DUBBO CITY COUNCIL POSITION STATEMENT

COAL SEAM GAS

BACKGROUND

The issue of Coal Seam Gas (CSG) exploration and production has become a major focus for the media, the general community and policy makers at the State, Federal and Local Government levels. In New South Wales, there are thought to be significant but as yet untapped CSG resources within coal deposits across our sedimentary basins. New South Wales is facing increasing demand for gas and a possible restriction of supply over coming years. However, harvesting CSG involves penetration of groundwater aquifers and in some cases, the introduction of chemical compounds into complex artesian systems, the effects of which are not yet fully understood.

Dubbo lies in an area of New South Wales which, to date, has not been the central focus of CSG exploration and development in New South Wales. Activity in both exploration and production has been focused on areas further to the east and North. However, as there is potential for CSG in parts of the Dubbo Local Government Area (LGA), concrete proposals for CSG development may emerge in the future and it is important Council be prepared to deal with the complex issues that may arise from such proposed development. This Position Paper provides background on the CSG issue as it might apply to the Dubbo LGA and the core principles to be applied in any Council assessment of CSG development proposals in the future.

DISCUSSION

Coal Seam Gas Defined

Coal Seam Gas (CSG) is a natural gas found in coal deposits. The coal and gas are formed from plant matter under pressure over many millions of years. Coal seam gas is used in the same way as any other form of natural gas for cooking and heating as well as in industrial processes and electricity generation.

Both conventional gas resources and coal seam gas resources are found in a number of locations throughout Australia. Figure 1 details the location of gas resources in Australia.

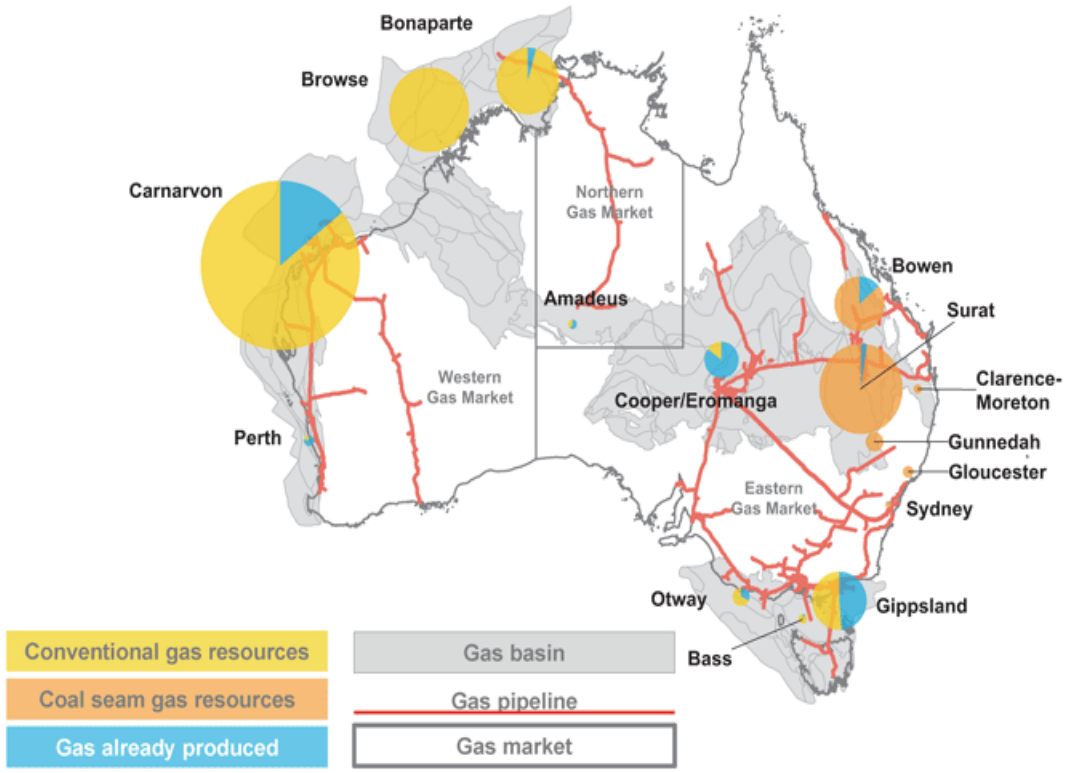

Figure 1 – Australian Gas Resources (Source: Parliament of Australia, 2013)

Coal seam gas is sourced from underground coal seams where the gas bonds to the surface of coal particles. Coal seams are generally filled with water and it is the pressure of the water that keeps the gas as a thin film on the surface of the coal. Coal seams that can produce coal seam gas to an economic level are ordinarily situated between 200 metres and one kilometre below the surface.

The level of gas that can be produced from a coal seam depends on the thickness of the coal, gas content, permeability and the depth of the coal seam. In high quality CSG deposits, cleats or fractures in the coal bed are permeable enough to allow gas and water to flow freely through them to allow for easy extraction of CSG without the need for 'fracking'.

Fracking hydraulic fracturing, or 'fracking', has been used by the oil and gas industry since 1947. In Australia, deep hydraulic fracturing has been previously carried out in 70 wells in the Cooper Basin. In the CSG industry, shallow hydraulic fracturing (less than 1,000 m depth) has been undertaken in hundreds of wells in eastern Australia. Fracking involves a fluid (sometimes a gas) pumped at high pressure into a coal seam to encourage fracturing of the rock. The fluid used in the fracking process is mostly water, but can contain a number of additives. These additives can include, but may not be limited to, the following:

Additive Type	Main Compound(s)	Purpose	Common Use of Main Compound
Diluted Acid (15%)	Hydrochloric acid or muriatic acid	Help dissolve minerals and initiate cracks in the rock	Swimming pool chemical and cleaner
Biocide	Glutaraldehyde	Eliminates bacteria in the water that produce corrosive by-products	Disinfectant; sterilize medical and dental equipment
Breaker	Ammonium persulfate	Allows a delayed break down of the gel polymer chains	Bleaching agent in detergent and hair cosmetics, manufacture of household plastics
Corrosion inhibitor	N, n-dimethyl formamide	Prevents the corrosion of the Pipe	Used in pharmaceuticals, Acrylic fibers, plastics
Crosslinker	Borate salts	Maintains fluid viscosity as temperature increases	Laundry detergents, hand soaps, and cosmetics
Friction reducer	Polyacrylamide	Minimizes friction between the fluid and the pipe	Water treatment, soil conditioner
	Mineral oil		Make up remover, laxatives, candy
Gel	Guar gum or hydroxyethyl	Thickens the water in order to suspend the sand	Cosmetics, toothpaste, sauces, baked goods, ice cream
Iron control	Citric acid	Prevents precipitation of metal oxides	Food additive, flavouring in food and beverages; lemon juice ~7% Citric Acid
KCl	Potassium chloride	Creates a brine carrier fluid	Low sodium table salt substitute
Oxygen Scavenger	Ammonium bisulfite	Removes oxygen from the water to protect the pipe from corrosion	Cosmetics, food and beverage processing, water treatment
pH Adjusting Agent	Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers	Washing soda, detergents, soap, water softener, glass and ceramics
Proppant	Silica, quartz sand	Allows the fractures to remain open so the gas can escape	Drinking water filtration, play sand, concrete, brick mortar
Scale inhibitor	Ethylene glycol	Prevents scale deposits in the Pipe	Automotive antifreeze, household cleansers, and de-icing agent
Surfactant	Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antiperspirant, and hair color

Figure 2 – Common additives used in the 'fracking' process (Source: US Department of Energy)

Water is a by-product of the gas collection process. Coal seams generally contain more brackish (salty) groundwater than aquifers that are usually used for agriculture. It is for this reason that careful consideration of the impacts on aquifers and water resources must be undertaken in the consideration of any proposals for coal seam gas extraction.

In New South Wales, coals seam gas concentrations occur in the major sedimentary basins as shown in the following graphic.

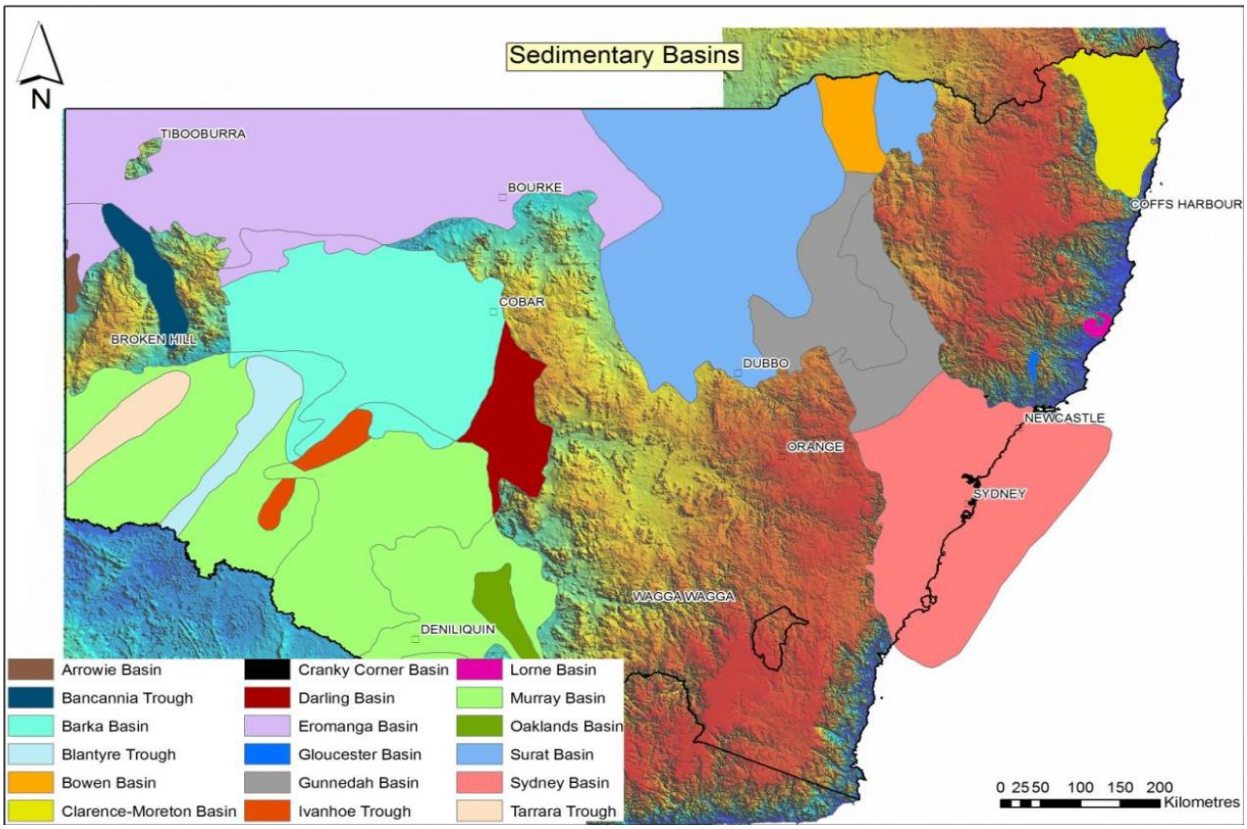

Figure 3 – Major Sedimentary Basins (Source: NSW Trade and Investment)

So far, focus of exploration and production activity has been in areas well to the north and east of Dubbo, including sites in the Sydney, Gunnedah, and Clarence-Moreton Basin.

Current State Government Initiatives

The New South Wales Government has established a multi-agency, multi-disciplinary approach to the assessment, review and approval of any application for exploration or production of CSG. It includes inputs provided from the following agencies:

- Office of Coal Seam Gas – The Office of Coal Seam Gas (OCSG) sits within New South Wales Trade and Investment and assesses applications for coal seam gas exploration, undertakes assessment and production and administers petroleum titles accordingly. The OCSG oversees the regulation of the CSG industry within the scope of the *Petroleum (Onshore) Act 1991* and the *Work Health and Safety Act 2011*. The OCSG also regulates the rehabilitation of sites and enforces compliance issues not regulated by the EPA.
- Environment Protection Authority (EPA) – As the lead regulator for health and environment aspects of coal seam gas in New South Wales, it can prosecute any company that breaches their Environment Protection Licence, with heavy fines of up to $1 million able to be imposed by the courts. Any company that fails to inform the EPA of a serious incident can be prosecuted and fined up to $2 million.

- The Department of Planning and Environment – A lead agency responsible for delivering the Government's Strategic Regional Land Use Policy, which includes planning for CSG. The Department's role includes establishing exclusion zones, resourcing the Gateway Panel and assessing development applications for major projects. The Department generally provides assessment reports on major CSG projects to independent experts at the Planning Assessment Commission, which makes a final determination.
- The NSW Office of Water – Responsible for the management of the State's surface water and groundwater resources. The Office of Water will assess the potential impacts of a coal seam gas proposal on water resources, their dependent ecosystems, culturally significant sites and existing water users. This assessment will cover potential impacts on water table levels, water pressure, and water quality, and will be provided to the appropriate consent authority. Any development that is approved will be required to hold water access licences for the water that is taken from any affected water source.
- The Land and Water Commissioner – Providing guidance to landholders, industry and the community on the implementation of new land access agreements that will ensure landholders receive the same level of compensation from industry for activity on their properties.
- The NSW Chief Scientist and Engineer – Completed an independent review to identify any impact CSG activity may have on human health, the environment and water catchments in 2014 and issued the Final Report of the Independent Review of Coal Seam Gas Activities in NSW on 30 September 2014.

This last entity is an important element in the New South Wales' Government approach to the issue of CSG. By investing significant resources in an evidence-based, objective analysis of the science underpinning CSG and its potential impact on the environment, it is hoped that a measure of clarity and certainty can be provided to the assessment of risks associated with this type of development.

The Final Report of the Independent Review of Coal Seam Gas Activities issued by the NSW Chief Scientist and Engineer included 16 recommendations to government. The Review found that many of the technical challenges and risks posed by the CSG industry can generally be managed through careful designation of areas appropriate for CSG extraction; high standards of engineering and professionalism in CSG companies; creation of a State Whole-of Environment Data Repository; comprehensive monitoring of CSG operations with ongoing scrutiny of collected data, a well-trained and certified workforce; and applying new technologies as they become available.

The report also highlighted that all of this needs to take place within a clear, revised, legislated framework which is supported by an effective and transparent reporting and compliance regime and by drawing on appropriate expert advice. The final report also outlined the need for Government and industry to approach this issue with a full appreciation of the risks, complete transparency, rigorous compliance, and a commitment to addressing any problems promptly with rapid emergency response and effective remediation.

Assessment of Coal Seam Gas Development

The New South Wales Planning System provides a complex environment for the assessment and consideration of proposals for mining and extractive industries. This is particularly so in the case of CSG. Assessment of any proposal for CSG exploration or production can trigger provisions of any or all of the following legislation:

- Mining Act, 1992
- Environmental Planning and Assessment Act, 1979
- National Parks and Wildlife Act, 1974
- Threatened Species Conservation Act, 1997
- Native Vegetation Act, 2003
- Contaminated Land Management Act, 1997
- Water Management Act, 2000
- Fisheries Management Act, 1994
- Rural Fires Act, 1997
- Heritage Act, 1977
- Roads Act, 1993
- Pipelines Act, 1967
- Protection of Environment Operations Act, 1999
- Commonwealth Approvals

State Environmental Planning Policy State and Regional Development specifically designates mining development as being State Significant if it meets certain criteria. In relation to CSG development proposals, all CSG production is classified as State Significant Development (SSD), but some exploration is also SSD.

If a development is classified as State Significant Development, the Minister for Planning and Environment (or Delegate) will be the consent authority.

Application for Petroleum Exploration Licence

During the exploration phase of any proposed CSG development, the opportunity and role available to Councils and local communities to impact on the process is relatively limited. The following graphic demonstrates that there is a limited and poorly defined window for public comment on applications for petroleum export licences.

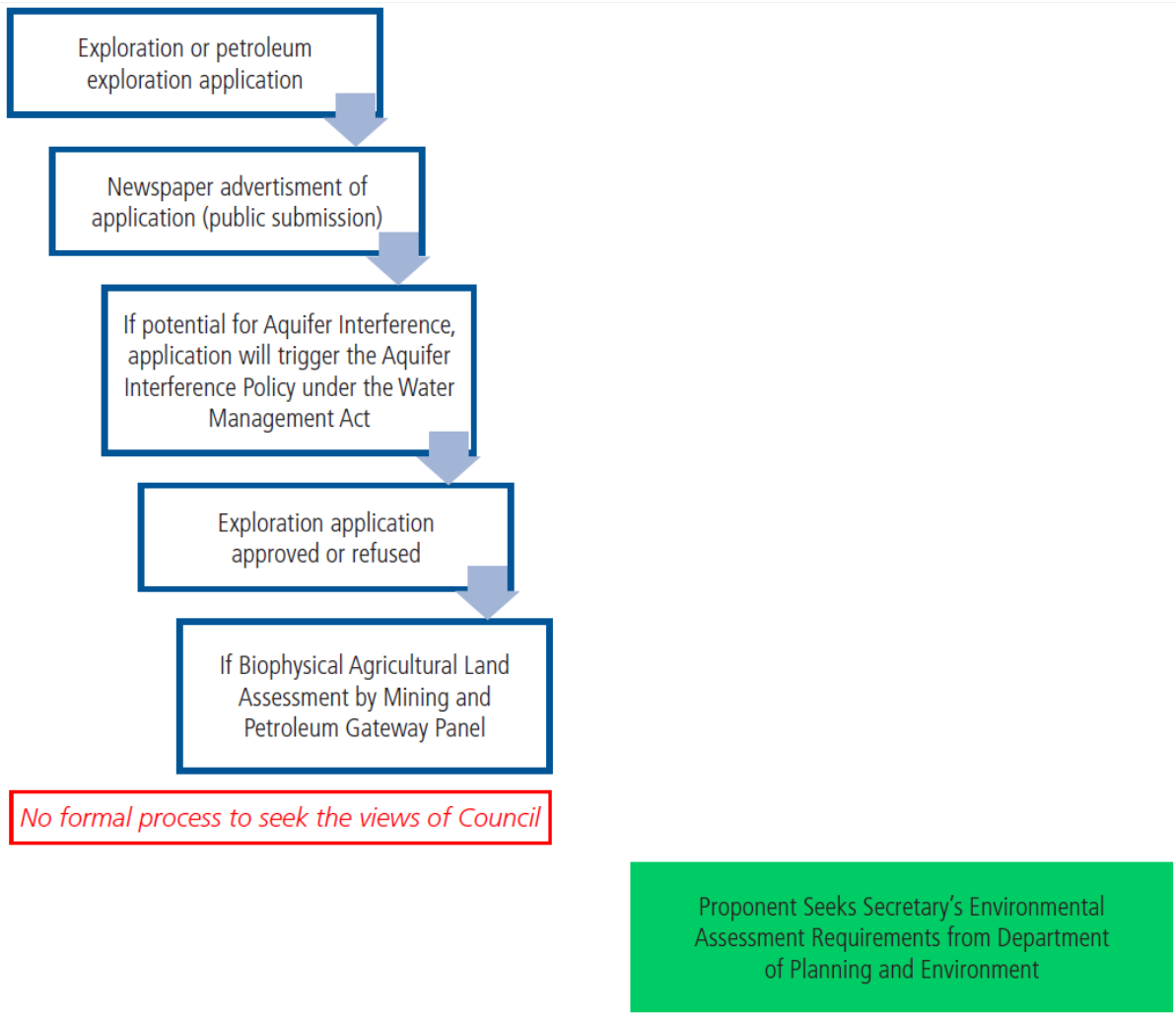

Figure 4 – Mining Act, 1992 (As Amended) Exploration Assessment System

In practice, the opportunity and the parameters on which Council and the local community can reasonably object to the granting of a petroleum exploration licence are relatively limited.

Application for Petroleum Production Lease

By contrast, when an actual application for petroleum production lease is lodged, there is a more formal process for the involvement of councils as representative of their local communities. Figure 5 details the assessment process for a State Significant Development proposal (including any coal seam gas proposal) and also shows the points where a council can provide input into the assessment process:

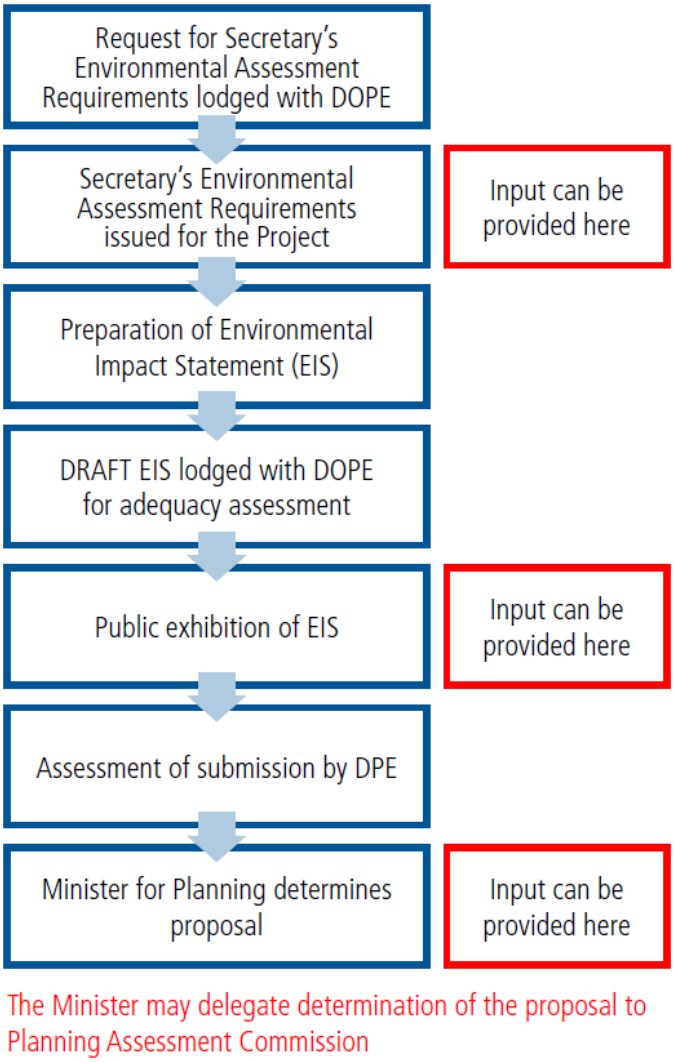

Figure 5 – Assessment System – State Significant Development

Current Situation in Our Region

At the current time New South Wales has 114 Coal Seam Gas wells (at AGL's Camden Project) producing commercial quantities of gas (of which 89-96 are producing at any one time). Ninety five per cent of New South Wales gas supplies come from interstate, including Queensland and South Australia. A number of areas are also under active exploration throughout New South Wales and, in particular, areas in the north and north-west with their connection to the Gunnedah and Surat Basins.

A number of exploration licenses have been issued in the north-west and in sections of the Orana Region. Figure 6 shows the range of exploration licenses currently in existence. Of particular relevance to Dubbo is Petroleum Exploration License (PEL) 433 currently held by Santos NSW Pty Ltd and includes land covered by the Goonoo National Park/State Conservation Area.

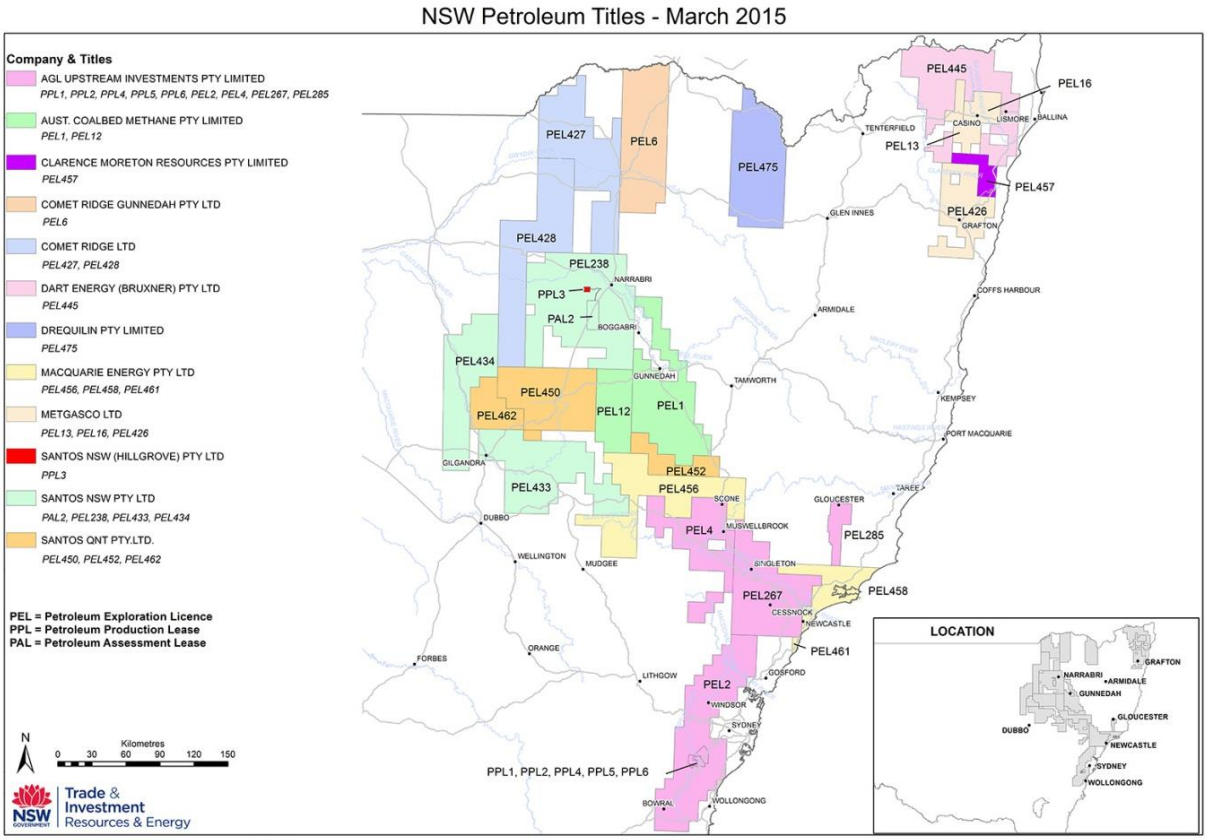

Figure 6 – Relevant Coal Seam Gas Licences

In addition, PELA 160 was lodged over an area incorporating the Dubbo Local Government Area. However, this Application was refused by the State Government in August 2014. In part, this refusal took into account the new elements of the NSW State Government policies and procedures regarding the assessment of petroleum (CSG) exploration and production licences.

It is important to note that, at this stage, no formal Petroleum Production Lease Application (PPLA) has been lodged over any lands that fall within or are neighbouring to the Dubbo LGA. An initial assessment of Coal Seam Gas potential has been undertaken in recent years in the areas around the south-eastern rim of the Goonoo National Park/State Conservation Area, heading eastwards towards Cobbora. While there is considered to be some potential for CSG in the area, significant further exploration is required to substantiate this assessment.

The nearest active PPLAs are those covering areas in the Pilliga Forest and surrounding lands near Narrabri, around 270 km north-east of Dubbo. There include PPLA 13, 14, 15, and 16

lodged by Santos Pty Ltd and currently under consideration by the NSW State Government. These applications form part of the large Narrabri Gas Project, a major coal seam gas extraction and production project that will have the following characteristics:

- Total project area of 98,000 hectares
- The project will produce 200 terajoules of natural gas per day, equivalent to around half of the gas requirements of New South Wales
- Gas is proposed to supply the New South Wales market through the construction of a pipeline connection to the existing gas pipeline network
- The project will employ 1,200 persons during construction and 200 persons during operation.

It is not considered that the Narrabri Project, as currently scoped, presents an imminent or substantiated threat to Dubbo groundwater or surfacewater resources at this stage. Rather, any issues will be longer term in nature, resulting from a significant (and as yet unplanned) expansion of exploration and development activity south west from Pilliga down towards the Goonoo National Park/State Conservation Area.

The Precautionary Principle

The overall assessment and consideration of mining and extractive industries development is a complicated process involving a range of State and Federal Government assessment systems all aimed at ensuring the impacts of a proposal can be managed and will not result in environmental harm that will impact the quality of life of future generations.

The assessment principles utilised in all decision making for mining and extractive industries are the principles of ecologically sustainable development, which includes the precautionary principle as provided in the definition from the NSW Local Government Act, 1993:

> ***"principles of ecologically sustainable development*** *means the following statements of principle:*
>
> *Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:*
>
> *(a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*
>
> *In the application of the precautionary principle, public and private decisions should be guided by:*
>
> *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
> *(ii) an assessment of the risk-weighted consequences of various options,*

(b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The principles of ecologically sustainable development and the precautionary principle do not mean that Council should not approve the undertaking of any development in the Dubbo Local Government Area.

The precautionary principle means that in the assessment and consideration of any proposal that all available science in relation to the proposal and its impacts are considered in determining whether there will be environmental harm and degradation.

Dubbo City Council has carefully considered the potential impacts of coal seam gas exploration and production on the unique environmental characteristics of the Dubbo Local Government Area and maintains the firm view that the precautionary principle be applied.

POLICY POSITION

Given the current state of scientific research and policy development with regards to coal seam gas, it is important the Council does not rush to judgement on an issue where public policy at the State level is still evolving. It is also important that the extent and limitations of Council's role in the assessment and decision-making process associated with such "State-significant" development is also recognised. However, the identification of the general position containing guiding principles which will govern Council's approach to any proposed coal seam gas development is apposite.

The following Policy position has been adopted by Dubbo City Council with regard to any future proposal to develop a coal seam gas production facility in the Dubbo Local Government Area:

That in the consideration and assessment of any application to develop Coal Seam Gas production, Council applies the following key principles:

a) **The primacy of the protection of the groundwater and surface water resources to the future of Dubbo and its agricultural hinterland are maintained –** any development should not occur unless the safety and security of Dubbo's water resources can be assured.
b) **In accordance with the NSW Local Government Act 1993 and the Environmental Planning and Assessment Act 1979 , the principles of Ecologically Sustainable Development and The Precautionary Principle are applied in any assessment -** that any proposed development will need to satisfy Council that:
    i) All practical measures available to prevent serious or irreversible damage to the environment have and will be taken
    ii) Risks of environmental damage are fully identified and adequately assessed.
c) **That Council requires full and satisfactory identification of all potential costs and impacts on the community resulting from any proposed development –** Proponents utilise the Dubbo Council Infrastructure and Services Model to calculate the full cost of the development to council and the community, including all necessary environmental prevention, mitigation and isolation works.
d) **That Council should receive appropriate resourcing and support to manage and mitigate identified impacts of any development –** That the proponent, or where appropriate the New South Wales State Government, provide all necessary and identified costs to mitigate any adverse impacts of a development, utilising mechanisms like Voluntary Planning Agreements, Resources to Regions and funding grants.
e) **That further research into CSG be undertaken as a priority** – Council supports the resolution of the Association of Mining Related Councils (AMRC) regarding both the finalisation of the Report by the Chief Scientist on the issue, and the commissioning of further detailed peer reviewed research demonstrating the possible impacts and effects of coal seam gas mining on ground water and surface water systems, effects related to the use of chemicals, effects related hydraulic fracturing, effects on greenhouse gas and other emissions and the nature and effect of remediation under the Petroleum (Onshore) Act 1991 and under clause 14 of SEPP (Mining, Petroleum Production and Extractive Industries) 2007.