Construction Phase

Chapter 07

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Current as of February 2022

THE GAS GUIDE

GasFields Commission Queensland

Construction Phase

You are here

This declares the start of a substantial financial commitment by the resource company, often running into millions of dollars. It can include the building and/or upgrading of vehicle access tracks, well pad development, drilling, well completion and the installation of aboveground infrastructure and pipelines.

The construction phase is the source of the most disruptive activity associated with petroleum and gas development. As a general rule, it can take 5-7 months from the start of a well pad to operational handover.

All the work you did building the relationship pays off again with open communication helping to reduce the 'irritant' factor.

LANDHOLDER TIP:

- Maintain regular and effective communication with your assigned land access/liaison officer
- Attend pre-construction meetings.

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GasFields Commission Queensland

Before work begins

In many cases the highly focussed nature of a CCA negotiation gives way to a period of relative inactivity as the resource company confirms its work program.

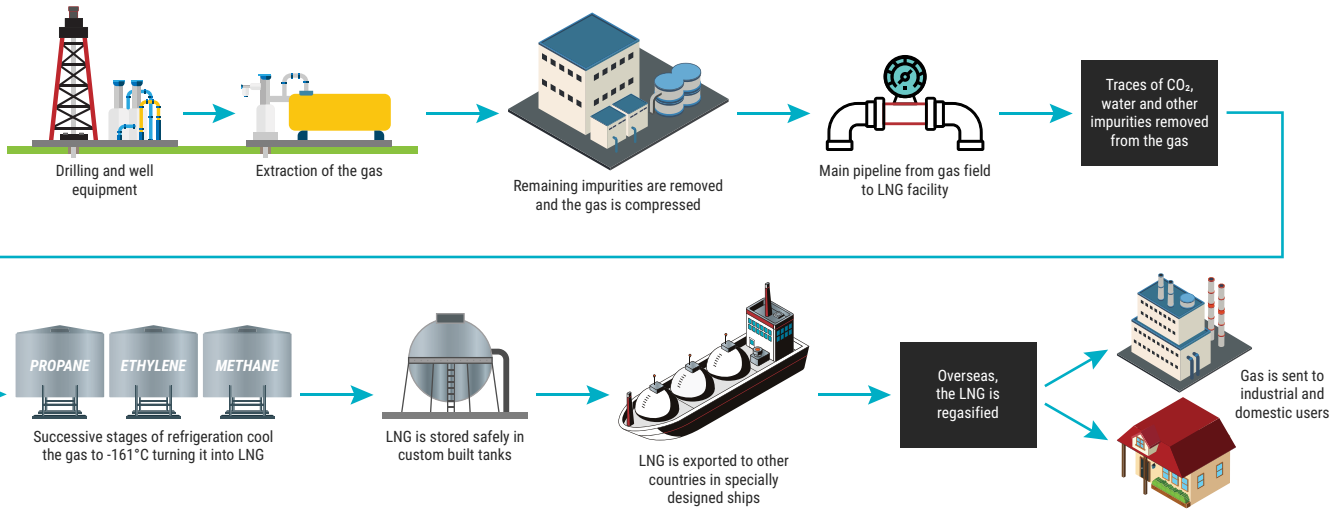
The resource company may arrange a pre-construction meeting on your property to brief workers, not only on the agreed access rules and conditions that you have negotiated, but also the company's proposed scope of works.

The landholder's attendance at this and other impromptu meetings is a sound investment in reinforcing the rules and expectations surrounding construction on your land.

Sharing your expert knowledge and getting to know the people and their roles helps build a respectful atmosphere.

LANDHOLDER TIP:
The construction phase is the most disruptive time; however the industry is continually developing new techniques to reduce time and property impacts.

How LNG is made



Construction phase

The types of activities generally associated with construction might include:

Access tracks

Access tracks give resource company employees and contractors the means of getting to and from work. Where practicable, a resource company will use existing tracks, which in some cases may require upgrading (at their expense) to accommodate large equipment including truck-mounted drilling rigs.

If new access tracks are needed, the resource company will consult the landholder to determine their best location to minimise disturbance. As a general rule, most new access tracks are located along previously cleared markers such as property boundaries and fence lines. Access tracks may need berms (or contours) constructed to reduce roadway and shoulder erosion. These are a project efficiency investment if done properly.

The resource company is required to maintain all tracks necessary for access to their infrastructure during its operational life. In many cases, landholders may see these tracks as a property improvement that they may like to retain as an asset after the gas operations have concluded. It's worth discussing this possibility with the resource company and relevant local authorities at the earliest opportunity.

LANDHOLDER TIP:
Resource companies place specific focus on establishing and maintaining good working relationships with landholders. Staff and contractors work to strict guidelines and standards of behaviour, but it is worth noting that best practice is effective and regular communication with your assigned land access/liaison officer.

Drilling gas wells

The site chosen for a gas well is generally cleared and levelled (commonly referred to as a well pad). Because of the equipment in play and for the safety of workers initiating construction, the pad area is noticeably larger than that required when the well is commissioned.

Drilling rigs construct the well from which petroleum and gas is extracted. Several rigs may be used as wells are installed in multiple stages.

As each section is drilled, casing is installed and secured before the next stage. There will be a significant amount of activity on the well pad during the drilling phase.

Once the well becomes operational, the well pad is reduced in size to minimise its footprint and previously disturbed land is rehabilitated however the well pad area needs to remain large enough to accommodate a workover rig for future maintenance.

Click here to view a time-lapse video of a Santos gas well (north of Wallumbilla in Queensland) being drilled and completed in under three days.

In 2021 a number of Western Downs landholders raised concerns to the GasFields Commission about the processes and potential impacts of directional drilling activities under their properties. In response to these concerns and to clarify the existing regulatory framework, the Department of Resources has released a 'Directional Drilling' fact sheet that sets out the "regulatory requirements for resource authority holders to access private land to carry out directional drilling activities on adjacent land, and the landholder rights that would apply in that scenario". For more information visit: **www.gfcq.org.au/directional-drilling-fact-sheet/**


RESOURCES

Considerations when accessing private land to carry out directional drilling on adjacent land

'Land' in the context of the Land Access Framework

Directional Drilling – Preliminary or Advanced Activity?

Entry Notice Requirements

Types of gas wells and well pads

The purpose of exploration activities is to identity geological conditions or "targets" that may contain a petroleum or gas resource. Drilling exploration wells into targets may lead to making a discovery. Further analysis and appraisal is generally required to determine if the discovery contains commercial quantities of petroleum and gas for future development and production. Appraisal and development wells need to be "completed" before production can commence. The completion of a well includes the installation of above and below ground equipment and facilities.

Well sites are located to maximize the chances of intersecting subsurface target formations and to minimise surface disturbance. Land access will need to be agreed with the landholder prior to a well being drilled. Best practice to minimise surface disturbance includes consultation with the landholder to select an optimal well location.

Gas wells

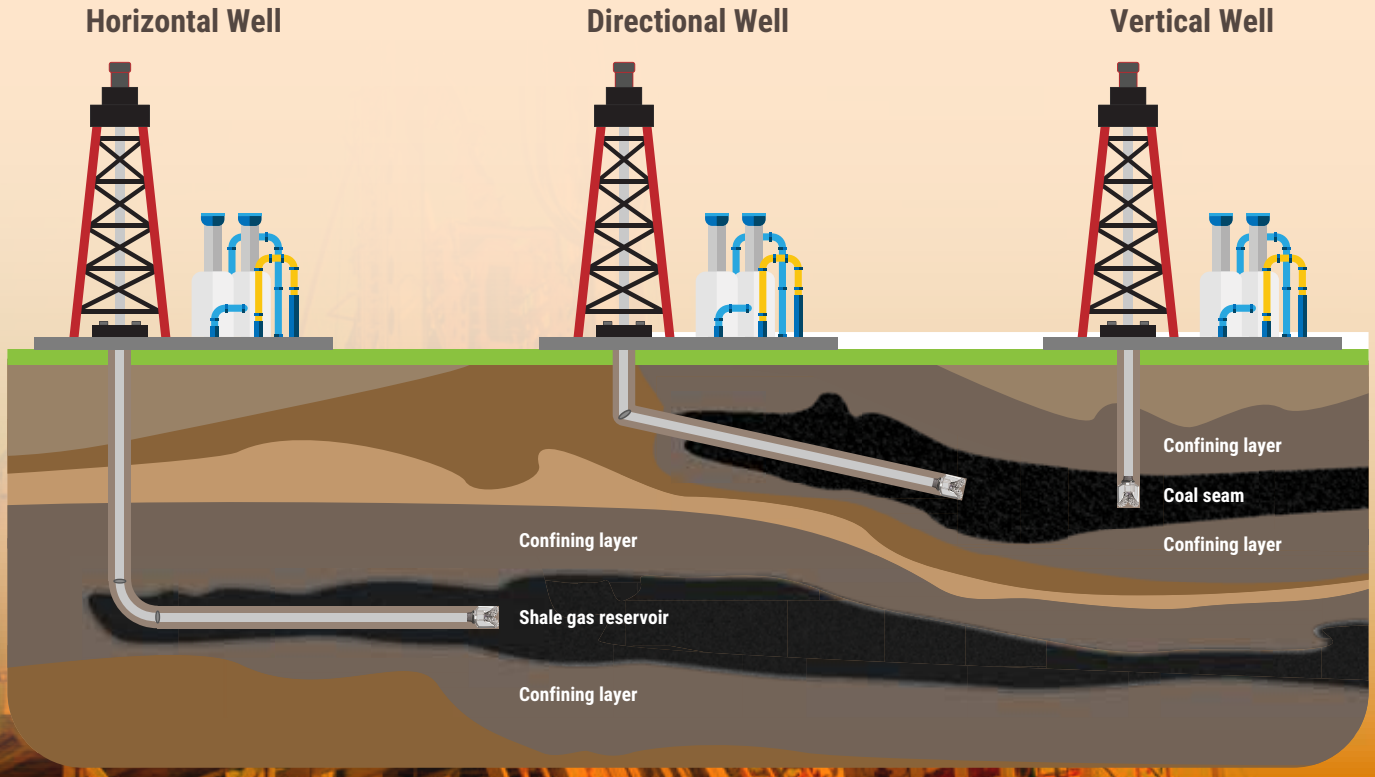
Queensland's onshore gas industry typically utilises three different well types for gas exploration and production:

1. **Vertical wells**, as the name suggests are drilled vertically straight down into a target formation. Typically, CSG wells are vertical wells. The primary benefit of a vertical well is its simplicity and the method has been tried and tested to be successful. As a result of the proven technique, a benefit of vertical wells is that they are relatively cost effective to drill and can minimise the disturbance to landholders.
2. **Directional wells** involve drilling a well at non-vertical and non-horizontal angles. **Directional drilling** allows a resource company to intersect target formations where vertical wells are not possible or practical. **Directional wells** are also used where multiple wells are drilled from the same well pad location, referred to as a multi-well pad.
3. **Horizontal wells** can be drilled along a target formation. This type of well typically involves drilling a vertical well to the desired depth and then steering the drill bit to travel horizontally along a target formation. The benefit of horizontal wells is that intersection with target formations is maximised, which reduces the overall number of wells required to be drilled.

Well pads

There are two well pad types commonly built in Queensland to accommodate the three different types of gas wells:

1. **Single well pads** house only one well type, with the main benefit being a smaller well pad footprint (usually 100m x 100m in size).
2. **Multi-well pads** allow multiple wells to be drilled on a single pad. The benefits include a smaller over-all footprint per well, fewer well pads on a property, a greater distance between pads (up to 2.4km), less gathering pipelines and access required by the resource company, and the ability to locate pads in paddock corners/less productive areas for a better fit with existing farming practices.

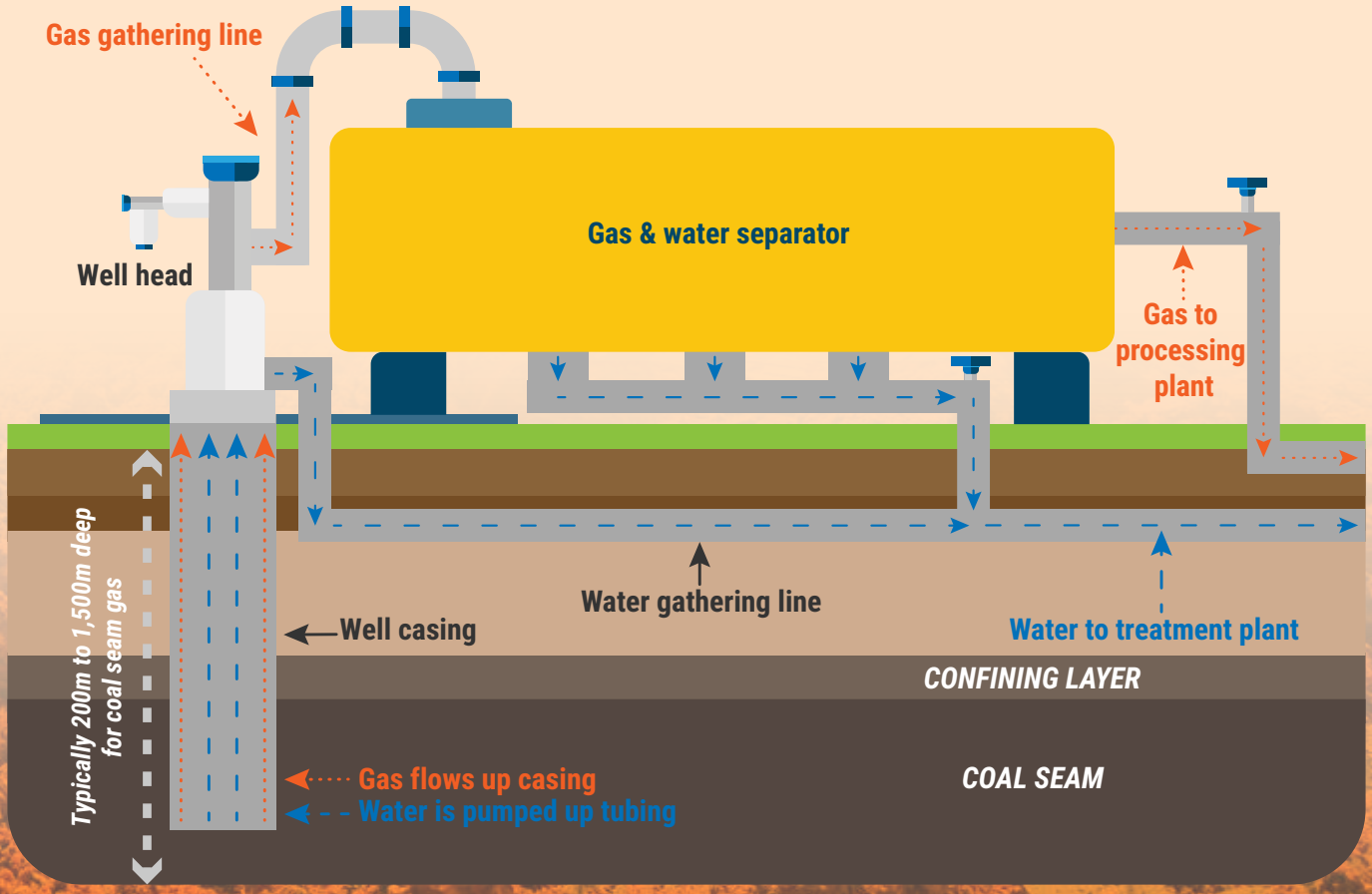


Aboveground facilities

After a well has been drilled it needs to be "completed". Completing a well involves making it ready for appraisal and/or production and includes the installation of belowground and aboveground equipment/facilities. Well completion includes the installation of production tubing and pumps belowground, plus the installation of the wellhead and associated valves and piping aboveground. Aboveground well facilities are typically required for production and appraisal wells. The aboveground facilities ensure the safe and controlled production of gas and water and typically include:

- Water/gas separator – a mounted unit that safely separates water and gas and controls the flow into the belowground pipe system
- Power unit – powers a pump at the bottom of the well
- Remote terminal unit – links the well to a control system for remote monitoring and operation
- Solids disposal tank – a collection vessel for sediment that collects in the separator.

How it works



Case study

Santos GLNG Construction Efficiency Improvements

Santos has developed a number of ways to reduce the time it spends and the disturbance it causes during the construction phase.

1. DRILLING DAYS

Since 2015, the average number of days taken to drill a CSG well has fallen from more than 11 days to around 3 days, a reduction of more than 71%. New drilling technology has resulted in a reduction in the time Santos needs to spend on a landholder's property.

2. WELL PAD CONSTRUCTION

Santos has also introduced the concept of 'minimal disturbance' well pads that significantly reduce the physical work and disturbance to ground cover when constructing a well pad.

In most scenarios the well pad no longer needs to be exactly level – previous cut-and-fill activity is now replaced by simply mowing the grass.

These changes further reduce the time work crews spend on the property as well as the time needed to rehabilitate the site.

3. DEVELOPMENT ACTIVITY

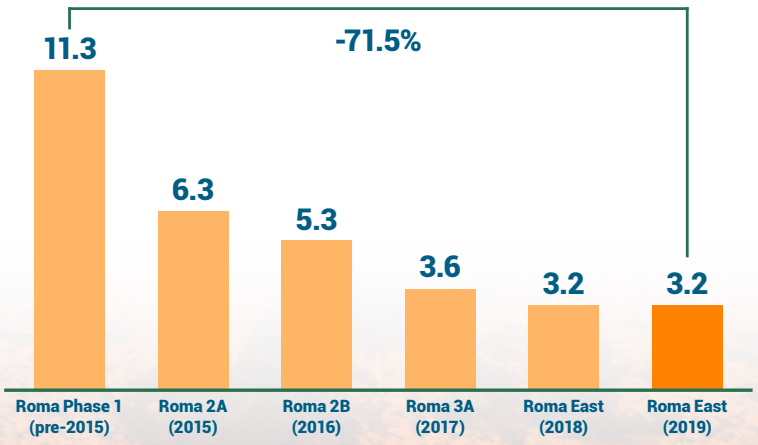
Standardisation of infrastructure such as fences and grids has improved the efficiency and quality of installation and reduced the amount of rework required.

Improved up-front planning, involving experts from land access, engineering, cultural heritage and environment teams among others, means Santos now makes less visits to the landholder's property before construction and there are less people involved on the ground, minimising disturbance to the landholder's activities.

Co-locating buried infrastructure (running multiple lines in one trench) where possible has also reduced the width of right of ways and minimised disturbance.

Days development drilling

Average days rig release to rig release



Source: Santos 2020

Additional infrastructure

This may include but is not limited to:

- Large pipelines that connect field compression stations to central processing plants
- Dams that store water produced from wells to be ultimately transported via pipeline to a water treatment plant for beneficial use
- Temporary camp(s) for resource company staff and contractors
- Gravel pits to supply gravel used to build access tracks and well pads
- Aboveground infrastructure associated with gas gathering such as high point vents (HPVs) or low point drains (LPDs)
- Laydown areas for storing materials associated with activities in the area
- Communication towers.

High point vents

Low point drain

Gas gathering

A production well is connected to an underground pipe system, commonly known as gathering lines that transports gas and associated water to processing and treatment facilities.

A trench is dug for the gathering lines to be lowered into the ground. The trench is filled with excavated material and the area where the gathering lines is buried (i.e. 'right of way') is covered with topsoil and reseeded.

Where possible, gathering lines are located alongside access tracks or cleared areas such as property boundaries to minimise impact and allow for regular property activities on the surface.

In some developments HPVs and LPDs may be necessary to optimise the movement of gas and water through the gathering lines.

HPVs are installed in water lines typically at higher points in the typography to allow any remaining gas dissolved in the water to escape.

LPDs are typically installed in gas lines at lower lying areas to allow for the removal of any condensed water.

Both HPVs and LPDs occupy relatively small areas of land.

Commissioning & startup

After system compliance checks and strength testing of all aboveground facilities and the gathering network has been completed, the well is ready to be turned on to start producing gas.

Petroleum wells, gathering systems and processing facilities are constructed to Australian or international standards or codes of practices where applicable.

Pressure testing occurs prior to commissioning to verify the integrity of the plant and the operators conduct routine monitoring to ensure ongoing safe operation.

Source: Petroleum and Gas Inspectorate – Code of Practice - For the construction and abandonment of petroleum wells and associated bores in Queensland (RSHQ, 2019)

Noise, light & dust

In Queensland, resource companies are subject to strict environmental assessment processes. Before a resource company can commence any on ground activity they must hold a current EA issued under the *Environmental Protection Act 1994* (currently administered by DES). The resource company is required to provide detailed information about the potential environment impacts during construction and operation such as light, noise and dust. The resource company will also need to describe how they intend to control and minimise potential impacts of environmental impacts or nuisances as part of the EA assessment process.

An approved EA sets the conditions that require resource companies to not cause environmental nuisance from noise at a sensitive receptor (a place where noise is measured to investigate whether impacts are occurring) or from dust, odour, light or smoke at a sensitive place (i.e. a dwelling, library, childcare centre, medical centre or a public park).

There are provisions for alternative arrangements between a resource company and a neighbouring landholder. An alternative arrangement refers to a written agreement between the holder of an EA and an affected or potentially affected person at a sensitive receptor site. The alternative arrangement dictates the way in which a particular nuisance impact will be dealt with.