



Arrow Energy

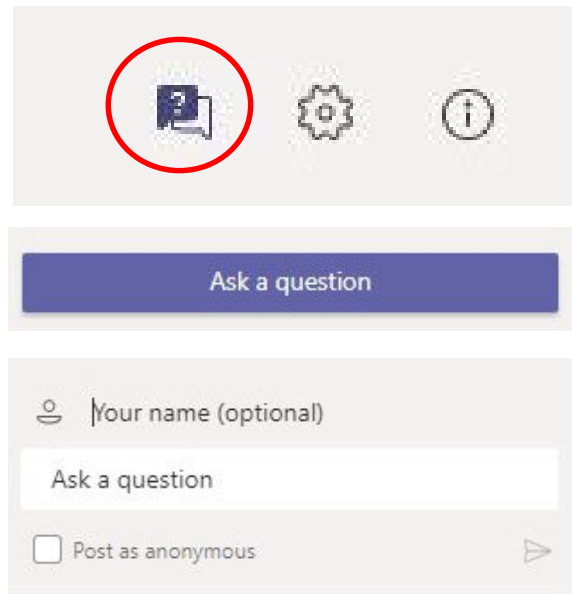
Surat Gas Project

September 2020

To ask a question:

- Select **Q&A button** on the top-right side of your screen to open
- Click on the '**Ask a question**' button
- Type your question in the compose box, and then select **Send**. If you want to ask your question anonymously, select '**Post as anonymous**'
- Attendees will be able to submit questions throughout the presentation using the Q&A feature
- You can also text your questions to: **0428 744 520**

Questions will be communicated to the presenters to answer at the end of the presentation.



Agenda

1

**Safety
moment and
about Arrow**

2

**Surat Gas
Project update**

3

Construction

4

**Beneficial Use
of Water**

5

**Jobs and
contracting**

PHOTO: Tipton Central Gas Processing Facility

Submit your questions.
Use the comment box, or text 0428 744 520.



Arrow Energy

**Safety Moment -
Cyber Security**



Safe Work. Strong Business.



Cybersecurity is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks.

Types of scams



Classified scams

Classified scams trick online shoppers on classified websites into thinking they are dealing with a legitimate contact but it is actually a scammer.



False billing

False billing scams request you or your business to pay fake invoices for directory listings, advertising, domain name renewals or office supplies that you did not order.



Phishing

Phishing scams are attempts by scammers to trick you into giving out your personal information such as your bank account numbers, passwords and credit card numbers.

More information

<https://www.cyber.gov.au/>

<https://www.scamwatch.gov.au/>

Protection

Example of Two Factor Authentication





- Arrow is an integrated energy company owned 50/50 by Shell and PetroChina
- ~1450 gas wells currently in the Surat and Bowen Basins in Queensland
 - five gas producing projects in the Surat and Bowen basins
 - gas supply to 4 power stations
- Existing domestic gas operations with generation capacity = supply for ~800,000 Queensland homes
- In April, Shareholders made a Final Investment Decision (FID) for phase one of the 27 year Surat Gas Project (SGP) project:
 - underpinned by the largest gas sales agreement on the east coast of Australia, with the Shell-QGC joint venture
- Construction now commencing
- Peak construction - 2021-2025; first gas - 2021

- Arrow's energy generation has steadily increased. Since 2018:
 - 108 wells drilled
 - 159 well workovers (wells maintained)
 - ~100km gas and water gathering pipelines
- Continued investment in facility improvements:
 - \$500 million to increase gas to the Daandine central gas processing facility (2016)
 - annual Central Gas Processing Facility (CGPF) maintenance for safe and sustainable production
 - 2 x Braemar 2 Power station overhauls
 - integrity check currently underway on Braemar 2 gas pipeline



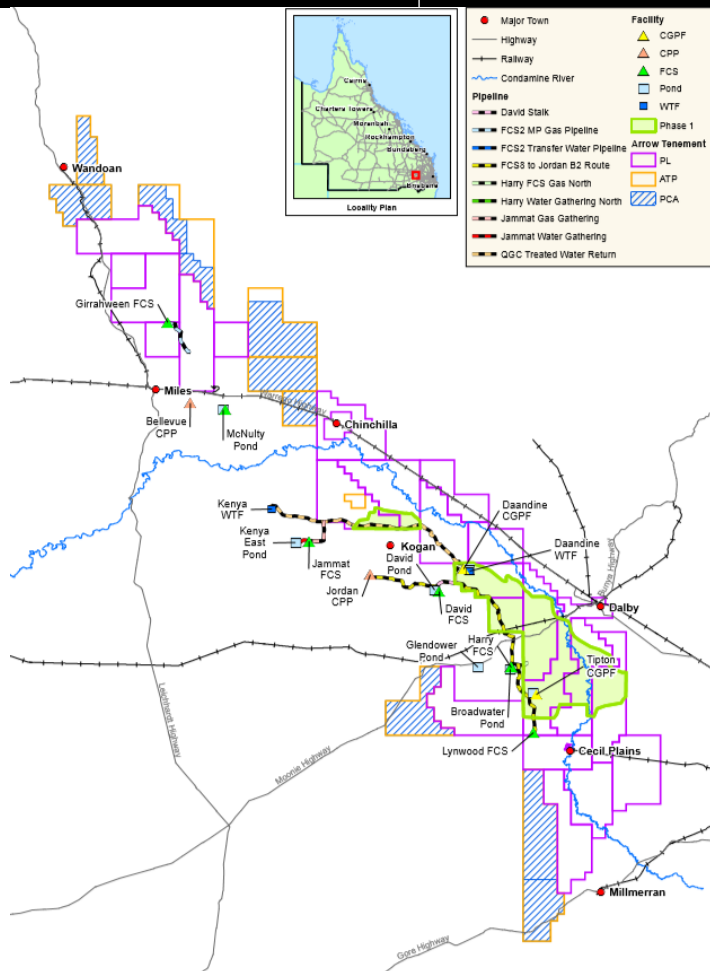


➤ Surat Gas Project Update

Submit your questions.
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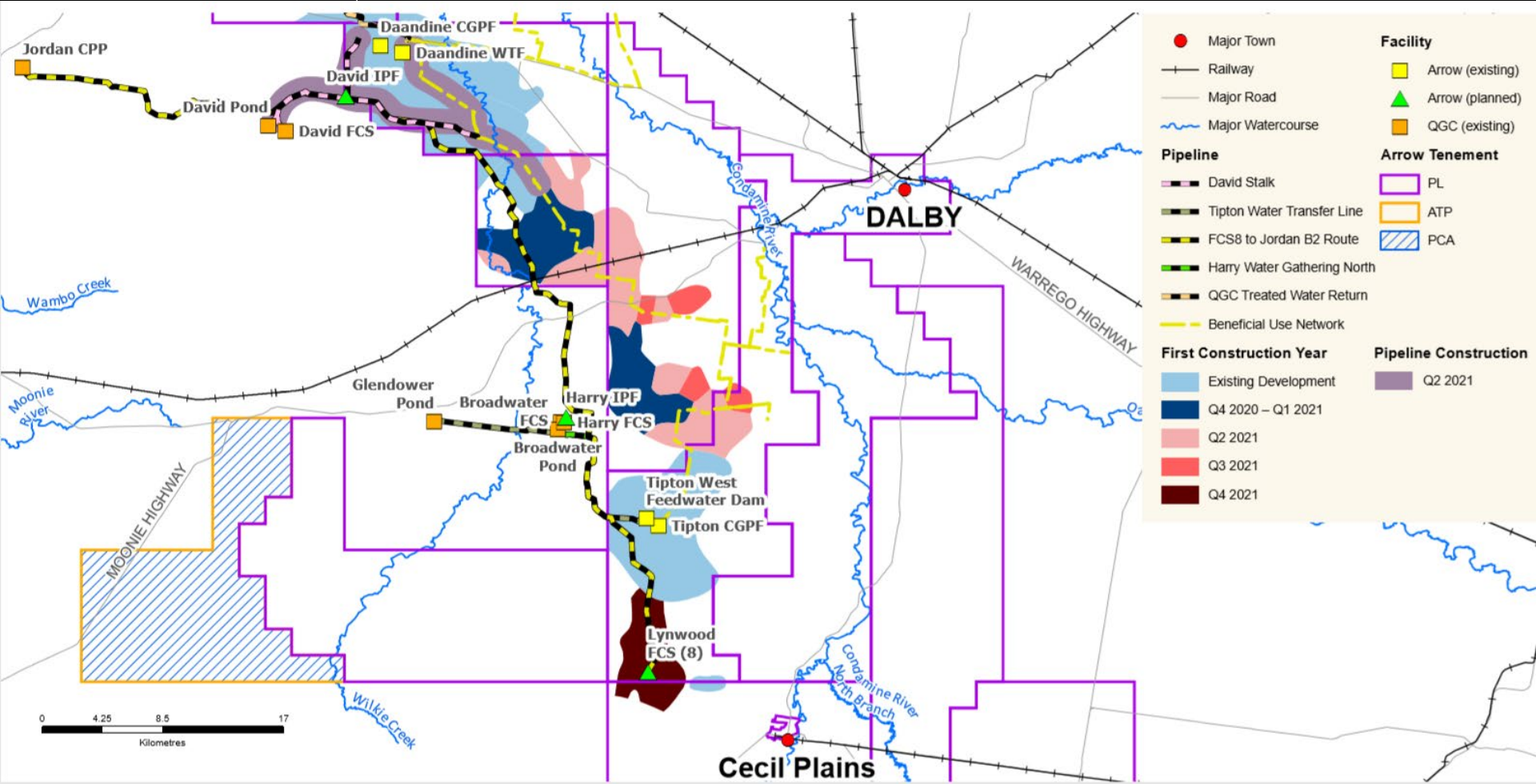
- Arrow will construct and operate the wells and pipelines:
 - use of existing Shell-QGC operated infrastructure to reduce impacts
 - gas feeds Arrow facilities, Shell-QGC operated Field Compression Stations (FCS) and Central Processing Plants (CPP)
 - ‘inlet processing facilities’ (IPFs) constructed by Arrow to allow gas into CPPs
- 15yrs+ of measured, sustained development:
 - ~3 drilling rigs, ~200 wells per year
 - sustained supply and procurement
 - learnings gained from other proponents
 - other proponents’ peak ramp up 4 x scale

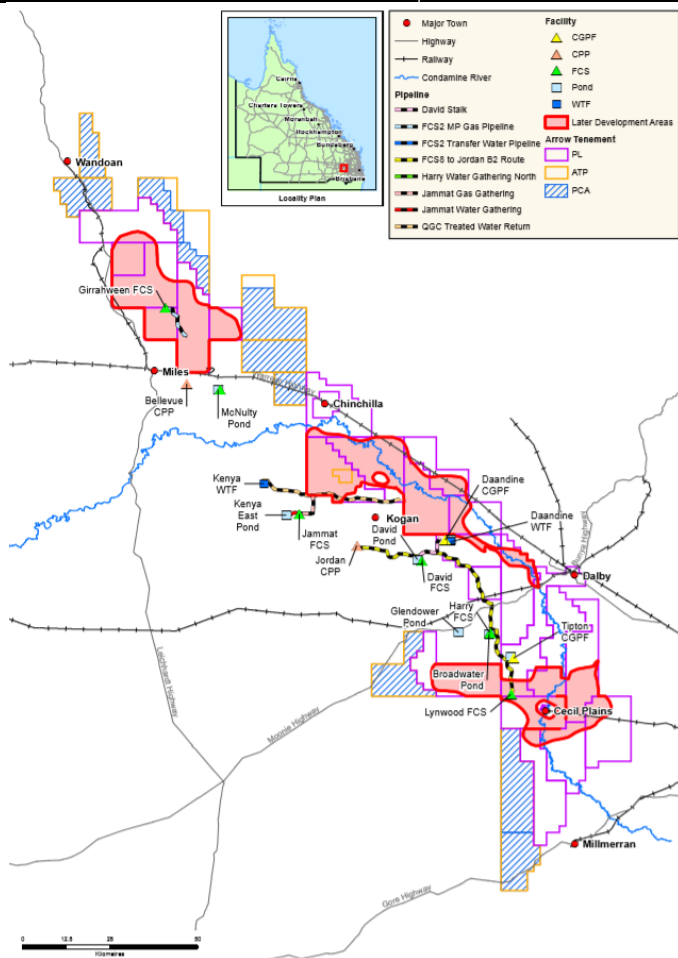


- Expansion of current operations between Daandine to Tipton:
 - 600+ wells and associated gathering; drilling starts 2020
 - new 'inlet processing facilities' (IPFs) at two Shell-QGC field compression stations (David, Harry)
 - David IPF the first delivery point; online early 2022
 - Arrow will continue using Daandine and Tipton compression facilities; upgrade at Tipton to extend its operating life
- New on and off-tenure gas/water pipelines to Shell-QGC facilities
- Upgrades to Arrow's water treatment facilities
- Treated Water Return Pipeline and Beneficial Use Network



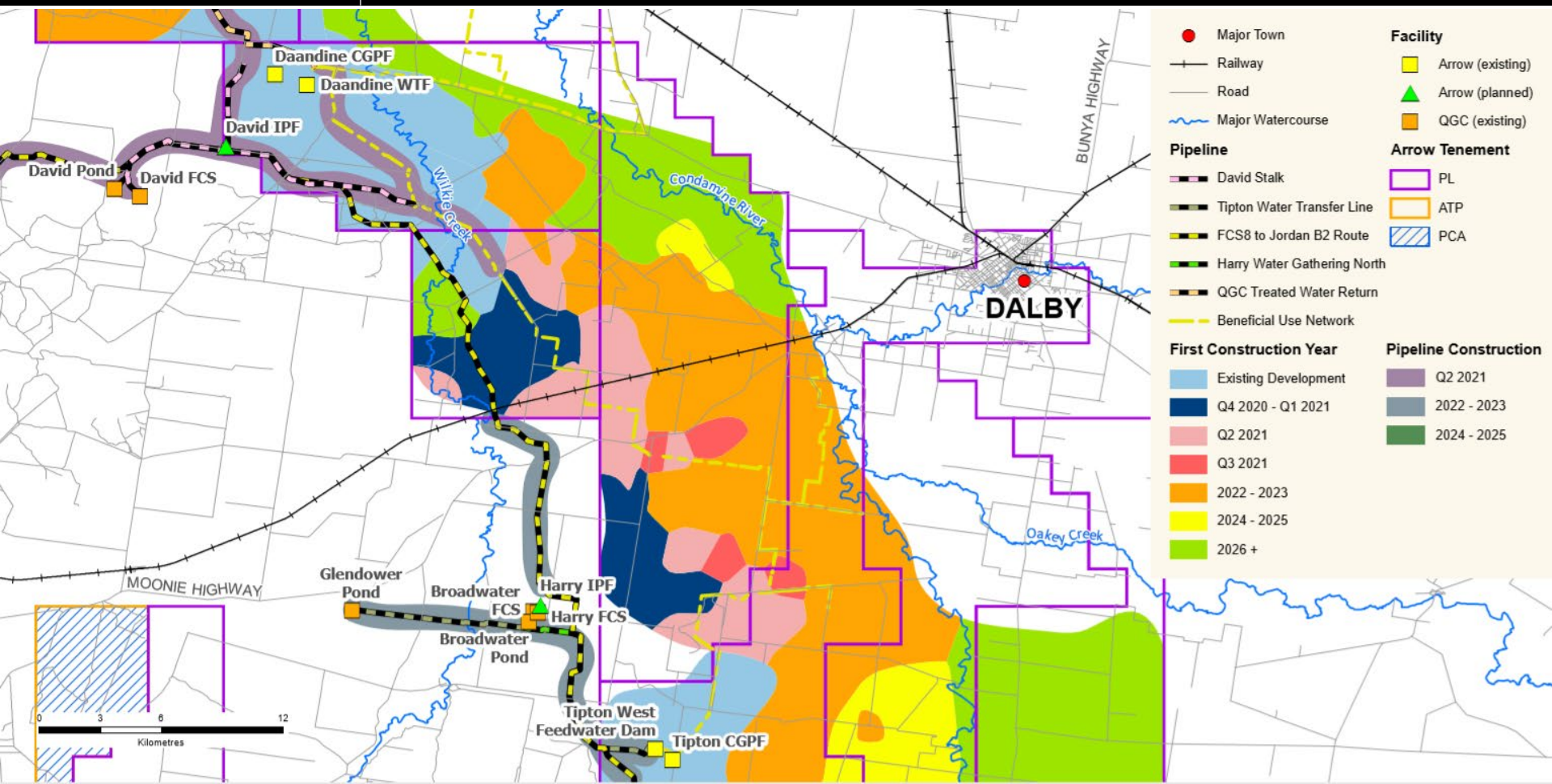
- Commencing 2020-2021:
 - 140 wells and associated gathering (including low point drains and high point vents) in areas between Daandine and Tipton
 - Pipelines including the beneficial use network
 - IPFs including David and Harry
 - Construction laydown areas nearby work fronts
 - Pipeline pressure tests
 - Local road maintenance and upgrades
 - Communications towers

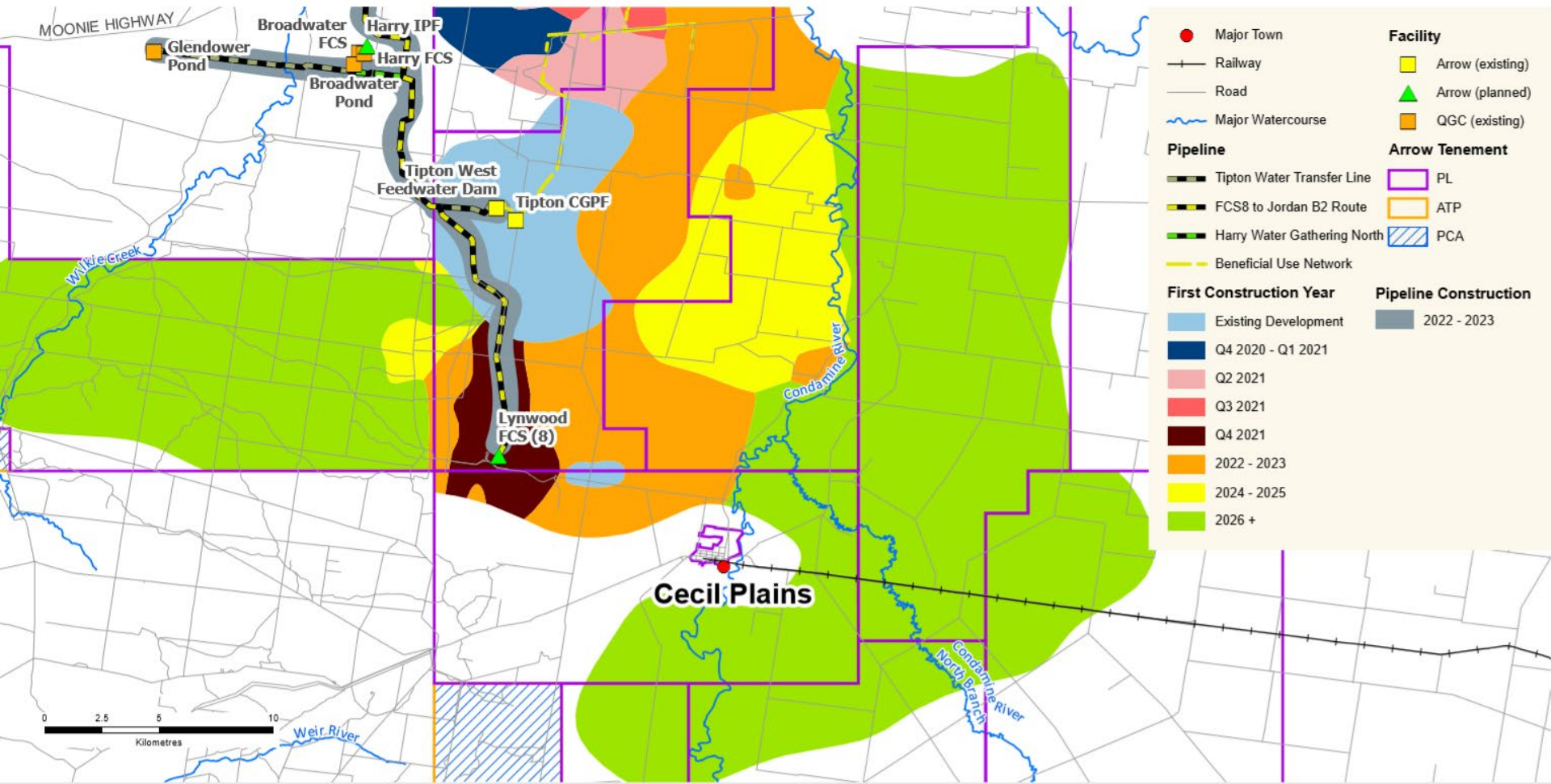


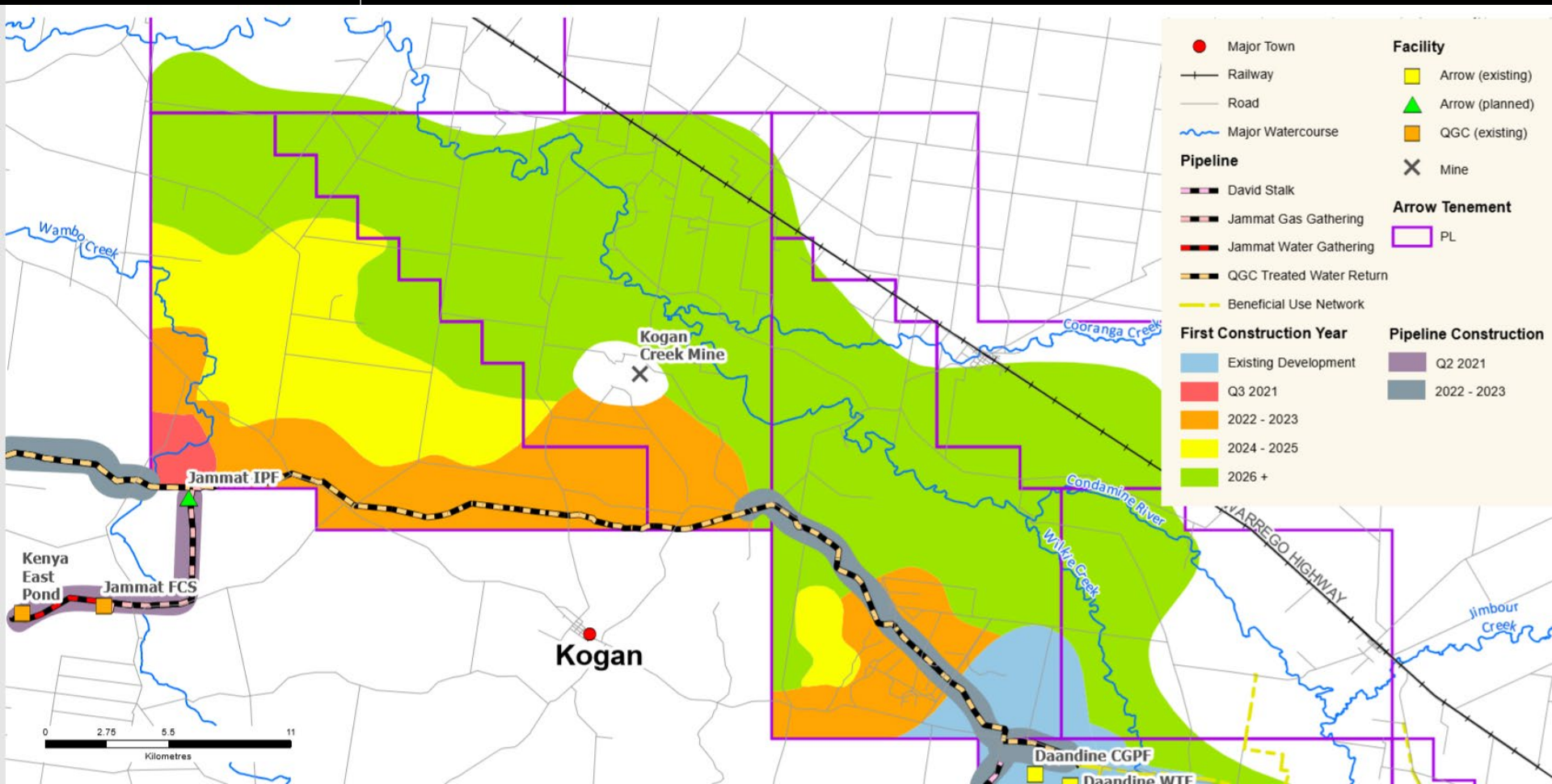


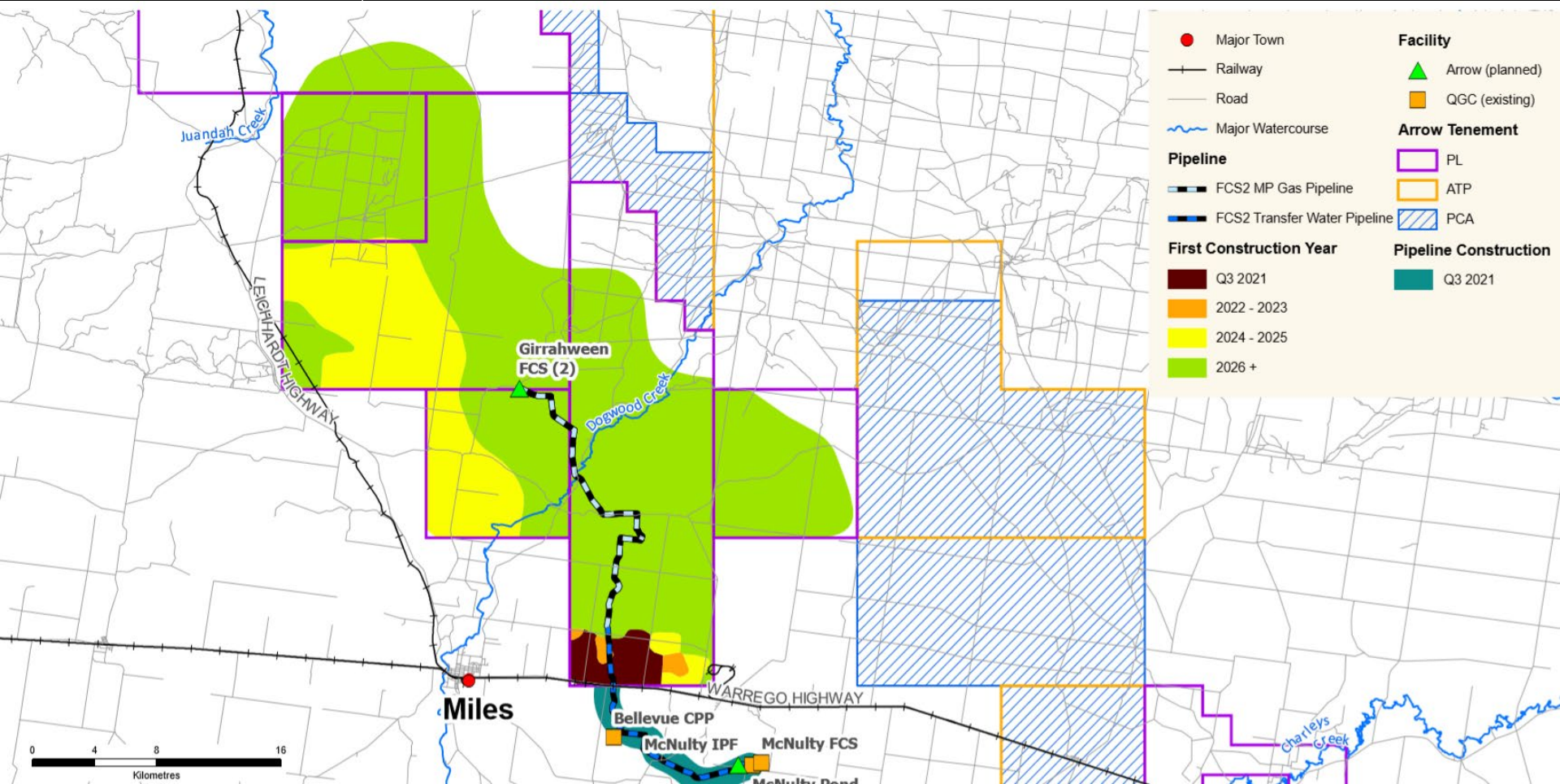
Subsequent phases will include:

- Two new field compression stations:
 - Lynwood, south of Arrow's Tipton development and Girrahween, north of Miles
- Two extra inlet processing facilities:
 - Shell-QGC operated Jammat and McNulty field compression stations
- ~1900 additional wells and gathering:
 - feeding QGC facilities, Lynwood and Girrahween FCSs
 - Between Miles and Wandoan, between Chinchilla and Kogan, east of Condamine river and south of Cecil Plains
- Arrow's fields will continue to expand with development beyond these phases. Ultimately, gas will be commercialised across Arrow's Surat tenure
- Planning for subsequent phases continues. Arrow will seek shareholder investment for phases as engineering definition is complete
















➤ Surat Gas Project construction








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- Typical construction workforce numbers:
 - Site prep: ~8 workers
 - Drilling: ~ 15 workers
 - Surface facility construction: ~10 workers
- Construction workforce accommodation:
 - existing Dalby accommodation (camp and local housing)
 - short-term ~30 person mobile camps for drilling contractors:
 - Stratheden (new)
 - Tipton, Daandine, Theten (existing)
- Lighting required short-term during 24-hour drilling
- Arrow will orientate lighting to minimise light spill

Wellpad cleared and levelled	4-8 days (depending on pad size)	
Drilling	4-7 days per well	
Installation of well surface facilities	30-90 days depending on well numbers	
Installation of water pump	5 days per well	
Well maintenance (workovers)	3-6 days per well	

- ~80 gathering construction workers on site at any one time covering number of work-fronts
- Construction timeframes vary
- Construction workforce:
 - Housed in Dalby in existing accommodation (mixture of existing camp, and local housing)



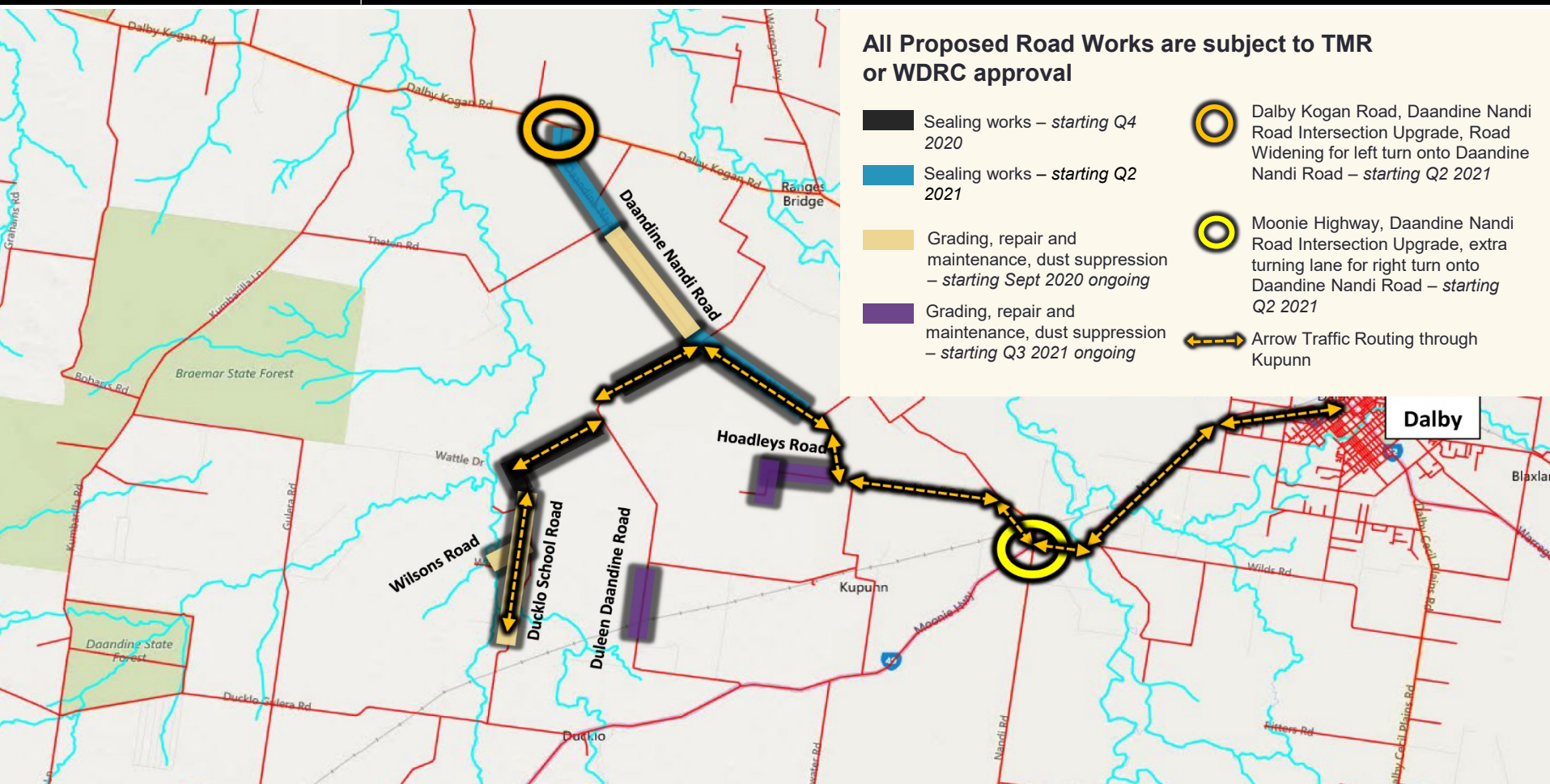
Right of way cleared and levelled, topsoil stockpiled	
Pipeline is laid out and welded in a continuous string	
The trench is excavated to at least 750mm to top of pipe, the pipe is lowered into the trench	
Above ground infrastructure (high-point vents, low point drains) are constructed	
The pipeline is pressure tested (road closures may be necessary)	
The right of way is rehabilitated	
During operations, maintenance will be required from time to time	



- Arrow is conditioned through regulation to manage traffic impacts
- A Traffic Impact Assessment has identified existing and projected increased traffic levels
- Road use plans identify strategies to reduce impacts during construction:
 - planning routes
 - using message signs on road verges
 - buses for construction staff
 - restricting speed (including on private roads and within 200m of homes)
 - in vehicle monitoring for staff
 - locating laydown areas near work fronts



- Roads will be maintained or upgraded where required to ensure road safety
- Dust impacts may occur during construction activities and are managed by:
 - minimised use of unsealed roads
 - dust suppression (water trucks)
 - restricted speed
 - road upgrades where required



- Most noise will occur during construction and drilling
- Once our infrastructure is installed and operating, noise will be less noticeable
- The Queensland Government prescribes noise limits
- In comparison to everyday noises:
 - a typical well is as loud as a window air-conditioner (at a typical well head)
 - outside a home, our noise limit is as loud as fridge during the day or a whisper at night
- Wells will be spaced away from homes at a distance to ensure noise limits are observed (unless agreed with land owners)
- If we cannot meet noise limits during construction, alternative arrangements will be offered (for neighbouring landholders), or specific conditions in CCAs (landholders hosting infrastructure)

Time period	Deemed background noise	Noise limit
7:00am – 6:00pm	35 dBA	40 dBA
6:00pm – 10:00pm	30 dBA	35 dBA
10:00pm – 6:00pm	25 dBA	28 dBA
6:00am – 7:00am	30 dBA	35 dBA
10:00pm – 7:00am (Construction, drilling activities and well maintenance)	25 dBA	33 dBA



- Flaring is the controlled burning of gas, a safety mechanism used at some facilities during maintenance and in emergency
- Up to seven permanent new flares will be required across the basin at IPFs as part of the SGP
- The impacts of flaring are being managed by:
 - construction of horizontal flares at Arrow's new facilities
 - constructing gathering lines to connect facilities (gas flows between facilities, reducing the need for unplanned flaring)
 - amending operational responses to reduce flaring instances

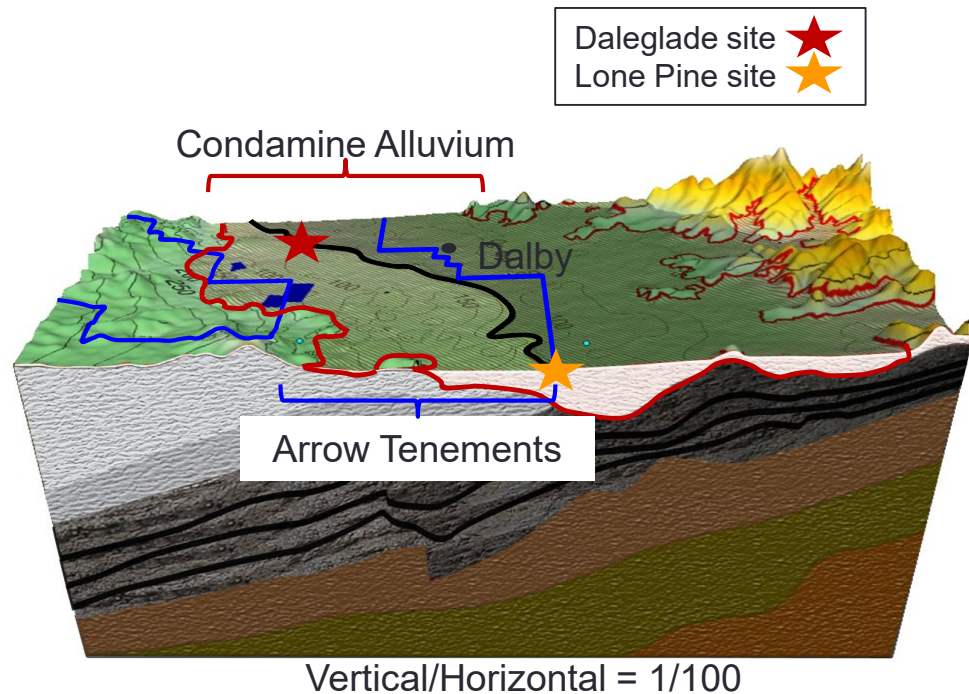
Example of horizontal flare

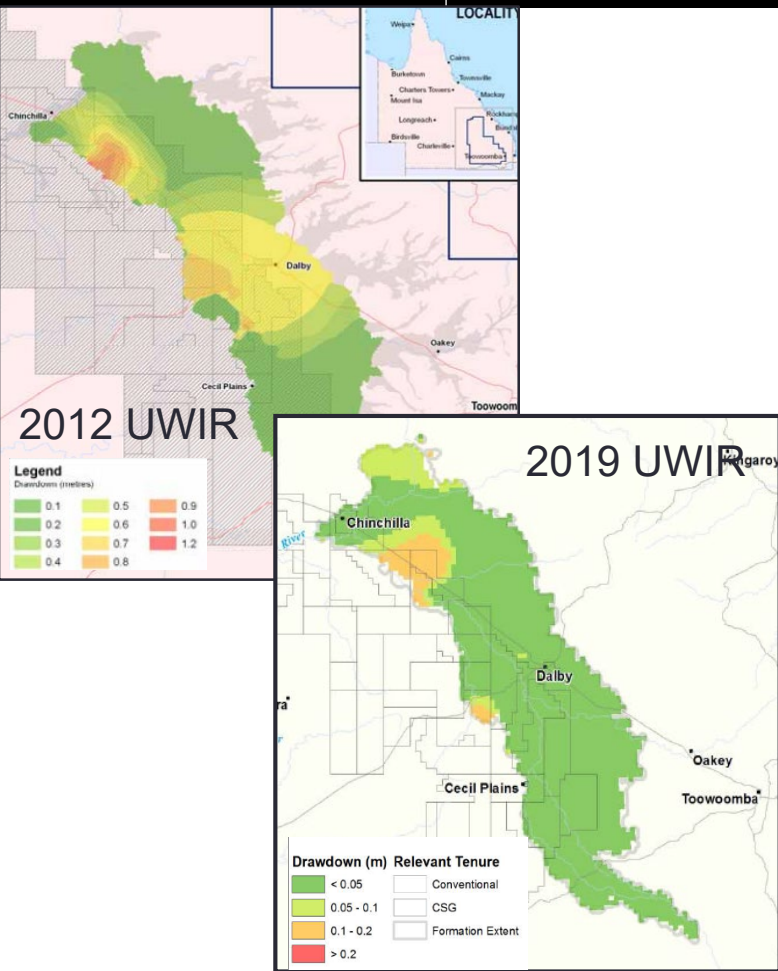


➤ Beneficial use of water

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- Concerns that CSG activity will impact the Condamine Alluvium (CA)
- Potential impact dependent on whether groundwater moves between the CA and Walloon Coal Measures (WCM)
- Research conducted over 8 years designed to provide scientific evidence
- Two research sites:
 - Daleglade – ~20 km west of Dalby where the CA directly overlies the WCM
 - Lone Pine – ~40 km south of Dalby where CA directly overlies the WCM
- Data collected from the tests verified only a low level of hydraulic connection





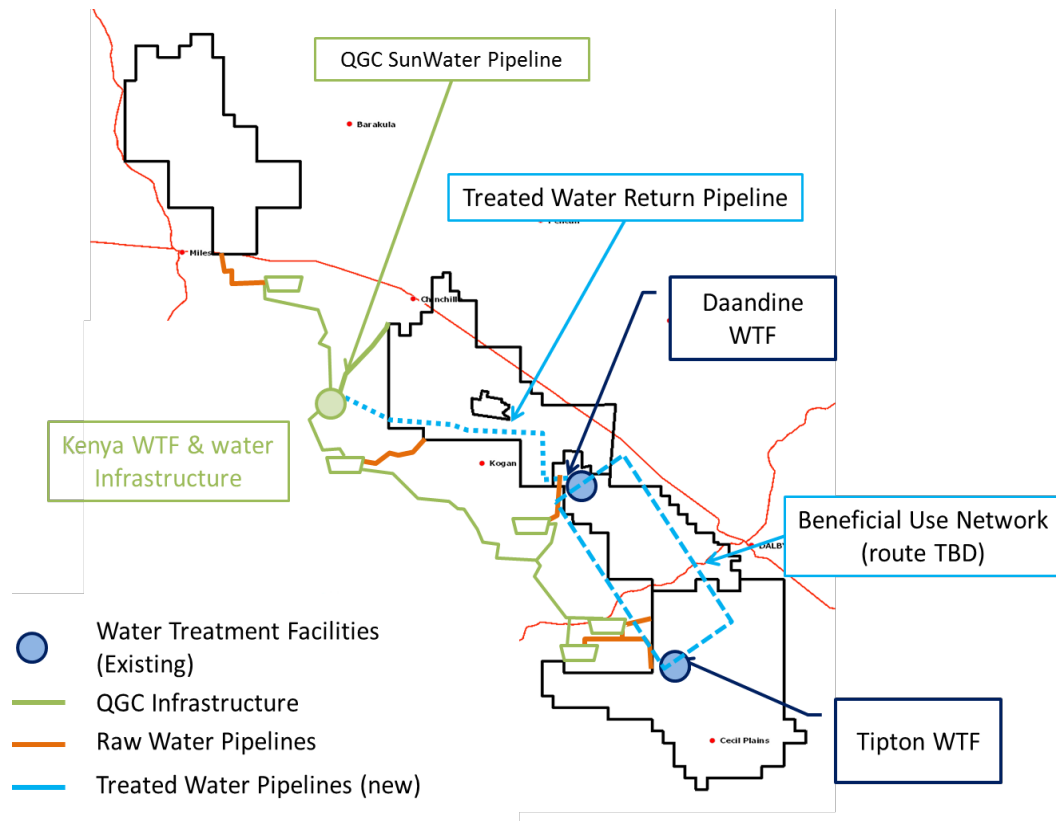
- Groundwater modelling predicted 63 GL less water in the Condamine Alluvium over 100 years
- Area of greatest impact on western boundary with **maximum** drawdown reduced to <5cm over 100 years
- To mitigate this, Arrow will:
 - Maximise beneficial use of produced water
 - Where practical, return water to the region from which it is produced
 - Offset our impact on the Condamine Alluvium in the area of greatest predicted Arrow drawdown
- Following previous community feedback, Arrow will undertake substitution of Condamine Alluvium allocations

Treatment

- Existing Arrow water infrastructure (Tipton & Daandine)
- Existing QGC water infrastructure (Kenya).

End use

- Existing QGC/SunWater pipeline
- New pipeline back to Condamine Alluvium region
- New beneficial use network.



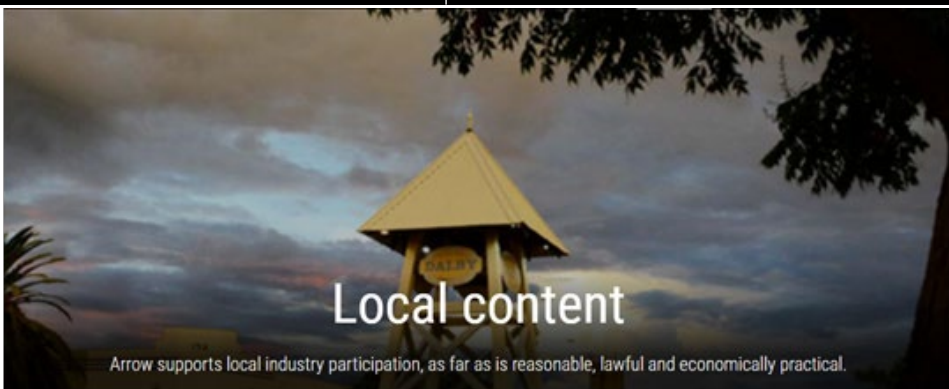


- Substitution of Condamine Alluvium allocation in the area of Arrow's greatest predicted drawdown
- Must achieve a substitution target (currently identified as 63GL)
- Losses from providing substitution water year-round be accounted for through a 'multiplier'
- Forecast volumes will change over time
- Beneficial Use Network (BUN) Committee established to gain irrigator insight to inform substitution scheme development
- Participant selection from early 2021



➤ Jobs and contracting

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Arrow operating in the Dalby region:

- 15+ years, providing and sustaining local jobs
- Contributed \$4.5M to the Western Downs local economy in 2019 through contracting packages alone
- 80% of our Surat Basin workforce resides locally
- Whanu Binal Indigenous Entrepreneur Program will help to increase the capacity of 100+ Indigenous businesses and entrepreneurs



Top 10 SGP phase one activities:

1. **Drilling**
2. **Well Services**
3. **Construction**
4. Engineering
5. Environment & Water Management
6. **Camps & Accommodation**
7. **Transport** and Warehouse
8. **Logistics**
9. Rotating Equipment
10. Other Maintenance and support contract

Highlighted activities require ramp up



Area	Category	Estimated Contract Value	2020			2021			
			Q2	Q3	Q4	Q1	Q2	Q3	Q4
Rigs and Well Services	Drilling Rigs								
	Completions / Workover Rigs								
	Geosteering								
	Cementing								
Materials	OCTG								
	ESP								
	Drill Bits								
	Wellheads								
	Wellhead Accessories								
	Drilling/Ops Chemicals								
Project Materials	Well Head Skids								
	Control Cabinets								
	HDPE Pipe & Fittings								
	Gensets								
	Flare								

Estimated Contract Value	
< \$50M	
\$50M - \$100M	
> \$100M	
Value TBD	

Area	Category	Estimated Contract Value	2020			2021			
			Q2	Q3	Q4	Q1	Q2	Q3	Q4
Logistics	Warehouse Services								
	Journey Management								
	3PL Transport								
Construction	CMSA Off Plot Surat								
	CMSA Off Plot Bowen								
	Water Treatment Upgrade								
	Dam Life Extension								
	Telecoms								
	Inlet Processing Facilities								
Engineering	Engineering MSA								
Operations and Maintenance	Waste Management Tender								

Estimated Contract Value

< \$50M

\$50M - \$100M

> \$100M

Value TBD



Finding opportunities

- Complete the *Supplier Registration Form* on the Supplier and Contractor Portal (Arrow's website)
- Dedicated information sessions in October, information out soon
- Local industry networks

Tendering

- Register with the Industry Capability Network (ICN) Gateway

Sub-contracting opportunities

- Contractors notify Arrow stakeholders of subcontractor opportunities
- Arrow's contracting requirements for local, Indigenous and regional opportunities will be cascaded to successful contractors and embedded in local content plans



- Landholder engagement continues
- Road maintenance now underway in Daandine/ Kupunn area
- Construction commencing early October in Duleen Kupunn area (site preparations followed by drilling)
- Planning for the Beneficial Use Network continues. Opportunities for allocation holders to register interest early 2021
- Supplier information sessions in October

Questions



PHOTO: Single well pad - Grassdale

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