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**Project Application and
Preliminary Environmental
Assessment
*Gas Supply Pipeline
Liddell Power Station
North-South Route***

February, 2008

Macquarie Generation



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1. Introduction

Macquarie Generation (the Proponent) has engaged PB to prepare a Project Application and supporting Preliminary Environmental Assessment in accordance with Part 3A of the *Environmental Planning and Assessment Act 1979 (EP&A Act)* for the proposed Gas Supply Pipeline (hereafter referred to as 'the proposal').

The route identified in the original Project Application submitted to the Department of Planning (DoP) in February 2007 has, due to ecological considerations, been modified and separated into east-west and north-south components with separate Project Applications. The current application is for the north-south component.

This report is presented in the following sections:

- Section 1 Introduction – provides background to the proposal, project objectives and the proponent.
- Section 2 Project description – provides a detailed description of the proposal and site location.
- Section 3 Planning and regulatory context – provides a description of the statutory planning context.
- Section 4 Preliminary environmental assessment – outlines the key environmental issues that must be addressed in
- Section 5 Environmental impacts and safeguards - provides a description of the key environmental issues associated with the proposal and recommended environmental safeguards and potential for cumulative effects
- Section 6 Conclusion – indicates the suitability of the project within environmental planning constraints

1.1 Background to proposal

Macquarie Generation is proposing to construct a pipeline to supply gas fuel to *supplement* coal-fired electricity generation that occurs at Liddell Power Station, which is located in the Upper Hunter Valley of NSW (refer to Figure 1.1).

The purpose of the pipeline is to utilise the currently wasted coal mine gas of the neighbouring Upper Hunter coal mines. Coal mine gas is of mixed quality with extremely variable composition and delivery rate (quantity), which can restrict the opportunity for use as a fuel in traditional generation technologies such as gas turbines or gas engines. The current practice for disposal of gas of this quality is disposal as waste by flaring into the atmosphere.

Macquarie Generation proposes an innovative alternative of which the pipeline is the essential element. The gas, piped to the power station, would be directly injected into the coal combustion fire-ball within the power station boilers. This project will ultimately be the first known large scale implementation of supplementary gas combustion in coal-fired boilers in Australia. The enabling factor in this approach is the coal-fired boilers' unique tolerance of gas inconsistency. The gas as a fuel *supplement* may displace up to 5% of the coal (by mass) required to generate a given amount of electricity. In addition, Liddell Power

Station has gas turbines on site that could also be fuelled by this waste gas under certain circumstances.

1.2 Proposal objectives

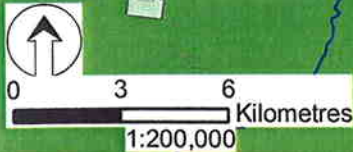
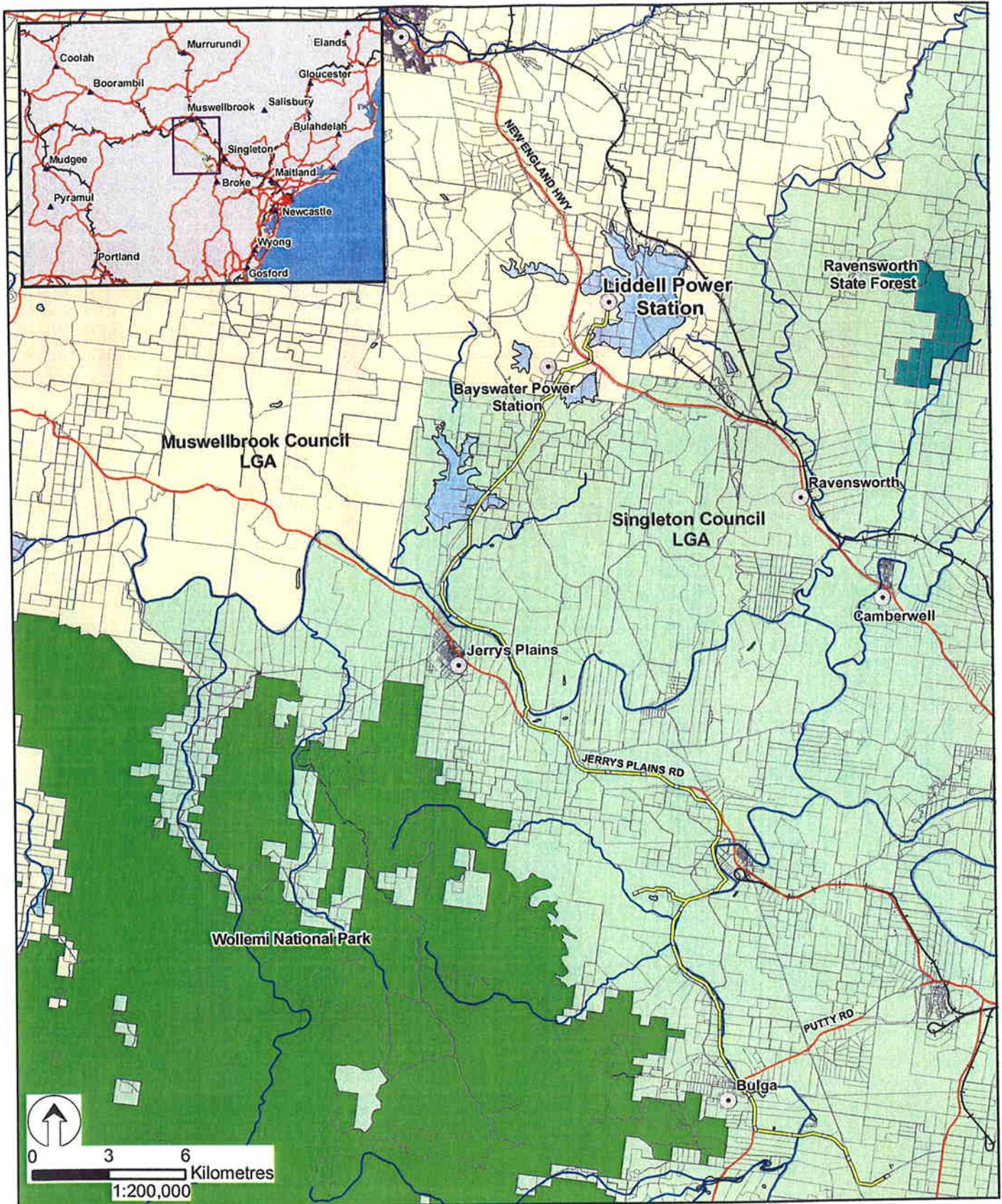
The objectives of the proposal are to:












- construct a pipeline to supply gas fuel to *supplement* coal-fired electricity generation at Liddell Power Station. The proposal would be the first known large scale implementation of supplementary gas combustion in coal-fire boilers in Australia;
- provide nearby Hunter Valley mines with the means to dispose of methane gas as required by their consent conditions, to the extent of up to 270 thousands tones per year (or 5.6 million tonnes CO2 equivalent);
- reduce the greenhouse impacts of both the coal mining process and electricity generation; and
- offset greenhouse gas production in response to Greenhouse Gas Reduction Scheme (GGAS) obligations under Macquarie Generation's electricity contract with Tomago Aluminium.

1.3 The proponent

Macquarie Generation is a State Owned Corporation, established in 1996 following NSW electricity system reforms. Macquarie Generation own and operate Liddell and Bayswater Power Stations, which are located between Singleton and Muswellbrook in the Upper Hunter Valley of NSW.

The core business of the proponent is related to the production and wholesale trading of electricity to the National Electricity Market. Macquarie Generation produces approximately 15% of the electricity needed by the population in Eastern Australia from South Australia to Northern Queensland. Electricity production by Macquarie Generation equates to 40% of the electricity required by the people of NSW, making Macquarie Generation Australia's largest electricity generator.



Legend		Title			
 Localities	 Singleton Cadastre	<h2 style="margin: 0;">Site Location Plan</h2>		Datum: MGA 94 / Zone 56	Scale: 1:200 000
 Main Pipeline	 State Forest			Drawn: MJC	Date: 06 December 2007
 Surface Water	 National Park / Nature Reserve	Project: Gas Supply Pipeline Client: Macquarie Generation	Designed: MJC	Date: 06 December 2007	
 Existing Roadways	 Muswellbrook LGA boundary		Proj No: 2122755A Layout Size: A4 GIS Proj: T:\NCL - J - NCLData\A902\NCL\PROJ\2122755A_Macquarie_Gener10_GIS	Checked: MM	Date: 06 December 2007
 Existing Rail	 Singleton LGA boundary	DWG No: 2122755A_1		Fig No: 1.1	
PDF Address: T:\NCL - J - NCLData\A902\NCL\PROJ\2122755A_Macquarie_Gener10_GIS PDF File: 2122755A_Site Location updated route concepts					

2. Project description

2.1 Site location and description

The proposed pipeline is approximately 51km in length (refer to Figure 2). The pipeline will transverse coal mine, private properties or Macquarie Generation properties (refer to Figure 3), which are significantly disturbed by past agricultural practices and/or mining operations. It incorporates several public road crossings as well as crossings of watercourses, such as the Hunter River, Wollombi Brook, Foy Brook, Bayswater Creek, Saltwater Creek, and Saddlers Creek. Where possible, the pipeline will also traverse existing haul roads and property access roads, as well as cleared property boundaries or fence lines.

The proposed pipeline has a southern and western component. The point of origin of the route originates some 35 km south of Liddell Power Station that is found 12 km southwest of Singleton and 1 km north of Broke. The pipeline will conclude at the proposed east west coal seam pipeline route assessed under a separate application that connects to Liddell Power Station, located on the New England Highway, south of Muswellbrook. The southern component of the route is approximately 51 km in length.

The proposed pipeline traverses a considerable number of allotments. Because the proposed development is considered a '*linear infrastructure project*' under clause 8F of the *Environmental Planning and Assessment Regulation 2000* it is not necessary to detail all relevant allotments. In lieu of such detail, a detailed plan of the land affected will be provided in the full environmental assessment.

2.2 Description of proposed development

Macquarie Generation is proposing to establish a low pressure pipeline to supply gas fuel to *supplement* coal-fired electricity generation at Liddell Power Station (Figure 1.1). The pipe material is anticipated to be polyurethane or fibreglass, buried approximately one metre below the ground surface, and up to a maximum 500mm in diameter. The pipeline may need to consist of two separate pipes to address certain processes in a mine's operation, typically the separation of pre-mining gas drainage from post-mining gas drainage. Provision will be made to allow the pipeline to be 'looped' on Macquarie Generation land to provide extra capacity if required.

The proposed pipeline will potentially take gas from up to eight coal mines south and west of Liddell Power Station. Lateral pipelines will extend from the main pipeline to relevant gas wells. The location of these lateral pipelines will be determined by the final mine plan of each coal mine and as such form part of a "local gas collection network" that does not form part of this proposal. The coal mine gas, to be supplied by the pipeline to Liddell Power Station, contains methane diluted mainly with air and is primarily sourced as a by-product of underground longwall operations. The gas is of mixed quality with extremely variable composition and delivery rate (quantity), which can restrict the opportunity for use as fuel in traditional generation technologies such as gas turbines or gas engines. The current practice is to dispose of coal seam gas by venting or flaring into the atmosphere.

Operation of the pipeline shall occur whilst there is an available supply of gas and it is anticipated that there would be in the order of at least 30 years of mine waste gas available.

Other commercial sources of gas may also arise in that time frame, adding to the pipeline's long-term productivity.

The proposed pipeline will provide nearby Hunter Valley mines with the means to dispose of methane gas, as required in their consent conditions, to the extent of up to 270 thousand tonnes per year (or 5.6 million tonnes CO₂ equivalent). At each of the gas supply points, on coal mine or Macquarie Generation land, a compression station will bring the gas up to the pipeline operating pressure required for its delivery to the power station. A typical compression station is a compact skid mounted enclosure similar in size and appearance to a 'shipping' container. It will emit low level electric motor and fan noise. The magnitude of compression station emissions will be small and vary from mine to mine, depending on the gas volume involved.

At low points along the pipeline there will be drain points where accumulated condensed water vapour will be periodically removed. Typically a vertical vent shaft connected to the pipeline would be flushed using gas pressure to force the water out to ground level, which is released by a valve. Such waste will most likely be captured and disposed of by a waste contractor.

The pipeline will also enable Macquarie Generation to extract the otherwise wasted energy-rich methane component of the neighbouring Hunter valley mines gas. The proposal will avoid emitting up to 5 million tonnes of greenhouse gas per year. As such, the key project outcome is the strong environmental benefits of both the coal mining process and electricity generation.

2.2.1 Summary description of proposed Project

The following table (Table 2.1) provides a summary of the Project in accordance with the Draft Guidelines 2005.

Table 2-1 Project summary

Project	Gas Supply Pipeline Liddell Power Station. Refer to Section 2.2 of this report for a detailed description of the proposal.
Objectives	To construct a pipeline to supply gas fuel to <i>supplement</i> coal-fired electricity generation at Liddell Power Station. Further project objectives are outlined within Section 1.2 of this report.
Major elements including any environmental mitigation measures	Installing a 51 km polyurethane gas pipeline to <i>supplement</i> coal-fired electricity generation at Liddell Power Station. Section 4 details the preliminary environmental mitigation measures associated with the proposal.
Any ancillary works- outline of construction methods	The gas collection infrastructure associated with supply of gas to the proposed pipeline will be the responsibility of the individual coal mines, as outlined within Section 2.2 .
Outline of operations	The pipeline shall form an integral part of the Liddell Power Station operation. The associated coal-mine gas may displace up to 5% of the coal required to generate a given amount of electricity. The gas pipeline shall be in operation 24 hours per day, 7 days per week.

Locations	The southern component of the pipeline originates approximately 12 km southwest of Singleton and 1 km north of Broke, and concludes at Liddell Power Station. Refer to Section 2.1 and Figure 1.1 of this report which detail the proposed location of the pipeline.
Time Frame	Construction is anticipated to be completed over a three (3) month period. Operation of the pipeline shall occur whilst there is an available supply of gas, and it is anticipated that there would be at least 30 years of mine waste gas available in the foreseeable future. Other commercial sources of gas may also arise in that time frame.

3. Planning and regulatory context

This section provides the planning and regulatory requirements for the proposal.

3.1 Commonwealth legislation

3.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* requires approval of the Commonwealth Minister for the Environment for actions that may have a significant impact on matters of national environmental significance (MNES).

A search of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters (National Environmental Significance) database will be conducted during the more detailed Environmental Assessment (EA) to determine whether any matters of national Environmental Significance would apply to the proposal.

Significance assessments in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* would need to be undertaken for any impact on MNES. It is not considered likely that the proposal will result in a significant impact on any threatened species, and therefore, the proposal would not need to be referred to the Commonwealth Minister for the Environment.

3.2 State legislation

3.2.1 Environmental Planning and Assessment Act

The proposed gas pipeline is a project to which Part 3A of the New South Wales EP&A Act applies. Part 3A applies to Major Projects identified under *State Environmental Planning Policy (Major Projects) 2005* or works declared as Critical Infrastructure by the Minister for Planning.

Schedule 1 of *State Environmental Planning Policy (Major Projects) 2005* identifies a range of developments that would constitute a Major Project and would therefore be assessed under Part 3A of the EP&A Act. Clause 6 of *State Environmental Planning Policy (Major Projects) 2005* provides that:

...development that, in the opinion of the Minister, is development of a kind:

- a) that is described in Schedule 1 or 2, ...

is declared to be a project to which Part 3A of the Act applies.

The proposed development is identified as a major project under Schedule 1, Group 8, Clause 26A of the policy, as:

...development for the purposes of a pipeline in respect of which:

- a) a licence is required under the Pipelines Act 1967, or
- b) an application for a licence is made under that Act on or after the commencement of this clause, or
- c) a licence was granted under that Act before the commencement of this clause.

Preliminary discussions with the Department of Planning have confirmed that the project is suitable for assessment under the provisions of Part 3A of the *EP&A Act*. Macquarie Generation, therefore, hereby requests the declaration of the proposed Macquarie Generation Gas Supply Pipeline as a Major Project under clause 6 of Part 3A of the *Environmental Planning and Assessment Act 1979*. The project would meet the definition of a 'Pipeline' Under Clause 26A (Group 8) of Schedule 1 of the *State Environmental Planning Policy (Major Projects) 2005*, and be subject to clause 8F of the *Environmental Planning and Assessment Regulation 2000*. The Director General's Requirements for the Environmental Assessment relating to the proposed development are also sought.

Under the provisions of Part 3A of the *EP&A Act*, Macquarie Generation, as the proponent of a Major Project, is required to make a Project Application. The Project Application is to include an outline of the project and a preliminary environmental assessment. This report constitutes the Project Application and Preliminary Environmental Assessment as required under the provisions of Part 3A of the *EP&A Act*.

Other NSW legislation and its relevance to the proposed development is summarised in Table 3.1.

Table 3-1 NSW legislation

Legislation	Key Requirements	Relevance to the proposed activities
<i>Threatened Species Conservation Act 1995</i>	This act requires any threatened plant or animal species, populations or ecological communities associated with a proposed development to be identified and that acceptable recovery and management strategies are implemented a likely significant impact would occur.	Under Part 3A of the <i>EP&A Act</i> the assessment of impacts to threatened species, populations, or ecological communities, or their habitats listed under the <i>TSC Act</i> need to be addressed with reference to Draft Guidelines for Threatened Species Assessment (DEC, 2005). The pipeline route can be aligned to avoid impacts on threatened species, as necessary. As such, it is anticipated that no impact on threatened species would occur.
<i>Heritage Act 1977</i>	Approval must be gained from the Heritage Council when making changes to a heritage place listed on the State Heritage Register, or when excavating any land in NSW where you might disturb an archaeological relic.	No known heritage items will be adversely affected by the project (<i>refer to Section 4.3</i>). The pipeline route can be aligned to avoid impacts on heritage items, as necessary. As such, it is anticipated that no impact on heritage items would occur.
<i>National Parks and Wildlife Act 1974</i>	The Act aims to prevent the unnecessary or unwarranted destruction of relics and the active protection and conservation of relics of high cultural significance.	Under Part 3A of the <i>EP&A Act</i> , approval under this Act is not required.

Legislation	Key Requirements	Relevance to the proposed activities
<i>Native Vegetation Act 2003</i>	The Native Vegetation Act 2003 requires development approval from the relevant Catchment Management Authority (Hunter/Central Rivers) for the clearing of any natural vegetation. Approval can only be granted under this act for proposals that improve or maintain environmental outcomes	Under Part 3A of the <i>EP&A Act</i> , the <i>Native Vegetation Act</i> does not apply.
<i>Protection of the Environment Operations Act 1997</i>	The Act enforces licences and approvals formerly required under separate Acts relating to air, water and noise pollution and waste management with a single integrated licence. Development requires a license under the Act, should it meet the assessment criteria outlined within Schedule 1 of the EPA- licensed activities.	A license under the Act is not considered necessary.
<i>Water Management Act 2000, including the Rivers and Foreshores Improvement Act 1948 and Water Act 1912</i>	Approval is required from the consenting authority for development within 40 metres of a declared waterway such as stream, rivers, lake or lagoon, including excavation of land or any works that would detrimentally affect the water flowing in a stream, river, lake or lagoon. Under the Act, a licence would be required if water was to be extracted from a creek or if any waterways were to be realigned during construction.	The proposal will cross the Hunter River and Wollombi Brook and would therefore require approval under this Act. However, clause 1(f) of Section 75U of the <i>EP&A Act</i> states that approval is not required for projects being assessed under Part 3A of that Act. Therefore approval under this Act is not required. The proposed development does not involve the extraction of water or realignment of any waterways. As such, a license for the development will not be required.
<i>Contaminated Land Management Act 1997</i>	Provides a regime for investigating and, where appropriate, remediating land affected by contamination, which represents a significant risk of harm to human health or the environment.	If contaminated land is uncovered by the construction works, it must be assessed and managed in accordance with the Act.
<i>Roads Act 1993</i>	Section 138 of the <i>Roads Act 1993</i> requires that a person obtain the consent of the appropriate roads authority for the erection of a structure, or the carrying out of a work in, on or over a public road, or the digging up or disturbance of the surface of a public road. If the applicant is a public authority, the roads authority must consult with the applicant before deciding whether or not to grant consent or concurrence.	The proposed development involves the crossing of several public roads and will therefore require approval from the NSW Roads and Traffic Authority before commencing work. Under section 75V of the <i>EP&A Act</i> consent under section 138 of the <i>Roads Act</i> cannot be refused if it is necessary for carrying out an approved project under Part 3A of the <i>EP&A Act</i> .

Legislation	Key Requirements	Relevance to the proposed activities
<i>Pipelines Act 1967</i>	This Act regulates the construction and operation of pipelines within NSW by requiring that a licence is obtained for certain pipelines outlined under the Act.	Macquarie Generation will require a licence under the <i>Pipelines Act 1967</i> . Under section 75V of the <i>EP&A Act</i> a licence under the <i>Pipelines Act</i> cannot be refused if it is necessary for carrying out an approved project under Part 3A of the <i>AP&A Act</i> .

3.3 Environmental planning instruments

The application and relevance of all State Environmental Planning Policies (SEPPs) has been assessed. As a result, the following SEPPs are considered relevant to the proposed development and would need to be addressed under any approvals process.

3.3.1 State Environmental Planning Policies

State Environmental Planning Policy No. 44 Koala Habitat Protection

SEPP No.44 – Koala Habitat Protection encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range. SEPP 44 also restricts the granting of development consent for proposals on land identified as core koala habitat without preparation of a plan of management.

Singleton and Muswellbrook Councils are identified on Schedule 1 of the SEPP as local government areas to which the environmental planning instrument applies. However, there is no clearing required for this development and no off-site impacts on koala habitat. Therefore this SEPP does not apply, and preparation of a Koala Plan of Management will not be required.

State Environmental Planning Policy (Major Projects)

SEPP (Major Projects) 2005 defines certain developments that are considered major projects under Part 3A of the Environmental Planning and Assessment Act 1979, or as determined by the Minister for Planning. Schedule 1 of SEPP (Major Projects) 2005 identifies a range of developments that would constitute a Major Project and would therefore be assessed under Part 3A of the Environmental Planning and Assessment Act 1979.

The project is defined as a 'Pipeline' under Clause 26A (Group 8) of Schedule 1 of the Major Projects SEPP. As such the project requires approval under Part 3A of the Environmental Planning and Assessment Act 1979, and as such the Minister for Planning will be the consent authority.

DRAFT State Environmental Planning Policy (Infrastructure) 2006

The Draft SEPP (Infrastructure) 2006 applies to certain infrastructure developments that include Electricity Generating Works under clause 4 of Schedule 1 of the SEPP. Specifically, clause 4(2) of the Draft SEPP (Infrastructure) 2006 requires "development consent, or a modification to an existing consent, prior to changing the fuel source to use more than 5% of either biomass, wastes or waste derived fuels in an existing electricity generating plant". However, the Macquarie Generation proposal will only displace up to 5% (by mass) of the current coal fuel source in the plant's boiler/s, and is most likely to be less than 2%. While

this is technically a change/modification of the plant's main fuel source (co-firing), it is within the prescribed threshold, and the draft SEPP is therefore not relevant to the proposal.

3.3.2 Hunter Regional Environmental Plan

The *Hunter Regional Environmental Plan 1989* applies to all land within the cities of Cessnock, Greater Taree, Lake Macquarie, Maitland and Newcastle and the Shires of Dungog, Gloucester, Great Lakes, Merriwa, Murrurundi, Muswellbrook, Port Stephens, Scone and Singleton.

The objectives of the plan are:

- a) *to promote the balanced development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources, consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community,*
- b) *to co-ordinate activities related to development in the region so there is optimum social and economic benefit to the community, and*
- c) *to continue a regional planning process that will serve as a framework for identifying priorities for further investigations to be carried out by the Department and other agencies.*

The plan identifies a range of mechanisms to implement its objectives which generally relate to policies for local environmental plan preparation and development control.

The proposed development appears consistent with the objectives of the Hunter Regional Environmental Plan 1989.

3.3.3 Local Environmental Planning

The project falls within the boundaries of two (2) Local Government Areas (LGA), Singleton Shire and Muswellbrook. Under 75J of the *Environmental Planning and Assessment Act 1979*, the Minister can not give approval for a project under Part 3A, if it is wholly prohibited under an environmental planning instrument by the operation of Section 76B.

The majority of the subject development is located within the Singleton LGA. Preliminary assessment to date reveals that in the order of 90% of the land traversed by the pipeline is currently zoned 1(a) Rural under the *Singleton Local Environmental Plan 1996 (SLEP 1996)*.

The objectives of the 1 (a) Rural Zone are as follows:

- (a) *to protect and conserve agricultural land and to encourage continuing viable and sustainable agricultural land use,*
- (b) *to promote the protection and preservation of natural ecological systems and processes,*
- (c) *to allow mining where environmental impacts do not exceed acceptable limits and the land is satisfactorily rehabilitated after mining,*
- (d) *to maintain the scenic amenity and landscape quality of the area,*
- (e) *to provide for the proper and co-ordinated use of rivers and water catchment areas,*

- (f) *to promote provision of roads that are compatible with the nature and intensity of development and the character of the area.*

The Rural Zoning Table under Part 3 Rural Development of the *SLEP 1996*, states that any development other than those included within clause 4 are permissible with development consent within the Rural 1(a) Zone. The types of development considered prohibited within the zone are listed as follows:

“advertising structures (other than as would be permitted by clause 33 of the Environmental Planning and Assessment Model Provisions 1980 if they applied); boarding-houses; bulk stores; bus depots; business premises; car repair stations; dual occupancy-detached; industries other than offensive or hazardous industries; junk yards; light industries; liquid fuel depots; motor showrooms; residential flat buildings; road transport terminals; shops; warehouses.”

Pursuant to the provisions of *SLEP 1996* the proposed pipeline does not fall under any of the above definitions and is therefore considered permissible within this zone with development consent. Accordingly the proposed development is not wholly prohibited under the meaning of Part 3A of the *E&PA Act*.

4. Preliminary environmental assessment

Due to the proposed route of the pipeline, almost entirely through highly disturbed terrain, there are no issues that pose significant threat to the environment or society. Nonetheless, a preliminary assessment identifies those issues requiring further investigation in the EA.

4.1 Flora and fauna

The proposed pipeline route is highly disturbed consisting of predominately cleared and modified landform, and has been selected to avoid vegetation for almost the entire length. While some minor vegetation clearing along the route may be necessary, due to the disturbed nature of the vegetation along the route, this should not cause significant impacts to any ecological communities or threatened and endangered species. Furthermore, due to the flexible nature of the pipeline route and construction material utilised it will be possible to minimise impacts to vegetation. Where possible, the pipeline route has been planned to utilise existing haul roads and property access roads, as well as cleared property boundaries or fence lines, to minimise any impact on vegetation.

In light of the above, a biodiversity assessment for this project would be based, where possible, on existing information, particularly for those abovementioned vegetation communities. Relevant databases would also be searched for records of threatened species within a 10 km radius of the study site. Reports, mapping, database and literature to be reviewed would include:

- NSW Department of Environment and Conservation Atlas of NSW Wildlife
- Department of the Environment and heritage protected Matters Search Tool
- vegetation mapping of the areas as available
- topographic maps
- aerial photographs
- relevant studies for the surrounding environ.

The quality of vegetation would be assessed using parameters such as intactness, diversity, history or disturbance, weed invasion and health. Similarly, fauna habitats would be assessed by examining characteristics such as native vegetation. If required, targeted surveys of selected areas of the pipeline route shall be conducted as part of the biodiversity assessment.

The assessment shall provide evaluations of the flora and fauna communities and list rare, endangered and vulnerable native species and communities. The likely impacts of the proposal would be determined with significance assessments carried out as required under Section 94 of the *Threatened Species Conservation Act 1995*, Section 5A of the EP&A Act, and the significant impact guidelines of the Department of the Environment and Heritage.

4.2 Hydrogeology

The proposed route potentially incorporates several public road crossings as well as crossings of watercourses, such as the Hunter River and other permanent and ephemeral watercourses. Where possible, the pipeline will also traverse existing haul roads and property access roads, as well as cleared property boundaries or fence lines.

It is proposed to cross, or underbore, the Hunter River using Horizontal Directional Drilling (HDD) techniques, thus providing minimal environmental impact. To cross the other watercourses, it is proposed to trench through the watercourse bed in an area previously cleared of vegetation. The pipelines would be trenched to a depth of approximately 1.5 m, and located in a sand bed with excavated topsoil materials reinstated following commissioning.

Once in place the pipelines at the crossing could be encased by a layer of concrete. Natural material would be backfilled and compacted over the concrete, aggregate would be used to cover the backfilled material. The aggregate layers covering the pipelines will be engineered to ensure a level consistent with the existing creek bed. This method has been recently adopted for a similar crossing on Bowmans Creek for an unrelated project.

The environmental assessment shall include a detailed description and assessment of existing surface and groundwater level and quality, including assessment of existing data regarding geotechnical constraints. Acid Sulfate Soils, surface excavation and potential river underboring will be described and the likely impacts addressed.

Initially the hydrology and geotechnical assessment will identify potential hazard areas and construction specifications. The profile description and classification, types, composition and erodibility of the soils and geology of the land will be of importance during the construction stage when soil shall be disturbed. The hydrology and geotechnical assessment will also analyse any issues relating to the management of erosion and drainage throughout the construction phase of the project.

4.3 Indigenous and Non-Indigenous Heritage

It is considered unlikely that any items of Aboriginal or European heritage shall be affected by the project, due mainly to the highly disturbed nature of the subject land earmarked for the pipeline. Nonetheless, Indigenous and Non-Indigenous Heritage identification will initially be by search of the various databases, registers and review of available literature. Including:

- review of relevant State and Federal heritage registers and listings such as, the NSW National Parks and Wildlife Services Aboriginal Heritage Information Management System and the Australian heritage Council's Register of the National Estate
- review existing Aboriginal archaeological reports
- review Local and Regional Environmental Plans.

The assessment of the presence of places and objects of cultural significance will describe any known places and objects that have archaeological, heritage or indigenous significance. The assessment will determine the proximity of known significant objects in relation to the proposed pipeline route. Likely impacts to heritage items from the project, and appropriate mitigation measures to limit these impacts shall be developed in light of statutory heritage requirements and 'best practice' heritage principles.

4.4 Hazards and risk

A preliminary hazard and risk assessment shall accompany the environmental assessment. The assessment shall include a consideration of relevant policy, including Preliminary Hazard Analysis in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*.

In addition, assessment in relation to more general issues, such as potential bushfire hazards and potential leakages, shall also be undertaken.

The typical compression station associated with bringing the gas up to the pipeline operating pressure will drain condensed water vapour, potentially containing dust particles, and form a residue requiring disposal. This is not anticipated to be a significant volume and can therefore be stored temporarily on site and removed by a waste contractor at regular intervals.

As the proposal is a low-pressurised, buried gas pipeline, it is not anticipated that the proposed pipeline shall be considered hazardous, nor shall any significant risks be associated with the proposal.

4.5 Noise and vibration

Minor noise impacts are expected to occur during construction of the pipeline from activities such as excavation. At the gas collection points a compression station will bring the gas up to the pipeline operating pressure (approximately 1000 kPa) required for its delivery to the power station. The typical compression station will emit low level electric motor and fan noise. The magnitude of compression station emissions will be small and vary from mine to mine, depending on the gas volume involved. However, as there are almost no residential receivers within the proximity of the proposed pipeline, and gas supply points, significant noise impacts would not be expected. Nonetheless, construction activities shall be undertaken in accordance with the Australian Standard AS 2436-1981 Guide to Noise Control on Construction, maintenance and Demolition Sites.

4.6 Visual

The proposed pipeline transverses an area of highly disturbed landscape that is predominately cleared of vegetation and the surrounding primary land uses are associated with rural and mining activities. As the proposed pipeline shall be constructed underground there shall be negligible visual impacts once the temporary construction phase of the project is complete.

The proposed compression stations at each of the collection points will typically comprise a compact skid mounted enclosure similar in size and appearance to a 'shipping' container. Located within existing mining land the visual impacts are not considered to be significant either during construction or operation, as visual receivers would be largely restricted to those traveling by public road. As such, a visual assessment will not be prepared as part of the environmental assessment.

4.7 Air quality

Limited air quality impacts may be experienced during construction of the proposed pipeline. Potential construction air quality impacts may include emissions from vehicles, refueling activities, and dust generated from excavation and/or clearing processes. These impacts shall be limited to the construction phase of the project and thus the air quality impacts of the project are considered negligible. As such, an air quality assessment will not be prepared as part of the environmental assessment.

4.8 Traffic and transportation

Any increase in the number of traffic movements occurring on local roads during construction of the proposal is anticipated to be negligible. As such, a traffic capacity assessment will not be prepared as part of the environmental assessment.

4.9 Community and stakeholders

The proposed facility would be constructed in a predominantly rural environment that is now dominated by coal mining and electricity production. However, occupants of properties along the proposed route near Bulga and Jerrys Plains townships will be consulted as part of the overall community consultation process. The community will be kept informed of the proposal through the dissemination of accurate information, liaison with appropriate landowners and briefings to elected members and key community groups.

Contact has commenced with the NSW Department of Planning, Singleton Shire Council, relevant coal mine companies and private landholders to identify their design, assessment and/or approval requirements. No major or significant issues have arisen from that process to date.

5. Justification for the Project

There is a need and priority for the State Government of NSW to provide greenhouse gas reducing and environmentally positive technologies in the coal mining and power generation industries.

The proposed pipeline also has a high priority for Macquarie Generation. Firstly, the opportunity to secure the available gas is limited by time. Coal mines on the proposed route are presently flaring gas and other mines along the pipeline route are currently preparing to flare gas in the immediate future. The volume of gas that is critical to the project's economic viability becomes ready for capture progressively over the next 12 months. If the pipeline can not be put in place in that timeframe the opportunity will almost certainly be lost. This is mainly due to the nearby coal mines needing to adopt alternatives to meet their gas disposal consent conditions if Macquarie Generation does not construct the proposed pipeline. Accordingly, the pipeline project needs expedient approval to enable its construction to be completed in time to capitalize the opportunity. As there is no major modification of the Liddell Power Station operation required for the project, Macquarie Generation have the ability to implement the project expediently once approval has been granted.

Further, the proposed pipeline enables Macquarie Generation to meet the GGAS obligations under their electricity contract with Tomago Aluminum. The project enables Macquarie Generation to extract the otherwise wasted energy of the energy-rich methane component of the mine gas. The project will avoid emitting up to 5 million tones of greenhouse gas per year. To achieve this offset Macquarie Generation is required to act now, to avoid an expected tight supply situation in the medium to long term.

In light of the above, Macquarie Generation seeks to have the project classified as a Major Project under the Environmental Planning and Assessment Act 1979, due to the expediency required for approval and the need for the State to provide greenhouse gas reducing technology and environmentally positive technologies in the coal mining and power generation industries.