



Coal Seam Gas - Water Management

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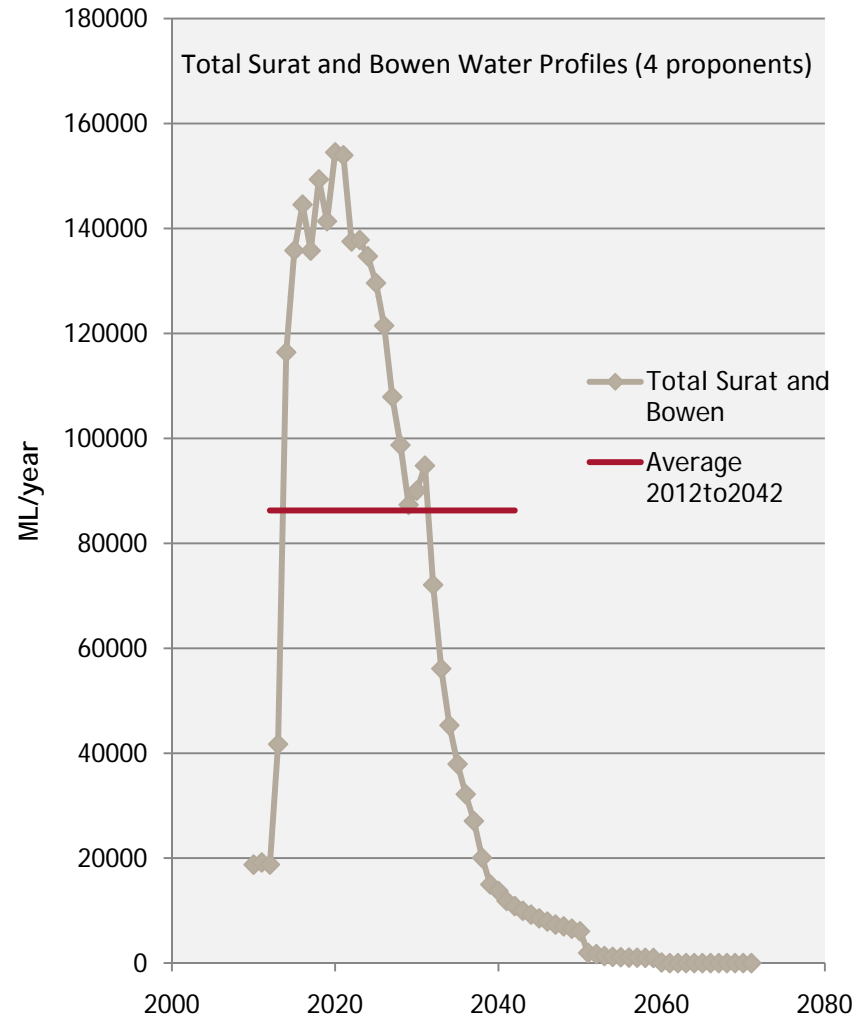
9th & 10th October 2013



CSG Water Production



- CSG Water is saline - commonly ranges from 1000 - 6000 mg/L - (seawater salinity is 35,000mg/L)
- The salinity of CSG water means that some form of treatment is required to provide water which is suitable for beneficial use
- The treatment of CSG water to remove salts produces a brine waste stream which also needs to be managed



Beneficial Use Options - CSG Water Management Policy 2012



- CSG Water Policy identifies the following beneficial use options
 - Injection into depleted aquifers for recharge purposes
 - Substitution for an existing water entitlement
 - Supplementary water for existing irrigation schemes
 - New irrigation use, with a focus on sustainable irrigation projects
 - Livestock watering
 - Urban and industrial water supplies
 - Coal washing and dust suppression
 - Release to the environment in a manner that improves local environmental values

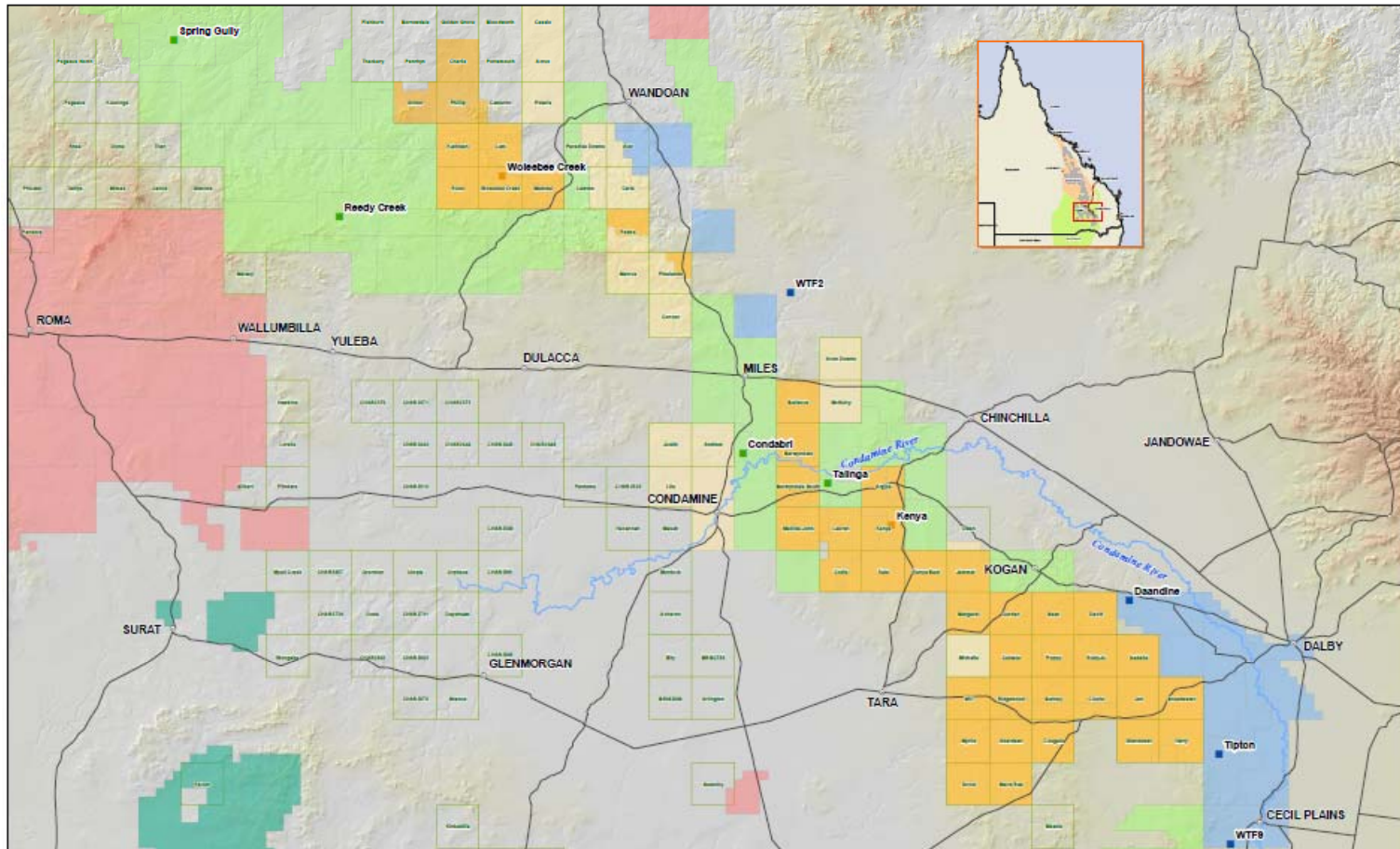
How is Each Company Managing CSG Water?



- From 'Waste' to Resource - Managing Produced Water
 - Varying climatic, land use, hydrological and hydrogeological conditions necessitate a variety of water management solutions which are being used by each CSG Proponent
 - Apart from some untreated water being suitable quality for construction purposes, **all CSG water is treated to the appropriate standard required for beneficial use**



Beneficial Use Allocation



QGC
100% Allocated

APLNG
100% Allocated

SANTOS
100% Allocated

ARROW
0% Allocated
- Currently in assessment phase

QGC - Chinchilla Weir Scheme



Treated Water Pond



Kenya to Chinchilla Weir Pipeline



Chinchilla Weir, Condamine River

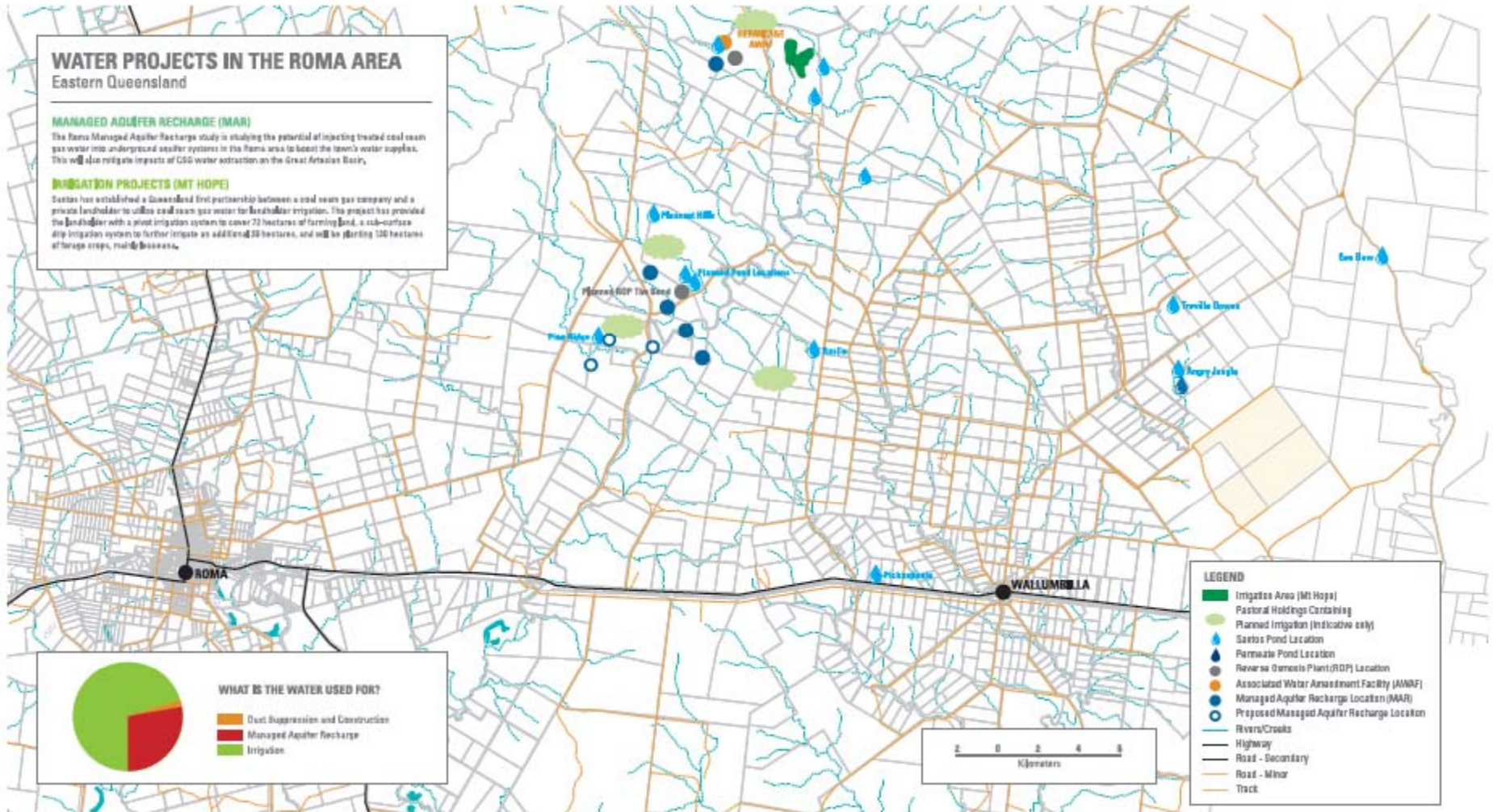


MAKING WATER WORK

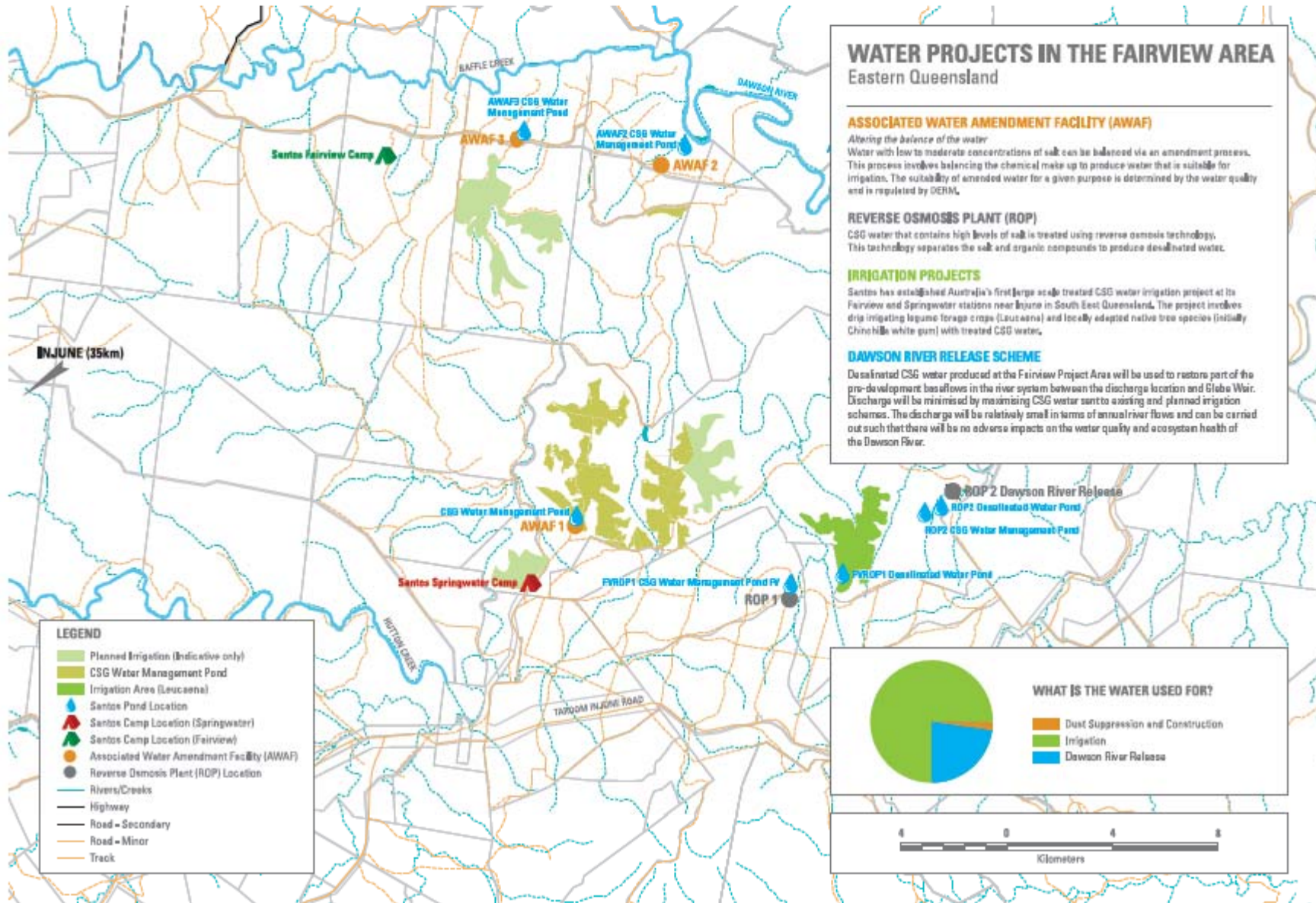
All water must be used within boundaries of SunWater Scheme

Beneficial use by agricultural customers and town of Chinchilla

Santos - Roma (MAR & Irrigation)



Santos - Fairview (Irrigation & Dawson River)

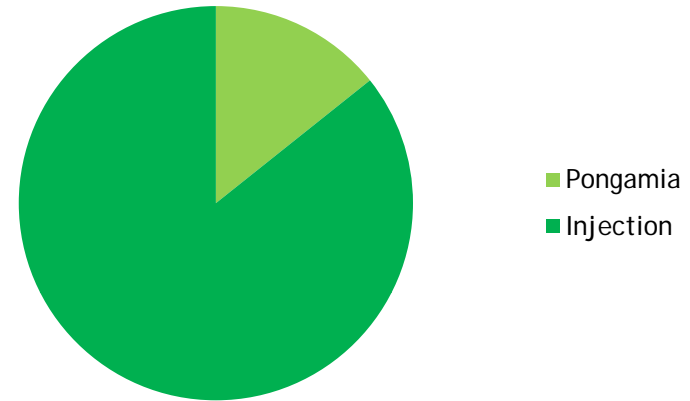


Origin - Roma (Spring Gully)



Spring Gully - Pongamia and Aquifer Injection

- 300ha existing Pongamia plantation
- Aquifer Injection targeting the Precipice Aquifer



Pongamia Plantation



Deoxygenation Plant

Origin - Roma (Reedy Creek)



- Proposed 30 ML/d Aquifer Injection Scheme
 - 20 Injection Bores
 - 5 Monitoring Bores
- Target - Precipice Aquifer
- Injection Scheme will be located on Australia Pacific LNG owned land



Origin - Miles (Talinga and Condabri)

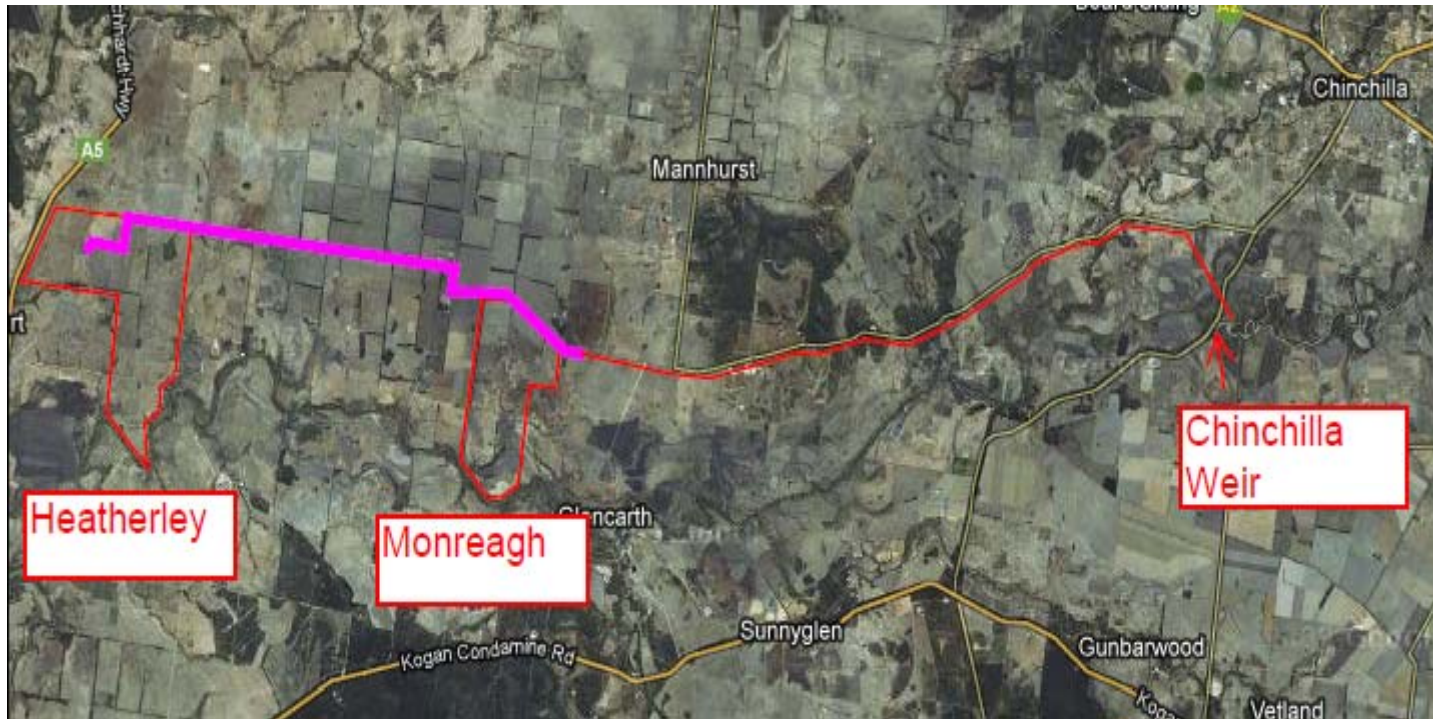


Condabri & Talinga Sites

Proposed Landholder Irrigation Scheme



Proposed Talinga/Condabri Irrigation Scheme



Arrow

DOMESTIC GAS BUSINESS		PROPOSED CSG-LNG PROJECTS	
Dalby Expansion Project	Moranbah Gas Project	Surat Gas Project	Bowen Gas Project
Irrigation	Coal washing	Irrigation - existing	New Industrial
Coal washing	Construction	New irrigation	Urban
Power station cooling	Urban (proposed)	New industrial	Agriculture
Feedlot		Urban	Injection
Construction		Injection	
Stock & domestic			
Urban (proposed)			





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Thank you
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