1 INTRODUCTION

1.1 INTRODUCTION

This chapter provides responses to general submissions received on the draft EIS related to the Gas Field Component. In addition, a summary of findings is provided for:

- the potential impacts on environmental factors from changes to Gas Field Component, as described in *Volume 2*, *Chapters 7* and *11*
- additional information gathered on aspects of the Gas Field Component described in the draft EIS.

1.2 RESPONSES TO SUBMISSIONS

A summary of the general submissions received in relation to the Gas Field Component and response to those submissions is provided in *Table 3.1.1*.

Table 3.1.1 Responses to Submissions on the draft EIS

Issue Raised	QCLNG Response	Relevant Submission (s)
Mitigation measures: All mitigation measures should be first described and explained in the main body of the EIS. This information should then be carried forward into the Environmental Management Plan (EMP) (as required in the EIS terms of reference) and the EM plan(s) (as required under section 310(d) of the *Environmental Protection Act 1994 (Qld)* (EP Act)) that allows those mitigation measures to be measured and audited. No mitigation measure should be described for the first time in the EMP or EM plan(s).	Mitigation measures for the Gas Field were proposed within the body of the EIS. Mitigation measures were incorporated into the Gas Field EMP. In some instances, standard mitigation measures were discussed in the body of the EIS and described in greater detail in the draft EMP in *Volume 9*. These standard measures will be reviewed once further studies are completed and any special measures will be added to the EMP. It is anticipated that this information should be available to enable a finalised EMP to be submitted with the application for an EA.	32

1.3 CHANGES TO PROJECT DESCRIPTION

Changes to the Gas Field Component Project description are presented in *Volume 2, Chapters 7* and *11*.

1.4 STUDIES

Additional studies were undertaken by QGC to assess the impacts, and measures to mitigate impacts, from changes to the Project or to supply supplementary information on aspects of the Project described in the draft EIS.

Studies were conducted to assess the potential for land contamination and impacts on noise, air, groundwater, transport and visual amenity.

1.5 SUMMARY OF FINDINGS

1.5.1 Climate and Climate Change

There are no additional findings for the Gas Field Component to those presented in the draft EIS.

1.5.2 Topography and Geomorphology

There are no additional findings for the Gas Field Component to those presented in the draft EIS.

1.5.3 Geology and Soils

There are no additional findings for the Gas Field Component to those presented in the draft EIS.

1.5.4 Land Use and Infrastructure

As a result of the changes to the Project, the Gas Field construction footprint has increased by approximately 11,400 ha (2.4 per cent) of the Gas Field and the footprint following progressive rehabilitation has increased by approximately 3,200 ha (0.7 per cent) of the Gas Field.

Additional mitigation measures have been proposed to minimise impacts to land use and infrastructure form the change in Project footprint. The overall assessment of impacts on land use and infrastructure is minor, which is unchanged from the draft EIS.

1.5.5 Land Contamination

The supplementary EIS assesses, in greater detail than presented in the draft EIS, the potential for land contamination from Associated Water, brine and salt management. In addition the potential for land contamination from the fracturing, chemicals management, sewage management, borrow pits and secondary salinity was assessed.

Mitigation measures for Associated Water, brine and salt management focussed on design, construction and operations of infrastructure, including untreated water storage ponds, brine ponds and salt disposal landfills. With

appropriate mitigation measures, QGC expect that there will be a low risk of land contamination from other potential sources assessed.

Due to the potential for land contamination from Associated Water management, particularly brine and salt management, the overall assessment of the significance of impacts has increased from negligible in the draft EIS to minor in the supplementary EIS.

1.5.6 Terrestrial Ecology

As a result of the increase in the amount of gas infrastructure that is to be sited within the Gas Fields the worst case estimate of remnant vegetation that may be cleared has increased from 4,966 ha to 9,577 ha.

However, due to improved analysis of the ability to avoid the endangered remnants within the Gas Field (i.e. many endangered remnants are not expansive and can be avoided by all field infrastructure) as well as some refinement of planned infrastructure locations there is a decline in the unavoidable clearing extent within *Environmental Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) and *Vegetation Management Act 1999 (Qld)* (VM Act) endangered vegetation communities/REs compared to the estimates presented in the draft EIS.

Additional flora and fauna surveys conducted within the gas tenements ATP 768 and PL 171 verified the occurrence of threatened Brigalow communities (REs 11.9.5 and 11.9.6) and semi evergreen vine thicket (SEVT) communities (REs 11.8.3 and 11.9.4).

The areas of Brigalow and SEVT that were observed on the edge on Cherwondah State Forest within PL 171 were found to be in a good condition. Due to the small size of these remnants it is expected that Gas Field infrastructure will be able to avoid these areas. Thus no clearing is anticipated to occur within these remnants.

The overall assessment of impacts on terrestrial ecology is minor, as per the draft EIS.

1.5.7 Aquatic Ecology

Review of the Queensland Wetlands Mapping lead to the identification of a limited amount of additional wetland areas within the Gas Fields, which have now been incorporated into the very high ecological constraints areas for the Project. The review of the Condamine Aquatic Conservation Assessment confirmed that riverine areas of high ecological and conservation value occur within and downstream of the QGC tenements. The, potential impacts on aquatic ecological Values resulting from the increased scale of Gas Field infrastructure has been considered but are expected to be the same as those presented in the draft EIS. The overall assessment of impacts on terrestrial ecology is negligible.

1.5.8 Surface Water

There are no additional findings for the Gas Field Component to those presented in the draft EIS. The supplementary EIS addresses the submissions received in relation to existing surface water users, water quality improvement devices, development of trigger values and the potential for reinjection to mitigate impacts of Associated Water extraction.

The overall assessment of impacts on surface water is minor, which is unchanged from the draft EIS.

1.5.9 Groundwater

Since the original modelling of QGC's tenements for groundwater impacts QGC has acquired further tenements in the north-west as a result of the purchase of ATP 768 and PL 171. Whilst these tenures were included in the draft EIS they were not included in the groundwater modelling. Re-modelling of the north-west drawdown area (NWDA) has been carried out during the supplementary study period to incorporate these additional tenements. The re-modelling found that the changed area did not impact on the overall findings of the draft EIS and impacts are expected to be no more than minor in long term.

1.5.10 Associated Water

QGC's options for beneficial use of Associated Water are as described in the draft EIS. The supplementary EIS provides additional information on the impacts and methods to mitigate impacts for tree cropping, reinjection, surface water discharge, municipal supply, QGC's own use, evaporation ponds and aggregation. In supplying this information, QGC is demonstrating its commitment to finding a robust solution for Associated Water management that overcomes many of the constraints presented by each option. QGC will seek approval for beneficial use of Associated Water through a separate approvals process to the QCLNG Project.

1.5.11 Air

The supplementary EIS assumes that compressors at the FCSs and CPPs in the CDA and SEDA are powered by electric drive engines or turbines connected to the electricity transmission grid. These engines no longer represent a direct source of air emissions in the Gas Field. The supplementary EIS has introduced emissions sources not described in the draft EIS, namely gas fired engines for wellhead compressor, water pumps and WTPs and flares at wells.

Modelling demonstrated that, with the appropriate mitigation measures applied to wellhead compressor and water pump engines, there will not be exceedences of air quality objectives for any of the modelled air emissions from the Gas Field. Hence, air emissions from the Gas Field are not expected to impact human health or biodiversity. The overall assessment of impact significance for air is negligible.

1.5.12 Noise and Vibration

For permanent noise sources such as FCSs, CPPs, WTPs, pumps and compressors, QGC shall apply a combination of options presented in the draft EIS and sEIS to mitigate nuisance to sensitive receptors. Since the publication of the draft EIS further design and investigation of mitigation options has enabled more stringent noise criteria to be applied in the assessment of the Project. With the necessary mitigation measures, modeling indicates that the day, evening and night time operational noise criteria are achievable. Noise mitigation measures will consider, where necessary, best practice engineering design. This includes

- electric drive compressors at CPPs and FCSs
- enclosures around engines and compressors
- variable speed fans
- low speed fans.

For temporary activities at well sites and construction activities the proposed operational noise criteria, if applied, would seriously constrain development and prevent full recovery of the gas resource. Where site selection and physical mitigation measures at the noise source are not appropriate QGC propose to manage the impact of noise through open engagement with those potentially affected.

1.5.13 Transport

A review of the transport strategy has been carried out for the supplementary EIS. The main focus of this strategy has been in relation to increases in the volume of material expected to be transported for the Gas Field development. QGC is committed to using rail where this is available however at this stage it is still not clear what volume of materials will be able to be transported by rail. The revised transport study has therefore been based on the worst case assessment of all of the materials being transported by road and an assumption of 75 per cent rail transport.

Transport of quarry materials over the life of the Project still remains the greatest impact on traffic movements. Even with the use of rail, road pavements will be adversely affected in a number of locations and contribution for impacts to road pavements might be required.

Further detail has been provided in relation to progressing agreement with the Department of Transport and Main Roads and other road authorities.

No additional mitigation measures have been identified at this stage of the Project.

Depending upon the final transport strategy the overall assessment of impact significance remains moderate to major.

1.5.14 Visual Amenity

The Supplementary EIS considered visual impacts for:

- changes to the Project description
- impacts on Gas Field residents from infrastructure described in the draft EIS and from changes to the Project description.

The majority of infrastructure will have a negligible or low visual impact. It is highly unlikely that any infrastructure will cause a high visual impact due to:

- the distance between infrastructure and residents
- naturally occurring screening vegetation
- the limited size of potential infrastructure in the viewshed.

Where there may be a visual impact, QGC will implement appropriate mitigation measures. The overall assessment of the significance of visual impacts is negligible to minor when appropriate site selection and mitigation measures are employed.

1.5.15 Waste Management

QGC has described additional methods to manage waste including sewage treatment and disposal and the use of waste transfer stations.

Concerns have been expressed by all local government authorities in relation to their ability to assist the Project with waste disposal. QGC will engage with local government authorities to develop suitable facilities for the disposal of Project waste. QGC considers that the overall Project assessment significance level for waste management remains minor.

1.5.16 Hazard and Risk Assessment

QGC has conducted qualitative assessments of the hazards and risks posed by bushfires, the components of CSG and CSG migration.

Detailed risk assessments will be conducted for the potential to cause bushfires during detailed design. Well pads will be designed to minimise the risk of causing a bushfire from a wellhead flare to as low as reasonably practicable. Emergency Response Plans will be developed to respond to bushfires.

The average gas content of CSG does not contain gases in concentrations that are in excess of Safe Work Australia guidelines.

There is a very low likelihood of CSG extraction resulting in methane migration. Even if methane migration was to occur, there is a very low probability of methane accumulating in sufficient concentration to pose an asphyxiation or ignition risk. QGC will monitor groundwater bores for methane emissions to establish a baseline for potential methane migration. This will assist in determining whether QGC's activities contribute to methane migration and the mitigation measures required if CSG extraction potentially causes methane migration.

1.5.17 Conclusion

The following chapters of *Volume 3* provide responses to submissions received on the draft EIS related to the Gas Field Component.

The chapters also discuss how environmental values for each environmental factor have been assessed in relation to any changes in the Project description as set out in *Volume 2, Chapters 7* and *11*.