QGC Submission to the Parliament of Australia Senate

Inquiry into the Management of the Murray Darling Basin – Impact of Mining Coal Seam Gas

July 2011

Uncontrolled when printed

QUEENSLAND CURTIS LNG PROJECT

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1.0 Background

The Rural Affairs and Transport References Committee of the Australian Parliament Senate, as part of its inquiry into the management of the Murray Darling Basin, is examining the impact of mining coal seam gas (CSG) on the management of the basin.

The terms of reference for this part of the inquiry are:

- The committee will examine the economic, social and environmental impacts of mining coal seam gas on:
    - The sustainability of water aquifers and future water licensing arrangements
    - The property rights and values of landholders
    - The sustainability of prime agricultural land Australia's food task
    - The social and economic benefits or otherwise for regional towns and the effective management of relationships between mining and other interests; and
    - Other related matters including health impacts

2.0 The QCLNG Project

Coal seam gas has been produced in Queensland for more than 10 years.

It is methane, also known as natural gas.

Coal seam gas now produces about 80% of all gas consumed domestically in Queensland.

QGC, a BG Group business, is developing coal seam gas in the Surat Basin of southern Queensland for domestic and export markets through its Queensland Curtis LNG (QCLNG) Project.

From 2010 to 2014, BG Group is investing US$15 billion in the project.

The project is drawing on QGC's extensive coal seam gas expertise and BG Group's international experience in liquefied natural gas (LNG) to meet rising demand for cleaner, more efficient energy.

QCLNG is creating a new industry for Queensland and will also help to address climate change by allowing natural gas, which has the lowest carbon emissions of all fossil fuels, to be transported economically to international markets.

QGC's plans for this major, integrated project, involve:

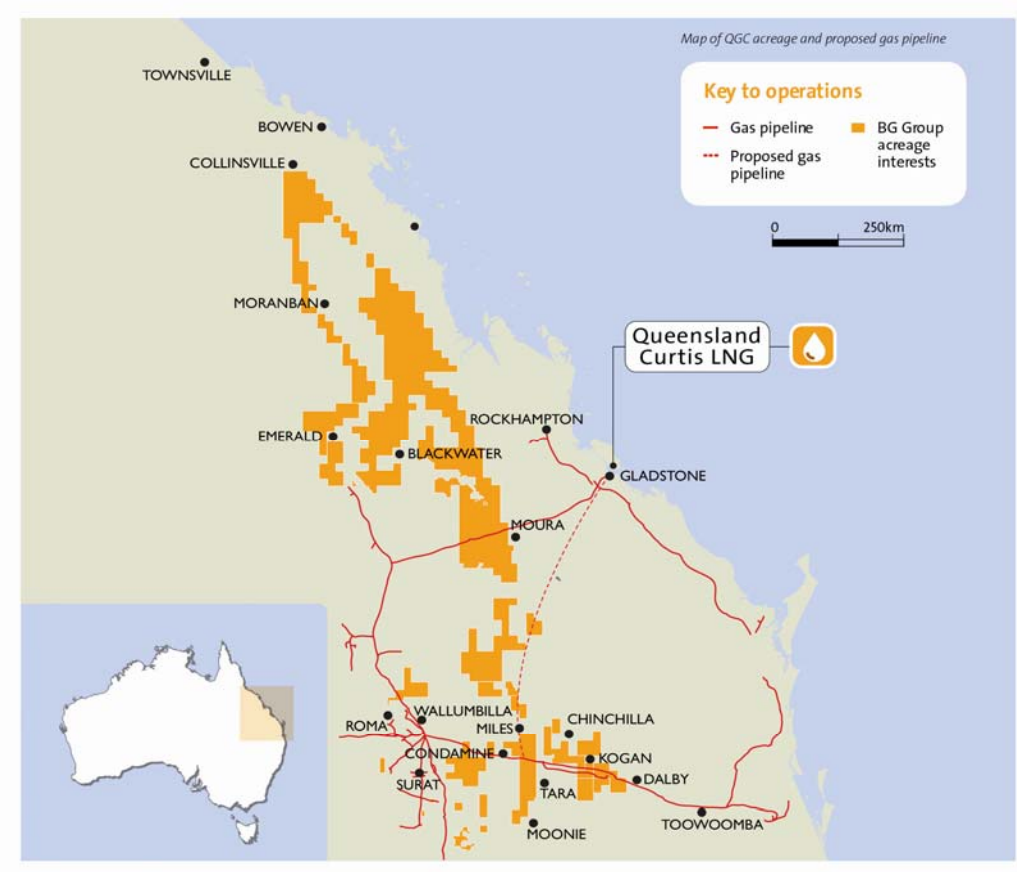
- Expanding QGC's existing coal seam gas production in the Surat Basin of southern Queensland[1]
- Building a 540km buried natural gas pipeline network linking the gas fields to Gladstone
- Constructing a natural gas liquefaction plant on Curtis Island, near Gladstone, where the gas will be converted to LNG for export

The project's first stage comprises two processing units, known as LNG trains, at the Curtis Island plant.

These trains, which have a design life of at least 20 years, will produce a combined 8.5 million tonnes of LNG a year.

The QCLNG site on Curtis Island site can accommodate an expansion to 12 million tonnes of LNG a year, subject to demand.

The first LNG delivery is scheduled to leave Gladstone in 2014.



1 See map QGC Tenements with the EIS Tenement Boundary – Appendix 1

3.0 QCLNG Project approval

The QCLNG Project was assessed for environmental and social impact under Queensland and Commonwealth legislation in a process that began in 2008 and took more than two years.

The environmental and social impact assessment totalled more than 12,000 pages.[2]

In June 2010, the Queensland Coordinator-General approved the QCLNG Project, subject to numerous environmental conditions that included water management, and subject to various, more detailed state approvals.[3]

Key among these other Queensland approvals are the project's environmental authorities which require approval by the Queensland Department of Environment and Resource Management (DERM).

In October 2010, the Federal Minister for Sustainability, Environment, Water, Population and Communities approved the project, subject to numerous environmental conditions that included measures to minimise impacts on the Great Artesian Basin.[4]

On 31 October 2010, BG Group announced that it had sanctioned the QCLNG Project and work began on 1 November 2010.[5]

In May 2011, the Federal Minister for Sustainability, Environment, Water, Population and Communities provided his "statement of reasons" for approving the QCLNG Project.

The minister's statement of reasons do not refer to impacts on the Murray Darling Basin (MDB). [6]

4.0 Stakeholder consultation

Stakeholder consultation is a key element of the QCLNG Project and it is a core value of BG Group and its subsidiaries.

During the project's environmental and social impact assessment from 2008 to 2010, QGC consulted more than 4000 individuals, rural and industry associations, conservation, indigenous and community groups and government organisations from the gas fields around Chinchilla to Gladstone.

This was in addition to the statutory seven-week stakeholder consultation program required under Queensland and Commonwealth legislation for people to consider the project's draft assessment document.

During this period, QGC consulted more than 800 stakeholders via more than 1000 separate interactions.[7]

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2 Queensland Curtis LNG Environmental Impact Statement July 2009 and Queensland Curtis LNG Supplementary Environmental Impact Statement January 2010: http://www.qgc.com.au/01_cms/details.asp?ID=427

3 Queensland Curtis LNG Project Coordinator-General's report on the environmental impact statement June 2010: www.dip.qld.gov.au/projects.energy/gas/queensland-curtis-lng-project.html

4 Federal Minister for Sustainability, Environment, Water, Population and Communities Decision on Approval for the Queensland Curtis LNG Project: EPBC 2008/4398; 2008/4399; 2008/4401; 2008/4402 and 2008/4405: http://www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=referral_detail&proposal_id=4398

5 See QGC news release of 31 October 2010: http://www.qgc.com.au/01_cms/details.asp?ID=464

6 See Minister's Statement of Reasons for the decision to approve an action under s.130 and s.133 of the Environment Protection and Biodiversity Conservation Act 1999 – Proposed Action reference number EPBC 2008/4398

7 For a detailed overview of the project's consultation process, see Chapter 4, Volume 1 of the Queensland Curtis LNG Supplementary Environmental Impact Statement January 2010: http://www.qgc.com.au/01_cms/details.asp?ID=427

5.0 Social and economic benefits of the QCLNG Project

The QCLNG Project is a major employer in Queensland with nearly 3600 people currently working on the QCLNG Project and QGC-related business.

At 31 March 2011, QGC's total workforce included more than 1350 full-time employees, more than 1400 employees with major contractors, and more than 800 in several smaller contract companies.

About 96% of the total are Australians.

These figures are being reported to the Queensland Coordinator-General every six months as a condition of project approval and are used to assess Australian industry participation in the QCLNG Project.[8]

Since January 2010, QGC's expenditure on the QCLNG Project is estimated at A$2.3 billion, with almost 75% (A$1.7 billion) being spent in Australia.

Over half the total has been spent in Queensland.

By 2014 it is expected that half of the expenditure on the QCLNG Project will be in Australia and almost 80% of expenditure over the life of the project is expected to be spent in Australia.

The project is expected to generate A$32 billion in additional revenue for Queensland in its first decade.

During construction from 2011 to 2014, the QCLNG Project is expected to generate an average of 5000 jobs.

During operations from 2014, it is expected to generate up to 1000 permanent jobs.

QGC has also spent more than $39 million in research and development since establishing its business in Queensland, specifically in water management, drilling techniques, gas and LNG technology, pipeline transport and environment.

6.0 Land access

QGC has a comprehensive land liaison procedure based on integrity, fairness and respect with a preference for voluntary and negotiated land access and compensation arrangements.

QGC has not entered properties without agreement from the landholders and has not taken a landholder to court.

QGC drills all of its wells under petroleum licences granted by the Queensland Government under the Petroleum and Gas (Production and Safety) Act.

Most QGC wells and associated gathering systems are on private properties and field development planning takes into account the location of homes and cattle yards, community assets such as schools, roads, good quality agricultural land, farming practices, topography and geology as well as cultural heritage and environmental constraints.

A key factor in deciding the most suitable location is the company's ability to minimise impact on individual landholders to ensure the co-existence of agriculture and gas production.

8 See QGC news release of early June 2011: http://www.qgc.com.au/01_cms/details.asp?ID=497

As part of this process, QGC funds independent land valuations for determining compensation and landholder legal costs but does not choose the lawyers that landholders engage.

The company prefers to build the infrastructure it needs, such as field compressor stations, central processing plants and other major facilities, on land the company owns to minimise impact on landholders and neighbours.

As at 30 June 2011, QGC owned 27,500ha of land in the Surat Basin.

Compensation

Payment of compensation to owners and occupiers of land affected by gas development is a statutory obligation under the Queensland Petroleum and Gas (Production and Safety) Act.

QGC's compensation payments are determined by the value of the land, the use made of it and the impact of gas development.

As a result, compensation varies from property to property (but the process for determining compensation remains the same).

Annual payments per well can vary from about $750 (for low-production, low-value land) to $5500 (for highly productive, high-value land).

In addition to these amounts, an initial payment of between $1000 and $10,000 a well is paid on execution of a compensation agreement.

Again, this payment depends on the value of the land, the use made of it and the impact of gas development.

QGC has several landholders who receive compensation of between $75,000 and $200,000 a year.

These landholders have between 30 and 65 wells on their property.

In each case, the surface land disturbance due to the presence of wells and roads is about 5% of the total surface area of the properties with agricultural production following the completion of construction activities being generally consistent with pre-CSG development levels.

A large part of QGC's stakeholder base includes landholders in the Surat Basin, about 1000 of whom will be affected by development of wells, gas gathering equipment and infrastructure for the QCLNG Project.

Of these 1000 landholders, QGC has at 30 June 2011 reached voluntary agreement with more than 700 landholders for access to their properties (either for survey, exploration or production activities).

In QGC's experience, landholders have welcomed the guaranteed cash flows and the diversification of farm income that come with agreements for gas infrastructure.

It should also be noted that in many cases the fundamental petroleum tenement, which is the authority to prospect for coal seam gas, has pre-existed the purchase of those properties by the current owners.

7.0 Sustainability of water resources

Continental context

QGC is part of the coal seam gas industry in Queensland and works alongside many other operators and stakeholders.

QGC can speak with authority only about its own operations and planned developments in the QCLNG Project area.

QGC believes that its QCLNG Project activities will not affect the sustainability of water resources of the Murray Darling Basin.

To illustrate, the total current surface water resource of the MDB can be considered in several ways:[9]

- Total inflows into the MDB – 29,640 GL/year
- The sum of the surface run-off generated across the MDB land surface – 28,900 GL/year
- The sum of water availability across all 18 regions of the MDB, including the internally generated portion of surface water availability for the Barwon-Darling and Murray regions – 23,417 GL/year
- Stream flow at the mouth of the Murray River – 12,233 GL/year

For the purposes of context, the entire Condamine-Balonne river catchment area has total inflows of 1738 GL/year or just 5.8% of the total MDB inflow.

The upper reaches of the Condamine River, which is the portion of the river catchment which could be affected by coal seam gas extraction, has an inflow of just a fraction of the total Condamine-Balonne river catchment area.

The Great Artesian Basin has an estimated 64,900,000,000 million litres of water in storage and a total recharge of 910,000 million litres a year.[10]

At this continental scale, the QCLNG Project environmental impact assessment did not identify any measurable impacts on the MDB surface and subsurface water resources as a result of QGC's gas development.

Hydrogeologic evaluations using available data and modelling also indicated that the impact of coal seam gas extraction on the overall Great Artesian Basin would be insignificant with the QCLNG Project likely to extract less than 0.001% of the water in the basin over the life of the Project.

Regional context

The QCLNG Project EIS approved tenements cover about 4687 km^2 of the Surat Basin and lie south-east from about Dalby to north-west of Wandoan in south-west Queensland.[11]

For planning purposes, QGC has divided these tenements into what are known as the Northern, Central and Southern development areas.

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9 See "Water Availability in the Murray Darling Basin", by CSIRO for the Australian Government (October 2008): http://www.csiro.au/files/files/po0n.pdf

10 John R Hillier, Consulting Hydrogeologist to Central Downs Irrigators Limited presentation at APPEA CSG Forum, Brisbane, June 2011: http://www.appeacsgwaterforum.com.au/

11 Note: QGC's other oil and gas tenements in Queensland are not included in this discussion because they are not part of the QCLNG Project development or approvals and have not been assessed for environmental impact. Should exploration drilling prove up sufficient reserves, these tenements would be subject to environmental and social impact assessment.

As has been documented in previous submissions to the Commonwealth Government, only the Central and Southern QCLNG Project tenements can be considered to be in the MDB and that the Northern tenements should be considered part of the Dawson River catchment.

The vast majority of QGC's tenements overlay areas other than the most heavily irrigated agricultural land overlying the Condamine Alluvium east of Dalby.[12]

The Condamine Alluvium can be found only in isolated pockets in the far eastern side of QGC's tenements and along the Condamine River.

As a result, QGC has concluded that it is highly unlikely that dewatering of the Walloon Coal Measures within QGC tenements will have any significant impact on the Condamine Alluvium.

QGC's view has also been confirmed by advice from Geoscience Australia and Dr M. A. Habermehl that "on the basis of available information, we consider that there is a limited likelihood of impact on the MDB groundwater or connected surface water resources as a result of any of the proposed operations".[13]

This is notwithstanding a report for Central Downs Irrigators Limited[14] which concluded that water quality information pointed to a transfer of water from the Walloons to the Condamine Alluvium.

The report noted that groundwater could also move in the other direction if the pressure gradient were reversed (by dewatering the Walloons, for example) and that more data was required to ascertain dewatering levels that would affect the alluvium.

In recognition of this, QGC has committed to installing bores to monitor the Walloon Coal Measures within QGC tenements that are near the Condamine Alluvium.

This monitoring will provide an early indication of any impact.

Local context

The QCLNG Project will dewater the Walloon Coal Measures in the Surat Basin to produce gas that is held in coal by water pressure.

This pressure must be reduced for the gas to flow.

Unlike other water producers and users, coal seam gas producers have no economic incentive to produce water.

Water is a by-product of gas production and adds significant capital and operating costs to a gas producer.

Current modelling estimates indicate QGC will extract on average about 11,900 ML a year from the Walloon Coal Measures until 2061 (the current forward modelling end date).

12 Please see map in Appendix 2. For an explanation of why QGC tenements are not considered to be part of the Condamine Alluvium, see "Walloon Coal Measures Hydrogeological Conceptualisation, Healthy Headwaters, Coal Seam Gas Water Feasibility Study", prepared by Klohn Crippen Berger for the Australian Federal Government and DERM

13 See "Final summary report on the potential impacts of coal seam gas extraction in the Surat and Bowen Basins", by Geoscience Australia and Dr M.A Habermehl, 29 September 2010: http://www.environment.gov.au/epbc/notices/pubs/gladstone-ga-report.pdf

14 See "Groundwater connections between the Walloon Coal measures and the Alluvium of the Condamine River", A report for the Central Downs Irrigators Limited, August 2010, by John R Hillier, Consulting Hydrogeologist: http://www.cdil.com.au/documents/JHillierfinaldoc.pdf

Extraction of water will follow a typical well dewatering cycle, meaning that more water will be extracted in some years.

This water is brackish and suitable only for stock water at best.

It is not generally used for human or farming purposes.

Consequently, QGC will treat this water and return it to the water cycle for agriculture, industry and town use.

QGC does not intend to release any untreated coal seam gas water to surface waters or to use it in any other fashion.

Under an agreement with SunWater, a Queensland Government-owned corporation for the Central and Southern Project development areas, QGC will provide treated water into the Chinchilla Weir in the upper Condamine River for beneficial use in a scheme managed by SunWater.

This good quality water release will provide an opportunity for shallow, stressed aquifers to be “rested” and could recharge the bed and banks of the Condamine River, thus having a positive impact on the receiving environment.

While it is technically feasible in some circumstances to re-inject water produced as a result of coal seam gas extraction, this is unlikely to be possible in most cases.

Re-injection in the same location as the water is drawn from is even less likely to be possible.

In QGC’s Northern development area tenements, landholders currently use several registered bores for water supply from the Walloon Coal Measures for stock.

QGC is monitoring and modelling the potential impact on these landholders of extracting coal seam water and has committed to “making good” should gas production affect them.

QGC is committed to matching solutions to any potential proven problem for which it is responsible.

The solution would be designed to put landholders into the same position they would have been had QGC not had any impact.

“Make good” measures could include deepening existing bores, sinking new bores (possibly into different geological formations other than the Walloons), or providing water from alternative sources such as supplies from SunWater using treated CSG water.

QGC acknowledges that “make good” measures will mean a negotiated process between landholders, Queensland regulators such as DERM, and QGC.

It is notable that impacts are currently occurring that cannot be attributable to coal seam gas extraction as expansion of the industry in Queensland has not yet occurred.

Groundwater heads across large areas of the Great Artesian Basin have been declining for many years, most likely due to the long-term effects of groundwater extraction for stock and domestic purposes.

Coal seam gas wells

Wells used to extract coal seam gas will be between 600 and 1200 metres deep and will target the Walloon Coal Measures.

As previously stated these coal seams are seldom used for irrigation, stock or domestic purposes as water for these uses are generally sourced from different aquifers at different depths.

The QCLNG project will drill about 6000 wells over the minimum 20-year life of this part of the QCLNG Project.

Subsidence

QGC's assessment of the QCLNG Project indicates that the potential for QGC's operations to have any degree of magnitude in differential settlement and subsidence will be negligible.

As such, the potential to affect MDB flows through redirection of water into the groundwater system, and away from surface flows (or vice versa) is considered unlikely.

Equally, since groundwater drawdown impacts do not manifest themselves to a measurable degree at the surface (particularly for the alluvial aquifers such as the Condamine River), direct groundwater impacts on surface flows (through redirection of rainfall recharge) to the MDB are unlikely.

QGC's view has been confirmed by Geoscience Australia and Dr Habermehl who said that "based on the estimated magnitude of the subsidence (in the order of centimetres to tens of centimetres), and with reference to subsidence assessments for CSG activities in similar geological environments elsewhere, we consider that the risk of impacts to surface water and shallow groundwater systems is very low". [15]

Salt management

Current QGC modelling indicates that total salt production from the Northern, Central and Southern development areas of the QCLNG Project is estimated to be 4,621,000 tonnes (dry) to 2040 based on the project's latest water production plans.

This includes salt stored in QGC's existing raw water storage ponds that will be dealt with when new QCLNG Project treatment plants come into operation, as well as future water production from that point to 2040.

QGC has identified various options for the management of salt.

While the QCLNG Project base case suggests that salt will be managed by solar crystallisation with long-term storage of solids in landfill, QGC wants a better salt management solution.

In June 2010 the Queensland Government published its Coal Seam Gas Water Management Policy requiring preference be given to "beneficial use" rather than "waste disposal" solutions.

QGC agrees with this and is developing a pilot development of a commercial solution for managing salt in the longer term.

The primary contaminants in salt from QGC's coal seam gas operations are sodium chloride, sodium carbonate (soda ash) and sodium bicarbonate.

These products are also basic commodities used in chemical and material manufacturing industries.

This provides an opportunity to reduce waste and generate revenue from the sale of product to offset capital and operational costs associated with appropriate brine management solutions.

15 See "Final summary report on the potential impacts of coal seam gas extraction in the Surat and Bowen Basins", by Geoscience Australia and Dr M.A Habermehl, 29 September 2010: http://www.environment.gov.au/epbc/notices/pubs/gladstone-ga-report.pdf

Market research by QGC has confirmed:

- that markets are available for products that would be produced by a brine reuse plant
- various technological options and commercial interests exist that can deliver a commercial solution
- the technical feasibility of the proposed technologies has been demonstrated through process modelling and laboratory testing
- suitable process technology is the property of individual organisations

Pilot projects are now required to confirm the technical and economic efficiencies and establish key process parameters for a commercial-scale processing facility.

Hydraulic fracturing

The development of the QCLNG Project gas fields involves drilling wells to extract gas from coal seams deep underground.

Sometimes, companies use "hydraulic fracturing" to improve gas flows when the natural rate of production is low. [16]

This technique, widely used in the oil and gas industry since the 1950s, involves using high-pressure pumps to inject mostly water and sand into wells to hold open tiny cracks in the coal seams.

Small amounts of chemicals may be added to the injection water, mainly to carry sand to help the spread of the fracture. The chemicals currently planned for use in QGC well operations are disclosed on the company web site and do not include any BTEX materials.

All chemicals are handled according to strict procedures by trained personnel and are used in concentrations so low as to cause no environmental impact or harm.

Hydraulic fracturing can increase the productivity of a well by two or three times compared to production rates before fracturing, which gives a clear benefit in a reduction of the number of wells that need to be drilled in a particular location.

Water management

QGC's Stage 1 Coal Seam Gas Water Management and Monitoring Plan fulfils various Queensland and Commonwealth Government conditions of approval for the QCLNG Project and covers these key components:

- Groundwater monitoring and management (including the assessment of groundwater impacts on existing users, springs and potential subsidence)
- Well stimulation technique matters
- Surface water monitoring and management
- Response actions
- Reporting requirements

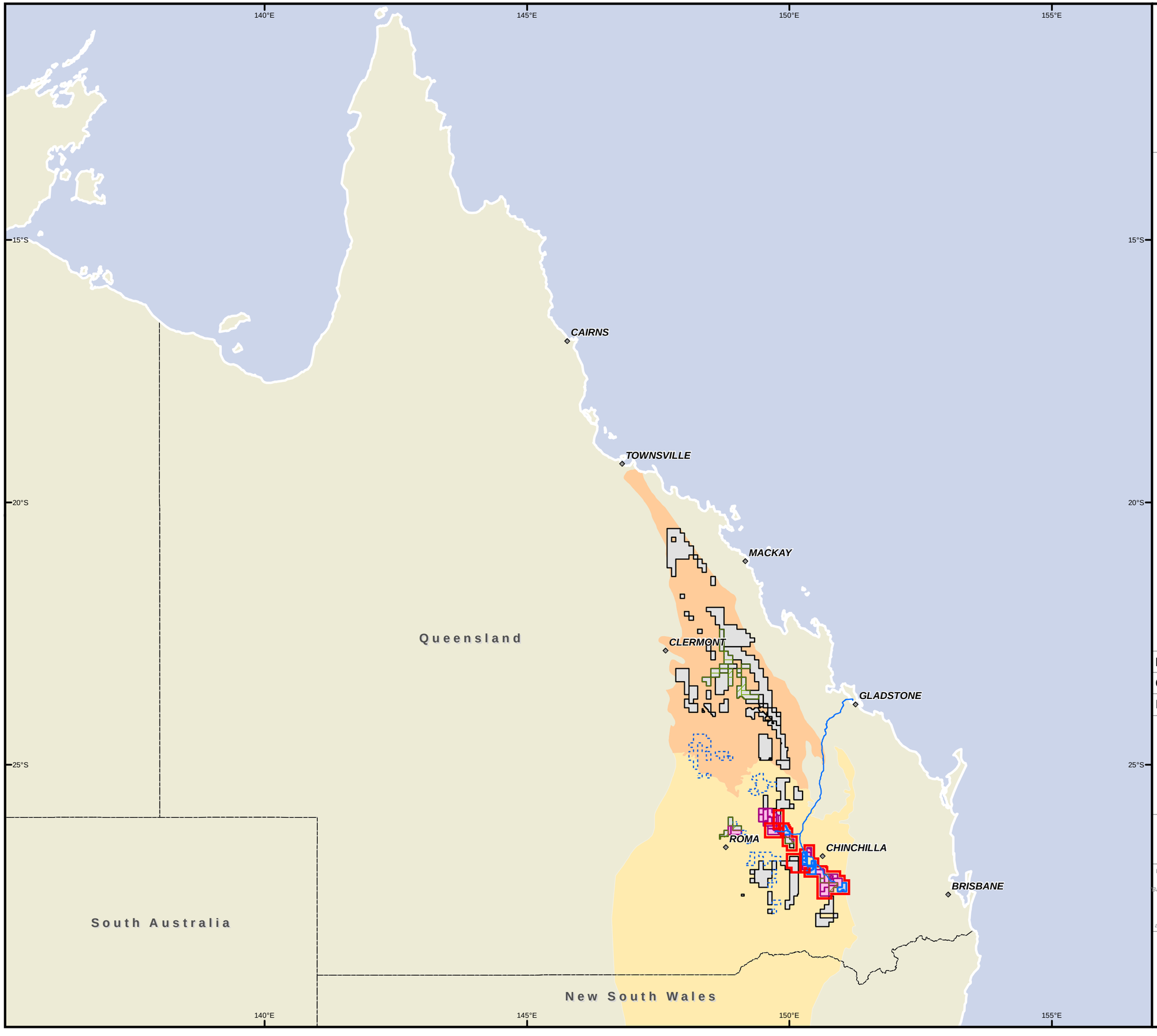
16 Hydraulic Fracturing Fact Sheet on QGC's website: http://www.qgc.com.au/01_cms/details.asp?ID=417

This plan was submitted to the Federal and Queensland Governments for approval on 20 April 2011 and will apply to the QCLNG Project for 12 months or until a Stage 2 plan starts following its submission in April 2012.

Under QGC's water management approach, the company expects to invest about A$1 billion by 2014 in water research, modelling, monitoring and treatment.

APPENDIX 1 – QGC TENEMENTS WITH THE EIS TENEMENT BOUNDARY

QGC Tenements with the EIS Tenement Boundary



- Towns
- QGC Granted PPLs
- QCLNG EIS Tenement Boundary
- QGC PCAs
- QGC ATPA
- QGC PLs
- QGC PLAs
- QGC ATP
- Bowen Basin
- Surat Basin

DATE:	7/07/2011	**MAP NO:**	M_07438_02
CREATED BY:	GV	**REV NO:**	A
PLAN REF:	XXXXXXXXXXX	**MAP TYPE:**	v2 Other

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GDA

0 200 400

Kilometers

Map Projection: GDA 94

SCALE: 1:7,500,000 (A3)

DATA SOURCE:

Tenements - DME
Towns, Roads, Rivers - Geosciences Australia

Note: Every effort has been made to ensure this information is spatially accurate. The location of this information should not be relied on as the exact field location.

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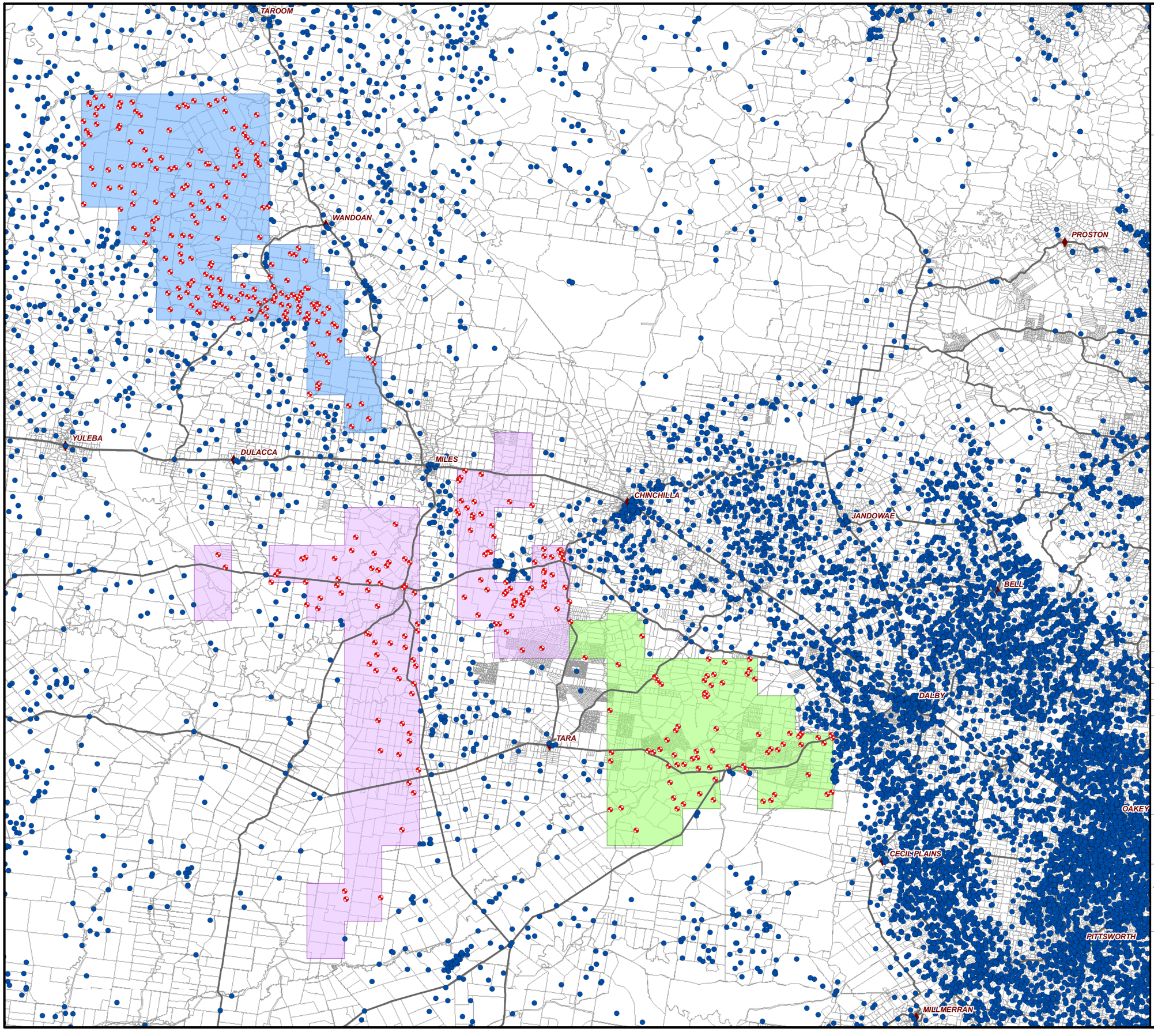
APPENDIX 2 – REGISTERED WATER BORES IN QGC AREAS



Registered Water Bores in QGC Areas

- Registered Water Bores in QGC Development Areas
- Registered Waterbores
- Northern QGC Development Area
- Central QGC Development Area
- Southern QGC Development Area

DATE:	04/07/2011	**MAP NO:**	M_06056_06
CREATED BY:	SJB	**REV NO:**	A
CHECKED BY:		**MAP TYPE:**	v3 Other
PLAN REF:			

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GDA

0 10 20 30 40 50

Kilometers

Map Projection: GDA 94 SCALE: 1:872,679 (A3)

DATA SOURCE: Roads, Towns, Watercourses - GA
DCDB, Waterbores - DERM

Note: Every effort has been made to ensure this information is spatially accurate. The location of this information should not be relied on as the exact field location.

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