



Arrow Energy

Arrow Surat Community Reference Group committee meeting

12 March 2020

 Safe Work. Strong Business.



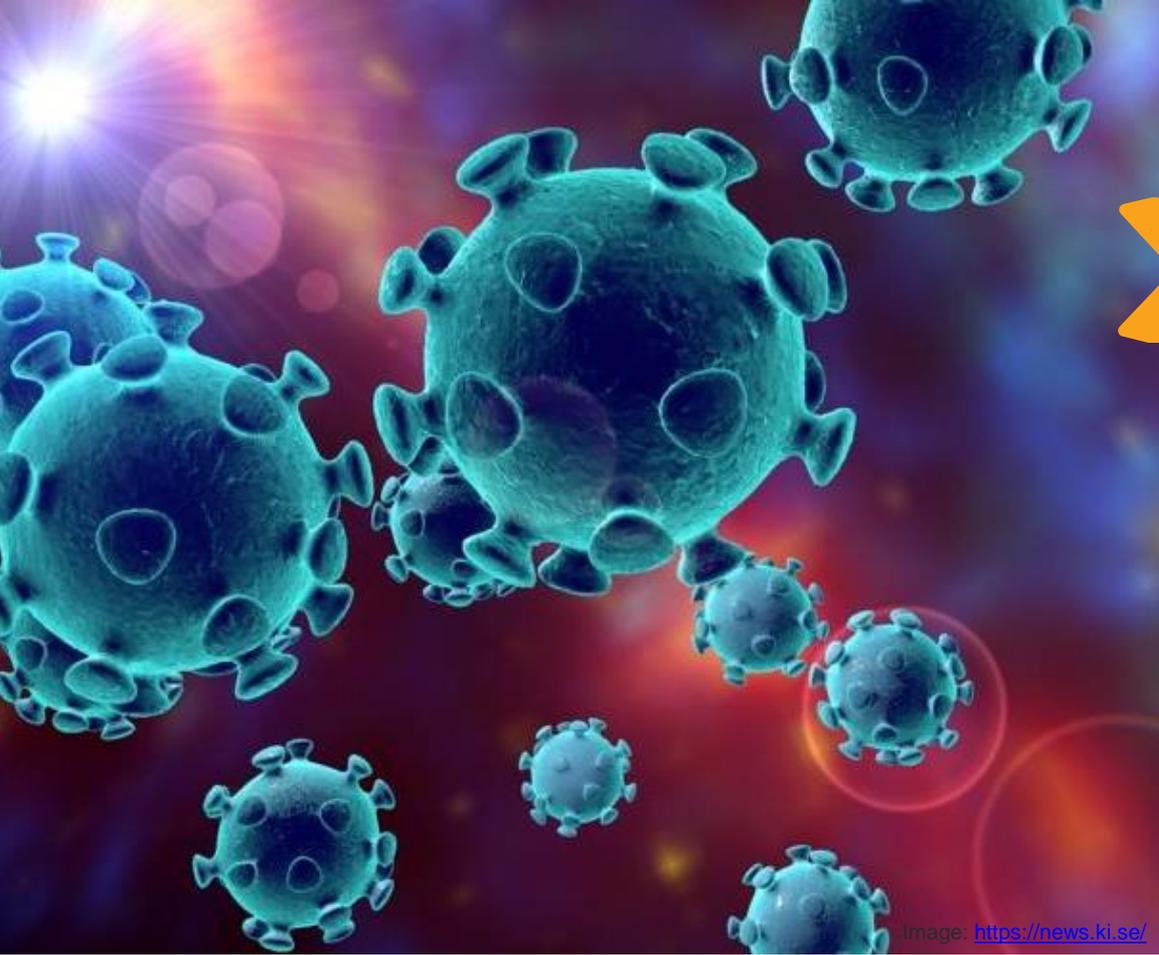


Image: <https://news.kj.se/>



Arrow Energy

Safety Moment Novel Coronavirus

Norman Neligan
*Health, Emergency & Security Manager
Arrow Energy*

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- Massive global response
 - Internal travel restrictions within China/International travel restrictions
 - Entry restrictions for non-Aus residents/citizens arriving from mainland China, Iran and South Korea.
 - Enhanced screening for arrivals from Italy
- No current treatment
 - Medical support only
 - No vaccine (none likely for at least 6 - 12 months)
- Spread may now be uncontrollable
 - Risk of infection in Australia remains low but is increasing

HEALTH WARNING CORONAVIRUS (COVID-19)

INFORMATION FOR TRAVELLERS

Developed a fever or cough?



ISOLATE YOURSELF



CALL YOUR DOCTOR



LIST TRAVEL HISTORY



COVER YOUR COUGH



WASH HANDS OFTEN

[STOP THE SPREAD]

- Implementation of home quarantine and travel restrictions
 - No travel to/from any country subject to AusGov travel restrictions
 - All other international travel subject to risk assessment by HSE
 - Self-quarantine in accordance with AusGov advice
 - Information & hygiene updates provided to staff
 - Zero tolerance for cold/flu symptoms in the workplace
 - Moving to increase Arrow bus service: avoid public transport
 - Screening on entry
- Coronavirus contingency working group established
 - Monitoring the situation
 - Working on protective measures for personnel
 - Reviewing business impacts
 - Slow down in Chinese factories: potential shortage of equipment
 - Key staffing risks from current and potential travel restrictions: including internal travel restrictions



Arrow Energy

Arrow update

Leisa Elder
Vice President ER&TM
Arrow Energy

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Cecile Wake
Chief Executive Officer



Pu Haiyang
Chief Operating Officer



Leisa Elder
Vice President External Relations and Tenure Management



Yu Junzai (Tony)
Chief Financial Officer



Han Tao
Vice President Strategy & New Business Development



Wet weather at Tipton



*Moranbah Gas Project Isaac
River crossing flooded*

- Wet start to the year with rain in both the Bowen and Surat Basin.
- Work towards a positive Financial Investment Decision and project execution for the Surat Gas Project is ongoing:
 - ~40 new wells planned for the Surat Basin this year
 - Area Wide Planning will engage landholder to place ~500 wells
 - focus on execution readiness, which includes looking at impact management (e.g. roads and noise).
- Increased focus on Bowen Basin development:
 - 100M appraisal program to de-risk the production challenges in the Bowen
 - Technical workshops to include Arrow and Shareholder representatives, focussed on maximising the value of the Bowen.
- Safety: Arrow had a strong safety result in 2019:
 - 2020 will bring an increase in on-ground activity and with it, an increased safety focus.
- Arrow hopes to build on its 2019 record production and revenue.



Solar installation at Arrow's Dalby Office

- Strong start to the year with ~\$700M worth of contracting and procurement opportunities progressing through Arrow's internal Tender Board approval
 - largely associated with construction activity.
- Arrow's Dalby office has gone solar with an 82kW system brought online mid-February, reducing Arrow's greenhouse gas emissions.
- Upgraded equipment monitoring and control:
 - IBM has been engaged to improve our cyber-security and SCADA system (supervisory control and data acquisition – remove monitoring of wells).
- University of Queensland Centre for Natural Gas Senior Research Fellow, Dr Kathy Witt, has been awarded a fellowship:
 - Dr Witt will explore the benefits of energy developments to regional Queensland communities.



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Current operational activities

Max Murray
Operations Manager Surat
Arrow Energy

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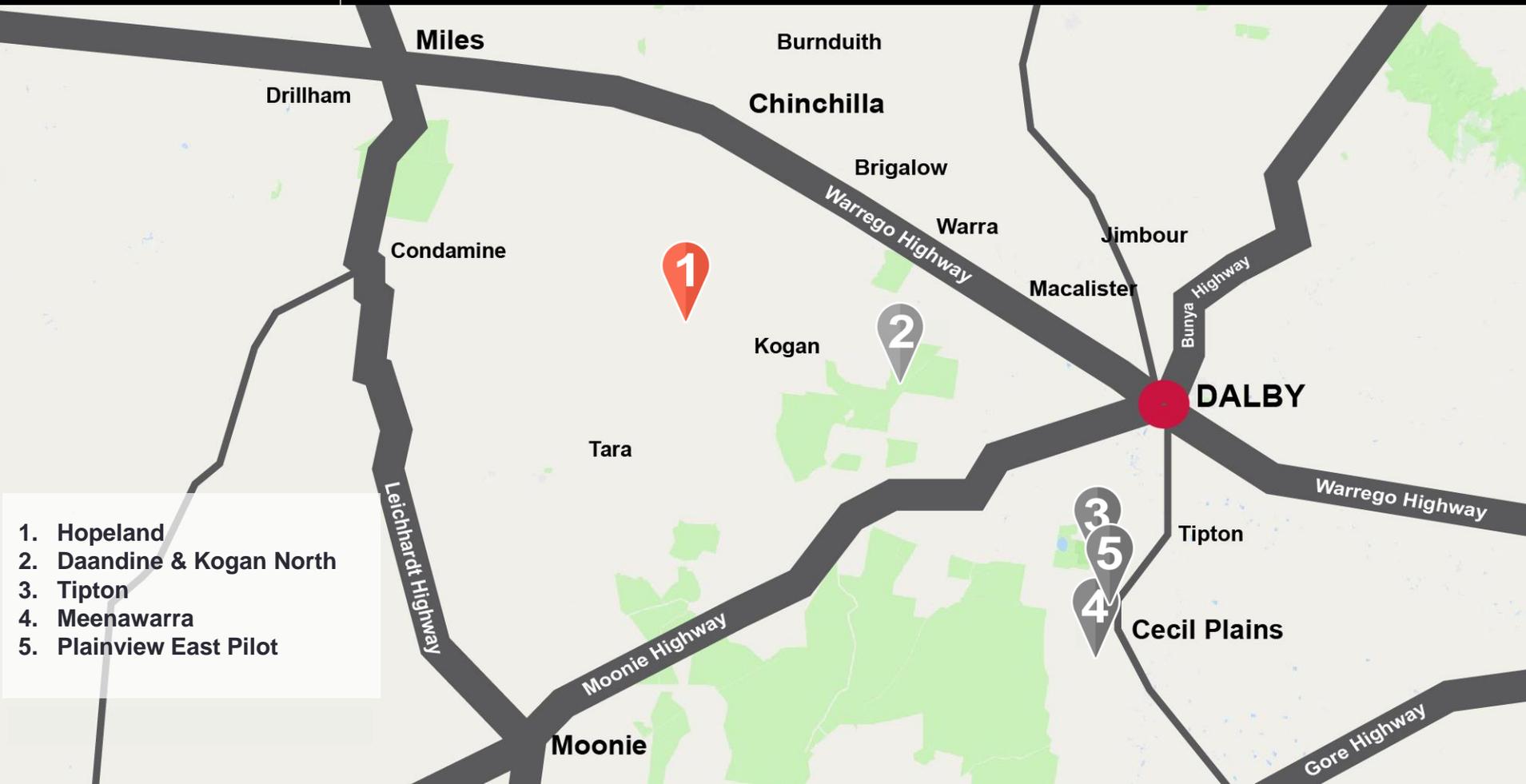




General wet weather impacts

- Site access restrictions
- Delays for drilling and construction activities
- Inspections to assess erosion and/or damage to access tracks etc.
- Erosion repairs and track maintenance will be carried out as required.

Flooded road, Rangers Bridge area

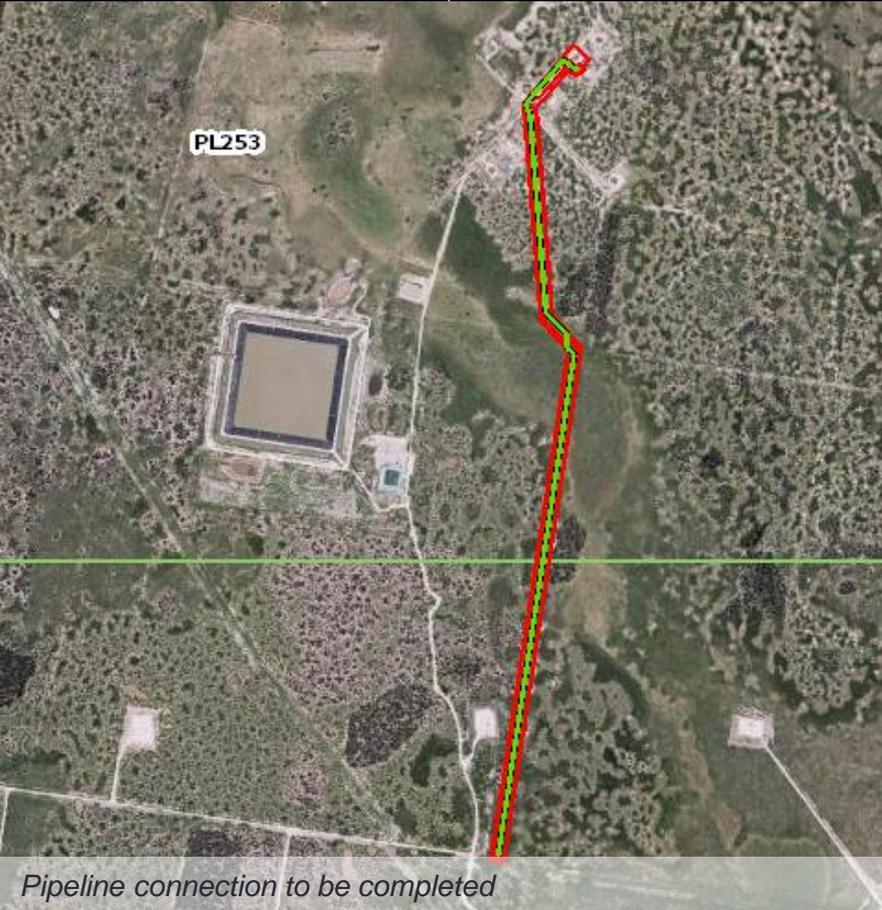


- 1. Hopeland
- 2. Daandine & Kogan North
- 3. Tipton
- 4. Meenawarra
- 5. Plainview East Pilot



Groundwater monitoring bores PL253

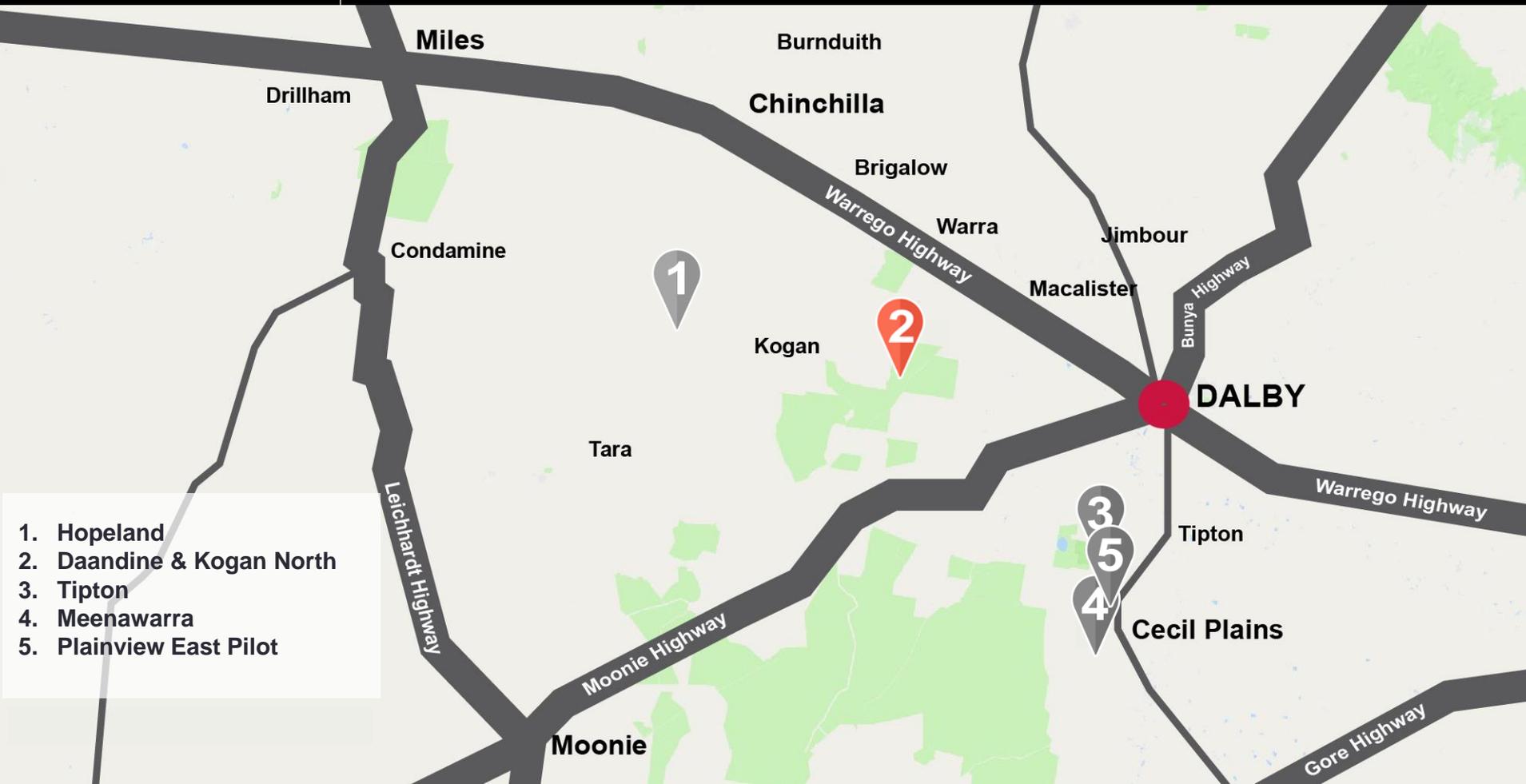
- Arrow is drilling eight groundwater monitoring bores under the Petroleum Lease 253 Environmental Authority (Hopeland area)
- Two bores have been drilled on Arrow's Wyalla property
- Bores currently being completed
- Water sampling to commence soon
- Stephen Denner will provide further details shortly.



Hopeland Pilot Pipeline

- Connection of 6 existing pilot wells to a third-party delivery point
- Pipeline construction completed
- Connection to third-party receipt point to be scheduled, targeting ~mid 2020

Pipeline connection to be completed



- 1. Hopeland
- 2. Daandine & Kogan North
- 3. Tipton
- 4. Meenawarra
- 5. Plainview East Pilot



Pump station upgrades in progress

Daandine RO

- Pump station upgrades to treated water and feedwater dams to increase capacity.

Daandine field

- 7 wells already drilled in 2019
- 6 additional wells to be constructed in 2020:
 - construction team has mobilised to site
 - temporary traffic increases on Dalby-Kogan and Daandine-Nandi Roads
 - night-time drilling – additional wellsite lighting.
- General well maintenance activities completed at the end of 2019.



Shutdown of the Daandine Central Gas Processing Facility (CGPF)

- Planned annual maintenance shutdown scheduled for 28 April 2020
 - 24 hour shutdown
 - flaring of gas will be required
 - community notifications will be carried out
- Compressor vent modifications also taking place from March, installation works to align with planned compressor outage
- General servicing and maintenance ongoing

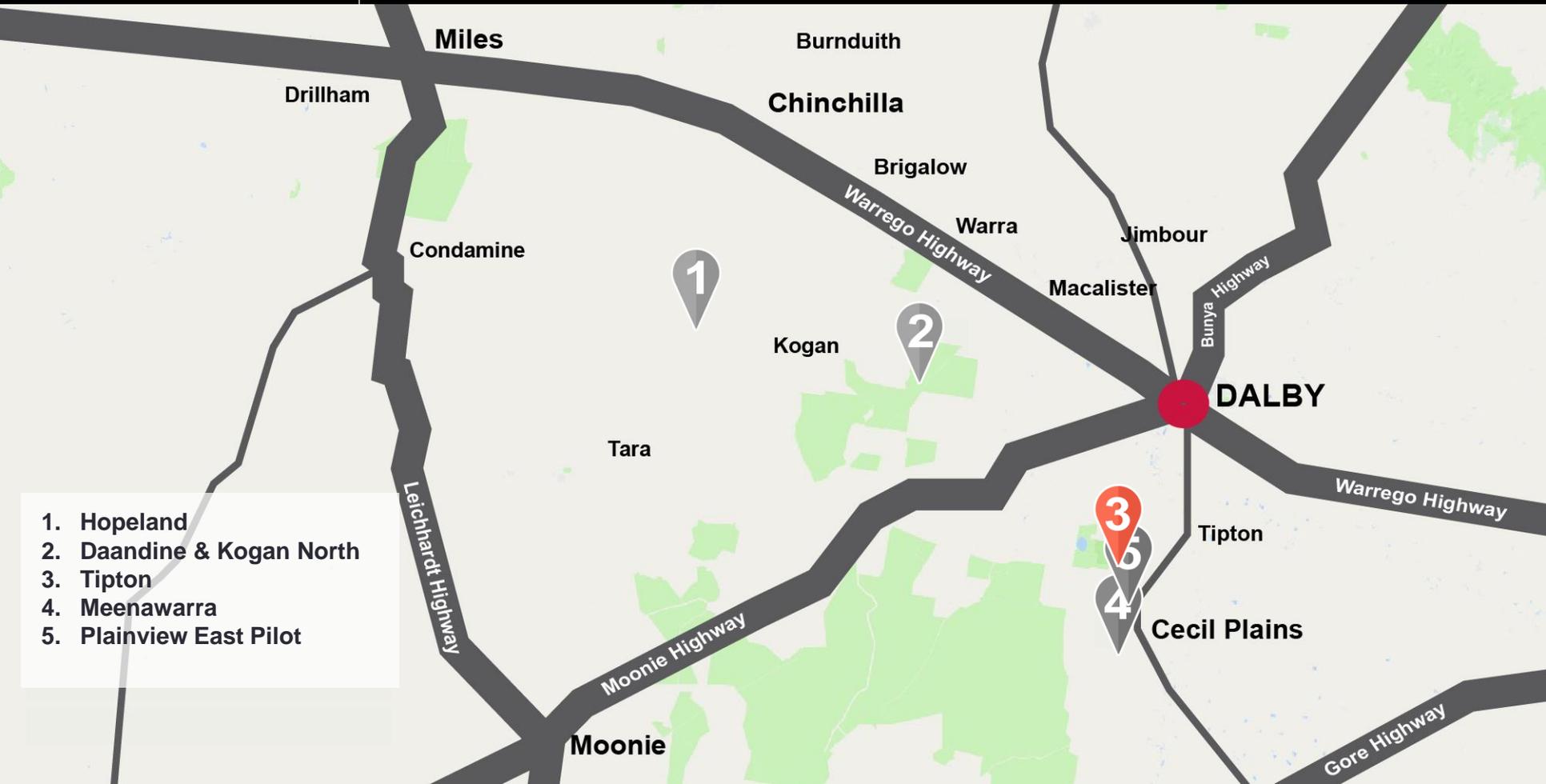


New well site, Kogan North

Kogan North

- Final rehabilitation completed for 3 new well sites that were drilled and brought online end of 2019.
- Maintenance of existing wells planned for March
- 3 additional wells to be drilled in Q3 2020

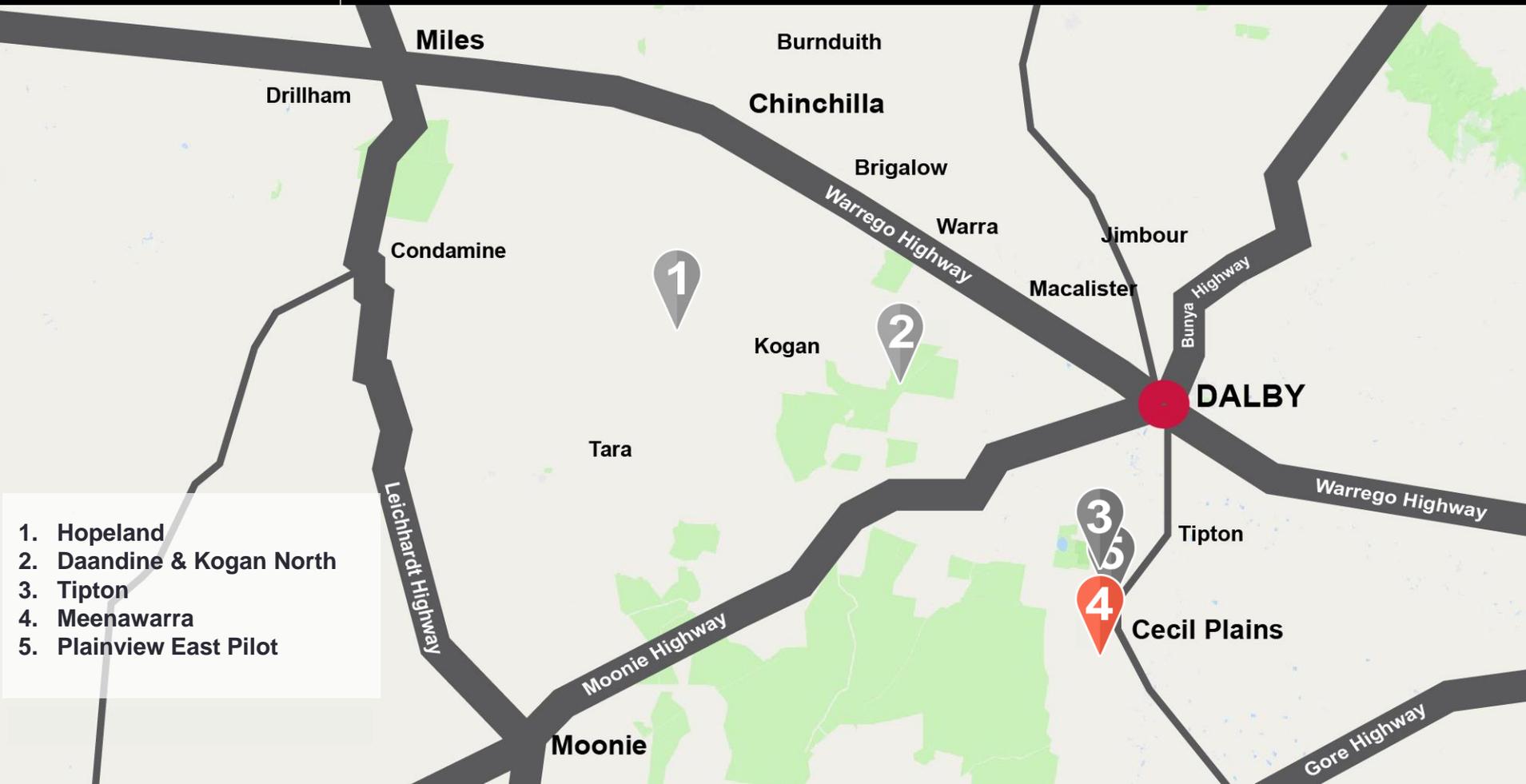
- 1. Hopeland
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Tipton field

- 21 new wells are drilled and are currently being commissioned
 - Delays due to ground conditions from recent weather
- Pipeline connections to continue into April 2020
- Wells to be brought online from April 2020
- Low Pressure Header Pipeline construction for SGP will commence Q3 2020.



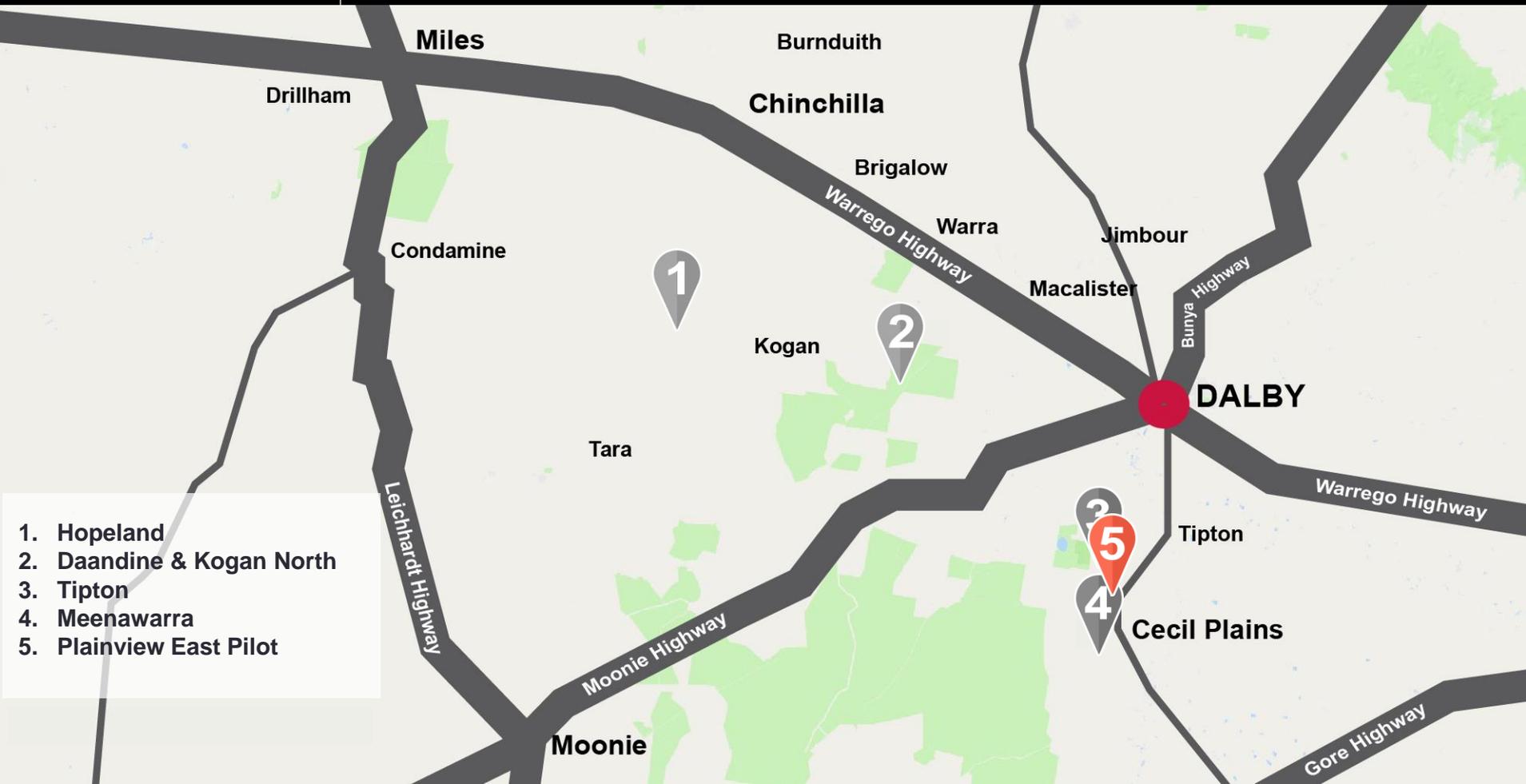
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Meenawarra wells

- Two additional wells drilled in 2019 were brought online in December
- Post construction rehabilitation completed
- Gas and water connection to Tipton facilities.

New well site, Meenawarra area



- 1. Hopeland
- 2. Daandine & Kogan North
- 3. Tipton
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- 5. Plainview East Pilot



Site assessment in Plainview East area 2020



Pipeline welding at Plainview Pilot in 2018

Plainview East Pilot

- New gas production pilot is being planned north of Cecil Plains:
 - four wells on a single well-pad
 - deviated wells targeting the Walloon Coal Measures
 - ~11km gas and water gathering pipeline back to Meenawarra pipeline and Tipton
 - 25 soil gas monitoring points will be installed in the area around the pilot to obtain baseline soil methane levels
- Similar objectives to the Plainview Pilot:
 - to test coal characteristics and production east of the Horrane Fault
- Pipeline construction to commence Q3 2020
- All landholders have been engaged and site surveys have been completed
- Currently carrying out soil sampling in the area



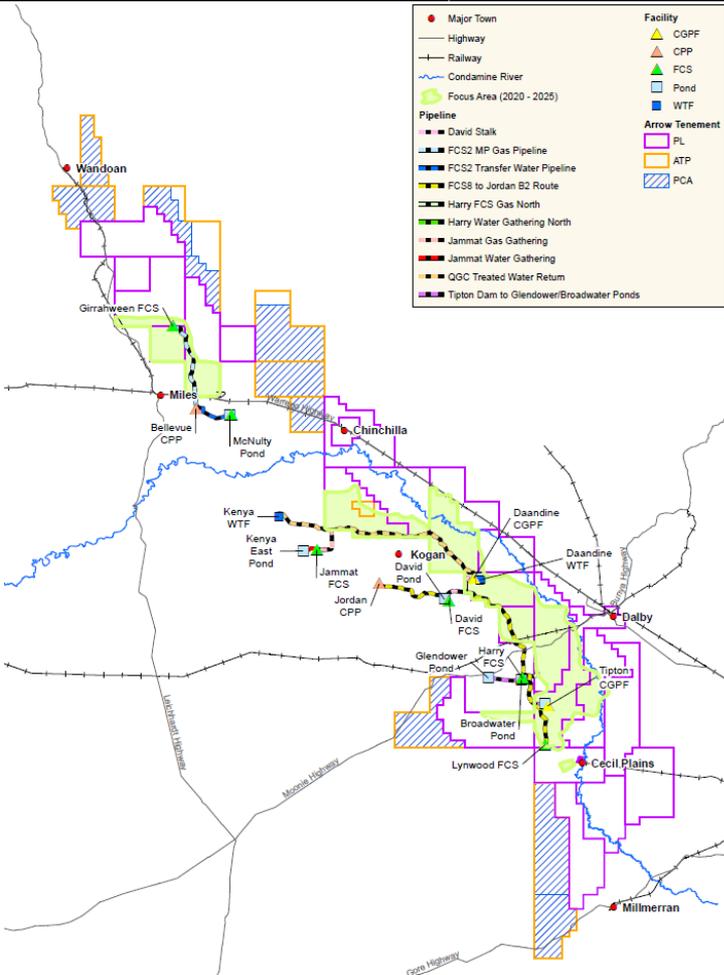
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Surat Gas Project

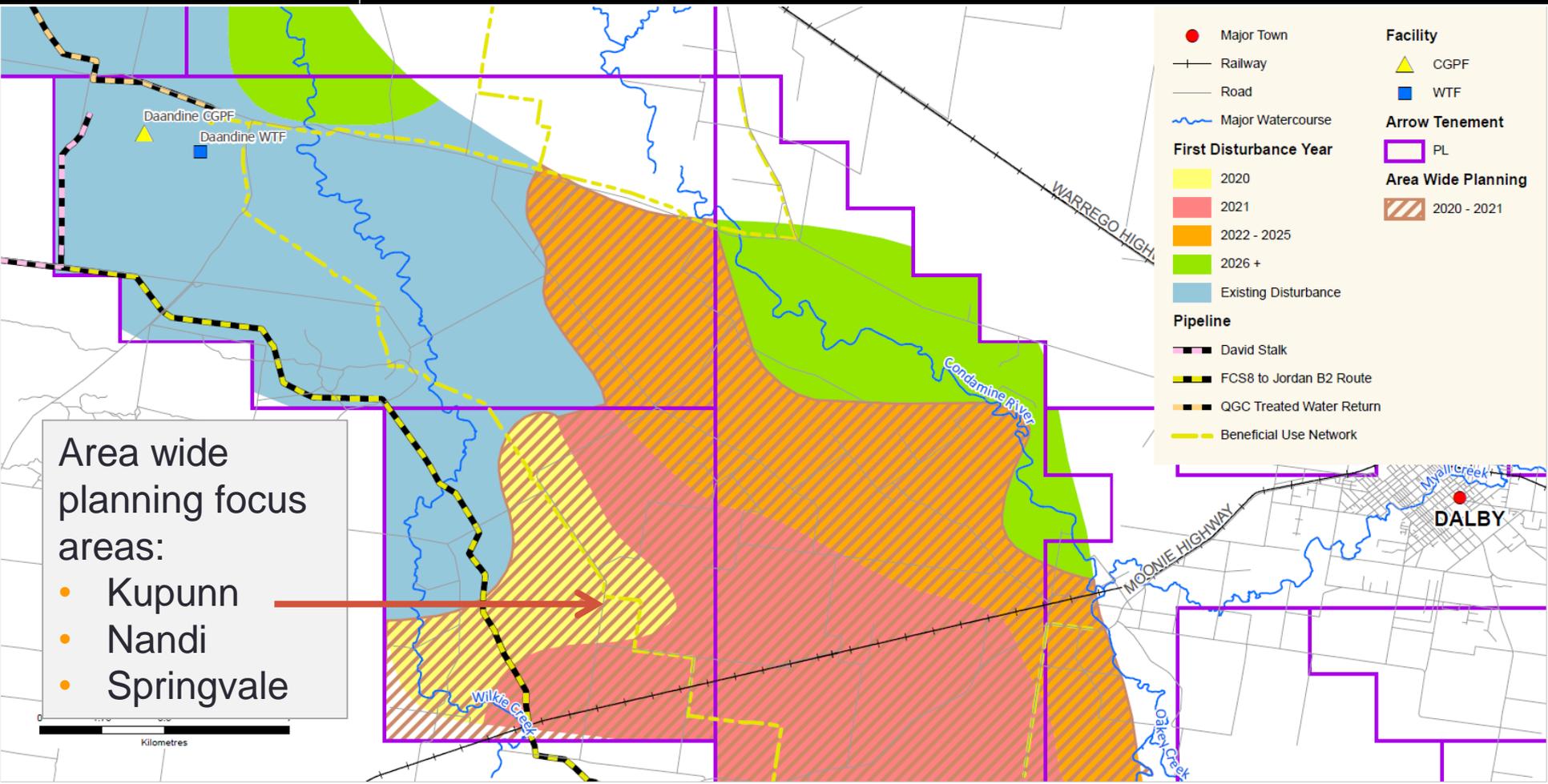
Chris Wicks
Senior Development Planner IFL
Arrow Energy

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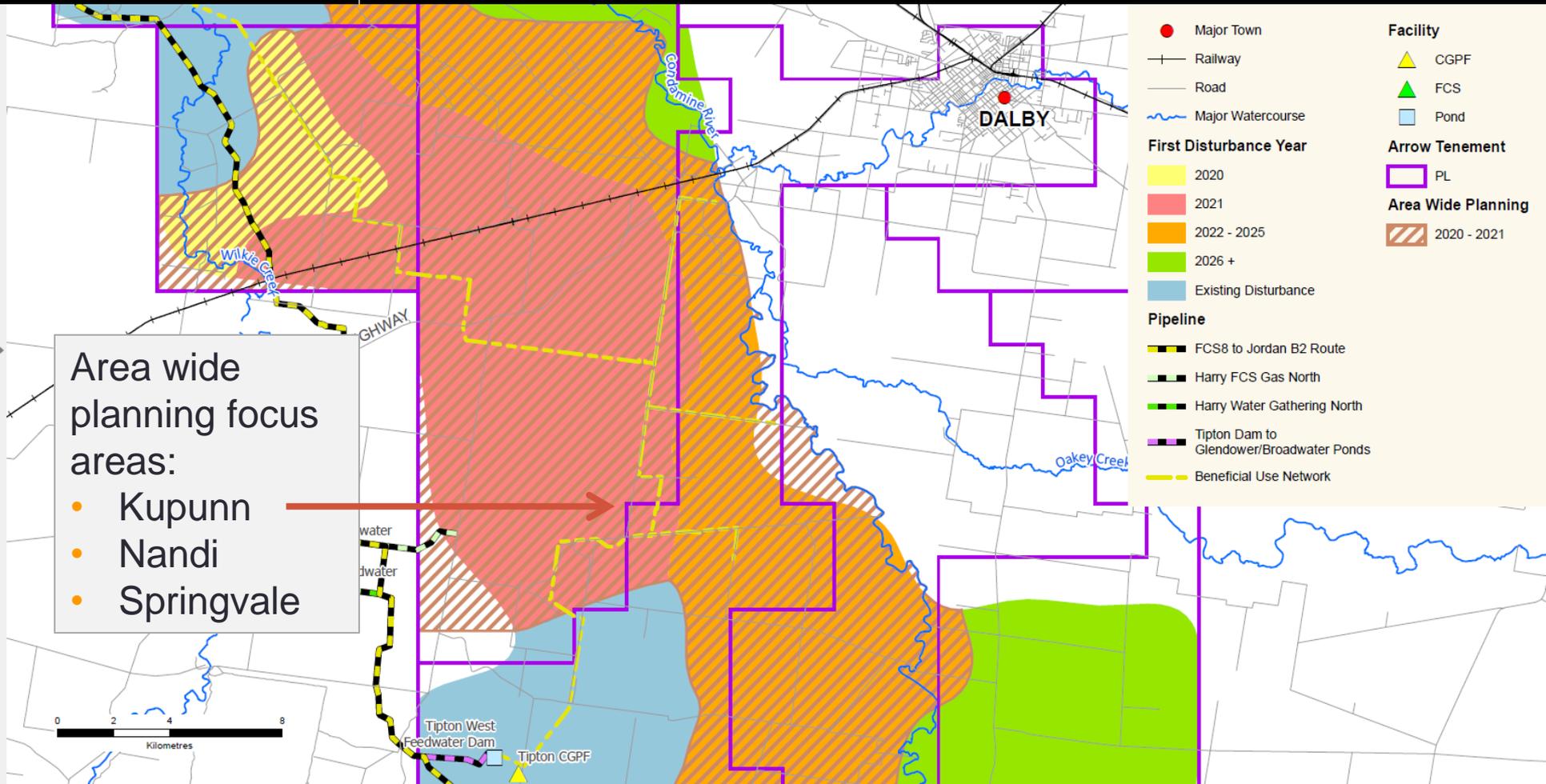
- Construction of wells and gathering infrastructure will be phased; ~150 wells drilled each year until around 2028
- Peak activity from ~2021-2025
- Phase one wells and gathering to 2025 (pictured):
 - expansion north and south from Arrow's current operational areas at Daandine and Tipton
 - development near Miles
 - additional civil construction including:
 - new smaller gas processing facilities (at existing Shell-QGC infrastructure sites)
 - upgrades to existing facilities (water treatment, Arrow warehouse)
- Phase two construction 2023 – 2025: two Arrow gas facilities
- Phase three wells and gathering from 2025 to around 2028:
 - development near Wandoan and Cecil Plains.



Area wide planning focus areas:

- Kupunn
- Nandi
- Springvale

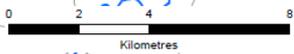




Area wide
planning focus
areas:

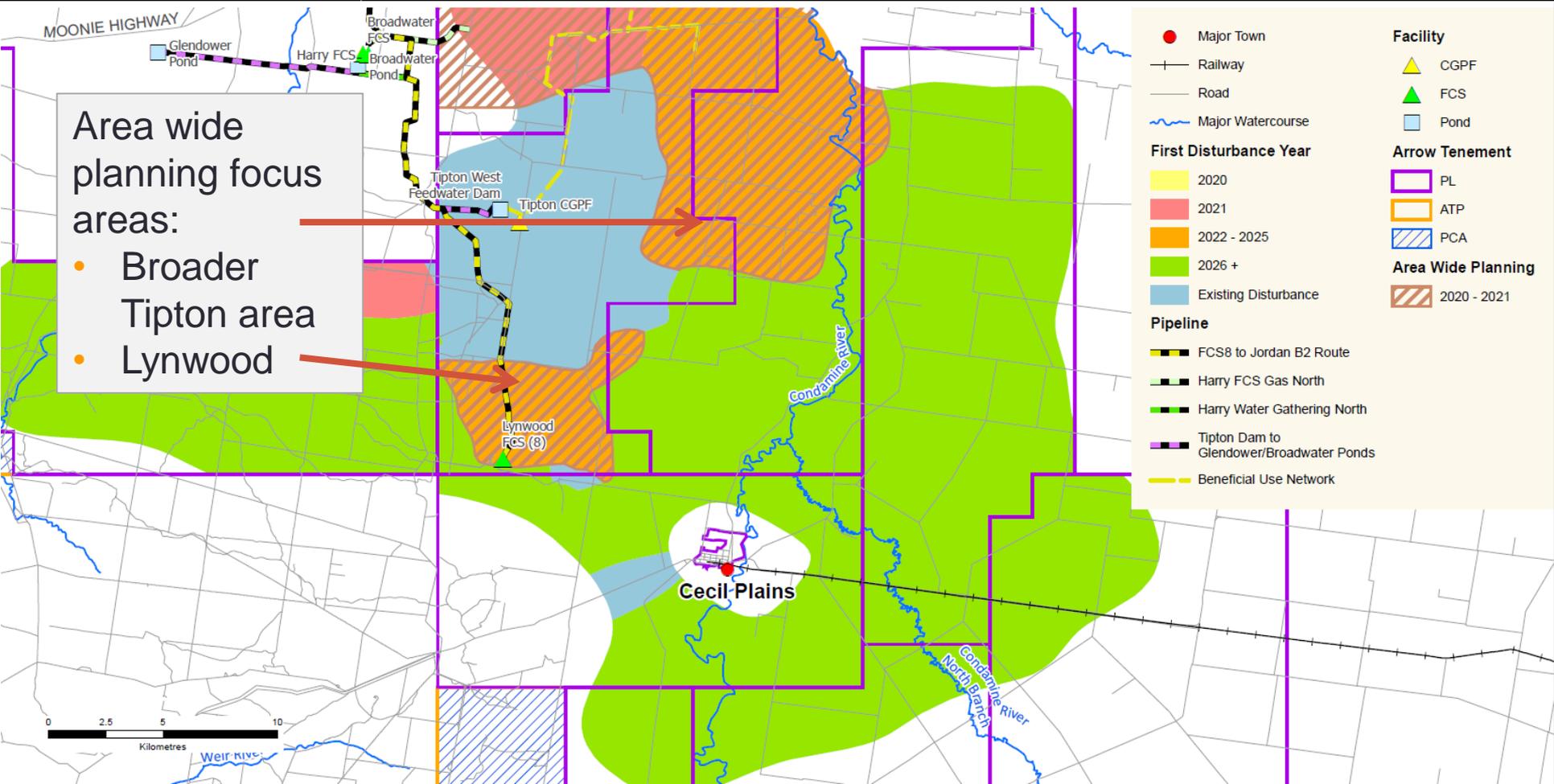
- Kupunn
- Nandi
- Springvale

● Major Town	Facility
—+— Railway	▲ CGPF
— Road	▲ FCS
~ Major Watercourse	□ Pond
First Disturbance Year	Arrow Tenement
■ 2020	□ PL
■ 2021	Area Wide Planning
■ 2022 - 2025	▨ 2020 - 2021
■ 2026 +	
■ Existing Disturbance	
Pipeline	
— FCS8 to Jordan B2 Route	
— Harry FCS Gas North	
— Harry Water Gathering North	
— Tipton Dam to Glendower/Broadwater Ponds	
— Beneficial Use Network	



Tipton West
Feedwater Dam

Tipton CGPF

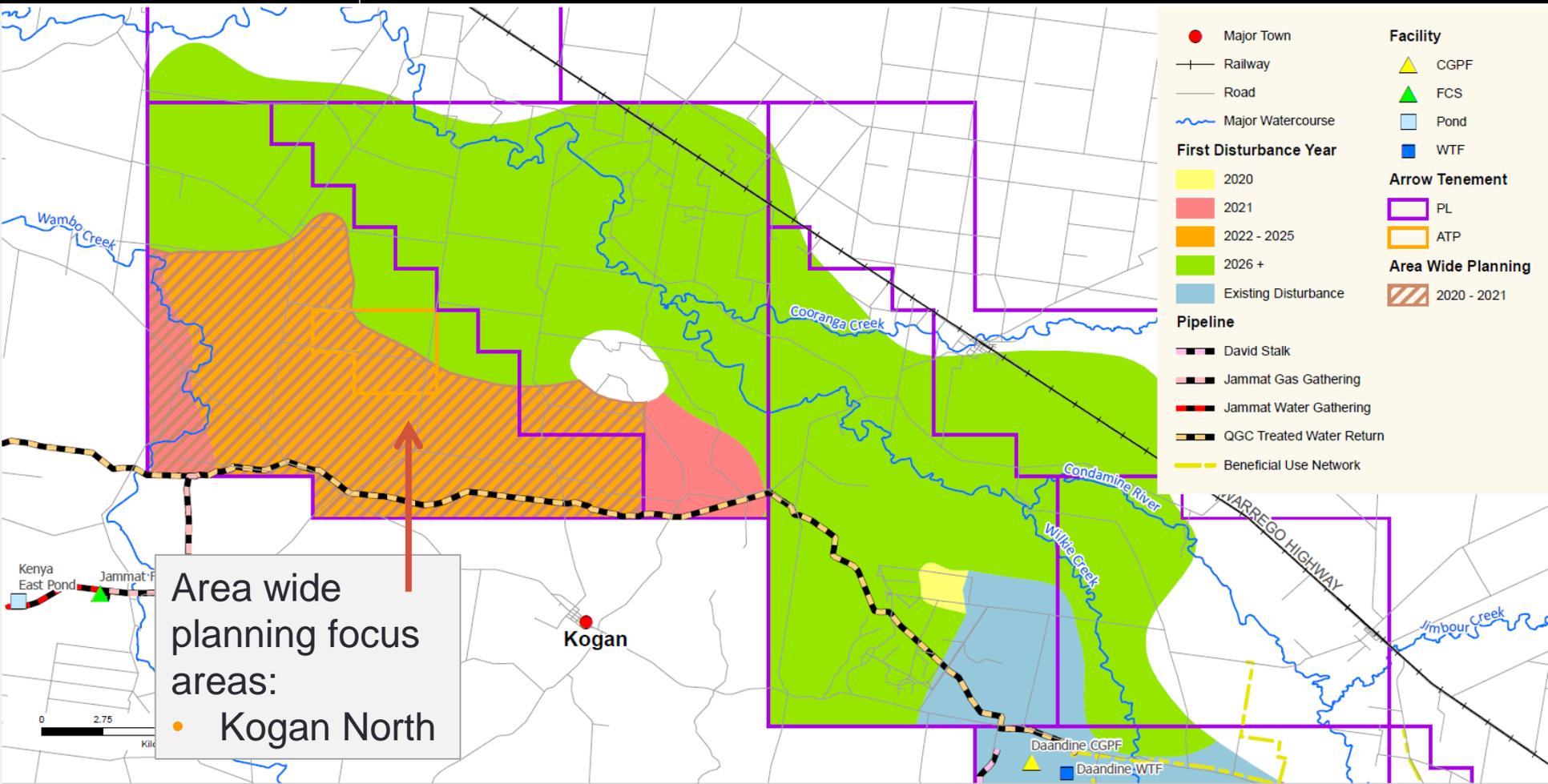


Area wide planning focus areas:

- Broader Tipton area
- Lynwood

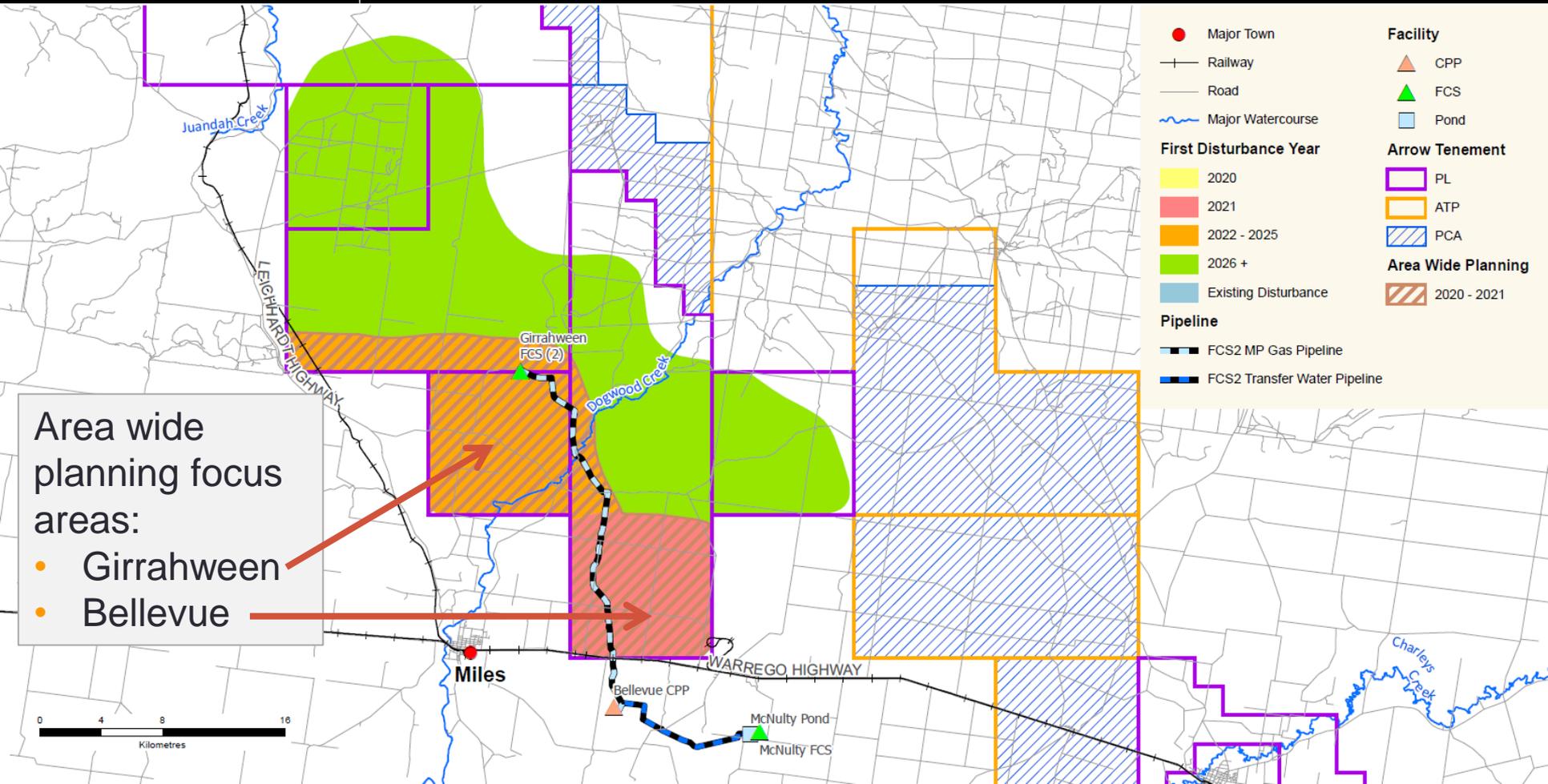
● Major Town	Facility
—+— Railway	▲ CGPF
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First Disturbance Year	Arrow Tenement
■ 2020	□ PL
■ 2021	□ ATP
■ 2022 - 2025	▨ PCA
■ 2026 +	Area Wide Planning
■ Existing Disturbance	▨ 2020 - 2021
Pipeline	
—+— FCS8 to Jordan B2 Route	
—+— Harry FCS Gas North	
—+— Harry Water Gathering North	
—+— Tipton Dam to Glendower/Broadwater Ponds	
—+— Beneficial Use Network	





Area wide
planning focus
areas:

- Kogan North



- Arrow's Traffic Impact Assessments identify and mitigate potential road safety issues caused by our increased traffic. Steps involve:
 - recording a baseline of existing traffic
 - predicting Arrow's likely construction traffic
 - calculating the total predicted traffic
 - conducting on-site inspections with the council to determine existing road quality
 - identifying if roads require an upgrade to maintain safety, in agreement with council or Department of Transport and Main Roads (DTMR).
- Once assessments are agreed with Council or DTMR, Arrow enters into infrastructure agreements to support road maintenance programs.
- Road Use Management Plans are developed directly prior to construction, are tailored to specific area.

	Planning traffic routes to avoid populated areas (where possible), interference with existing road uses and low capacity bridges
	Placing message signs on road verges to identify hazards
	Using buses (where appropriate) for construction staff
	Reducing traffic movements in school zones and school bus hours
	Ensuring road maintenance and upgrades are carried out
	Restricting speed limits on private roads and within 200m of homes
	In vehicle monitoring to record and manage speeding, harsh braking, driver fatigue
	Dust suppression (using water trucks)
	Where possible, sourcing local products close to the work front (water and aggregate, local laydown areas)



Current status

- Arrow are part-way through development of Traffic Impact Assessments for the area Daandine to Tipton.
- Site inspections with WDRC across the Daandine to Tipton area will occur in March (postponed due to wet weather).
- Arrow are engaged with TMR to progress proposed seal of Daandine-Nandi Road:
 - in recognition of the concerns raised by landholders
 - as committed to Kupunn landholders in November 2019.



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Water and soil research and monitoring

Stephen Denner
Team Lead Hydrogeology
Arrow Energy

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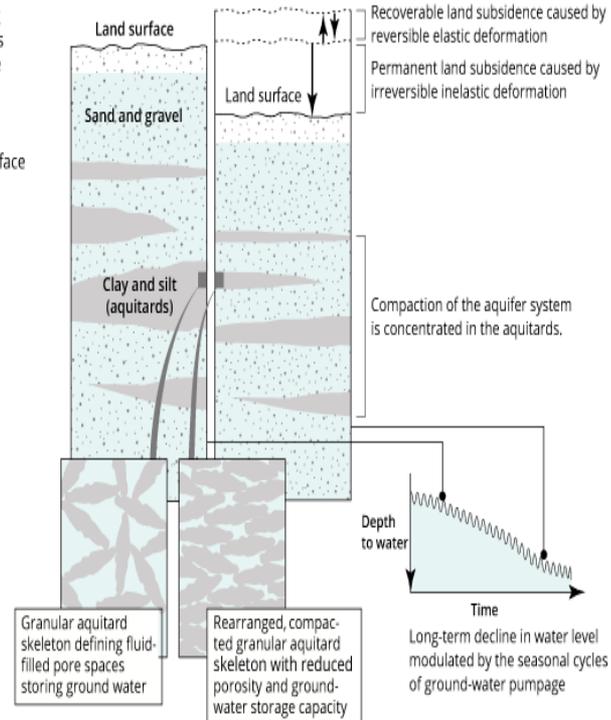


Sinkhole opens up near Rainbow Beach, 2018. Source: The Guardian

- Land subsidence—the loss of surface elevation due to removal of subsurface support—occurs globally.
- Subsidence is one of the most diverse forms of ground failure, ranging from small or local collapses to broad regional lowering of the earth's surface.
- The causes (mostly due to human activities) of subsidence are:
 - withdrawal of fluids (groundwater, petroleum, geothermal)
 - subterranean mining
 - dewatering leading to oxidation of peat or organic soils
 - dissolution in limestone aquifers
 - natural compaction, liquefaction (earthquakes), crustal deformation
 - thawing permafrost.

- At any point below the ground surface:
 - the weight of overlying strata is supported partly by water pressure and partly by the fabric of the rock mass
 - any reduction in water pressure results in an increased proportion of the load being carried by the rock mass, leading to compression of the rock
 - the combined compression over the thickness of rock strata affected by reduced water pressure results in subsidence at the ground surface.

When long-term pumping lowers groundwater levels and raises stresses on the aquitards beyond the preconsolidation-stress thresholds, the aquitards compact and the land surface subsides permanently.

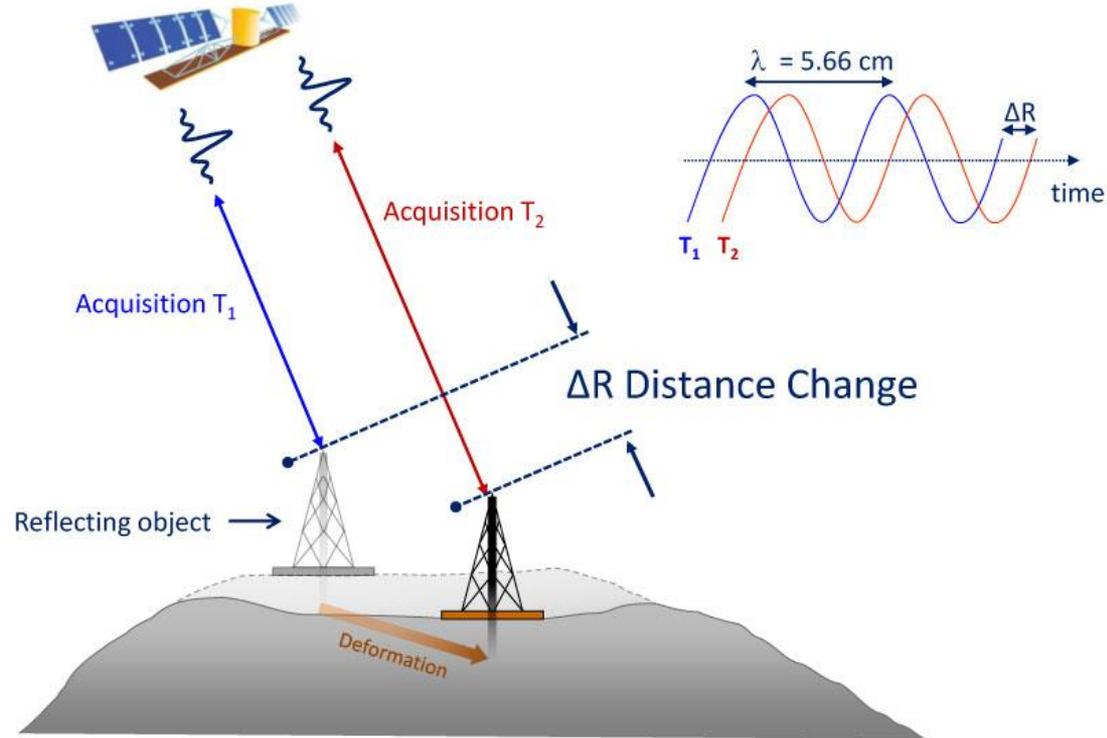


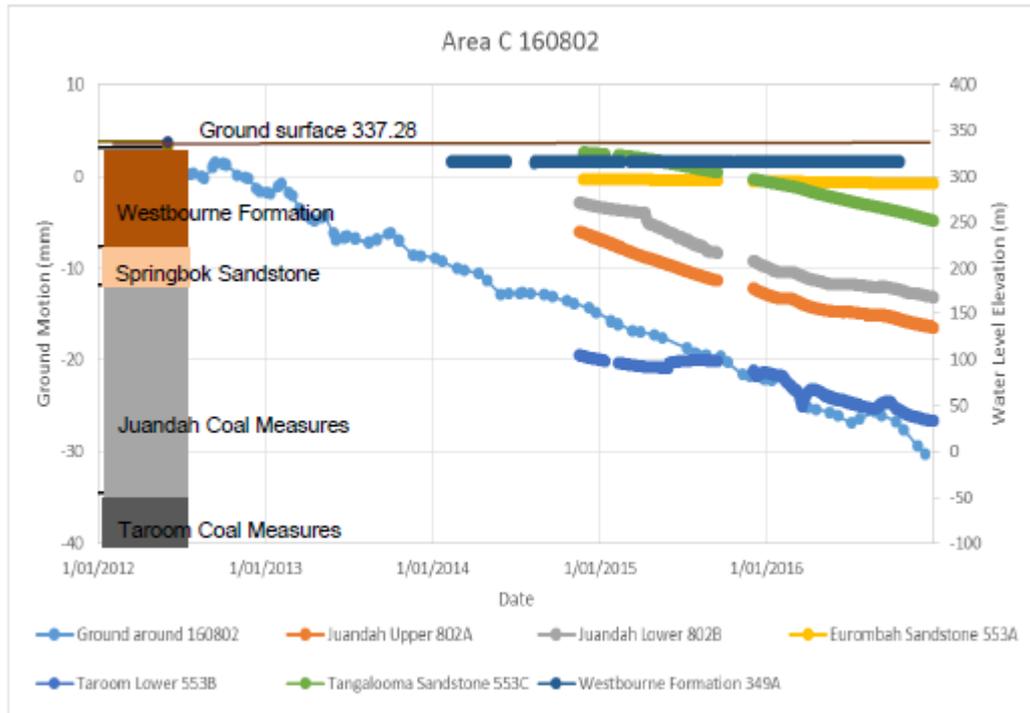
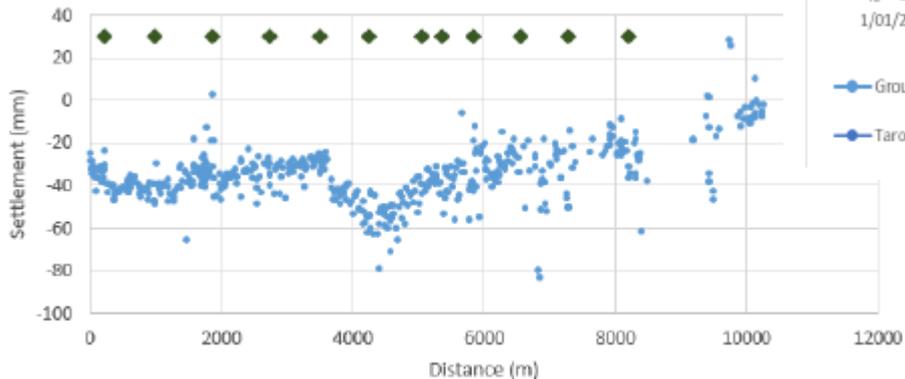
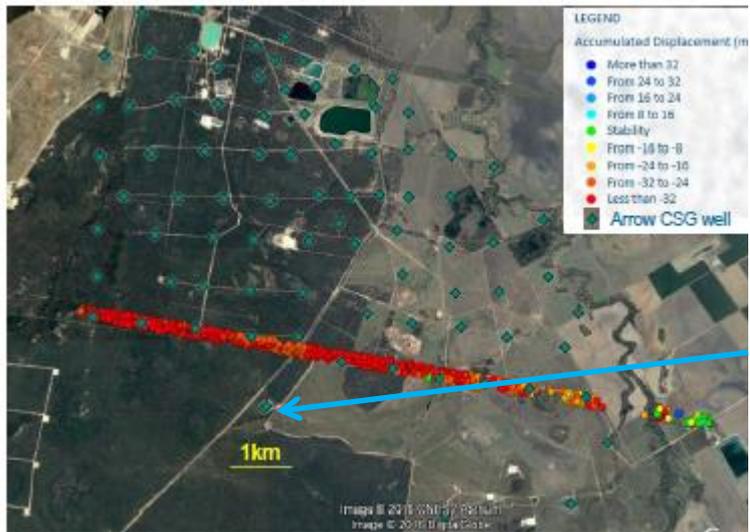


Location	Subsidence	From
LaTrobe Valley VIC	2.6m since the 1950s	Reduction in artesian water pressures related to coal mine.
Shanghai China	98mm/yr 2.63 m total	Intensive exploitation of groundwater
Venice Italy	Pre 1952 – 1mm/yr 1952-1969 – 6.5 - 17mm/yr 1969- 1975 Surface rebound 1-2 cm over 10 yrs	Withdrawal of underground water Now - Tidal heights increasing
Tokyo Japan	27 cm/yr	Groundwater pumping
Mexico City	1m – 9m over time	Groundwater pumping
Wairakei Thermal Field NZ	Vertical 1956 – 76mm 10mm/yr Horizontal – 110mm/yr – 15mm/yr	Steam piped to power station
California	0.3m – 9m (pre 1977) 0.54m/yr	Groundwater pumping

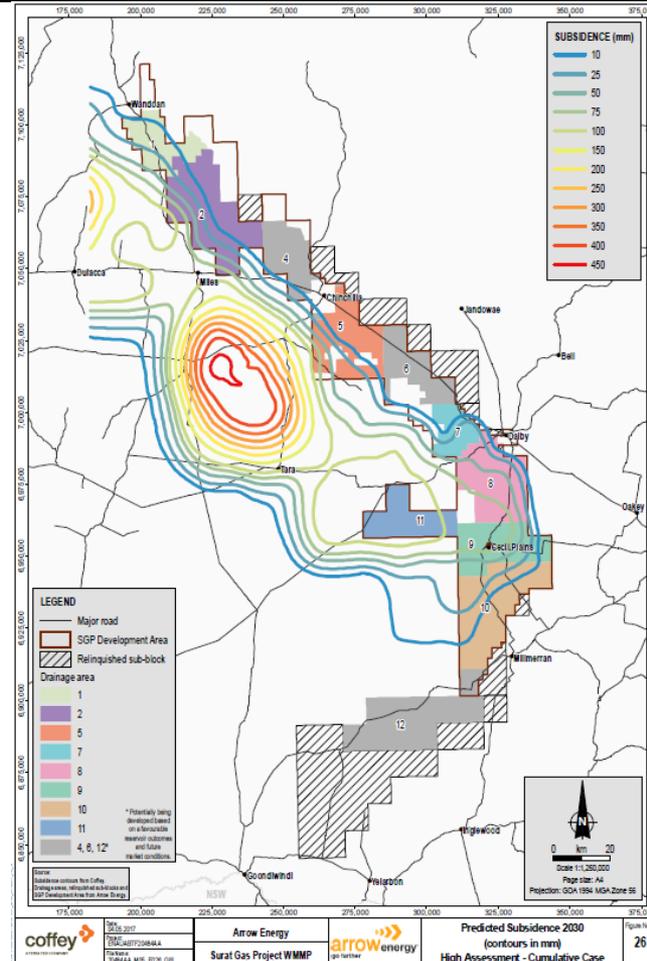
- The effects of compaction fall into 2 categories: those on **man-made infrastructures** and those on **natural systems**.
 - highly visible damage from subsidence on roads, buildings, utilities infrastructure which can have costs for ongoing maintenance or rebuilds.
 - compaction of the aquifer system, may permanently decrease its capacity to store water. Even if water levels rose, compacted sediments would remain as-is; most compaction that occurs as a result of historically low groundwater levels is irreversible.
 - As the topography of the land changes by varying amounts in different places, the low areas, such as wetlands, will change size and shape, migrate to lower elevations, or even disappear. Rivers may change course or erosion/deposition patterns to reach a new equilibrium and aggravate the flood potential or permanently inundate an area.
 - Impeding surface flow of irrigation water on levelled paddocks. This may lead to wetter and drier sections of the paddock, impacting crop growth and resulting in uneven crops.

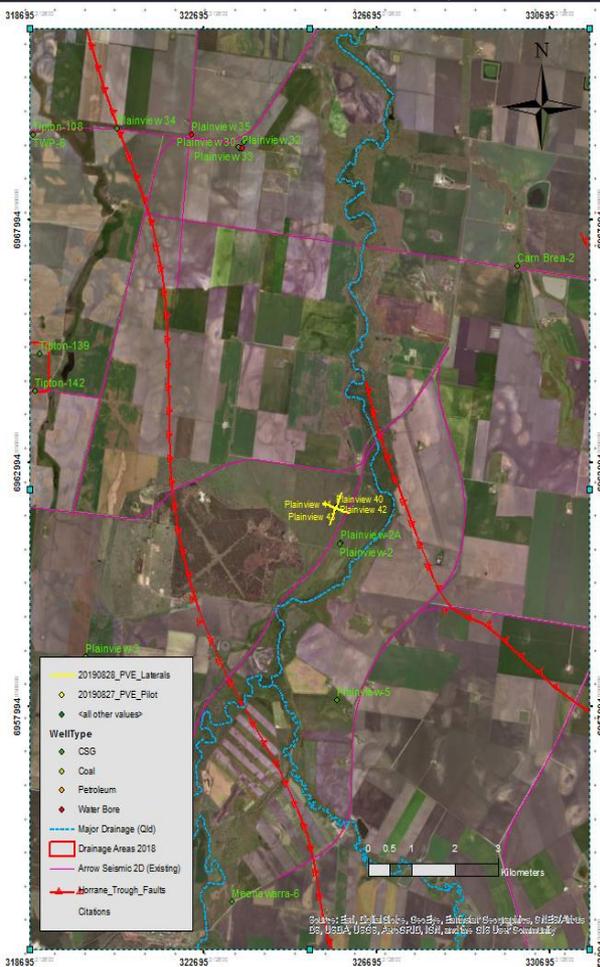
- Interferometric Synthetic Aperture Radar (InSAR) provides high spatial resolution with an accuracy of 5-15 mm, acquired from international SAR satellite missions.
- Interpretation involves identification of phase difference between points within the areas scanned for each data set and applying various corrections to account for the elevation of the points, the velocity of the satellite and atmospheric effects.



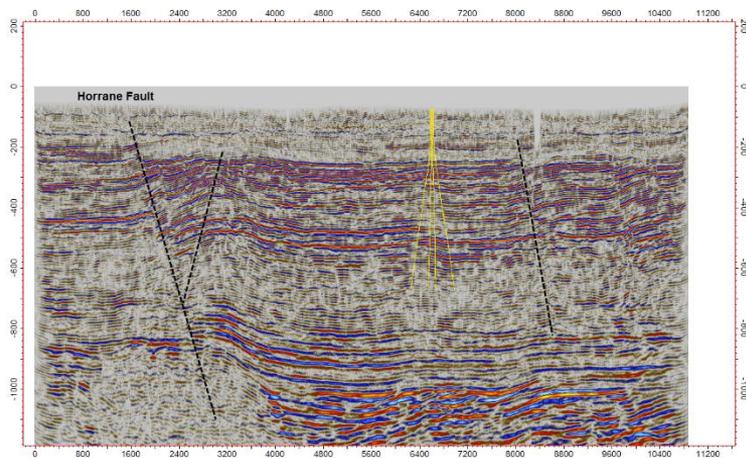


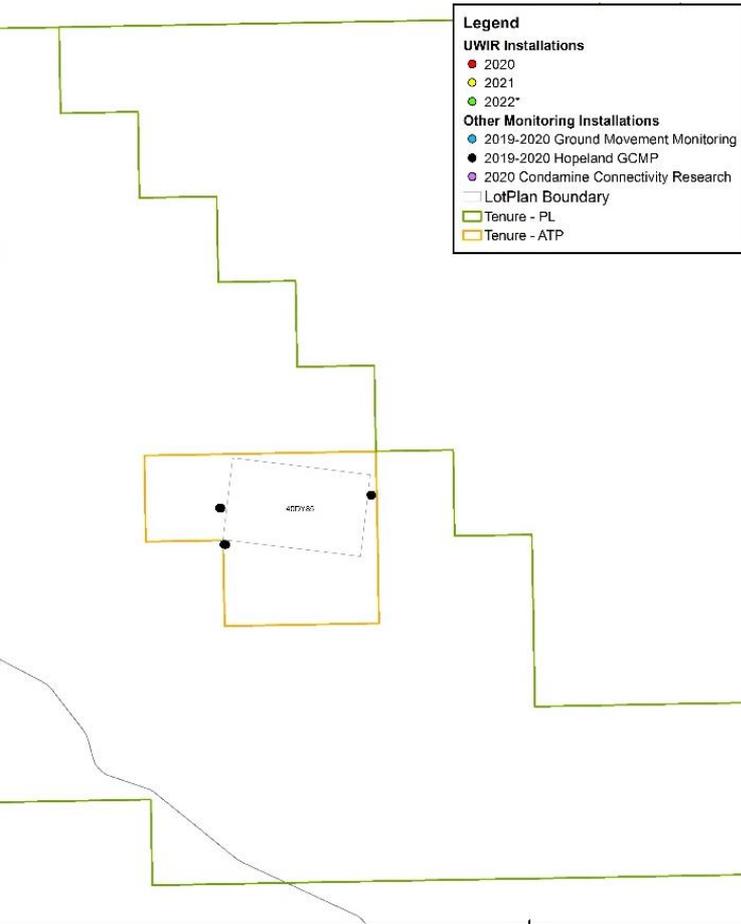
- Approval Condition 13g:
 - A program to monitor subsidence impacts from the action, including trigger thresholds and reporting of monitoring results in annual reporting required by condition 28.
 - If trigger thresholds are exceeded, the approval holder must develop and implement an action plan to address impacts within 90 calendar days of a trigger threshold being exceeded.





- Objective – appraise the Walloon Coal Measures in the southern Horrane Trough, an area south-east of Tipton that is located to the east of the Horrane Fault.
- Pilot Pad
 - 4 deviated wells
 - 2 groundwater monitoring bores (Condamine Alluvium and Springbok Sandstone)
- 25 soil gas monitoring points





- PL253 (Hopeland) monitoring installations:
 - As part of the Environmental Approval, Arrow must conduct groundwater modelling and monitoring activities.
 - Activities include installation of up to 14 additional water monitoring bores.
 - Arrow drilled eight bores, between 12 November and 30 December 2019:
 - 2 Springbok Sandstone
 - 3 Macalister Coal Seam
 - 3 Wambo Coal Seam.
 - Completions of the bores commenced on 6 January and are expected to finish around 23 March 2020
- Information gathered will be provided to the Queensland Department of Environment and Science (DES) and OGIA, to contribute to a broader understanding of the groundwater system in the area.



Arrow Energy

Make good: decommissioning landholder water bores

Simon Gossmann
Groundwater Manager
Arrow Energy

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Department of Natural Resources, Mines and Energy

Code of Practice

For the construction and abandonment of petroleum wells and associated bores in Queensland

Petroleum and Gas Inspectorate

Version 2

16 December 2019



- Make good agreements describe the make good measures Arrow will provide for a bore impaired by extraction of groundwater due to CSG
- These agreements also typically include for Arrow to plug and abandon (P&A) the impaired bore
- The P&A must be conducted in accordance with the Code of Practice (CoP)
- Committee members have requested further information on how Arrow can demonstrate it is compliant with the CoP.



Queensland
Government

Mines ABN 59 020 847 551

Notice of decommissioning a well, water observation bore, water monitoring bore or water supply bore

*Mineral Resources Act 1989,
Petroleum and Gas (Production and Safety) Act 2004 and Petroleum Act 1923*
Form MMOL-44 Version 1

Please use a pen, and write neatly using **BLOCK LETTERS**. If there is insufficient space, provide attachments. Cross where applicable. Further information and copies of forms can be obtained from the department or from our site: <https://www.business.qld.gov.au/industries/mining-energy-water/resources>

Question 1 – Resource Authority details

Resource Authority type	Number	Principal holder name
Authority to prospect		
Petroleum lease		
Mineral Development Licence		
Mining Lease		
Water monitoring authority		

Question 2 – Decommissioning details (choose only A or B below, dependant on bore or well type)

A: Details of water observation bore, water monitoring bore or water supply bore

Please complete all details below where applicable:

Date of decommissioning of the water observation bore, water monitoring bore or the water supply bore in compliance with sections 816 and 817 of the <i>Water Act 2000</i> .	/ /
Water observation bore, water monitoring bore or water supply bore identifying name and number (both the primary and secondary names); or	
If the water observation bore or water supply bore was converted from a petroleum well, the identifying name and number of the well; and	
Date the well was converted to a water observation bore or water supply bore	/ /

Note – The water bore must be plugged and abandoned in accordance with the document called 'Minimum construction requirements for water bores in Australia' which can be found on the departmental website.

Question 4 – Declaration

By signing you confirm that the relevant sections of the *Mineral Resources Act 1989*, *Petroleum and Gas (Production and Safety) Act 2004* and the *Petroleum Act 1923* and their associated regulations will be/have been complied with, and that the information contained within this notification is true to the best of your knowledge. You are also confirming that you have complied with the requirements under these Acts and associated regulations for decommissioning a well, or sections 816 and 817 of the *Water Act 2000* for decommissioning a water observation bore, water monitoring bore or water supply bore. Pursuant to section 404D of the *Mineral Resources Act 1989*, section 813 of the *Petroleum and Gas (Production and Safety) Act 2004* and section 116 of the *Petroleum Act 1923*, a document containing information that is false or misleading may attract a penalty.

Signature

Name

Position

Company

Date

Signature

Name

Position

Company

Date

Water bores for petroleum tenure or water monitoring authority holders

Drill log form

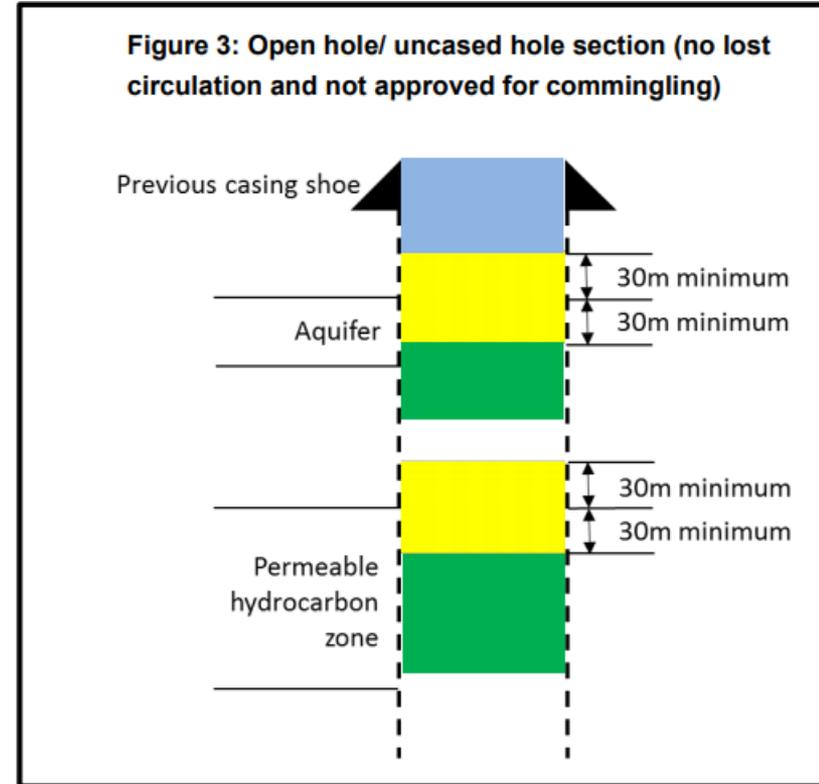


AUTHORISATION DETAILS Bore name: Bore identification number: QDEX report number:																																
SECTION A—LOCATION DETAILS Name of landholder: Phone No.: Postal address: Postcode: Real property address: Postcode: Real property Lot: Plan: or Bore location GPS. Latitude: Longitude: Datum: description Easting: Northing: Zone:			SECTION B—BORE COMPLETION DETAILS Date commenced: Date completed:																													
SECTION D—HOLE SIZE <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Diameter (millimetres)</th> <th colspan="2">Location (metres)</th> </tr> <tr> <td></td> <td>From</td> <td>To</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>			Diameter (millimetres)	Location (metres)			From	To				SECTION I—BORE PURPOSE <input type="checkbox"/> Observation <input type="checkbox"/> Injection <input type="checkbox"/> Domestic <input type="checkbox"/> Commercial <input type="checkbox"/> Stock <input type="checkbox"/> Irrigation <input type="checkbox"/> Commercial <input type="checkbox"/> Urban <input type="checkbox"/> Industrial Other (please specify)																				
Diameter (millimetres)	Location (metres)																															
	From	To																														
SECTION E—CASING DETAILS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Type (PVC, steel etc)</th> <th>Size O.D. (millimetres)</th> <th>Wall thickness (metres)</th> <th colspan="2">Location (metres)</th> </tr> <tr> <td></td> <td></td> <td></td> <td>From</td> <td>To</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			Type (PVC, steel etc)	Size O.D. (millimetres)	Wall thickness (metres)	Location (metres)					From	To						SECTION J—PARTICULARS OF STRATA <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>From (metres)</th> <th>To (metres)</th> <th>Strata description (use more than one line if required)</th> <th>Water bed thus: (*)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>			From (metres)	To (metres)	Strata description (use more than one line if required)	Water bed thus: (*)								
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	From	To																														
Depth struck (metres)	Water rose to (metres)	Supply (litres/second)	Quality (e.g. potable, brackish, salty)																													
SECTION G—PERFORATIONS/ SLOTS/ SCREENS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Type</th> <th>Size O.D. (millimetres)</th> <th>Aperture (millimetres)</th> <th colspan="2">Location (metres)</th> </tr> <tr> <td></td> <td></td> <td></td> <td>From</td> <td>To</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			Type	Size O.D. (millimetres)	Aperture (millimetres)	Location (metres)					From	To						Conductivity (EC) pH														
Type	Size O.D. (millimetres)	Aperture (millimetres)	Location (metres)																													
			From	To																												
SECTION H—CEMENTING DETAILS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Type & material size</th> <th>Hole diameter (millimetres)</th> <th>Casing diameter (millimetres O.D.)</th> <th colspan="2">Location (metres)</th> </tr> <tr> <td></td> <td></td> <td></td> <td>From</td> <td>To</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			Type & material size	Hole diameter (millimetres)	Casing diameter (millimetres O.D.)	Location (metres)					From	To						SECTION L—SUB ARTESIAN BORE ON COMPLETION Depth to standing water level from ground level: Depth to pump suction or bottom of drill stem: (metres) (metres)														
Type & material size	Hole diameter (millimetres)	Casing diameter (millimetres O.D.)	Location (metres)																													
			From	To																												
SECTION M—ARTESIAN BORE ON COMPLETION Pressure (kilopascal) Free flow (litres/second) Temperature (°C)			SECTION N—REMARKS (PLEASE ATTACHED SEPARATE PAGE)																													
SECTION O—CERTIFICATION BY DRILLER Name of Authorised Person if drilled by petroleum tenure or water monitoring holder: Name of driller/drilling contractor if drilled by licensed water bore driller: License No.: Date:			Completion of this section certifies that the driller has complied with <i>Petroleum and Gas (Production and Safety) Act 2004, Petroleum Act 1923, or the Water Act 2000</i> for the drilling of the bore																													

- Abandonment must ensure:
 - Environmentally sound and safe isolation of the well
 - Protection of groundwater resources
 - Isolation of the productive formations from other formations
 - The proper removal of surface equipment.

- The following must be considered prior to abandonment:
 - The construction and integrity of the well
 - Geological formations encountered
 - Hydrogeological conditions i.e. aquifers
 - Environmental risk.

- To meet the objectives the following must be achieved:
 - The well must be sealed and filled in such a manner to prevent leakage of gas and/or water
 - Cement must be used as the primary sealing material
 - All groundwater units identified in the GAB Water Plan must be isolated from each other with a continuous cement barrier extending a minimum 30m above to 30m below the interface between units
 - Single, continuous cement sections must be no more than 200m long.



- Remediation of annular cement, via perforation and squeeze, may be required (subject to cement bond log)
- Downhole equipment (pumps, tubing, etc) and any other debris in the well that can practicably be removed are removed
- Plugs that do not pass pressure testing must be remediated until requirements are achieved
- Wellheads must be removed and the casing must be cut at a minimum of 1.5 m below surface
- The well must be capped below the surface with a marker plate.





CUT & CAP & ID PLATE INSTALLED



RED & WHITE TAPE INSTALLED DURING BACKFILL



BACKFILL COMPLETE & REHAB

- Arrow records information on the abandonment in daily drilling reports, downhole geophysical logs, perforation and cementing reports.
- We are currently finalising the format for a more comprehensive report we can share with our bore owners to demonstrate we are compliant with the CoP.



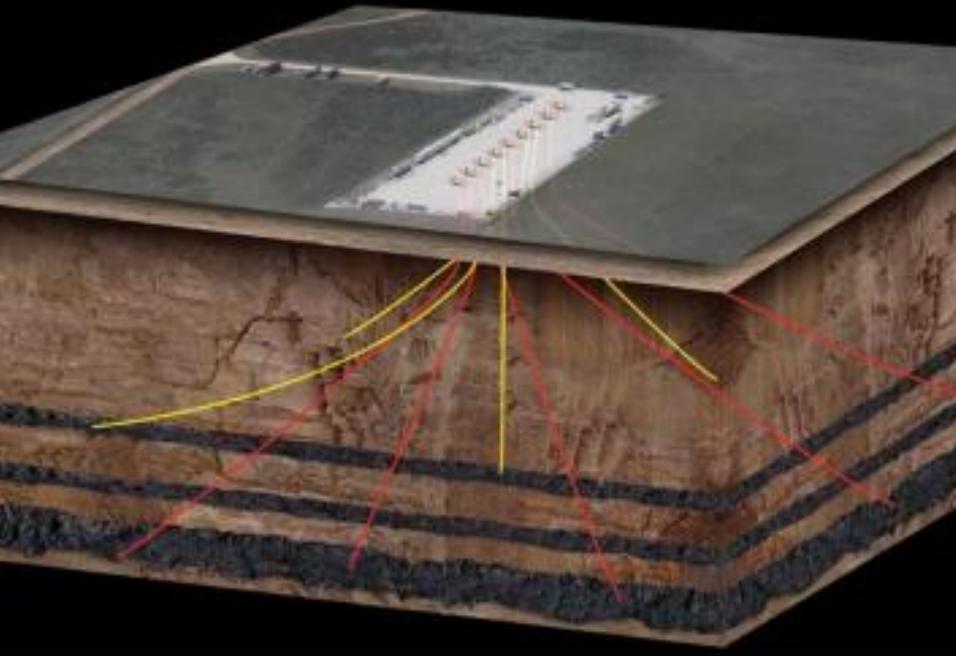
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Deviated wells and compensation

Richard McLean
*Principal Land Liaison Officer
Arrow Energy*

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- Deviated wells on multi-well pads is one of the ways that Arrow demonstrates coexistence with agriculture.
- This method developed in collaboration with landholders, significantly reduces impacts to land surface.
- Area Wide Planning process ensures landholders are given equal opportunity to benefit from the industry and compensation agreements.
- Arrow will work with landholders to co-develop infrastructure plans and locations for deviated wells.

Payment type 1: Upfront payment This payment covers negotiation costs and the first 12 months of activities	Payment type 2: Ongoing payment This is an annual payment until the sites are fully rehabilitated	Compensation considerations We recognise there are various factors which need to be considered when compensating landholders
		Land value* – 100 per cent of the improved land value on the directly impacted area
		Disturbance* payments – for any loss of amenity, development and construction intensity
		Land use – 100 per cent of the gross margin* on the directly impacted area
		Professional Fees (e.g. negotiation of Conduct and Compensation Agreement)
		Management Time*

- Arrow will engage all landholders (owners and occupiers) who are directly affected by surface infrastructure or underground gathering pipelines through a Conduct and Compensation Agreement (CCA).
- The level of compensation will vary depending on the direct impact to the property and its residents.
- Compensation is determined on existing land value and level of land use disturbance plus reasonable professional fees and landholder management time.
- CCAs are not provided to landholders where wells deviate under their property (i.e. no surface infrastructure or gathering line impact) as there are no compensatable impacts.
- Impacts on properties where there is no infrastructure e.g. water impacts, are covered by other frameworks.

- Arrow acknowledges that, in some instances, local residents will be temporarily impacted by nearby activity e.g. due to construction/drilling noise.
- The Government provides set noise limits within environmental approvals, designed to protect the community from noise impacts.
- Alternative compensation arrangements may apply to residents on properties where:
 - the activity is being undertaken, and/or
 - neighbouring properties
 - only where Arrow's activities are likely to exceed the limits within environmental approvals.





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Arrow Beneficial Use Network sub-committee update

David Wigginton
Produced Water Manager
Arrow Energy

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- Committee members had questions regarding assurance of water quality through reverse osmosis (RO) facility
- Visit to Tipton water treatment facility
- Included a visit to multi-well pad at Plainview Pilot.



Complete

- Identify all options for supply of water which achieves substitution of allocation requirements
- Narrow options
- Identify preferred option

Underway

- Work through details regarding implementation of preferred option

Next steps

- Committee will continue to meet into 2020

- Six meetings held to date. Remaining meetings to discuss:
 - changes to water level due to substitution
 - managing changes to allocations through scheme
 - end of project water management
 - legacy and decommission
 - process for selecting participants
 - key terms and conditions.



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Local jobs and contracting

Sunil Deedwania
CP Manager, Well Delivery and Services
Arrow Energy

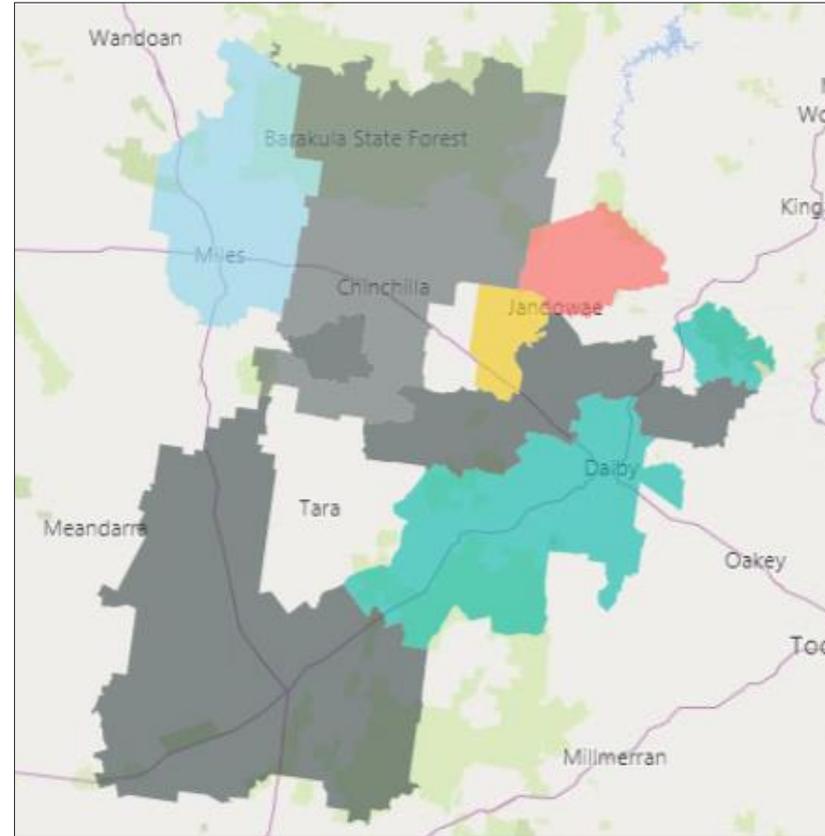
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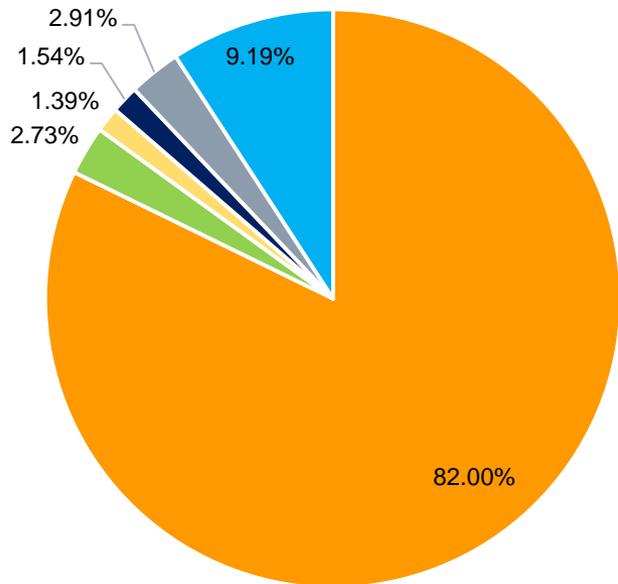
Regional spend:

- Defined by post code
- Some limitations to current reporting system
- Focus in 2020 to improve tracking, reporting and local engagement

Type	Spend
Motels / Hotels (Travel)	\$353,576
Credit Card Payments	\$460,768
Vendor Spend	\$4,045,551
Total	\$4,859,895

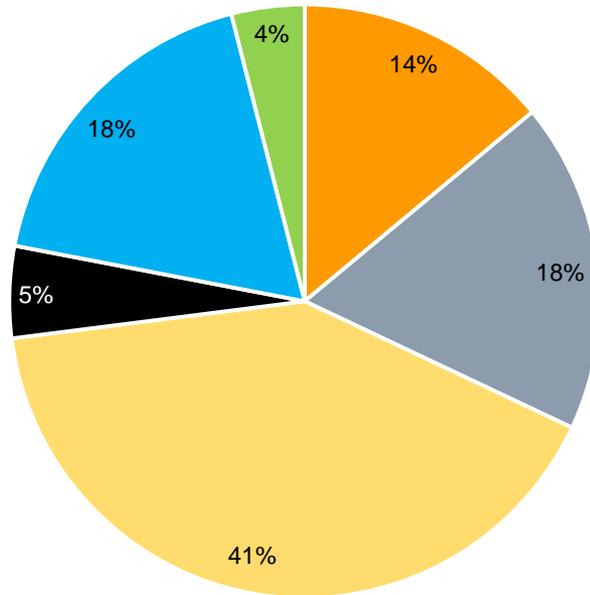


Credit card payments



- Accommodation
- Events & catering
- Consumables
- Other
- Field equipment & maintenance
- Meals while travelling

Purchase orders (incl. contracts)



- Construction
- Materials
- Operations & maintenance
- Professional services
- Transport & logistics
- Wells

2020

2025

2028



Wells and gathering

- Drilling
- Civil construction
- Logistics
- Telecommunications infrastructure
- Facility construction and upgrade
- Operations and maintenance

Field compression facilities

- Facility construction and equipment
- Power station
- Civil construction
- Logistics
- Operations and maintenance

Wells and gathering

- Drilling
- Civil construction
- Logistics
- Telecommunications infrastructure
- Operations and maintenance



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Community update

Liz Edwards
Manager Community & Communications
Arrow Energy

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Dalby Agricultural Scholarships Award Ceremony (2nd Mar):

- 10 students have been awarded Arrow Energy Scholarships enabling them to pursue agricultural studies at the Dalby SHS Bunya Campus.
- Scholarships are valued at \$5,000 each, which covers a large portion of the annual tuition and boarding costs.
- A total of 80 students have been awarded scholarships since 2013.

Dalby Youth Design-a-thon (23-25th Feb):

- Created to allow Year 9-12 students to engage with STEM related fields and bring their ideas to life.
- Over two days, 32 students pitched ideas, formed teams, made prototypes and presented their products to a panel of industry experts.
- Local teachers benefited from a full-day of Professional Development on STEM related topics.



Arrow Broncos Dalby Blitz
School Visits, Regional Dinner & Fan Day

2020 Indigenous Tertiary Scholarships Open
USQ, QUT, Griffith, CQUni, JCU



Free Kids Face Painting
Dalby Christmas Street Party



Waminda Services
Paddock to Plate Program



'R U Bogged Mate?' Workshop
Dalby Staff Toolbox Talk



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The role of gas in energy transition

Professor Andrew Garnett
*Director, Centre for Natural Gas
University of Queensland*

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Minutes of previous meeting
and actions

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Any other business

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