

MAJOR PROJECT ASSESSMENT
Wellington Gas-fired Power Station



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

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1. BACKGROUND

1.1 Project Description

ERM Power (the Proponent) proposes to construct and operate a gas-fired peaking power station near Wellington in the Wellington local government area. The power station is expected to have a nominal maximum capacity of 600MW, comprising four turbines of 150MW each. As a peaking power station, the facility would respond to period of peak electricity demand, which the Proponent expects would be approximately 4% of any single year, or approximately 350 hours per annum (all four turbines) or 1,400 hours per annum (with only a single turbine in operation).

The proposed power station would be connected to an existing TransGrid 330/132kV substation adjacent to the proposed site of the power station. Gas supply to the site would be provided by a new, approximately 100-kilometre long gas pipeline (part of the subject application) between the site and the existing Central West Gas Pipeline near Alectown, north of Parkes. The gas pipeline would pass through the Wellington, Cabonne and Parkes local government areas, and would include an associated compressor station near Alectown.

1.2 Location and Proposed Project Site

The proposed power station would be located to the north of Wellington, approximately 50 kilometres south of Dubbo on the Central West region of New South Wales. The site is approximately two kilometres north of the centre of Wellington, along the Gulgong Road. The site of the proposed power station is indicated in Figure 1.

The proposed gas pipeline would travel generally in a south-west direction from the power station site towards Alectown. It would cross three major watercourses (Buckinbah Creek, Little River and the Macquarie River) and would pass through the Peak Hill Road reserve at the Goobang National Park. The proposed alignment of the gas pipeline is indicated in Figure 2, with a regional context for the power station also provided.

1.3 Surrounding Land Use

The proposed power station site is agricultural in nature, with gently undulating grazing land and some scattered paddock trees. The site is adjacent to the existing TransGrid Wellington substation, and is surrounded by three existing residential properties. The closest, Nanima House is approximately 700 metres to the west and is topographically elevated relative to the power station site. Mount Nanima lies approximately 1.3 kilometres to the south and Keston Rose Garden Café approximately 1.5 kilometres to the north-west. The closest residential area is the Cadonia subdivision to the north-east, in which the closest residential premises is 1.6 kilometres from the power station site (and most parcels of land within the subdivision are approximately 2.5 kilometres away).

The gas pipeline generally passes through agricultural lands, and traverses rail infrastructure, roads and watercourses. It passes close proximity to the Goobang National Park and the township of Alectown.

1.4 Submissions Report

The Proponent prepared a Submissions Report and lodged it with the Department on 30 September 2008. The Submissions Report adequately addresses issues raised in submissions, and provides further information in relation to noise impacts, consultation, water supply, hydrogeology and clarifications of air modelling assumptions. The Report also includes an updated Statement of Commitments. The Proponent has not altered the scope of the project.

1.5 Need and Justification

On 26 February 2008, the Minister for Planning declared development for the purpose of energy generating facilities with capacity to generate in excess of 250MW to be critical infrastructure projects. In making this declaration, the Minister recognised that additional energy generating development of this scale was essential to the State for economic and social reasons. The Minister based his (as the Minister was at the time) decision on the outcomes of the Owen Inquiry into Electricity Supply in NSW and the annual Statement of Opportunities published by the National Electricity Market Management Company (NEMMCO).

Both the Owen Inquiry and the NEMMCO Statement of Opportunities have recognised that there is a need to provide additional electricity generating capacity in New South Wales to service growing energy demands. At the time the Minister made the abovementioned critical infrastructure declaration, both the Owen Inquiry and the Statement of Opportunities (2007) predicted that additional generating capacity would be required by 2013/2014 to ensure on-going supply within acceptable reliability standards. The 2008 Statement of Opportunities has revised this date and pushed it back to 2014/2015 based on progress with the implementation of the Tallawarra, Uranquinty and Colongra gas-fired power stations. The 2008 Statement of Opportunities highlights that low reserve conditions are expected in 2014/2015 (with an additional 283MW required at that time) unless additional generation capacity is installed before then. Based on forward predictions, the shortfall could be as much as 1200MW by 2017/2018.

While demand management and efficiency measures have a role to play, it is apparent that these approaches, while important, will not serve to entirely mitigate the risk of an energy generation-energy demand imbalance by 2014/2015. Therefore, additional generating capacity is a real and necessary requirement to ensure a secure energy system for the State into the medium term.

Renewable energy developments are likely to play an important role in the provision of sustainable energy to address the State's demands into the future. However, and despite a number of approved and proposed wind farm projects in New South Wales, the implementation of wind energy projects (and other renewable energy proposals) is currently not being undertaken at a rate to sufficient to address the predicted generation shortfalls. This circumstance may change in future, but at this time it would be imprudent to rely solely on renewable energy projects to address the energy supply-demand balance predictions. Further, the Department considers that the most effective means of ensuring an energy generation and supply system that is effective, secure and environmentally balanced is to deliver a diverse range of energy generating options. Beyond that, market factors, consumer choices and carbon regulation will ultimately regulate generation options from the diverse suite of alternatives available.

In this context, the proposed gas fired power station is necessary and justified in terms of its potential contribution to energy generation in New South Wales and its role in a diverse and competitive energy market. Further, the Department considers that the subject project would play an important role in stabilisation and securing energy supply in the Central West Region, particularly in the event of disruptions in transmission between Mount Piper and Wellington, and the growing energy requirements of the region.

Figure 1 - Proposed Power Station Site and Local Context

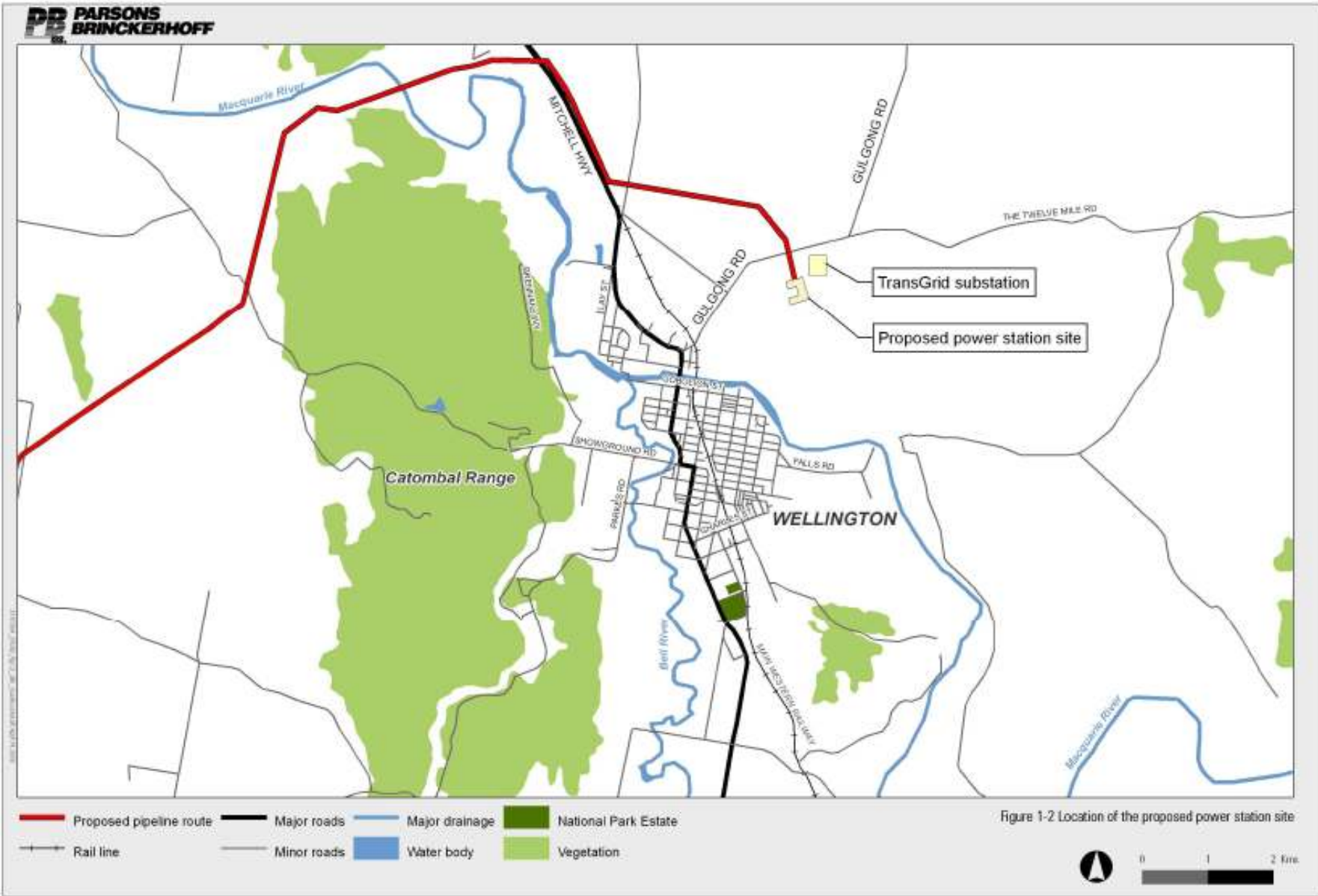
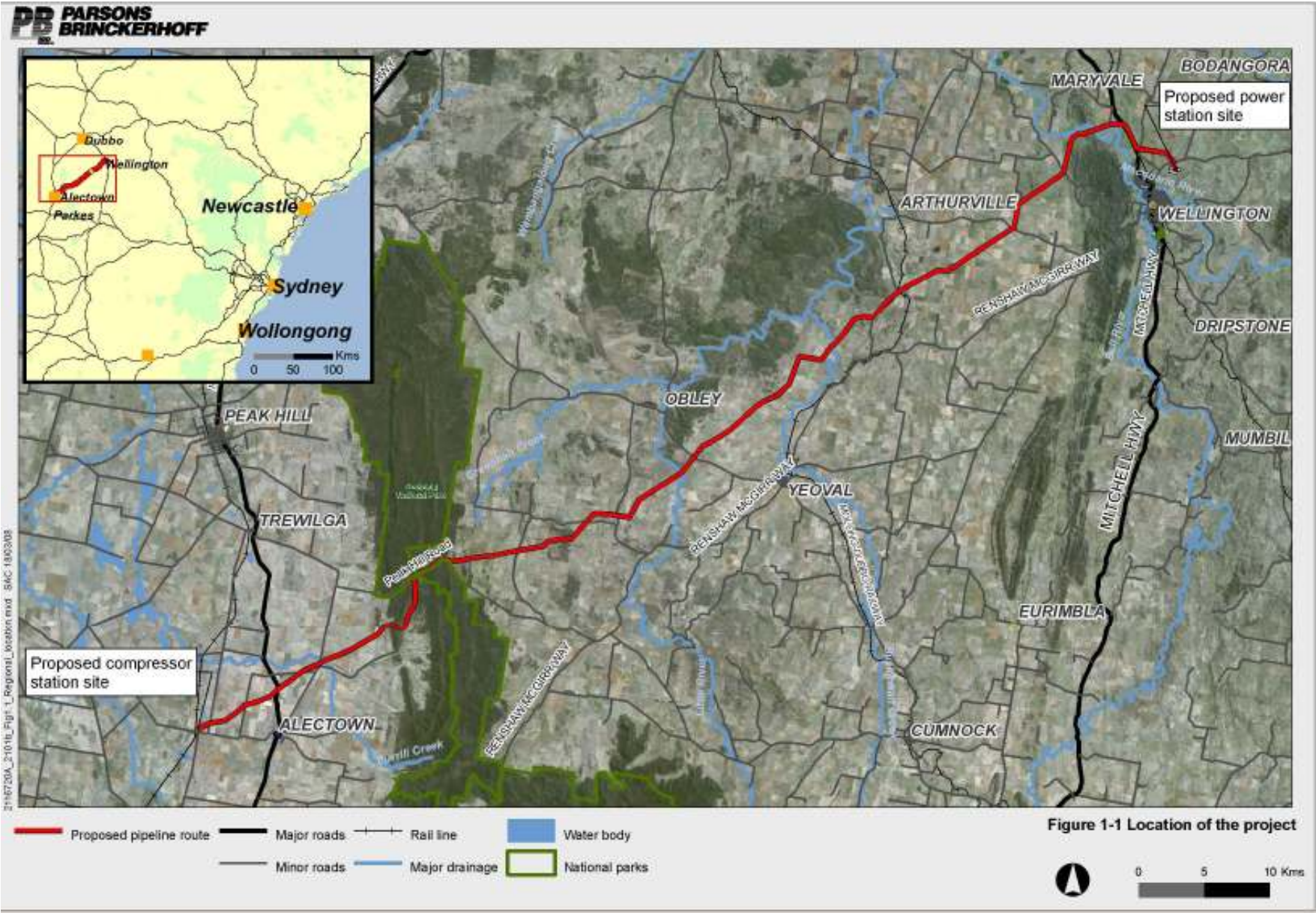


Figure 2 – Proposed Gas Pipeline Route and Regional Context



2. STATUTORY CONTEXT

2.1 Major Project

On 25 November 2006, the Minister for Planning's delegate formed the opinion pursuant to clause 6 of *State Environmental Planning Policy (Major Projects) 2005* that the proposal is for the purpose of development described in Schedule 1 to that Policy (clause 24(a) – development for the purpose of a desalination plant for the purpose of an electricity generation facility that has a capital investment value of more than \$30 million). The proposal is thus declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies.

2.2 Critical Infrastructure Project

The project is a critical infrastructure project under section 75C of the *Environmental Planning and Assessment Act 1979* by virtue of an Order made by the Minister for Planning on 26 February 2008. That Order declares development for the purpose of an electricity generation with capacity to generate at least 250 megawatts to be critical infrastructure, if an application is lodged before 1 January 2013. The subject project relates to a power station with capacity to generate 600 megawatts and an application was made on 22 November 2006. It therefore meets the criteria to be considered a critical infrastructure project.

2.3 Environmental Planning Instruments

There are no State Environmental Planning Policies that apply to the proposal and that substantially govern the carrying out of the project.

2.4 Minister's Approval Power

The application and environmental assessment were placed on public exhibition from 21 May 2008 until 23 June 2008 and submissions invited in accordance with section 75H of the Act. The Department has met all of its legal obligations so that the Minister can make a determination regarding the project.

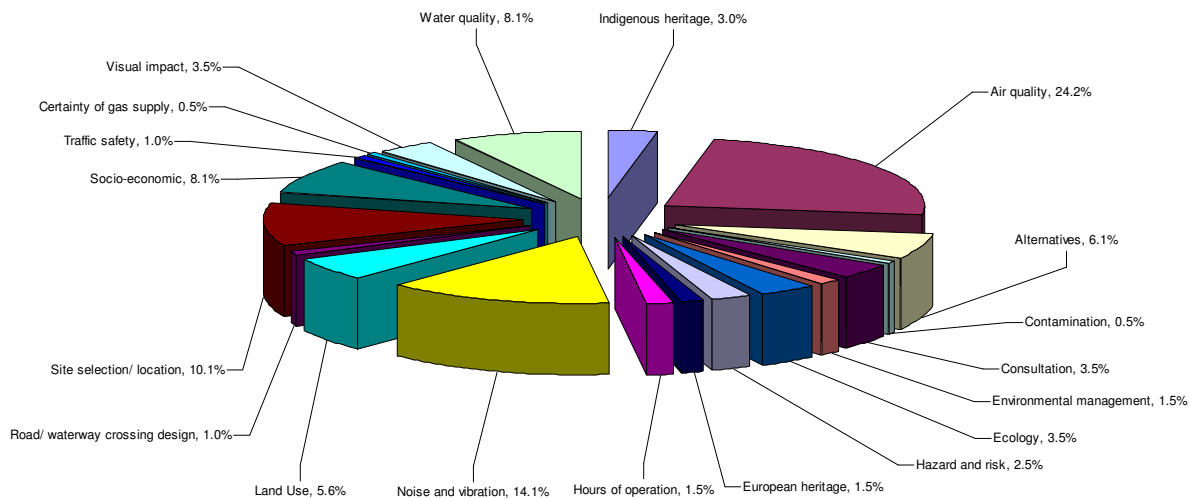
It is also noted that the Environmental Assessment submitted in support of the subject application adequately addresses the Director-General's requirements.

3. CONSULTATION AND ISSUES RAISED

The project application and accompanying Environmental Assessment were public exhibited from 21 May 2008 until 23 June 2008, during which time 60 submissions were received. Four of these submissions were from State Government agencies, with the remaining 54 made by members of the public and community groups. No submissions were received from local government.

None of the four State Government agency submissions objected to the project, but raised issues for further consideration as part of the assessment process. All 54 public submissions objected to the project. Key issues raised in public submissions included air quality impacts (24.2%), noise and vibration impacts (14.1%) and water quality impacts (8.1%). A significant number of submissions raised concern about the impact of the project on local land values, amenity and quality of life, expressed principally through issues of site selection (10.1%), socio-economic impacts (8.1%), alternatives (6.1%) and land use (5.6%). A breakdown of issues raised in submissions is presented in Figure 3.

Figure 3 - Breakdown of Issues Raised in Submissions



Key issues raised in State Government agency submission can be summarised as follows:

- Department of Environment and Climate Change – **raised no objection to the project**, but expressed concerns over the elevated noise impacts from the project at the closest residential receptors. The DECC also provided comments and recommended conditions of approval relating to environmental management and auditing, measures to mitigate and manage impacts on indigenous heritage, air quality performance, the storage of chemicals and the alignment of the gas pipeline in proximity to the Goobang National Park.
- Department of Primary Industries (Fisheries) – **raised no objection to the project**, but raised concerns of over the design of watercourse crossings to prevent adverse impacts on aquatic environments and threatened fish species.
- Department of Primary Industries (Mineral Resources) – **raised no objection to the project**, and recommended that the exploration title holders should be consulted in relation to the gas pipeline route.
- Department of Water and Energy – **raised no object to the project**, but recommended further consideration of water supply security, design of watercourse crossings and groundwater conditions.

4. ASSESSMENT OF ENVIRONMENTAL IMPACTS

Key issues raised in the submissions in response to the public exhibition of the project and/or identified during the Department's assessment included:

- air quality impacts;
- noise impacts;
- ecological impacts; and
- impacts on Aboriginal heritage.

All other issues are considered to be minor and have been addressed as part of the Proponent's Statement of Commitments.

4.1 Air Quality Impacts

Issues

There is potential for the generation of dust and consequent impacts on nearby receptors during the construction of the power station and associated gas pipeline. The Proponent has suggested that it would minimise the generation of dust, and manage potential impacts through standard construction methods. Such measures include the minimisation of soil disturbance areas, the use of water trucks/ sprays where appropriate, the sealing of roads where practicable and stabilisation of disturbed areas as soon as possible after the completion of works. Dust monitoring would be undertaken to ensure that dust mitigation and management measures were effective in minimising the generation of dust and impacts on the amenity of potentially affected receivers.

During operation of the project, there is potential for air quality impacts from the power station itself, and from the proposed compressor station. The Proponent expects that emissions from the power station will include oxides of nitrogen, sulfur dioxide, carbon monoxide and carbon dioxide, particulates and traces of air toxics. The compressor station is expected to pose potential impacts through the emission of oxides of nitrogen and particulates. The Environmental Assessment for the project presents the results of air dispersion modelling undertaken for each of these sources. In the case of emissions from the power station, the Proponent considered normal operating conditions, as well as a start-up scenario (under which emissions are expected to be higher in pollutant loads, for a limited duration).

The results of the air dispersion modelling undertaken by the Proponent for normal operation of the power station are summarised in Table 1 below. The Environmental Assessment presents expected ground level concentrations at a number of sensitive receiver locations in the area, but for the purpose of this report, concentrations of pollutants at the most affected receiver location (Cadonia Estate) have been presented. Other receivers at Mount Nanima, Keston Rose Garden Café and Nanima House area expected to experience lower ground level concentrations than the Cadonia Estate receiver.

Table 1 - Predicted Air Quality Impacts from Normal Power Station Operations

Pollutant	Maximum Ground Level Concentration (μgm^{-3})	Ground Level Concentration at Most-affected Receiver (μgm^{-3})	Criteria (μgm^{-3})
PM ₁₀ (24-hour)	1.29	0.58	50
PM ₁₀ (annual)	0.06	0.05	30
NO _x (1-hour)	63.3	34.3	246
NO _x (annual)	0.33	0.23	62
SO ₂ (10-minute)	3.02	1.63	712
SO ₂ (1-hour)	2.11	1.14	570
SO ₂ (24-hour)	0.22	0.10	228
SO ₂ (annual)	0.01	7.70×10^{-3}	60
CO (1-hour)	15.4	8.33	30,000
CO (8-hour)	4.30	1.90	10,000
Benzene (1-hour)	0.13	0.07	29

Benzene (annual)	6.8×10^{-4}	4.73×10^{-4}	-
Toluene (1-hour)	0.24	0.13	360
Toluene (24-hour)	0.03	0.01	-
Toluene (annual)	1.28×10^{-3}	8.90×10^{-4}	-
Xylenes (1-hour)	0.12	0.07	190
Xylenes (24-hour)	0.01	5.61×10^{-3}	-
Xylenes (annual)	6.30×10^{-4}	4.40×10^{-4}	-
Formaldehyde (1-hour)	1.34	0.73	20
Formaldehyde (24-hour)	0.14	0.06	-
Polycyclic aromatic hydrocarbons (PAHs) (1-hour)	4.16×10^{-3}	2.25×10^{-3}	0.4
Polycyclic aromatic hydrocarbons (PAHs) (annual)	2.00×10^{-5}	2.00×10^{-5}	-

Based on the predicted pollutant concentrations presented in the table above, the Proponent highlights that the power station will comfortably meet acceptable air quality outcomes under normal operating conditions. As a peaking power station, however, it is also important to consider impacts during start-up because emissions during start-up cycles are typically higher than during normal operating scenarios. The predicted ground-level concentrations during start-up are presented below, including predicted maximum concentrations and predicted impacts at the most-affected receiver (Cadonia Estate).

Table 2 - Predicted Air Quality Impacts during Start-up of Power Station

Pollutant	Maximum Ground Level Concentration (μgm^{-3})	Ground Level Concentration at Most-affected Receiver (μgm^{-3})	Criteria (μgm^{-3})
PM ₁₀ (24-hour)	1.31	0.54	50
PM ₁₀ (annual)	0.07	0.04	30
NO _x (1-hour)	368	166.8	246
NO _x (annual)	2.26	1.44	62
SO ₂ (10-minute)	2.83	1.29	712
SO ₂ (1-hour)	1.98	0.90	570
SO ₂ (24-hour)	0.23	0.10	228
SO ₂ (annual)	0.01	7.72×10^{-3}	60
CO (1-hour)	13.9	6.28	30,000
CO (8-hour)	4.48	1.78	10,000

As with normal operations, air quality impacts during start-up comfortably meet established air quality criteria, with the exception of oxides of nitrogen. During start-up, the Proponent predicts that the ambient air quality criterion of nitrogen dioxide (1-hour average) would be met at all sensitive receivers, but would be exceeded in areas to the east and north-east of the site, between two and three kilometres from the power station. The Proponent highlights, however, that start-up conditions would only last for about six minutes and therefore strict comparison to the 1-hour average criterion is conservative (the Environmental Assessment assumed continuous operation under start-up conditions for the purpose of the air dispersion modelling).

The Proponent has committed to installing dry, low-NO_x technology as part of the project to ensure minimisation of NO_x emissions from the plant. In addition, the Proponent has committed to air quality monitoring and management of air quality performance through an Operation Environmental Management Plan.

The compressor station for the gas pipeline component of the project is located near Alectown and approximately 2.5 kilometres from the nearest and potentially most-affected receiver (Mountain View). The compressor station would be run by a reciprocating gas engine, utilising gas from the pipeline, with combustion gases generated and emitted to atmosphere as a consequence. The results of air dispersion modelling for this emission source are presented in Table 3 below, and indicated that ambient air quality criteria would be met.

Table 3 - Predicted Air Quality Impacts from the Compressor Station

Pollutant	Maximum Ground Level Concentration (μgm^{-3})	Ground Level Concentration at Most-affected Receiver (μgm^{-3})	Criteria (μgm^{-3})
PM ₁₀ (24-hour)	31.4	0.26	50
PM ₁₀ (annual)	0.62	0.20	30
NO _x (1-hour)	48.7	2.92	246
NO _x (annual)	0.87	0.03	62

In addition to local and regional air quality impacts associated with the project, the Proponent has considered the implications of greenhouse gas emissions from the operation of the power station. It is estimated that the project will result in the emission of up to 97,544 tonnes of CO_{2-e} per annum, assuming all four turbines operate for 350 hours per year (approximately 4% capacity factor). In terms of greenhouse gas intensity, the Proponent expects that the project will emit 0.445 tonnes of CO_{2-e} per megawatt-hour, which it suggests compares favourably with the 1996 NSW pool coefficient (0.969 tonnes per MWh), the 2005 Australian average from major power stations (1.021 tonnes per MWh) and the 2005 Australian average for black coal power stations (0.936 tonnes per MWh). The Proponent argues that the project is environmentally beneficial if considered in the context of alternative energy generation options involving coal.

Submissions

Almost a quarter of all issues raised in submissions (24.2%) related to the air quality impacts of the project. Submissions generally raised concerns with respect to the modelling approach, suggesting that the meteorology of the region was not well known or reflected in the modelling presented in the Environmental Assessment, concerns over air pollution in general, and specific concerns about the health impacts of emissions (including issues around asthma and sulfur emissions, in particular). A number of submissions also raised concern over the greenhouse gas emissions from the project, stating a preference for alternative, non-emissive energy sources.

The Department of Environment and Climate Change did not raise any objection to the project, based on air quality impacts or greenhouse gas emissions. It did, however, provide recommended conditions of approval relating to these issues.

Consideration

The Department is generally satisfied that the Proponent has undertaken an appropriate level of assessment of the air quality impacts of the proposed project, using an appropriate methodology consistent with current modelling and assessment guidelines. While the Department appreciates concerns raised in public submissions in relation to modelling methodology and assumptions, and particularly in relation to the meteorology of the area, it is satisfied that the Proponent's approach is robust and justified. The Department considers that the meteorological assumptions upon which the air dispersion modelling are based are representative of the site and provide a reasonable articulation of likely dispersion performance.

There is potential for dust generation during the construction of the project and this is particularly relevant for the power station site, around which there are located a number of residential receivers. The Department concurs with the Proponent that issues of dust generation and management are generally well-known and subject to established best practice construction dust mitigation and management measures. The general management approach outlined by the Proponent in the Environmental Assessment is considered appropriate and would form the basis of a solid Construction Environmental Management Plan dealing with issues of construction dust impacts. The Department has therefore recommended imposition of a condition of approval requiring such a plan, with specific reference to construction dust management.

In relation to operational air quality impacts, the Department highlights that under normal operating conditions, the power station will comfortably meet established ambient air quality criteria. Further, it is also noted that the plant will achieve regulated pollutant concentrations at the point of discharge. If anything, the predicted air quality impacts presented in the Environmental Assessment are highly conservative and overstate the likely effects of

the project on the local and regional airshed. That is because, for the purpose of the assessment, the Proponent has assumed continuous operations when in fact that project (as a peaking power station) is likely to operate for significantly less than continuously (depending on market conditions, perhaps a maximum of 10-15% in any single year) and only in periods of peak demand (ie limited duration for any single operational event).

This point is fundamental to consideration of the air quality impacts of start-up operations, during which the concentrations of oxides of nitrogen are, in particular, elevated and in one case (1-hour averaging period) are predicted to exceed the relevant ambient air quality criterion. As the Proponent points out, start-up cycles are expected to last for about six minutes, compared with the assumption underpinning the air quality assessment of continuous operations. While the modelling has predicted an exceedance, this is unlikely to be the case in reality given the relatively short duration of start-up activities. A further point to note in this regard is that air quality criteria are not conservatively predicted to be exceeded at residential receptors, with peak NO_x impacts expected further to the east. The Department is therefore satisfied that under start-up conditions, acceptable air quality outcomes will be achieved by project and the environment and human amenity will be protected.

With respect to concerns raised in submissions in relation to health impacts from air emissions, particularly the respiratory effects of sulfur compounds, the Department reinforces that emissions from the project will be relatively low, and in the case of pollutants such as sulfur dioxide, well below the stipulated ambient air quality criteria. These criteria take into account environmental, amenity and health effects from air pollutants. The Department also notes that the sulfur dioxide concentrations generated by the project at ground level are almost negligible.

To manage the air quality performance of the project, the Department has recommended imposition of conditions of approval that limit the concentration of pollutants from the power station and the compressor station, in line with regulated values under the *Protection of the Environment Operations (Clean Air) Regulation 2002*. As the principal regulated pollutant, the Department considers it appropriate to impose emission limits for oxides of nitrogen only. The reasoning for this approach is twofold: firstly, other regulated pollutants are well below regulated limits, and so much so that it is expected that compliance with limits would be achieved under all scenarios; and by regulating NO_x as the principal pollutant, other lower pollutant emissions can be effectively indirectly regulated (noting that pollutant emissions will generally be in similar proportions to each other).

To ensure that the project is in fact achieve acceptable air quality outcomes in reality, the Department, with advice from the Department of Environment and Climate Change, has recommended a comprehensive air quality monitoring regime for both the power station and the compressor station discharge points. This monitoring would be complemented with an air quality performance verification process, undertaken within three months of the commencement of operation, to demonstrate that predicted air quality performance is being achieved. In the event that predictions made in the Environmental Assessment are exceeded, and or established air quality criteria are not met, the Proponent would be required to identify and implement additional mitigation measures.

In relation to the greenhouse gas performance of the project, the Department concurs with the Proponent's assertions that emissions from the project are acceptable. It is highlighted that the project is significantly less greenhouse gas intensive than current average energy sector operations in New South Wales and across Australia. The project also performs significantly better than coal-fired generation options. While the Department appreciates and supports calls made in public submissions to support renewable energy sources instead of the subject project, it does recognise that such generation options do not currently represent a viable alternative to a 600MW gas-fired peaking power station in the locality. Notwithstanding the technical complications with operating a renewable energy facility (particularly based on wind energy) in the area as a fast-response peaking facility, the scale of such a development and commercial realities of its development make it unlikely as a viable alternative to the current proposal. That is not to say that renewable energy sources are not, and will not continue to be a very important component in securing the State's energy future, but that gas-fired generation is a necessary component of a diverse energy generation sector and an important transition from coal to greater reliance on renewable energy sources.

4.2 Noise Impacts

Issues

The project has the potential to generate noise impacts at surrounding receivers during construction of the power station, gas pipeline and compressor station, and during operation of the power station and compressor station components.

The Environmental Assessment presents predicted construction noise impacts, and compares these with established construction noise goals for receivers relevant to the power station, gas pipeline and compressor station. This assessment is summarised in the table below. Predicted exceedances of construction noise goals are highlighted in red, as relevant.

Table 4 - Predicted Construction Noise Impacts

Receiver	Construction Noise Goals (dB(A))	Predicted Construction Noise (dB(A))
Power Station		
Mount Nanima	35	42.5
Cadonia Subdivision	35	37
Keston Rose Garden Café	35	41.5
Nanima House	35	48
Compressor Station		
Mountain View, Alectown	50	47.5
"Property A"	50	42
Gas Pipeline		
300 metres from pipeline	50	56.5
350 metres from pipeline	50	55.5
400 metres from pipeline	50	54
500 metres from pipeline	50	52

The Proponent intends to apply standard construction hours to the project works, and employ all reasonable and feasible noise mitigation measures during the construction phase. These measures would underpin the development and implementation of a Construction Environmental Management Plan.

The Environmental Assessment also presents predicted operational noise impacts from the project, with consideration of noise from the power station component during neutral and adverse weather conditions, and from the compressor station under worst-case night-time operations. The results of operational noise modelling are reproduced in the tables below, with predicted exceedances of noise criteria derived in accordance with the *NSW Industrial Noise Policy* indicated in red.

Table 5 - Predicted Operational Noise Impacts – Power Station

Receiver	Noise Criteria (dB(A))	Predicted Noise Impacts (dB(A))	
		Neutral Conditions	Adverse Conditions
Mount Nanima	35	36	38.5
Cadonia Estate	35	26.5	29.5
Keston Rose Garden Café	35	34.5	37
Nanima House	35	43	44.5

Table 6 - Predicted Operational Noise Impacts – Compressor Station

Receiver	Noise Criteria (dB(A))	Predicted Noise Impacts (dB(A))
Mountain View, Alectown	35	34.5
"Property A"	35	31

As can be seen from the outcomes of the noise modelling presented above, the compressor station component of the project is expected to comply with operational noise criteria under all conditions. In contrast, the power

station component is predicted to exceed operational noise criteria at a number of receivers, particularly under adverse weather conditions. The most-affected receiver, Nanima House, is likely to experience exceedances of up to 8 dB(A) under neutral conditions and as much as 10 dB(A) under adverse conditions. With the exception of a minor exceedance at Mount Nanima (1 dB(A)), noise criteria would be met during neutral weather conditions. Exceedances of 2-4 dB(A) are expected at Mount Nanima and the Keston Rose Garden Café under adverse conditions.

The Proponent has argued that it has applied all reasonable and feasible noise mitigation measures to the project, and notwithstanding cannot achieve operational noise criteria. It has suggested that where noise criteria are exceeded by no more than 5 dB(A) (ie noise impacts between 35 and 40 dB(A)), it would offer to architecturally treat affected properties to reduce internal noise. Where noise criteria are exceeded by more than 5 dB(A) (ie >40 dB(A)), the Proponent would negotiate to acquire the affected property. Based on this approach, the Proponent would treat the Mount Nanima and Keston Rose Garden Café, and seek to purchase the Nanima House property.

As part of its Submissions Report, the Department required the Proponent to undertake further work into options for addressing the noise impacts of the project, particularly at Nanima House. In particular, the Department required the Proponent to consider at-source and on-site options for mitigating noise impacts, including changes to the configuration and orientation of plant and equipment, and options for acoustic barriers on the site. The outcomes of this additional work suggests that further at-source and on-site measures would not appreciably alter the acoustic performance of the project and its impacts on surrounding receivers.

The Proponent did, however, pursue further options for treating and/ or acquiring the Nanima House property. These include direct negotiations with the landowner over the potential to acquire the property, and the terms of such an acquisition. The Department understands from the Proponent that the parties were not able to agree on the terms of acquisition. The Proponent's Submissions Report also presents consideration of a noise barrier on the Nanima House property. Noise modelling undertaken based on an assumption of a noise wall at Nanima House suggests that such an acoustic barrier, if approximately 10 metres in length and 5 metres in height, would mitigate noise from the project and achieve the 35 dB(A) noise criterion at Nanima House if installed approximately ten metres from its façade.

Submissions

Noise impacts from the project represented 14.1% of all issues raised in submissions. Noise concerns articulated in public submissions were generally either a broad concern over the acoustic amenity implications of the project, or specific opposition to the project based on an inability to meet established operational noise criteria.

The DECC has provided recommended noise limits for the project, which will be reproduced in the Environment Protection Licence for the project. These noise limits were based on an understanding that the Department would allow for acquisition rights with respect to the Nanima House property, and rights to architectural treatments for properties affected by more than 38 dB(A).

Consideration

In relation to construction noise impacts, the Department is satisfied that the Proponent has undertaken an adequate level of assessment and concurs with the Proponent that construction noise impacts should be subject to best practice mitigation and management. With the exception of the Nanima House property, construction noise impacts associated with the power station and compressor station components of the project are expected to exceed noise goals by no more than about 5-6 dB(A). This level of impact is considered acceptable given the limited duration and transient nature of construction noise impacts. The Department considers that the Proponent will need to pay much more careful attention to construction noise impacts at Nanima House (given a prediction of 13 dB(A) above established noise goals). However, the Department is satisfied that best practice construction management and close consultation with the owner of the Nanima House property will enable the Proponent to minimise amenity impacts at the residence for the duration of construction works.

It is important to note that the Proponent has assessed construction noise based on worst-case assumptions and conservatism associated with applying continuous noise generation characteristics for the duration of

construction. In reality, the construction period will be characterised by periods of more and less intense noise impacts and it is reasonably possible for the Proponent to schedule works to avoid the noisiest works at the most sensitive times, and to include appropriate periods of respite for affected landowners. The Department has recommended imposition of standard construction hours as a condition of approval, noting that the Proponent will need to pay particular attention to scheduling of works within those times to achieve its stated aim of best practice noise mitigation and management. The recommended conditions of approval require a formal Construction Environmental Management Plan, including consideration of noise and vibration issues, to clearly document how the Proponent will proactively and reactively manage construction works to minimise acoustic amenity impacts to the greatest extent practicable.

In relation to operational noise impacts, the Department considers that the noise impacts from the compressor station are acceptable and unlikely to adversely impact on the acoustic amenity of surrounding receivers. The Department therefore recommends imposition of a condition of approval that requires the compressor station to be designed and operated to achieve 35 dB(A) at the two closest properties (ie Mount View and "Property A").

Receivers affected by operational noise from the power station component of the project fall into three categories:

1. those at which noise criteria are met (Cadonia Estate);
2. those at which noise criteria are marginally exceeded under certain conditions (Mount Nanima and Keston Garden Café); and
3. those likely to experience elevated noise impacts from the project (Nanima House).

In the case of the impacts at Cadonia Estate, the Department considers the Proponent's assessment to appropriate and its outcomes reasonable. The Department recommends imposition of noise limits for this receiver (35 dB(A)) and notes that this is likely to be comfortably met by the project.

In the case of Mount Nanima and the Keston Rose Garden Café, the Department considers that impacts under neutral weather conditions would be acceptable. The predicted 1 dB(A) exceedance at Mount Nanima under these meteorological conditions is not considered significant, and within the confidence levels and assumption certainties implicit in the modelling approach. With respect to exceedances of noise limits under adverse weather conditions (2-4 dB(A)), the Department suggests that these exceedances need to be considered in light of the probability of the power station operating concurrently with adverse weather conditions, and the frequency of such concurrence in any particular time period. Given that the power station will operate up to 10% in any year, even if operation occurs concurrently with adverse weather conditions on each occasion, the total duration of exceedance of noise limits would be limited. Further, the magnitude of the exceedance is considered to be minor (ie less than 5 dB(A)). The Department therefore recommends imposition of noise limits of 39 dB(A) and 37 dB(A) at Mount Nanima and Keston Rose Garden Café, respectively. The Department of Environment and Climate Change supports this approach and has agreed to licence the power station accordingly.

To protect the interests of the affected landowners, the Department also recommends the imposition of a condition of approval that allows any affected landowner (of Mount Nanima and Keston Rose Garden Café) to request architectural treatment of their property. Such treatments may include, for example, double glazing or such other measures as the parties may agree. The noise performance of the project would be subject to monitoring requirements through the conditions of approval and a comprehensive noise performance verification review within three months of the commencement of operation.

With respect to the predicted noise impacts at the Nanima House property, the Department recognises the elevated nature of acoustic impacts and the genuine concerns raised by the land owner in relation to the effects on their amenity. The situation confronting the Department in this case is therefore one of elevated impacts from a proposed project that has been deemed essential to the State, and justified as necessary at a regional and a State level. These two competing factors need to be balanced in considering the merits of the project. In considering the merit balance for the project, the Department highlights that:

1. the project is considered essential to the State and will have significant benefits for energy supply and security at a State and regional level;
2. the project is not expected to operate more than 10% in any year;
3. the noise impacts of the project, while elevated, are elevated with respect to a very quiet existing background acoustic environment (relative difference) rather than being excessive in absolute terms;

4. the Proponent has applied all reasonable and feasible noise mitigation measures at the power station (at-source controls) and is prepared to provide further at-receiver mitigation.

With regard to the last point, the Department notes the Proponent's suggestion of a noise wall on the Nanima House property. While the Department accepts that this option may in fact reduce noise impacts to meet Industrial Noise Policy limits, it considers the outcome to be sub-optimal in terms of visual amenity implications and heritage impacts (noting the heritage value of the property). The Department considers that noise mitigation should not physically intrude into the Nanima House property and more than is necessary to reasonably deal with noise impacts, and without significant impacts in other areas. While the Department considers that a noise wall is sub-optimal, the landowner and the Proponent may agree to such an approach (noting that, for example, the landowner may form a different view from the Department in relation to the relative significance of acoustic and visual amenity).

Noting the arguments above, the Department considers that the Minister should grant approval to the project despite the fact that noise criteria derived under the Industrial Noise Policy and strictly applied would not be met. In this case, the Department considers the benefits of and need for the project outweighs the negative aspects of the elevated noise impacts predicted at this particular property. Notwithstanding, the Department considers it fundamental to protect the landowner's interests, and has therefore recommended conditions of approval that allow the landowner to voluntarily seek acquisition of the Nanima House property. Should the project generate a noise impact at the Nanima House property above 40 dB(A) (or 45 dB(A) in the case of short duration sleep disturbance impacts), the landowner may request that the Proponent acquire the property at market value. The conditions of approval provide for independent valuation and dispute resolution by the Director-General, if required. The Department highlights that this approach does not preclude alternative arrangements being made between the parties, for example, negotiation agreements dealing with noise impacts and mitigation.

4.3 Ecological Impacts

Issues

Construction of the power station component of the project will require clearing of remnant vegetation on the site. The Environmental Assessment indicates that this will involve the removal of 20 scattered paddock trees over an area of approximately 4.2 hectares. The Proponent argues that the loss of these trees is not significant and does not represent a significant ecological impact.

With respect to the gas pipeline component on the project, the Proponent has indicated that it endeavoured to align the pipeline to avoid the need to clear native vegetation. Notwithstanding, total avoidance was not possible. It is estimated that 37.2 hectares of native vegetation would need to be cleared during construction of the pipeline, including some vegetation communities listed as endangered. Expected clearing rates for vegetation communities along the pipeline route are summarised in Table 7.

Table 7 - Expected Vegetation Clearing along Gas Pipeline Route

Vegetation Community	Area to be Cleared (ha)
Fuzzy Box Woodland (threatened ecological community)	0.5
Ironbark/ Black Cyprus Woodland	7.7
Red Stringybark Woodland	2.3
River Red Gum Woodland	3.1
Scattered paddock trees including some areas of former Gum Woodland	14.0
Tumbledown Red Gum and Dwyers Red Gum Woodland	6.4
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland (threatened ecological community)	3.3
Total clearing	37.2

The Proponent argues that the extent of clearing necessary for the construction of the gas pipeline is not significant, and would not significantly impact on ecological values. Notwithstanding, it has committed to further minimising clearing to the greatest extent reasonably possible during detailed design of the project. It has also

committed to an off-set package for the vegetation loss, to be developed and implement prior to the commencement of construction.

In addition to consideration of vegetation loss, the Environmental Assessment presents consideration of the impacts of the project on a number of fauna species. In each case, the Proponent concludes that the project will not have a significant effect.

Submissions

Concerns over impacts of the project on ecology comprised 3.5% of all issues raised in submissions. Most submissions objected to the extent of vegetation clearing required for the project.

The Department of Environment and Climate Change did not object to the level of impact on biodiversity and threatened species, but supported the Proponent's commitment to pursue a habitat off-set package. The DECC also recommended that a formal registered survey be undertaken of the Peak Hill-Baldry road that passes through Gingham's Gap where it is bounded by the Goobang National Park. Such a survey would assist in clearly identifying the route of the pipeline relative to the Goobang National Park, noting that the DECC would need to grant an easement should the pipeline encroach into the National Park.

The submission from the Department of Primary Industries highlighted the presence of a number of sensitive watercourses in the region with the potential to be impacted by the project (particularly the construction of the gas pipeline). It recommended that careful attention be paid to the design of watercourse crossings to ensure that the potential impacts on aquatic threatened species are minimised and avoided.

Consideration

The Department considers that the Proponent has undertaken an appropriate level of assessment of the potential impacts on ecology associated with the project. In general terms, it concurs with the Proponent's assertion that the impacts associated with the power station component of the project will be minimal and the principal focus of impact mitigation and management should be on the gas pipeline component. While there will need to be some vegetation clearing on the power station site, the Department considers that the extent and quality of this vegetation is not significant, and superior ecological and visual amenity outcomes can be achieved with appropriate landscaping of the site.

In relation to the ecological impacts of the gas pipeline component of the project, the Department notes that impacts potentially stem from two key areas: the clearance of vegetation; and watercourse crossings. In the case of vegetation clearance, the Department is satisfied that the Proponent, through its preliminary design work, has endeavoured to minimise the extent of vegetation clearing through careful selection of the pipeline alignment. It is recognised that this will be an on-going process through the detailed design phase, but the Department is satisfied that final route alignment options, if they do in fact deviate from the preliminary alignment, will not result in a significant impact on habitat, species or populations.

The Department does, however, consider it important to off-set the vegetation lost as a result of the gas pipeline construction and notes that there is significant potential to have a positive ecology effect through careful location of compensatory habitat to complete existing high-quality vegetation in the region. The Department therefore recommends that the Proponent be required to develop and implement an off-set package equivalent to 47 hectares of equal or better value than the vegetation to be cleared for the gas pipeline. In deriving this area for compensation, the Department has taken into account that some 14.0 hectares of vegetation to be cleared is of generally poor quality, while the remaining 23.2 hectares is significant in terms of quality, composition and threatened species status. The Department considers it appropriate to apply an off-set ratio of 2:1 in this case, resulting in an off-set requirement of 46.4 hectares (rounded to 47 hectares). The recommended conditions of approval require the Proponent to develop the off-set package in consultation with the Department of Environment and Climate Change and to place a particular focus on maximising the presence and protection of the threatened vegetation communities (Fuzzy Box Woodland and White Box-Yellow Box-Blakely's Gum Grassy Woodland) as part of the off-set package. The recommended conditions also direct that compensatory habitat provision is to take into account connectivity with other conservation areas, edge effects and long-term management.

With respect to impacts on aquatic threatened species, the Department considers that the final detailed design of watercourse crossings will be fundamental to minimising and avoiding potential impacts. In this regard, the Department notes the Proponent's commitment to directionally drill under the three most significant watercourses along the proposed pipeline route: Macquarie River, Little River and Buckinbah Creek. This commitment is reinforced as a recommended condition of approval. In the case of all other watercourse crossings, the Department recommends that final watercourse crossing designs be developed in consultation with the Department of Water and Energy and the Department of Primary Industries, and consistent with guidance from those agencies on threatened species and riparian management issues. Final detailed designs for all watercourse crossings, demonstrating compliance with these requirements, would be submitted to the Director-General for approval.

The Department is satisfied that subject to the imposition of these measures, the project is unlikely to have an impact on threatened species or biodiversity more generally.

4.4 Impacts on Aboriginal Heritage

Issues

The proposed power station site is highly disturbed as a result of historical use and agricultural activities, and is unlikely to present any significant potential for the presence of Aboriginal heritage items. Further, the location of the site relative to watercourses, drainage lines and local topography support a conclusion of low likelihood of heritage significance.

In contrast, the gas pipeline component of the project is much more likely to potentially impact on items of Aboriginal heritage significance. The Environmental Assessment notes that 25 heritage items have previously been identified and recorded in a ten-kilometre corridor around the gas pipeline route. These items include 13 artefact scatters, six scarred trees, two burial grounds, one bora ground, one grinding groove, one stone arrangement and one stone cairn.

As part of the assessment of the proposed project, the Proponent applied an initial site prediction model to consider the potential for certain types of Aboriginal heritage items to be located along the pipeline alignment, and supplement this with field surveys within 200 metres of the alignment. The results of these two approaches are summarised in the tables below.

Table 8 – Outcomes of Site Prediction Modelling

Site Type	Potential Presence	Potential Location
Open artefact scatters/ open campsites	High to moderate	Flat, open areas associated with creeks
Isolated artefacts	High	Landforms associated with past Aboriginal activities (ie ridgelines, level areas with access to water)
Scarred/ carved trees	Moderate	Old tree growth occurrences associated with Goobang National Parl, Macquarie, Bell and Little Rivers and tributaries
Burial mounds, carved tree	Moderate to low	-
Bora ground	Low	-
Grinding grooves	Moderate to low	Areas north of Macquarie River in association with sandstone and/ or granite formations
Stone arrangements and cairns	Low	-
Quarries	Moderate to low	-

Table 9 – Outcomes of Site Survey Work

Site	Type	Description	Assessed Significance
1	Artefact scatter	Two chert flakes, one red and one black	Low
2	Artefact scatter	Four chert flakes, 4 silcrete flakes, three quartz bipolar flakes	Low
3	Scarred tree	50 x 40 centimetre scar	High
4	Artefact scatter	Two chert flakes	Low

The Proponent indicates that Site 1 and Site 4 are likely to be directly impacted by the construction of the gas pipeline. However, given the assessed low significance of items at these sites, the impact on Aboriginal heritage is argued by the Proponent to be minimal. With respect to Site 2, the Proponent considers it practical to avoid impacts on items at this site through the detailed design process for the gas pipeline. Site 3, which has been assessed by the Proponent as having high significance, would be avoided entirely and protected with a 10-metre buffer during construction works.

The Proponent recognises that additional heritage items may be discovered during construction works, or impacted as a result of minor refinements to the gas pipeline route as part of the detailed design process. To address these possibilities, the Proponent has committed to developing and implementing a program, in consultation with local Aboriginal stakeholders, to identify and assess the historic and contemporary social, cultural and spiritual Aboriginal heritage values of the project area, including full inspection of all known Aboriginal sites. This would be complemented by a strategy to avoid and minimise harm to Aboriginal objects, and to salvage potentially affected items, where appropriate.

Submissions

Approximately 3.0% of all issues raised in submissions identified impacts on Aboriginal heritage as being of particular concern. One submission provided a comprehensive review and comment on Aboriginal heritage issues, and raised concerns in relation to the veracity and completeness of the heritage impact assessment presented in the Environmental Assessment. The submission called on the Proponent to undertake a detailed Aboriginal heritage assessment based on final pipeline design, in full and transparent consultation with the local Aboriginal communities. The submission also suggested the presence of a significant number of other Aboriginal heritage items in the region, beyond those identified in the Environmental Assessment, include a significant scarred tree at Three Mile Reserve.

The Department of Environment and Climate Change raised no fundamental objection to the project based on Aboriginal heritage impacts, but recommended strengthening the Proponent's Statement of Commitments in this area.

Consideration

The Department is satisfied that the Proponent has undertaken a sufficient and appropriate level of assessment of potential impacts on Aboriginal heritage. It concurs with the Proponent's assertion that the principal focus of mitigation and management measures should be on the proposed gas pipeline route, given the historical disturbance of the power station site.

The Proponent has endeavoured to avoid known items of heritage significance, and areas of assessed high potential occurrence, through the preliminary design and route alignment selection for the gas pipeline. The Department recognises that this will be an on-going process through the detailed design phase of the project, but is satisfied that there is sufficient flexibility available to the Proponent to deliver on its commitment to avoid items of significant value if they are uncovered during design or construction. The final design assessment recommended by the Department of Environment and Climate Change and adopted by the Proponent through its Statement of Commitments will be an important part of ensuring that Aboriginal stakeholders are consulted and heritage items are avoided through the detailed design phase.

Of the heritage items currently known along the gas pipeline route, the Department considers that the scarred tree identified by the Proponent (Site 3) and the scarred tree at Three Mile Reserve identified in a public

submission are of such significance that they must be protected and not impacted by the project. The Department therefore recommends a condition of approval that prohibits the Proponent from destroying, modifying or otherwise affecting these items. Items identified at Site 1, Site 2 and Site 4 are considered to be of low significance and should be appropriately salvaged in consultation with the Department of Environment and Climate Change and the Local Aboriginal Land Council.

The Department notes concerns raised in submissions that there may in fact be a significant number of other Aboriginal heritage items in the area that have not been previously identified (by the Proponent or on current registers). To manage this issue, the Department recommends that any approval of the project exclude consideration of currently unknown items of heritage significance, and require further assessment of impacts on such items if and when they are encountered. It is expected that the pre-construction survey based on a final pipeline design and alignment recommended by the Department of Environment and Climate Change would be an important contribution to this process.

5. CONCLUSIONS AND RECOMMENDATIONS

The Department has assessed the Environmental Assessment, Statement of Commitments, submissions on the proposal and Submissions Report, and is satisfied that the impacts of the proposal can be mitigated and/ or managed to ensure an acceptable level of environmental performance. The Department recommends approval of the project accordingly.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – SUBMISSIONS REPORT

APPENDIX C – ENVIRONMENTAL ASSESSMENT
