

# QGC/QCLNG update

## Brett Smith



September 2014

Hydro testing Tank B, QCLNG project  
Curtis Island, Australia

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# Safety moment – Sun safety

## Facts and Stats

- 2 in 3 Australians will be diagnosed with skin cancer by the age of 70.
- About 2,000 Australians die from skin cancer each year.
- More than 750,000 Australians are treated for skin cancer each year – that's more than 2,000 people every day.
- The most commonly diagnosed cancer among adolescents and young adults is melanoma; it accounts for more than one-quarter of all cancers among Australians aged 15–29 years.



**Slip** on sun protective clothing



**Slop** on SPF30+ sunscreen. Reapply every two hours



**Slap** on a broad-brimmed hat



**Seek** shade



**Slide** on wrap-around sunglasses



# Contents



1. QGC – A BG Group business
2. What is CSG?
3. QCLNG Project
4. Water management
5. Salt management
6. Further exploration

# QGC – A BG Group business

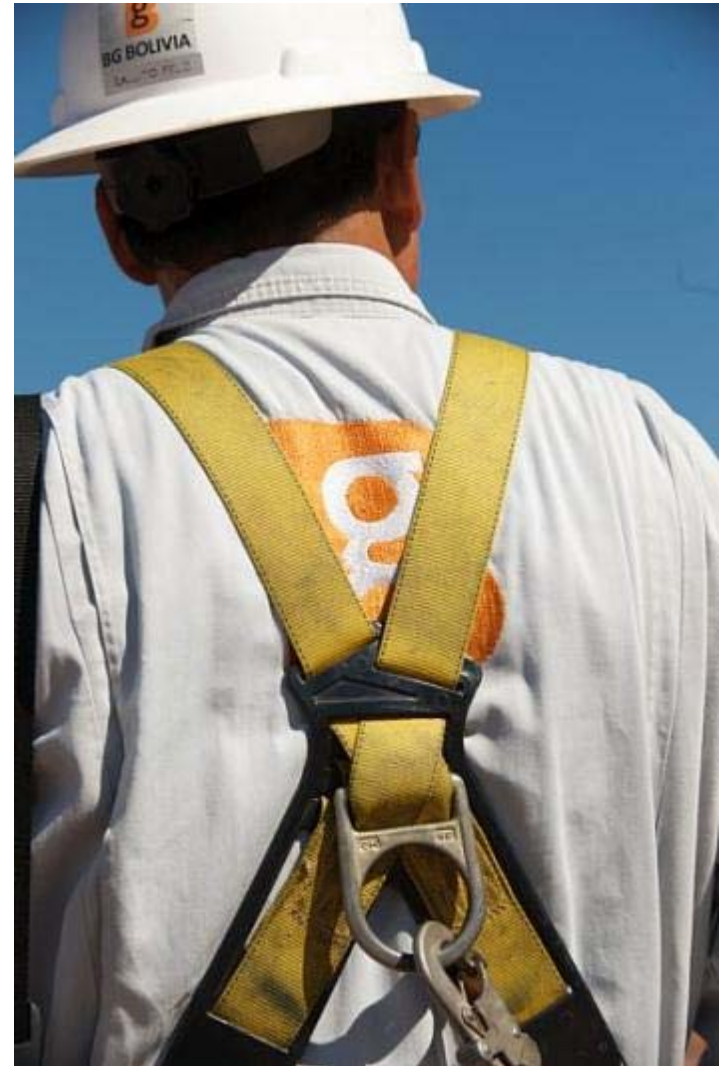


- Australian subsidiary of BG Group plc
- Currently about 10,400 employees and contractors in Surat Basin, Brisbane and Gladstone
- Operator of Queensland Curtis LNG Project

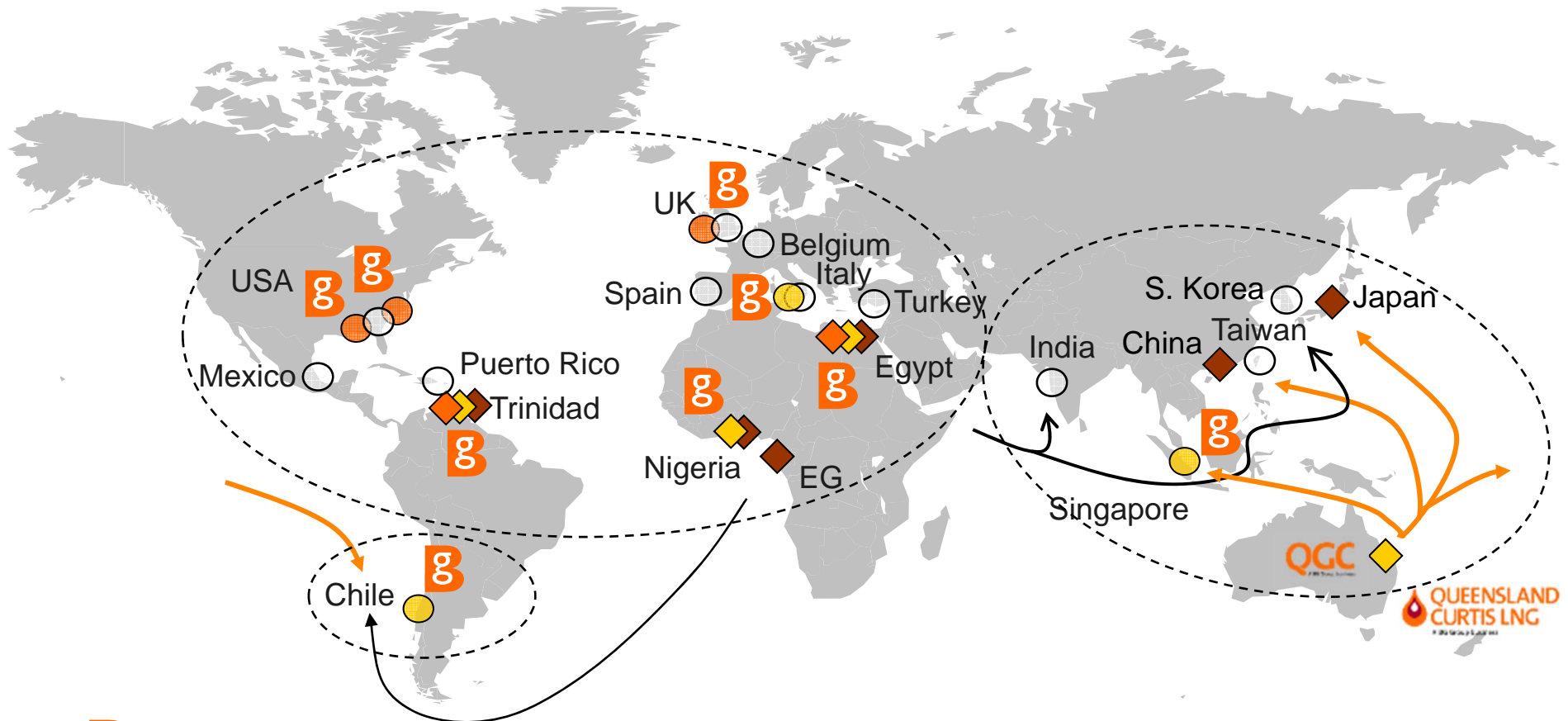


# BG Group snapshot

- A world leader in natural gas
- Top 15 UK company
- Operates in more than 25 countries
- Leading Atlantic Basin LNG position; Asia Pacific customers
- Track record of LNG project delivery




# BG's portfolio inc. QCLNG




## Current and future equity positions

 Existing import capacity

 Existing liquefaction

 Future import capacity

 Future liquefaction

 Markets supplied

 Long-term purchases (contracted)



**Coal seam gas = Natural gas**



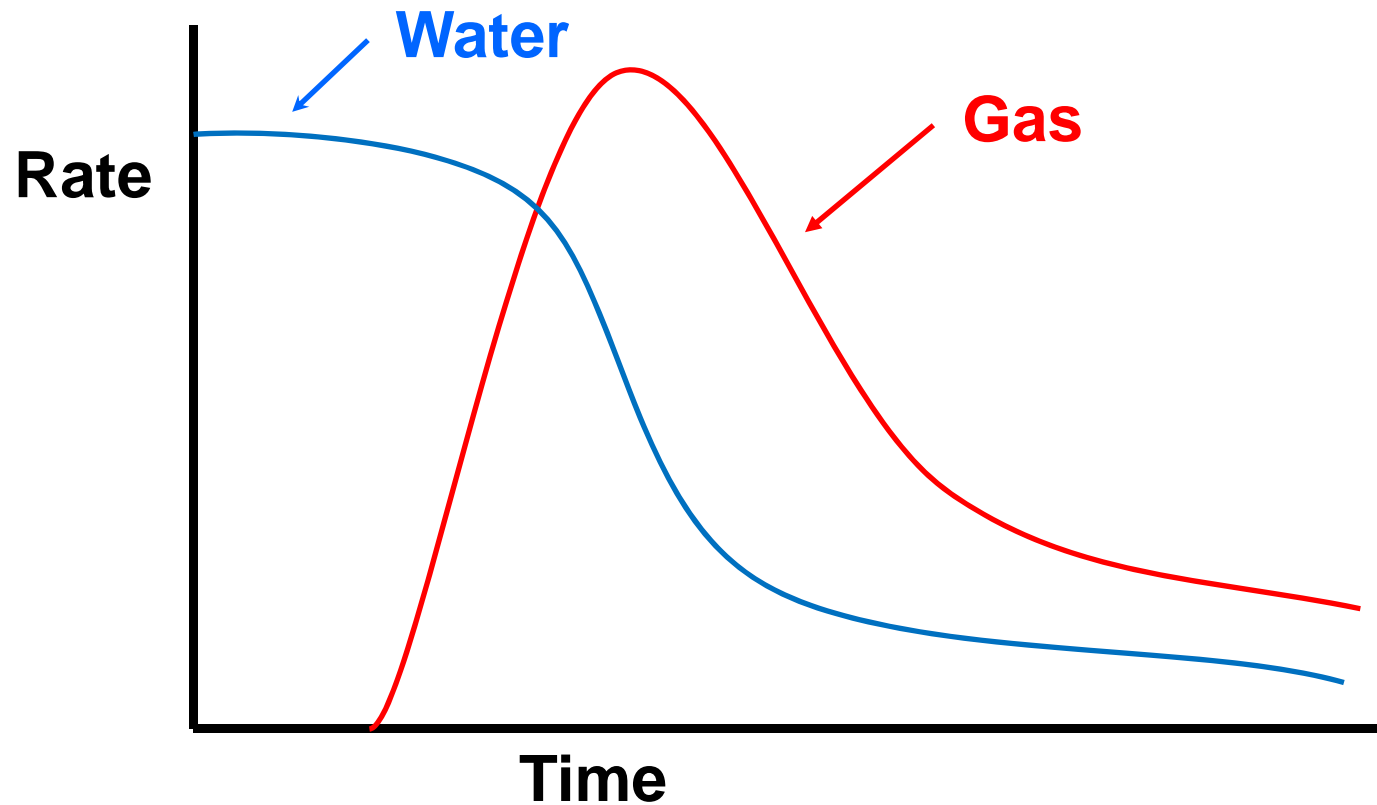


# What is special about CSG?

- Coal Seam Gas / Coal Bed Methane
- Natural gas associated with coal deposits
- Coal is the reservoir – fluids fill and flow through the pores and cracks in the coal
- Gas is adsorbed on the surface of the coal



# CSG production



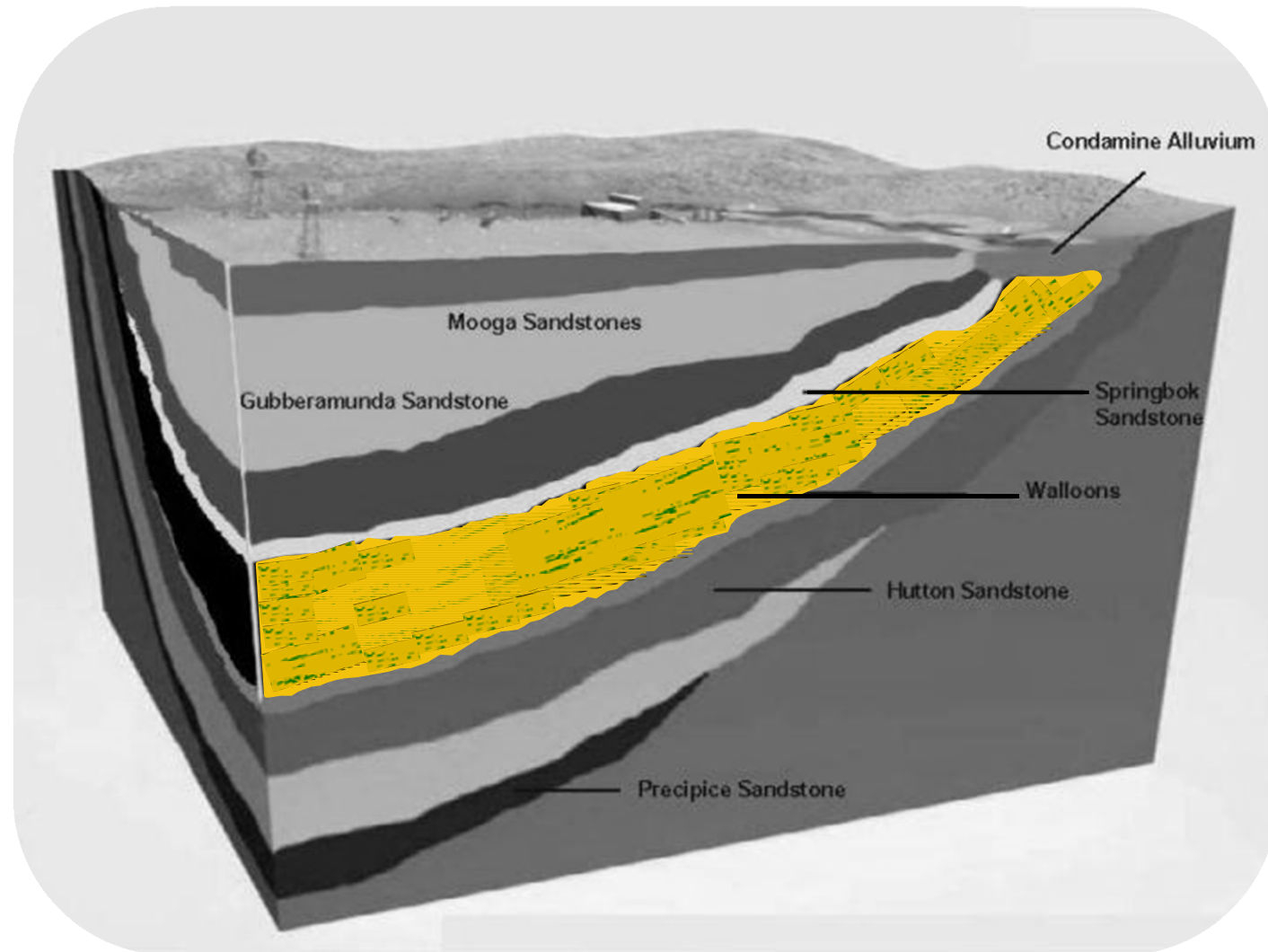
- To liberate gas from the coal surface, the pressure must be reduced. Usually, this requires water to be pumped out of the coal.

# Coal – isn't it all like this?

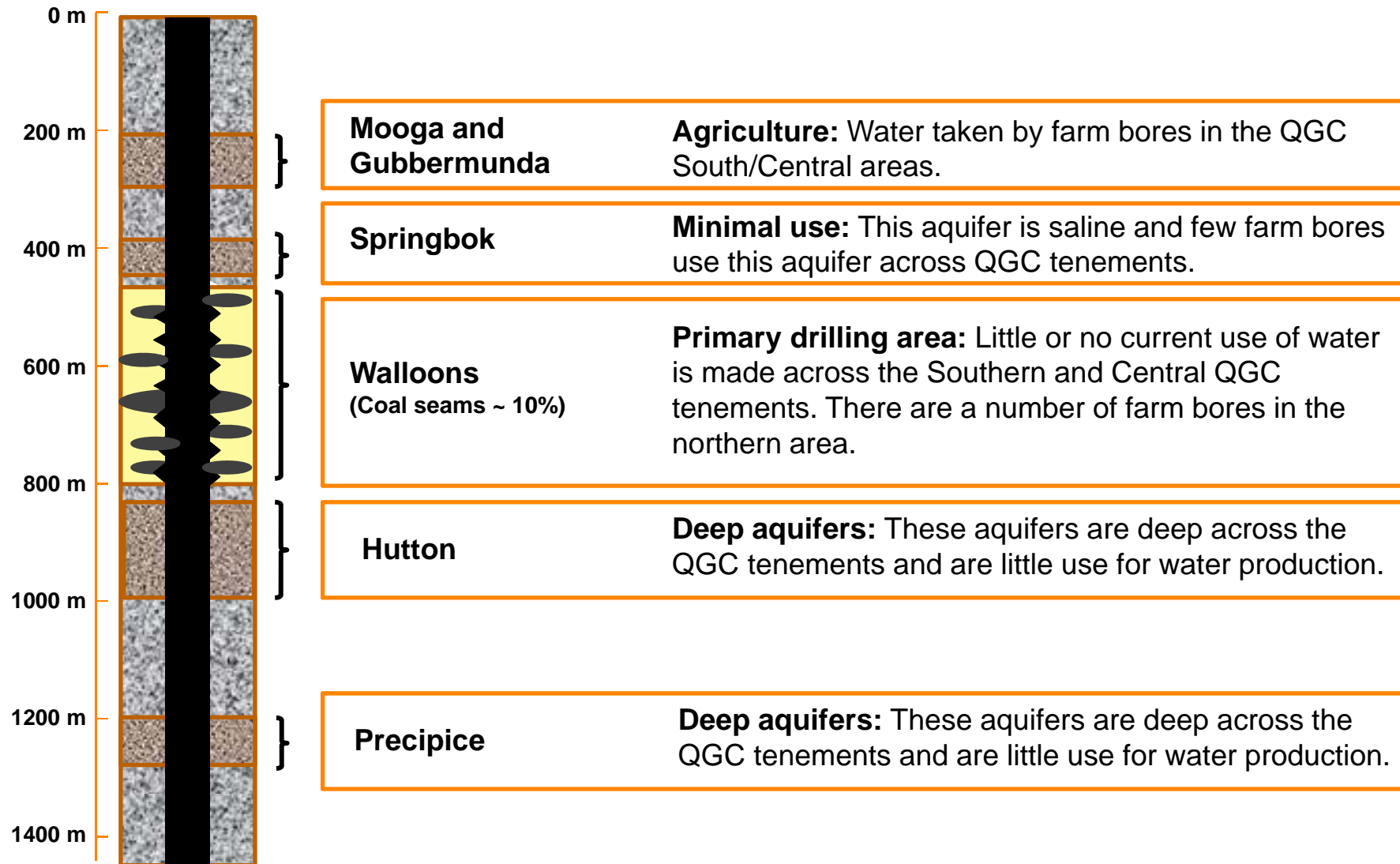




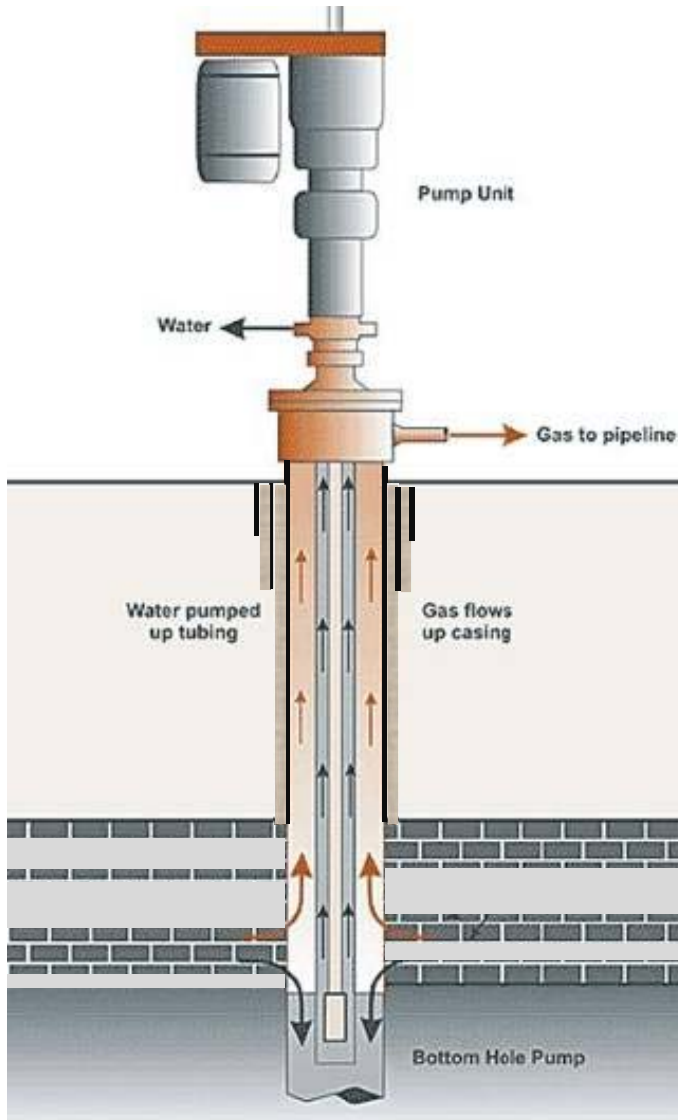
# Subsurface overview



# Where do we find coal seam gas?



# Typical CSG pumping well



## Wellhead

- Provides basis to control operation of the well and to ensure containment of produced gas and water.

## Casing

- Pipe used to segregate and isolate various formations to protect groundwater, minimise drilling problems, and maximise production.

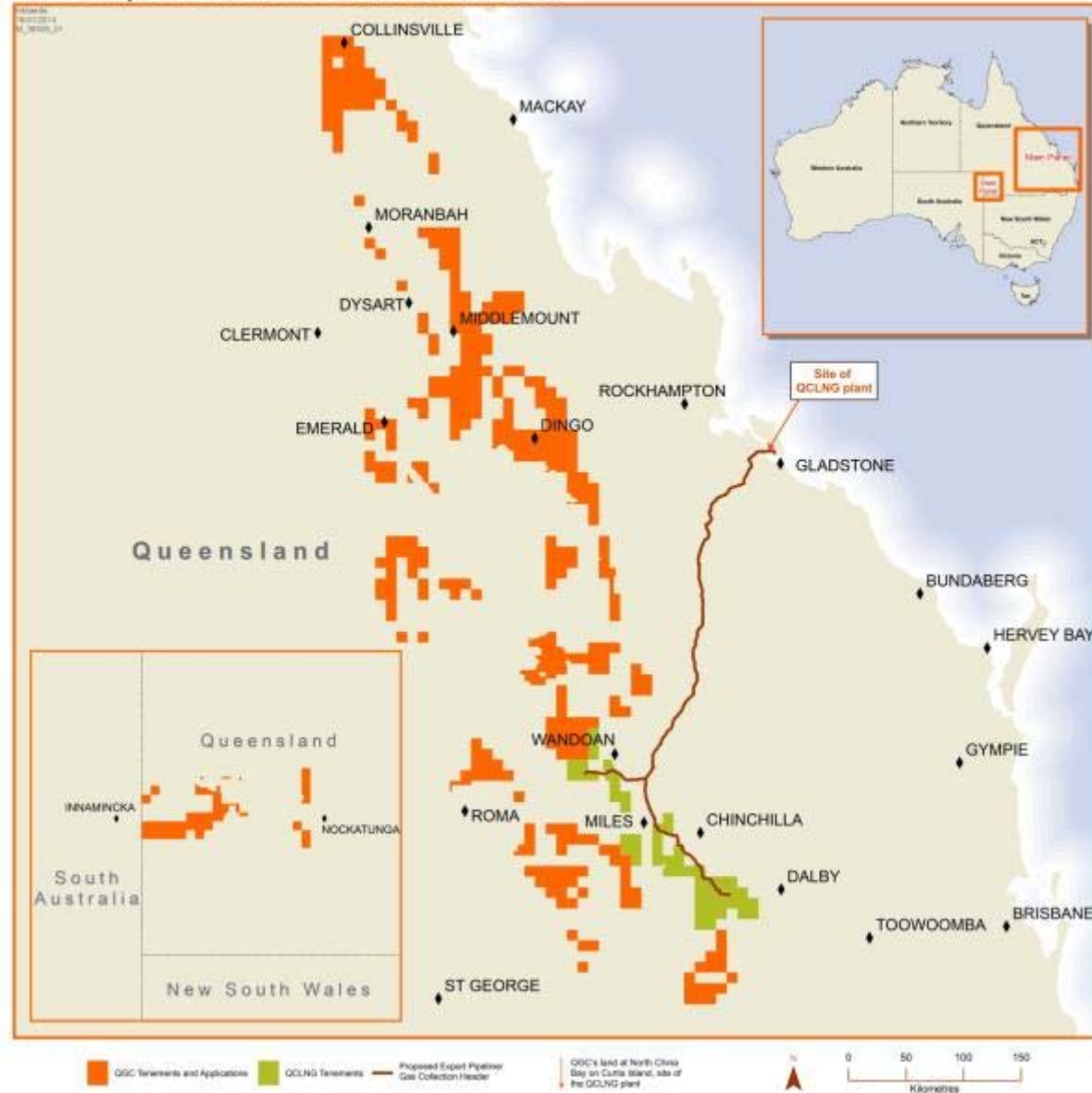
## Cement

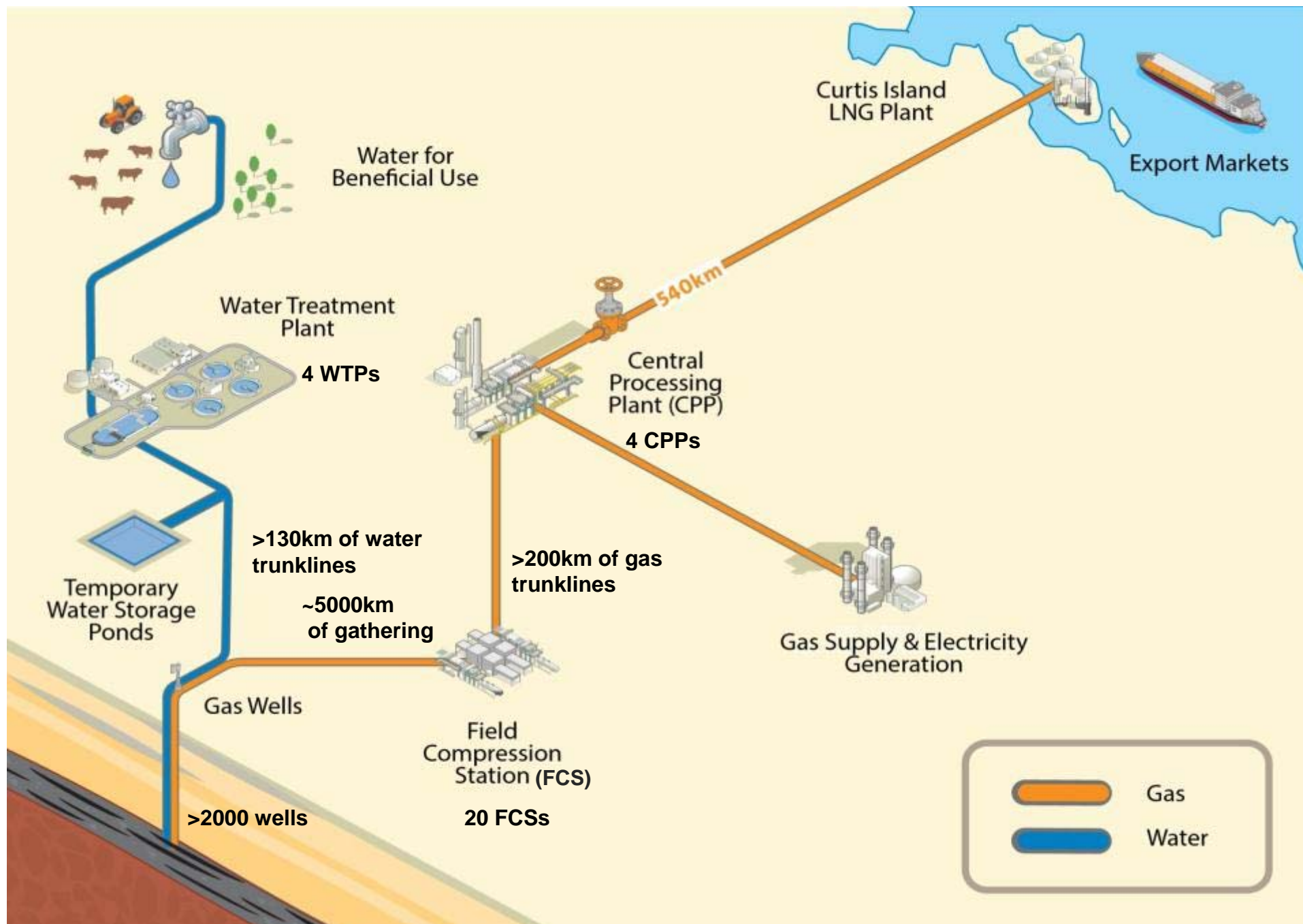
- Prevents fluid movement between formations and shields casing from potential corrosion.

Not to scale



## QGC's Exploration and Production Interests



















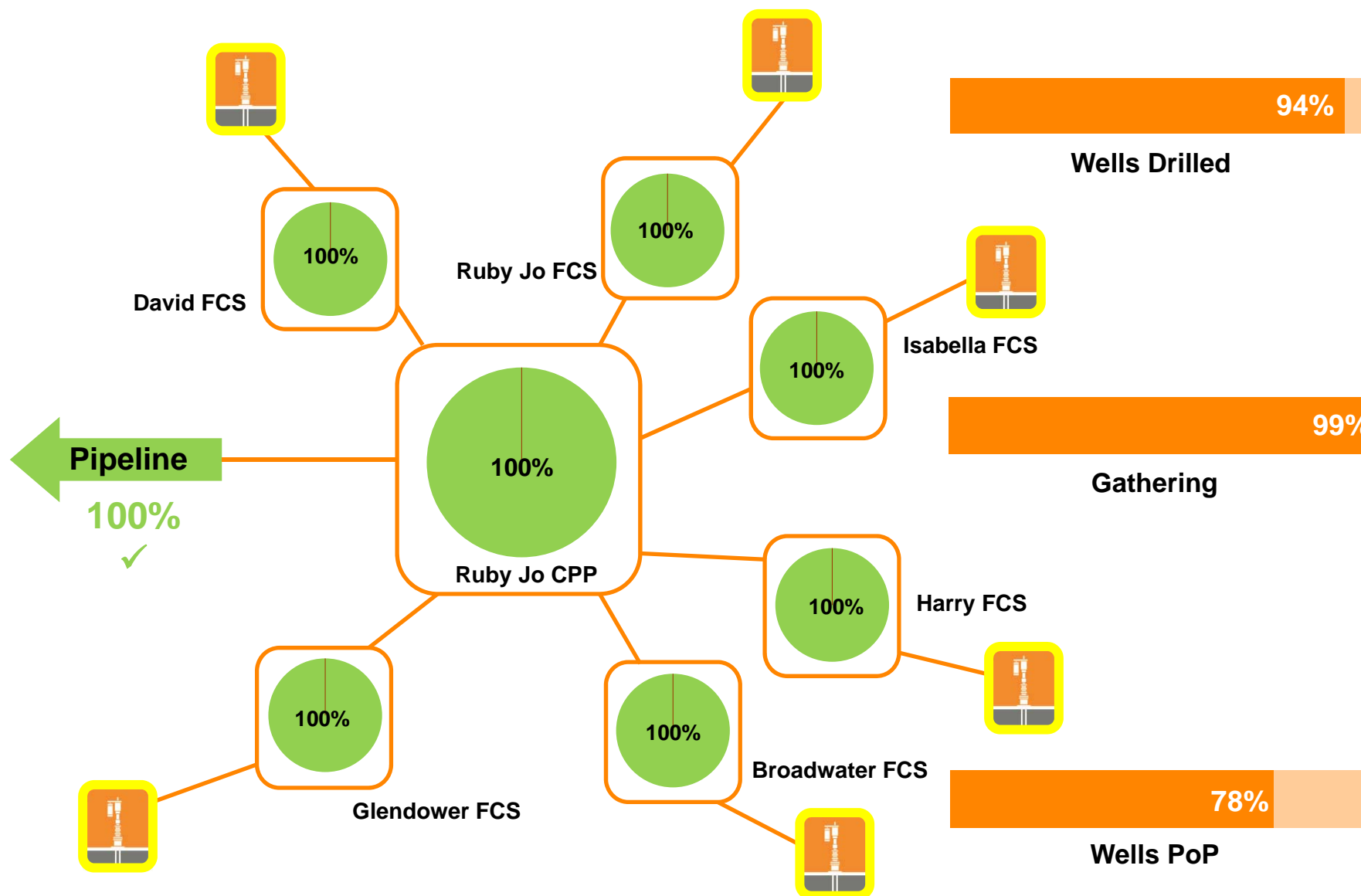




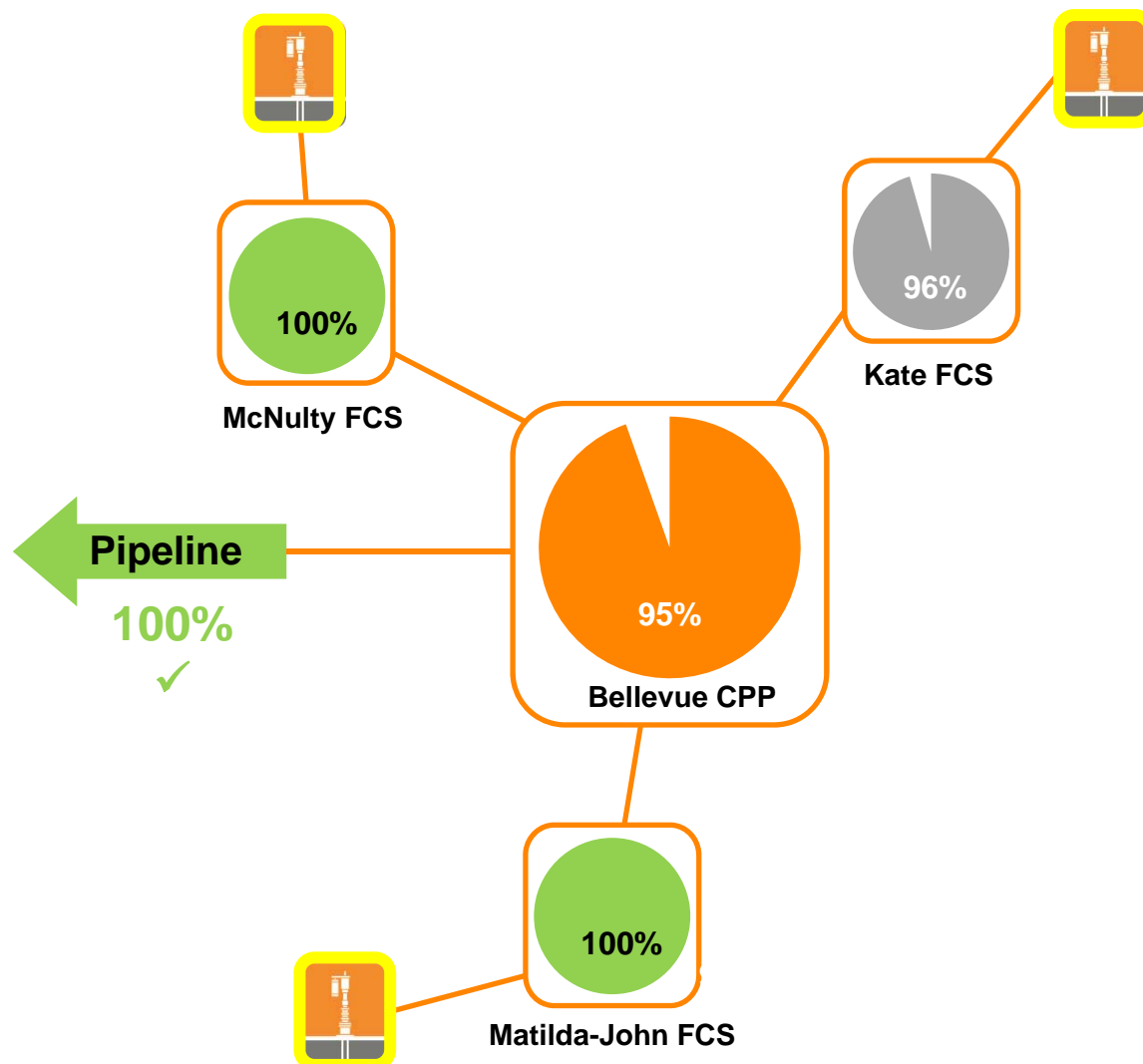




# Progress in the South Area



# Progress in the Central Area



**Wells Drilled**



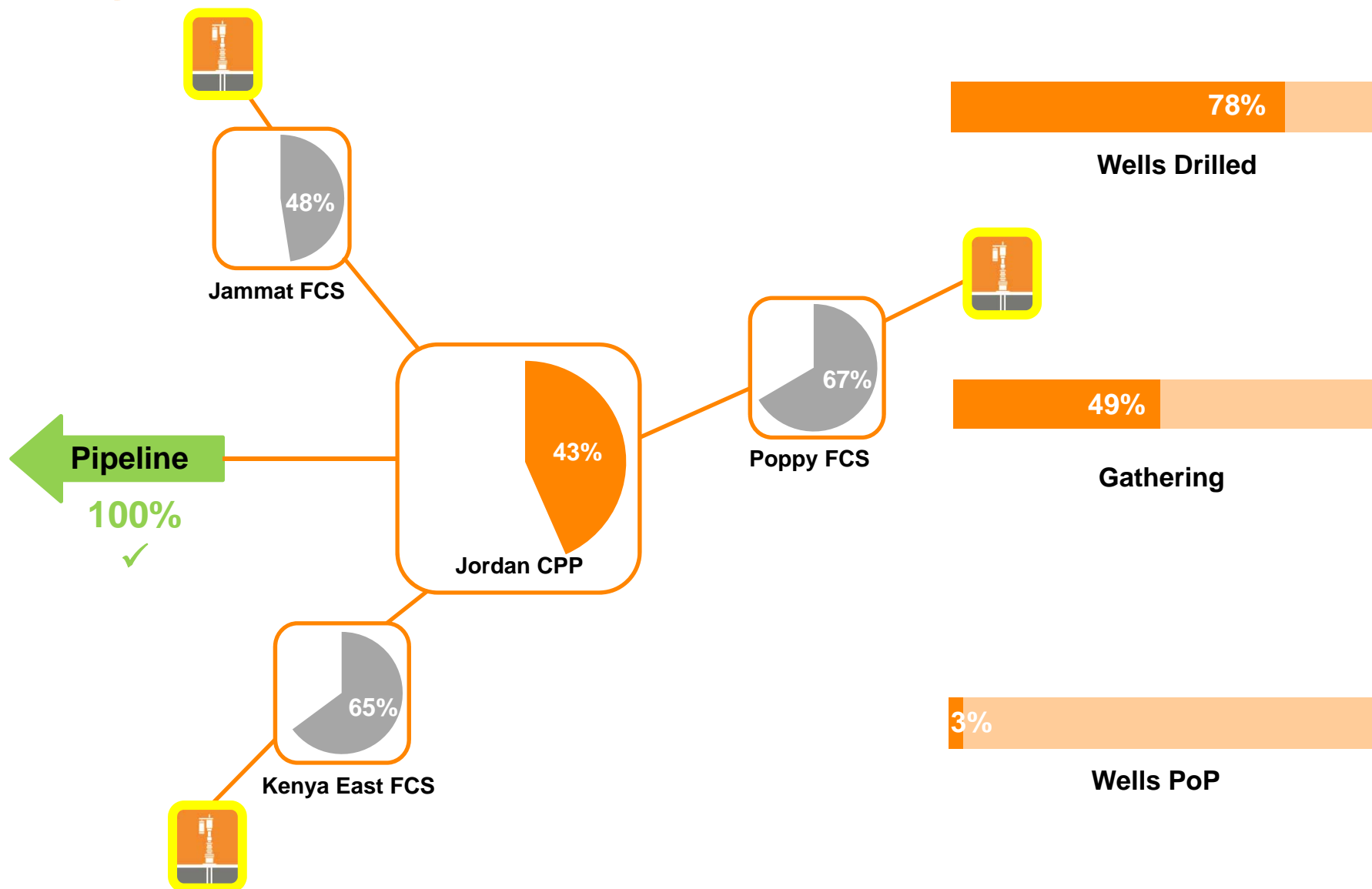
**Gathering**



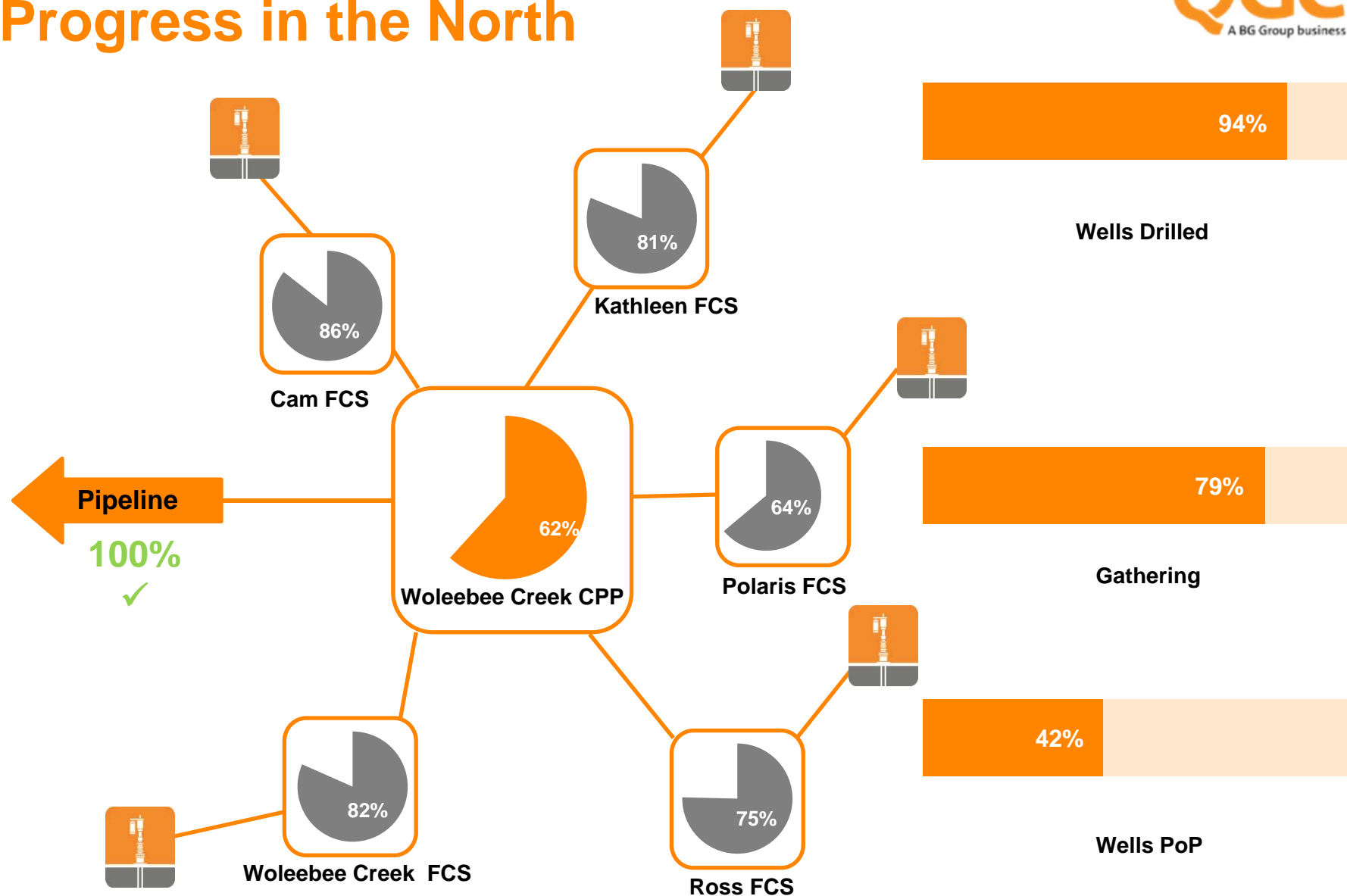
**Wells PoP**



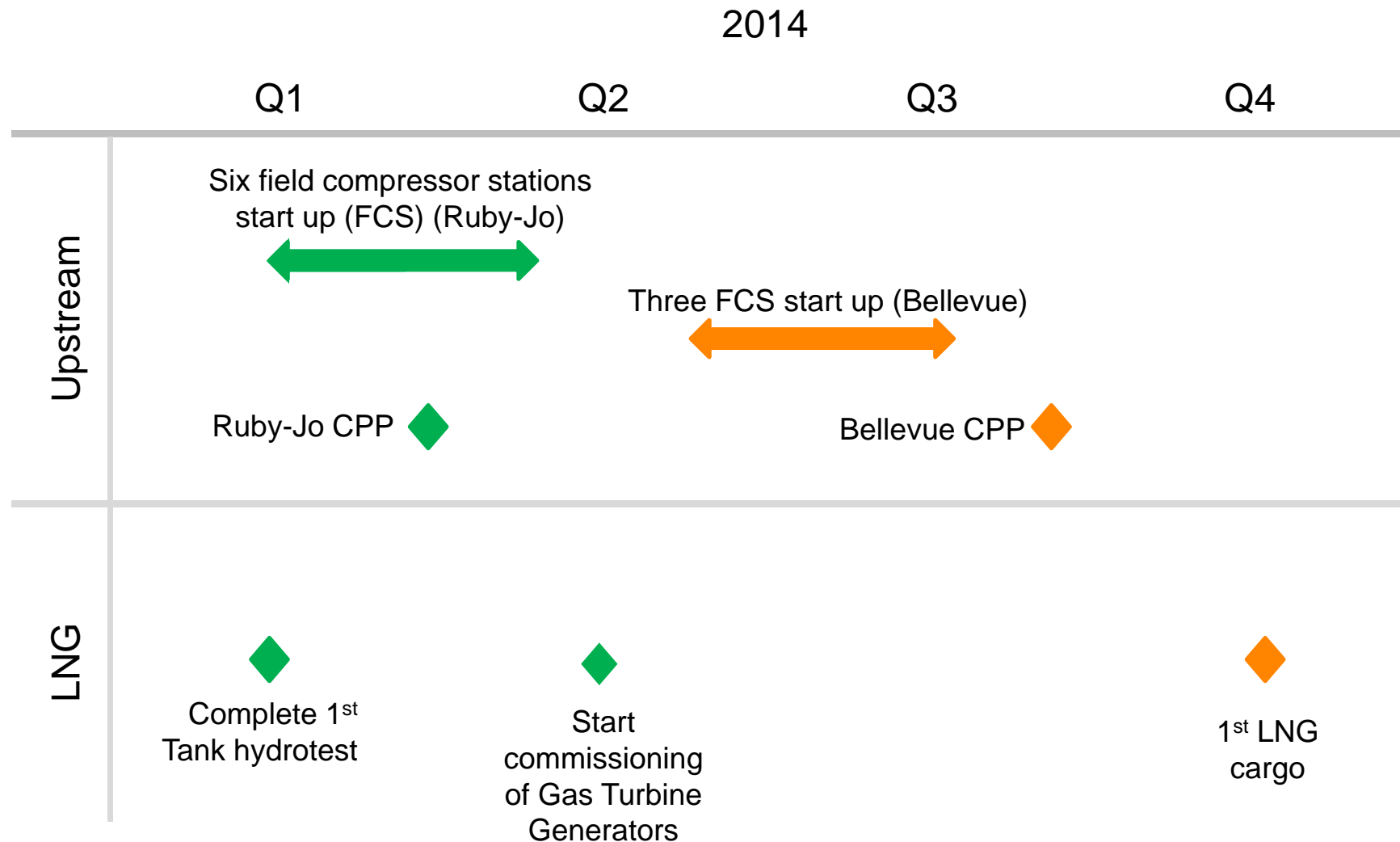
# Progress in the Jordan Area



# Progress in the North



# 2014 key milestones

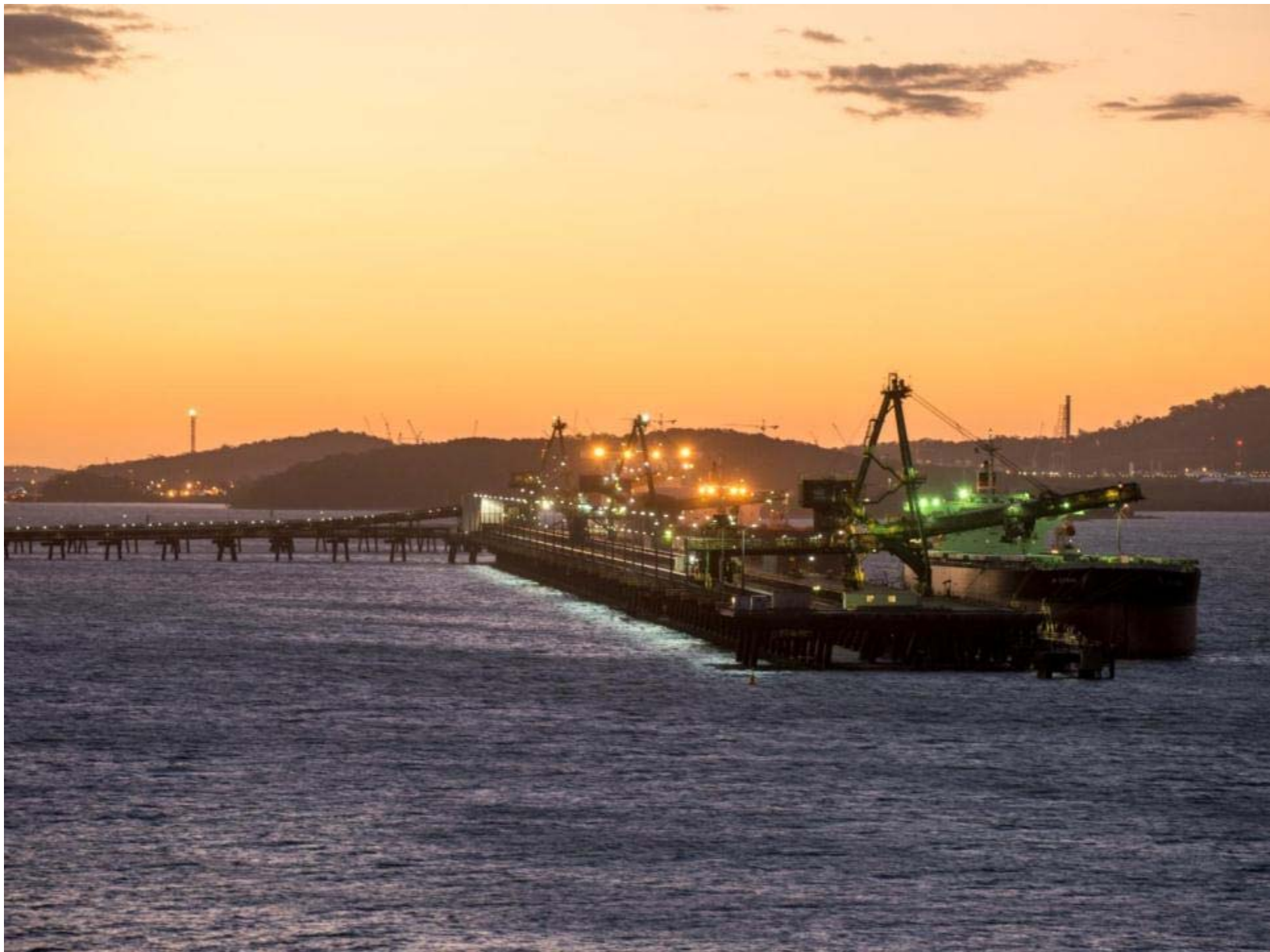
















## QCLNG customers

- Tokyo Gas
- Chubu
- CNOOC
- GNL Chile
- Singapore





# Social Impact Management Plan (SIMP)



- Approved under the State government guidelines (approved April 2012)
- 18 conditions, 94 commitments (on track for delivery)
- Up to \$150M
- Covers 6 themes as identified in the Social Impact Assessment (SIA)
- Now developing plans for 2015+

## QGC's Social Impact Management Plan

Indigenous  
Participation

Road and Marine  
Traffic  
Management

Community, Health,  
Safety and  
Infrastructure



Housing

Land Use  
Management

Employment and  
Economic  
Development



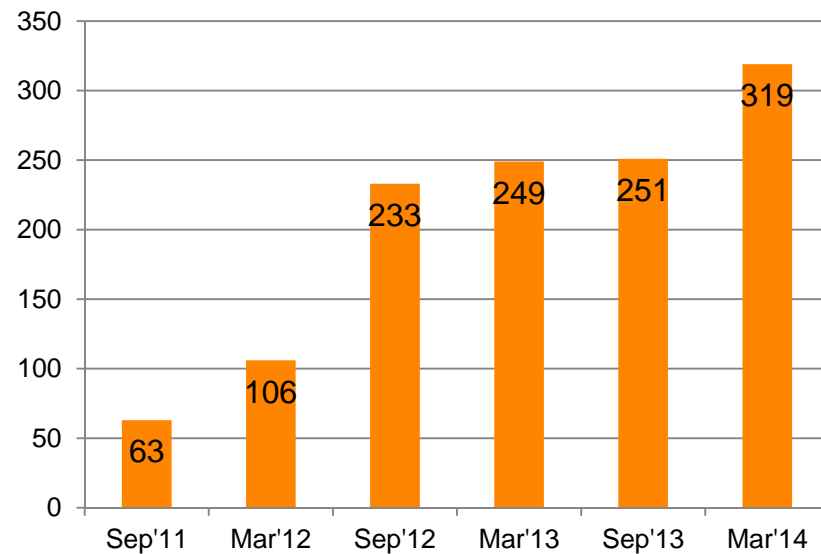
# ILUA delivery



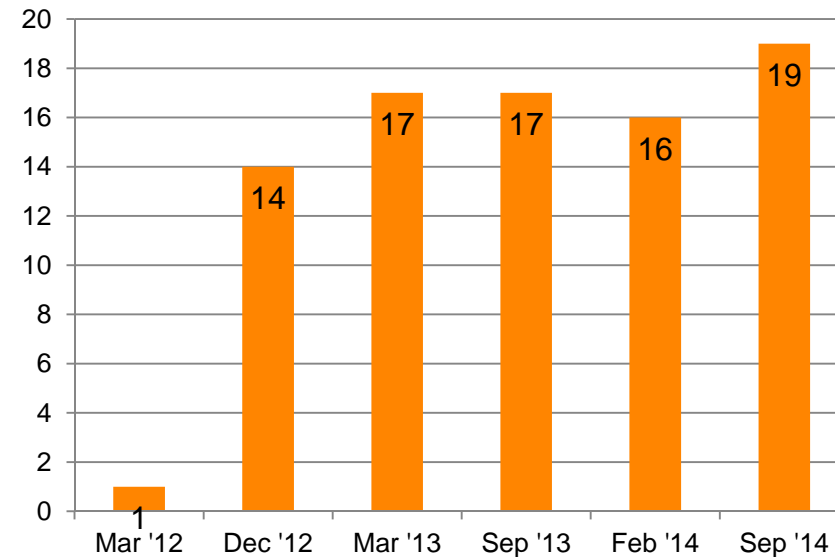
## Five Key Objectives

Employment with QGC	Employment with QGC contractors or other local businesses	Education and training opportunities	Assisting the development of Indigenous-owned businesses	A system which supports workforce demand and supply opportunities
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**Indigenous Employment on QCLNG**



**Indigenous Enterprises on QCLNG**



# QUESTIONS



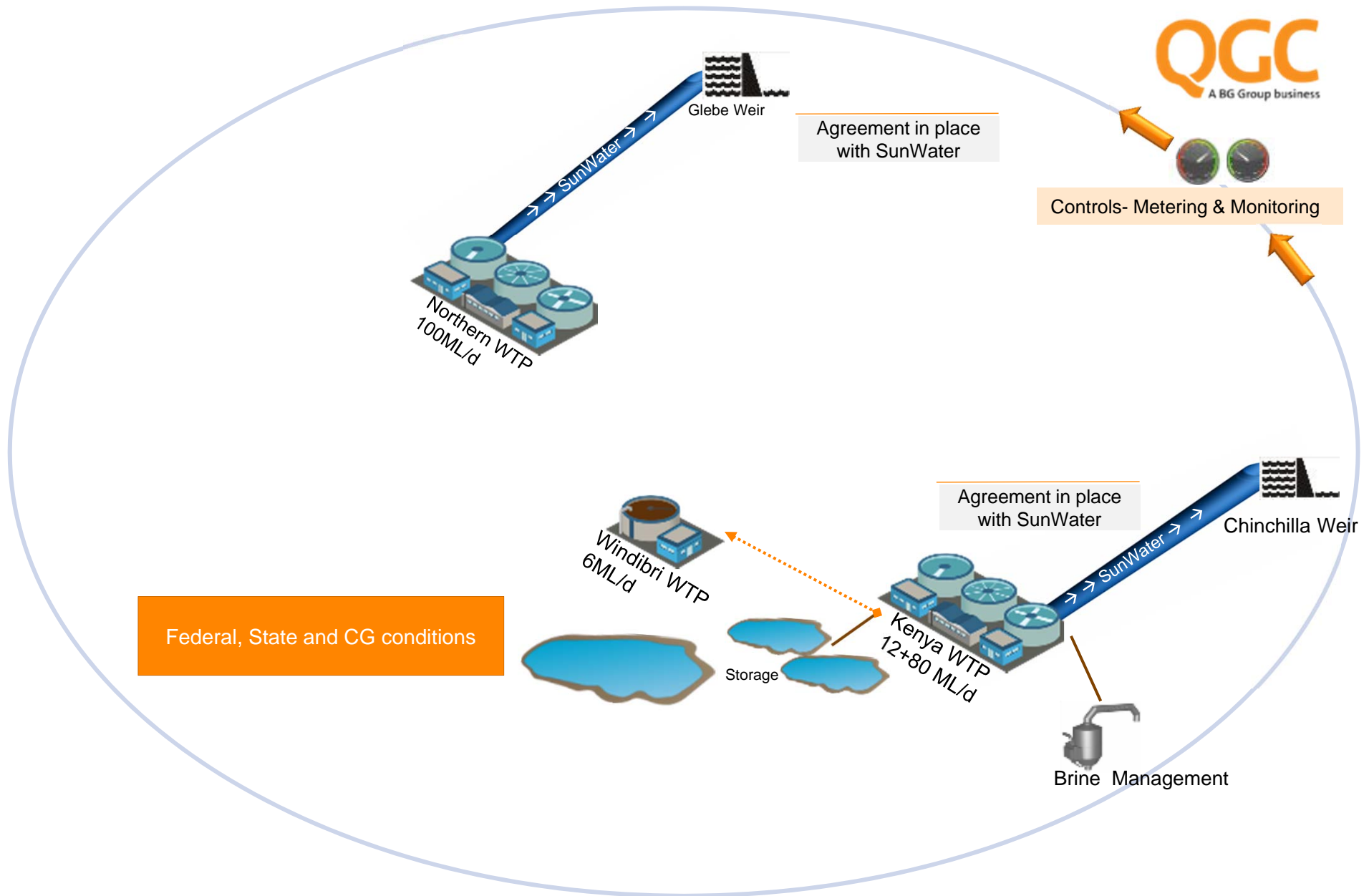
# Water and salt management



## What is the concern? CSG industry will impact the GAB



- Over the total life of CSG industry, it will produce 0.004% of the total volume of the Great Artesian Basin
- The produced water will be treated, and put to “beneficial re-use”
- The majority of the produced water therefore is a substitution for existing water needs





# Alternatives for salt management

1. Ocean outfall
2. Injection
3. Selective salt recovery
4. Storage



# Alternatives investigated

## Ocean outfall

- Piped brine dispersed into the ocean at Tugun on southern Gold Coast
- Would require up to 600km of mainland pipelines
- Much of the pipeline corridor would traverse heavily populated areas in Brisbane and the Gold Coast and prime agricultural land
- **Not feasible**

## Selective salt recovery

- Involves separating particular salts and transforming them into saleable products for market
- Pilot program – \$20 million over two years
- A 125 km brine pipeline would be required, passing through 40 agricultural properties
- Salt products would have to be transported by road or rail from Miles to Port of Brisbane
- Cost of production and transport would be at least four times more than the value of the product
- Technology risk remains too high to proceed
- **Not feasible**

# Alternatives investigated

## Injection

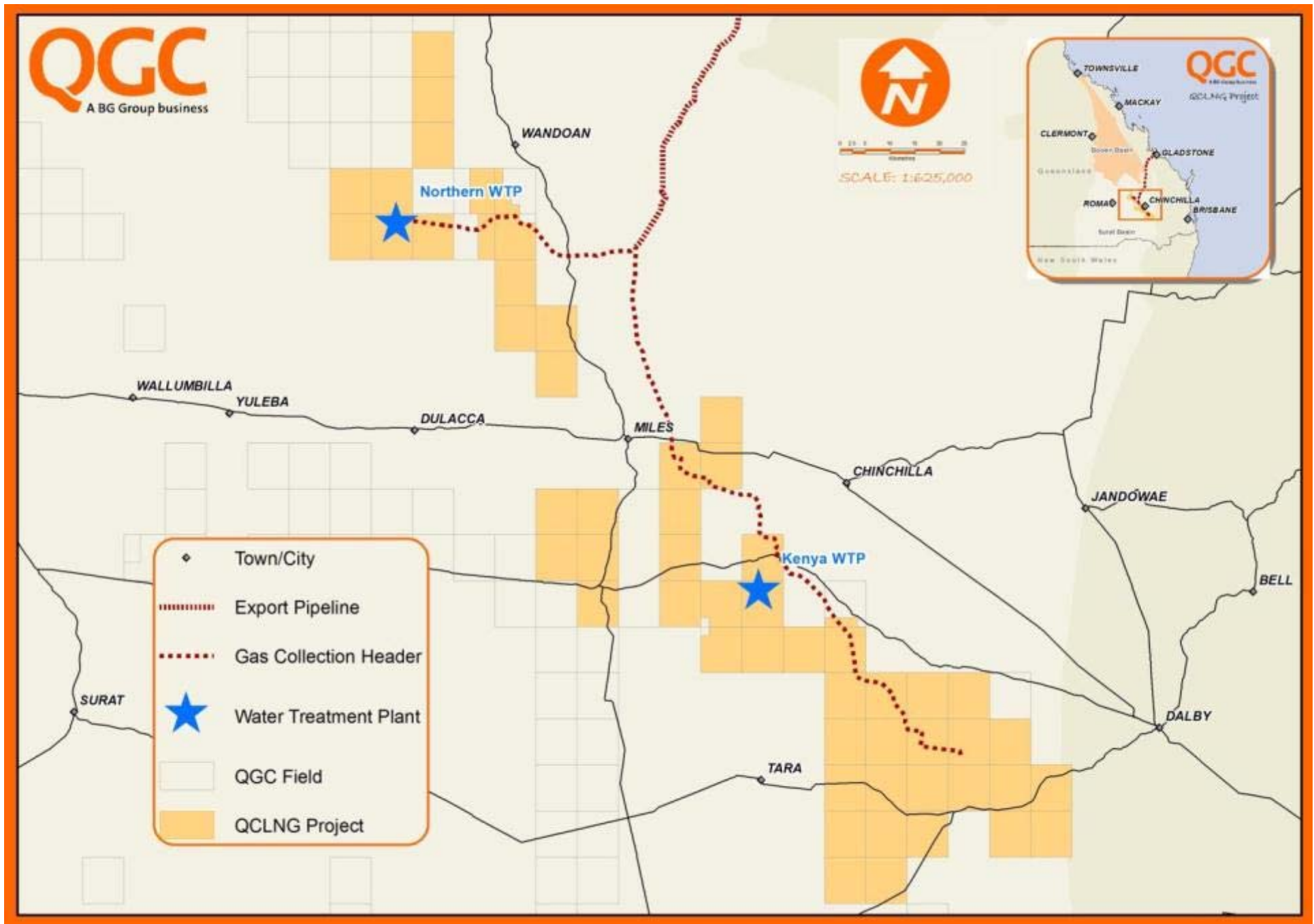
- Involves injecting brine back into suitable underground geological structures
- Potentially feasible where there are natural underground structures that are geologically isolated and do not contain groundwater or provide potential supplies of potable or agricultural water
- No potentially suitable underground structure available to QGC
- **Not feasible for QGC**



## Salt management update

*QGC is committed to working sustainably and with respect for the environments in which we work. We continue to work with industry and government to refine planning for safe and sustainable management of waste produced by our activities.*

- Regulated waste facilities are authorised in QGC's EAs and were identified in the QCLNG EIS as the base case for salt management
- QGC has spent \$20 million investigating technologies to treat salt for commercial use. None of these technologies is feasible
- No viable injection targets
- Salt can be safely encapsulated on two QGC-owned sites at the Central and Northern Water Treatment Plants using reliable and proven technology
- Both sites separated from good quality agricultural land and fresh water aquifers
- Both sites above all recorded flood levels, including 2011 and 2013
- QGC's salt encapsulation strategy represents a safe long-term solution
- The facilities will be managed by a specialist waste management company



# Site selection and layouts

Central Site



Cell 1 - 2017

Cell 2 - 2020

Cell 3 - 2025

Northern Site



Cell 1 - 2017

Cell 2 - 2022

Cell 3 - 2025

Cell 4 - 2029

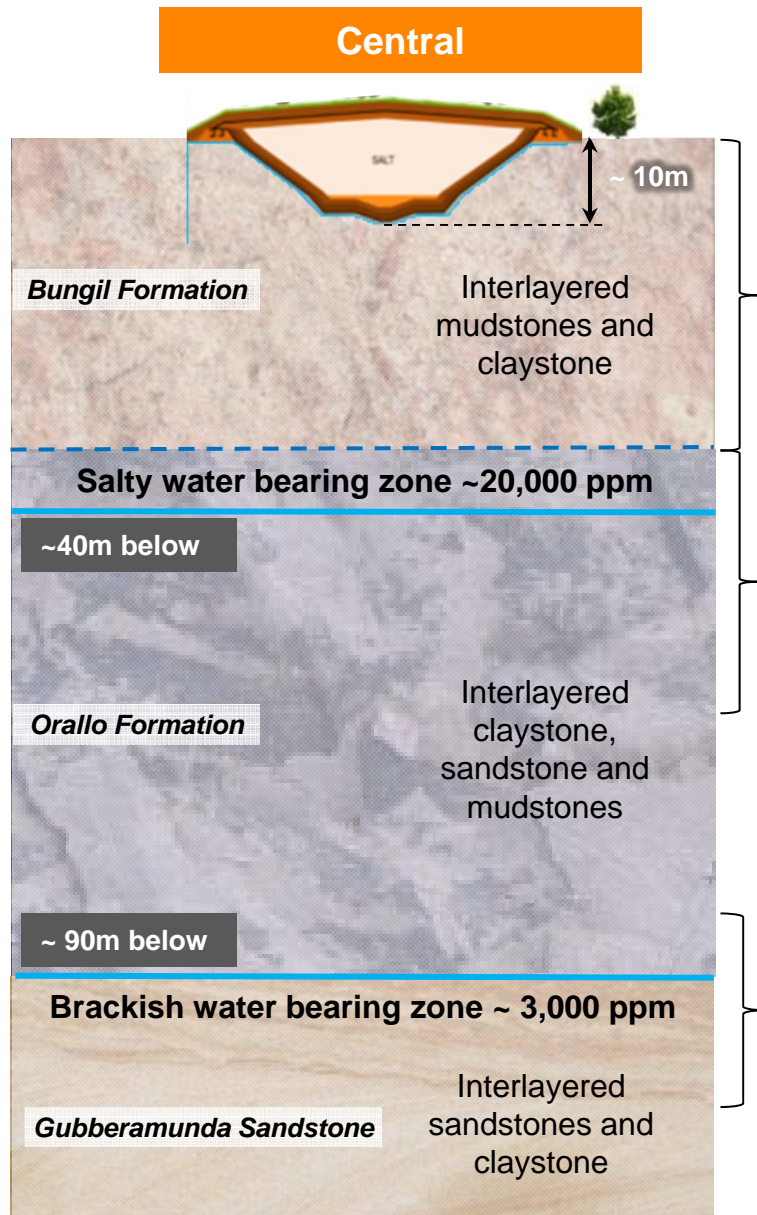
Cell 5 - 2039



## Site selection

- Individual 4-hectare cells will be built as they are required until 2040 (3 in Central, 5 in North)
- Total cell area across both sites will be about 30 hectares – about a quarter of the area of the largest of our water storage ponds
- Both sites are separated from good quality agricultural land and fresh water aquifers
- Both sites are above all recorded flood levels, including 2011 and 2013

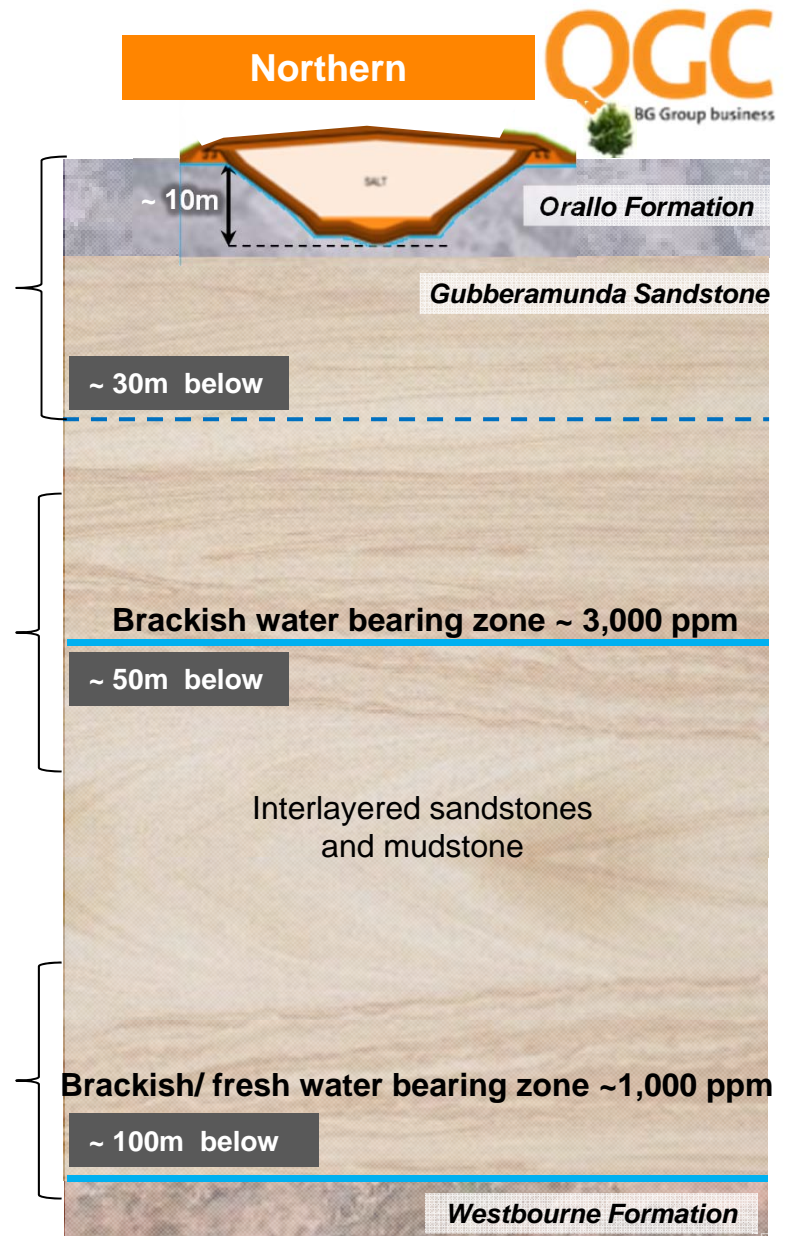
# Suitable site geology



Unsaturated zones prohibit water movement

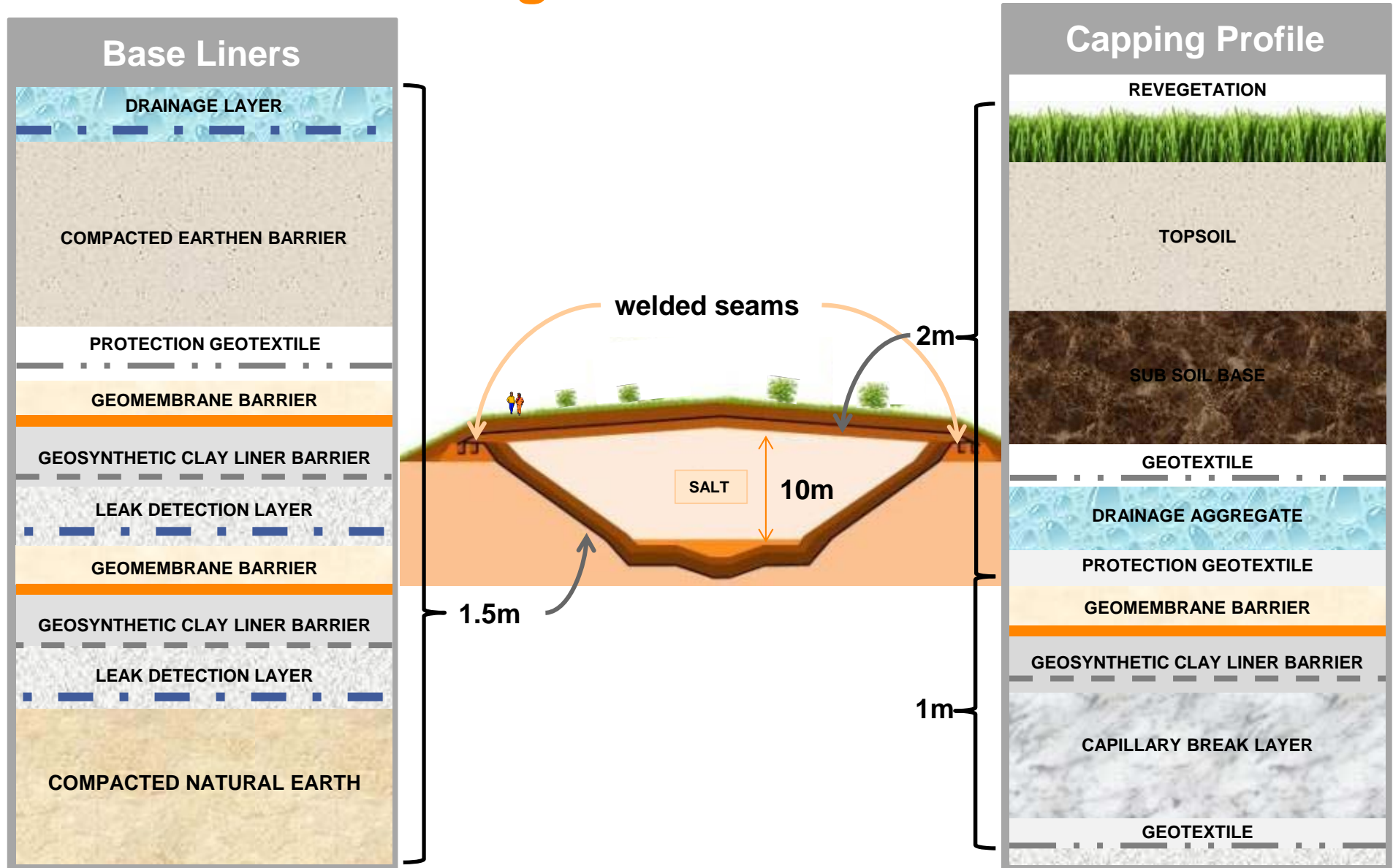
Very poor quality water bodies

Poor quality water bodies



**Layers of rock and clay naturally isolate the existing low quality water bodies**

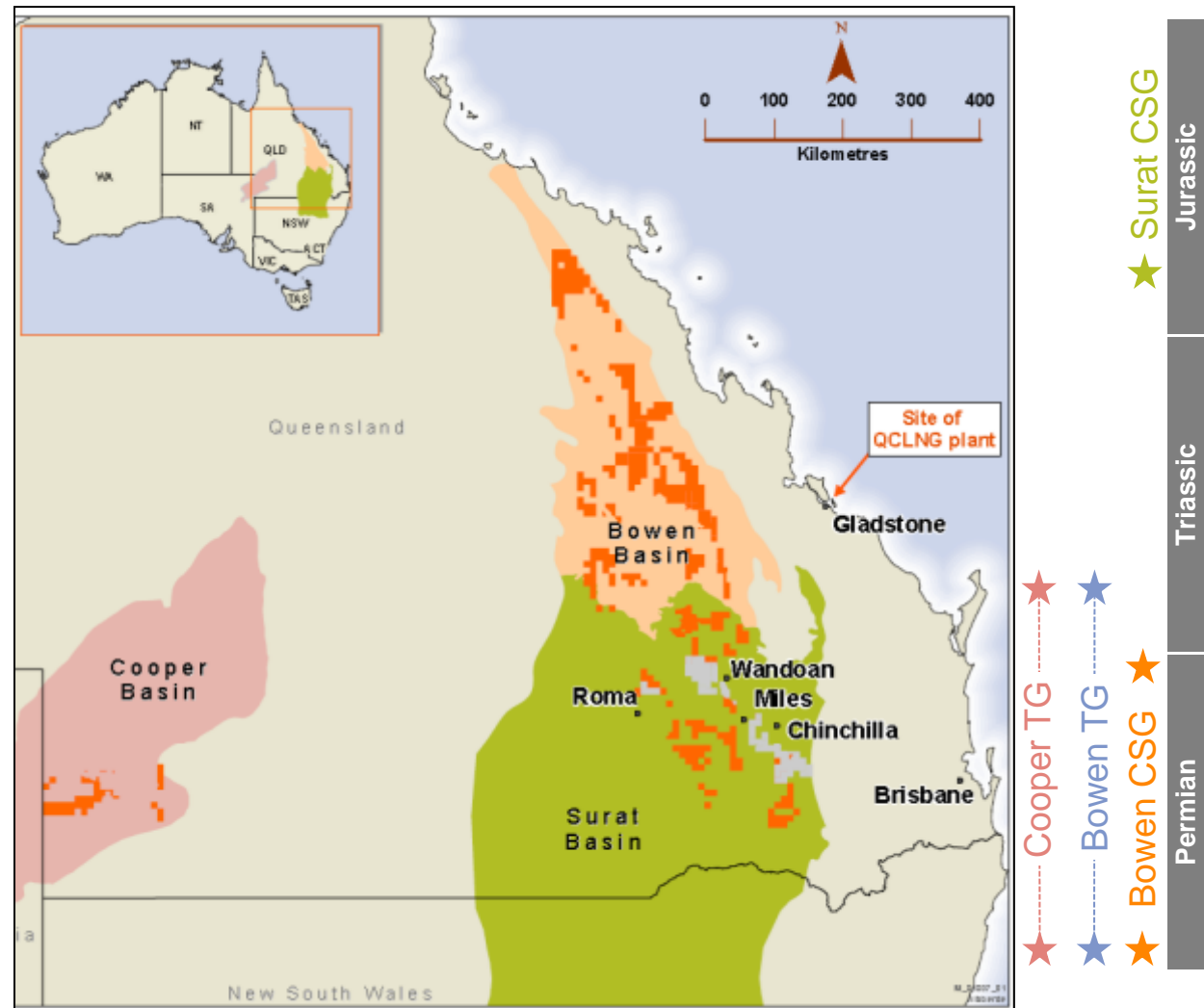
# World-class design



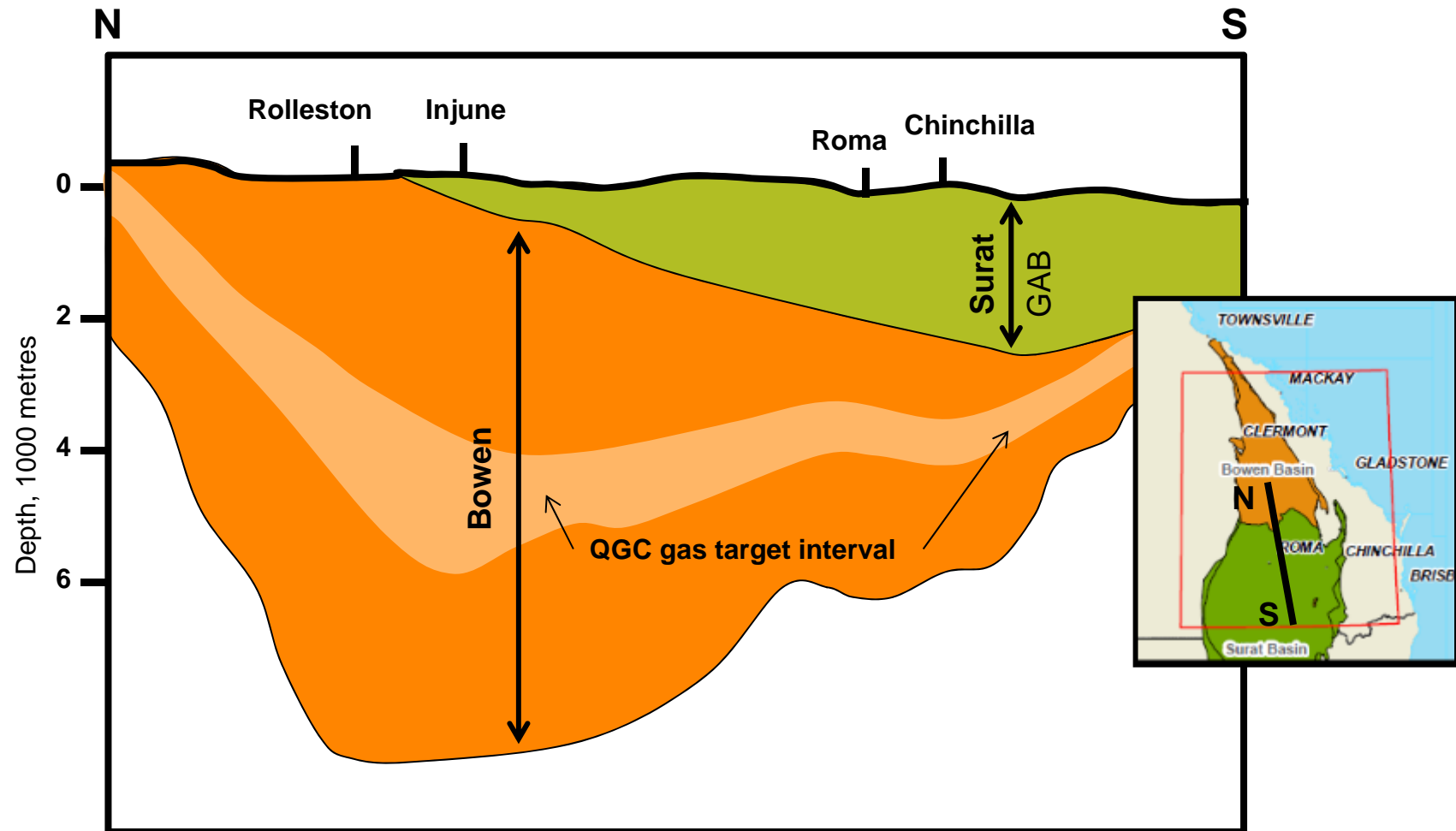


# Exploration strategy and portfolio

- Prove up next tranche
- Four E&A strands
  - Surat CSG (QCLNG)
  - Bowen CSG
  - Bowen Tight Gas
  - Cooper Tight Gas
- Large resource potential
- Proof of concept
- Key drivers:
  - Unlocking deliverability
  - Reducing cost base



# Cross-section of Surat-Bowen basins



# Exploration drilling

- CSG drilling – core holes and exploration wells
- Deep gas drilling – exploration wells
- Contractors are strictly bound by QGC's commitments to HSSE and Social Performance
- Crews work in rotating 12-hour shifts for 24/7 operation
  - Deep gas - 90 days
  - CSG – 3-4 days
- Noise from drilling rigs is monitored to ensure activities remain within regulated limits.





# Deep Gas drilling

- Wells drilled
  - **Moa-1**, 30km north of Taroom, October 2011, 3750m
  - **Daydream-1**, 10km north-west of Condamine, January 2012, 4140m
  - **Fantome-1**, 25km west of Condamine, March 2012, 4694m
  - **Tasmania-1**, 35km south-west of Condamine, June 2012, 4623m



# Seismic surveys

- A normal part of exploration of a gas field
- Low-impact activity, run under state and local government approvals
- Used to create an underground picture of where coal seams are located
- Helps accurately to plan well locations so we can limit the number drilled
- Environmental management plans set guidelines and restrictions on activities to minimise impact.

