power Station (clause 34(3)). Amendments to the existing environment protection licence will be required.

The Minister for Planning is the approval authority for project approval requests under section 75J of the EP&A Act. On 4 March 2009, the Minister delegated her powers and functions under 75J of the EP&A Act to the Director-General in cases where:

a) there are fewer than 25 public submissions in respect of the project; and
b) the project application involves development that has a capital investment value of less than $50 million.

The subject approval request complies with the above criteria. Consequently, the Director-General may determine the project approval request under delegated authority.

Following public exhibition of the Project from 24 February 2009 to 25 March 2009, the Department received a total of eight submissions on the Project. Of these, two raised objection to particular elements of the proposed pipeline route and trenching work for waterway crossings. Two of the submissions indicated in principle support for the Project, whilst the remainder did not specifically state a position. Six of the submissions were received from public authorities being: NSW Department of Environment and Climate Change, NSW Department of Water and Energy, Hunter-Central Rivers Catchment Management Authority, NSW Department of Primary Industries, NSW Roads and Traffic Authority, and Muswellbrook Shire Council.

Key issues included the potential for environmental impacts related to flora and fauna, cultural heritage, hydrology, land use conflict and hazards and risks.

The Department assessed the Proponent's Environmental Assessment (February 2009), Submissions Report and Final Statement of Commitments (May 2009) and submissions received by public agencies and the community on the Project. Based on its assessment, the Department is satisfied that the Proponent has provided a robust and conservative assessment of impacts and that the impacts associated with the Project can be managed and mitigated to achieve acceptable environmental standards, so as to not preclude the orderly and economic development of surrounding land use.

On balance, the Department considers the Project to be justified and in the public's interest and should be approved subject to the Department's recommended conditions of approval and the Proponent's Final Statement of Commitments.

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1. BACKGROUND

1.1 Introduction

In February 2008, the Proponent, Macquarie Generation, submitted a Project Application to the Department of Planning and a preliminary environmental assessment for a proposed coal seam methane gas pipeline along a north-south corridor in the Hunter Valley, NSW to collect and transfer fuel to the Liddell Power Station. This provided information about the Project and its potential environmental impacts. The Department issued formal Director-General Requirements on 5 May 2008 for a detailed environmental assessment of the Project under the provisions of Part 3A of the New South Wales *Environmental Planning and Assessment Act 1979* (EP&A Act).

An Environmental Assessment was prepared by CDB Environment Pty Ltd (CDB) on behalf of the Proponent in November 2008. Following an adequacy review, the final Environmental Assessment Report was submitted to the Department in February 2009.

The Proponent is seeking Project Approval under Part 3A of the EP&A Act for construction and operation of the Liddell North-South Gas Pipeline Project (the Project) located in the Hunter Valley, NSW. A proposed Liddell East-West Gas Pipeline Project is currently being assessed by the Department under a separate Part 3A Project Application.

1.2 Project Background

Liddell Power Station was constructed in the early 1970's and is located adjacent to the New England Highway, between Singleton and Muswellbrook, NSW. Infrastructure at the power station has been progressively upgraded to improve performance. The power station produces electricity for markets ranging from South Australia to North Queensland.

A number of mining operations are located in the Hunter Valley, neighbouring the Liddell Power Station. An important safety measure undertaken at these mines before the commencement of mining activities and during the mining operation itself is the venting of large volumes of coal seam gas. The typical mixed quality, composition and quantity of coal seam gas can restrict its opportunity for use as a fuel in traditional technologies such as gas turbines or gas engines. The current management practice conducted by mines located in the Hunter Valley area, is disposal of the waste coal seam gas by venting or flaring into the atmosphere. According to the Australian Greenhouse Office, fugitive emissions from Australian black coal mines are estimated to constitute 3.1 per cent of Australia's net greenhouse emissions. To help reduce these emissions the Australian government is establishing the Carbon Pollution Reduction Scheme (due for release in 2010) which will contain obligations for the coal sector.

The purpose of the Project is to utilise coal seam gas of the neighbouring Hunter Valley coal mines in the Liddell Power Station. In line with principles of the NSW Greenhouse Gas Reduction Scheme and the proposed Commonwealth Carbon Pollution Reduction Scheme, the Proponent proposes an innovative alternative to management of coal seam gas, via construction of the pipeline. Coal seam gas piped to the power station would be directly injected into Liddell's coal–fired boilers. The enabling factor in the Project is the tolerance of Liddell's coal-fired boilers to gas inconsistency. The gas as a fuel supplement from a combination of the Liddell North-South and the Liddell East-West gas pipelines may displace up to 5% of the coal (by mass) required to generate a given amount of electricity. In addition, gas turbines at the Liddell Power Station could also be fuelled by the coal seam gas under certain circumstances.

1.3 Objectives

The Project objectives are to:

- Collect and transport coal seam gas as a fuel to supplement coal-fired electricity generation at Liddell Power Station and thereby reduce the fuel demand of the power station
- Provide nearby Hunter Valley coal mines with the means to dispose of coal seam gas, to the extent of up to 270,000 tonnes per year (or 5 million tonnes carbon dioxide [CO_2] equivalent) as a combined figure for both the Liddell North-South and the Liddell East-West gas pipelines
- Reduce the greenhouse gas emissions that result from the flaring of coal seam gas, in response to NSW Greenhouse Gas Reduction Scheme (GGAS) obligations; and
- Provide an example of innovative use of coal seam gas in coal-fire boilers through this first large scale implementation of supplementary gas combustion in coal-fired boilers in Australia.

1.4 Existing Site

The proposed Liddell North-South pipeline is approximately 51 kilometres (km) in length and the pipeline corridor is 50m wide (refer to Figure 1). The Project is located in the Singleton and Muswellbrook Local Government Areas.

The starting point of the corridor, at the Bulga Mine site, is located approximately 51km south of the Liddell Power Station; 12km southwest of Singleton and 1km north of Broke (refer to Figure 1). The pipeline will terminate at the Liddell Power Station, located on the New England Highway, south of Muswellbrook. This end point has been assessed in the Environmental Assessment. An alternative termination point is at the proposed Liddell East-West coal seal pipeline corridor (which is being assessed by the Department under a separate Project Application (07_0028)) that also connects to the Liddell Power Station.

The selected proposed north-south pipeline corridor traverses approximately 58 separate allotments comprising previously disturbed land including coal mines and agricultural land that is owned publicly, privately or by Macquarie Generation. According to land ownership details provided in the Environmental Assessment, the corridor also includes the following key features as illustrated in Figure 1:

- the proposed pipeline commences at the Bulga Mine area
- crosses Charlton Road
- crosses Wollombi Brook
- intersects with Putty Road
- passes the township of Bulga and continues parallel with rural property boundaries and Wollombi Brook, entering the Wambo Mining Area
- crosses the Wambo and Wambo North Creeks
- intersects with the Golden Highway and runs within this highway easement for approximately 10km
- crosses the Hunter River
- runs in cleared agricultural land parallel to the Hunter River before entering Macquarie Generation owned land
- crosses Parnells Creek and continues parallel to the existing road access and infrastructure corridors before meeting the New England Highway; and
- crosses under the New England Highway and terminates at the Liddell Power Station.

According to the Environmental Assessment, selection of the proposed pipeline corridor has been conducted to avoid areas of high ecological significance, such as the Warkworth Sands Woodlands area, cultural heritage and existing or potential mining activities. Use has been made of existing roads, property access roads cleared property boundaries and fence lines where possible.

1.5 Surrounding Land Use

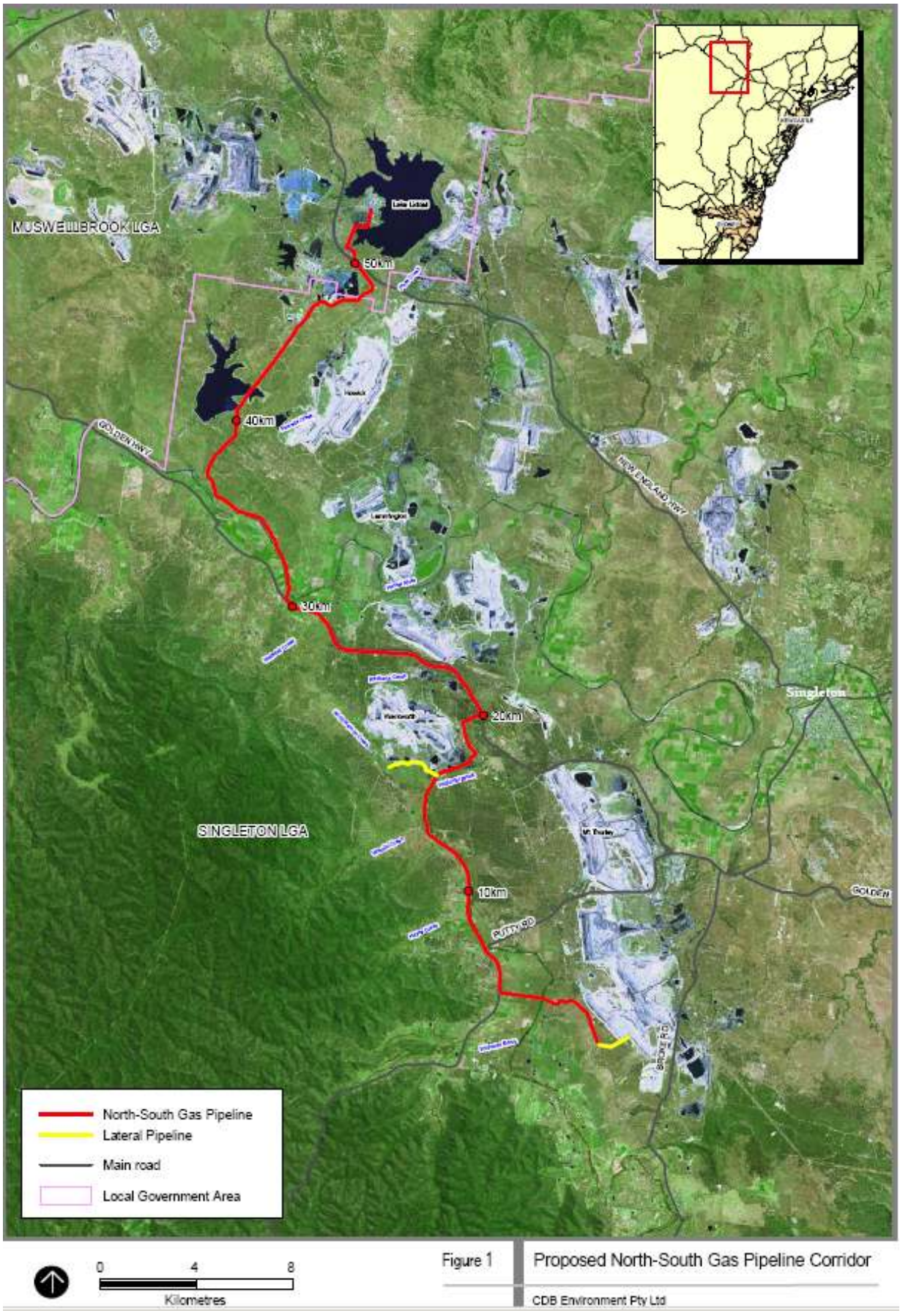
The proposed pipeline corridor is located within a rural landscape and is generally surrounded by a range of rural-based land uses including farmland and agricultural land, mining operations and mining-related industries such as road and rail transport. According to the Environmental Assessment, the route has been selected to reduce potential land use conflicts.

Significant surrounding land uses include Wollemi National Park (west), Yengo National Park (southwest) and Pokolbin State Forest (south). The proposed corridor also traverses the Hunter River valley floor which comprises mostly green pastures.

The nearest sensitive receivers to the site are located within 200m of the proposed pipeline corridor and include rural residential properties. For the purposes of the Environmental Assessment, a 50 metre wide pipeline assessment corridor was identified. According to information provided in the Environmental Assessment:

- no residences are located within the 50 metre pipeline assessment corridor
- 30 residences are located adjacent to cadastral boundaries traversed by the pipeline assessment corridor
- 12 residences are located between 50 to 100 metres away (most within the township of Bulga); and
- the remainder are located greater then 100 metres from the pipeline assessment corridor.

Figure 1 – Proposed North-South Gas Pipeline Corridor (CDB, Feb 2009)



2. PROPOSED DEVELOPMENT

2.1 Project Description

The Proponent is proposing to establish a low pressure coal seam gas pipeline to collect and supply gas fuel to supplement coal-fired electricity generation at Liddell Power Station (refer to Figure 1). The pipe material is anticipated to be polyurethane or fibreglass. The pipeline is proposed to be buried to a minimum of 750mm below the ground surface, and to be a maximum 500mm in diameter and have a maximum allowable operating pressure (MAOP) of 1050 kilopascals.

The pipeline may need to consist of two separate pipes to address specific mining processes and the separation of pre-mining gas drainage from post-mining gas drainage. Provision will be made to allow the pipeline to be 'looped' to provide extra capacity if required. The expected construction duration of the Project is anticipated to be over a period of five months.

The project has a stated capital investment value of $16 million. A total of 15 construction jobs will be generated over three to four months of the construction period. One fulltime equivalent job for operation and maintenance will be generated, comprising several part-time service providers.

Construction activity will be confined to the 50 metre wide pipeline corridor and adjoining land where access is available for construction purposes. A construction right-of-way (ROW) of approximately 20 metres width plus temporary work space will be required to be established within the 50m wide corridor. Where possible, the high disturbance zone will be kept to a 10m to 12m width for trenching, brush and spoil storage and vehicle movement. Temporary extra work space will be required at watercourse and road crossings and will be leased for the duration of the construction phases of the Project.

Standard pipeline construction methods will be applied to the Project and compliance will be made with all relevant codes and standards, including Australian Standard 2885. Construction of the pipeline will be undertaken progressively along the corridor starting with clearing the right-of-way (ROW), trenching, pipeline joining and installing the pipeline, backfilling and then rehabilitating the right of way (ROW) upon completion.

Table 1 provides a summary of the project description. Detailed engineering and final commercial negotiations are still to be conducted.

Table 1 - Project Description Summary

Project	**Gas Supply Pipeline Liddell Power Station**	
Pipeline features	Approximate pipeline length Pipeline assessment corridor Approximate construction ROW width Maximum pipe diameter Pipeline material Mainline valves (approx. number) Condensate drainage valves Pig launching/receiving stations Compressor stations	51 km 50 m 20 m 500 mm polyethylene or fibreglass Two (estimate) 2 Three (estimate) 3 One (estimate) 1 None (0)
Construction	Installation of a 51 km polyethylene or fibreglass gas pipeline.	
Ancillary works	Gas collection infrastructure associated with supply of coal seam gas to the proposed pipeline will be the responsibility of the individual coal mines.	
Operation	The pipeline shall form part of the Liddell Power Station operation. The pipeline shall be in operation 24 hours per day, 7 days per week.	
Location	Hunter Valley, NSW (Refer to Figure 1).	
Time Frame	Construction completed over three to four months. Operation of the pipeline shall occur	

	whilst there is an available supply of gas, anticipated to be at least 30 years in the foreseeable future. Other commercial sources of gas may arise in that time frame.

A range of temporary construction worksites may be required including a construction site office, equipment storage areas, temporary pipeline storage and HDD pipe string fabrication. The exact nature of such facilities will be determined by the construction contractor during the detailed design stage.

Waterway Crossings

The proposed pipeline will cross two major watercourse being Wollombi Brook and the Hunter River, as shown in Figure 2. These crossings are proposed to be constructed by horizontal directional drilling (HDD), involving boring beneath the invert of the river from bank to bank. All other waterway crossing are proposed to be constructed by open trenching techniques.

Road Crossings

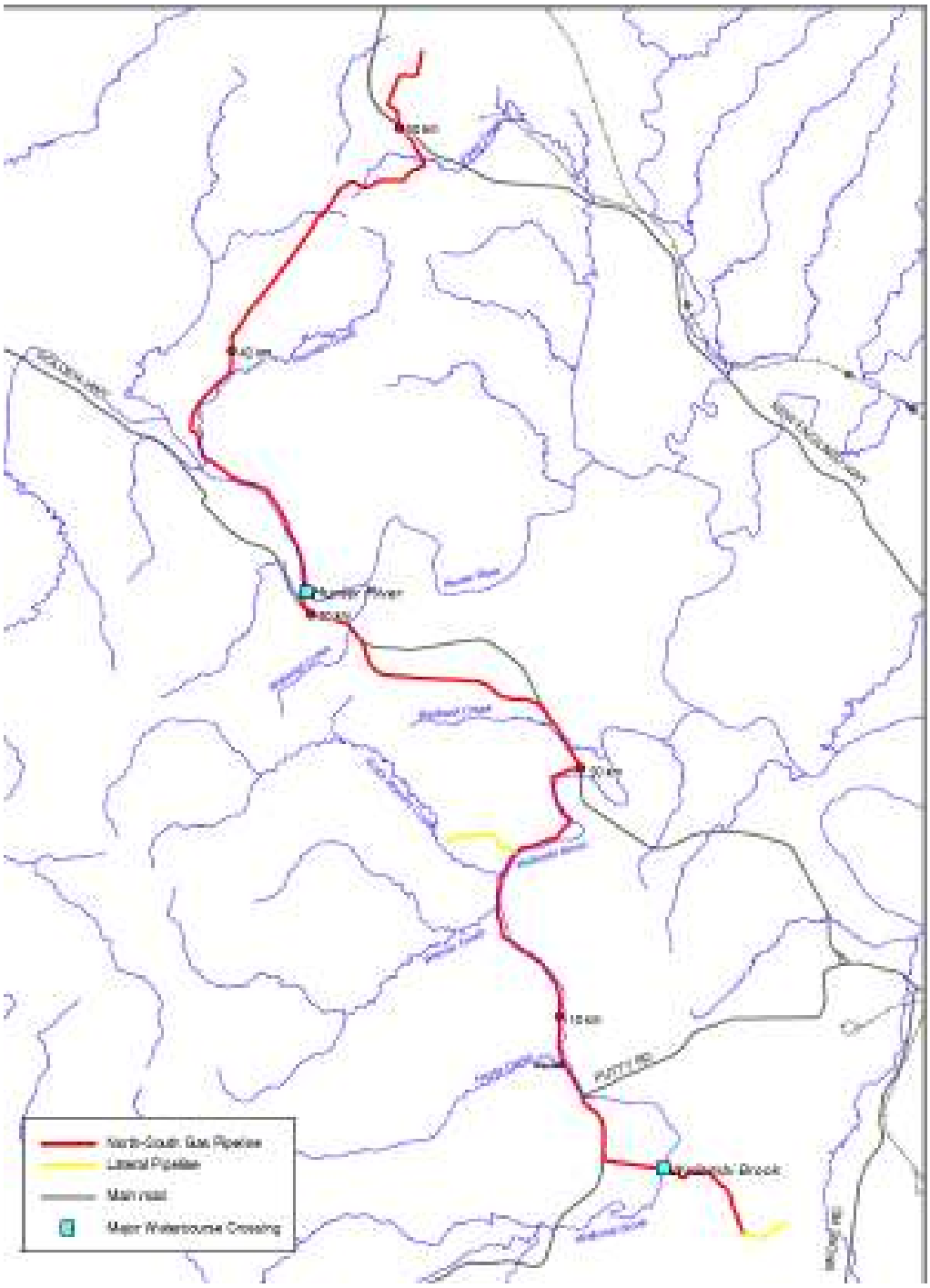
The main sealed roads proposed to be crossed by the pipeline are Charlton Road, Putty Road, Golden Highway and New England Highway. It is proposed that boring below these sealed bitumen roads will be conducted. Crossings of unsealed roads and tracks will be constructed by open cut techniques and compacted during backfilling to required standards. Public road crossings will be subject to approval by the local shire Council or NSW Roads and Traffic Authority. Crossings of private roads, tracks and mine roads will be subject to agreement with land owners, such as mining companies in the case of mine roads.

2.2 Ancillary Facilities

Ancillary facilities required to be installed for operation of the pipeline include, but are not limited to, the following:

- New gas regulating stations at both ends of the pipeline
- intermediate isolation valve stations with local bypass and venting if required, monitoring points and condensate drains
- pipeline marker posts; and
- remote control systems within the Liddell Power Station.

Figure 2 - Location of proposed Wollombi Brook and Hunter River crossings



2.3 Sources of Gas

The proposed pipeline will be accessible to multiple coal mines along its route including Xstrata, Peabody and Rio Tinto, pending gas procurement negotiations with the Proponent. The coal seam gas delivered to Liddell Power Station will be a blend of gases drawn from underground mines along the route. Each mine source will contribute variable raw gas composition and volume over time. Humidity at source will be 100% and there will be some dust. The water and dust will be substantially reduced in the compression and transport stages.

Modelling by the Proponent indicates the following mid-range coal seam gas composition by volume will be delivered to Liddell Power Station:

- Methane (CH_4) 75%
- Carbon dioxide (CO_2) 2%
- Oxygen (O_2) 1.5%
- Nitrogen (N_2) 21.5%
- Sulphur trace

Hunter Valley Gas Turbine

The Hunter Valley Gas Turbine (HVGT) provides power to a number of minor buildings and equipment within the Liddell Power Station and is at present fuelled using distillate. There is the potential to use gas from the Project to run the HVGT plant to produce electricity, which would be in accordance with the existing environment protection licence EPL 2122 conditions (as detailed in Section 3 below).

2.4 Environmental Protection Licence

Liddell Power Station has an existing environment protection licence (EPL, Number 2122) that allows for coal works, electricity generating works and waste facilities – HIGAB processing. The licence conditions will be reviewed as a result of operational changes when the proposed pipeline commences, as follows:

- Emission Limits: Substitution of boiler fuel from solid coal to gaseous methane will directly reduce boiler emissions to air and land. Boiler emissions must not exceed the site EPL limits of 600ppm SO_2, 700ppm for NO_2 and 20% for opacity (smoke) as measured in the flue gas exit paths of each boiler

- Ash and dust: Substitution of methane at 5% of the coal feed rate may reduce disposal of ash and dust by-products by some 10,000 tonnes per annum

- Sulphur: Only trace amounts of sulphur are expected in coal seam gas, which, due to fuel substitution, will reduce oxides of sulphur formed during combustion; and

- Nitrogen: The Nitrogen level within the coal seam gas (21.5%) is much lower than in air (78%) as such, use of the gas fuel should assist in lowering overall emission of oxides of nitrogen following combustion through dilution and changes to flame propagation.

Prior to commencement of the Project, a request to vary EPL 2122 will be submitted to the Department of Environment and Climate Change (DECC) to include the handling and burning of coal seam gas at the Liddell Power Station. The amended EPL will establish emission limits and reporting requirements for ongoing use of coal seam gas at the Liddell Power Station.

2.5 Project Need

A stated project objective is to provide Hunter Valley coal mines with the means to dispose of coal seam gas, to the extent of up to 270,000 tonnes per year (or 5 million tonnes of CO_2 equivalent) as a combined figure for both the Liddell North-South and the Liddell East-West gas pipelines. This would reduce the greenhouse impacts of both the coal mining process and electricity generation. The Project provides an opportunity to offset greenhouse gas production in response to NSW Greenhouse Gas Abatement Scheme (GGAS) obligations. The Project also will provide an example of innovative use of coal seam gas in coal-fired boilers and is the first of its kind in Australia.

Alternative project options were presented in the Environmental Assessment, including the "do nothing" option. This would result in the continued practise of venting or flaring coal seam gas to atmosphere or using the gas on site, at each mine site where it is generated. However assessment of these alternatives indicates a strong incentive for the Project as the most viable option, with optimal greenhouse gas reduction benefits.

3. STATUTORY CONTEXT

3.1 Major Project

The Project is declared to be a Major Project under *State Environmental Planning Policy (Major Projects) 2005* because it is a development for the purposes of a pipeline that requires a licence under the *Pipelines Act 1967*, as stated in clause 26A of Schedule 1. The Project is therefore subject to Part 3A of the EP&A Act and the Minister for Planning is the approval authority.

A licence is required under section 11 of the *Pipelines Act 1967* for a person to construct or operate a 'pipeline' unless the person falls within section 5 of that Act. Section 5 contains various categories of excluded pipelines including a pipeline constructed by a 'public authority', being only those public authorities listed in the definition in section 3 or 'anybody declared by the Minister, by order published in the Gazette'. As the Proponent (Macquarie Generation) is not listed as a public authority under the *Pipelines Act 1967* nor has it been published in the Government Gazette to be a public authority under that Act, the Proponent will be required by the *Pipelines Act 1967* to obtain a pipeline licence and that requirement means that the Project falls within the 'Major Projects' developments under clause 26A of schedule 1 of the SEPP (Major Projects) 2005 with the result that Part 3A applies.

3.2 Permissibility

The Project falls within the boundaries of Singleton Shire and Muswellbrook Shire Local Government Areas (LGA)

The majority of the proposed pipeline is located within the Singleton LGA (approximately 48km) and traverses land zoned 1(a) (Rural Zone) under the *Singleton Local Environmental Plan 1996* (Singleton LEP). The Rural Zoning Table under Part 3 Rural Development of the Singleton LEP lists developments that are permissible without consent in Clause 2 and developments other than those included within Clause 4 that are permissible with consent. The types of development considered prohibited within the zone are listed and do not apply to the proposed pipeline Project. The Project is permissible with consent under this zoning.

A small proportion of the proposed pipeline is located within the Muswellbrook LGA (approximately 3km) and traverses land zoned Special Purpose Zones SP2 (Infrastructure) under the *Draft Muswellbrook Local Environmental Plan 2008* (Muswellbrook LEP). According to the Muswellbrook LEP Part 2 Land Use Table, the Project is permissible under this zoning.

Under the provisions of Singleton LEP and draft Muswellbrook LEP the proposed pipeline does not fall under any of the definitions as a prohibited development and is therefore considered permissible within the zone with development consent.

3.3 Environmental Planning Instruments

In addition, *State Environmental Planning Policy (Infrastructure) 2007* will apply to the Project because it is an infrastructure development that includes Electricity Generating Works and Gas Pipelines. Clause 53 in *SEPP (Infrastructure) 2007* states that development for the purpose of a gas pipeline may be carried out by any person without consent on any land if the pipeline is subject to a licence under the *Pipelines Act 1967.* However, in the case of an inconsistency, SEPP (Major Projects) 2005 applies.

Liddell Power Station has an existing environment protection licence (EPL Number 2122) that is next due for review in May 2012. The licence allows for coal works, electricity generating works and waste facilities – HIGAB processing. EPL 2122 requires that an Annual Return, comprising a Statement of Compliance and a summary of monitoring required by the licence be submitted to DECC.

The coal seam gas to be supplied to the Liddell Power Station is argued to be a 'Standard' fuel under the *Protection of the Environmental Operations (Clean Air) Regulation 2000*, Part 4 Division 1 Clause 20, rather than

an "alternate" fuel. Following discussions with DECC, the Proponent proposes to submit a request to vary EPL 2122 to include the handling and burning of coal seam gas fuel at the Liddell Power Station. Once amendments to the licence are finalised, the emission limits and reporting requirements of the licence are considered suitable for ongoing monitoring of the use of the coal seam gas at the site.

Any potential use of the HVGT (refer to Section 2.1 above) would require compliance with the site EPL 2122 condition A3.1 which lists the operation of the gas turbine plant as an activity undertaken on site. Emissions are not required to be monitored; however, the plant must comply with the *Protection of the Environment (Clean Air) Regulation 2000* emission limit of 2500mg/m^3 for NO_2. Current emission levels are approximately 350 mg/m^3 with lower levels likely from coal seam gas fuel.

The proposed development is consistent with the objectives of the following additional environmental planning instruments (EPIs):

- Lower Hunter Regional Strategy 2006
- Hunter Regional Environment Plan 1989

No other EPIs apply to the Project.

3.4 Minister's Approval Power and Delegation

The Proponent submitted an Environmental Assessment with the Director-General in February 2009, following an adequacy review of the original Environmental Assessment in November 2008. Pursuant to Section 75H and 75I(2)(g) of the EP&A Act, the Director-General was satisfied that the Environmental Assessment had addressed the Director-General Requirements for the construction and operation of a coal seam methane gas pipeline (north-south route) to the Liddell Power Station dated 5 May 2008. A copy of the Environmental Assessment is attached (see Appendix D).

The Environmental Assessment was placed on public exhibition from Tuesday 24 February 2009 until Wednesday 25 March 2009 at the following locations during business hours:

- Department of Planning, Information Centre, Sydney
- Nature Conservation Council of NSW, Sydney
- Singleton Council, Administration Centre; and
- Muswellbrook Shire Council.

The Environmental Assessment was also made publicly available on the Department's website. Submissions were invited in accordance with Section 75H of the EP&A Act.

Following the exhibition period, the Director-General directed the Proponent to respond to the issues raised in submissions. As the Project will require a variation of the existing Liddell Power Station EPL under the *Protection of the Environment Operations (Clean Air) Regulation 2000*, a copy of the submissions were also provided to DECC, pursuant to Section 75GH of the Act. The Submissions Report (see Appendix C) prepared by the Proponent in May 2009 was subsequently made publicly available on the Department's website.

The Minister for Planning is the approval authority for project approval requests under section 75J of the EP&A Act. On 4 March 2009, the Minister delegated her powers and functions under 75J of the EP&A Act to the Director-General in cases where:

c) there are fewer than 25 public submissions in respect of the project; and
d) the project application involves development that has a capital investment value of less than $50 million.

The subject approval request complies with the above criteria. Consequently, the Director-General may determine the project approval request under delegated authority.

3.5 Nature of the Recommended Approval

The Proponent is seeking full Project Approval under Part 3A of the EP&A Act for construction and operation of the proposed north-south low pressure coal seam gas pipeline in the Hunter Valley, NSW.

The Department is satisfied that the environmental investigations and assessment undertaken by the Proponent demonstrates that the Project would be within acceptable environmental limits. In particular, amendment of the selected pipeline corridor has considered and avoided areas of high ecological significance, cultural heritage and existing or potential mining activities and use has been made of existing roads, property access roads and cleared areas.

Consequently, the Department recommends project approval for the Project, subject to conditions.

An instrument of project approval has been created, establishing stringent environmental standards, mitigation measures, environmental controls and monitoring requirements that the Proponent must meet during the construction and operation of the coal seam gas pipeline.

4. CONSULTATION AND ISSUES RAISED

4.1 Public Submissions

The Department received a total of eight public submissions on the Project. Of these, two raised objection to the Project, specifically to particular elements of the proposed pipeline route, two indicated in principle support, whilst the remainder did not specifically state a position. Six of the submissions were received from public authorities and the remaining two from private interests. The key issues identified in public submissions are summarised in Table 2.

Table 2: Issues Raised by Public Submissions

Issue		Number of submissions
Wastewater	• provision of drainage points along the pipeline to drain residual and contaminated water • the identification and protection of wastewater disposal methods	1
Hydrology	• Bed stability of Wollombi Brook of concern due to fragile sand-based system • Necessary to protect banks before and after trenching and restore bed of the stream to the same level and condition, leaving no depressions post trenching • Watercourse crossings of Hunter River and Wollombi Brook are on potentially geomorphically unstable points. Unacceptable risk of destabilisation of sand infill channels by trenching therefore alternate installation method required limited to horizontal directional drilling beneath beds • Condition of approval should require extra detail on waterway crossings.	3
Traffic	• maintenance to affected roads • retention of adequate widths of road reserve for future road widening • approval as per *Roads Act 1993* required from the NSW RTA.	2
Flora and Fauna	• The pipeline should not cross any land with Conservation Agreements in place, including any Voluntary Conservation Agreements and covenants for converted Crown Land • Apply an offset to compensate for native vegetation loss • Apply an Environmental Outcomes Assessment Methodology used by the CMA to assess impact of clearing vegetation • Confirm if widening of access tracks is part of the Part 3A assessment. If not, seek any approvals required by *Native Vegetation Act 2003* for clearing for this activity • Restoration of disturbed areas should use indigenous native vegetation and tubestock, instead of seed and fertiliser • Weed management plan required at all stages of the project. The weed *serrated tussock* is of particular concern. Consult with local Council regarding weed management and controls • Clearing of 1.59 hectares of native vegetation will reduce available habitat for threatened species. Mitigation measures are considered insufficient to offset this loss.	3
Aboriginal heritage	• Cultural heritage survey is incomplete and provides insufficient data. Surface facilities and access points not assessed, poor quality maps and inconsistent number of sites are reported. Exact number and status of each site should be confirmed • Recommend Proponent accurately records and maps all sites as the Project proceeds • Insufficient consultation with Aboriginal stakeholders conducted.	1

Land use	• High value agricultural land including land containing centre pivot irrigation system may be impacted by Project. Consultation and agreement with land owners required • Primary access routes to agricultural farms should remain open during construction or alternate access provided • Impact on farm security, safety and livestock impact • Construction may prevent or delay sowing of crops and may involve compensation for opportunity loss to land owners • Potential impact from blasting if pipeline is near open cut operations • Determine any impact on sand extraction operation near southern end • Unacceptable pipeline route through private land rendering it useless for three months. Alternative route suggested by land owner.	2
Planning & consultation	• Licence under the *Pipelines Act* required to be issued by DWE • Consultation with DPI was not completed • Consultation with agricultural land owners required • Insufficient community consultation with land owners.	4
Hazards and Safety	• Measures to protect the installation from industry blasting • Operation and integrity of the pipeline may be adversely affected by blasting and mine subsidence near the United Collieries Mine and Bulga and Beltana Mines. Management plans required • The pipeline design and construction should withstand maximum predicted subsidence and blasting impacts by each mining operation.	2

4.2 Issues Raised in Submissions from Public Authorities

Six submissions were received from public authorities being: the NSW Department of Environment and Climate Change, NSW Department of Water and Energy, Hunter-Central Rivers Catchment Management Authority, NSW Department of Primary Industries, NSW Roads and Traffic Authority, and Muswellbrook Shire Council. The Department of Water and Energy stated that trenching techniques for installation of the pipeline is unacceptable at the two major river crossings due to the risk of destabilisation of the sand infill channels.

The following summarises the issues that were raised in submissions from public authorities.

Department of Primary Industries (Minerals and Agriculture Divisions)

- Mitigation measures for waterway crossings required to minimise impact on Hunter River and Wollombi Brook. Horizontal directional drilling (HDD) is proposed unless specific geological features necessitate open trenching
- Incomplete consultation was conducted with DPI as request for DGRs was not received. Future consultation requested
- Weed management issues raised including the requirement to develop mitigation and control measures through consultation with Council for specific weed species along the route
- Potential impact on farms may include:
  - pipeline corridor is in close proximity to agricultural land including high value land containing centre pivot irrigation system. Consultation and agreement with land owners is required
  - impact on farm security, safety & livestock impact
  - construction may prevent or delay sowing of crops & may involve compensation for opportunity loss to land owners.
- Potential impact on coal resources: the pipeline corridor includes several coal titles and known coal resources. Significant consideration should be given in the design specifications near any open cut operations which use blasting techniques. Consultation with relevant titleholders, DPI and the Mine Subsidence Board on design parameters should be conducted
- Consultation required to determine any impact on sand extractive operation at southern end of pipeline (located off the Putty Road) and whether sterilisation of this resource is an issue.

Department of Environment and Climate Change (DECC)

- Clearing of 1.59 hectares of native vegetation will reduce available habitat for threatened species, particularly tree-dwellers and less mobile species
- Proposed mitigation measures considered insufficient to offset this loss of threatened species habitat. Recommend that the Proponent provide adequate offset areas consistent with DECC's *Principles for the use of biodiversity offsets in NSW* (DECC 2008)
- Identified potential habitat for the Pine Donkey Orchid & species recorded within 6km of the Project area. Surveys conducted for the EA were in the wrong season for this species, therefore wasn't detected
- Aboriginal cultural survey in the EA is incomplete and reports inconsistent number of Aboriginal sites. Maps are of poor quality and data provided is insufficient. Exact number and status of each site to be confirmed;
- Recommended condition of approval is for the Proponent to accurately record and map all Aboriginal sites as Project proceeds
- The EA has only considered the proposed pipeline route, not the broader project footprint including surface infrastructure and access points. The assessment is therefore considered incomplete and additional Project mapping is required.
- Insufficient consultation with Aboriginal stakeholders conducted.

Department of Water and Energy (DWE)

- The pipeline crossings of Hunter River and Wollombi Brook are on potentially geomorphically unstable points. Unacceptable risk of destabilisation of sand infill channels. Therefore, alternate installation method required such as directional boring beneath the mobile infill sand bed of the two rivers
- Condition of approval should require further detail on river crossings including
  - geomorphic justification of crossing points
  - controls on river bed and banks
  - thalweg and inflexion points
  - vegetation type and extent of cover; and
  - protection controls during and after pipeline installation.
- Licence under the *Pipelines Act* required to be issued by DWE.

Roads and Traffic Authority (RTA)

- No issues raised
- Detailed plans for approval should include the need to obtain approval from the RTA as per the *Roads Act 1993*.

Hunter-Central Rivers Catchment Management Authority

- The Proponent should ensure the pipeline does not cross any land with Conservation Agreements in place, including any Voluntary Conservation Agreements and covenants for converted Crown Land
- For the proposed clearing of native vegetation, the following issues are raised:
  - Apply an offset to compensate for native vegetation loss from proposed clearing activities by applying the *Native Vegetation Act 2003*, although this Act does not apply under this Part 3A assessment
  - Apply an Environmental Outcomes Assessment Methodology used by the CMA to assess impact of clearing
  - Confirm if widening of access tracks is part of the Part 3A assessment. If not, seek any approvals required by *Native Vegetation Act 2003* for clearing for this activity
  - Restore disturbed areas using indigenous native vegetation & tubestock, not seed & fertiliser.
- Weed management plan required at all stages of the project. The weed *serrated tussock* is of particular concern being a level 3 noxious weed and a Weed of National Significance
- Bed stability of Wollombi Brook of concern due to fragile sand-based system. It is necessary to protect the banks before and after trenching and restore bed of the stream to the same level and condition, leaving no depressions post trenching.

Muswellbrook Shire Council

The project is supported subject to the following issues being resolved:

- The provision of appropriate drainage points along the pipeline to provide a satisfactory means to drain residual and contaminated water
- The identification of waste water disposal methods
- Appropriate measures being in place to protect the installation from industry blasting
- Satisfactory maintenance to the affected road corridors
- The retention of adequate widths of road reserve for future road widening.

4.3 Issues Raised in Submissions from Private Interests

Two submissions were received from private interests: Xstrata Coal and a land owner. The following summarises the issues that were raised in submissions from private interests.

Xstrata Coal

- The operation and integrity of the proposed pipeline could be adversely affected by blasting and mine subsidence in the area of the United Collieries Mine and Bulga and Beltana Mines
- The Proponent should ensure the pipeline is designed and constructed to withstand maximum predicted subsidence and blasting impacts specific to each mining operation
- The Proponent should prepare an on-going operations management plan for the pipeline for each Xstrata operation affected to the satisfaction of Xstrata.

Private land owner

- Suggest pipeline corridor along road easement on Coal and Allied land instead of their private property to give access to WarkWorth Mine's gas and reduce impact on residents. Recommend using land adjacent to Wallaby Scrub Road for life of the Project
- Insufficient community consultation
- Unacceptable use of respondent's land as pipeline runs through paddock rendering it unusable for three months and preventing access to owner's pump on Wollombi Brook.

4.4 Submissions Report

Upon review of the submissions received, the Department directed the Proponent to prepare a Submissions Report. The Submissions Report was received by the Department on 8 May 2009 and did not include any additional environmental assessments. The Proponent's response to the submissions did not lead to any changes to the Project and as such a Preferred Project Report was not prepared.

The Submissions Report (including finalised Statement of Commitments) was made publicly available on the Department's website.

4.5 Department's Consideration

The Department's consideration of issues raised in public and agency submissions is summarised in Table 3.

Table 3: Department's consideration of issues raised in Submissions

Issue	Department's Consideration
Flora and Fauna	Refer to Section 5.1
Cultural Heritage	Refer to Section 5.2
Hydrology	Refer to Section 5.3
Land Use	Refer to Section 5.4
Hazards and Risk	Refer to Section 5.5
Traffic	Traffic impacts detailed in the Environmental Assessment would occur primarily

	during the construction period due to use of roads for haulage and construction of road crossings, both of which are temporary in nature. Horizontal boring is proposed to be used under sealed roads to minimise disruption and prevent degradation of road surface integrity. Furthermore, any such damage would be repaired by the Proponent to the satisfaction of the NSW RTA or Council. Short-term road closures during trenching of minor roads would be conducted in accordance with the NSW RTA Traffic Commanders' authority. Proposed mitigation measures are considered adequate to minimise traffic impact. The submission from Muswellbrook Shire Council stated the requirement for satisfactory maintenance of affected road corridors and the retention of adequate widths of road reserves for future road widening. This will be achieved as all crossings of public roads will be subject to approval by either the local shire council or NSW RTA, as stated in the Submissions Report. The RTA submission did not raise any issues. Approval of detailed plans from the RTA will be required as per the *Roads Act 1993*.
Noise and Vibration	Potential sources of construction noise identified in the Environmental Assessment include the use of vehicles, under-boring and trenching machinery and earth-moving machinery. However, noise impacts are not expected to be significant given that no sensitive receptors (ie residents) are located within the 50 metre pipeline corridor easement and the short-term nature of proposed work. Proposed mitigation measures are considered sufficient during construction works. Operational noise impacts are considered to be insignificant under normal operating conditions.
Sedimentation and erosion	Soil issues and slope instability are expected to be adequately managed through the implementation of mitigation measures including sedimentation and erosion controls at all work areas. These controls would be implemented prior to the commencement of construction. Furthermore, engineering designs would address potentially vulnerable sections of the proposed pipeline corridor.
Greenhouse Gas	The Proponent's assessment has demonstrated that the greenhouse gas impacts associated with construction and operation of the pipeline would be limited to vehicle emissions, venting of natural gas during pipeline purging on commissioning, emergency venting and fugitive emissions of methane. The Department considers these emissions will be minor in comparison to the net reduction in greenhouse gas emissions that will result from the project. The Project will provide nearby Hunter Valley coal mines with the means to dispose of coal seam gas, to the extent of up to 270,000 tonnes per year (or 5 million tonnes carbon dioxide [CO_2] equivalent) as a combined figure for both the Liddell North-South and the Liddell East-West gas pipelines by inclusion of coal seam gas in the power station boiler as well as providing an alternative to the practise of coal seam gas venting to atmosphere. The Project therefore has the potential to reduce greenhouse gas emissions.
Section 94 contributions	The Proposal has the potential to increase the demand for local infrastructure and services during the construction period, with respect to the local road network (construction related haulage). The project approval and the recommended conditions of approval include requirements for the Proponent to bear the cost of any damage that may result to the local road network from the traffic and transportation impacts of the proposal. Furthermore, the Proponent will be required to enter into an agreement with Councils (including appropriate fee arrangements) to enable ongoing maintenance of the pipeline. The Department is satisfied that these requirements will ensure that the Proponent bears full responsibility for any increase in demand to local infrastructure and services associated with the project, such as to not warrant additional Section 94 contribution levies in this regard.
Licensing	The proposal will require amendment to the existing EPL 2122 held by Liddell Power Station for the handling and burning of coal seam gas fuel at the site. The

	Department considers other approvals and consultation requirements are as detailed in the Environmental Assessment.
Waste management	The Department is satisfied that these matters have been adequately addressed in the Proponent's Submissions Report and / or Finalised Statement of Commitments and have been included in the Conditions where relevant
Onsite water management (including water re-use initiatives, wastewater management and sewage disposal)	
Air quality	
Visual amenity	
Socio-economic	

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

After consideration of the Environmental Assessment, submissions, the Submissions Report, and the finalised Statement of Commitments, the Department has identified the following key environmental issues associated with the proposal:

- Flora and fauna
- Cultural heritage
- Hydrology
- Land Use
- Hazards and Risk

All other issues are considered to be adequately addressed by the Proponent's Statement of Commitments.

5.1 Flora and Fauna

Issue

A flora and fauna survey conducted as part of the Environmental Assessment identified biodiversity values in relation to the proposed pipeline corridor including the potential presence and impact of the Project on any endangered ecological communities, threatened species and/or their habitat listed under the *Threatened Species Conservation Act* (TSC Act), the *Fisheries Management Act* and any NES listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act). In addition, as assessment of the Project against the aims of the *State Environmental Planning Policy No. 44 Koala Habitat* (SEPP 44) was conducted.

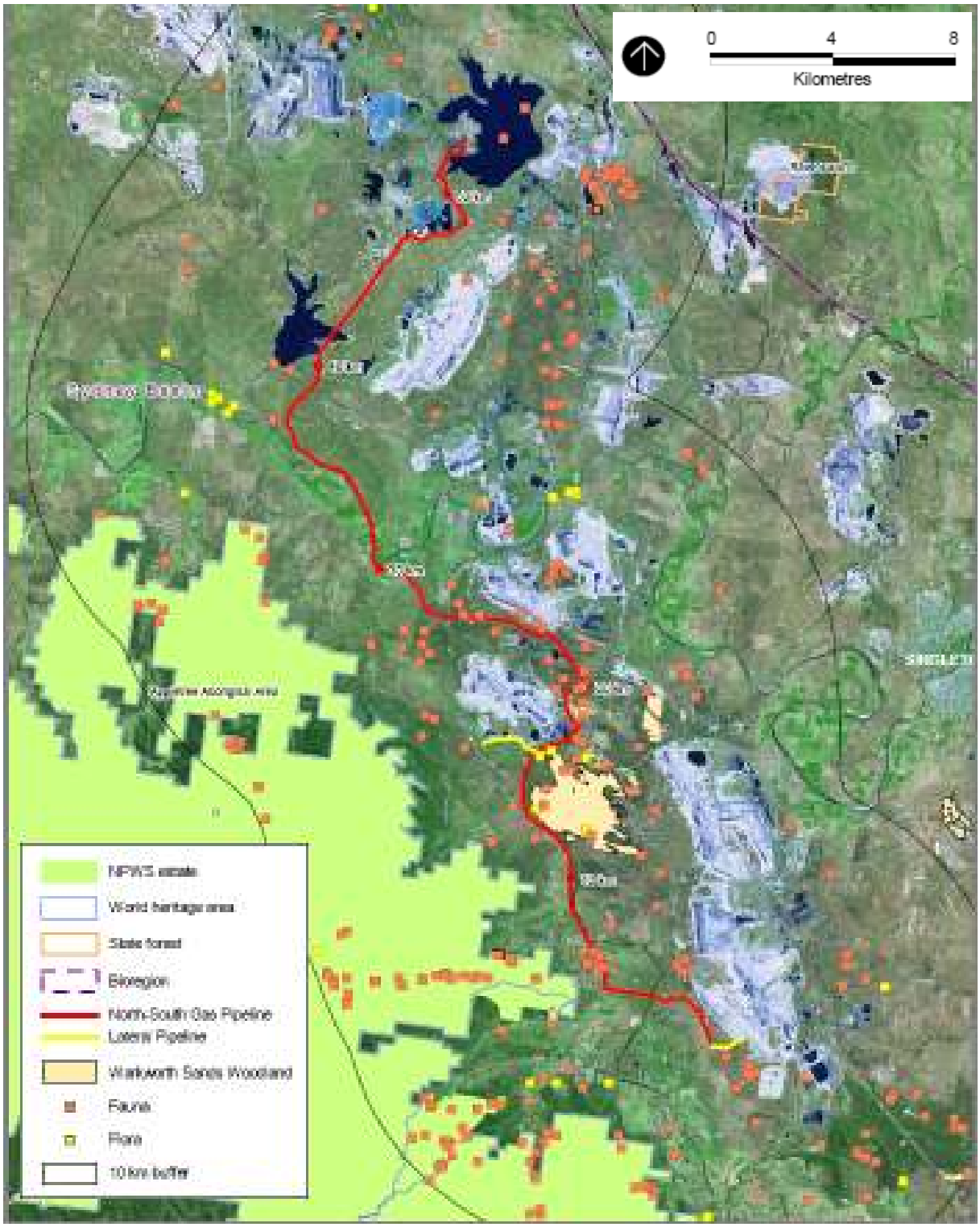
The project lies within the Sydney Basin Bioregion which is typically dominated by a large range of vegetation types, as shown in Figure 3. Vegetation communities occurring along the pipeline corridor include pasturelands, planted areas, Narrow-leaved Ironbark Open Woodland, Spotted Gum/narrow-leaved Ironbark Open Grassy Woodland and Hunter Valley River Oak Forest. Terrestrial fauna habitat along the proposed pipeline corridor includes introduced grasslands, drainage lines/creeks/rivers (mostly weed infested), woodland patches and paddock trees. Vegetation clearing in the area has occurred in the past for agriculture and coal mining related activities.

Wollemi National Park comes to within 1 km of the pipeline corridor near Bulga and Yengo National Park is located 6km south and south-west of Bulga.

The following ecological features were identified along the proposed pipeline corridor:

- Most of the pipeline corridor comprises weed species, being 44% of the 94 flora species identified
- 39 fauna species were recorded including birds, the Common Wombat and the Eastern Grey kangaroo. Habitat was observed for a range of microchirpteran bats
- One critically endangered community is predicted to occur within the locality (White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland) but not along or adjacent to the proposed pipeline corridor
- Predictive modelling indicated that 11 fauna, 6 flora and 10 migratory terrestrial species listed under the EPBC Act have the potential to occur within the locality of the pipeline
- No endangered ecological communities listed under the TSC Act were identified along or adjacent to the pipeline corridor
- 11 flora and 43 fauna species listed under the TSC Act have been recorded within 10km of the Project area. However, the Environmental Assessment concludes that as the majority of the pipeline traverses highly modified and fragmented habitats, these species are unlikely to be present except ones that are highly mobile (such as the Grey-crowned Babbler, Masked Owl, Regent Honeyeater and Squirrel Glider)
- Eight species of noxious weeds were identified along the pipeline corridor and require management to prevent spread, in accordance with the *Noxious Weeds Act 1993*. One species of Weed of National Significance was also identified and requires the implementation of controls
- No Rare or Threatened Australian Plants (RoTAP) were identified along the pipeline corridor, however they may be present in adjacent areas

Figure 3: Protected Areas and Recorded Threatened Species in the Project area



Source: Gas Pipeline (North-South Route) Liddell Power Statement Environmental Assessment, CDB Environment Pty Ltd 2009

According to information in the Environmental Assessment, potential direct impacts of the Project include:

- Vegetation clearance: a total of 1.59 hectares will be cleared, comprising Central Hunter Box – Ironbark Woodland (1.02 ha) and Central Hunter Ironbark – Spotted Gum – Grey Box Forest (0.57 ha). A 20m ROW along the proposed pipeline corridor will be cleared. The majority of this comprises pasturelands. Vegetation

clearing would also remove some fauna habitat for a range of woodland birds, small mammals and common reptiles
- Other loss of fauna habitat: short-term impact is predicted on the Eastern Grey Kangaroo and Common Wombat. This is expected to be a temporary impact only as the trench for the pipeline would be backfilled as the pipe is laid. In addition, paddock trees would be avoided during construction works as would vegetation along drainage lines
- Impacts on aquatic ecology: due to trenching of creek crossings. Impacts would be expected to be spatially and temporally limited as backfilling would be conducted once the pipe is laid. Crossings would be constructed during dry or low flow where possible. The Environmental Assessment reports these waterways to be highly eroded, weed infested and ephemeral in nature. Therefore impact of the Project would be limited. Water quality impacts would be managed by the implementation of erosion and sedimentation controls.

Note that creek crossings at the Hunter River and Wollombi Brook are proposed to be constructed via horizontal directional drilling. Direct impacts to aquatic ecology in these waterways are therefore unlikely to occur. Work compounds are proposed to be placed clear of riparian zones.

Indirect impacts at minor waterway crossings include:
- Edge effects: clearing of vegetation along the length of the pipeline corridor has the potential to increase edge effects which may increase weed establishment, alter microclimates and allow movement of feral animals through an area. However given the cleared and fragmented nature of the Project area, this is considered unlikely
- Disturbance of fauna: increase in noise, vibration, traffic and activity levels along the pipeline corridor may disturb fauna and alter behaviour and/or increase road kill. However, this is considered unlikely in existing cleared areas and highly modified paddocks.

Key threatening processes listed under the TSC Act / EPBC Act which may apply to this Project include:
- Clearing of native vegetation / land clearance, as detailed above
- Alteration to natural flow regimes of rivers, streams, floodplains and wetlands. As stated above, watercourse crossings would be constructed during dry or low flow where possible and work compounds are proposed to be located away from stream banks
- Predation by the European Red Fox: may increase due to the creation of the pipeline corridor as a track for this predator, though considered unlikely to be a substantial impact in the already modified environment
- Corridors and Connectivity: less mobile and smaller fauna species may be disrupted over a short time frame during construction works, however substantial impact in this fragmented area is unlikely.

The Environmental Assessment concluded that based on habitat densities, the Project area is unlikely to be Core Koala Habitat and therefore the provisions of SEPP 44 do not apply.

Three submissions raised issues regarding flora and fauna impacts from the Department of Primary Industries, DECC and the Hunter-Central Rivers Catchment Management Authority. The issues were in relation to the assessment methodology used in the Environmental Assessment and also concern was raised regarding the need for an offset for native vegetation loss, weed controls and the need to restore disturbed areas using locally native vegetation and tubestock, as opposed to seed and fertiliser.

In addition, DECC identified potential habitat for the threatened species, Pine Donkey Orchid within 6km of the Project area. Surveys conducted for the Environmental Assessment were in the wrong season for this species and this species was not detected. Further information from the Proponent indicated that the presence of suitable habitat for Pine Donkey Orchid is limited to within the Central Hunter Box – Ironbark Woodland located on the Wambo Mining Area. This potential habitat is degraded and unlikely to contain high quality habitat for this species. The proponent suggested that the ROW is reduced from 20m to 10m through this area to minimise further disturbance and risks to ecology in this area. This has been included in the conditions of approval.

The Director-General requirements for this Project specifically identified the need for assessment of impacts on the endangered ecological community (EEC), Warkworth Sands Woodlands. The original 2007 north-south gas pipeline route adjoined an area of Warkworth Sands Woodlands, however the pipeline route was amended away

from this EEC. There are no remnants of Warkworth Sands Woodlands present within or adjoining the currently proposed north-south gas pipeline route. Therefore Warkworth Sands Woodlands was not considered further by the ecological assessment for the Project.

Consideration

According to information provided in the Environmental Assessment, the proposed gas pipeline corridor has been amended in several location to avoid vegetation (trees), the Warkworth Sands Woodlands, and drainage lines and to follow existing tracks or cleared paddocks. The Department considers this approach to be satisfactory.

With regard to vegetation clearing of native vegetation, including the removal of some threatened species fauna habitat, the Department considers that offset measures to compensate for the loss of native vegetation resulting from the Project are required to be incorporated into the design plans, such as replanting, rehabilitation work and provision of roosting boxes for specific species. However, DECC recommended that the Proponent provides adequate offset areas to offset the loss of threatened species habitat to ensure consistency with DECC's *Principles for the Use of Biodiversity Offsets in NSW* (DECC 2008). Given the fragmented and modified nature of the existing area, the Department considers that this is not warranted and the Department considers that the use of specific-specific measures of replanting, rehabilitation work and provision of roosting boxes will be adequate in achieving an outcome of 'improve or maintain biodiversity values" which is in accordance with the *Principles for the Use of Biodiversity Offsets in NSW* guidelines (DECC, 2008).

Given the presence of weeds species along the pipeline corridor, the Department considers weed mitigation measures to be a critical component of flora management during the construction of the Project. This has been reflected in the conditions of approval.

The Department considers that the implementation of mitigation measures that are proposed in the Environmental Assessment would reduce specific impact of the Project on flora and fauna. The Department is satisfied that the final proposed pipeline corridor has been selected to avoid intact remnant or regrowth vegetation.

5.2 Cultural Heritage

Issue

A cultural heritage assessment for the Project, conducted in 2008 for the Environmental Assessment comprised a desktop study and field assessment of the entire proposed pipeline corridor. The assessment was conducted in accordance with draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DECC 2005).

The Environmental Assessment reported that the proposed pipeline corridor is heavily disturbed with a long history of clearing and earth moving activities associated with power generation, mining and agricultural activities. This has impacted the survival of both Aboriginal and non-Aboriginal archaeological deposits in the existing environment.

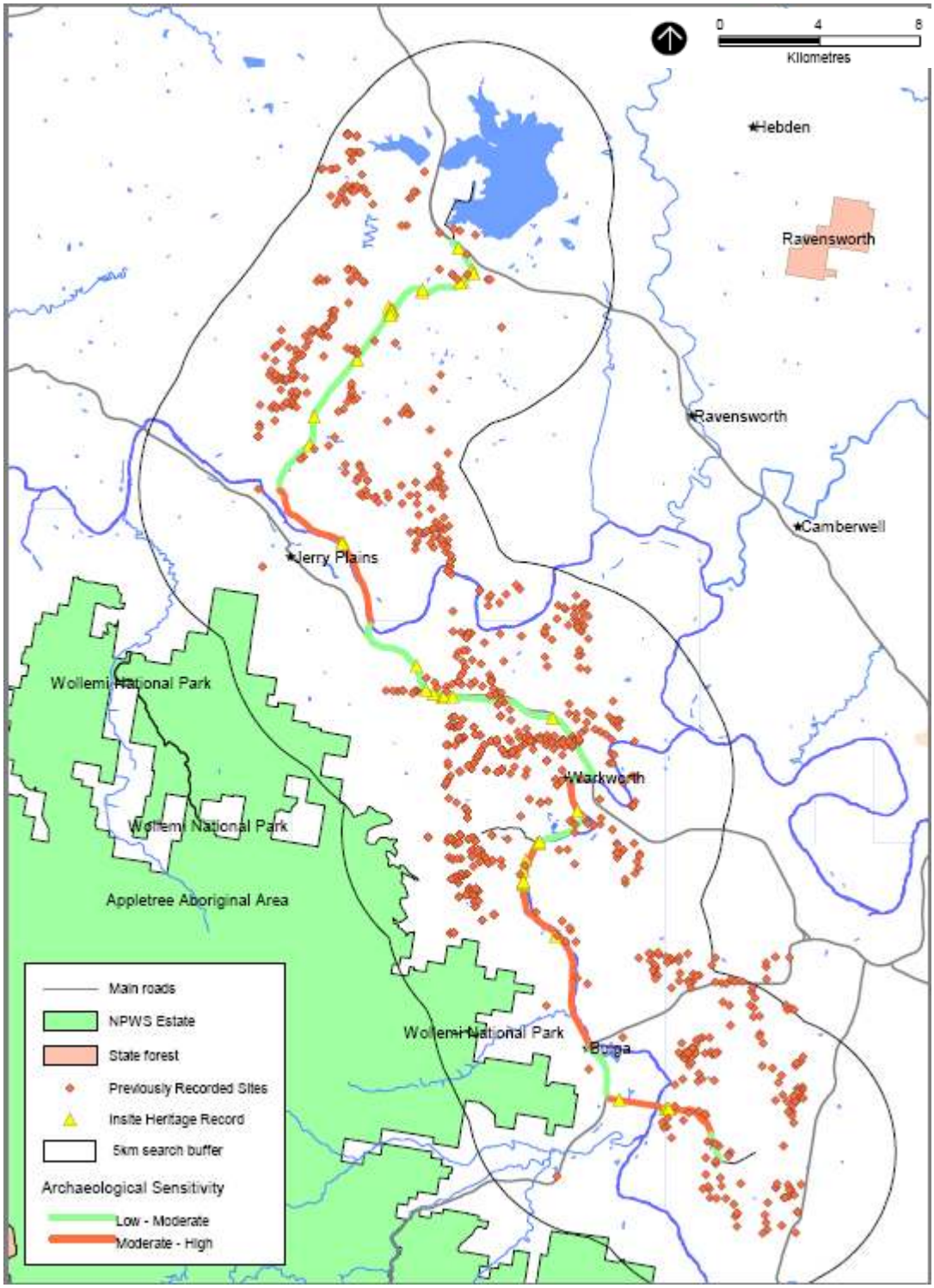
Despite the level of past disturbance, the Project area includes isolated stone artefacts and artefact scatters, primarily of silcrete and mudstone. There are also scarred trees, grinding grooves, ceremonial sites, hearths and rock art sites. Single or scatters of stone are found in the topsoil or in cultural deposits buried within the sub-soil. Stone artefacts are distributed widely across the Project area, as shown in Figure 4. The Environmental Assessment identified each site as being of low, medium or high sensitivity and investigated potential impacts of the Project on each site.

The results of the cultural heritage assessment were as follows:

- The proposed pipeline corridor traverses areas of low to moderate and moderate to high sensitivity
- 28 new and five previously registered Aboriginal sites are located along or adjacent to the proposed pipeline corridor, comprising mainly scatters of low sensitivity will be impacted by the Project to a degree
- Indirect impacts are predicted at six additional sites associated with drainage corridors and an adjacent power line easement

- Four areas of predicted moderate to high archaeological sensitivity predominantly associated with drainage corridors will be impacted by the proposed pipeline corridor
- Five areas of low to moderate archaeological sensitivity, predominantly already disturbed, will be impacted by the Project; and
- Investigation of moderate to high sensitivity areas did not identify any highly sensitive or highly significant sites.

Figure 4: Archaeological Sensitivity and Recorded Sites



Source: Gas Pipeline (North-South Route) Liddell Power Statement Environmental Assessment, CDB Environment Pty Ltd 2009

One site, known as Liddell N/S 19 was identified to be of moderate to high archaeological sensitivity and moderate-high significance, comprises grinding grooves on a large rock outcrop. Site specific mitigation measures will be required to protect this site, such as under-boring or re-routing of the pipeline around the site. This has been included in the conditions of approval.

For the remaining identified sites, mitigation measures are proposed in the Environmental Assessment based on the perceived archaeological sensitivity of the various sections of the corridor. The mitigation measures were developed through consultation with stakeholders, and include the following:

- Cultural awareness training of all construction personnel
- Identification and pegging of all known sites prior to commencement of construction
- Artefact collection and monitoring to record activities undertaken
- Site-specific measures may include under-boring or re-routing the pipeline to prevent any impact from occurring during construction or operation (and maintenance) of the Project. This approach was found to be the preferred option by the Aboriginal community, through the consultation process
- Containment of surface disturbing works in the ROW in proximity to known sites; and
- In the case of new sites being discovered, stop work measures are proposed with testing, implementation of management procedures and notification to DECC.

In the locations of relatively undisturbed river terraces, the Environmental Assessment identifies in-situ subsurface deposits may be present that contain a continuum of artefacts in varying densities. To mitigate against impact on these sites, they would be archaeologically excavated prior to disturbance by the pipeline and care would be taken to contain impact to the excavated zone. Further, mapping of any sensitive river terrace areas, followed by testing and salvage of these loci and monitoring of earthworks would be conducted. Horizontal direction drilling at the Wollombi Brook and Hunter River would reduce the likelihood of impact in these areas.

The Environmental Assessment reported no known non-indigenous sites located within the proposed pipeline corridor.

One submission from DECC raised concerns regarding the cultural heritage assessment methodology. In particular, concern was raised that the Environmental Assessment only considered the proposed pipeline route, not the broader project footprint including surface infrastructure and access points. In the Submissions Report, the proponent confirmed that a 50 metre wide assessment corridor was assessed for the Project covering all ancillary requirements for pipeline construction and operations.

Consideration

The Department is satisfied that the relatively disturbed nature of the existing Project area has reduced the survival rate of intact Aboriginal and non-Aboriginal archaeological sites. Notwithstanding this, newly identified and previously identified Aboriginal sites are located along or adjacent to the proposed pipeline corridor. The Department is satisfied that the implementation of management measures will minimise direct and indirect impacts occurring on these archaeological sites during construction and operation of the Project. These measures have been included in the conditions of approval. Site specific measures at Liddell N/S 19 are also conditioned. Impact on sites in low to moderate sensitivity areas may be avoided or mitigated by collection, recording and replacement adjacent to the pipeline. Further, the Department is satisfied that sites in the high sensitivity zones and in relatively undisturbed river terraces can be sufficiently mitigated by the above methods or by under-boring or re-routing the pipeline corridor.

DECC recommended that additional Aboriginal archaeology survey work should be conducted as part of the final pipeline route decision. However, the Department disagrees with this approach because it is satisfied that the cultural heritage assessment conducted in 2008 has adequately identified sites within the assessment corridor. Furthermore, the Department is satisfied that the implementation of appropriate mitigation measures would provide a balance between the orderly development of the pipeline and minimising the likelihood of impact with respect to cultural heritage, given the modified status of the existing local environment.

5.3 Hydrology

Issue

The Project area falls entirely within the Hunter River catchment area and also includes the Wollombi Brook sub-catchment area. A number of small ephemeral creeks are located within the Project area. The proposed pipeline corridor crosses two major watercourses and a number of minor watercourses, as shown in Figure 5.

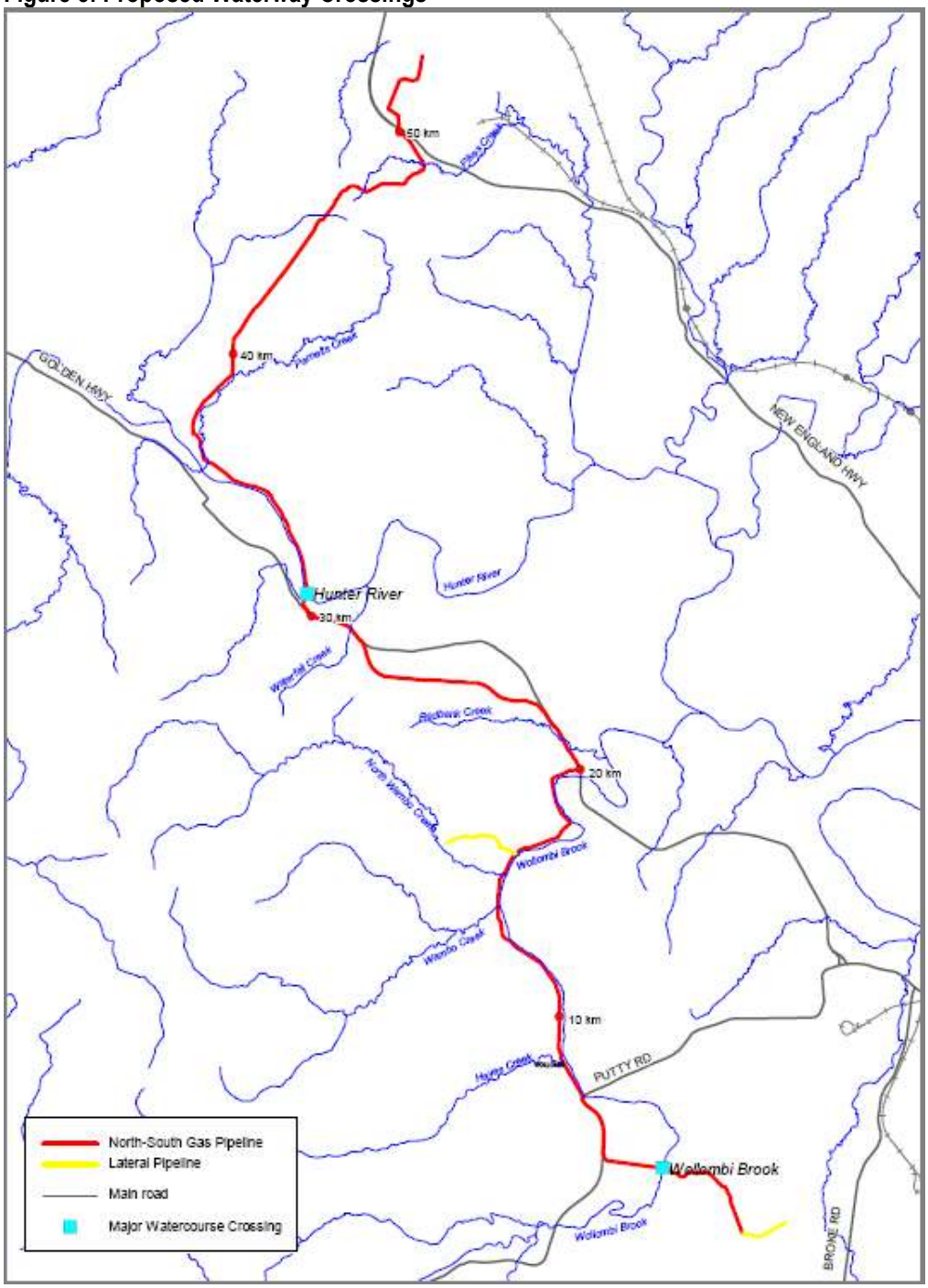
The major waterway crossings will be as follows:

- Wollombi Brook – characterised by recent low flow conditions. Stream banks are described in the Environmental Assessment as being sparsely vegetated and containing weeds, with some signs of erosion
- Hunter River – characterised by steep banks dominated by weeds or cleared areas with some signs of erosion on the northern side

The minor waterway crossing will be as follows and shown in Figure 5:

- Hayes Creek
- Wambo Creek
- Wambo North Creek
- Parnells Creek

Figure 5: Proposed Waterway Crossings



Source: Gas Pipeline (North-South Route) Liddell Power Statement Environmental Assessment, CDB Environment Pty Ltd 2009

According to information in the Environmental Assessment, most of the waterways where crossings are proposed are ephemeral streams that are unlikely to be flowing at the time of construction.

The waterway crossings of the Hunter River and Wollombi Brook are proposed to be conducted by horizontal directional drilling to avoid disturbance of the banks or riparian vegetation at these two locations and to avoid any impact on existing surface water flow regimes.

The minor waterways crossings are proposed to be constructed using open trenching techniques, where possible during periods of nil to low flow. Potential impacts identified in the Environmental Assessment resulting from the construction work at the minor waterway crossings may include:

- Erosion of exposed soil in the ROW has the potential to cause downstream sedimentation in the event of heavy rain
- For open trenching areas, potential subsidence along the trench line may occur after the pipe trench is backfilled and compacted due to settling of backfill material. This depends on the soil type, soil moisture and degree of backfill compaction; and
- Spillage of fuels, lubricants and chemicals during construction in the work areas, which has the potential to contaminate surface and groundwater

A site-specific environmental assessment for each waterway crossing has not been provided in the Environmental Assessment.

Mitigation measures are proposed in the Environmental Assessment for each potential impact, including flow diversion techniques where the waterway is flowing, erosion and sedimentation controls, spill protection measures and ongoing monitoring of the waterway crossing locations post construction to ensure that no scouring or subsidence occurs and to ensure riparian vegetation re-establishes to stabilise the banks.

Three submissions were received regarding the issue of the proposed waterway crossings. The Department of Primary Industries proposed mitigation measures for waterway crossings to minimise the impact on the Hunter River and Wollombi Brook. Horizontal directional drilling (HDD) is proposed to be used unless specific geological features necessitate open trenching. The Hunter-Central Rivers Catchment Management Authority raised concerns of bed stability of Wollombi Brook due to the fragile sand-based system and stated that protection of the banks is required and restoration of bed of the stream to the same level and condition, leaving no depressions post any trenching.

The Department of Water and Energy raised concern regarding the proposed crossings of Hunter River and Wollombi Brook as they are on potentially geomorphically unstable points. To avoid an unacceptable risk of destabilisation of sand infill channels, the Department of Water and Energy supports the use of directional boring beneath the mobile infill sand bed of the two rivers. The Department of Water and Energy further stated that additional information to justify each waterway crossing construction methodology should be a condition of approval, including:

- geomorphic justification of each crossing points
- controls on river bed and banks
- thalweg and inflexion points
- vegetation type and extent of cover; and
- protection controls during and after pipeline installation.

Consideration

A site-specific environmental assessment for each waterway crossing has not been provided in the Environmental Assessment in order to allow determination of the most appropriate construction technique in each location. Only for the major waterways, the Hunter River and Wollombi Brook, horizontal directional drilling has been clearly defined as the most suitable construction methodology. The Department considers that the Proponent should provide an assessment of each waterway crossing with regard to potential environmental impacts, in the form of a Watercourse Crossing Risk Assessment. This would enable the most appropriate decision to be made regarding the specific construction technique based on environmental impact and not only economic considerations. The Department therefore recommends that the Proponent is required to justify each waterway crossing by providing the following information:

- existing waterway condition, the presence of water and existing aquatic and riparian values
- geomorphic characteristics of the proposed crossing points
- likely impacts on stream stability/ hydrology, aquatic and riparian habitat; and
- construction risks and benefits associated with the chosen methodology including the duration of construction at each crossing.

Further, the Department has recommended as a condition of approval that the Hunter River and Wollombi Brook waterway crossing will be constructed by horizontal directional drilling.

5.4 Land Use

Issue

The Project is located within a mixed rural and farming landscape within the Singleton and Muswellbrook Local Government Areas, north of the Hunter Valley, New South Wales. The final selected pipeline corridor is in a 20m wide ROW (located within the 50m wide assessment corridor), and approximately 51km in length, and traverses the following land use features:

- coal mines and exploration licence areas (as detailed below)
- public land, Crown land, and privately owned properties (including Macquarie Generation-owned properties) which are mainly characterised by past agricultural activities
- public road crossings, including the Golden and New England Highways, and property access roads
- waterway crossings, including the Hunter River and Wollombi Brook and minor waterway crossings, as detailed in section 5.3; and
- cleared property boundaries or fence lines.

Rural areas potentially affected by the proposed pipeline alignment include Bulga, Warkworth and Jerry Plains. The proposed corridor runs adjacent to the Golden Highway between Warkworth and Jerry Plains. Within the Muswellbrook Shire Council area, the pipeline is located entirely on Macquarie Generation owned land. According to the Environmental Assessment, no residence or industry in this portion of the pipeline corridor will be impacted.

Potential land use conflicts as a result of construction and operation of the proposed gas pipeline include the following:

- Access by local residences to private properties, roads, bike and pedestrian paths and public spaces;
- Short term losses to agricultural land holders, which would be compensated through agreements between land holders and the Proponent;
- Interactions and potential sterilisation of coal resources, interaction with exploration licences in the area including geothermal and mineral potential exploration licences (PEL) and exploration licences (EL), as listed below;
- Interactions with existing coal mining operations including potential blasting and subsidence impacts on the gas pipeline;
- Interactions with the existing sand extraction operation near the southern end of the proposed gas pipeline; and
- Construction of road and waterway crossings.

The Department received two submissions from private interests on land use conflict issues. A coal mining company (Xstrata) raised concern regarding blasting and subsidence impacts from current mining operations in the vicinity of the proposed pipeline on pipeline integrity and operation. In addition, a private land owner raised concern regarding placement of the pipeline across their agricultural land and access issues.

Consideration

To avoid land use conflicts, the Department has recommended a condition of approval that requires the Proponent to consult with the following land owners and stakeholders in the final design of the project:

- private land owners;
- public authorities, including but not limited to:
  i) the Mine Subsidence Board regarding the portion of the pipeline that lies within the area of the Patrick Plains Mine Subsidence District to ensure design parameters withstand maximum predicted subsidence;
  ii) the relevant road authority regarding the construction method and depth of cover for all road crossings;
  iii) the Department of Lands to minimise the potential for impact to Crown lands;
- companies and titleholders of mineral and petroleum resource licences to minimise the potential for any sterilisation of resources in licence areas, including:

i) Bulga Coal Management Pty Ltd, the holder of mining licence ML1547;
ii) Saxonvale Coal Pty Ltd, holder of exploration licence EL5277;
iii) Wambo Coal Pty Ltd, the holder of coal titles CCL743 and CL365 and the holder of ML1527 and Auth444 and including seams from the Upper Whittingham Coal Measures;
iv) The Construction Forestry Mining Energy Union, holder of coal title CCL755
v) Coal and Allied, the holder of coal titles CCL714 and CL327;
vi) Bloomfield Collieries Pty Ltd, holder of exploration licence EL6705;
vii) Geodynamics Limited, holder of EL5560 for (Group 8) Geothermal Substances;
viii) Sydney Gas Operations, holder of PEL4 and PEL267;
ix) Hexxon Minerals Pty Ltd, regarding the currently operating sand extraction site located off the Putty Road, east of Wollombi Brook; and

- owners of any open cut operations which use blasting techniques in the area of the pipeline corridor to ensure design parameters withstand blasting impacts specific to each existing operation.

The Department is satisfied that this approach ensures all potentially impacted stakeholders are consulted during the final design of the project. The final proposed pipeline easement alignment and the gas pipeline itself will be designed with full consideration of potential land use conflict issues.

5.5 Hazards and Risks

Issue

To ascertain the need for a Preliminary Hazard Assessment, a hazard and risk screening report was conducted in 2008 and incorporated into the Environmental Assessment. This identified and assessed risk associated with general and location specific threats to the integrity of the proposed pipeline. For each potential threat, the likelihood of occurrence and the consequences from public, employee, environmental and economic perspectives was assessed and the risk mitigation measures that have been proposed during all stages of the project were considered.

The following table provides results of the hazard and risk screening report.

Table 4: Hazard and Risk Screening Assessment

Threat	Location	Mitigation	Risk Assessment		
			Frequency	Severity	Risk Ranking
Third party interference resulting in gas leak	Above ground inlets to pipeline	Inlets will be located on coal company sites. Inlets will be fenced. Fail-safe overpressure protection installed	Improbable	Severe	Low
	Along pipeline route	Pipeline buried (min 750mm cover) Clear signage Landowner liaison Routine patrols Pipeline in easement over private land Increased penetration resistance where appropriate Land-use unlikely to cause interference	Unlikely	Severe	Low
	Underground road crossings	Pipeline buried (1,900mm cover) Clear signage Routine patrols	Unlikely	Severe	Low
	New England Highway	Restricted access Pipe material selection	Unlikely	Severe	Low

	underpass				
	Waterway crossings	Pipeline buried (2,000 mm minimum cover)	Unlikely	Severe	Low
	Water drains	Clean signage Routine patrols Restricted access	Unlikely	Severe	Low
Underground coal mine subsidence	Possible underground activity at several locations	Design to accommodate subsidence Monitor induced stresses, remedial action if necessary	Occasional	Minor	Low
Open-cut coal mine blasting	Possible blasting adjacent to pipeline route	Design pipeline to accommodate peak particle velocities. Possible operational constraints during blasting.	Occasional	Minor	Low
Failure of pipe material	Any location	Rigorous application of relevant standards, codes and procedures	Improbable	Severe	Low
Over-pressure of pipeline	Any location	Duplicated, fail-safe facilities	Hypothetical	Severe	Low
Static electricity build up	Any location, normal operations	No risk due to nature of pipeline contents during normal operations	Hypothetical	Minor	Low
	Any location, gas leakage	Provision of AS/NZS 1020:1995 will be rigorously applied	Hypothetical	Minor	Low
Explosive pipeline contents	Any location	Pipeline is buried with no source of ignition. In the event of leakage gas will dissipate.	Occasional	Minor	Low
Road crossings – mechanical damage	Crossings on minor roads	Pipeline buried (minimum 1,900mm cover) Clear signage	Hypothetical	Severe	Low
Waterway crossings – pipe exposure		Pipeline buried (minimum 2,000mm) Regular patrols	Remote	Severe	Low
Natural phenomena	Any location	Pipeline buried Regular patrols Erosion control measures employed	Unlikely	Severe	Low
Inadequate maintenance	Any location	Trained and qualified personnel. Maintenance procedures formalised.	Improbable	Severe	Low

The hazard and risk screening report provided in the Environmental Assessment concluded that with implementation of industry standard practices for managing hazards associated with the proposed pipeline, the risks arising from construction and operation of the pipeline are deemed to be low.

Pending the results of risk assessment to be conducted during the detailed design phase of the project, additional protective measures may be adopted to mitigate risks associated with the pipeline, particularly in proximity to residential and commercial premises.

The Department received one submission raising concern on hazard and risk issues of the proposed pipeline from the Department of Primary Industries and one private submission from Xstrata Coal. The issues raised related to protecting the pipeline operation and integrity from industry blasting and mine subsidence near the United Collieries Mine and Bulga and Beltana Mines. The submissions also stated that the pipeline design and construction should withstand maximum predicted subsidence and blasting impacts by each mining operation.

Consideration

The project was referred to the Department's Major Hazards Unit for review. Based on existing information provided in the Environmental Assessment, Submissions Report and submissions received in relation to this issue, the Major Hazards Unit recommended the following studies which have been included in the conditions of approval:

- preparation of a Hazard and Operability Study (HAZOP) at least one month prior to the commencement of construction of the pipeline for Director-General approval, in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 8, "HAZOP Guidelines" and accompanied by a program for the implementation of all recommendations made in the report.
- update the hazard and risk screening report conducted for the Environmental Assessment for Director-General approval within one month of the final project design to include all new hazard related issues resulting from deviations to the final design
- provide details of the Safety and Operating Plan (SOP) required under the Pipeline Regulation 2005; and
- preparation of a pre-start up compliance report (which has been incorporated into condition 4 of the conditions of approval).

6. CONCLUSIONS AND RECOMMENDATIONS

The Department accepts that the proposed Project would entail significant benefits to the state of New South Wales. The Project will directly help to reduce greenhouse gas emissions from Hunter Valley coal mining operations from the venting or flaring of coal seam methane gas to atmosphere, while also reducing coal demand at the Liddell Power Station. Waste coal seam methane gas would be collected by the proposed gas pipeline and transported to the Liddell Power Station for use in the Power Station boilers and possibly gas turbines.

Together, the proposed North-South and East-West Liddell Gas Pipeline projects would provide nearby Hunter Valley coal mines with the means to dispose of coal seam gas, to the extent of up to 270,000 tonnes per year (or 5 million tonnes carbon dioxide [CO_2] equivalent) and also result in a combined saving of approximately 5% energy demand in the Liddell Power Station.

The Project comprises

- Construction of a 51km pipeline, located within the Singleton and Muswellbrook Local Government Areas
- Construction of ancillary facilities for the pipeline operation including a pig launching/receiving station, condensate drainage valves and mainline valves
- Connection of the proposed gas pipeline to the Liddell Power Station, or to the proposed East-West gas pipeline which is the subject of a separate project application; and
- Operation of the pipeline by collecting coal seam gas from coal mining operations in the Hunter Valley and delivery to the Liddell Power Station for use as a boiler fuel source.

Access to the proposed gas pipeline by coal mines located along its route may include the operations of Xstrata, Peabody and Rio Tinto. These would be subject to separate agreements between each mining company and the Proponent that do not form part of the Project. It is noted that coal seam gas collection infrastructure required to supply coal seam gas to the proposed pipeline will be the responsibility of the individual coal mines.

Construction of the pipeline is expected to be completed over approximately five months. The pipeline will be in operation 24 hours per day, 7 days per week while there is an available supply of gas. It is anticipated that there will be at least 30 years of waste coal seam gas available.

The benefits of the Project are significant. The Project provides Hunter Valley coal mines with the means to dispose of coal seam gas, usually a waste stream, and offsets greenhouse gas production in response to the NSW Greenhouse Gas Abatement Scheme (GGAS) obligations. The Project is also consistent with the principles of the Australian government's Carbon Pollution Reduction Scheme (due for release in 2010) which contains obligations for the coal sector. The Project represents an innovative use of coal seam gas in coal-fire boilers through this first large scale implementation of supplementary gas combustion in coal-fired boilers in Australia.

The key potential impacts associated with the Project relate to flora and fauna, heritage, hydrology, land use and hazards and risk.

The Department assessed the Proponent's Environmental Assessment, Submissions Report and Finalised Statement of Commitments on the Project and submissions received from public interests and government agencies. Based on its assessment, the Department is satisfied that the Proponent has provided a robust and conservative assessment of impacts and that the impacts associated with the Project can be managed and mitigated to achieve acceptable environmental standards, so as to not preclude the continuation of existing land uses and the development of surrounding land use.

Although some residual impacts may result, the Department considers the project to be on balance justified given its benefits to the broader community. The Department has drafted a recommended instrument of approval incorporating stringent and comprehensive environmental mitigation and management requirements that will serve to mitigate potential environmental impacts and enhance commitments made by the Proponent in its finalised Statement of Commitments.

On balance, the Department considers the project to be justified and in the public interest and should be approved subject to the Department's recommended conditions of approval and the Proponent's Finalised Statement of Commitments.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – FINALISED STATEMENT OF COMMITMENTS

APPENDIX C – RESPONSE TO SUBMISSIONS

APPENDIX D – ENVIRONMENTAL ASSESSMENT