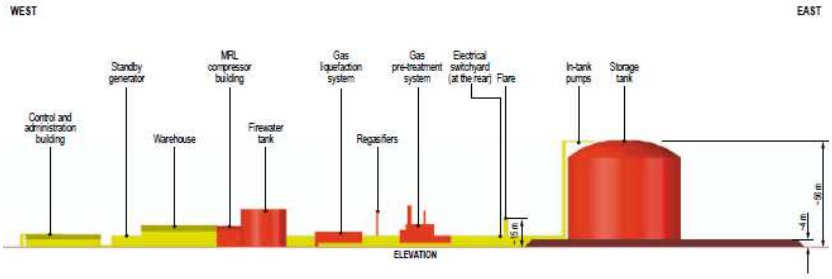
MAJOR PROJECT ASSESSMENT:
Newcastle Gas Storage Facility
Tomago
(10_0133)



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

April 2012

Cover: Cross Section diagram of proposed Gas Storage Plant

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NSW Government
Department of Planning and Infrastructure

ABBREVIATIONS

AHD	Australian Height Datum
CIV	Capital Investment Value
Department	Department of Planning and Infrastructure
DGRs	Director-General's Requirements
Director-General	Director-General of the Department of Planning and Infrastructure
EA	Environmental Assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPI	Environmental Planning Instrument
LEP	Local Environmental Plan
LNG	Liquefied Natural Gas
MD SEPP	*State Environmental Planning Policy (Major Development) 2005*
Minister	Minister for Planning and Infrastructure
No_x	Mono-Nitrogen Oxides
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
PAC	Planning Assessment Commission
Part 3A	Part 3A of the *Environmental Planning and Assessment Act 1979*
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PJ	petajoule (10^{15} joules)
PBP	Planning for Bushfire Protection
PM_{10}	Particulate Matter (< 10 micrometres)
PPR	Preferred Project Report
Proponent	AGL Energy Limited
Ramsar wetland	A wetland protected under the Ramsar convention
RMS	Roads and Maritime Services – formerly Roads and Traffic Authority (RTA)
RtS	Response to Submissions
SEPP 14	*State Environmental Planning Policy No. 14 – Coastal Wetlands*
SEPP 71	*State Environmental Planning Policy No. 71 – Coastal Protection*
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SO_2	Sulphur dioxide
TAC	Tomago Aluminium Corporation
TJ	terajoule (10^{12} joules)
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

AGL Energy Limited (the Proponent) proposes to construct and operate the Newcastle Gas Storage Facility project at Tomago and Hexham, approximately 13 kilometres north-west of Newcastle in the Port Stephens and Newcastle Local Government Areas (LGA). The project involves the construction of a gas storage plant on industrial zoned land at a site in Tomago, that would process and store 30,000 tonnes of liquefied natural gas (LNG) at a temperature of minus 162^{o} Celsius. The proposal would help to diversify and secure gas supply in NSW during times of peak demand or supply interruption. During times of low demand, natural gas would be drawn from the NSW gas pipeline network at Hexham, and delivered via a high-pressure gas pipeline to the gas plant where it would be converted to a compact liquefied form for storage. During times of peak demand, the process would reverse and LNG would be regasified and re-injected back into the network.

The development was declared to be a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* on 9 August 2010 because it met several of the declaration thresholds under the then *State Environmental Planning Policy (Major Development) 2005*. By virtue of the operation of savings and transitional provisions, the project will continue to be assessed and determined as a transitional Part 3A project despite the recent repeal of Part 3A. The application will be determined by the Planning Assessment Commission because the Proponent has made a reportable political donation.

The project has also been declared to be a critical infrastructure project because on 28 October 2010, the then Minister for Planning formed the view that the project is essential to the State for economic, social and environmental reasons.

In addition to NSW environmental planning approvals, the project also requires approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) because it may impact on matters of National Environmental Significance (including listed threatened species and migratory birds). The NSW assessment process has been accredited for the purpose of compliance with the assessment requirements of the EPBC Act.

The Proponent's Environmental Assessment was publicly exhibited from Friday, 24 June 2011 until Friday, 29 July 2011. The Department received a total of 25 submissions, 14 of which were public submissions with the remainder from NSW public authorities including: Office of Environment & Heritage; the NSW Office of Water; Hunter Water Corporation; Fire & Rescue NSW; WorkCover; Hunter-Central Rivers Catchment Management Authority; Roads & Traffic Authority (now known as Roads & Maritime Services); Civil Aviation & Safety Authority; Department of Defence; Port Stephens Council; and Newcastle City Council.

Key issues associated with the project, identified through the Department's assessment of the Environmental Assessment and Preferred Project Report, and consideration of issues raised in submissions include: impacts on ecology; impacts on surface water and groundwater; impacts on Aboriginal heritage; hazards and risk impacts; and noise impacts.

The Proponent has undertaken considerable effort to design the project in a manner that minimises the need for vegetation clearing. The Department considers that the unavoidable loss of 19.38 hectares of native vegetation (2.61 hectares of which is Endangered Ecological Communities) does not represent an unacceptable environmental impact. With the development of a biodiversity offset in accordance with the requirements of the recommended conditions of approval, the Department is satisfied that the project can be implemented with no net loss of ecological values. Coupled with this, the Department has recommended a suite of site management measures, including translocation of Koala and New Holland Mouse individuals, offset of 15 Earp's Gum individuals, and provision of

compensatory tree hollows, which would further act to minimise the impacts of the project on local and regional ecology.

The project would be located above a major potable water source for the region (the Tomago Sandbeds Aquifer). While the project is generally low risk with respect to surface and groundwater contamination (noting that refrigerated gas to be stored and handled on site would rapidly evaporate if released and not infiltrate the groundwater system), there is some potential for spills and leaks of other materials on the site to affect surface and ground water. The Proponent has developed a system of multiple bunds and water management systems to minimise risks from spills and leaks.

A Preliminary Hazard Analysis was prepared for the project, which demonstrates that applicable land use safety criteria would be met. The Department has recommended a suite of hazards related conditions to ensure that this outcome is achieved in reality through appropriate design and provision of risk identification, mitigation and management measures.

The ability to comprehensively survey the site for items of Aboriginal heritage significance was limited by the existing vegetation cover. Although low, there remains potential for heritage items to be uncovered on the site during construction works. The Department has therefore recommended that the Proponent be required to minimise ground disturbance and to have a qualified heritage specialist on site to assist in the identification and management of heritage items, should they be uncovered. The Department has also recommended that Aboriginal stakeholders be invited to attend the works.

The Department has assessed the Proponent's Environmental Assessment, Preferred Project Report and Statement of Commitments and submissions received from public agencies and the community regarding the project. On balance, the Department considers the project to be justified and in the public interest.

The Department has also drafted a recommended instrument of approval incorporating stringent and comprehensive environmental mitigation and management requirements to enhance commitments made by the Proponent in its Statement of Commitments. Therefore, the Department considers that the project should be approved, subject to the recommended Conditions of Approval.

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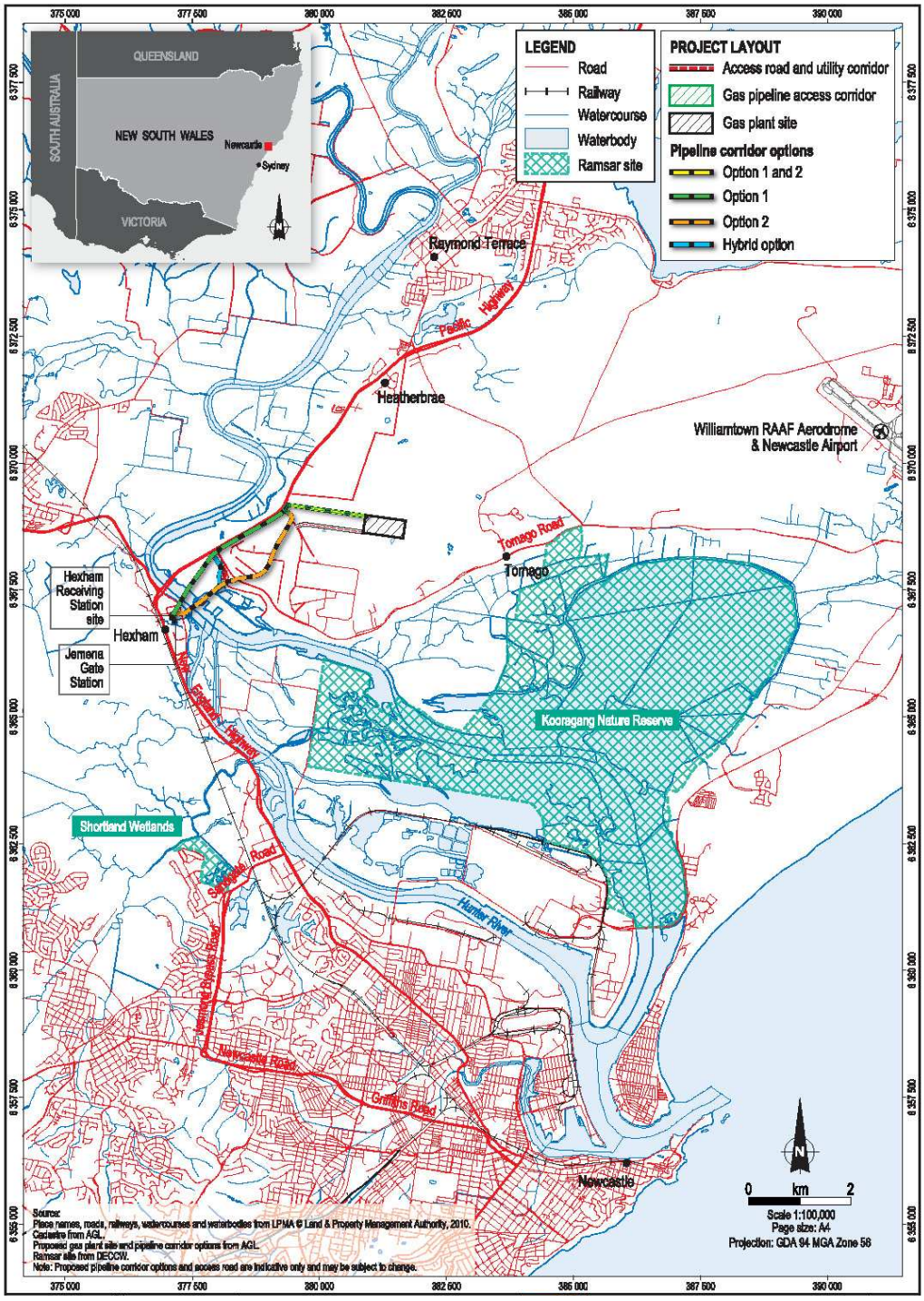
1. BACKGROUND

AGL Energy Limited (the Proponent) proposes to construct and operate the Newcastle Gas Storage Facility project at Tomago and Hexham, approximately 13 kilometres to the north-west of Newcastle in the Port Stephens and Newcastle local government areas (LGA). The project will have the capacity to draw natural gas from the NSW gas pipeline network during times of low demand, process, refrigerate and store the gas into a compact liquefied form, and regasify and re-inject it back into the gas network during peak demand periods. The project location is shown in Figure 1:

Figure 1: Project Location



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

The development comprises the following key components:

- a gas storage plant with the capacity to liquefy and store approximately 1,500 terajoules (or 30,000 tonnes) of Liquefied Natural Gas (LNG) and ancillary infrastructure, located at Tomago;
- a 1.4 kilometre vehicle access road to the plant, that will also provide a utility corridor;
- a 1.7 kilometre secondary emergency access road to also contain the underground gas pipeline corridor along the northern boundary of the site;
- a 5.1 kilometre high-pressure gas pipeline to connect the gas storage facility to the gas receiving station at Hexham; and
- connection from the receiving station to the NSW gas pipeline network at the adjacent Jemena Gate Station at Hexham.

For the purpose of assessment of the project, it was divided into two key components: the Primary Project Area (PPA), being those parts of the project within Lot 105 (the gas plant site, the site access road and the gas pipeline corridor (refer to Figure 2)); and the remainder of the project, being the off-site pipeline corridor and the gas pipeline within it, and connection works at the Hexham receiving station and Jemena Gate Station.

NSW is dependent on gas imported via pipelines from South Australia, Victoria and Queensland. During periods of gas supply shortfall from these states, or in the event of infrastructure failure or disruption, gas supply to NSW households, commerce and industry is put at risk. The project aims to mitigate this risk by providing significant gas supply buffering in periods of high demand or service interruption. The project would have the capacity to supply up to 120 terajoules of gas to the market per day, compared with the current NSW/ACT market demand of approximately 688 terajoules per day.

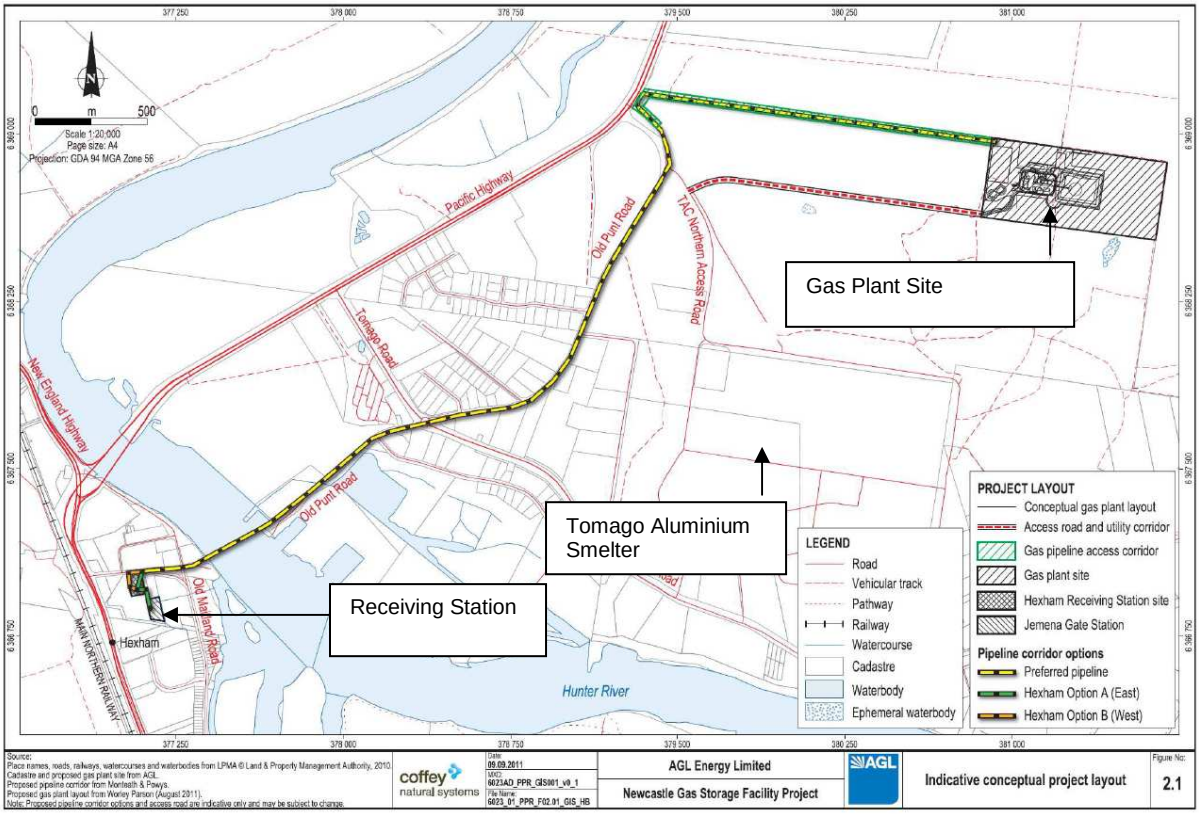
The site has been chosen for its proximity to the existing NSW gas pipeline network via the Wilton-Newcastle Trunk Line that delivers gas to Newcastle from the Moomba-Sydney pipeline, and which terminates at the Jemena Gas Station at Hexham. The site is also well positioned to potentially connect with other approved gas projects including the Queensland-Hunter Gas Pipeline project and the Proponent's approved Gloucester Gas Project, as well as the developing coal seam gas industry in NSW.

1.1. Location

The PPA is located in the north-eastern corner of Lot 105 DP 1125747, which is currently owned by Tomago Aluminium Corporation. The site is generally undeveloped and is characterised by native vegetation, fire trails and an electricity easement. The PPA is approximately 1.8 kilometres east of the Pacific Highway, at Tomago, in the Port Stephens local government area.

The Hexham receiving station is located at 235 Old Maitland Road, Hexham adjacent to the Jemena Gate Station facility and is in the Newcastle LGA. The Hexham site is on the southern side of the Hunter River, and a few hundred metres to the east of the Main Northern Railway and Maitland Road, which is the main road north from Newcastle CBD. The selected pipeline route runs a short length from the receiving station at Hexham, beneath the Hunter River, and follows the Old Punt Road alignment before connecting to the PPA secondary access road and pipeline corridor. Figure 2 illustrates the layout of the key project components.

Figure 2: Project Layout



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

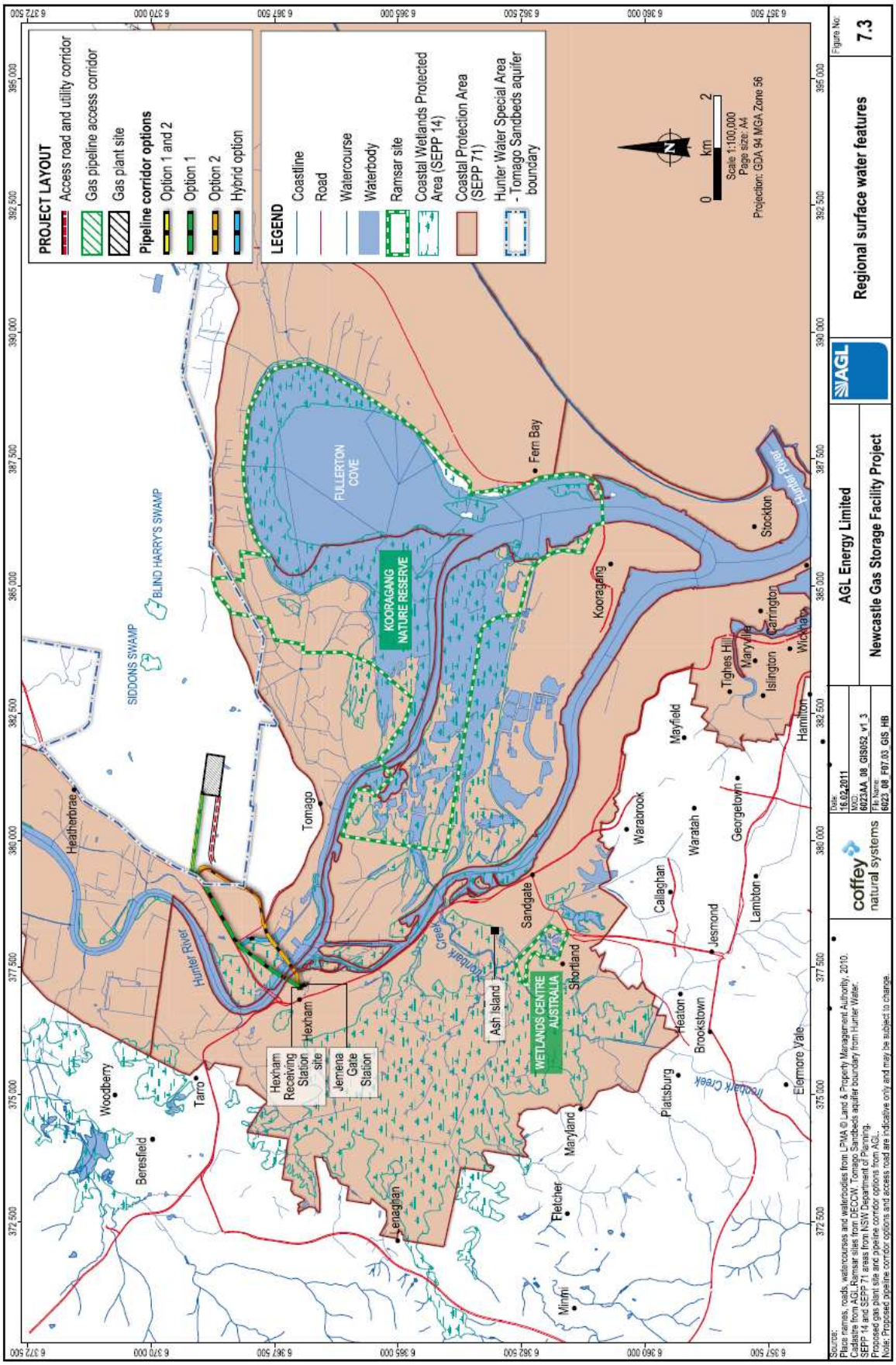
1.2. Project Locality

The project is located on generally flat land containing native vegetation, roads, industrial uses and the Hunter River. The project is also located within the Hunter Water Corporation (HWC) Tomago Sandbeds Aquifer catchment area and also within the NSW Coastal Zone. The selected pipeline corridor skirts, but does not directly affect, wetlands listed under *State Environmental Planning Policy 14 – Coastal Wetlands*. The Hunter River Estuary Wetlands Ramsar site is to the south and east of the site. It has two components: the larger Kooragang Nature Reserve is located three kilometres to the east and south of the PPA, and Shortland Wetlands approximately 4.5 kilometres south of the Hexham receiving station.

The Tomago Aluminium Smelter is located within the same lot as the PPA, and is approximately 500 metres to the south. Other local industries in Tomago include distribution, ship-building, display centres (homes and swimming pools), haulage, logistics and recycling. The Hunter Region Botanic Gardens is 300 metres to the north-west of the gas storage facility. The closest residential receivers to the project are located approximately 1.2 kilometres from the PPA (45 School Drive) and approximately 150 metres from the Hexham Receiving Station site (185 Old Maitland Road).

Figure 3 shows the regional context of the project and key landscape features. Figure 3 also shows the gas pipeline corridors considered in the Environmental Assessment for the project. As part of its Preferred Project Report, the Proponent has confirmed corridor option 2 for the alignment of the gas pipeline component of the project.

Figure 3: Key Landscape Features



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

2. PROPOSED PROJECT

2.1. Project Description

AGL Energy Limited (the Proponent) proposes to construct and operate a gas storage facility at Tomago, north-west of Newcastle, that will draw gas from the NSW gas pipeline system, store it as a liquid at minus 162^{o} Celsius (at approximately 1/600th of its gas volume), and re-inject it back into the NSW gas pipeline network via a receiving station at Hexham adjacent to the Jemena Gate Station terminus of the Wilton-Newcastle trunkline.

There are five key components of the project:
1. Gas storage plant, including subdivision of land;
2. Access road and utility corridor;
3. Secondary emergency access road and gas pipeline corridor;
4. A high-pressure buried gas pipeline; and
5. Hexham receiving station and network connection.

2.1.1 Gas Storage Plant

As part of the project, the Proponent seeks approval to subdivide existing Lot 105 on which the Tomago Aluminium Smelter is located, to provide a separate parcel for the project access road and utility corridor, and a 28-hectare site for development. The gas storage plant would occupy approximately half of the subdivided land.

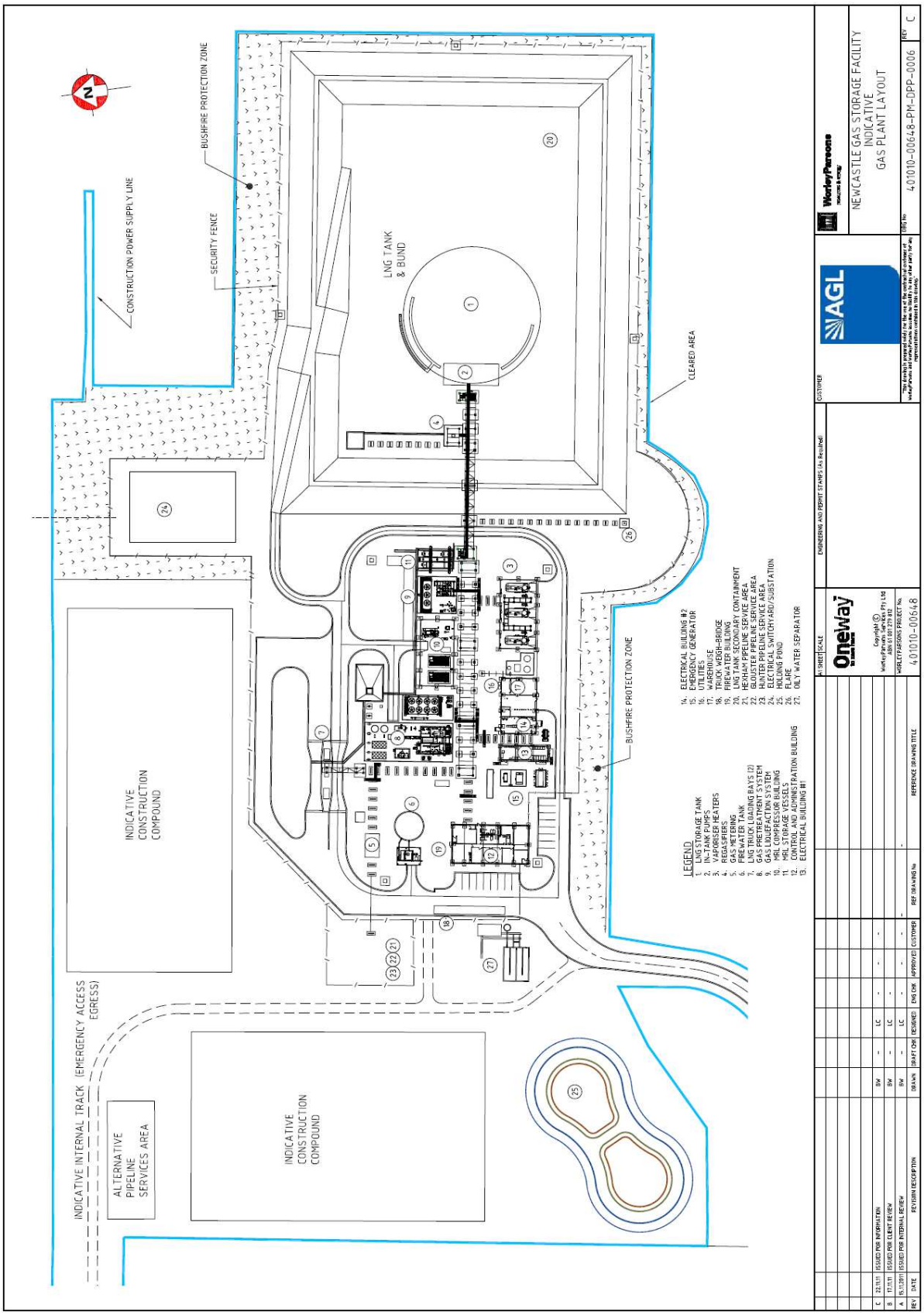
The indicative gas plant layout is shown in Figure 4, with details of the plant summarised in Table 1 below:

Table 1 – Summary of Key Gas Plant Components

Aspect	***Description***
Gas Storage tank	The Liquefied natural gas (LNG) storage tank (60 metres wide x 56 metres high) would be located within a containment bund (that can hold 110% of its volume) and would be able to store 30,000 tonnes or 1,500 terajoules of LNG at minus 162 degrees Celsius.
Gas Pre-Treatment Facility	Prior to liquefaction, natural gas would be treated to remove trace amounts of mercury, carbon dioxide, water and small quantities of odorant.
Liquefaction System including refrigeration unit	The conversion of natural gas into a liquid would occur in the gas liquefaction unit using refrigerants composed of nitrogen, methane, ethylene, propane, butane and pentane. Some 22 tonnes of these refrigerants would be stored on site, liquefied under pressure. The liquefaction system would contain one or more aluminium plate-fin heat exchangers to chill the natural gas. The plant would be able to liquefy approximately 10 terajoules of gas per day. Liquefaction would occur approximately nine months of the year (September to May) during periods of low market demand. The proposal would have a production capacity of 66,500 tonnes per year of stored LNG.
Regasification unit	During periods of peak demand or network supply disruptions, LNG would be pumped from the storage tank to the regasifier to be converted back into its gaseous form. The plant would be able to regasify approximately 120 terajoules per day of LNG to be delivered back into the NSW gas network intermittently, as needed during the peak winter period (May to August) or during supply interruptions (any time of year).
Flare System	The plant would have a 15 metre high flare stack that would combust residual hydrocarbons discharged from the liquefaction process or regasification during upsets, start ups, or shutdowns. The flare system would include a continuous pilot flare approximately one metre high, which would increase to two to three metres in height during liquefaction and during plant commissioning.
Gas Plant Infrastructure	Ancillary infrastructure within the gas plant would include: custody metering and analysis facilities; pipelines, vessels and pumps; odourisation facilities; a compressed air system; cooling system; a nitrogen storage and gasification unit; a demineralised

Aspect	***Description***	
	water unit; a hot oil unit; emergency response facilities; safety and fire protection systems; stores and unloading facilities for refrigerants and chemicals; electrical distribution system and control systems; an electrical substation; and a backup power supply system for critical systems.	
Truck Loading Area	The project would include two truck loading bays and a turning circle to allow the receipt and transport of LNG by up to 1,000 road tanker movements per year. Each tanker is expected to carry approximately 18 tonnes of LNG. Although most of the gas would be delivered via pipeline, there is scope within the development to deliver LNG to other – as yet unidentified – destinations via tanker.	
Buildings	Buildings and structures on site would be one or two storeys high and would include maintenance areas, offices, amenities, a control room, workshops and warehouses. The design of the buildings would be refined and finalised during the detailed design phase of the project.	
Car Parks and Hardstands	At-grade parking would be provided on site for operational staff (up to 15 staff during operation), visitors and delivery vehicles (a total of 17 spaces, subject to detailed design). All car parking would be adequately drained and would be designed to minimise the need to construct large hard stand areas. Additional hard stand areas would be required for storage of spare plant and equipment.	
Fencing, lighting and landscaping	Security fencing would be installed around the perimeter of the gas storage facility with a security gatehouse at the entrance. Lighting would be provided in the general gas plant area, and would be the minimum lighting required for safe operational purposes. The gas storage tank would not be lit, but would include an aircraft warning light at its highest point. Mains power would provide primary power for the gas storage facility with a connection to the existing 33 kV transmission line to the north of the site (on HWC land) provided via an underground cable.	
Operation	Gas liquefaction mode	September to May (nine months).
	Gas storage mode	May to August (once tank is full).
	Re-gasification mode	Intermittently – except during supply disruptions.
	Staff	Up to 15 operations staff plus additional contract labour for routine and major maintenance.
	Waste	Waste water, mercury, waste hydrocarbons, domestic waste and sewage would be removed from the site and disposed of by licensed contractors. Due to distance from the mains, and the limited operation workforce, sewer mains connection is not considered viable.

Figure 4: Gas Plant Site Layout



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

2.1.2 Access Road and Utility Corridor

A 1.4 kilometre two-lane, sealed, all-weather access road (as shown in Figure 2) would connect the gas plant site to the TAC Northern Access Road (approximately 140 metres south of its junction with Old Punt Road) to provide principal site access. The road would be seven metres in width with two-metre wide shoulders either side (11 metres in total). The access road would be located within a 30-metre wide cleared easement, including formal stormwater drainage infrastructure.

Setbacks would house utilities to service the gas plant site, including telecommunications, mains water supply and a stormwater pipeline that would pump out stormwater to a discharge point at Old Punt Road. Figure 5 shows the cross section of the access road.

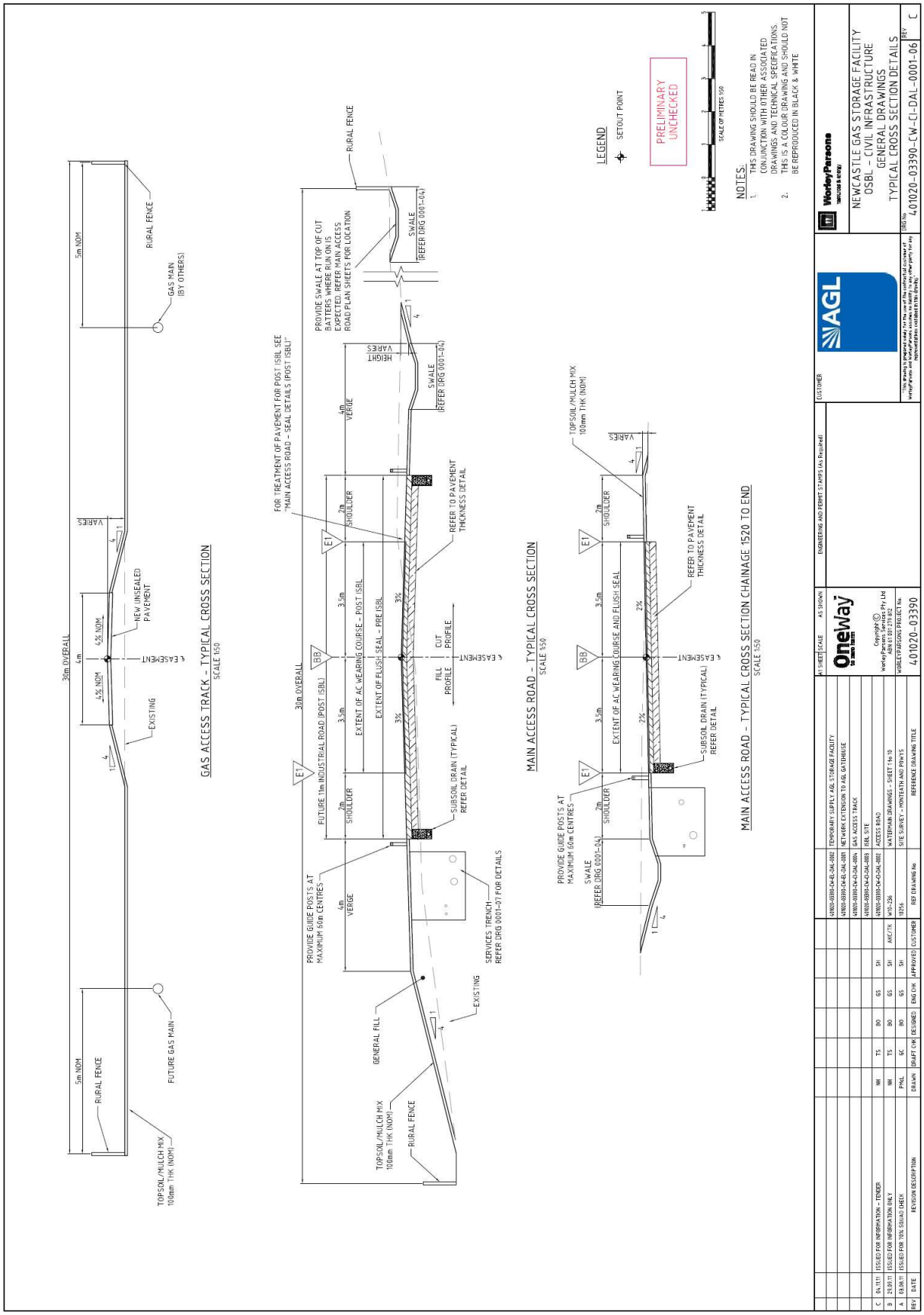
Two new 7.5 metre road splays would be constructed along both sides of the access road at the corner of the TAC Northern Access Road intersection to enable sufficient space for truck access and egress. The intersection would be lit via existing power supply along Old Punt Road. The access road would include adequate turning circles at the entry areas of the gas plant site for large vehicles and an additional turning circle for trucks accessing the LNG loading station.

During construction, the access road would be all-weather and un-paved with standard construction techniques employed, including earth compaction, removal and stockpiling of top soil, road surfacing, erosion and sediment control measures and drainage works. On average 10 vehicles per day would be associated with the construction of the access road and utilities corridor.

2.1.3 Secondary Emergency Access Road and Pipeline Corridor

In addition to the principal site access corridor, the project would include a 1.7 kilometre secondary access road (which runs along the green yellow line on Figure 2) along the northern boundary between the gas plant site and Old Punt Road. The secondary access road would be four metres wide with one metre shoulders each side (six metres in total) and would include a turning circle at the entry area of the gas plant site. It would also contain the underground high-pressure gas pipeline to both supply and export gas from the site, buried to a depth of 0.75 metres. A 30 metre wide corridor would be cleared during construction. Following the completion of construction, the majority of the 30 metre wide corridor would be rehabilitated using a variety of local native grasses and shrubs. The secondary access road is proposed to be used in the event of an emergency. Figure 5 illustrates a cross section of the road corridor:

Figure 5: Cross Sections of Principal and Secondary Access Corridors



Source: Newcastle Gas Storage Facility Project AGL Energy Ltd November 2011

2.1.4 Gas Pipeline

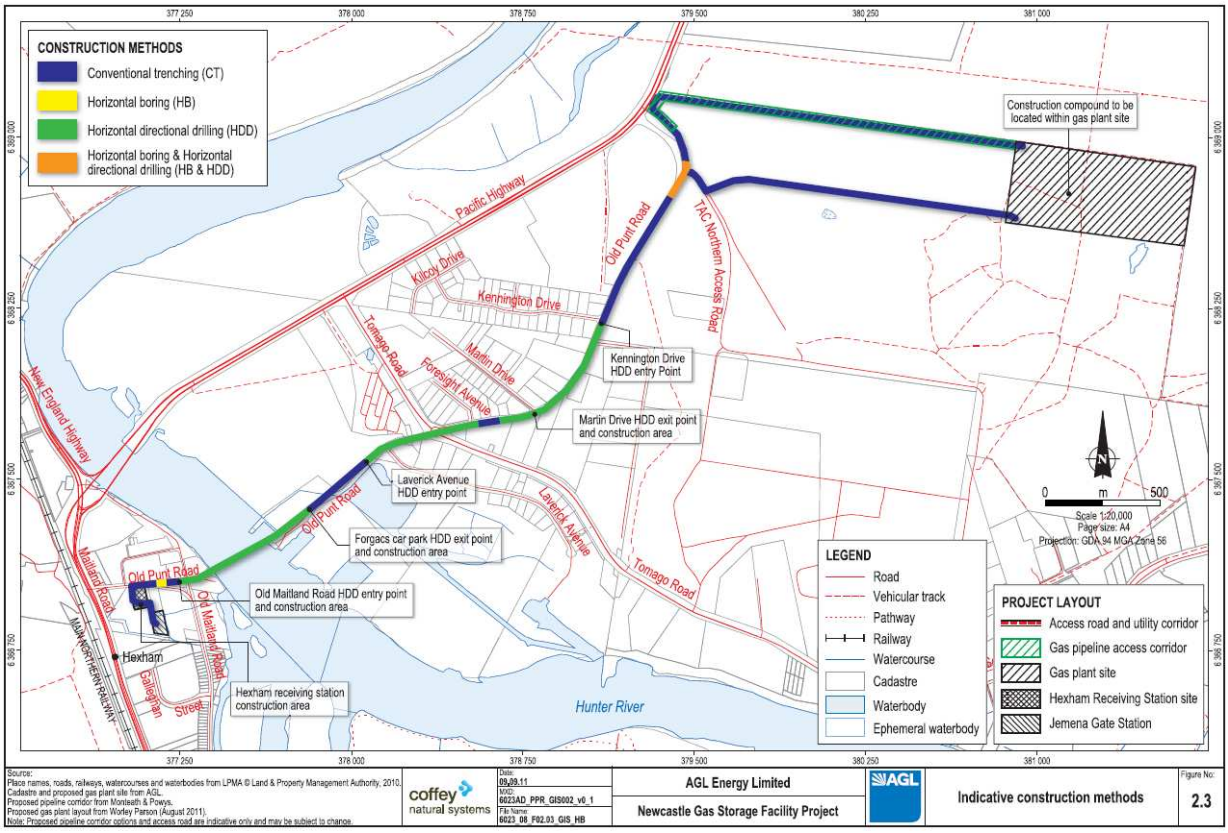
Outside of the Primary Project Area (PPA), the high-pressure gas pipeline would deliver gas to and from the Hexham receiving station and the gas storage plant along a 5.1 kilometre corridor. The 400 millimetre diameter pipeline would be designed and operated in accordance with the requirements of *AS 2885:2008 Pipelines – Gas and Liquid Petroleum* and buried at a depth of between 0.75 metres and 2.5 metres. The pipeline would be constructed from coated steel pipe and would incorporate cathodic protection to prevent corrosion.

The Environmental Assessment for the project presented four separate gas pipeline options. As part of its Preferred Project Report, the Proponent has confirmed that option 2 would be applied to the project, generally following Old Punt Road from the PPA to the Hunter River (refer to Figure 6). Option 2 was selected by the Proponent as it would avoid crossing coastal wetlands listed under SEPP 14, and would predominantly follow existing road corridors. As such, it was considered by the Proponent to have less potential environmental impacts compared with other potential alignments.

The gas pipeline would be located within a five metre construction easement along road corridors, and within a 20 metre corridor on privately-owned land. Construction methods would include a mixture of conventional trenching, horizontal directional drilling (HDD) and a small section of horizontal boring (beneath the Old Maitland Road Y-junction at Hexham). HDD would be used to take the pipeline under the Hunter River, beneath the intersection of Tomago Road and Old Punt Road and would possibly be used beneath the TAC Northern Access Road to avoid clearing the Alluvial Tall Moist Forest vegetation community along Old Punt Road. Figure 6 shows the location and type of pipeline construction methods.

Following construction of the gas pipeline, temporary construction lay down and hardstand areas no longer required would be removed and rehabilitated with landscaping works. The gas pipeline corridor would also be rehabilitated after construction, including re-seeding with native grasses where applicable. The design life of the pipeline would be approximately 60 years.

Figure 6: Indicative Pipeline Construction Methods



Source: Newcastle Gas Storage Facility Preferred Project Report AGL Energy Ltd May 2011

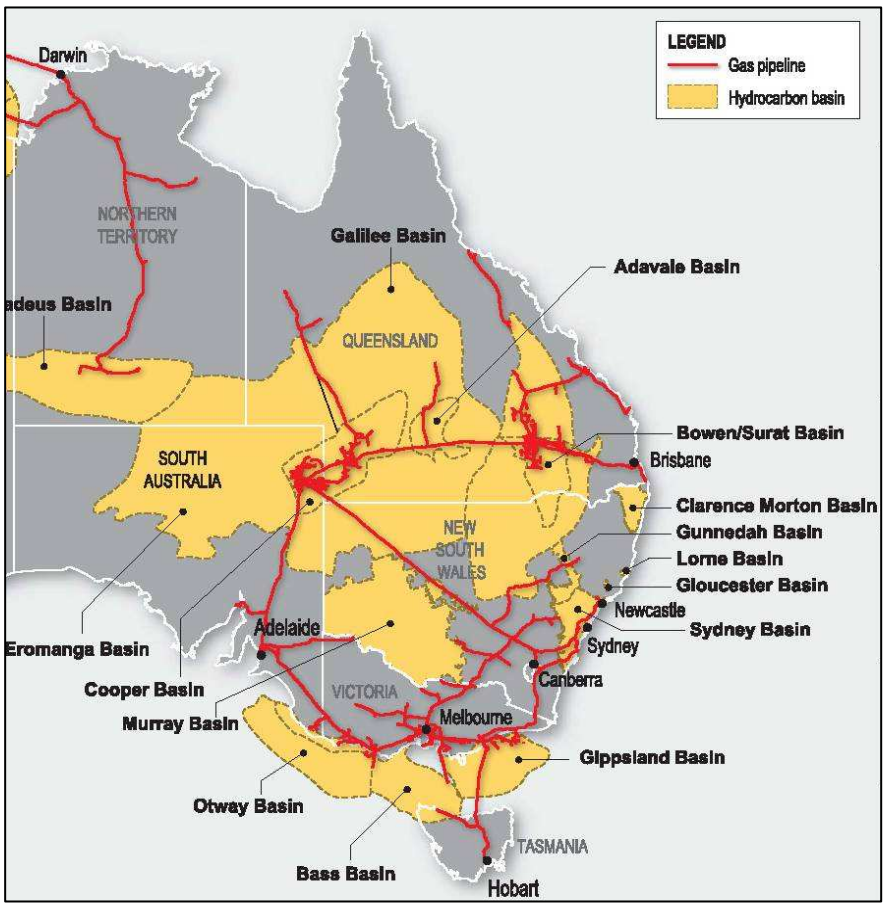
2.1.5 Hexham Receiving Station and connection to the NSW gas network

The Hexham receiving station would monitor and control the volume of gas to and from the gas storage facility. The receiving station would occupy approximately 0.25 hectares and would be up to three metres high. It would be constructed on concrete pads between 20-30 metres by 5-10 metres. A short underground pipeline (< 200 metres) would be constructed to connect the receiving station to the Jemena Gas Station and the NSW gas network.

2.2. Project Need and Justification

New South Wales is unique among Australian states as it is currently reliant on gas supplied from interstate (via pipelines from Victoria, South Australia and Queensland) to be able to meet current industrial, commercial and residential demand (see Figure 7). While gas is currently produced from the Camden gas plant in NSW (at a rate of 27 terajoules per day) it is not enough to solely guarantee supply to customers within NSW. Further, in the event of gas supply interruptions and when other states use their emergency supply legislation to prioritise gas supply to customers within their own State, there is a significant risk of supply interruption to NSW customers.

Figure 7: Gas supply pipelines to New South Wales



*Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011*The Proponent states that since 2004 there have been ten instances of partial or full gas supply interruption at the Moomba gas production facilities in South Australia affecting the NSW gas network. The most significant of these interruptions occurred in 2008 when gas supplies to large industrial and commercial customers were curtailed for approximately 24 hours.

In addition to risks associated with supply disruptions from other states, current forecasts suggest that gas supply pipelines into New South Wales may reach capacity in the short to medium term. The current pipeline capacity for the NSW/ACT market comprises the Moomba to Sydney Pipeline (MSP) (439 terajoules per day) and the Eastern Gas Pipeline (EGP) (268 terajoules per day). The most recent *Gas Statement of Opportunities* published by the Australian Energy Market Operator (AEMO) in 2011 presents winter 1-in-20 day peak demand projections for a number of scenarios over the coming decade. These projections indicate that the combined capacity of the MSP and EGP (707 terajoules per day) into the NSW/ ACT region is likely to be exceeded during the winter peak at some point in the period 2017 to 2020, depending on the scenario considered, and if no additional action is taken (either by reducing consumption, providing additional pipeline capacity from interstate, or augmenting NSW/ ACT gas sources).

A number of major projects have been approved in NSW which could contribute to the predicted shortfall in gas import capacity relative to expected growth in demand. These include the Queensland to Hunter Gas Pipeline Project (approved on 11 February 2009) and the Gloucester Gas Project (approved on 22 February 2011). Applications for other NSW-based gas projects are also under assessment, including additional production capacity at the Camden Gas Project, and the new Narrabri Gas Project. However, construction of approved projects has yet to commence and there is a reasonable level of uncertainty around the potential implementation timeframes of those projects currently under assessment. It would be imprudent to assume that any or all of

these projects would proceed within the timeframe necessary to address predicted import capacity shortfalls.

Further, given the significance to NSW industrial, commercial and residential gas customers of a shortfall in gas supply, the most appropriate approach is to maximise the number of environmentally acceptable gas projects to the market, thereby increasing the probability that one or more would be implemented in the short to medium term. As one such project, the Department considers that approval of the Newcastle Gas Project would contribute to reducing the potential risk that an appropriate gas project is implemented to resolve a predicted shortfall in gas supply before it eventuates. Importantly, and as distinct from other gas production and gas pipeline projects, the Newcastle Gas Project would offer an intermediate buffering capacity to address short term supply shortfalls while additional production or pipeline capacity is implemented.

The Proponent states that the proposed gas storage facility would also support and promote the efficient use of AGL's coal seam gas resources in the Hunter and Gloucester regions as coal seam gas is most efficiently recovered if the flow of gas from the field is held steady. The gas storage facility would be able to store coal seam gas produced over summer and feed it back into the network over winter when gas is in short supply.

2.3. Critical Infrastructure

On 28 October 2010, the then Minister for Planning declared the proposal to be a critical infrastructure project. In making this declaration, the Minister was satisfied that the project is essential for the State for economic, environmental and social reasons.

2.4. Multiple Landowners

On 1 December 2010, the Proponent requested that the project be designated as one that occurs on land with multiple owners in accordance with clause 8F(1)(e) of the *Environmental Planning and Assessment Regulation 2000*. The designation removes the requirement to obtain landowners consent but requires the Proponent to give notice of the application through an advertisement published in a local newspaper before the start of the public consultation period.

The project was designated a project occurring on land with multiple owners on the 3 December 2010. The Proponent gave notice of the application through a published advertisement in the *Newcastle Herald* and *Port Stephens Examiner* on 17 March 2011 before the start of the public consultation period.

3. STATUTORY CONTEXT

3.1. Major Project

The proposal was declared a major project under the then Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 9 August 2010 because it was development of a kind described in Schedule 1 of the *State Environmental Planning Policy (Major Development) 2005*. In particular, the proposal satisfies the following declaration triggers:

- Clause 10(2) – development of a gas storage facility that has a capital investment value of more than $20 million;
- Clause 10(3) – development for the manufacture, storage or use of dangerous goods in such quantities that constitute the development as a major hazard facility under the *Control of Major Hazard Facilities National Standard [NOHSC: 1014 (2002)]*, and
- Clause 26A – development for the purpose of a pipeline in respect of which a licence is required under the *Pipelines Act 1967*.

The project is therefore subject to assessment and determination by the Minister for Planning and Infrastructure (or his delegate) under part 3A of the *Environmental Planning and Assessment Act 1979*. Despite the recent repeal of Part 3A of the EP&A Act, the project is considered a 'transitional Part 3A project' (clause 2, Schedule 6A of the EP&A Act) and would continue to be assessed and determined as if Part 3A were still in existence.

On 14 September 2011, the Minister for Planning and Infrastructure delegated his approval functions under section 75J of the EP&A Act to the Planning Assessment Commission (PAC) in the cases where applications have been made by private companies (including reportable political donation applications). The Proponent is a private company and has provided, with its project application for the subject proposal, a statement indicating it has made a reportable political donation. Consequently, pursuant to the Minister's delegation of 14 September 2011, the project application is subject to determination by the PAC.

3.2. Permissibility

The proposal is located on land within the Port Stephens and Newcastle local government areas. As show in Table 2 and Table 3 the proposal is permissible with consent in all zones in the *Port Stephens Local Environmental Plan 2000* and the *Newcastle Local Environmental Plan 2003*.

Table 2: Port Stephens Local Environmental Plan 2000

Zoning	***Permissibility***
4(a) Industrial – General A	Permissible with consent
1(a) Rural Agriculture	Permissible with consent
Unzoned - Hunter River	Permissible with consent

Table 3: Newcastle Local Environmental Plan 2003

Zoning	***Permissibility***
4(b) Port and Industry	Permissible with consent
Unzoned - Hunter River	Permissible with consent

In addition to existing local environmental plans, Newcastle City Council has prepared *Draft Newcastle Local Environmental Plan 2011*, which may be made and take force in future. Under the draft local environmental plan, the proposal would be partly prohibited where it crosses under

the Hunter River (proposed to be zoned W2 – Recreational Waterways). The permissibility of the proposal under the draft local environmental plan zoning is summarised in Table 4:

Table 4: Draft Newcastle Local Environmental Plan 2011

Zoning	*Permissibility*
IN3 – Heavy Industry	Permissible with consent
W2 – Recreational Waterways	Prohibited

Although the proposal would be prohibited in the W2 – Recreational Waterways zone, the Department does not consider that it would be inconsistent or conflict with the permissible uses within the zone, given that the proposal would involve a gas pipeline beneath the bed of the Hunter River at this location.

Notwithstanding the permissibility of the project under existing local environmental plans, or the potential prohibition of part of the project in future if the draft Newcastle local environmental plan is made in its current form, *State Environmental Planning Policy (Infrastructure) 2007* specifies that development for the purpose of a gas pipeline is permissible without consent if it also requires a licence under the *Pipelines Act 1967*. As the gas pipeline component of the project requires such a licence, it would be permissible despite the potential future operation of the draft Newcastle local environmental plan. Relevantly, the Infrastructure SEPP prevails over local environmental plans to the extent of any inconsistency (such as the issue of permissibility in the W2 zone).

3.3. Environmental Planning Instruments

There are no environmental planning instruments that substantially govern the carrying out of the project as this project has been declared as critical infrastructure.

3.4. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in section 5 of the Act:

(a) to encourage:
- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
- *(iii) the protection, provision and co-ordination of communication and utility services,*
- *(iv) the provision of land for public purposes,*
- *(v) the provision and co-ordination of community services and facilities, and*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development, and*
- *(viii) the provision and maintenance of affordable housing, and*

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

Of particular relevance to the environmental assessment and eventual determination of the subject project application are those objects stipulated under section 5(a). Relevantly, the objects stipulated under (i), (ii), (iii) and (vi) are significant factors informing determination of the application (noting that the proposal does not raise significant issues relating to land for public purposes, community services and facilities or affordable housing). These objectives have been

taken into account in the Department's assessment of the project, and have guided the environmental assessment presented in this report.

With respect to ecologically sustainable development, the EP&A Act adopts the definition in the *Protection of the Environment Administration Act 1991*. This is discussed further in Section 3.5. In addition to the above, the agency and community consultation undertaken as part of the assessment process (see Section 4 of this report), addresses objects 5(b) and (c) of the Act.

3.5. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle,

(b) inter-generational equity,

(c) conservation of biological diversity and ecological integrity,

(d) improved valuation, pricing and incentive mechanisms.

It is important to recognise that while the EP&A Act requires that the principles of ecologically sustainable development be encouraged, it provides other objects that must be equally included in the decision-making process for any proposal (including the objects outlined above).

As part of this assessment, the Department has considered the need to encourage the principles of ecologically sustainable development, in addition to the need for proper management and conservation of natural resources such as: water resources; the orderly development of land considering land use; the need for the project as a whole (which comprises a utility provision); and, the protection of the environment including threatened species.

The Department considers that the project generally promotes the principles of ESD as it is proposed to be undertaken in a manner that minimises environmental impacts, including biodiversity impacts and supports intergenerational equity through provision of a secure gas supply over the longer term for NSW gas markets.

3.6. Statement of Compliance

In accordance with section 75I of the EP&A Act, the Department is satisfied that the Director-General's environmental assessment requirements have been complied with.

3.7. Commonwealth Environmental Approvals

On 23 December 2010, the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) determined that the project was a "controlled action" under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC Reference 2010/5752), as it was considered likely to have a significant impact on wetlands of international importance (Sections 16 and 17B), listed threatened species and communities (Sections 18 and 18A) and listed migratory species (Sections 20 and 20A).

At the same time, the Proponent was advised that the project would require assessment through the accredited assessment process under the NSW EP&A Act. This means that separate assessment processes are not required under both the EPBC Act and the EP&A Act, and the NSW assessment process has been accredited for the purpose of the assessment requirements of the EPBC Act.

The Department has consulted SEWPaC throughout the assessment process, and the Department's assessment of Commonwealth matters is detailed in Section 5 of this report.

4. CONSULTATION AND SUBMISSIONS

4.1. Public Exhibition

Under section 75H(3) of the EP&A Act, the Director-General is required to make the environmental assessment (EA) of an application publicly available for at least 30 days. After accepting the EA, the Department publicly exhibited it from 24 June 2011 until 29 July 2011 (36 days) on the Department's website, and at various exhibition locations in Sydney and Newcastle. The Department published details of the public exhibition period and invited submissions through advertisements in the:

- *Sydney Morning Herald* on 22 June 2011;
- *Daily Telegraph* on 22 June 2011;
- *Newcastle Herald* on 22 June 2011; and
- *Port Stephens Examiner* on 23 June 2011.

The Department notified relevant State and local government authorities of the public exhibition period in writing and invited submissions on the project.

The Department received 25 submissions during the exhibition of the EA – 11 submissions from public authorities and 14 submissions from the general public and special interest groups.
A summary of the issues raised in submissions is provided below.

4.2. Public Authority Submissions

Eleven submissions were received from public authorities including: Fire and Rescue NSW; Australian Department of Defence; WorkCover NSW – Major Hazards Facilities Team; Civil Aviation Safety Authority; Newcastle City Council; Office of Environment and Heritage; Hunter-Central Rivers Catchment Management Authority; Port Stephens Council; NSW Roads and Traffic Authority; NSW Office of Water; and Hunter Water Corporation.

None of the agencies objected to the proposal, however raised issues for the Department's consideration.

<u>Fire and Rescue NSW (FRNSW)</u>

- Expects any new buildings or alterations to comply with the Building Code of Australia and relevant Australian Standards;
- Believes that the Proponent may have to submit an Emergency Plan (EP) to NSW Fire Brigade to ensure compliance with FRNSW Policy No 1: *Guidelines for Emergency Plans at Sites Having Dangerous Goods, Explosives and Major Hazard Facilities*;
- Believes that a Fire Safety Study should be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 2*, and submitted to FRNSW; and
- Requests an assessment of the ability of proposed traffic arrangements to meet FRNSW requirements outlined in *Guidelines for Emergency Vehicle Access, Policy No. 4*.

<u>Australian Government – Department of Defence</u>

- Requests confirmation that the height of proposed structures and the elevation of the exhaust plume would not infringe on the fixed wing Obstacle Limitation Surfaces for the RAAF Base Williamtown; and
- Requests a condition of approval requiring that the RAAF Aeronautical Information Service be notified of the location and heights of tall structures that are 30 metres or more above ground level within 30 kilometres of an aerodrome, or 45 metres or more above ground level elsewhere. The proposed Gas Storage Tank and Flare Stack meet these definitions.

WorkCover NSW – Major Hazards Facilities Team

- Requests that in case of project approval, two conditions be applied to the project:
  - As soon as the Proponent decides to proceed with the project or prior to commencement of detailed design, whichever comes first, the Proponent must consult with WorkCover with regard to complying with the regulations applicable to Major Hazard Facilities and obtain requirements for the preparation of the site risk assessments and the Safety Report (or Safety case if after 1 January 2012). The Proponent must comply with all requirements provided by WorkCover; and
  - The Safety Report (or Safety Case if after 1 January 2012) required to be prepared by the Proponent under the Major Hazard Facilities legislation must be submitted to WorkCover no later than six months prior to commissioning of the proposed project, or any other date agreed with WorkCover.

Civil Aviation Safety Authority

- Advises that neither the gas storage facility nor the gas plume would have any effect on the instrument flight procedures associated with Williamtown Airport.

Newcastle City Council

- Advises that the current operation noise acoustic report for evening/night time noise at 217 Old Maitland Road may be overly conservative, as the site is zoned 4(b) Port and Industry Zone and approved for a Church; requests that the Proponent takes into consideration noise control requirements in the detailed design phase of the project; and that a Noise Management Plan be prepared for the construction and operational periods;
- Requests that a second contamination report be conducted for 235 Old Maitland Road, conducting the further soil and groundwater sampling that was indicated in the preliminary report;
- Advises that strict adherence to the legal requirements of SEPP 55 (potential contamination and Remedial Action Plan) may be difficult to achieve, as the proposed scope of development works for the Hexham receiving station site is not currently known;
- Advises that approval should not be granted until a detailed acid sulphate soil assessment and acid sulphate soil management plan are implemented, in accordance with clause 25 of the Newcastle LEP 2003;
- Notes that the Hexham receiving station does not contain any habitable buildings, and is therefore not required to be suitably protected from 100 ARI flood levels. Requests a consent condition stating that the facility would be constructed on a platform 500mm above the 100 year ARI flood levels allowing for flood flows under the platform;
- Notes that the concept stormwater management plan does not include the Hexham receiving station site; requests a condition noting an increase in impervious areas and additional discharge controls required in accordance with Element 4.5 of Newcastle DCP 2005; and
- Notes that access to Hexham receiving station site is not addressed in the traffic study and requests a condition of approval in regard to this; notifies that access via the adjoining Jemena transfer station facility would be sufficient, provided that legal rights of access are provided if necessary; advises that the existing roadway used for the Hexham receiving station can cater for additional construction traffic and requests a condition ensuring the preparation of a Construction Traffic Management Plan to the road authority's requirements; notes that the submitted traffic study does not address on-site parking at the Hexham receiving station; requests that a single on-site space be provided for a service/maintenance vehicle.

Office of Environment and Heritage (OEH)

- Advises that if project approval is given, the Proponent would require an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act);
- OEH has identified potentially minor air issues including the following: CALMET modelling has under-predicted calm weather conditions by almost 50%; would like clarity

as to whether or not glycol hydrator vent steam(s) would be present, and; raises questions regarding missing elements considered in Emissions Scenario 3;
- Recommends that the Department enforces noise limits for the Hexham receiving station, regarding construction traffic noise impacts;
- OEH met with the Proponent regarding a number of concerns and came to the following agreements, which it also recommends as conditions of approval:
  - Biodiversity Offset Package: the Proponent, in consultation with OEH, conducted biodiversity assessments of the proposed offset site and the development site using BioBanking Assessment Methodology; OEH requests details on vegetation communities, flora and fauna species, habitat types, regional connectivity and links for the offset site; and details of how the offset will be conserved and site environmental management strategies; and
  - Rehabilitation Offset Package: Whilst offsetting the habitat of planted *Eucalyptus parramattensis* subsp. *decadens*, on-site seed collection from the development footprint would ensure a representative sample of species would be planted;
- Recommends as a condition of approval that targeted flora surveys are carried out with respect to possible indirect impacts to any surrounding habitats;
- Considers the Aboriginal Cultural Heritage Assessment to be satisfactory, but suggests conditions of approval ensuring: continual consultation and involvement of Aboriginal communities; the development of a Cultural Heritage Management Plan; opportunities for local Aboriginal stakeholders to monitor any initial ground disturbance works in the Project area and adjacent Aboriginal sites; immediate halt in works upon discovery of any further objects or human remains; and the implementation of an Aboriginal Cultural Education Programme for all personnel and contractors involved in construction activities;
- Notes that the EA makes no reference to the Flood Prone Land Policy, and notes that a request for formal consent must be made to the OEH Urban and Coastal Water Programme section in Newcastle;
- Recommends as a condition of approval that the disposal of hydrostatic test waters and stormwater must be conducted so as to not pollute waters as defined in the *Protection of the Environment Operations Act 1997*.

<u>Hunter-Central Rivers Catchment Management Authority</u>
- Requests that the Catchment Action Plan (CAP) and *Native Vegetation Act 2003* (NVA) apply to the project, despite its status as a transitional Part 3A project;
- Requests that any native vegetation cleared should be off set, with the inclusion of management actions to maintain and improve biodiversity; requests details of the proposed 20 hectares of native vegetation to be cleared as well as offset strategies, otherwise objects to the clearing;
- Recommends that offsets be determined using either the Environmental Outcomes Assessment Methodology or BioBanking methodology;
- Supports the removal of Pipeline Option 1, which would have proposed Horizontal Direct Drilling through two Endangered Ecological Communities on the northern bank of the Hunter River;
- Requests that conditions of approval include ensuring accountability to measures outlined in Section 9.4 of the EA regarding the mitigation actions implemented after the removal of *Eucalyptus parramattensis subspecies decadens* (Earp's Gum) habitat and koala habitat, in consultation with Port Stephens Council;
- Notes that a Groundwater Management Plan should be conducted. It is critical that monitoring of groundwater in and around the proposed development be carried out throughout the life of the project to ensure protection of groundwater resources from contamination and the effects of pipeline construction; including a response plan to any spills and a contingency plan to respond to drawdown caused by Horizontal Directional Drilling during construction; the plan should also include monitoring and mitigation strategies of terrestrial vegetation in the case of adverse reactions to groundwater disturbance.

Port Stephens Council

- Requests that pursuant to section 80A(1) of the EP&A Act and the Port Stephens Section 94A Development Contributions Plan, that the Department imposes a contribution fee of 1% of total development cost to be paid to Council;
- Requests that stormwater drainage details be approved by an accredited certifier or Council prior to the issue of a Construction Certificate; the submission of a Works-as-Executed plan and report ensuring that drainage works are carried out in a complying manner; the Proponent shall maintain a stormwater system and comply with Council's Water Quality Management Plan; requests that Bushfire APZs be amended so as to be aligned with Planning for Bushfire Protection; requests that the provision and/or construction of water supply infrastructure be carried out;
- Questions the location of the main building and its impact on Supplementary Koala Habitat and buffers and linkage areas; disagrees with the Proponent's stance that an alternative route for the access road is not feasible, suggesting a small route modification to avoid interference with koala habitat; suggests that any future plans to extend the facility should not be supported;
- Council raises the following concerns with respect to the ecological impacts of the project: the clearing of 67 Earp's Gum (listed by Federal and State authorities as Vulnerable); possible impacts to the New Holland Mouse (listed Federally as Vulnerable) and Koalas (listed as Vulnerable in NSW); concerns about the impacts on bird and bat species and the diversity of vegetation communities (suggesting offset areas be purchased, including the replanting of 100 Earp's Gum); suggests that independent botanists are used to undertake future additional targeted surveys and that a Vegetation Management Plan (including a bond to ensure restoration) and Weed Management Plan be prepared as a condition of approval; the pipeline route should avoid impacts on Vegetation Communities 1 and 2 in the vicinity of Old Punt Road and Communities 10 and 12 in the section north of the Hunter River as a condition of approval;
- Requests that a Vegetation Management Plan and Weed Management Plan be prepared; that development within areas identified as Preferred or Supplementary Koala Habitat or Linkage Areas or Buffers be prohibited in the future; that the Proponent undertakes rabbit and fox control measures;
- Requests that a Construction Traffic Management Plan be put in place as a condition of approval to ensure proper safety, traffic control, public notification and signage for the protection of people and animals; and
- Council does not agree with the Proponent's preferred option of tank removal for wastewater due to design and environmental reasons.

NSW Roads and Maritime Services (formerly Roads and Traffic Authority)

- Notes that RMS consent is required for road works, connections, traffic control and connections changes on the Pacific Highway and Tomago Road;
- Raises no objections, provided that a Construction Traffic Management Plan (CTMP) is prepared detailing management of pedestrians, cyclists and vehicular traffic on State roads throughout construction and submitted to the RMS and local Council; with the RMS reserving the right to review and make changes to the CTMP;
- Notes that all works undertaken shall be paid for in full by the developer;
- Provides guidelines for the installation of pipelines within classified (State) road reserves; notes that the RMS has received the most recent details of the pipeline route from Hexham to Tomago from the Proponent, and maintains support for Option 2 (crossing of Tomago Road perpendicular to the centreline further to the east and away from the Old Punt Road intersection); and
- Notes that the developer would need to enter into a Works Authorisation Deed with the RMS for any State road crossings.

NSW Office of Water (NOW)

- NOW is satisfied that the water supply for the project (via Hunter Water Corporation) would have minimal impact on water sources and dependent ecosystems;
- Notes that any dewatering undertaken in the course of construction must be appropriately authorised by a water licence – which is not identified in the EA;
- Based on information presented in the EA regarding avoidance, mitigation and management strategies, NOW is satisfied that the project would not pose an unacceptable risk of harm to water sources, groundwater dependent ecosystems, basic landholder rights to water and existing licensed water users;
- Supports the revised site stormwater management philosophy, however still has concerns that:
  - the EA does not address the potential impact of the gas pipeline crossing Water Feature 4 in accordance with NOW's *Controlled Activities: Guidelines for Watercourse Crossings*, however notes that this is not necessary under Part 3A of the EP&A Act; and
  - the EA does not demonstrate the capability of the constructed wetland/holding pond to deal with the volume of runoff from the uncovered and general plant areas; and
- Recommends conditions of approval relating to: water licensing; Surface Water Management Plan; and the Groundwater Management Plan.

Hunter Water Corporation (HWC)

- Notes that the proposed development is located within the Tomago Sandbeds Special Area which protects the Tomago Aquifer, which supplies 20-25% of the Lower Hunter's drinking water; information provided suggests the direction of the groundwater flow in the vicinity of the development is directly towards a drinking water bore line. HWC is treating the project as one of high significance to drinking water catchments;
- HWC recommends that the Proponent considers acquiring additional land south of the proposed site as an environmental offset for the purpose of setting aside conservation land aimed at eliminating further potential industrial development in the area;
- Requests conditions of approval relating to: development of a peer reviewed Stormwater Management Plan and submitted to the HWC; development of a Groundwater Management Strategy; strategies to minimise illegal dumping on site during construction; and the signing of a Deed Agreement with HWC regarding the ongoing management of the drinking water aquifer beneath the proposed development.

4.3. Public Submissions

Fourteen submissions were received from the public, including submissions from the following special interest groups:

- Gimbay Gatigaan Aboriginal Corporation;
- EcoNetwork Port Stephens Inc.;
- Australian Water Campaigners; and
- Rising Tide Newcastle.

Of the 14 public submissions, all objected to the project. Other individuals and groups also stated that detailed submissions were to follow, however, the Department has to date not received further comment. The key issues raised in public submissions are listed in Table 5, and are considered further in Section 5 of this report.

Table 5: Summary of Issues Raised in Public Submissions

Issue
Aboriginal Heritage and Land Claims: • The site of the facility and pipeline is currently under the process of a Native Land Claim by a local Aboriginal group; • Concern that further indigenous relics may be found on the site; and • Claims that Indigenous groups' concerns are being ignored by the Proponent and by authorities.
Flora and Fauna: • Potential negative impacts on the lower Hunter River estuary and the Ramsar listed wetlands; • Effects of lost natural forests on local fauna populations; • Possible damage to local wetlands; • Continued destruction of the Tomago Sand-bed habitat and the effect of pollution on eucalyptus trees and leaves; • Concern over the maintenance and monitoring of the proposed offset areas; • The effect of bushfires on the koala habitat; • Concern over possible impacts on threatened species, including migratory birds; • Concern over the destruction of koala habitat and the local koala population; • Concern about the impact of the development on native fauna, including the New Holland Mouse and the Green and Golden Frog; and • Concern over the impact on migratory fauna, including the Satin Flycatcher, Black Faced Monarch, Spotted-tail Quoll, Long-nosed Potoroo and the Grey-headed Flying Fox.
Cumulative Impacts: • Concerns that the facility would be constructed on the buffer zone for the existing Tomago Aluminium smelter – requests that the Proponent relocates the plant and access road 200 m to the west to avoid the buffer zone.
Greenhouse Gases/ Climate Change: • Concerns regarding the project's potential negative effect on climate change; • Promotion of the use of fossil fuels and concern over the use of gas as an 'interim' fuel between coal/oil and renewables; and • Threat of tsunamis and further disasters as a result of climate change and the mixture of flammable gas and chemicals.
Air Quality: • Potential negative effects on air quality by the process of liquefaction and regasification;
Impacts of Coal Seam Gas Extraction: • Notes that a gas energy company in Queensland is currently being sued for breaching environmental guidelines; • Potential devastation caused to the natural water table by coal seam gas exploration, and the effect of pollutants on water supply; • Newcastle's current threat of an earthquake may be increased by mining and gas extraction activities; • Concern that the establishment of the LNG plant would encourage the extraction of coal seam gas through fraccing methods and the drilling of gas off the coast.
Hazards and Risk: • Threat of tsunamis and further disasters as a result of climate change and the mixture of flammable gas and chemicals; and • Concern over potential catastrophic gas release and plant explosions as a result of power outages and a reduced ability to cool and liquefy gas.

4.4. Proponent's Response to Submissions

The Proponent provided a response to the issues raised in submissions (see Appendix C). The response included a Preferred Project Report which made the following changes to the proposed project:

- Reconfiguration of the gas storage facility footprint. This involves shifting the gas plant facility's southern boundary to the north by a further 20 metres and reconfiguring the alignment of the internal access road to the facility. This would result in the retention of a minimum of 52 Earp's Gums that were originally going to be removed;
- Removing the constructed wetland and infiltration ponds initially proposed as part of the project and replacing them with a single holding pond along the western boundary to collect stormwater runoff;
- Power supply has been amended to utilise the existing 33 kV transmission line located to the north of the site, along the existing Ausgrid easement;

- Reducing the flare stack height from up to 45 metres to 15 metres;
- Erecting a gate along the access road to enhance security and prevent illegal dumping;
- Provision of two additional road splays to enable sufficient space for turning of larger vehicles;
- Selection of Option 2 for the pipeline corridor; and
- Widening of the existing road easements along the TAC Northern Access Road towards the Old Punt Road intersection to provide additional area to install the required utilities to service the Access Road and Utility Corridor functions.

5. ASSESSMENT

The Department considers the key environmental issues for the project to be:

- Flora and Fauna;
- Water Quality and Hydrology;
- Hazards and Risks;
- Aboriginal Heritage; and
- Noise.

5.1. Flora and Fauna

Methodology

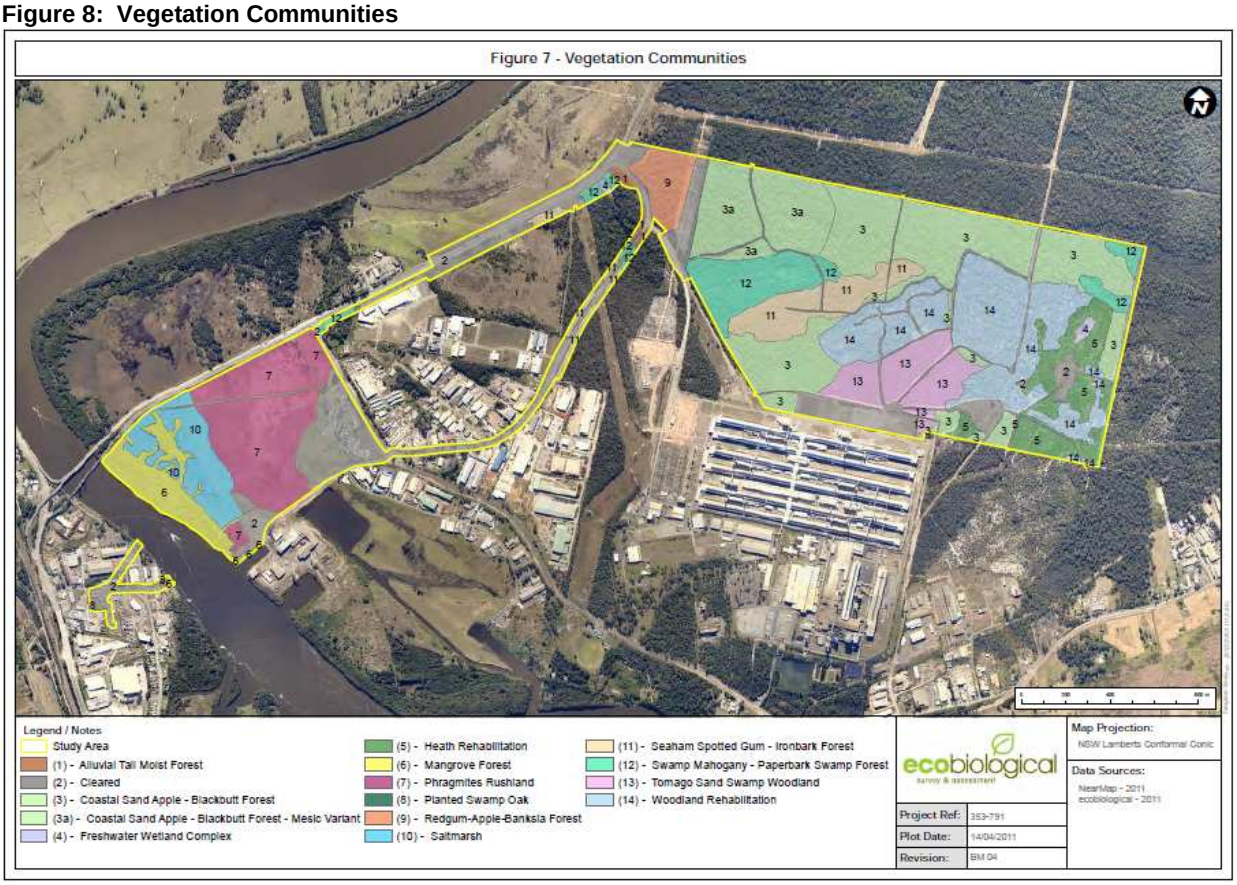
The Environmental Assessment undertook a mixture of desktop and field surveys to determine the impact of threatened species under both the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Database searches (DECCW's "Atlas of NSW Wildlife"; National Herbarium of NSW; SEWPaC's Protected Matters) were undertaken to determine the likelihood of threatened species occurring in the project area. Desktop information helped to establish the likelihood of any threatened species occurring in the study area and identify the habitat for species that may use the study area as part of a foraging range.

Field surveys for flora were then undertaken comprising a mixture of methods including floristic quadrats, random meanders and targeted threatened species surveys during flowering periods. Fauna field surveys involved such methods as trapping techniques (hair tube, cage, reptile funnel trap, harp trap), anabat call recorders, after dark calls for owls, spotlighting, searchers for diggings, droppings and scratch marks and targeted surveys of key threatened species including the Green and Golden Bell Frog (*Litoria aurea*) and New Holland Mouse (*Pseudomys novaehollandiae*). A full description of survey methodology is in the Flora and Fauna appendix in the Environmental Assessment.

Flora

Twelve vegetation community types have been identified across land potentially affected by the project, comprising 10 natural and two rehabilitated vegetation communities. Of these, the majority occur within the Primary Project Area, although patches of Alluvial Tall Moist Forest, Swamp Mahogany – Paperbark Swamp Forest, Seaham Spotted Gum – Ironbark Forest, Mangrove Forest and Phragmites Rushland occur along the preferred gas pipeline corridor (gas pipeline option 2, generally along Old Punt Road). Vegetation in and around the Hexham receiving station site is limited to planted Swamp Oak and cleared areas. The location and distribution of vegetation communities is shown in Figure 8:

Figure 8: Vegetation Communities



Of the vegetation communities identified across the project area, four are listed as endangered ecological communities (EECs) under the TSC Act:

1. Freshwater Wetland Complex (a small area in the eastern part of the Primary Project Area), which forms part of the *Freshwater Wetlands on Coastal Floodplains* of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community;
2. Phragmites Rushland (a small area of the gas pipeline corridor adjacent to the Hunter River), which also forms part of the *Freshwater Wetlands on Coastal Floodplains* of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community;
3. Swamp Mahogany – Paperbark Swamp Forest (generally in the western portion of the Primary Project Area, with some patches along the gas pipeline route), which forms part of the *Swamp Schlerophyll Forest of Coastal Floodplains* of the NSW North Coast, Sydney Basin and South East Corner Bioregion Endangered Ecological Community; and
4. Saltmarsh (adjacent to the Hunter River, but outside the preferred gas pipeline corridor), which forms part of the *Coastal Saltmarsh* in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community.

In addition to the above EECs, the Tomago Sand Swamp Woodland and Woodland Rehabilitation communities were considered to be of high vegetation community significance since they contained the threatened Earp's Gum (*Eucalyptus parramattensis* subsp. *decadens*). In particular, the Woodland Rehabilitation community is located within the development footprint in the Primary Project Area. The Earp's Gum is listed as threatened under both the TSC Act and the EPBC Act.

With amendments to the project footprint as part of the Proponent's Preferred Project Report, the expected number of Earp's Gum individuals required to be cleared has reduced from 67 to 15. In addition to being a threatened species, the Earp's Gum is an important Koala habitat tree (most of the Primary Project Area has been mapped as Supplementary Koala Habitat under SEPP 44).

Targeted field surveys for the Dwarf Kerrawang (*Rulingia prostrate*), listed as endangered under the EPBC Act, found no individuals of this species within any part of the project components. Therefore an impact upon this species is considered to be unlikely.

Land along the northern bank of the south arm of the Hunter River is mapped as a SEPP 14 wetland. As a result of the selection of gas pipeline corridor option 2 as part of the Preferred Project Report, the Proponent has been able to avoid direct impacts on these wetland areas.

Table 6 below summarises the expected clearing of vegetation required for the Project on a community basis, and indicates the reduction in clearing requirements as a result of preferred project amendments, with communities forming part of an EEC or of high conservation value highlighted. For the purpose of the areas presented in Table 6, the Proponent has assumed a worst-case construction methodology (ie. open trenching through vegetation, rather than directional drilling underneath it). Amendments to the Project have reduced expected maximum clearing from 22.34 hectares to 19.38 hectares (with a reduction in the clearing of high conservation value communities/TECs from 5.65 hectares to 2.61 hectares).

Table 6: Vegetation Loss

Project Component/Vegetation Community	***Original Project Footprint (Hectares)***	***Preferred Project Footprint (Hectares)***
Access Road + Utility Corridor		
Coastal Sand Apple-Blackbutt Forest	1.02	0.96
Coastal Sand Apple-Blackbutt Forest-mesic Variant	1.08	1.08
Seaham Spotted Gum-Ironbark Forest	0.45	0.45
Swamp Mahogany-Paperbark Swamp Forest	0.64	0.64
Woodland Rehabilitation	0.25	0.26
Total vegetation removal	*3.44*	*3.39*
Gas Plant Footprint		
Coastal Sand Apple Blackbutt Forest	8.06	9.62
Woodland Rehabilitation	4.54	1.71
Total vegetation removal	*12.6*	*11.33*
Gas Pipeline Access Corridor		
Coastal Sand Apple-Blackbutt Forest	2.36	2.02
Coastal Sand Apple-Blackbutt Forest-Mesic Variant	1.95	1.61
Redgum-Apple-Banksia Forest	0.85	0.69
Total vegetation removal	*5.16*	*4.32*
Preferred Pipeline (Conventional Trenching)		
Alluvial Tall Moist Forest	0.19	0
Planted Swamp Oak	0.01	0.06
Redgum-Apple-Banksia Forest	0.12	0.28
Seaham Spotted Gum-Ironbark Forest	0.60	0
Swamp Mahogany –Paperbark Swamp Forest	0.22	0
Total vegetation removal	*1.14*	*0.34*
Total	**22.34**	**19.38**

Fauna

Nine threatened fauna species were recorded in the project area during the ecological surveys undertaken to inform the Environmental Assessment. Of these, eight are listed under the TSC Act, including five species of bat, the Koala (*Phascolarctos cinereus*), Little Lorikeet (*Glossopitta pusilla*) and Squirrel Glider (*Petaurus norfolcensis*). The ninth species, the New Holland Mouse (*Pseudomys novaehollandiae*), is listed under the EPBC Act. All species were recorded within the Primary Project Area, with surveys of the gas pipeline route and Hexham receiving station site identifying no threatened species.

As a result of the selection of the option 2 pipeline corridor, the project avoids direct impact to the habitat for the Green and Golden Bell Frog (*Litoria aurea*), listed as endangered under the TSC Act and vulnerable under the EPBC Act. The Rufous Fantail (*Rhipidura rufifrons*) was also identified on the site, and is protected as a migratory species under the EPBC Act. The Proponent suggests that although no other migratory species were identified on the site, potential exists for a further seven migratory species to utilise the habitat within the Primary Project Area.

The Environmental Assessment also highlights the significance of tree hollows to local native fauna, including several of the threatened species identified on the site during ecological surveys. The highest density of hollow bearing trees is expected in the Coastal Sand Apple-Blackbutt Forest community (average density of 25 hollows per hectare). Other communities with hollow-bearing potential are the Redgum-Apple-Banksia Forest, Swamp Mahogany-Paperbark Swamp Forest and Seaham Spotted Gum Ironbark exhibiting between 6.6 and 10 hollows per hectare. Based on these figures, it can be expected that the Project would result in the loss of between 300 and 400 hollows.

Potential Impacts

The Proponent has identified a range of impacts that may result from specific components of the Project, as summarised in Table 7 below:

Table 7: Flora and Fauna Impacts

Project Component	*Impact*
Gas plant footprint	▪ Removal of threatened fauna and fauna habitat including preferred koala habitat ▪ Removal of EECs and TSC/EPBC Acts' listed Earp's Gum ▪ Vibration, noise and lighting associated with project construction and operation ▪ Prevention of fauna dispersal due to inappropriate fencing of the gas plant facility.
Access road and utility corridor	▪ Removal of threatened fauna and fauna habitat including preferred koala habitat ▪ Removal of EECs and TSC/EPBC Acts' listed Earp's Gum ▪ Vibration and noise from vehicles associated with project construction and operation ▪ Lighting impacts from vehicles and access road ▪ Slashing of regrowth and spraying of weeds to maintain the corridor ▪ Injury or death of fauna and limiting fauna dispersal due to inappropriate fencing of corridor.
Gas pipeline access corridor	▪ Removal of preferred koala habitat ▪ Slashing of regrowth and spraying of weeds to maintain the corridor.
Preferred pipeline corridor (Option 2)	▪ Removal of threatened ecological communities and SEPP 71 Coastal Protection Areas ▪ Decrease in water quality from earthworks and frac-out associated with Horizontal Directional Drilling (HDD) ▪ Slashing of regrowth and spraying of weeds to maintain the corridor ▪ Release of acid sulphate soils and surface water runoff and impacts on Ramsar wetlands.

To offset the direct loss of habitat and biodiversity values as a result of the Project, the Proponent has proposed the development and implementation of a formal biodiversity offset package. The Proponent proposes that the package would include habitat offsets identified using the Biobanking assessment methodology to provide a 'like for like' offset, and an offset for the loss of Earp's Gum individuals. The Proponent is currently investigating a number of potential offset sites, and has committed to on-going consultation with OEH and SEWPaC to ensure that offsets meet the requirements of those agencies.

To minimise potential impacts during construction, the Proponent proposes to implement a series of measures, including implementation of 'no go areas' and comprehensive erosion and sedimentation control measures. These approaches would be detailed in a construction environmental management plan for the project.

Consideration

The Department is generally satisfied that the Proponent has undertaken an appropriate level of assessment of the potential flora and fauna impacts associated with the project. Through amendments to the project articulated through the Preferred Project Report, the Proponent has been able to further minimise the potential impacts of the project on flora and fauna. Key to the Proponent's approach has been a minimisation of impacts on Earp's Gum individuals, avoidance of more sensitive wetland areas – particularly through the selection of the preferred gas pipeline route – and a general minimisation of vegetation clearing requirements through careful up-front consideration of project configuration. The Proponent's selection of the Option 2 pipeline route avoids crossing SEPP 14 wetlands and therefore avoids potential direct impacts to the Green and Golden Bell Frog listed as vulnerable under the EPBC Act.

The Department also notes that any potential impact on downstream environments, including the Hunter Estuary Wetlands Ramsar site (also a habitat for the Green and Golden Bell Frog), is unlikely to be significant given that impacts on water quality should be minimal due to the recommended stringent conditions for both ground and surface water impacts and acid sulphate soils. (See section 5.2 – Water Quality and Hydrology and the assessment for Acid Sulphate Soils in section 5.5 – Other Issues.)

With respect to the potential flora and fauna impacts of the project, the Department considers that the following are key aspects for this assessment:

1. The extent of vegetation clearing and the need for biodiversity offsets;
2. Potential impacts on Earp's Gum;
3. Potential impacts on the New Holland Mouse and Koala; and
4. The need for additional survey work.

Vegetation Clearing and Biodiversity Offsets

The Department is satisfied that the Proponent has undertaken reasonable endeavours to minimise the extent of clearing required for the project. In particular, further consideration of options to minimise the need to clear existing vegetation, and to avoid areas of high quality and/or threatened species and communities has led to amendments to the project, as detailed in the Preferred Project Report. The net outcome of this process is an expected clearing requirement of 19.38 hectares, with as little as 2.61 hectares of this representing endangered ecological communities or high conservation value communities.

While the Department considers that this level of clearing would not represent an unacceptable loss of ecological values from the site, it considers it important that an appropriate offset package is developed and implemented. Both the Department and OEH support this approach, and note that the Proponent proposes to apply the Biobanking methodology to ensure that an acceptable offset ratio is established for the species and communities likely to be removed from the project site. Notwithstanding, OEH raised

concern (also shared by the Hunter-Central Rivers Catchment Management Authority) that the Proponent had yet to identify a specific offset site, nor demonstrate that the offset site would represent maintenance or improvement of ecological values relative to the loss associated with project clearing.

Since this issue was raised by the OEH, the Proponent has advised the Department that it has acquired two offset sites at Lot 16 DP 7531200 and Lot 20 DP 7531200 near Medowie in the Port Stephens local government area and is in the process of developing Conservation Agreements with the OEH to protect an area of 113 hectares. In addition, the Proponent has advised that it has negotiated a rehabilitation package with the Hunter Region Botanic Gardens to offset the loss of 15 Earp's Gums. The package includes: on-site seed collection from the development footprint of the Earp's Gum and species commensurate with the taxa occurring in the "Woodland Rehabilitation" complex; seed propagation in accordance with best practice measures, specifications and principles outlined in nationally accepted guidelines; and replanting a target of 60 plants that will be established and maintained.

In order to ensure that adequate offsets are provided, the Department recommends that the Proponent be required to deliver appropriate offsets in two stages. Firstly, the Proponent should develop a Biodiversity Offset Strategy prior to the commencement of construction, which would detail offset requirements, delivery mechanisms and management actions. In the second stage, the Biodiversity Offset Package would detail the actual offset site(s) and would be required to be analysed prior to operation. This two-stage process is intended to provide the Proponent with some flexibility around project implementation concurrently with offset development, while ensuring that focus is placed on timely progression of offset requirements at an early stage of project implementation. The Department recommends that the Strategy and Package be developed by a suitably qualified ecologist, in consultation with OEH and Port Stephens Council.

With the loss of vegetation on the site, the Proponent has estimated that some 300 to 400 tree hollows may be lost. The Department considers this number to be significant and a loss that should be offset. This is a view also echoed by Port Stephens Council. The Department recognises that hollow bearing trees may form the primary habitat for a number of fauna species and therefore play a critical role in any ecological area where they are abundant. The opportunity exists for the Proponent to install nest boxes or similar measures on adjacent land. The Department therefore recommends that the Proponent be required to replace tree hollows lost as part of the project at a ratio of no less than 1:1, as part of the Biodiversity Offset Strategy and Package.

To facilitate the identification of tree hollows prior to clearing, the Department recommends that the Proponent be required to employ a suitably qualified ecologist to attend and advise on all vegetation clearing and fauna management activities (refer to various roles in the subsections below).

Earp's Gum

The Department supports the Proponent's commitment to minimising the number of Earp's Gum individuals to be removed from the site. It is noted that the Proponent has reduced this requirement from 67 to only 15 as part of the Preferred Project Report. The Department notes that Earp's Gums are not endemic to the area and considers this relatively small loss to be acceptable.

Based on advice from OEH, the Department recommends that the Proponent be required to offset the loss of Earp's Gum individuals at a ratio of 3:1. This offset would be detailed in the Biodiversity Offset Strategy and Package required for the project. To ensure that an accurate final number of Earp's Gum individuals to be lost are known prior to clearing, the Department recommends that the Proponent be required to undertake a confirmatory survey for this species within the proposed disturbance footprint of the project prior to any vegetation

disturbance. The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) has raised no objection to this approach, but has indicated it will consider the need for additional offsets beyond those proposed at the State level.

New Holland Mouse and Koala

The Department accepts the Proponent's assessment that the loss of vegetation from the project site would not adversely affect the New Holland Mouse or the Koala. However, the Department considers it important that every reasonable opportunity is pursued to ensure that individuals of these species are moved from the proposed area of vegetation clearing prior to the commencement of clearing.

In the case of the Koala, the Department recommends that individuals be subjected to non-invasive methods of coercing koalas to leave the area, and if they remain on the site, that human-assisted translocation be considered. The suitably qualified ecologist required under the conditions of approval would be instrumental in directing this effort.

For the New Holland Mouse, the Department recommends that the Proponent be required to implement a trapping programme (managed by the suitably qualified ecologist) to capture and relocate individuals from the site prior to vegetation clearing. In order to enhance the likelihood of translocation success, the Proponent has committed to investigating habitat characteristics of affected areas and offset areas to ensure appropriate areas are used for translocation, which is to be done in consultation with SEWPaC. These measures are expected to minimise the potential for individuals of these species to be affected by clearing works. The Department accepts this approach as it will assist in removing individual species from the construction zone and placing them in areas that have habitat characteristics similar to their existing habitat.

Additional Survey Work

OEH has raised concern that targeted surveys for Tall Knot-weed (*Persicaria elatior*), Small Water-ribbons (*Maundia triglochonoides*) and Horned Pondweed (*Zannichellia palustris*) were not undertaken in areas of Freshwater Wetland Complex and Phragmites Rushland as part of the ecological assessment for the project. OEH has recommended that the Proponent be required to undertake surveys to understand the ecological composition of the Wetland and Rushland areas in the event of a direct or indirect impact, prior to the commencement of works.

While the project would be subject to comprehensive water and spill management measures to minimise the potential for indirect impacts through contamination of Wetland and Rushland areas with poor quality water, the Department has recommended a condition of approval which strictly prohibits direct or indirect impacts on areas mapped as Freshwater Wetland Complex or Phragmites Rushland. Furthermore, the condition requires the suitably qualified ecologist, employed by the Proponent, to oversee and advise on measures to ensure this outcome is met.

While the Department does not consider the risk to the Tall Knot-weed, Small Water-ribbons and Horned Pondweed to be great, it does consider the OEH recommendation to be reasonable and has included a condition of approval that targeted surveys for these taxa be undertaken, and any potential impacts be included in the Biodiversity Offset strategy.

Migratory Species

With respect to the identified migratory species, the Department notes that gas pipeline options that required clearing of SEPP 14 Coastal Wetlands have now been removed from the proposal as a result of the PPR. As such, there will be no direct impact upon migratory species and their habitats as a result of the project. In addition, indirect impacts to migratory species utilising Ramsar wetlands some three kilometres downstream, will be mitigated by

stringent conditions and control measures for water quality and acid sulphate soils. (See section 5.2 – Water Quality and Hydrology and the assessment for Acid Sulphate Soils in section 5.5 – Other Issues.)

Conclusion

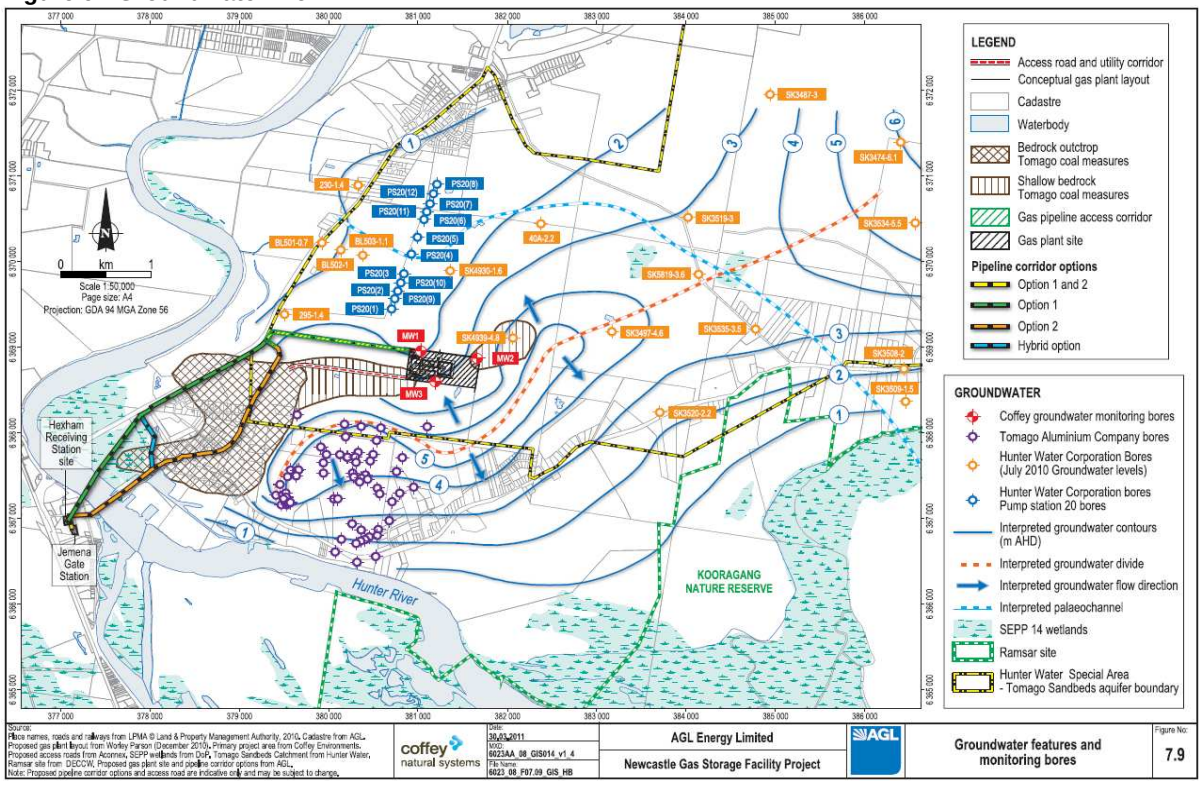
The Department is satisfied that the potential ecological impacts of the project can be avoided, mitigated and offset with the combination of measures proposed by the Proponent and the conditions of approval recommended by the Department. Provided these measures are implemented, the Department is satisfied that the project is unlikely to have an unacceptable impact on ecology.

5.2. Water Quality and Hydrology

Issue

The project is located within the Tomago Sandbeds Catchment Area on the Tomago Sandbeds aquifer which is used as a potable water source for the Hunter Region. The thickness of the aquifer is approximately four metres in the west and northwest of the gas plant site to more than 45 metres in a palaeochannel north of the Primary Project Area from the Hunter River to Fullerton Cove. Due to the nature of the Tomago Sandbeds landscape, infiltration to the shallow water table is rapid. Figure 9 illustrates surface and ground water flow in relation to the project site:

Figure 9: Groundwater Flow



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

Surface water features in the vicinity of the project include the Hunter River and associated estuary wetlands including the Ramsar wetlands of Kooragang Nature Reserve and the Wetlands Centre Australia and several ephemeral water bodies near the primary project area.

Water Resource

During construction, water would be required for dust suppression, drilling, wash down and amenities for up to 300 construction employees. A one-off requirement for approximately 42 mega litres of water would also be needed for hydrostatic testing of tanks and pipelines. Sources

of water may include Hunter Water Corporation's (HWC) potable water network, untreated water from the HWC Bore Station 20 and/or groundwater locally abstracted from new bores. Depending on the quality of the test water it may need to be treated with biocides and oxygen scavengers prior to use to prevent corrosion or scale forming inside the water pipelines.

The wastewater from hydrostatic testing could be discharged via infiltration to groundwater or discharged to an existing watercourse. Where the water has been treated with chemicals prior to hydrostatic testing, the resultant concentrations in the water at discharge are expected to be at trace levels only. If potable water is to be used, the water would be treated to remove chlorine and any other contaminants prior to discharge to the environment.

During operation, the project would require approximately 48 kilolitres per day for the operation of the gas plant and amenities for approximately 15 operational employees and is expected to produce between 17 and 27 kilolitres of wastewater per day. The remaining water (between 21 and 41 kilolitres per day on average) would be lost to evaporation from the gas plant. Operational water requirements would be sourced from the HWC potable water network and the wastewater and trade waste would be disposed of via a tanker to the HWC Wastewater Treatment Works.

Surface Water

Construction and operation of the project have the potential to impact surface water quality. During construction, run-off from disturbed areas, increased erosion and sedimentation, areas containing contaminated or acid sulphate soils, drilling fluid and spills have the potential to impact surface water and to infiltrate groundwater if not appropriately managed.

There is the potential for drilling fluid from horizontal directional drilling to escape through fissures or weaknesses in the substrate. The drilling fluid, if released, could smother vegetation or increase turbidity of the Hunter River depending on the discharge point. The Proponent proposes to use Tuff Gel Extra as a drilling fluid and claims that it comprises chemicals of low bioaccumulation potential, which are non-toxic naturally occurring substances that would pose a minimal impact to aquatic life down stream if frac-out occurred.

Run-off from the site access road would be discharged into road-side swales similar to other roadside swales used by the RMS or Port Stephens Council. Run-off from roads, car parks and hardstand areas within the gas plant site would be captured and treated using wet sump oil and grease separators and a bio-retention system before being discharged to infiltration basins. Wastewater generated from the enclosed workshops would be collected at source and disposed of as trade waste. Rain water falling on uncovered plant areas would be retained within a primary bund which would be sized to accommodate 110% of the maximum possible spill or the rainfall from a 20 year ARI, 24-hour duration rainfall event. The secondary bund would be designed to capture the volume of water from the fire fighting tank and/or the runoff volumes from a 100 year ARI, 72-hour storm event. Water within the bunds would be directed to blind sumps and pumped into a holding and inspection tank.

Run-off from uncovered and general plant areas would be tested prior to being manually released to the holding pond via a wet sump oil and grease separator. A constructed wetland and infiltration ponds were initially proposed as part of the project, however, these have been replaced by a single holding pond along the western boundary to collect stormwater runoff. Stormwater would be tested for water quality and either treated if found to be sub-standard or disposed of via the trade waste process. A pump station would be connected to the holding pond and would transport stormwater (of acceptable quality) from the gas storage facility via a 1.6 km (225 mm diameter) pipeline, to Old Punt Road along the proposed access road and utility corridor. The proposed discharge point would be along the western side of the culvert crossing on Old Punt Road.

The LNG storage tank would have a bunded area designed to capture 110% of the storage volume of the tank. Pipe inlets and other structures that may be subjected to spills, drips or leaks

would be bunded, and drained to an impoundment sump before being pumped to the inspection tank as for run-off from the primary bund.

Flooding

The project would involve an underground pipeline crossing declared floodplains of Tomago and Hexham. The Hexham receiving station is also within the Hexham declared flood range. Potential impacts from flooding include the flotation, damage and rupture of pipes. To prevent potential erosion of ground cover and the flotation of pipes as a result of flooding, horizontal direct drilling beneath the Hunter River will be designed with entry and exit points positioned at least 50 metres from the river's edge. Other measures include additional depth of cover, and extra wall thickness to be provided at waterways, drains and swamp crossings.

The Hexham receiving station would have a minimum floor level equivalent to the 100 year ARI flood level (3.9 metres AHD) plus a freeboard of 500 millimetres (ie. 4.4 metres AHD) to enable flood flows under the platform. This is in line with the requirements outlined in Newcastle City Council's submission and the development at Hexham is not expected to have an impact on peak levels up to the 100 year ARI event.

The gas storage plant at Tomago is expected to be levelled to a finished surface of 6.35 metres AHD, which is above the peak levels (4.6 metres AHD for 100 years ARI flood / 4.9 metres AHD for 200 years ARI flood / 5.4 metres AHD for 500 year ARI flood). In addition, the LNG storage tank will be located within a bund and surrounded by an earth mound at least three metres high. The Proponent has committed to providing a Flood Emergency Response Plan.

Groundwater

There is the potential for spills and leaks from the project to impact on the groundwater quality of the Tomago Sandbeds aquifer and transport contaminants towards HWC's Bore Station 20 resulting in the loss of water for potable supply, industrial or irrigation purposes. There is no risk of contamination of the groundwater should the LNG tank leak, as LNG would freeze the ground before evaporating.

Groundwater levels and flows could also be disrupted by drawdown caused by horizontal directional drilling. Drawdown during the construction of the trenches is expected to impact the water levels within 50 metres of the trench but is unlikely to affect the HWC abstraction bores approximately 400 metres away. There is not expected to be ongoing impacts to groundwater levels as a result of the gas pipeline as it would be buried above the water table.

The gas plant site would have pile foundations to 15 metres deep. A conservative impact assessment assumed that the pile foundations would prevent all groundwater flow beneath these buildings (although full prevention of groundwater flow beneath the foundations is unlikely). Despite this conservative assumption, the groundwater impact assessment presented in the Environmental Assessment suggested a consequential maximum predicted fall of 0.7 metres in groundwater levels for the 200 metre groundwater flow path across the site. Beyond this, there is expected to be a negligible impact on groundwater hydrology.

Impacts on groundwater quality, if they were to occur, would most likely be as a result of surface water contamination through spills and infiltration to groundwater. Modelling was undertaken to identify contaminant migration should an uncontrolled spill occur outside the primary and secondary containment measures or if the containment measures fail. The modelling considered two potential contaminants: amine (A-Methyldiethanolamine, a gas scrubber) and ethylene glycol (a coolant). Both contaminants are fully miscible (can be mixed together without separating) with water and potential contaminants of drinking water quality at HWC's Bore Station 20. The results of the modelling indicate that a 205 litre spill would result in a concentration of 2.0 milligrams per litre at a distance of approximately 400 metres from the spill in ten years. It is expected that the contaminant would be observed at Bore Station 20 after five to six years. The Proponent states that, due to the predicted ground flow rate of 37 metres per year under current HWC pumping

conditions, there would be ample time to implement contingency measures to prevent contamination from a spill reaching HWC's Bore Station 20 (in the unlikely event that such a spill should occur). Such measures would be contained in a spill contingency plan that would form part of the Groundwater Monitoring Programme, and would include:

- determining whether the uncontained spill is sufficient size to potentially impact groundwater;
- cleaning up of surface and soil contamination (to the depth of the water table);
- advising HWC, OEH and NOW;
- implementing hydraulic containment using one ore more down gradient pumping bores if required; and
- install additional monitoring bores and increased monitoring frequency if required.

Mitigation

The Proponent has committed to developing surface water and groundwater monitoring plans in consultation with OEH, NOW and HWC. As part of this, it has committed to monitoring groundwater levels through a total of 14 monitoring bores during construction and operation. It is noted that there are currently three monitoring bores with the Proponent to provide an additional 11 monitoring bores. The location of an additional 11 groundwater monitoring bores would be downstream of surface water treatment areas and locations would be determined in consultation with HWC, OEH and NOW as part of the Groundwater Monitoring Plan. Monitoring of groundwater at Hexham and adjacent to horizontal directional drilling entry and exit points is proposed to be only during construction and would be ceased once no changes to groundwater hydrology beyond expected natural variation are confirmed.

If water for hydrostatic testing is obtained from groundwater bores, this water allocation would be obtained from existing allocations under the Tomago Tomaree Stockton Water Sharing Plan. Hydrostatic test water management measures would be developed in consultation with HWC and the NOW.

Consideration

Water Resource

The Department is satisfied that the Proponent has given adequate consideration to the water requirements of the project during construction, and that construction water demands are both reasonable and able to be supplied. While the Proponent has yet to identify a final water source(s) for construction purposes, the Department is satisfied that there is sufficient certainty among the identified options that an appropriate and adequate source allocation could be secured. It is accepted that the Proponent would need to consult further with Hunter Water Corporation (HWC) to determine which of the water supply options would eventually be applied to the construction of the project, and the Department acknowledges that the Proponent is committed to these on-going discussions. In the case of operational water requirements, the Department is satisfied that supply of water from the HWC potable water system is achievable and would not impose an unacceptable burden on the existing system or water supplies.

The Proponent states that it is investigating how it would dispose of the hydrostatic test water in consultation with relevant agencies. The Department considers that there are various options available to dispose of the hydrostatic test water and it does not necessarily require determination prior to the approval of the project. However, the Department does consider it prudent to undertake a determinative role in the disposal of the test water in order to ensure that it will be disposed of in a matter that is considered best practice in the context of the project. As such, the Department recommends that the disposal of the test water be addressed in the Surface Water Management Plan.

Port Stephens Council and HWC raised concerns in their submissions in relation to the disposal of wastewater generated during operation of the project. These concerns relate to the use of tankers to transport wastewater offsite and the possibility of on-site spillage and resulting

contamination of surface and groundwater. In response to these concerns, the Proponent has committed to the following:

- the system will have a telemetered level sensor that alarms when over range;
- the tank will be included on the regular site inspection and reporting programme; and
- there is a groundwater monitoring piezometer downstream of the tank that is regularly sampled for pathogens and nutrients.

The Department accepts that the disposal method proposed by the Proponent would provide adequate protection against contamination whilst the Groundwater Monitoring Programme recommended as a condition of approval would register any contamination in the unlikely event that it would occur. In the event that contamination is identified, contingency measures would then be implemented (the details of these will be included in the Groundwater Monitoring Programme in close consultation with HWC and NOW). Importantly, the Department does not consider it warranted to require formal connection of the project to the HWC sewer system given the relatively isolated location of the project, and the cost to service the small volumes of sewage and wastewater expected to be produced during operation of the project.

Surface Water

Management of surface water and stormwater associated with the construction and operation of the gas storage facility can be adequately and appropriately addressed through the application of best environmental practice. This includes well-known and commonly applied surface water management techniques to minimise and manage the generation of sediment-laden waters, and prevention of erosion. The Department recommends imposition of conditions requiring the Proponent to install and operate surface water management controls in accordance with *Managing Urban Stormwater: Soils and Conservation (Landcom, 2004)* and to develop a comprehensive Surface Water and Groundwater Management Plan for both construction and operation.

In addition to general surface and stormwater management, the Department notes that surface water has the potential to transport hazardous materials, such as chemicals and sediments, into the natural environment causing adverse environmental impacts, particularly if hazardous materials are released into the river system where they have the potential to be widely distributed via natural flows. The Department considers that the mitigation measures intended to be utilised by the Proponent represent best practice and should successfully mitigate the potential for the unintended transport of hazardous materials in the environment. However, HWC has noted that the stormwater management system that has been proposed (and in principle agreed to by HWC) is a complex engineering structure that will only provide adequate protection if it is well designed and well built. To ensure its integrity, the Department has included a condition of approval that the Proponent engages a suitably qualified expert to undertake a peer review of the design, construction and ongoing maintenance of the stormwater management plan. The results of this will inform the required Surface Water Management Plan in which the proponent must address hazardous surface water contamination.

It is noted that NOW raised concern that the Environmental Assessment did not demonstrate the capability of the holding pond to deal with the volume of runoff from the uncovered and general plant areas. As such, NOW required the wetland/holding pond to be designed to ensure it is capable of handling the volume of runoff from the uncovered and general plant areas. In response to the concerns raised by NOW, the Proponent removed the wetland/holding pond from the design of the project as part of the Preferred Project Report and has included a single holding pond along the western boundary to collect stormwater runoff. A pump station would be connected to the holding pond and would transport stormwater from the gas storage facility, via a 1.6 kilometre underground pipeline, to Old Punt Road along the proposed access road and utility corridor, with the discharge point to be along the western side of the culvert on Old Punt Road.

Whilst the Department accepts that the amendment from the original design has the potential to alleviate the concerns of NOW, it has not been demonstrated that the amended design would in

fact have the capability of handling the volume of runoff that may occur. Notwithstanding, the Department considers the issue of surface water management is one that is ultimately able to be resolved through the detailed design process and does not represent a significant impediment to the implementation of the project. In order to ensure there is adequate capacity to handle stormwater flow, the Department recommends that details be provided in the Surface Water Management Plan, to be developed in consultation with NOW, HWC and Port Stephens Council.

Flooding

Comments were also received from Newcastle City Council indicating concern with the potential for flooding impacts, particularly around the Hexham receiving station. Council recommended the preparation of a flood emergency response plan as a result of the low lying flood prone land. The Department notes that the Proponent has agreed to the preparation of a Flood Emergency Response Plan and recommends a condition of approval requiring the preparation of this plan. In relation to the flooding dynamics, the Department accepts that the project would not have a significant impact on the flood storage or local flood characteristics at the gas plant site or have an impact on peak levels of flooding at the Hexham receiving station up to the 100 year ARI event.

Climate Change

In August 2010, the *NSW Coastal Planning Guidelines – Adapting to Sea Level Rise* were released to provide guidance on how sea level rise is to be considered in land use planning and development assessment in coastal areas. This guideline adopts sea level rise planning benchmarks contained in the *NSW Sea Level Rise Policy Statement (2009)* which are 40 centimetres by 2050 and 90 centimetres by 2100.

The Primary Project Area is located more than six metres above sea level with the finished floor level at 6.35 metres Australian Height Datum (AHD). The Hexham Receiving Station will have a finished floor level of 3.9 metres AHD (equivalent to the 100 year ARI flood level) plus a freeboard of 500 millimetres (ie. 4.4 metres AHD). The Department accepts that with regard to the development in the flood affected area at Hexham, sea level rise associated with climate change would not affect ARI flood heights during the project life.

Groundwater

The key issue for the Department is to ensure that the groundwater supply is not contaminated as a result of the project. It is noted that submissions have been received relating to the risk of contamination to the Tomago aquifer water supplies. The potential for groundwater contamination is heavily reliant on the surface water conditions. As mentioned above, the Department is satisfied that the potential surface water impacts of the project would be effectively mitigated, both in line with the Proponent's methods and via recommended conditions of approval.

Notwithstanding, the Department considers that the importance of the Tomago Sandbeds aquifer to the local region necessitates a stringent monitoring programme to ensure there is no contamination as a result of the construction or operation of the project. The use of a monitoring programme would require contingency planning for construction and operational phases in the unlikely event that contamination of groundwater does occur, which should be incorporated into a groundwater management plan. It is noted that submissions have been received from various agencies recommending a Groundwater Monitoring Programme and as such, it is recommended that this monitoring programme be imposed as a condition of approval and required to be prepared in consultation with NOW and HWC.

A Groundwater Management Plan, prepared in consultation with NOW and HWC, is also recommended as a condition of approval, to detail how impacts to groundwater will be avoided and mitigated during the construction of the project. The plan should integrate data from the groundwater monitoring programme to set baselines and establish targets and thresholds that will continue for the operation of the project. This Groundwater Management Plan should also include a contingency plan in the event that groundwater is contaminated during construction, such as

through horizontal directional drilling and should be the basis of ongoing management during operation.

In relation to the stored gas, the Department accepts the Proponent's conclusion that the risk to groundwater is low as natural gas cannot contaminate the groundwater if spilled as it freezes the ground and then evaporates.

The Department notes that groundwater flows may be altered as a result of the buried pipeline, which would cross the declared floodplains of Tomago and Hexham. The Department accepts the Proponent's position that the pipelines would be embedded in sand in the base of the trench and, as far as practical, material excavated from trenches would be replaced to minimise changes to groundwater flows (as a result in changes to ground conditions such as packing and porosity). This technique would operate to ensure that groundwater flow over the pipeline experiences minimum disruption whilst the compaction of material around the pipeline would mitigate the possibility of channels forming below the pipeline and therefore altering groundwater flow. This technique, combined with the fact that the pipeline extends for a relatively short distance, satisfies the Department that there would be no significant adverse impacts to groundwater hydrology as a result of the pipeline placement.

In summary, the Department is satisfied that waste water, ground water and surface water impacts would be minimal and may be successfully mitigated and monitored to ensure that the project does not result in any serious irreversible impacts on groundwater resources.

5.3. Hazards and Risks

Issue

This section considers land use safety risks and bushfire risks. Risks associated with flooding are considered in Section 5.2 (as part of the consideration of surface water impacts).

Land Use Safety Risks

The proposed gas storage facility is classified as a "potentially hazardous industry" under the provisions of *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and the Proponent prepared a preliminary hazard analysis (PHA) as part of the Environmental Assessment. Through an analysis of materials to be stored and handled on the site, and a qualitative analysis of potential hazards and associated mitigation measures, the Proponent identified that the following events had the potential to generate off-site risk consequences:

1. Uncontrolled release of natural gas from the natural gas pipeline due to generic faults in the pipeline;
2. Uncontrolled release of natural gas due to impact or damage to the gas pipeline;
3. Uncontrolled release of natural gas from the receiving station due to generic faults;
4. Uncontrolled release of natural gas due to impact of damage to the receiving station;
5. Leak in pipe or equipment handling natural gas;
6. Leak in pipe or equipment handling LNG or refrigerants;
7. Uncontrolled release from the LNG storage tank;
8. Overfilling of the LNG storage tank resulting in uncontrolled vapour release;
9. Over pressuring of the LNG storage tank resulting in uncontrolled vapour release;
10. Creation of a partial vacuum in the LNG storage tank resulting in air ingress and tank top fire;
11. Stratification (roll over) leading to major vapour release from atmospheric relief valves and severe tank vibration resulting in tank collapse;
12. Uncontrolled release of LNG during tanker filling;
13. Natural event causes failure of the LNG storage tank, structural collapse or other damage to plant and subsequent loss of containment of flammable gas;

14. Security threat/terrorism or external mechanical damage causes external mechanical or thermal damage failure of LNG storage tank or other flammable gas handling/ process equipment;
15. Aircraft crash results in process upsets, potential damage to process/storage facilities resulting in hazardous releases.

These events were carried forward for further, quantified assessment based on a range of release scenarios from minor leaks to catastrophic failures.

Risk modelling for the project demonstrates that land use safety criteria for all land use types, except for sensitive land uses, is never exceeded for incidents involving the gas pipeline or the Hexham receiving station. This includes both injury and fatality risk. In the case of the sensitive land use fatality criterion (0.1×10^{-6} per year), exceedances are predicted at up to 110 metres from the gas pipeline and 70 metres from the Hexham receiving station. The Proponent highlights that there are no sensitive land uses within these areas (such as hospitals).

In the case of the Primary Project Area, and in particular the gas plant itself, the injury (heat radiation and explosion overpressure) and fatality risk criteria applicable to industrial land uses (50×10^{-6} per year for both metrics) are not exceeded beyond the site boundary. Similarly, the fatality risk criterion for open space (10×10^{-6} per year) is not exceeded beyond the boundary of the gas plant site.

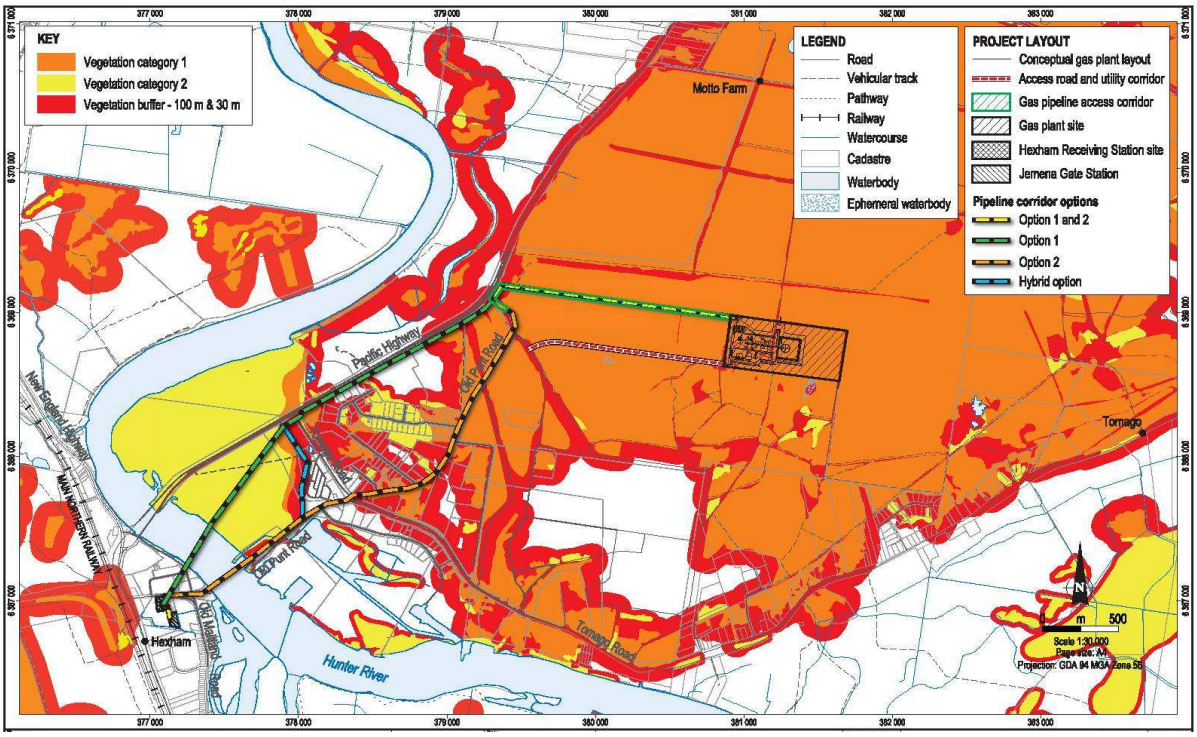
If the residential fatality criterion (1×10^{-6} per year) or the sensitive land use fatality criterion (0.1×10^{-6}) is applied, then exceedances are predicted at up to approximately 250 metres and 500 metres beyond the gas plant site boundary, respectively. The Proponent reinforces that the areas around the gas plant site form part of the buffer lands around the Tomago Aluminium Smelter (and are in the ownership of Tomago Aluminium Corporation) and do not include nor are appropriate for residential or sensitive land use developments. On this basis, the Proponent argues that acceptable land use safety outcomes would be met for injury and fatality risks around the Primary Project Area, particularly the gas plant site, for land uses that are permissible and that could reasonably be expected to be developed within the smelter buffer lands (ie. no development type more sensitive than industrial land uses).

The Preliminary Hazard Analysis also presents an assessment of societal risk, which demonstrates risks lie well within the 'tolerable zone' (and do not extend into 'as low as reasonably possible' or 'intolerable' risk zones) of the societal risk graph detailed in Hazardous Industrial Planning Advisory Paper No. 4. The project is therefore considered to pose an acceptable societal risk in addition to individual injury and fatality risk outcomes.

Bushfire Risk

A bushfire assessment was conducted in accordance with *Planning for Bushfire Protection* (RFS 2006) (PBP) with a key objective to identify and provide adequate separation between potential bushfire hazards and buildings associated with the project. The gas storage facility and pipelines would be located within an area containing extensive bush fire prone vegetation including dry sclerophyll forests, and is classified as Level 3 – Extreme under PBP guidelines. As the gas pipeline infrastructure is to be buried underground, and the Hexham receiving station is distanced from mapped bushfire prone land, the Primary Project Area and particularly the gas plant component of the project are the key focus for consideration of potential bushfire impacts. Figure 9 illustrates the bushfire prone land in the vicinity of the site.

Figure 9: Port Stephens and Newcastle City Council Bush Fire Prone Land Map



Source: Newcastle Gas Storage Facility Project Environmental Assessment AGL Energy Ltd May 2011

The gas plant component of the project would occupy half of the 28 hectare site (Primary Project Area) with the eastern part to remain uncleared and connected to the Hunter Water Corporation conservation lands to the east. Radiant heat and flame contact could therefore be a threat to the integrity of the gas plant if appropriate asset protection zones are not established.

The gas plant facility is classified as "other development" under the PBP and must satisfy requirements for minimum defendable space, emergency planning, access, water and services and landscape and vegetation management. The revised site layout, presented in the PPR, includes an Asset Protection Zone (APZ) clearance of 25 metres around general plant areas and buildings (site perimeter) and a minimum 31 metres around the LNG storage tank. The APZs would be maintained to ensure vegetation is appropriately managed.

Consideration

Land Use Safety Risks

The Department considers that the PHA compares the risks from the project with the Department's risk criteria for land use safety planning to demonstrate that the risks from the project comply with the criteria adopted in NSW for new developments. Based on the information provided in the PHA and the additional information provided in response to the Department's requests, and assuming all risk reduction measures and recommendations of the PHA would be implemented, and conditioned accordingly, the Department is satisfied that the project would not pose unacceptable risks to the surrounding land uses.

Bushfire Risk

Fire & Rescue NSW (FRNSW) is satisfied with the project provided that buildings comply with the current Building Code of Australia (BCA) and relevant Australian Standards. In addition, sufficient access must be provided for FRNSW vehicles in the event of an emergency. In this regard, FRNSW recommends that an assessment is carried out to ensure the proposed traffic arrangements meet the requirement detailed in FRNSW *Guidelines for Emergency Vehicle Access, Policy No. 4*. This requirement has been included in the scope of the Traffic Management Plan required under the recommended conditions of approval.

The Proponent proposes to retain some Earp's Gum individual trees within the asset protection zone. The Department is satisfied with this provided that they are retained with the appropriate canopy distance recommended by the PBP and with appropriately managed understory. The Department has included a condition for minimum APZ distances of 25 metres around the gas plant site and no less than 31 metres around the processing plant and storage tank and that the APZ management strategy is included in a Fire Safety Study which should be submitted to the Department and FRNSW prior to construction.

Recommended Conditions

To ensure safe operation throughout the life of the facility, the Department recommends a range of hazard-related conditions of approval including the following:

- Prior to the commencement of detailed design, the Proponent must consult with WorkCover with regard to complying with regulations applicable to Major Hazard Facilities and to obtain requirements for the preparation of Site Risk Assessments and the Safety Case. The Safety Report must be submitted to WorkCover no later than six months prior to the commissioning of the project;
- A Final Hazard Analysis (FHA) is submitted and approved by the Director-General prior to the commencement of construction. The FHA should report on the implementation and recommendations in the PHA;
- A Fire Safety Study is prepared and submitted to FRNSW for review and comment and to the Department for the Director-General's approval prior to construction;
- A Hazard and Operability Study is undertaken for the project, chaired by a qualified person approved by the Director-General, prior to the commencement of construction, and accompanied by a programme for the implementation of all recommendations made in the report;
- An Emergency Plan is submitted to FRNSW and the Department for the Director-General's approval prior to commissioning that considers the safety of all people outside of the project who may potentially be at risk from the project;
- A Safety Management System is submitted prior to commissioning covering all site operations and transport activities involving hazardous materials;
- A Pre-Startup Compliance Report is submitted one month ahead of the commencement of operations that details compliance with the relevant pre-construction and pre-commissioning reports;
- A Post-Startup Compliance Report is submitted three months after the commencement of operation to verify that the Emergency Plan and Safety Management Plan are both in place;
- Sufficient access must be made for FRNSW vehicles in the event of an emergency and traffic arrangements must meet FRNSW *Guidelines for Emergency Vehicle Access, Policy No. 4*. This must be included as a sub-management plan as part of the Operation Environmental Management Plan; and
- The Proponent must undertake a Hazard Audit one year after the commencement of operations, and every three years after that. The audit must be accompanied by a programme for the implementation of all recommendations made in the audit report.

Other hazards, including threats from natural disasters (earthquake, lightning strikes and tsunamis) raised by one submission, are considered by the Department to be appropriately mitigated through standard construction measures including *AS 1170.4 – Structural Design Actions Part 4: Earthquake Actions in Australia* and *AS 1768 – Lightning Protection*. The Department considers a tsunami risk to be extremely minimal.

5.4. Aboriginal Heritage

Issue

An Aboriginal Cultural Heritage Assessment was undertaken as part of the Environmental Assessment and comprised of a desktop study and field assessment across the Primary Project Area, the Hexham receiving station site and along all pipeline corridor options. The assessment was undertaken in accordance with *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DECC, 2005).

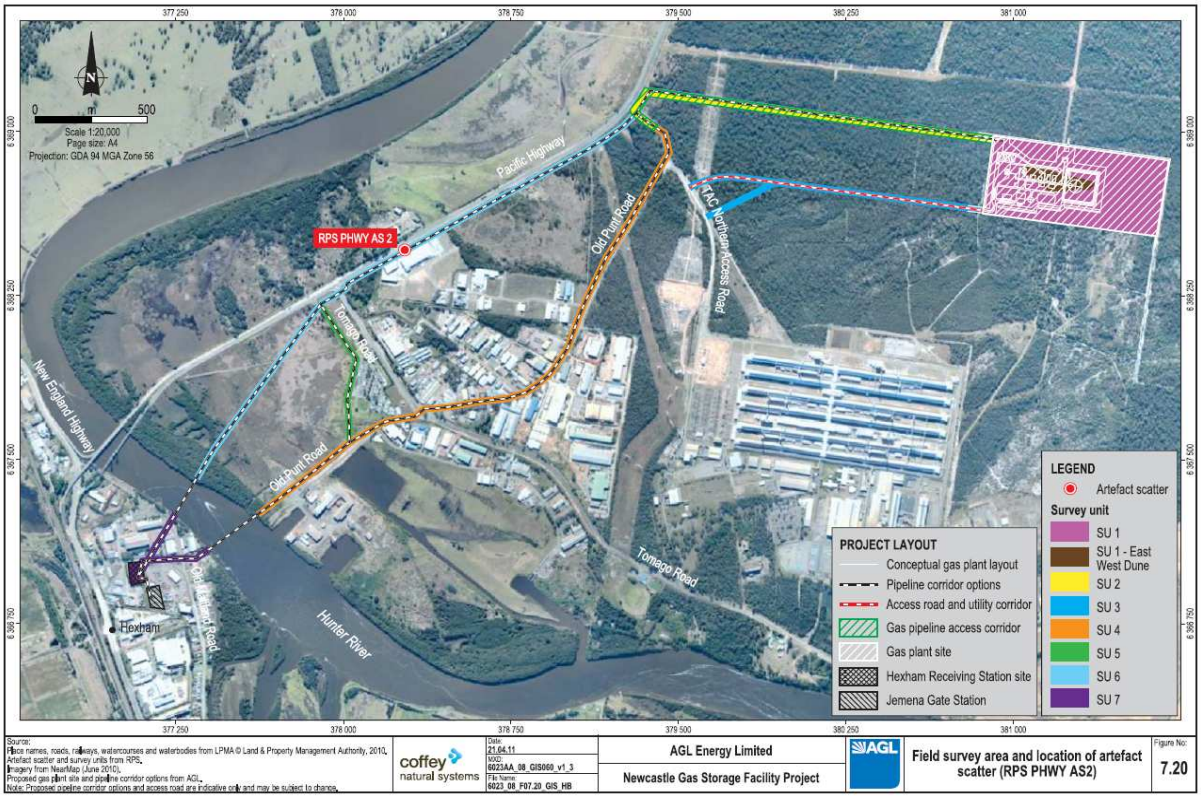
The project spans two Local Aboriginal Land Council (LALC) areas being the Worimi LALC (generally on the north side of the Hunter River) and the Awabakal LALC in the Hexham portion of the development. A search of the Aboriginal Heritage Information Management System (AHIMS) database identified 24 recorded sites within a 10 kilometre radius centred on a point between the Primary Project Area and the Hexham receiving station site. None of the known Aboriginal heritage items have been located on land within the proposed development footprint, with the majority being located further to the east along Tomago Road. Most of the recorded heritage items (15 of the 24 records) in the area were identified as artefact scatters.

The Environmental Assessment also presents a summary of other archaeological investigations that have previously been undertaken in the region, including across areas of land proposed to be affected by the project. The previous studies reinforce that the most common form of archaeological sensitivity and site types, are culturally sensitive land forms and artefact scatters/camp sites. AHIMS searches and previous studies have not identified grinding grooves, rock shelters, art or engravings in the area.

The proposed project area was subject to an archaeological field survey in partnership with key stakeholders including representatives from the Worimi LALC, Mu-Roo-Ma Inc and Nu-Run-Gee Pty Ltd in the Tomago portion of the project and with representatives from the Awabakal LALC, Awabakal Descendents Traditional Owners Aboriginal Corporation and Awabakal Traditional Owners Aboriginal Corporation. The results of the finding are presented in detail in the Environmental Assessment. The survey divided the project scope into seven broad survey units (SU1 to SU7) consisting of: the Hexham section of the project; three pipeline route options; the access road and services corridor; the secondary access road and pipeline corridor; and the Primary Project Area, which also incorporated the east-west trending sand dune sub unit.

Results from the field survey identified a single site RPS PHWY AS 2 which had not previously been recorded and included in the AHIMS database. This site is an artefact scatter of five tuff and three silcrete stone artefacts of flaked tools, flaked pieces and cores. The site is located along gas pipeline corridor option 1 (on the Pacific Highway). The selection of option 2 in the Preferred Project Report avoids site RPS PHWY AS 2 entirely. Figure 10 shows the survey units and archaeological finds:

Figure 10: Site Survey Area and Archaeological Find



Previous archaeological investigations in the area have highlighted the potential for culturally sensitive land forms in the area. During the field survey work for the Project, the east-west sand dune landscape within the Primary Project Area (SU1 – East-West Dune in Figure 10) was identified as one such potentially culturally sensitive landform. The east-west trending sand dune is on a naturally elevated landform, and was considered by the Aboriginal community stakeholders as the most likely area to contain Aboriginal cultural material. The dune crest was investigated, however, due to the very thick shrub vegetation and dense floor cover, no artefacts could be identified. The areas that are accessible and exposed have been highly disturbed by vehicle movements, the construction of the electricity line easement to the north and previous sand mining in the region. However, because some parts of the dune are relatively undisturbed, it does retain the potential for undiscovered Aboriginal sites. Notwithstanding, considering the limited number of Aboriginal artefact sites in the immediate locality, previous studies noting the availability of resources in more accessible areas, the regular inundation of the area which may have compromised the intact nature of parts of the dune, and its distance from the Hunter River (>300 metres), the evidence to date indicates that the dune may well possess no artefact material. On this basis, the assessment presented in the Environmental Assessment concludes that the dune area is of moderate to low heritage sensitivity.

The expected location of an electricity network connection from the existing network into the Primary Project Area was not comprehensively considered and assessed as part of the Environmental Assessment. The approximately 300-metre long, largely cleared easement for the transmission connection was therefore subject to a further Aboriginal Due Diligence Report, including a one-day site visit. The report and site investigation, which were included as part of the Preferred Project Report, did not identify any items of Aboriginal heritage significance that may be impacted by the construction or operation of the short electricity network connection.

The Proponent recognises that given the vegetation on the site and the limited visibility in some areas during archaeological survey, there is residual potential for previously unrecorded heritage items to be uncovered during construction of the Project. This residual potential is proposed to be managed through a Construction Environmental Management Plan, including procedures to be followed should an item of potential heritage significance be uncovered. This commitment was

further developed and detailed in the Preferred Project Report as a formal Cultural Heritage Management Plan. As part of the proposed approach to heritage management on site, the Proponent has committed to attendance at site clearing by a suitably qualified archaeologist and representatives of the Worimi LALC, Mu-Roo-Ma Inc and Nu-Run-Gee Pty Ltd (Aboriginal stakeholders present during site survey work). These representatives would assist in the identification of potential heritage items, and identification of options for management of any items that may be uncovered.

Consideration

The Department is satisfied that the Proponent has undertaken an adequate and appropriate level of Aboriginal heritage impact assessment, and recognises the challenges of archaeological survey in areas of dense vegetation and limited visibility. In such circumstances, the Department is satisfied that the Proponent has proposed an appropriate management response to mitigate the potential for impacts on items of potential heritage significance during construction of the Project. The Office of Environment and Heritage has confirmed that it is also satisfied with the Aboriginal heritage assessment and has recommended conditions of approval.

The Department has recommended that a suitably qualified archaeologist be employed on site during all clearing and vegetation removal works in sensitive locations, such as riparian areas and through vegetated parts of the Primary Project Area. The Department accepts that there are parts of the project (particularly along the gas pipeline corridor in a disturbed road reserve) where the Aboriginal heritage assessment has reasonably concluded that there is a low potential for discovery of previously unrecorded heritage items, and is therefore not necessary to have an archaeologist on site for these areas. The function of the on-site archaeologist will be identifying and advising on the management of Aboriginal heritage items, should they be uncovered during construction. The Department also recommends that Aboriginal stakeholders (those who have previously been involved in survey and assessment work) also be invited to attend clearing activities.

In these more sensitive areas, the Department highlights that the risk of disturbing items would increase with the level of ground disturbance. Where possible, this risk could be mitigated by avoiding soil disturbance when clearing land for the project, and the Department has recommended that this be reflected as a condition of approval.

One public submission from the Gimbay Gatigaan Aboriginal Corporation (GGAC) objected to the proposal as the group is in the process of lodging a Native Title Claim. A search of the Native Title Tribunal database found that no application had yet been lodged. The GGAC did not register as a stakeholder during the Aboriginal Cultural Heritage Assessment. However, the Proponent advises that it would include the GGAC in future consultation regarding Aboriginal cultural heritage in relation to the project. The Department notes the Proponent's commitment in this regard, and supports on-going consultation with GGAC representatives during the development and implementation of heritage mitigation and management measures for the project.

To provide an overarching management framework for heritage issues associated with the project, the Department has recommended that the Proponent be required to develop and implement a Cultural Heritage Management Plan as part of the Construction Environmental Management Plan for the project. It is noted that the Proponent has committed to preparation of such a plan, and provided an initial outline of the scope and content of the plan in the Environmental Assessment.

5.5. Noise and Vibration

Issue

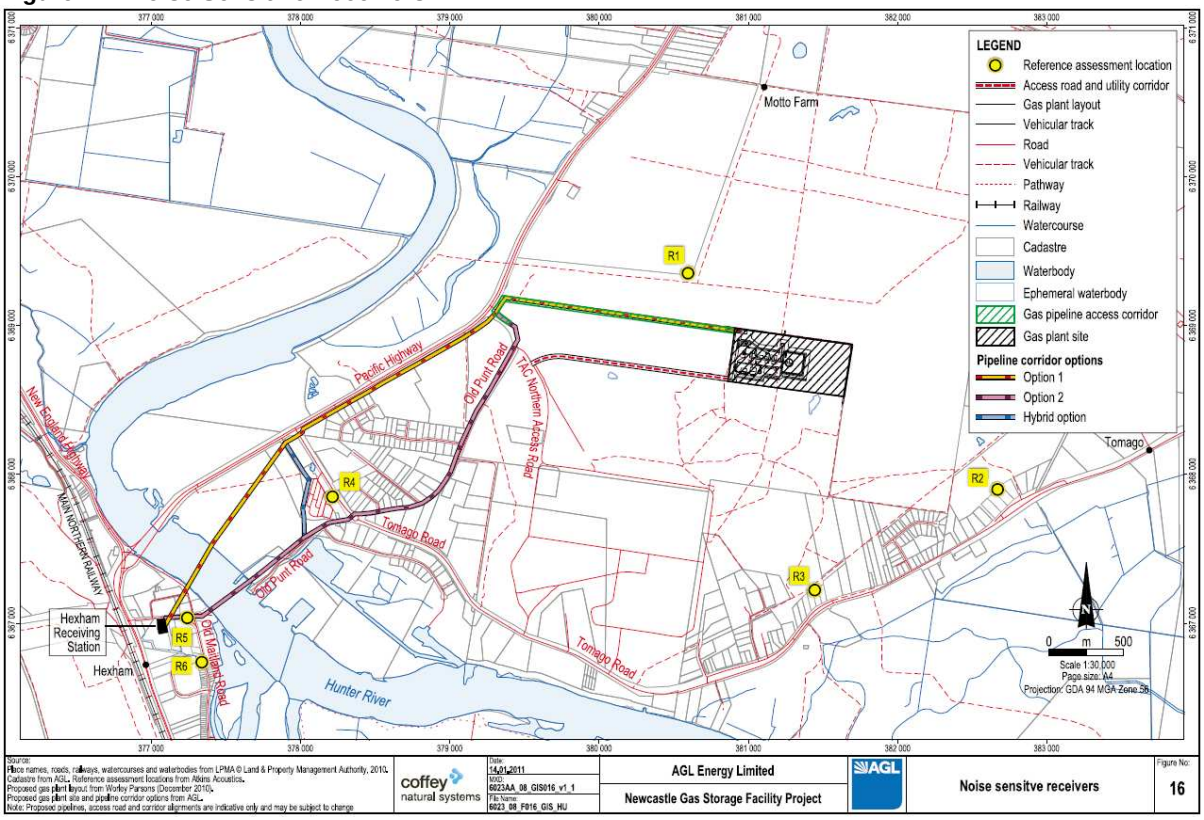
The project has the potential to generate noise and vibration impacts:

- During construction for all components of the project; and
- During operation, particularly in relation to the operation of the gas plant facilities (Primary Project Area) and the Hexham receiving station facilities. The gas pipeline and other infrastructure connections to the project are not expected to be a significant operational noise source.

Construction Noise Impacts

The Environmental Assessment identifies a series of potentially-affected residential receivers in the vicinity of the Primary Project Area, gas pipeline corridor and the Hexham receiving station site which may be affected by construction noise impacts. Residential receivers are generally more than one kilometre away from the Primary Project Area, but as close as 150 metres (R5) from the Hexham site. In addition to residential receivers, the Hunter Region Botanic Gardens (R1) approximately 460 metres north of the Primary Project Area, was identified in the Environmental Assessment as a potentially-affected receiver. Figure 11 shows the location of identified sensitive receivers in relation to the project:

Figure 11: Noise Sensitive Receivers



Construction noise management goals have been derived and presented in the Environmental Assessment in accordance with *Interim Construction Noise Guidelines* (ICNG) (DECC 2009). The ICNG stipulates that construction noise exceed the Ratings Background Noise level (RBL) by no more than 10 dB(A) during day time and 5 dB(A) at night at residential receivers. Construction noise goals for the above sensitive receivers are shown in Table 8:

Table 8: Construction Noise Goals

Period	*Sound Pressure Levels*	
	Existing RBL	*Recommended Construction Noise Management Level LAeq (15 min)*
R1 Hunter Region Botanic Gardens		
Day	41	When in use 60*
Evening	39	
Night	38	
R2 5 Graham Drive, Tomago		
Day	42	52
Evening	39	44
Night	37	42
R3 45 School Drive, Tomago		
Day	46	56
Evening	44	49
Night	44	49
R4 Tomago Village Caravan Park		
Day	50	60
Evening	48	53
Night	46	51
R5 217 Old Maitland Road, Hexham		
Day	44	54
Evening	45	50
Night	40	45
R6 185 Old Maitland Road, Hexham		
Day	44	54
Evening	45	50
Night	40	45

* Hunter Region Botanic Gardens has been classified as a "Passive Recreation Area" to which a noise goal of 60 dB(A) applies

The Proponent has adopted an unusual approach to the assessment of construction noise from the nodal components of the project (the Primary Project Area and Hexham receiving station), with predicted noise impacts presented as a function of distance from each of those sites, rather than as a predicted value at each receiver location. While the information that is presented does not make it immediately obvious what the predicted noise impact at each receiver may be, it is possible to interpolate from the references to receiver locations and modelling results to make a reasonable estimate of noise impacts at each location.

Around the Primary Project Area, receiver (R3) would be affected by no more than 49 dB(A) during construction, which falls within the daytime construction noise management goal of 52 dB(A). Similarly for the construction of the Hexham receiving station, the most affected receiver (R5) is expected to experience peak construction noise of up to 49 dB(A), compared with the daytime construction noise management goal of 54 dB(A). It is noted that evening and night time construction activities are not proposed at these two sites. The Hunter Region Botanic Gardens is predicted to experience construction noise impacts of no more than 55 dB(A), which would not exceed the 60 dB(A) construction noise management goal at this location.

In the case of construction of the gas pipeline, the noise assessment also presents predicted construction noise levels as a function of distance from the construction works. This approach is commonly applied to linear infrastructure projects and is appropriate for assessment of the gas pipeline construction. Figure 6 (section 2.1.4 of this report) shows indicative pipeline construction methods that includes horizontal directional drilling (HDD), conventional trenching, horizontal boring and a mixture of HDD and boring.

Modelling predicted the following construction noise levels for different pipeline construction activities, at increasing distances from noise source:

Table 8: Predicted Gas Pipeline Construction Noise Levels (L_{Aeq} dBA re: 20 x 10^{-6} Pa)

Construction Activity	*Distance from Construction Activity (metres)*						
	25m	*100m*	*250m*	*500m*	*1000m*	*2000m*	*3000m*
Site Preparation	79	67	59	53	47	41	37
Trenching	79	67	59	53	47	41	37
Directional Drilling*	76	64	56	50	44	38	34
Pipe Install	70	58	50	44	38	32	28

* required to occur 24 hours / 7 days.

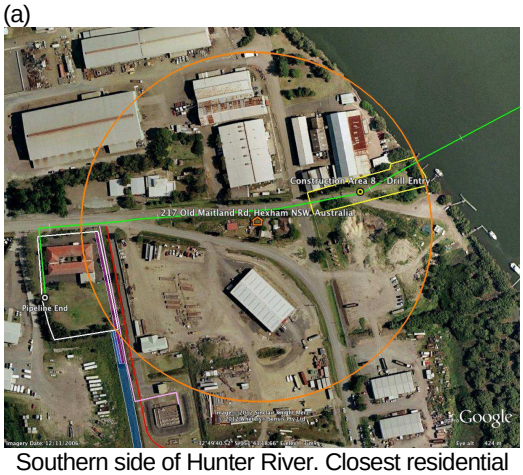
Interpreting the above predictions coupled with receiver distances from the pipeline activity, daytime construction noise goals for residential receivers will be exceeded at R5 and to a lesser extent at R4 at all stages of pipeline construction. In particular, it is expected that noise levels at R5 may peak at up to 79 dB(A), and the Department notes that 75 dB(A) is identified as a highly noise affected limit in the ICNG and the level at which respite periods and restricted hours may occur.

While site preparation, trenching, horizontal boring and pipe installation are to be confined to daytime construction hours (7.00 am to 6.00 pm, Monday to Friday and 8.00 am to 1.00 pm, Saturday), practical construction requirements necessitate that HDD be undertaken continually 24 hours a day, seven days a week with the noise source radiating at the HDD entry point. The Proponent has estimated that HDD under the Hunter River will take approximately three weeks. Of the three drill entry points for the pipeline, two are in the vicinity of R5 and R4. (The third, on Old Punt Road, north of the junction with the TAC Access Road, is well removed from both sensitive as well as industrial receivers.)

Figure 12 shows the two high-noise impact HDD entry points: (a) on the southern side of the Hunter River at Hexham approximately 70 metres west of R5; and (b) Old Punt Road, south of the T-junction with Laverick Avenue at Tomago approximately 100 metres south-west of R4.

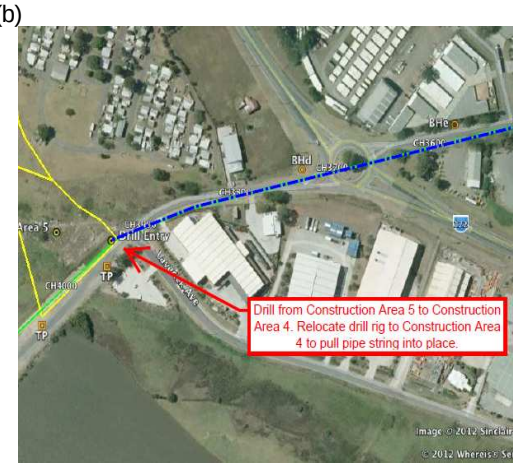
Figure 12: Horizontal Directional Drilling

(a)



Southern side of Hunter River. Closest residential receiver R5 (217 Old Maitland Road, Hexham) approximately 70 metres west of HDD drill entry.

(b)



Northern side of Hunter River. Closest residential receiver R4 (Tomago Village Caravan Park) approximately 100 metres north-east HDD drill entry.

Modelling suggests that noise levels will be between 64 and 76 dB(A) at R5 compared with a noise goal of 45 dB(A) and will likely be greater than 64 dB(A) at R5 compared with a night noise goal of 51 dB(A). In addition the night time noise goal of 45 dB(A) may also be exceeded at R6 (185 Old Maitland Road) and adjoining residential properties to the south-east along Old Maitland Road, by up to 11 dB(A).

Construction Vibration Impacts

Vibration would occur during the construction of the project as a result of earthworks such as rock breaking and surface compacting. The vibration levels are predicted to be between 0.3 and 0.5 mm/sec at the closest sensitive receiver (R5), which is classed as 'barely noticeable' under German Standard DIN4150 1986.

Operation Noise Impacts

The noise modelling demonstrates that operation of the gas storage facility (Primary Project Area) would not cause an exceedance of operational noise criteria at any residential receiver location, under all meteorological conditions. The most affected receiver (R2) is expected to receive noise levels no more than 25 dB(A) under worst-case meteorological conditions, which would be well below the INP criterion of 42 dB(A) at this location. Similarly, the Hunter Region Botanic Gardens would not be affected by noise levels more than 40 dB(A), which is below the 50 dB(A) criterion at this location.

In the case of the Hexham receiving station, noise modelling presented in the Environmental Assessment would meet applicable criteria under all conditions, with the exception of receiver R5 (217 Old Maitland Road). Most receivers would experience noise levels no more than 30 dB(A), which compares favourably with applicable criteria across the receivers from 41 to 45 dB(A). In the case of receiver R5, exceedances of the 42 dB(A) noise criterion are predicted to range from three to seven decibels during high gas flow operations, and from one to five decibels during low flow conditions. The Proponent highlights that these predicted exceedances are in the absence of reasonable and feasible noise mitigation measures that may be applied to the receiving station. The Proponent states that it is confident that with the application of such mitigation that a reduction of at least 7dB(A) could be achieved at the most affected receiver, and on this basis, the applicable INP noise criteria could be met.

Consideration

Construction Noise and Vibration

The Department has identified some shortfalls with the Proponent's assessment of the construction noise impacts associated with the project. However, it is satisfied that in relation to the construction of the Hexham receiving station and primary project area (PPA) at Tomago, the predicted construction noise impacts are expected to fall below construction noise management goals stipulated by the ICNG. With regard to the pipeline, construction noise goals are likely to be exceeded, however, this will be for a period of up to three weeks at any one time, compared with the nine months construction duration at Hexham and up to three years at the PPA.

The Department accepts that there are challenges associated with the management and mitigation of construction noise emissions for major projects, particularly given the practical limits of mitigating impacts from activities such as excavation and the 24-hour requirement of horizontal directional drilling (HDD). Relevantly, construction impacts tend to be limited in duration and it is appropriate to take the temporal nature of construction works into account when considering noise issues.

In the case of the two most affected receivers – R4 (Tomago Village Caravan Park) and R5 (217 Old Maitland Road) – construction noise impacts will be exacerbated by the placement of HDD entry points in their vicinity and the 24 hour / seven day operation over a three week period. The Proponent has stated that there are construction constraints such as the need for HDD construction areas and the potential disruption to traffic along Old Punt Road and Tomago Road that have influenced the location choice of HDD entry points.

The Proponent has identified a number of mitigation options for these scenarios that include:

- Restricting the number of nights per week and / or the number of nights per calendar month that the works are undertaken, in consultation with residents who will be most affected; and

- Examining and implementing the option of relocating noise affected occupants for short periods of time (alternative accommodation or other respite options).

The Department has recommended that the Proponent be required to prepare and implement a Construction Noise Management Plan to the satisfaction of the Director-General to guide the management and mitigation of noise during construction works. As part of that Plan, the Department recommends that the Proponent clearly identify all sensitive receivers that will be affected by construction noise levels above the ICNG goals for day, evening and night time.

In addition, the Department has recommended that the Proponent be required to consult with and develop specific noise management measures to minimise potential impacts at affected receivers including R4 and R5 and any other receivers which are identified as subject to excess noise levels. Furthermore, such measures must include the need to consider and provide where appropriate, opportunities for temporary alternative accommodation, noting that these receivers may be impacted by night time works.

The Department has recommended that standard construction hours be imposed on the majority of construction works, and more stringent hours be specified for high noise activities. However, the Department also accepts the Proponent's arguments about the impracticality of undertaking horizontal directional drilling in stages during day time hours (with a practical preference for continuous construction from start to finish) and therefore recommends that this construction technique not be included in the limitation on construction hours.

It is noted that OEH has suggested the inclusion of a traffic noise management strategy. The Department considers this can be implemented as part of the Construction Traffic Management Plan, which has been recommended as a condition of approval.

Operational Noise and Vibration

The Department notes that the noise impact assessment undertaken for the project demonstrates that in most cases, operational noise would not lead to an exceedance of applicable noise criteria derived in accordance with the INP. On this basis, the Department recommends imposition of noise limits consistent with those presented in the submission received from OEH. It is important to note that where the Proponent has predicted very low noise impacts (less than 35 dB(A)), OEH has recommended imposition of the lowest noise limit possible under the INP (ie. 35 dB(A)), rather than a higher noise limit (which would ordinarily apply to the project under the INP). The Department supports this approach as a means to ensure that noise from the project is maintained as low as reasonable and feasible, rather than allowing the project to operate at a higher noise level when better acoustic practice is achievable.

It is noted that noise modelling for the project has indicated that noise limits at receiver R5 (217 Maitland Road) could be exceeded without the application of additional at-source noise mitigation. The Department notes that the Proponent is confident that it could achieve the applicable noise limits, and has committed to implementing the necessary additional noise mitigation measures to achieve this outcome. On this basis, the Department has recommended imposition of noise limits for receiver location R5 in accordance with the INP. These noise limits would apply for the duraction of the operation of the facility. A noise monitoring programme is to be developed to the satisfaction of the EPA prior to the operation of the facility. In the event that operational noise is non-compliant, the Director-General would be required to be notified within seven days. Subsequent to this notification, the Proponent may be ordered to undertake mitigation works.

5.6. Other Issues

5.6.1. Air Quality

Issue

The project has the potential to impact on local and regional air quality through the generation of construction-related dust, and through the emission of combustion productions during operation.

During construction, the Proponent notes that the following activities have the potential to generate dust, which if not effectively managed, could adversely impact on air quality:

- Roads works associated with construction activities;
- Site preparation and excavation, including for the access road, pipeline access corridor, the selected pipeline route and within the gas plant site; and
- Delivery of gas plant and pipeline components along unsealed roads or tracks.

The Proponent proposes to manage these construction activities using typical construction management approaches that will be included in an Air Quality Management Plan.

During operation of the project, it would be necessary to combust natural gas as part of the processing operations on the site, as well as for safety management. Key sources of combustion emissions from the project are:

- Hot oil heaters during liquefaction;
- The sour gas flare during liquefaction;
- The pilot flare during liquefaction;
- The LNG regasifier during re-gasification; and
- The flare during start-up, shut-down and emergencies.

Principal combustion emissions from these processes relevant to local and regional air quality are sulphur dioxide (SO_2), mono-nitrogen oxides (NO_x), fine particulate matter (PM_{10}) and volatile organic compound (VOCs) (in the case of partial combustion during flaring). These pollutants were modelled during liquefaction, during re-gasification and during start-up/ shut-down (flaring). The modelling results at the most affected receivers are summarised in Table 8.

Table 8: Predicted Air Quality Impacts

Pollutant	*Criterion*	*Liquefaction*	*Re-gasification*	*Flaring*
SO_2 (1-hour) (μgm^{-3})	570	1.27	0.88	-
SO_2 (24-hour) (μgm^{-3})	228	0.13	0.18	-
SO_2 (annual) (μgm^{-3})	60	0.015	0.011	-
NO_x (1-hour) (μgm^{-3})	246	2.23	7.61	7.61
NO_x (24-hour) (μgm^{-3})	62	0.03	0.09	-
PM_{10} (24-hour) (μgm^{-3})	50	0.006	0.08	-
PM_{10} (annual) (μgm^{-3})	30	0.00046	0.007	-
VOCs (μgm^{-3})	-	-	-	0.09

The Environmental Assessment also presents an assessment of cumulative air quality impacts, particularly in relation to cumulative sulphur dioxide impacts between the project and the adjacent Tomago aluminium smelter. Existing background data (which takes into account the smelter as well as other regional sulphur dioxide sources) indicates that on isolated occasions, the short-term sulphur dioxide ambient air quality standard (1-hour) may be exceeded. The potential for such an exceedance currently exists, and the Environmental Assessment demonstrates that the project

would not alter this situation, nor adversely contribute to any additional exceedances of the standard.

Consideration

In relation to the construction based air quality impacts, the Department is satisfied that these can be appropriately managed through the implementation of mitigation measured identified by the Proponent, such as

- Minimising exposed surface via vegetation management;
- Watering of construction sites;
- Consideration of meteorological conditions when timing earth moving activities;
- Prevention of dirt migration; and
- Control measures to minimise emissions from heavy vehicles (eg. unnecessary idling).

One public submission noted that the Primary Project Area is within an environmental buffer zone for the Tomago aluminium smelter that was purchased to assist in offsetting any potential for impacts from fluoride emissions. The project does not involve additional fluoride emissions and its location in proximity to the aluminium smelter would neither contribute to fluoride levels nor impede the ability of the smelter to meet acceptable fluoride outcomes. A further submission was received from the Hunter Koala Preservation Society highlighting a concern the liquefaction and re-gasification process would result in adverse damage on eucalyptus leaves and therefore upon koala habitat. The Department considers that the level of air quality impact is minimal and it would be unlikely to result in a significant adverse impact to eucalyptus leaves.

Also noted is one public submission received highlighting concerns with air quality impacts on the health and safety of workers. The Department notes predicted air quality impacts and accepts that the cumulative assessment is likely to result in a negligible impact to on-site workers. The Department is satisfied that the implementation of standard measures to reduce air quality impacts during construction and operation, in conjunction with conditions of approval recommended by the Department regarding dust and odour would successfully mitigate excessive air quality impacts throughout the construction and operation of the project.

The Department is satisfied that the project would operate comfortably below applicable air quality criterion. Based on submissions made by the Office of Environment and Heritage, the Department has recommended appropriate air quality discharge limits for operation and ongoing monitoring for the project to ensure that the air quality outcomes presented in the Environmental Assessment are met.

5.6.2. Traffic

Issue

Traffic impacts would occur during the construction of the project. The primary issues relating to traffic are increased traffic volumes and the change in traffic composition (a greater proportion of heavy vehicles). Potential impacts associated include a reduction in road safety (particularly at intersections), decreased level of road service (speed, travel time, manoeuvrability and delay), and increased stresses on road infrastructure (such as degradation or road surfaces and the building and upgrading of access roads).

Construction traffic volumes expected to be generated by the project are summarised in Table 9. During construction, the volume of heavy and light vehicles would increase at the Old Punt Road and Pacific Highway intersection and the local road network in the vicinity of the project. The analysis presented in the Environmental Assessment demonstrates that construction of the project would:

- Increase traffic on the Pacific Highway by less than 0.1% average annual daily traffic (AADT);

- Be unlikely to have a significant impact on the operation of the Old Punt Road-Pacific Highway intersection given that it currently operates at a level of service B and at a current capacity of approximately 25%;
- Be unlikely affect the intersection of the TAC Northern Access Road and Old Punt Road, subject to minor upgrades to this intersection to provide simple priority control; and
- Be unlikely change the current operation and character of the Old Punt Road-Tomago Road intersection given its current capacity and heavy vehicle nature (associated with traffic from surrounding industrial operations).

Table 9: Construction Traffic Volumes

Component	*Task*	*Daily Deliveries – Heavy Goods Vehicles*	*Daily Workforce – Light Vehicles*
Gas Plant	Site preparation	40 to 50	20
	Bulk earth works	20	20
	Structural works 1 (2 month period)	20 to 30	250
	Structural works 2 (remainder of period)	5	250
	Commissioning	3	30
	Rehabilitation and landscaping	4	20
Pipeline	Construction	20	50
Access road and utility corridor	Construction	10	50
Hexham receiving station	Construction	5	25

Operational Traffic

In contrast with construction traffic, operational traffic generation is expected to be significantly less, as summarised in Table 10. Operational traffic would typically only constitute employee vehicles, deliveries and removal of waste water. Depending on the operational mode of the project, there is also potential for export of LNG from the site by road from time to time.

Expected traffic impacts are expected to be lower than the impacts predicted for the construction phase of the project above.

Table 10: Operation Traffic Volumes

Component	*Hours (Shifts)*	*Deliveries Per Day (Heavy Goods Vehicles)*	*Workforce Per Day (Light Vehicles)*
Gas Plant	7 am to 3 pm	3 LNG tankers < 1 waste water tanker 5 other delivery trucks	15 workforce 5 visitors
	3 pm to 11 pm	0	7 workforce
	11 pm to 7 am	0	2 workforce

Consideration

The Department is generally satisfied that the Proponent has undertaken an appropriate level of assessment of potential traffic-related impacts associated with the project. While some disruption to the surrounding road network can be expected, particularly during construction, the Proponent has demonstrated that such disruption would not significantly affect the capacity, operation or safety of the local and regional road network. Notwithstanding, the Department considers that proactive management is an important focus in mitigating the residual traffic implications of the project and in this regard notes that the Proponent has committed to a number of measures to mitigate impacts such as:

- Undertaking heavy vehicle movements during off-peak hours when traffic volumes are reduced, wherever possible;
- Ensuring heavy vehicles meet the Australian Road Rules and RMS standards so that road safety is not compromised;
- Transporting oversized equipment and machinery in accordance with the RMS guidelines for oversized movements;
- Implementing appropriate signage to warn road users of the presence of construction vehicles as well as changes to the normal traffic conditions; and
- Notifying the local community by means of public notice publications and advertisements on the progress of the project and the scheduling of works so as to inform the local community of any additional vehicles added onto the local road network.

Whilst no objections were received in relation to the actual construction traffic impacts, a number of agencies, including the RMS have requested the preparation of a Construction Traffic Management Plan. The Department agrees that a Construction Traffic Management Plan should be included to provide detailed measures to effectively manage construction traffic and has therefore recommended a condition of approval requiring this.

With regard to the operational traffic, the Department notes that a public submission was received raising concern with the estimated 1,000 truck movements per year. The Department considers that this number of movements is low (fewer than three movements per day on a 365-day basis) and would be negligible in terms of impact upon the local road network and intersections.

5.6.3. Visual Amenity

Issue

The existing environment of the project site is surrounded by trees, with significant industrial development to the south of the project area towards the Tomago industrial estate. Cleared agricultural and rural lands exist between the Tomago industrial estate and the Hunter River, with mangroves located along the northern banks of the Hunter River.

There will be potential temporary visual impacts from construction activities at the project area (although largely out of view), along the gas pipeline and at the Hexham receiving station site. During the later stage of construction and during operations there will be potential impacts on surrounding residential areas, landscape character and visual amenity from new structures, removal of vegetation and night-time lighting.

Consideration

The Department recognises that major construction works often involve unavoidable, temporary adverse visual amenity impacts during the construction phase. The subject project is no different in this regard, and the Department does not consider that any particular aspect of the construction activities for the project represents unique or unusual impacts compared with general construction works. Given the scale, nature and duration of construction works, the Department does not consider that construction-based visual amenity mitigation is warranted.

Upon the completion of construction of the project, the Department notes that the physical infrastructure would be visible. However, given the relatively close proximity of the industrial area and the Tomago aluminium smelter the Department considers that the project would not result in visual amenity impacts different from the existing landscape. An industrial visual impact in a site zoned for industrial uses is also a reasonable expectation. However, to ensure consistency of form and design of site landscaping, the Department recommends that site landscaping measures are implemented to meet the requirements of the relevant local council. Further, the Department also recommends that lighting of the project is installed in accordance with the Australian Standard for the management of the intrusive effects of lighting.

5.6.4. Acid Sulphate Soils

Issue

Acid Sulphate Soil (ASS) mapping in the area indicate the following risk of ASS occurring within the parameters of the project:

- The Primary Project Area (PPA) is classified as "low risk" above four metres below ground level (bgl);
- For the majority of the Option 2 gas pipeline corridor, there is a "high risk" up to one metre bgl in the section closer to the Hunter River and "high risk" at between two and four metres bgl further inland towards the PPA; and
- Hexham receiving station is considered "high risk" between one and two metres bgl;

Initial screen testing in the PPA showed that ASS is unlikely above 1.0 metre Australian Height Datum (AHD) at the PPA (Note: the 28 hectare gas plant site area ranges between 3.5 and 9.9 metres AHD with more than half the area above 5.0 metres AHD). ASS were found in samples collected at one metre depth close to the Hunter River and at the HDD exit point on the northern bank (Forgacs carpark). Soil screening at Hexham receiving station suggest that potential ASS exists, however, net acidity of the soils have a degree of natural buffering due to the presence of calcium carbonate.

The exposure of ASS through excavation for pipeline trenching and entry and exit points for HDD is most likely to occur at sites near to the Hunter River and at Hexham receiving station. HDD drilling below the Hunter River would avoid disturbance to sediment compared with other pipeline crossing techniques, such as open cut trenching. The exposure of ASS has the potential to form acid leachate resulting in soil salinity that would weaken successful land rehabilitation and compromise future land use post-construction. In addition they pose significant risks to downstream groundwater and surface water impacts – including the potential degradation of Ramsar wetlands.

The Proponent states that it is considered unlikely that there will be exposure of ASS during construction of the PPA and construction along much of the pipeline corridor. No ASS impacts to soils are likely to occur during project operations. The Proponent's Environmental Assessment has outlined measures to mitigate the risks associated with exposure of ASS including:

- The preparation of an ASS management plan;
- Site testing prior to construction;
- Minimising the disturbance and exposure of ASS;
- Storing excavated ASS in conditions that simulate its natural state or treat and store away from water bodies;
- Treat excavated ASS using agricultural lime with machinery sufficient to perform adequate mixing, where practicable;
- Bund areas where ASS are exposed – including HDD; and
- Undertake potential ASS remediation in accordance with relevant Council local environmental plans and the Acid Sulphate Soils Manual (ASSMAC 1998).

Consideration

The Department agrees that the likelihood of encountering acid sulphate soils is high, particularly at the Hexham receiving station site and at HDD entry and exit points. Management of construction needs to be guided by the *Acid Sulphate Soils Planning Guidelines* (ASSMAC 1998). The Department is satisfied that by adopting measures identified in the Environmental Assessment, the risks associated with the exposure of ASS can be effectively managed limiting any harmful impacts to Ramsar wetlands and their habitat or groundwater potable water supply. The Department has included a condition that an Acid Sulphate Soil Management Plan must be prepared and submitted for the approval of the Director-General prior to the commencement of construction in affected areas.

5.6.5. Section 94(a) Contribution Plan

Issue

Port Stephens Council requests that in line with the Port Stephens Section 94A Development Contribution Plan, a contribution of 1% of the cost of the development be paid to Council.

Consideration

The Department notes that based on a capital investment value of $300 million, this would equate to a payment of $3 million to Port Stephens Council. The necessary infrastructure support for the construction of this project, such as road upgrades, will be provided by the Proponent. In addition it is noted that the isolated location poses no significant amenity impacts to the community, while infrastructure development of this type is unlikely to place any significant demands on Council services particularly with a maximum workforce of only 15 people employed during operation. In light of the development providing key infrastructure to the state by securing its gas supplies, the Department does not consider that a s94 levy is warranted in this instance.

6. RECOMMENDATION

The Department has assessed the Proponent's Environmental Assessment, Preferred Project Report and Statement of Commitments for the Newcastle Gas Storage Facility project. The Department has also assessed submissions received from public agencies and the community in relation to this project.

The project would form a significant component of the gas supply system in New South Wales, and would provide protection for State supplies in the event of inter-state supply disruption. Further, in the short to medium term the project may also assist in offsetting limitations to inter-state importation of gas if gas supply pipelines become capacity-constrained by increasing demands.

The key potential impacts associated with the project relate to flora and fauna, surface and ground water, hazards and risk, Aboriginal cultural heritage and noise.

The Primary Project Area, including the gas storage facility and access roads at Tomago, is proposed to be constructed in an area containing high bushfire threat, important fauna habitat and listed species and is in the catchment area for the Tomago Sandbeds Aquifer supplying a significant quantity of the lower Hunter's drinking water. In this regard the Department has recommended that stringent measures for environmental protection are implemented to reduce risk from contamination, that appropriate offsets are undertaken, and that appropriate asset protection zones are in place. Although there is a low potential for additional items of Aboriginal cultural heritage to be found in a thickly vegetated sector of the development's footprint, the uncertainty that remains has also resulted in requirements for further assessment.

The Department notes that the site of the gas plant is zoned for industrial use. It is therefore accepted that the site is considered as suitable for clearing and establishing industrial areas. Notwithstanding, the Proponent has applied significant effort to investigating and reducing potential ecological impacts, particularly through project design and configuration. The Department is satisfied that with careful implementation of the project and the development of an appropriate offset package, the project would not significantly impact on the ecological values of the locality or the region.

Based on its assessment, the Department is satisfied that the Proponent has provided a robust and conservative assessment of potential impacts and that the project warrants approval.
Accordingly, the Department has drafted a recommended instrument of approval incorporating stringent and comprehensive environmental mitigation and management requirements that will serve to mitigate potential environmental impacts and enhance commitments made by the Proponent in its finalised Statement of Commitments.

A/Executive Director
Major Projects Assessment
16/4/12.

16/4/12

Deputy Director-General
Development Assessment & Systems Performance

Director-General 17/4/2012.

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4187

APPENDIX B SUBMISSIONS

See the Department's website at http://majorprojects.planning.nsw.gov.au/index.pl?action=list_submissions&job_id=4187

APPENDIX C PROPONENT'S PREFERRED PROJECT REPORT

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4187

APPENDIX D POLITICAL DONATIONS DISCLOSURE

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4187

APPENDIX E RECOMMENDED CONDITIONS OF APPROVAL