5 LAND USE AND INFRASTRUCTURE

5.1 INTRODUCTION

This chapter provides responses to submissions received on the Queensland Curtis LNG (QCLNG) Project's draft environmental impact statement (EIS) related to land use and infrastructure of the Gas Field Component.

Impacts on land use and infrastructure as a result of changes to the Project description, as detailed in *Volume 2, Chapters 7 and 11*, are described along with mitigation measures.

5.2 SUBMISSIONS RECEIVED

Table 3.5.1 provides a summary of, and responses to, the submissions received on land use and infrastructure of the Gas Field.

Table 3.5.1 Responses to Submissions on the Draft EIS

Issue Raised	QCLNG Response	Relevant Submissions(s)
QGC and Xstrata Coal Queensland should co-operate over issues such as overlapping tenures and common infrastructure requirements, the supply of Associated Water and biodiversity offsets. Underground coal gasification (UCG) companies with overlapping tenements should be consulted about potential impacts and mitigation measures.	Refer to *Section 5.4.4*	*18, 38*
Proposed quarries are on State land.	Refer to *Section 5.4.5.*	*32*
There could be between 2,000 and 3,600 gas wells in the rural residential area. Between 12,000 and 20,000 wells may be drilled.	The rural residential zone, as declared under the Western Downs Regional Council (WDRC) planning scheme, accounts for 21,600 ha or 5 per cent of the total Gas Field area of 468,700 ha. Assuming wells are evenly spaced across all Gas Field tenements, there will be approximately 300 wells in the rural residential zone. QGC has determined that the average well spacing for optimal gas production is 750 m, based on the gas content, pressure and permeability of coal seams. At this spacing, approximately 6,000 wells will be drilled.	*11, 9, 12*

Issue Raised	QCLNG Response	Relevant Submissions(s)
Details of expected flights into the WDRC area, the impact on aerodromes and potential contributions to upgrades and maintenance.	Refer *Section 1.4.7*.	*36*

5.3 CHANGES TO THE PROJECT DESCRIPTION

Changes to the Gas Field Component description are provided in *Volume 2, Chapters 7* and *11.* A change to the assessment of impacts on land use and infrastructure has resulted in:

- an increase in the estimated footprint, before progressive rehabilitation, from 15,100 ha to 26,800 ha
- the development of borrow pits with a footprint of approximately 420 ha
- the use of power lines to connect field compression stations (FCSs) and the central processing plants (CPPs) to the electricity transmission grid
- the use of existing airports for personnel flights.

5.3.1 Change to Gas Field Infrastructure Footprint

Operational and construction activities within the Gas Field will impact on land use and infrastructure. These activities are described in *Volume 2, Chapters 7* and *11*, of both the draft and supplementary EIS. It is estimated that the majority of construction activity will take approximately 24 months between 2011 and 2013, with operations and ongoing construction for at least 20 years from 2014. A secondary construction peak is expected in 2018-19. Disturbances expected as a result of these activities before and after progressive rehabilitation, which aims to mitigate ongoing impacts as soon as possible after a disturbance, are presented in *Table 3.5.2*. Final rehabilitation will occur after full decommissioning of the areas of disturbance.

Table 3.5.2 Disturbance Area Before and After Progressive Rehabilitation

Activity/ Infrastructure	Draft EIS – Disturbance Area (ha)		Supplementary EIS – Disturbance Area (ha)	
	Before rehabilitation	After rehabilitation	Before rehabilitation	After rehabilitation
Gas Wells	6,000	3,000	6,000	3,000
Borrow Pits	Independent supplier	n/a	420	0
Gas/Water Gathering Line Easements	3,750	750	15,600	6,800
Gas and Water Trunklines (including power transmission)	3,600	720	1,600	550
Gas Collection Laterals	400	80	0	0
FCSs and CPPs	200	200	500	500
Water Treatment Plants	24	24	75	75
Ponds, including brine ponds and brine evaporation basins	250	250	665	665
Salt landfill	Not specified	Not specified	50	50
Access Tracks	800	720	1,600	1440
Construction Camps	65	15	250	60
Total Area	**15,089**	**5,759**	**26,760**	**13,140**
Percentage of Gas Field[1]	**3.2per cent**	**1.2 per cent**	**5.7 per cent**	**2.8 per cent**

1 Based on a total Gas Field tenement area of 468,700 ha.

The total estimated footprint before progressive rehabilitation has increased by approximately 11,700 ha (or 77 per cent), from 15,100 ha (draft EIS) to 26,800 ha (sEIS). This represents an increase from 3.2 per cent to 5.7 per cent of the total tenement area of the Gas Field. Progressive rehabilitation will reduce the construction footprint from an estimated 26,800 ha to 13,200 ha. Compared to the draft EIS, the footprint following progressive rehabilitation will have increased by approximately 7,400 ha, from approximately 5,800 ha (1.2 per cent of the Gas Field) to approximately 13,200 ha (2.8 per cent of the Gas Field).

The majority of the increase from the draft EIS to the sEIS is as a result of the larger easement footprint for the gas and water gathering line, from approximately 3,750 ha to 15,600 ha. However, gathering line easements will be progressively rehabilitated once the pipelines are installed, reducing the footprint to 6,800 ha. As such, the remaining footprint has increased from 750 ha in the draft EIS to 6,800 ha in the sEIS.

5.3.2 Assessment of Impacts

The draft EIS described the potential impacts of the Gas Field development on land use and infrastructure. The nature of the impacts described in *Volume 3, Section 5.2.2* of the draft EIS is unchanged. However, due to the increase in the Project footprint, the magnitude and extent of impacts may have increased. Following progressive rehabilitation, the expected Project footprint has increased by approximately 1.5 per cent of the total Gas Field. QGC does not expect this increase, when spread across multiple, discrete disturbances, to result in significantly greater impacts on land use and infrastructure. Additional mitigation measures are proposed where the footprint may create additional impacts to those described in the draft EIS.

5.4 MITIGATION MEASURES

The mitigation measures described in *Section 5.3* of the draft EIS are substantially unchanged. Additional mitigation measures required as a result of changes in the Project description are described below.

5.4.1 Urban/Rural/Recreational/Residential Zones

Gas Field development will not be conducted in existing urban, residential and recreational areas as defined under local planning schemes. Proximity to such areas will be determined by safety and separation distances nominated in these planning schemes, by regulatory restrictions and as a result of consultation with the community.

QGC has drafted a Code of Conduct for Operations in Rural Residential Land. This draft code will be finalised in consultation with communities in the Gas Field area. The code will set minimum distances between activities and dwellings, as well no-go zones for well development on blocks of less than 12 ha.

5.4.2 Agricultural – Pastoral

5.4.2.1 Land Contamination

Potential contamination of land and subsequent mitigation measures are described in *Volume 3, Chapter 6* of the sEIS.

5.4.2.2 Land Fragmentation

It is estimated that wells will be sited at approximately 750 m spacing across all tenements. For technical, social, commercial and environmental reasons, approximately 20 per cent to 30 per cent of tenements will not have wells. Progressive rehabilitation of well sites, gathering systems and access tracks will reduce the impact on farming practices.

QGC is investigating ploughing-in technology as an alternative to trenching for installation of gathering lines. If practicable, this could significantly reduce the easement width required for gas and water gathering lines.

Where multiple gas and water gathering lines or trunklines are proposed in the same easement, QGC will investigate the feasibility of merging multiple gathering lines or trunklines into a single, larger gathering line or trunkline in order to reduce the easement width required. However, merging of pipelines would require additional surface infrastructure such as scraper stations.

The selection of locations for well sites and gathering lines will be conducted in consultation with the relevant landholders. This should result, as far as is reasonably practicable, in the siting of wells and gathering systems within individual paddocks in order to minimise disruption to farming and the total area impacted for individual landholders.

5.4.3 Agricultural – Cropping and GQAL

5.4.3.1 Land Fragmentation

Infrastructure will be sited after close consultation with landholders in order to minimise impacts on cropping practices, i.e. along access tracks or farm boundaries. Potential well-drilling techniques such as multiple wells from a single site will be investigated by QGC as a means of helping to minimise disturbances to cropping land.

5.4.4 Mining Tenures and Economic Mineralisation

5.4.4.1 Sterilisation of Mining Resources

The predominant mineral resource located in the Gas Field area is coal, with small areas of bentonite.

Land overlaid by mining permits, claims and leases is subject to the provisions of the *Minerals Resources Act 1989 (Qld)* (MR Act). QGC has considered the relevant provisions of the MR Act in determining the current proposed Gas Field petroleum tenures and will consult with mining and exploration companies to determine the preferred strategy to meet current and future needs.

Queensland's petroleum and mineral resources legislation provides a framework for consultation and co-ordination with those exploring or seeking to develop coal resources (*Part 8* of the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) and *Part 7AA* of the *Mineral Resources Act 1989* (Qld) respectively). Consistent with this framework, QGC will continue to engage the holders of overlapping coal and UCG tenures.

QGC is also represented on the Industry Consultative Committee, established pursuant to the Queensland Government's Underground Coal Gasification Policy announced on 18 February 2009. This provides a further forum for engagement with companies pursuing UCG pilots in the Surat Basin.

QGC has engaged holders of exploration and production tenures under the MR Act to consult on the location of its infrastructure, including Export and Collection Header Pipelines.

5.4.4.2 Delays in Accessing Mining Resources

CSG extraction is not compatible with other forms of mining in the same area and may cause a delay in accessing other mining resources until the termination of the Project. QGC will consult with potentially impacted parties prior to establishing any Gas Field infrastructure in areas where current mining activities exist.

5.4.5 Extractive Industries

5.4.5.1 Quarries

It is not expected that extraction of CSG will permanently sterilise quarry resources. CSG extraction is not compatible with quarrying in the same area and may cause a delay in accessing quarry resources until the termination of the Project. QGC will not attempt to establish Gas Field infrastructure without prior consultation with potentially impacted parties in areas where quarrying activities occur.

QGC intends to develop borrow pits on its tenements for the supply of quarry materials for construction access tracks and hardstands. QGC has not decided the final locations of borrow pits. In the unlikely event that QGC will seek to locate borrow pits on State Land, all necessary approvals under the *Forestry Act 1959* will be obtained.

5.4.6 *Electrical interference*

High-voltage power lines have the potential to create unacceptable electrical interference with the steel pipelines if followed for long distances. As such, the following separation distances will be maintained between any steel pipelines and power lines:

- 50 m from 132 kV above ground power lines
- 20 m from 33 kV above ground power lines
- 4.7 m from 33 kV underground power lines.

To mitigate against potential rises and faults where power lines run parallel to pipelines for long runs, surge diverters and earthing ribbon at the ends of the pipeline runs will be installed.

5.4.7 *Airports/Airstrips/Helipads*

There are no known commercial aircraft facilities within the Gas Field. All private aircraft facilities will be identified through consultation with landholders. All Gas Field infrastructure will be located to comply with all aviation safety requirements. QGC currently flies operational staff to Chinchilla aerodrome. Any works required to upgrade facilities will be undertaken in conjunction with civil aviation authorities and the aerodrome operator.

QGC will conduct a charter aircraft service to transport personnel from Brisbane to the Gas Fields. The frequency and number of flights has yet to be determined.

5.5 *CONCLUSION*

QGC expects that, following progressive rehabilitation, the impact on land use and infrastructure will not differ significantly from that described in the draft EIS. Nevertheless, additional measures have been proposed to mitigate any potential change in impacts.

QGC will co-operate, through the appropriate legislative framework, with other mining companies with tenements overlapping the proposed Gas Field Component tenements.