



QGC

# WATER MANAGEMENT



SHELL'S QGC BUSINESS IS COMMITTED TO ENVIRONMENTAL SUSTAINABILITY AND MINIMISING HARM TO THE ENVIRONMENT IN WHICH IT OPERATES.

Shell's QGC business understands the importance of groundwater for both agricultural and domestic use, particularly in the Surat Basin area of Queensland.

We are committed to appropriately managing potential impacts to water resources and we operate infrastructure required to gather and treat the water we produce with this commitment in mind. This enables us to provide water for beneficial use by the agricultural industry, our own industry and to supplement local town water supplies.

[WWW.SHELL.COM.AU/QGC](http://WWW.SHELL.COM.AU/QGC)

**SHELL'S QGC BUSINESS IS COMMITTED TO MINIMISING HARM TO GROUNDWATER RESOURCES IN THE REGION.**

Visit our website to download a copy of our Stage 3 Water Monitoring and Management Plan which provides a detailed overview of our planned water infrastructure and water monitoring programs [www.shell.com.au/about-us/projects-and-locations/qgc/environment/water-management/regulation-of-water.html](http://www.shell.com.au/about-us/projects-and-locations/qgc/environment/water-management/regulation-of-water.html)

## HOW IS GROUNDWATER EXTRACTED?

Water is a by-product of natural gas extraction. Natural gas in coal seams is held in place by the pressure of groundwater. The water is pumped to the surface by wells, relieving this pressure and allowing gas to flow and be collected.

The coal seams we develop are between 300 to 1,100 metres beneath the ground's surface and sit within the Walloon Coal Measures.

The water in those seams is typically saline and generally unsuitable for agriculture use or human consumption unless the salt is removed.

## WHAT HAPPENS TO THE WATER?

Most water is separated from gas at the wellhead before flowing through a network of gathering pipelines to storage ponds that are connected to our treatment facilities.

With the ability to extract groundwater comes the opportunity to treat the water for beneficial use.

**OUR WATER TREATMENT PROCESS SUPPLIES AN AVERAGE OF 12,000 ML PER YEAR OF TREATED WATER TO THE CONDAMINE RIVER.**

## HOW DOES QGC TREAT ITS WATER?

Shell's QGC business operates two purpose-built water treatment facilities.

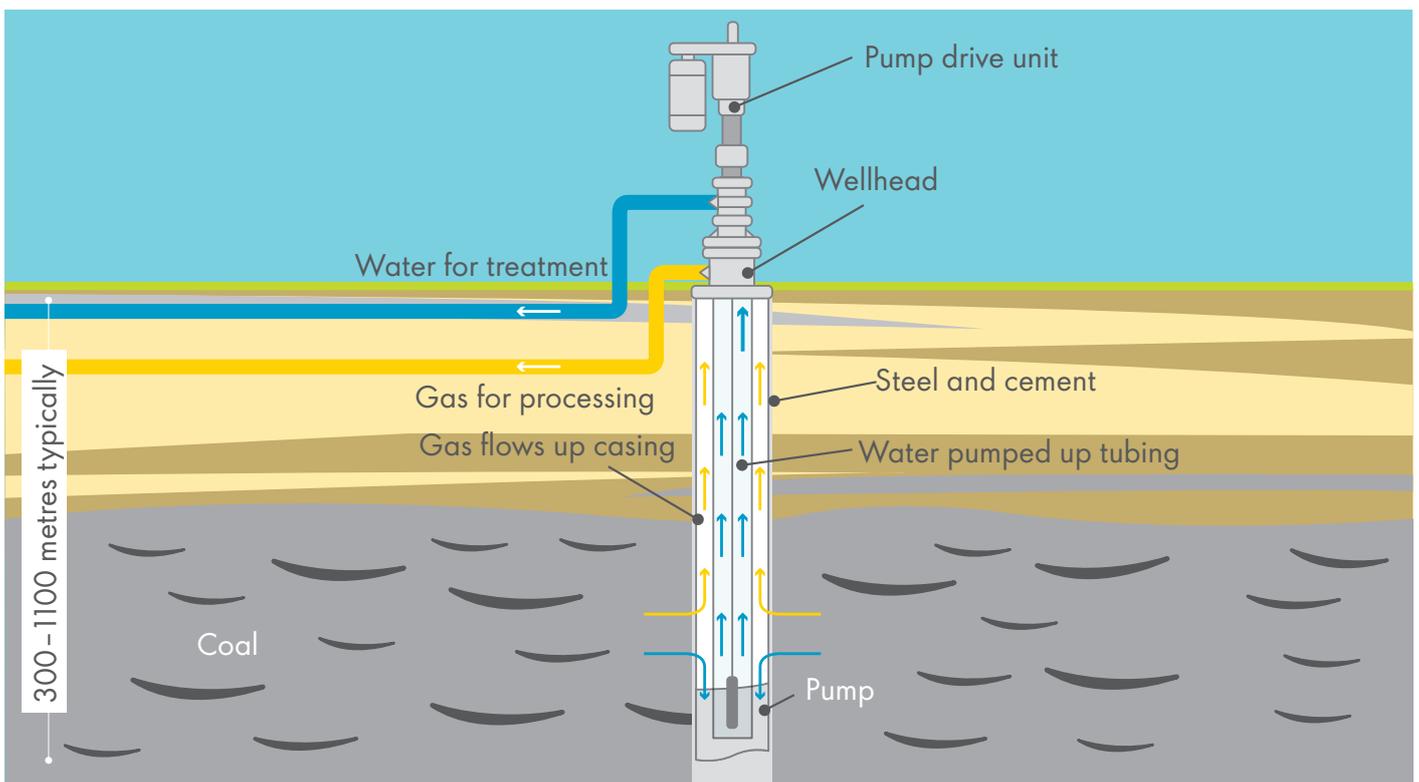
The water is treated via a reverse osmosis treatment process which converts almost 97% of water into good quality, treated water suitable for beneficial use.

## WHAT IS BENEFICIAL USE?

Treated water from water treatment facilities is supplied to SunWater, Queensland's largest bulk water service provider, which delivers it to farmers and other customers.

As a result of beneficially reusing treated water, some farmers now have commercial opportunities to develop an irrigation system and increase farm income.

SunWater and Shell's QGC business monitor and test treated water for beneficial reuse to ensure it complies with the approvals that safeguard human health, the environment and to ensure suitability for agriculture use.



Natural gas is held in the Surat Basin coal seams by groundwater pressure. When the water is released gas flows from the seams.

## WHAT HAPPENS TO THE SALT?

The residual 3% (brine) from the water treatment process is currently safely stored in purpose built, dedicated ponds. Shell's QGC business has studied a number of ways to safely manage brine for the long-term.

When all safety, environmental and community and business factors are considered, crystallising brine into solid salt form and encapsulating it for long-term storage in purpose built cells is considered the most feasible and optimum solution.

## WHAT IS THE EFFECT ON WATER BORES?

The company models how groundwater may be impacted and assessments indicate that coal seam gas related water extraction will not significantly impact on groundwater supplies. We have entered Make Good Agreements with relevant landholders to rectify any water bores that are impaired due to our operations.

A Make Good Agreement is a legally binding agreement which can involve compensation, measures to ensure supply or drilling of a replacement bore.

The *Queensland Water Act 2000* outlines the process for undertaking bore baseline assessments on water bores within our tenements before gas production commences.

The baseline assessments are important because they provide information on bore and groundwater characteristics before gas extraction begins. The baseline assessment is undertaken in accordance with guidelines published by the Queensland Department of Environment and Science.

The assessment involves gathering information on water level and quality, bore depth and diameter, bore construction and type of pumping infrastructure. Shell's QGC business provides results of all assessments to landholders and the Office of Groundwater Impact Assessment (OGIA).



Water from treatment facilities is used to assist agricultural producers in drought-proofing their property.

Find out more about our partnerships resulting in beneficial use of water solutions by visiting our website:  
[www.shell.com.au/about-us/projects-and-locations/qgc/environment/water-management/beneficial-use-of-water.html](http://www.shell.com.au/about-us/projects-and-locations/qgc/environment/water-management/beneficial-use-of-water.html)

## ARE THE AQUIFERS IMPACTED?

Shell's QGC business is confident that our impact on the aquifers above and below the Walloon Coal Measures will be minimal based on geological research as well as operational experience over the past 13 years.

In our tenements the Walloon Coal Measures are generally 300 to 400 metres thick but only 10% of the formation actually contains coal. Most of the coal seams are about only 30 to 50 centimetres thick and only a few hundred metres long.

The aquifers are typically sandstone formations and have a high porosity and permeability, allowing water movement within the formation.

## GROUNDWATER MONITORING

Our monitoring network measures and records groundwater pressure and quality in aquifers above and below the Walloon Coal Measures, as well as within the reservoir to help understand and manage any potential impact associated with our activities.

The company has built sophisticated models of the Surat Basin from seismic surveys, core analysis and production-well data.

The OGIA in its Underground Water Impact Report (UWIR) identifies potential impacts of gas production activities and allocates responsibility for monitoring, management and, where required, mitigation and/or compensation.

The majority of the monitoring network is mandated by the OGIA and Shell's QGC business provides that data to OGIA on a six monthly basis. Monitoring data is also published on the Shell Australia website.

## GROUND SETTLING MONITORING

During natural gas production, groundwater and gas is extracted from coal seams. Sometimes the reduction in water pressure may result in compaction of the coal seam, which leads to settling of the ground above the coal seam. Shell's QGC business completes ongoing monitoring of potential environmental impacts related to natural gas and associated water extraction. We closely monitor ground levels using independent satellite data and findings are sent annually to the Federal Government and published online. A Federally approved Ground Motion and Monitoring Management Plan is being implemented by our business which is part of the regulatory process.

## BASELINE ASSESSMENT FACTS

- Baseline assessments are important because they establish benchmark groundwater data on bore and groundwater characteristics before gas extraction begins.
- The baseline assessments are undertaken in accordance with guidelines published by the Queensland Department of Environment and Science (DES).
- Baselines assessments involve gathering information on water level and quality, bore depth and diameter, bore construction and type of pumping infrastructure.
- Shell's QGC business provides results of all assessments to landholders and the OGIA.

**SHELL'S QGC BUSINESS IS COMMITTED TO WORKING WITH LANDHOLDERS TO MEET MAKE GOOD OBLIGATIONS. IT ALREADY HAS MORE THAN 30 MAKE GOOD AGREEMENTS IN PLACE.**

## CONTACT DETAILS

Please contact your Land Access Advisor or a member of the community engagement team for more information.

QGC Community Information Centre,  
18-20 Bell St, Chinchilla

QGC Office  
27 Royd St, Wandoan  
1800 030 443 (toll-free)  
email: [community@shell.com.au](mailto:community@shell.com.au)