



The Coordinator-General



# Queensland Curtis LNG Project

## Coordinator-General's report on the environmental impact statement

June 2010



# Queensland Curtis LNG Project

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# Coordinator-General's report synopsis

This Coordinator-General's report has been prepared pursuant to s. 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWOA) and provides an evaluation of the environmental impact statement (EIS) process for the Queensland Curtis LNG Project (the project). The Department of Infrastructure and Planning (DIP) managed the impact assessment process for this project on my behalf in accordance with the SDPWOA.

The report includes an assessment and conclusions about the environmental effects of the project and any associated mitigation measures. Assessed material includes: the EIS, supplementary report to the EIS; properly made submissions and other submissions that have been accepted; and any other material that is relevant to the project—such as comments and advice from advisory agencies and other entities, technical reports and legal advice.

Queensland Gas Company Limited (QGC) is proposing to develop a liquefied natural gas (LNG) export facility at Gladstone in Central Queensland, Australia. The facility will allow Queensland Curtis Liquefied Natural Gas (QGC) to commercialise QGC's Surat Basin coal seam gas (CSG) resources. The proponent will initially construct a two train LNG facility to produce up to eight million tonnes per annum (mtpa) of LNG with the potential for future expansion to twelve (12) mtpa.

The facility will be developed on Curtis Island (in the North China Bay area) which lies within the limits of the Port of Gladstone. The North China Bay site is in close proximity to the industrial deepwater berths of the Port of Gladstone. The project will source gas from QGC's CSG fields around the Miles area of the Surat Basin, with gas being transported to the Curtis Island LNG facility via a subsurface 380 km gas transmission pipeline.

The project has the following major components:

- coal seam gas fields
- gas transmission pipeline
- LNG liquefaction and export facility
- shipping operations.

Other components of the project include ancillary infrastructure which may be constructed and operated by parties other than the Proponent. Separate approval processes and environmental impact statements are already being undertaken for these ancillary components or may ultimately be undertaken by other parties separately from this EIS. The ancillary infrastructure may include:

- options for construction and operations access from Gladstone to Curtis Island
- developments and infrastructure for the beneficial use of associated CSG water.

On 3 June 2008, the proponent prepared and lodged an initial advice statement (IAS) for the project with the Coordinator-General (CG). On 4 July 2008, the CG declared the project to be a 'significant project for which an EIS is required', pursuant to s.26 (1) (a) of the SDPWO Act.

On 15 September 2008, and subsequently amended on 31 July 2009, the Australian Minister for the Department of Environment, Water, Heritage and the Arts determined that six referrals relating to the project are each a 'controlled action' under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to the potential impacts of the following matters of national environmental significance:

- sections 12 and 15A (World heritage properties)
- sections 15B and 15C (National heritage places)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 23 and 24A (Commonwealth marine).



As a result, the project will require assessment and approval under the EPBC Act before it can proceed.

The draft terms of reference (ToR) were advertised for public and advisory agency comment on 1 November 2008. Advisory agency briefings were held in Gladstone on 25 November 2008 and in Brisbane on 26 November 2008.

A total of 21 submissions were received, including 17 from advisory agencies, and 4 private companies and members of the public. The final ToR were approved by the Coordinator-General on 26 May 2009.

The final EIS was approved by the Coordinator-General for release and publicly advertised on 28 August 2009 in The Courier-Mail, the Weekend Australian, the Dalby Herald and the Gladstone Observer. Advisory agency briefings were held in Gladstone on 16 September 2009 and in Brisbane on 17 September 2009.

A total of 37 submissions was received by DIP with 9 from advisory agencies and 28 from the general public, commercial operations and environmental non-government organisations. These were recorded by DIP and provided to QGC for appropriate consideration and response.

The issues raised in submissions that required additional attention and that were required to be addressed in an SEIS were:

- associated water
- social and community impacts
- environmental impacts
- gas field infrastructure
- groundwater monitoring and impacts
- greenhouse gas emissions and impacts on climate
- transportation.

A draft of the SEIS was provided in stages by electronic means commencing on 23 December 2009, with revised and additional volumes of the SEIS being uploaded progressively until the 29 January 2009.

The release of the SEIS was publicly advertised in the The Courier-Mail, The Australian, the Dalby Herald and the Gladstone Observer on Wednesday 10 February 2010. Comments were invited until 5.00pm 10 March 2010. A CD of SEIS was provided to the public free of charge or via the proponent's website.

The project's draft Social Impact Management Plan (SIMP) was placed on the DIP web site on Friday, 15 February 2010 and advertisements notifying of the availability of the SIMP were placed in the Dalby Herald and the Gladstone Observer on 19 February 2010.

A total of 39 submissions were received by DIP, with 14 from advisory agencies and 25 from the general public, commercial operations and environmental non-government organisations.

The submissions received from the SEIS consultation process indicated satisfaction with issues raised or suggested actions or conditions to address outstanding issues. These responses have been discussed with the proponent and with relevant agencies. These matters have been taken into consideration in the preparation of this report and conditions contained therein. While the main assessment in this report is of the QGC project, I have, where relevant, considered cumulative impacts in determining the conditions by which this project can proceed.

The following outlines the major issues and how they are dealt with in the Coordinator-General's report:

### **1. Accommodation on Curtis Island**

Although accommodation facilities are not a preferred land use in the Curtis Island Industry Precinct, of the Gladstone State Development Area (GSDA) QGC and other similar proponents have submitted plans for temporary worker accommodation facilities on their LNG plant sites. Potential cumulative impacts of a workforce of 8,000 from 4 LNG projects in Gladstone and their daily movement on land and



across the harbour, indicate to me that the use of temporary workers accommodation facilities on Curtis Island is warranted for most of the fly in fly out workforce. I will take this factor into account in terms of the size and duration of this facility, when considering the Material Change of Use decision for the LNG facilities on Curtis Island, which was lodged by the proponent on 8 April 2010.

## **2. Crossing of The Narrows**

Potential impacts from up to four gas transmission pipeline routes from LNG projects proposed between 2010 and 2013, crossing through wetlands and The Narrows, all located within the Australian government Great Barrier Reef World Heritage Area, strongly indicates to me a bundled pipeline trenched construction methodology should be adopted by all proponents. This will allow all pipelines and possibly water supply, sewerage, power and telecommunications, if feasible, to be positioned in the one location. Along with The Narrows crossing, this co-location will minimise potential acid sulfate soil disturbances, reduce significant harm to flora and fauna and allow for effective environmental management and monitoring. Engineering pre-feasibility of the bundled pipeline concept has been demonstrated by representatives from all four proponents. However, I require that environmental assessment is provided on a final design that is agreed by all proponents in this bundled approach. I have nominated 1 September 2010 as the date by which this bundled crossing approach must be verified, before I will entertain individual crossing solutions.

## **3. Logistics in Gladstone and on the harbour**

The proponent's SEIS outlined that the proponent is committed to using rail transport, and the proponent advises that a negotiated outcome with Queensland Rail is imminent. I note it is the proponent's intention to make rail transport a central plank of its logistics network. I support the proposal to rail at least 75% of pipe during the construction phase of the project from the receiving ports to Miles.

I have only accepted the use of Gladstone port for pipe import if either a small amount of pipe is imported for local use, or the pipe is transported by rail out of Gladstone.

Although most workers will be located in Temporary Workers' Accommodation Facilities on Curtis Island, there will be daily transport across the harbour, and on land within Gladstone for staff and all materials and equipment required for construction. Therefore there is a need to develop a coherent logistics plan for the movement of these transport tasks, and for these to be integrated with those of other LNG projects. I therefore require the proponent to prepare a Gladstone Logistics Plan together with the Gladstone Regional Council, the Gladstone Ports Corporation and other proponents, and submit to me for approval.

A separate Harbour Management plan should also be developed with the Gladstone Harbour Master and Gladstone Ports Corporation, to govern the movement of persons and materials across the harbour.

## **4. Impact of flare and plume on air space around Gladstone Airport**

I am concerned about whether there might be limitations being placed on Gladstone Airport by plume from the LNG site. Given other LNG facilities are also planned for Curtis Island, I need to see a cumulative impact assessment on aviation airspace, and the adjustments to airspace which may be required, and whether this will affect Gladstone airport operations. I require the proponent to commit to an undertaking to ensure that a stack flare will not interfere unduly with the operation of air traffic and to participate in a detailed cumulative modelling study of plumes associated with the production of LNG and the impacts, if any, on airspace around Gladstone Airport and for formal agreement to be reached with CASA and GRC on limitations, if any.

## **5. Cumulative impacts of transport on roads**

This proposal will require a considerable transport task for pipe and other materials haulage added to the central Queensland area road network. The emergence of multiple, overlapping proposals for LNG and other significant developments occurring concurrently or consecutively, is likely to result in significant cumulative impacts for communities and regions, including state and local road networks. I have initiated a proposal that requires all LNG proponents, in conjunction with DTMR, to contribute to a





Road Transport Infrastructure Cumulative Impacts Study – Proposed LNG Industry Impacts and to implement the findings of this study.

## **7. Gas field development locations of infrastructure and extent of disturbance of ecosystems**

I note the proponent has prepared and submitted a gas fields infrastructure development plan for the first five years of CSG extraction. In addition, I will require several reports to be provided to me, in order to ensure that appropriate strategies are in place that will govern major aspects of the gas field development, and to identify that they are in keeping with government policy on CSG development. These will include cumulative impacts, regional groundwater model, coal seam gas water management plan, a brine management strategy, an ecological constraints management strategy and more information on operational plans.

Further specification of operational plans showing positions and design of the gas field infrastructure, will be refined prior to petroleum activities taking place.

## **8. Strategies for management of gas field and CSG water**

I am concerned about the significant amount of water and salt removed from coal seams over the life of the project, and I note the proponent proposes a number of strategies to manage the use of these resources. Furthermore, I note the proponent has submitted a CSG Water Management Plan to Department of Environment and Resource Management, where high level support for further detailed assessment has been provided, along with guidance as to what the final plan must contain. I consider the strategies for managing CSG water as critical, as there is the potential for ongoing risks to streams, soils and landscapes, through inappropriate use and disposal of CSG water. Furthermore, the Queensland government has an obligation to ensure actions it approves, do not increase downstream salinity in the Murray-Darling Basin. It is important for overall impact management that a clear set of strategies are in place for the project which consider the hierarchy of both preferred water uses and brine disposal strategies under government policies.

I require that a report on the cumulative impacts of multiple CSG gas field projects on water and ecological values be included in the reports which are provided to me as the gas field development is progressed.

## **9. Construction management of third train of LNG facility**

Regarding the third train, I have been advised by the proponent that a firm starting date for construction of this train is not available at present, and it will not be within the 5 year construction period of the first two trains. Therefore I am unable to make a final determination now on the start of construction of a project on Curtis Island which is beyond five years hence – namely the third train. However, I state that this Coordinator-General's report remains in force for four (4) years. If, prior to expiry of the standard 4 year period of currency of the Coordinator-General report, construction of Trains 1 and 2 has substantially commenced, and the proponent has decided to proceed with substantial commencement of Third Train construction within the following 2 year period, the proponent may apply to the Coordinator-General to extend the Coordinator-General report for the further 2 year period if satisfactory contemporary social and logistics planning documents are provided to the Coordinator-General.

If a decision is made to construct the Third Train, but the Third Train is not substantially commenced within a 6 year period, the Coordinator-General Report lapses and a new declaration and environmental assessment will be required, whether or not the Coordinator-General has extended the currency of the Coordinator-General report.

## **10. Social impacts and presence of large workforce in regional communities**

The Queensland government now requires major industrial projects to conduct a rigorous a social impact assessment (SIA), conforming to published guidelines. The SIA must include information relevant to: the social and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts, both positive and negative, and proposed mitigation measures and management strategies.

The proponent has completed a very comprehensive SIA during the EIS process and I commend the proponent on being the first proponent to complete a Social Impact Management Plan (SIMP).



I note that the proponent has committed to finalise the SIMP following ongoing extensive consultation, and submit the SIMP to me for approval. I will require a high standard of effective mitigation strategies to be implemented, along with a monitoring regime to measure the success of these strategies.

I propose the establishment of an overarching Industry Leadership Group for CSG Resource Projects which would provide cross-project coordination in relation to the social and community cumulative effects of multiple LNG projects being developed simultaneously across the regions (Gas Fields, Pipeline and LNG plant).

In order to ensure that the cumulative impacts associated with this new emerging industry are adequately addressed and minimised, all new CSG resource projects will be required to establish, or participate in the new Industry Leadership Group for CSG Resource Projects.

I consider that a coordinated approach which promotes collaboration between the proponent, all levels of government and local communities is best to assist affected local communities to plan and fund the provision of the social infrastructure required to address future growth. I am therefore proposing a social infrastructure and service delivery strategy comprising four integrated elements. These integrated elements are:

1. proponent's commitments register
2. QGC's SIMP, associated Social Investment Program and Community Development Fund
3. the Social Infrastructure Strategic Plans (SISP) for Gladstone and Maranoa/Western Downs Regions
4. specific contributions to manage negative social impacts e.g. housing contributions.

For element 3, proponents can provide financial contributions to a special social infrastructure fund in which industry funds are pooled to (1) mitigate the impacts of major project developments in the respective regions; and (2) implement a priority social infrastructure schedule developed as part of the Social Infrastructure Strategic Plan for Gladstone Region (SISP-Gladstone); and a Social Infrastructure Strategic Plan for Maranoa and Western Downs regions (SISP- Maranoa and Western Downs).

For element 4, proponents or their construction contractors will be required to develop an *Integrated Project Housing Strategy* for the project in consultation with other major project proponents, Councils and the Department of Communities, within three months from the project commitment, and submit to the Coordinator-General for approval. I recognise that QGC is well advanced in the preparation of this strategy.

The purpose this approach is to initiate cooperative and coordinated approaches in consultation with other major project stakeholders and government agencies to resolve the cumulative housing impacts, with the outcome of achieving joint mitigation strategies, and delivery of housing solutions.

I agree that the large demand for workers required by the QGC is likely to have an effect on the ability of other businesses in the area to attract and retain staff, particularly smaller businesses.

I therefore have asked the proponent to establish a Jobs Service for local businesses with similar trades/skills which require expanding or replacing staff and integrate it with the proponent's own recruitment service, such that applicants can choose from local or project employment prospects

## **11. Impacts on Australian Government matters**

The relevant impacts (actual or likely impacts) on Matters of National Environmental Significance of each controlled action for the project, was provided in the EIS and SEIS. As the project is being assessed by the Australian government in a parallel process, no analysis of the impacts is provided in this report.

## **12. Offsets for ecological impacts**

I note the project will have unavoidable vegetation clearing requirements, as outlined in the EIS and SEIS. As such the Queensland government, along with DEWHA, will require terrestrial and marine ecology offsets to compensate for these unavoidable impacts.

Whilst a gas field development plan has been provided for gas extraction activities until 2014, due to the uncertainty of the extent and location of future gas field development, the full extent of disturbance can



not be determined. Advice from DERM and DEWHA has identified the following requirements in relation to offsets:

- the proponent is to provide further confirmation of the availability of suitable offset sites
- there is a preference for a significant proportion of the life-of-project offset requirements to be established early on in the project
- there is a preference for a smaller number of larger and strategic offset sites to be established over an approach that uses a large number of small offsets.

The proponent has analysed offsets for the LNG facility, pipeline and CSG fields encompassing endangered and of concern regional ecosystems, fish habitat values, coastal and marine values on Curtis Island, essential habitat for rare and vulnerable plants, habitat for threatened species under NCA and EPBC; and EPBC endangered ecological communities.

I require that environmental offsets are to be secured by the proponent in a manner that achieves a “no net loss” of biodiversity outcome, and in a manner and timeframe acceptable to DERM. I require that an environmental offsets program, consistent with Queensland Government Environmental Offsets Policy (QGEOP) must be provided for approval before environmental authorities are issued.

I therefore require that a package for the whole project be submitted for assessment at the time gas field development plans are being provided, and for the package to be regularly updated and reconciled with actual gas field development and other disturbance as it is undertaken. The proponent must note that DEWHA will also require a comprehensive offsets package.

### **13. Potential resource tax**

The evaluation and consequent conditions are on the basis that there is currently no resource tax as recently announced by the Australian Government. If a tax is introduced and it is used to provide project infrastructure which has been required to be funded as a condition of approval, then the proponent may submit a request for project condition change.

### **14. Conclusion**

I am satisfied that the EIS process conducted for the project meets the requirements for impact assessment, to the greatest extent practicable, in accordance with the provisions of Part 4 of the SDPWO Act and Part 5 of the *State Development and Public Works Organisation Regulation 1999* (the Regulation), as specified in Schedule 1 (Item 2, Class 2) of the *Bilateral Agreement between the Australian Government and Queensland*.

Conditions proposed in this report have been formulated in order to further manage impacts to social, environmental, transport, economic and workforce values through material change of use, environmental authority and Coordinator-General imposed conditions and other policy, regulatory and licence arrangements.

Therefore, I recommend that the QGC project, as described in detail in the EIS and Supplementary EIS, and summarised in section 2 of this report, can proceed, subject to the recommendations and conditions contained in Appendices 1 to 4 of this report.

This report will be provided to the Australian Department of the Environment, Water, Heritage and the Arts, for consideration during assessment and recommendation to the Minister about whether or not the project should be approved to proceed pursuant to the EPBC Act.

**Colin Jensen**  
**Coordinator-General**

**23 June 2010**



# Introduction

This report has been prepared pursuant to s. 35 of the *State Development and Public Works Organisation Act 1971 (Qld)* (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) process for Queensland Curtis LNG Project. The EIS was conducted by the proponent, QGC.

On 3 June 2008, the proponent prepared and lodged an initial advice statement (IAS) for the project with the Coordinator-General (CG). On 4 July 2008, the CG declared the project to be a 'significant project for which an EIS is required', pursuant to s.26 (1) (a) of the SDPWO Act.

On 15 September 2008, the Australian government Minister for the Environment, Heritage and the Arts determined that the nine referrals relating to the project are each a 'controlled action' pursuant to the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act) for which environmental impacts should be assessed by way of an environmental impact statement pursuant to section 87 of the EPBC Act. The EIS process will address matters on behalf of both the Queensland and Australian governments for their individual assessments.

The nine referrals relating to the project are EPBC2008/4398 coal seam gas fields expansion, 2008/4399 construction of a pipeline network, 2008/4400 construction of a bridge to Curtis Island, 2008/4401 development of marine facilities such as wharves, 2008/4402 development of the LNG facility, 2008/4403 construction of mainland roads to the bridge, 2008/4404 construction of Curtis Island roads, 2008/4405 shipping activities, and 2008/4406 dredging of swing basin and channel. The collective controlling provisions of the referrals are:

- sections 12 and 15A (World Heritage properties)
- sections 15B and 15C (National Heritage places)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 23 and 24A (Commonwealth marine).

Subsequent to the submission of the nine referrals, further studies by QGC determined that the preferred method for transporting personnel, materials, equipment and waste to and from the LNG Facility on Curtis Island is via marine transport from Gladstone. As such, the development of the Curtis Island Bridge, Mainland Road and Bridge Approach and Curtis Island Road is no longer QGC's preferred method, and the following three referrals were therefore withdrawn on 31 July 2009: EPBC 2008/4400 – Curtis Island Bridge, EPBC 2008/4403 – Mainland Road and Bridge Approach, EPBC 2008/4404 – Curtis Island Road. In addition, regarding EPBC 2008/4406, Swing Basin and Channel Dredging, potential impacts to matters of matter of national environmental significance (MNES) have not been assessed within the QGC SEIS, because these infrastructure components have been addressed in Gladstone Ports Corporation's EIS for the Western Basin Dredging and Disposal project. As such, further consideration of the assessment for the works identified in EPBC 2008/4406 will be undertaken by the appropriate party at the conclusion of discussions with GPC.

The Australian and Queensland governments will each assess the project in a parallel process using this EIS. The release of the EIS did not indicate support for, or approval of, the project by the Australian government, the Coordinator-General or the Queensland government. It was an opportunity to provide feedback to the Coordinator-General on whether the EIS satisfactorily addressed and managed the impacts of the project.

The object of this report is to summarise the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels. It is not intended to record all the matters which were identified and subsequently settled. Instead, it concentrates on the substantive issues identified during the EIS process.

This report represents the end of the Queensland government significant project impact assessment process. Essentially, it is an evaluation of the project based on information contained in the EIS,



submissions made on the EIS and information and advice from advisory agencies and other parties. The report also contains an evaluation of the SEIS, submission made on the SEIS and information and advice from advisory agencies and other parties. The report also states conditions under which the project may proceed.



# 1. Project description

## 2.1 The proponent

### **QGC Limited**

The proponent of the project is QGC Limited. Founded as Queensland Gas Company Limited, the Brisbane-headquartered coal seam gas (CSG) explorer listed on the Australian Stock Exchange (ASX) in August 2000 with a market capitalisation of AUD\$16 million. The company has a reserves base in the Surat Basin of southern Queensland. First gas sales were made to the domestic market in 2007.

In February 2008, QGC announced an alliance with BG Group plc (BG Group) via a subsidiary company (BG International Limited) to develop the QGC Project. After an agreed takeover announced in October 2008, BG Group purchased QGC. This acquisition consolidated QGC's CSG expertise and BG Group's international experience in liquefied natural gas (LNG) within a single-company structure. QGC now has more than 370 employees located in Queensland.

In addition to LNG, the new QGC is focused on continued expansion of its CSG resource base in Queensland and supply to both domestic and export markets. QGC has committed a significant proportion of its reserves to meeting Australia's energy needs. These reserves are projected to supply about 20 per cent of Queensland's domestic gas market in 2009. QGC will continue to identify, evaluate and pursue opportunities for domestic gas sales.

### **BG Group PLC**

BG Group plc is a UK-listed energy business with activities on five continents and interests in 27 countries. Although headquartered in Reading, more than 60 per cent of the company's 5,300 employees are located outside the United Kingdom.

BG Group has operations across the energy sector, particularly in natural gas where it has experience throughout the gas chain from exploration to distribution to the customer. BG Group ranks among the largest companies on the London Stock Exchange with a market capitalisation of approximately A\$72 billion (as of July 2009).

#### *LNG project experience*

BG Group's LNG business encompasses liquefaction, shipping, re-gasification and marketing. In particular, BG Group has relevant industry experience, acquired in conjunction with its operating partners, in the development and operation of:

- numerous gas production fields and delivery pipelines around the world
- a four-train LNG export facility on the south-western coast of Trinidad which commenced operation in 1999 and has a production capacity of more than 15 mtpa using ConocoPhillips Optimised Cascade Process<sup>SM</sup> liquefaction technology
- a two-train, 7.2 mtpa LNG export facility in Egypt, which commenced operation in 2005 and uses ConocoPhillips Optimised Cascade Process<sup>SM</sup> liquefaction technology
- development of an initial two-train LNG export facility of around 12 mtpa in Nigeria, with potential for expansion (currently under development with joint venture partners)
- processing capacity in LNG import terminals and re-gasification facilities in the United States, Chile and Wales, with new capacity currently under development in Italy.

BG Group also has a long history in LNG shipping and was involved in development of both the prototype and the first working LNG carriers in the industry.



In May 2009 BG Group signed a LNG Project Development Agreement with China National Offshore Oil Corporation and its affiliates (CNOOC), focused on the QGC Project. The agreement involves the purchase by CNOOC of 3.6 mtpa of LNG for a period of 20 years from start-up of QGC as well as investments by CNOOC in the Project. BG Group and CNOOC will jointly participate in a consortium formed to construct two LNG ships in China that would be owned by the consortium.

## 2.2 Project components

QGC will develop four principal components as part of the Queensland Curtis LNG (QGC) Project in an area spanning some 500 km and five local government areas. These four principal components are:

- **Gas field component:** the expansion of QGC's coal seam gas (CSG) operations in the Surat Basin. The Gas Field component comprises:
  - approximately 6,000 gas production wells over the life of the project with initially 1,000 to 1,500 wells across the Gas Field by mid-2014. The remaining wells will be phased in over the life of the project (20 to 30 years)
  - gas and water gathering systems and gas processing and compression infrastructure
  - associated surface equipment, such as wellhead compression and wellhead separators, telemetry devices and metering stations
  - field infrastructure such as access tracks, warehouses, camps (both construction and operations), office and telecommunications
  - the management of Associated Water produced in the CSG extraction process on the petroleum tenements. Water transported off the petroleum tenements for beneficial use, as defined by the *Water Act 2000* (Qld), is not discussed in this EIS.
- **Pipeline component:** development, construction, operation and decommissioning of a gas pipeline network of approximately 730 km to link the Gas Field and other nearby CSG resources to the LNG Facility. The pipeline network includes:
  - a 340 km Export Pipeline from QGC's Gas Field in the Surat Basin to the LNG Facility in Gladstone
  - a 191 km Gas Collection Header – a central pipeline located in an Upstream Infrastructure Corridor (UIC) to collect gas from centralised compressor facilities for delivery to the Export Pipeline
  - a pipeline crossing at The Narrows connecting the mainland Export Pipeline with the LNG Facility on Curtis island.
- **LNG component:** development, construction and operation within the Curtis Island Industry Precinct (CIIP) of the Gladstone State Development Area (GSDA) of a LNG processing plant (LNG Facility) with production capacity up to 12 million tonnes per annum, nominally comprising three LNG processing units or 'trains' with 4 mtpa production capacity each. The LNG component comprises:
  - onshore gas reception facilities
  - gas pre-treatment facilities for the removal of water and impurities from the feed gas
  - gas refrigeration and liquefaction units sized for 4 mtpa production trains
  - a nitrogen rejection unit for the removal of nitrogen in the feed gas
  - three full containment LNG storage tanks with capacities of between 140,000 m<sup>3</sup> and 160,000 m<sup>3</sup> capacity each
  - jetty and docking facilities with turning basin for the loading of LNG carriers
  - a material offloading facility (MOF) for ferry transportation and receipt of construction material
  - associated onshore mainland facilities
  - utility requirements to support the LNG Facility.
- **Shipping operations:** regular transit of LNG tankers. Shipping operations will involve three stages: firstly, loading LNG; secondly, transit of ships through Gladstone Harbour; and thirdly, transit of ships through the outer channel of the Great Barrier Reef Marine Park to open ocean.



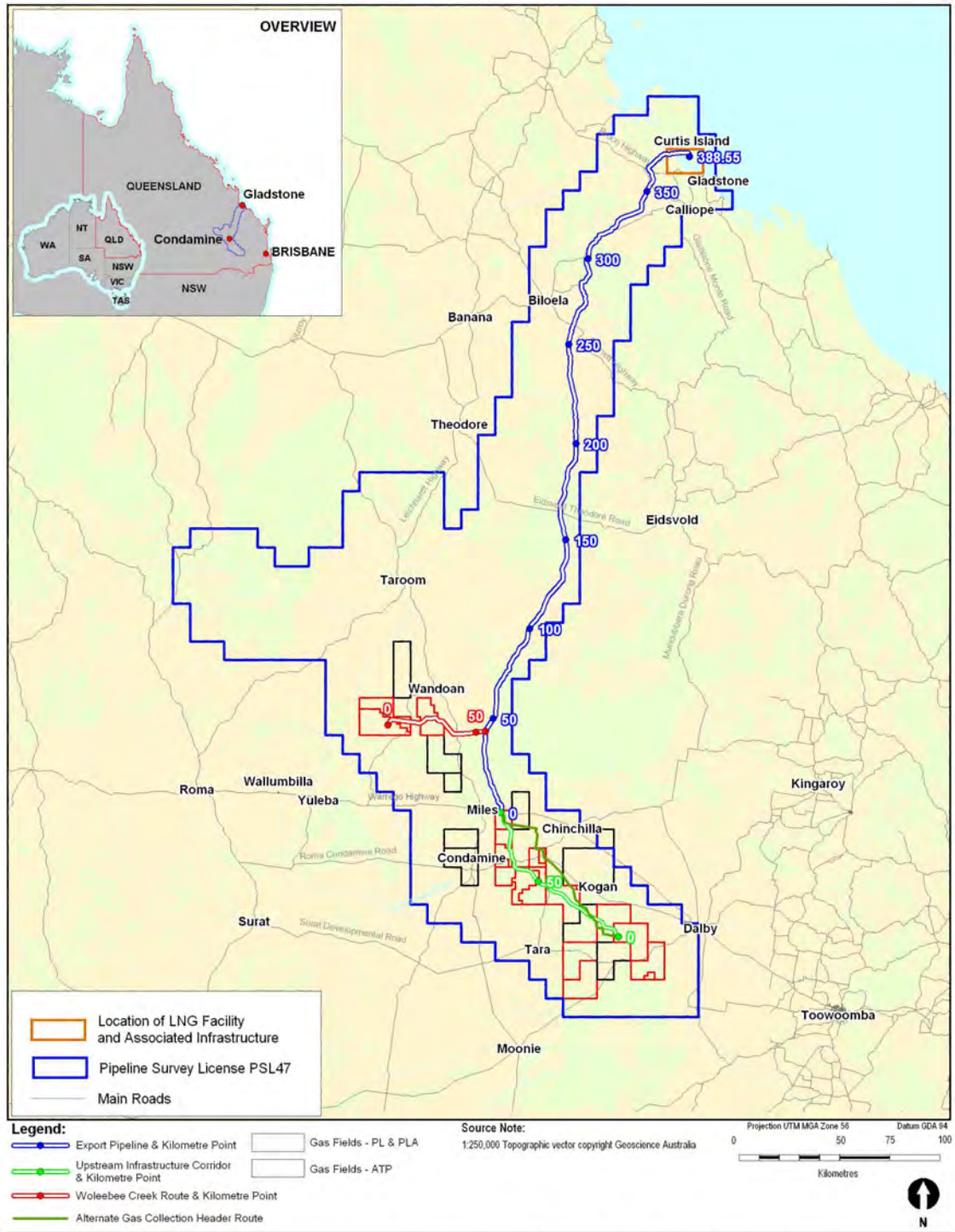
Figure 2.1 shows the first three components of the project.

QGC is seeking approval under this EIS for these principal components. However, the execution of the project will require developing associated or ancillary infrastructure. Other parties solely or possibly with the involvement of QGC will develop this Ancillary Infrastructure. Ancillary infrastructure was defined as part of the EIS Reference Case and includes off-tenement transport of the associated water, covering water produced from the development of the Gas Field component off-tenement and its beneficial use. The environmental assessment and planning permit processes for these components are separate to this EIS.





Figure 2.1 QCLNG project



<p>QUEENSLAND CURTIS LNG A BG Group business</p>	Project <b>Queensland Curtis LNG Project</b>		Title <b>QCLNG Project Study Area</b>	
	Client <b>QGC - A BG Group business</b>			
<p>ERM Environmental Resources Management Australia Pty Ltd</p>	Drawn Undel	sEIS Volume 2	Figure S2.4.1	
	Approved CDP	File No	E05-P-MA-96246	
	Date 21.01.10	Revision	Supplementary	
			Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only, ERM does not warrant the accuracy of any such Maps and Figures.	



## 2.3 Project rationale

Energy security and fuel diversification policies have played an important role in increasing demand for gas as governments seek to reduce dependence on oil and encourage the use of more environmentally-friendly fuels.

The Queensland Government is encouraging the development of the natural gas industry through the Queensland Gas Scheme. Under the current scheme, electricity retailers are required to source at least 13 per cent of their electricity sales from gas-fired generation. The government intends to increase this target to 15 per cent in 2010 and allow for further increases up to 18 per cent by 2020.

New gas extraction and transportation infrastructure developed as part of the project will help expand the domestic market by offering more opportunities to gas producers, in turn increasing choice for consumers.

### **NEED FOR THE PROJECT AND TIME FRAME**

The increasing importance of LNG globally is highlighted by the projected growth of the LNG trade worldwide from 142 mtpa in 2005 to a projected 380 mtpa by 2020.

The QGC project provides a new source of LNG to supply rapidly growing markets near Australia. Intense competition to supply these markets is expected from international and Australian LNG (existing and potential new) projects.

A total of 17 LNG projects are in various stages of planning and development in Australia. The total potential supply from Australia and elsewhere is significantly greater than the available uncontracted demand. Given that there are also projects outside of Australia competing for this Pacific Basin market, it is unlikely that all but a few projects will proceed as the market cannot absorb the total volume of possible new Australian LNG supply. Therefore, a key success factor for a new LNG project is the ability to meet market demand in the 2014-2015 timeframe. Pending the relevant approvals, QGC advise the first train is scheduled to begin commercial LNG production late in 2013, with the shipments of commercial quantities of LNG from the project scheduled to begin in 2014. Commercial production from the second train is planned 6 to 12 months later.

### **Domestic supply**

The CSG industry in Australia is relatively small with current production around 138 PJ in Queensland and New South Wales for the year ending March 2009. CSG resources are abundant with Australia's total CSG resources estimated at in excess of 250,000 PJ. Only 20 per cent of these total resources need to be recovered to meet Queensland's and New South Wales' gas needs for a minimum of 40 years. Approximately 500 PJ per year of CSG will supply the initial two QGC processing trains.

The QGC Project will provide significant new gas extraction and transportation infrastructure, offering greater opportunities for gas producers and increasing choice for consumers.

### **Economic benefits**

The QGC Project is estimated to stimulate an increase in Queensland's gross state product of up to \$32 billion between 2010 and 2021, or approximately \$2.6 billion per annum. The benefits of the project will extend well beyond this period as it will have at least a 20 year life.

The project will provide a direct multi-billion dollar capital injection during the primary construction phase and generate substantial benefits including employment and value-added activity in regional economies. It is estimated that the total on-site construction workforce for the LNG, gas field and pipeline components will peak at approximately 9,000 workers in late 2012. The project will provide approximately 700 permanent jobs during operation, with an estimated capital value of approximately



\$8 billion. Based on economic modelling, up to half the project's capital expenditure during 2010-2013 will be spent within Australia, including more than 18 per cent in the Fitzroy and Darling Downs regions.

In addition, it is expected that up to 80 per cent of the project's expenditure during 2014-2021 will be within Australia (based on economic modelling).

The project will generate benefits including:

- approximately \$2.4 billion in value-added activity in Queensland during the construction phase (2010 to 2013)
- approximately \$29.5 billion in value-added activity in Queensland during the operations phase (2014 to 2021)
- annual average royalty income for Queensland of between \$150 million and \$330 million
- annual average tax income for the Australian government of between \$600 million and \$1.1 billion, depending on oil prices.

Direct economic benefits include increased employment and purchasing of goods and services from local businesses. Indirect benefits include the flow-on effects of increased spending and employment.

During the construction phase the project will create direct economic benefits through significant capital expenditure; the number of employees directly required (approximately 9,000 people at peak); and the demand for supplies and services from local businesses.

The project's operating phase will also provide a number of direct regional and state-level benefits from the annual revenue generated; the direct creation of approximately 700 jobs; and significant royalties and tax revenues over the life of the project (at least 20 years).

Mitigation strategies have been identified to maximise benefits and minimise adverse economic impacts from the project, including supporting local business, building capacity in the local labour market, minimising use of agricultural land and impacts on local property.

## **CONSEQUENCES OF NOT PROCEEDING**

A standard approach to weighing alternatives for a project as a whole, is to consider the potential environmental, social and economic consequences if the project does not proceed.

The investment case for the QGC project involves an estimated capital value of \$8 billion, which is an investment in Queensland's CSG industry that will provide thousands of jobs (estimated to be approximately 9,000 during peak construction) and generate significant royalties and tax revenues for the Queensland and Australian governments. It will also provide new supplies of natural gas, in the form of LNG, at a time when countries are seeking cleaner, more efficient supplies of energy.

The development of CSG projects (such as the QGC Project) for supply to power stations represents a favourable option from an environmental emissions perspective over construction of additional coal-generated power – both in Australia and in countries to which the LNG will be exported and utilised. CSG-to-LNG projects effectively monetise a significant potentially stranded hydrocarbon resource of Queensland and Australia.



## 2. Impact assessment process

The Department of Infrastructure and Planning coordinated the impact assessment process for this project on behalf of the Coordinator-General in accordance with the SDPWO Act.

### 3.1 Significant project declaration and controlled action

On 3 June 2008, the proponent prepared and lodged an initial advice statement (IAS) for the project with the Coordinator-General (CG). The IAS provides an outline of the proposed project, including the project rationale and its potential impacts.

On 4 July 2008, the CG declared the project to be a 'significant project for which an EIS is required', pursuant to s.26 (1) (a) of the SDPWO Act. Matters considered by the CG in making this declaration included information in the IAS prepared by QGC, the level of investment necessary for the project, employment opportunities provided by the project, potential impacts on the environment, potential effects on relevant infrastructure and the significance of the project to the region and state. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act 1971, which requires the proponent to prepare an EIS.

On 15 September 2008, the Australian government Minister for the Environment, Heritage and the Arts determined that nine referrals relating to the project are each a 'controlled action' pursuant to the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act) for which environmental impacts should be assessed by way of an environmental impact statement pursuant to section 87 of the EPBC Act.

The nine referrals relating to the project are:

- 2008/4398 coal seam gas fields expansion
- 2008/4399 construction of a pipeline network
- 2008/4400 construction of a bridge to Curtis Island
- 2008/4401 development of marine facilities such as wharves
- 2008/4402 development of the LNG facility
- 2008/4403 construction of mainland roads to the bridge
- 2008/4404 construction of Curtis Island roads
- 2008/4405 shipping activities
- 2008/4406 dredging of swing basin and channel.

The collective controlling provisions of the referrals are:

- sections 12 and 15A (World Heritage properties)
- sections 15B and 15C (National Heritage places)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 23 and 24A (Commonwealth marine).

Subsequent to the submission of the nine referrals, further studies by QGC determined that the preferred method for transporting personnel, materials, equipment and waste to and from the LNG Facility on Curtis Island is via marine transport from Gladstone. As such, the development of the Curtis Island Bridge, Mainland Road and Bridge Approach and Curtis Island Road is no longer QGC's preferred method, and the following three referrals were therefore withdrawn on 31 July 2009: EPBC 2008/4400 – Curtis Island Bridge, EPBC 2008/4403 – Mainland Road and Bridge Approach, EPBC 2008/4404 – Curtis Island Road. In addition, regarding EPBC 2008/4406, Swing Basin and



Channel Dredging, potential impacts to matters of matter of national environmental significance (MNES) have not been assessed within the QGC SEIS, because these infrastructure components have been addressed in Gladstone Ports Corporation's EIS for the Western Basin Dredging and Disposal project. As such, further consideration of the assessment for the works identified in EPBC 2008/4406 will be undertaken by the appropriate party at the conclusion of discussions with GPC.

Because a component of the project, shipping activities, involves Commonwealth jurisdiction the Australian government has determined that a Commonwealth EIS, a level of assessment parallel to that required by Queensland is the appropriate level of assessment. Cooperation between the Queensland and Australian governments will enable a single assessment document to be prepared to meet the requirements of both jurisdictions and for the harmonisation of process timelines. At the conclusion of the assessment process, separate State and Australian government approvals will be considered by the Coordinator-General and the Australian government minister.

## 3.2 Review and refinement of the EIS terms of reference

Representatives of state agencies and local governments were invited to act as advisory agencies for the EIS process. These included:

- Department of Communities
- Department of Community Safety
- Department of Employment, Economic Development and Industry
- Department of Education and Training
- Department of Infrastructure and Development
- Department of Justice and Attorney-General
- Department of Premier and Cabinet
- Department of Transport and Main Roads
- Queensland Health
- Queensland Police
- Queensland Treasury
- Gladstone Regional Council
- Maranoa Regional Council
- Western Downs Regional Council
- Banana Shire Council.

The draft terms of reference (ToR) were advertised for public and advisory comment on 1 November 2008 in the Weekend Australian, The Courier-Mail and the Gladstone Observer newspapers. The advertisement was also placed in the Dalby Herald on 4 November 2008. Release of the draft ToR was also notified on DIP's website from which the draft ToR could be downloaded. Hard copies of the draft ToR were also publicly available for inspection at the offices of the Gladstone Regional Council and other local governments along the pipeline route.

Advisory Agency briefings were held in Gladstone on 25 November 2008 and in Brisbane on 26 November 2008.

The period for receipt of submissions closed on 12 December 2008. A total of 21 submissions were received, including 17 from advisory agencies, and 4 private companies and members of the public. Copies of all submission were forwarded to the proponent. The submissions were considered in preparing the final ToR which was approved by the Coordinator-General on 26 May 2009.

## 3.3 Public review of the EIS

A draft of the EIS was provided in stages by electronic means commencing on 29 May 2009. The final EIS was approved by the Coordinator-General for release and publicly advertised on 28 August 2009 in the Weekend Australian, The Courier-Mail and the Gladstone Observer and on 1 September in the



Dalby Herald. The EIS was available for public consultation from 2 September 2009 until 5.00pm 19 October 2009.

Advisory agency briefings were held in Gladstone on 16 September 2009 and in Brisbane on 17 September 2009.

The EIS was available for viewing on the proponent's website as well as the DIP website. A hard copy of the executive summary or CD version of the EIS was available free of charge from the proponent.

The EIS was displayed at:

- Western Downs Regional Council, 107 Drayton Street Dalby
- Chinchilla Customer Service Centre, 80-86 Heeney Street Chinchilla
- Miles Customer Service Centre, 29 Dawson Street Miles
- Tara Customer Service Centre 19 Fry Street Tara
- Wandoan Library, 6 Henderson Road, Wandoan
- Eidsvold Library, 36 Moreton Street. Eidsvold
- Monto Library, 50 Newton Street, Monto
- Biloela Library, Cnr Grevillea & Milton St, Biloela
- Calliope Library, Don Cameron Drive, Calliope
- Boyne/Tannum Library, Wyndham Drive, Boyne Island
- Capricorn Lodge, Curtis Island
- QGC, QGC Project Office, 172 Goondoon Street, Gladstone
- QGC, 275 George Street, Brisbane
- State Library of Queensland, Cultural Centre, Stanley Place South Bank, Brisbane
- DEWHA Central Library, John Gorton Building, King Edward Terrace, Parkes ACT.

A total of 37 submissions were received by DIP, with 9 from advisory agencies and 28 from the general public, commercial operations and environmental non-government organisations as set out below.

#### **Advisory agencies**

- Banana Shire Council
- Department of Environment and Resource Management
- Department of Transport and Main Roads
- Gladstone Ports Corporation
- Gladstone Regional Council
- Queensland Health
- Queensland Police
- Toowoomba Regional Council
- Western Downs Regional Council.

#### **General public**

- Callide Valley Land Care
- Capricorn Conservation Council
- Fitzroy Basin Association
- Fodder King
- Gangulu People
- Port Curtis Coral Coast Native Title Claim Group
- Queensland Conservation Council
- Queensland Seafood Industry Association
- Santos
- Surat Basin Homes
- The MAC Services Group
- Waminda Services
- Wildlife Preservation Society of Queensland



- Wildlife Preservation Society – Upper Dawson Branch
- World Wildlife Fund
- Xstrata Coal
- 12 private submissions.

Issues that were required to be addressed in the SEIS were:

- associated water
- environmental impacts
- gas field infrastructure
- groundwater monitoring and impacts
- impacts on climate and greenhouse gases
- social and community impacts
- transport.

### 3.4 Review of the supplementary EIS

Due to many changes to the project and a condition of approval by the Australian government that an SEIS be prepared, a draft of the SEIS was requested. It was provided in stages by electronic means commencing on 23 December 2009, with revised and additional volumes of the SEIS being uploaded progressively until the 29 January 2010.

The Coordinator-General approved that the SEIS be issued for review to those advisory agencies and general public submitters who had raised issues on the EIS. The release of the SEIS was publicly advertised in The Courier-Mail, The Australian, the Dalby Herald and the Gladstone Observer on Wednesday 10 February 2010. Comments were invited until 5.00pm 10 March 2010. The CD of the SEIS was provided to the public free of charge or via the proponent's website.

The projects Social Impact Management Plan was placed on the DIP web site on Friday, 15 February 2010 and advertisements notifying of the availability of the Social Impact Management Plan were placed in the Dalby Herald and the Gladstone Observer on 19 February 2010.

A total of 39 submissions were received by DIP, with 14 from advisory agencies and 25 from the general public, commercial operations and environmental non-government organisations as set out below.

Advisory agencies were then requested to provide confirmation in writing acknowledging that their issues had been addressed by the proponent, either satisfactorily or alternatively by providing possible recommendations and/or conditions that might allow the project to proceed.

#### **Advisory agencies**

- Department of Environment and Resource Management
- Department of Community Safety
- Department of Communities
- Department of Justice and Attorney General
- Queensland Police Service
- Queensland Health
- Department of Employment, Economic Development and Innovation
- Department of Transport and Main Roads
- Department of Infrastructure and Planning
- Gladstone Regional Council
- Banana Shire Council
- Toowoomba Regional Council
- Western Downs Regional Council
- Gladstone Ports Corporation Limited.



### **General public**

- BOZ Technical Services Pty Ltd
- Environment and Property Protection Association
- Gladstone Area Water Board
- Queensland Seafood Industry Association
- Wildlife Preservation Society of Queensland
- Upper Dawson Branch of Wildlife Preservation Society of Queensland
- Australia Pacific LNG Pty Ltd
- Xstrata Coal Queensland
- 17 private submissions.





## 3. Project approvals and legislative framework

### 4.1 Major project approvals

This report is the culmination of the assessment phase of the EIS pursuant to Section 35 of the SDPWOA. It takes into account the EIS and the SEIS, all properly made submissions and other submissions accepted by me, and other material which I consider relevant to the project, such as comments from advisory agencies and technical reports on specific components of the project.

On 15 September 2008 the Australian Minister for the Department of Environment, Heritage and the Arts determined that nine referrals (subsequently reduced to six on 31 July 2010) relating to the project are each a 'controlled action' under section 75 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) due to the potential impacts on the following matters of national environmental significance (MNES):

- sections 12 and 15A (World heritage properties)
- sections 15B and 15C (National heritage places)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 23 and 24A (Commonwealth marine).

Because Commonwealth marine areas are involved the Commonwealth has decided that the approval process will be by way of a separate EIS assessment. A common State/Commonwealth terms of reference, EIS and SEIS was developed for the project. Commonwealth approval for the project is required under Part 9 of the EPBC Act following receipt of submissions on the SEIS. Therefore I advise that comment on MNES is not required to be part of my report.

In addition to the requirements under the SDPWOA and the EPBC Act, the QGC project will require environmental authorities under the *Environmental Protection Act 1994* (EP Act), petroleum authorities under the *Petroleum and Gas (Production and Safety) Act 2004*, development approvals under the Gladstone State Development Area Development Scheme and Callide Infrastructure Corridor State Development Area Development Scheme (made under the SDPWOA), and development approvals under the *Sustainable Planning Act 1997* (SPA).

Under divisions 6 and 6A of the SDPWOA, the CG report may state conditions for the environmental authority and/or any petroleum lease, pipeline licence or petroleum facility licence required for the project.

Section 39 of the SWPDOA outlines the application of the Coordinator-General's Evaluation Report to the Integrated Development Approval System (IDAS). The Coordinator-General's report may state for the assessment manager one or more of the following:

- the conditions that must attach to any development approval
- that the development approval must be for part only of the development
- that the approval must be a preliminary approval only.



The main approvals required for commencement of project activities are shown in the following table:

**Table 4.1 Project approvals**

<b>Legislation</b>	<b>Approval of relevant component</b>	<b>Approving agency</b>
<b>Pipeline</b>		
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i> Controlled Actions. Approval to take a “Controlled Action” (ss 68 & 133) 2008/4399 pipeline network	Application made to the Department of Environment, Water Heritage and the Arts	Australian Minister for Environment
<i>Environmental Protection Act 1994 (s426A)</i>	Environmental Authority	DERM - EPA
<i>Petroleum and Gas (Production and Safety) s409/s339/s497</i>	Petroleum Pipeline Licence	DEEDI – M&E
<i>SDPWO Act 1971 s84</i> - development scheme for the GSDA	Approval for a material change of use GSDA	DIP
<i>SDPWO Act 1971 s84</i> – development scheme for the CICSDA	Approval for a material change of use CICSDA	DIP
<b>Plant</b>		
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i> Controlled Actions. Approval to take a “Controlled Action” (ss 68 & 133) 2008/4402 LNG facility	Application made to the Department of Environment, Water Heritage and the Arts	Australian Minister for Environment
<i>PGPS Act (s445)</i>	Petroleum Facility Licence	DEEDI – M&E
<i>SDPWO Act 1971 s84</i> - development scheme for the GSDA	Approval for a material change of use GSDA	DIP
<i>Dangerous Goods Safety Management Act 2001(s36)</i> <i>Dangerous Goods Safety Management Regulation 2001</i>	Notification of a Major Hazard Facility	JAG – HICB
<i>Dangerous Goods Safety Management Act 2001(s47)</i> <i>PGPS Act (s674)</i>	Submission of Safety Report	JAG - HICB
<b>Marine facilities</b>		
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i> Controlled Actions. Approval to take a “Controlled Action” (ss 68 & 133) 2008/4401 marine facilities 2008/4405 shipping activities	Application made to the Department of Environment, Water Heritage and the Arts	Australian Minister for Environment
<i>SDPWO Act 1971 s84</i> - development scheme for the GSDA	Approval for a material change of use GSDA	DIP
<i>Environment Protection Act 1994</i>	Environmental authority – Marine Facility	DERM-EPA
<i>Environment Protection Act 1994 (Qld)</i> <i>Sustainable Planning Act 2009</i>	Development permit for a material change of use for an environmentally relevant activity other than a petroleum activity.	DERM-EPA Relevant Council
<b>Gas fields</b>		
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i> Controlled Actions. Approval to take a “Controlled Action (ss 68 & 133) 2008/4398 CSG fields expansion	Application made to the Department of Environment, Water Heritage and the Arts	Australian Minister for Environment
<i>Environmental Protection Act 1994 (Qld)</i> <i>Environmental Protection Regulation 1998 (Qld)</i>	Environmental authorities	DERM-EPA
<i>Petroleum and Gas ( Production and Safety) Act 2004 (Qld)</i> <i>Petroleum and Gas ( Production and Safety) Regulation 2004 (Qld).</i>	petroleum pipeline licences, petroleum leases, petroleum survey licences and petroleum facility licences.	DEEDI



Legislation	Approval of relevant component	Approving agency
<p><i>Sustainable Planning Act 1997 (Qld)</i> Development Permit for a Material Change of Use assessable under a Planning Scheme</p>	<p>Material changes of use applications for RO Plants, temporary workers' accommodation</p>	<p>Applicable local government</p>
<p><i>Environmental Protection Act 1994</i> Beneficial reuse of associated water. CSG water is a regulated waster under the EP Act. The tenure holder will then require either a beneficial use approval or an environmental authority that specifically provides for the disposal of the waste. <i>Environmental Protection (Water Management) Regulation 2000</i> Approval of a resource or type of resource for a beneficial use (Section 66B of the <i>Environmental Protection (Waste Management) Regulation 2000</i> <i>Water Act 2000</i> To supply CSG water for another purpose (for example water supply or an environmentally relevant activity) the proponent must also obtain a water licence under the <i>Water Act 2000</i> (Chapter 2, part 6)</p>	<p>Approval of a resource or type of resource for a beneficial use Water Licence</p>	<p>DERM</p>



## 4. Key findings and environmental management plans

### 5.1 Key findings

The QGC EIS and SEIS identified the following key findings:

- The development of the Gas Field will necessitate the placement of many noise sources in a rural setting. Investigations into potential noise mitigation measures and their usefulness have been undertaken. These investigations have influenced the project design in terms of choice of development approach. This approach has been designed to protect community environmental amenity. Regulatory guidelines will be developed and complied with.
- As a result of treating associated water, salt is produced. It is likely that about 360,000 m<sup>3</sup> of salt will be produced to the end of 2014. Over the life of the project, approximately 5,500,000 tonnes or 2,700,000 m<sup>3</sup> of salt will be produced. QGC is seeking to sell this salt to third parties as a beneficial by-product of the CSG industry. Salt-disposal landfills will be required as default options for the long-term management of salt generated from the water treatment processes that cannot be sold or transported offsite for beneficial use by others.
- Based on the conceptual groundwater model, the proposed development and operation of the Gas Field component of the QGC Project is expected to have a minor-to-moderate impact on neighbouring bore users with limited inter-aquifer transfer from the Precipice and Hutton formation aquifers is predicted. Regulatory guidelines have been developed for dealing with this issue.
- A negligible to insignificant impact on shallow aquifers and hence on ecosystems depending on these is predicted. This is reinforced by aquifer connectivity limitations and there being no identified groundwater dependent ecosystems within the Gas Field. Consistent with this finding, there is unlikely to be any significant impact on the baseflow to local river systems, particularly the Condamine River.
- There is potential for moderate impacts on land use and infrastructure, particularly cropping lands and state forests, due to the dispersed nature and multiple locations of the Gas Field wells and associated infrastructure. This may reduce the ability of the landholder to access all areas of productive land. Mitigation measures have been proposed, including landholder consultation and engineering solutions.
- A risk-based approach to land contamination that considers the most likely contaminants and their likely locations has been adopted. At this stage no potentially contaminated areas have been located. Any potentially contaminated sites will be identified and appropriately managed as gas fields are developed.
- Dredging impacts will be limited to the immediate area of the dredging operation and will be conducted in a manner similar to that applicable to other dredging activities in Port Curtis.
- Offsets will be offered for flora and fauna disturbance in accordance with State and Commonwealth policies.

The assessment of the project in both the EIS and SEIS concluded that the project will have minor to moderate impacts which can be mitigated through design and management, and through appropriate conditioning and monitoring by government agencies.



## 5.2 Environmental management plans

### 5.2.1 Coal Seam Gas Field EMP

The proponent provided draft EMP for construction and operation of the CSG Field in the EIS. The content of the EMP will be revised as a result of stakeholder consultation, as well as ongoing refinement of Project construction planning and detailed design, for eventual issue of the final EMPs as part of an application for an Environmental Authority under the *Environmental Protection Act 1997*.

The following elements are contained within the EMP. They have been updated with additional management and mitigation measures developed during preparation of the SEIS:

- noise and vibration
- traffic and transport
- visual amenity and lighting
- weeds and pests
- air quality and dust
- groundwater monitoring
- associated water storage
- associated water management
- flora and fauna
- soil contamination
- effluent disposal
- fire management
- landscape and character maintenance
- decommissioning.

### 5.2.2 Gas transmission pipeline EMP

The EMP for the pipeline component of the project has been developed to provide an overall framework for the management of environmental hazards, risks and impacts during construction and operation. The EMP has been developed in accordance with the Australian Pipeline Industry (APIA) Code of Environmental Practice to ensure that the pipelines are constructed and operated to industry best practice standards.

#### **Construction activities**

The construction elements of the EMP consist of the following:

- noise and vibration
- traffic and transport
- visual amenity and lighting
- weeds and pests
- air quality and dust
- surface water and groundwater
- soil erosion and sediment control
- acid sulfate soils
- flora and fauna
- marine ecology
- stock access and control
- waste management
- effluent disposal
- soil contamination
- mosquito and biting midge
- Easter Red Fire Ant
- incidents and complaints
- environmental induction and training



- emergency response for environmental incidents
- fire management and prevention
- landscape character and maintenance
- topography maintenance
- revegetation and rehabilitation
- dangerous good and hazardous substances
- incidents and complaints
- decommissioning.

### **Operational activities**

The operational elements of the EMP consist of the following:

- noise and vibration
- traffic and transport
- visual amenity and lighting
- weeds and pests
- air quality
- surface water and groundwater
- flora and fauna
- soil erosion and sediment control
- waste management
- soil contamination
- incidents and complaints
- environmental induction and training
- emergency response for environmental incidents
- fire management
- climate extremes and climate change
- landscape and character maintenance
- topography maintenance
- revegetation and rehabilitation
- dangerous goods and hazardous substances
- decommissioning.

## **5.2.3 LNG facility EMP**

### **LNG facility environmental management plan overview**

The draft EMP contains mitigation and management measures for construction and operation of the LNG facility component of the project, as presented in the EIS. The content of the draft EMP will be revised as a result of stakeholder consultation, including comments from DEWHA.

### **Construction activities**

The construction elements of the EMP consist of the following:

- noise and vibration
- traffic /transport
- visual amenity
- lighting
- weeds and pests
- air quality and dust management
- groundwater quality management plan
- surface water quality management
- soil erosion and sedimentation control
- acid sulfate soils
- soil contamination



- terrestrial ecology
- marine ecology
- mosquito and biting midge management
- eastern red fire ant management
- marine fuel and oil spill
- waste management
- mulch stockpile
- effluent disposal
- fire management
- incidents and complaints
- environmental induction and training
- emergency response for environmental incidents
- dangerous goods and hazardous substances
- decommissioning.

### **Operational activities**

The operational elements of the EMP consist of the following:

- noise and vibration
- traffic/transport
- shipping transport
- visual amenity
- lighting
- weeds and pests
- air quality management plan
- groundwater quality management plan
- surface water quality management
- soil contamination
- terrestrial ecology
- marine ecology
- mosquito and biting midge management
- marine fuel and oil spill
- waste management
- effluent disposal
- fire management
- incidents and complaints
- environmental induction and training
- emergency response for environmental incidents
- dangerous goods and hazardous substances
- decommissioning.



## 5. General issues

### 6.1 Transport

#### 6.1.1 Pipe transport

An intricate transport issue associated with the construction of the gas transmission pipeline is the transport of pipe to the construction corridor.

#### **Pipe transport task**

The EIS and in particular Appendix 4.4 outlined that there will be two proposed pipelines:

- (a) a 340 km export gas transmission line from approximately 9 km east of Miles to the LNG plant at Curtis Island
- (b) an upstream infrastructure corridor consisting of approximately 191 km of gas pipeline (collection header) and parallel water pipeline, spanning from south-west of Dalby at its eastern end to south-west Wandoan at its western end

The EIS assessed seven haulage options and concluded that the preferred option is 1B which is the landing point at Gladstone with a single haulage route along the Dawson and Leichhardt highways. The export pipeline and the collection header would be constructed at the same time. The supply of 1050 mm diameter pipe would be at the rate of 40 km/month (combined) for both pipelines over a period of 15 months. It is planned to alternate the delivery between the two pipelines month by month. The upstream infrastructure corridor would contain not only the 1050 mm collection header gas pipeline but also a parallel 525 mm diameter water pipeline within the central and southern tenement area which collects water from the wells and transmits it to a central point for treatment prior to disposal. The minimum number of 1050 mm diameter pipes that would be transported on any one truck is two, loaded side by side. In total there will be some 140 to 150 truck loads per day during the construction period (see Table 2.3 in Appendix 4.4).

In the SEIS, QGC outlined that the proponent is now committed to using rail transport. It is its intention to make rail transport a central plank of the logistics network. The plan is to rail at least 75% of pipe to be used in construction. 60% of the pipe will be railed from the Port of Brisbane to Chinchilla or Miles and then road will be used. The other 15% of pipe will be railed from Gladstone.

#### **Stakeholder issues**

The EIS determined that the impact from transport on roads will be moderate to major before mitigation measures are applied. The Department of Transport and Main Roads (DTMR) and Gladstone Regional Council (GRC) expressed concerns about QGC transporting pipeline and other equipment out of Gladstone due to:

- the volume of the road transport task (possibly up to 140 daily heavy vehicle movements over a fifteen month period)
- concerns raised by stakeholders from Gladstone.

GRC also raised concerns about the number of trucks passing through Gladstone and also noise associated with unloading the pipes from the vessel onto the laydown area at Auckland Point and then reloading onto trucks.





## Proponents response

As discussed above QGC have advised that they plan to use rail out of both Gladstone and Brisbane to the various regional lay down areas. At the time of writing this report no firm contracts have been entered into with QR or any other rail provider.

## Coordinator-General's conclusion

I consider it is acceptable that the final arrangements to transport pipe to the pipeline corridor be resolved subsequent to the EIS process during the detailed design phase of the project. However **I am concerned** about the impacts on roads and also on the Gladstone community. Therefore **I set** a condition regarding arrangements for use of rail if pipes are brought in via Gladstone. I bring this condition to the attention of the relevant agencies (DTMR, Gladstone Ports Corporation (GPC) and GRC) responsible for any subsequent approvals required for pipe transport. These conditions appear in Appendix 1 Part 2 Conditions 1 and 2.

**I require** the proponent to commit to 75% pipe transport by rail, as it indicates in the SEIS using Brisbane and Gladstone for importation of pipes, with some local pipe sources. This is conditioned in Appendix 1 Part 2 Condition 1.

If the proponent determines that for either environmental or commercial reasons, it is expedient to utilise another port other than Gladstone or Brisbane to discharge pipe or other materials, then **I require** a thorough transport and road impact study on the alternative port location. This condition is presented in Appendix 1 Part 2 Condition 2.

### 6.1.2 Material and personnel transport

#### Operational transport (shipping)

As described in Volume 5 Chapter 15 of the EIS the frequency of LNG vessels will vary subject to the mix of vessels being used. Approximately 60 LNG vessels per year will be loaded per operational LNG process train.

Whilst vessel types, sizes and configurations will vary over the lifetime of the Project, the typical LNG vessel will range between 125,000 cubic metres and 180,000 cubic metres LNG capacity and LPG vessels between 38,000 and 85,000 cubic metres. All LNG and LPG vessels will be of double-hull designs as mandated by the International Gas Code (IGC).

These ships will navigate through the Great Barrier Reef Marine Park (GBRMP) within the designated shipping area before entering the Port of Gladstone, and again navigate through the GBRMP Shipping Area when leaving the Port of Gladstone. After consulting with MSQ, QGC have decided that their shipping associated with the project will use the outer route that is seaward of the GBRMP, unless it is unsafe to do so (e.g. in a cyclone).

The level of shipping for all trade through the designated shipping channels is approximately 2,000 ship movements per year. The typical ships using these channels carry products like coal, sugar, iron ore and oil. The QGC project will represent an increase of 12.5% in operational shipping visits to the Port of Gladstone once all three trains are operational.

#### Construction transport

The EIS, Volume 5, Chapter 15, states that shipping activities associated with construction of the LNG facility relate to the:

- transfer of personnel between Gladstone and the LNG Facility on Curtis Island, staging out of Auckland Point



- delivery of plant, materials and equipment to the LNG Facility site on Curtis Island. This will be through a combination of barges shipping directly to the Materials Offloading Facility (MOF) on Curtis Island and by transfer across Gladstone Harbour from the Auckland Point staging facility.

Given the proposed split of personnel accommodation between the construction camp on Curtis Island and the mainland, the numbers of personnel travelling daily will depend upon the:

- stage of construction
- stage of shift schedule, with local personnel travelling daily throughout the schedule and all personnel assumed to travel at the completion of each fortnight
- number of workers sourced from the local area.

At peak construction, with 3,300<sup>1</sup> total personnel, it is anticipated approximately 1,100 personnel will depart the Curtis Island site daily and return to Gladstone and surrounds via Auckland Point. This will require some 120 plus ferry services per month.

### **Stakeholders issues**

Agencies and other stakeholders, such as the local fishing industry, have expressed concerns about the increase in shipping movements within the Gladstone Harbour during the QGC construction phase. Car parking and increased traffic volumes around Auckland Point are also of particular concern.

In addition to marine loading facilities being proposed at Auckland Point and RG Tanna terminal, the proponent has indicated that the Gladstone Marina and Fisherman's Landing could be used as a transfer point for early construction personnel and equipment from the mainland to Curtis Island. Further discussions are needed to take place to establish details regarding this proposal.

### **Coordinator-General's conclusion**

**I am satisfied** that the LNG industry has had an impressive safety record over the last 50 years. Since international commercial LNG shipping began in 1959, for example, tankers have carried over 33,000 LNG shipments without a serious accident at sea or in port. Insurance records and industry sources show that there were approximately 30 LNG tanker safety incidents (e.g. leaks, groundings or collisions) up to the year 2002. Of these incidents, 12 involved small LNG spills, which caused some freezing damage but did not ignite. Two incidents caused small vapour vent fires, which were quickly extinguished.

**I am concerned** that some of the above plans to use facilities within the Port of Gladstone may not be possible as there could be significant capacity issues to resolve in order to minimise impacts for other port and road users. Also not enough account has been taken of cumulative impacts of other LNG projects utilising the same or adjacent locations and roads. **I am also concerned** that the commencement of this project will result in significant additional large ferry traffic in the Port of Gladstone and heavy congestion at the ferry terminal.

Therefore in order to ensure that all potential impacts of the construction and operation of all marine loading and unloading facilities within the Port of Gladstone can be properly managed, **I impose** a series of conditions for the QGC project which revolve around my approval of a Gladstone Logistics Plan, following the proponent's consultation with infrastructure and local authorities, as well as with other proponents, for the integrated use of port and road facilities. These appear as Conditions 3 to 6 in Appendix 1 Part 2.

I also require the proponent to prepare and submit for the approval of Maritime Safety Queensland and the Regional Harbour Master (Gladstone), Marine Traffic Management Plan and a Harbour Management Plan that should ensure navigational safety is maintained at all times for the life of the project, both for harbour traffic during construction and LNG export shipping. These conditions appear in Appendix 1, Part 2, Condition 6, parts 1 and 2.

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<sup>1</sup> Vol2 Ch 6 Pg 1



## Recommendation 1

It is recommended that the proponent coordinate with other LNG proponents in regard to ferry and other employee-related travel in order to stagger working shift changes to avoid high personnel shipping periods in the port environs.

### 6.1.3 Roads impacted by QGC

The proponent in its EIS stated that all materials for the gas field component are to be transported by road and this will result in moderate to major impacts on the road pavement of a number of state-controlled roads. Pavement impacts are also expected on regional council roads, the majority of which are unsealed.

The proponent advises since that since the preparation of the EIS and SEIS, negotiations to transport the majority of pipe via rail are well developed. Furthermore, the proponent advises that the timing of a formal agreement or contract is imminent. Depending on the transport strategies to be implemented and the final corridors selected, the preliminary assessment undertaken on the information available to date, suggests a moderate impact on the road network.

For the LNG plant it is expected that the impact on state or local controlled roads will not impose a significant impost. All transport road related impacts associated with the LNG Facility are considered manageable.

## Stakeholder issues

DTMR has expressed doubts that the proponent has adequately assessed the cumulative impacts of the LNG plant and pipeline for the construction and operational phases on the state-controlled road network and its infrastructure. Further discussions need to take place on the impacts on intersections, for example the Gladstone-Mt Larcom/Landing Road intersection. Mitigation measures in some cases have not been addressed and a “statement of commitments” needs to be developed.

Banana Shire Council advised that the increased volume of construction traffic required for the project will push capacity on the existing road network to the limit. Damage to the road network is already being experienced due to construction traffic for similar projects. Council is concerned about the impact on council assets and their ability to undertake any rehabilitation on their roads. Likewise GRC also has concerns about the impact upon road surfaces due to the trucks carrying long pipes. They have also noted that no allowance has been made for cumulative impacts. Council submitted a number of development conditions (traffic and transport) for consideration. **I believe** that these conditions have been addressed in the conditions attached to this report.

While specific elements related to road impacts and proposed road upgrades around the LNG plant, pipeline and gas fields are discussed, there remains a need to set a number of general conditions to cover road use by the QGC. These general conditions are especially required to cover the construction of the linear infrastructure elements of the project such as pipelines for which detailed engineering designs and detailed plant and materials transport logistics plans are not currently available.

## Coordinator-General's conclusion

**I consider** that QGC should consult with the DTMR Central District office, for state-controlled roads, and the relevant local government (depending upon location of the works) for local roads, within 3 months of making the financial investment decision to proceed with the project to:

- provide precise details of intended usage of each road for the haulage of personnel, materials and equipment for the construction of the plant, pipeline and gas fields
- where necessary, identify any additional upgrades required to ensure that road infrastructure is of an adequate standard to support construction and operational haulage that is not identified elsewhere in this Report or provided in commitments made by QGC



- adequately mitigate the impacts of this haulage through the implementation of agreed RMPs in accordance with DTMR and the relevant local authority standards and policies, prior to the commencement of each phase of construction for each component of the QGC project
- contribute to road infrastructure improvements necessary to alleviate impacts of the project.

Therefore, in order to ensure that road and traffic impacts are properly managed, **I have included** conditions and recommendations on the above subjects for the project and I bring these conditions to the attention of the relevant agencies (DTMR, Gladstone Ports Corporation, DIP and all relevant regional councils) responsible for any subsequent approvals. These appear in Appendix 1 Part 2 as Conditions 6, 7, 8, 9 10 and 11.

In Condition 15 **I recommend** that QGC work closely with the Officer in Charge, Gladstone District Traffic Branch and other areas of Queensland Police Service (QPS) when developing the Traffic and Transport Management Plans for Gladstone. QGC should engage with relevant entities early to ensure a capability in policing response to security risks and emergencies. **I note** that the proponent has made a commitment to work closely with QPS to ensure adequate planning and response measures are implemented.

**I note** that the proponent has not made commitments to provide infrastructure such as marked vehicles needed to supervise the movements of over-dimensional vehicle movements. **I recommend** that in discussions with the relevant authorities on over-dimensional vehicle movements the proponent should consider such a commitment to ensure road safety is maintained at all times.

DERM expressed concern that construction of approximately 6500 km of roads and access tracks in the gas fields represents a significant potential impact on land, water quality and aquatic ecosystems in the project area. The magnitude of this potential impact is not adequately described or assessed in the EIS or the SEIS, nor do the proposed mitigations measures reflect the extent of the potential impact. **I therefore require** that mitigation measures associated with tracks and roads be included in the proponent's environmental management plans. This appears in Appendix 1 Part 2 Condition 13.

## 6.1.4 Air transport

### Gas fields

The EIS assumed that the peak construction workforce for the Gas Field would be approximately 2,000 personnel. In the SEIS this was revised to 4,900. The workforce is expected to be accommodated in up to ten camps at four locations. The EIS did refer to Gladstone airport but no mention was made about the use of rural airports. The SEIS identified six aerodromes/airfields within two to four hours driving distance of the potential camp locations for the Gas Field development. They are:

- Miles Airfield (uncertified)
- Chinchilla Aerodrome (registered)
- Dalby Airfield (uncertified)
- Taroom Aerodrome (registered)
- Toowoomba Aerodrome (certified)
- Roma Aerodrome (certified).

Chinchilla Aerodrome is already being used by the proponent for charter flights to minimise personnel driving long distances to the Gas Field area. The SEIS determined that apart from Toowoomba and Roma, both of which are at least two hours drive to the nearest camp location, the other aerodromes/airfields would require some form of upgrade to cater for the volume of traffic needed to support the project. Upgrades that may be required include:

- pavement
- runway dimension
- amenity (hangers, terminal, etc)
- lighting (landing, taxi lights)
- security



- navigation (beacons, etc)
- emergency (rescue, fire response, etc)
- ground services (fuelling, communications, etc).

QGC are still considering their options in personnel logistics.

However, **I also note** that the proponent has been in discussion with a mining proponent to identify opportunities to share the cost of providing an aerodrome at Wandoan.

## Stakeholder issues

Western Downs Regional Council has requested the proponent make a contribution to the upgrade, operations and maintenance of aerodromes which are operated by the Council. **I note** that discussions between QGC and the Council have already commenced.

## Coordinator-General's conclusion

I believe it is appropriate for QGC to make a financial contribution to any airport upgrades which may be required to alleviate the impacts of the fly-in fly-out workforce on the local airports. In order to ensure impacts of the project on airports are adequately managed, QGC would need to consult and agree with the relevant local governments about the design and timing of any upgrades required and allow enough time to obtain appropriate approvals for the works. The condition I recommend is in Appendix 1 Part 2 Condition 12.

## LNG plant Gladstone

In the EIS, Volume 5, Chapter 12, Section 12.9, QGC outlined an assessment of vertical plumes and their affect on aviation operations. The proposed LNG facility consists of a number of stacks that emit industrial exhausts with the potential to generate significant vertical plume velocities above the LNG plant, as well as potential vertical plumes arising from flaring events. The Gladstone airport is located some 10.3 km to the south of the plant. For normal operating conditions, there is a potential for the average plume vertical velocity to exceed 4.3 m/s up to a maximum height of 500 m above ground level, at a maximum downwind distance of approximately 200 m. A plume with a vertical velocity above 4.3 m/s is likely to exceed the PANS-OPS (Procedures for Air Navigation Services – Aircraft Operations) for 24 hours per year or 0.33 per cent of the time.

Each LNG train will have a planned shutdown every 3-4 years with associated maintenance and start-up flaring. For non-normal operating conditions (planned events during maintenance and start-up) the operating condition likely to generate the highest plume is the dry gas flare release during start-up. This event is estimated to occur 2-4 times per year for 12-24 hours, but with much smaller events during start-up which may involve periodic flaring for up to five days. During start-up conditions the plume generated by the flare is expected to penetrate PANS-OPS for half the time at a vertical velocity above 4.3 m/s. This could occur sporadically for up to five days every three to four years per train (QGC plan to construct three trains). The 0.1 percentile critical plume height (when operation for all year is assumed) is almost 1,500 m above ground-level. The horizontal extent of the plume that exceeds a vertical velocity of 4.3 m/s is expected to be, on average, approximately 450 m (and up to 650 m).

For non-normal operating conditions (unplanned events or emergency operations) the operating condition likely to generate the highest plume is the emergency operation of the dry gas flare. This event is likely to occur less than once per year and last for approximately 20 minutes. During this unscheduled emergency operation of the dry gas flare, the vertical velocities generated by the extremely buoyant plume are expected to exceed the PANS-OPS height of 300 m under almost all meteorological conditions to a maximum height of 1921 m above ground-level. The horizontal extent of the plume that exceeds a vertical velocity of 4.3 m/s is expected to be, on average, approximately 500 m (and up to 719 m). The flare flame height is expected to be less than 250 m above ground-level during worst-case meteorological conditions.



## Stakeholder issues

In its submission on the SEIS, Gladstone Regional Council stated that the report had not dealt with their concerns related to potential aviation impacts of the project. GRC noted that the proponent stated that they will consider appropriate management and mitigation measures. However Council hold a firm view that it is essential that design/management strategies are agreed and in place prior to approvals being granted so that the precise nature and extent of restrictions to aviation activity are known and fully taken into account in the decision making. GRC are concerned that the use of Gladstone Airport will be significantly restricted in conditions where instrument approaches are required and a number of aircraft will be redirected over residential areas. In addition, aircraft on arrival to Gladstone will be required to fly additional track miles, resulting in added fuel burn and inefficient use of air space. The increased potential for aircraft diversions to Rockhampton will have direct, adverse impacts on aviation business that rely on all weather access to Gladstone Airport.

## Proponent response

In the SEIS, QGC state that they will continue to work with Air Services Australia, CASA and other appropriate stakeholders, including the operator of Gladstone Airport with regards impacts on aviation operations at Gladstone Airport from these plumes.

## Coordinator-General's conclusion

Given that other LNG facilities are also planned for Curtis Island I **require** a cumulative impact assessment on aviation airspace. QCLNG did not address these concerns satisfactorily in their SEIS so I therefore have nominated a condition appearing in Appendix 1, Part 2, Condition 18.

### 6.1.5 Cumulative transport impacts

The SEIS contained a detailed traffic and transport impact assessment undertaken by Halcrow, refer appendices to Volume 5, Appendix 5.8.

In its response to the SEIS, DTMR has submitted that QGC has not adequately assessed the cumulative impacts of the LNG Plant and Pipeline for the construction and operational phases on the state-controlled road network and its infrastructure.

## Coordinator-General's conclusion

The emergence of multiple and overlapping proposals for LNG and other significant resource sector developments will more than likely result in significant cumulative impacts for communities and regions, including State and local road networks. The Terms of Reference for the EIS for this project require the proponent to identify cumulative impacts of projects where possible. As discussed above, information provided to date does not give a clear assessment of the impacts of multiple projects especially other LNG projects on road networks.

Transport cumulative impacts need to be investigated because, although one project may not trigger road upgrades, or a drop-off in service standards, the cumulative effects of three or four significant projects utilising road infrastructure concurrently, or even consecutively, may cause overloading of capacity. This could potentially result in congestion or pavement deterioration, negatively impacting on road safety and trigger the need for mitigation and road upgrade works.

To ensure present proposals include appropriate impact mitigation, road contribution strategies for a number of scenarios which take account of the number of proposed projects, construction schedules, timing and transport tasks, I have initiated a proposal that DIP, in conjunction with DTMR, conduct a "Road Transport Infrastructure Cumulative Impacts Study – Proposed LNG Industry Impacts". As a consequence I therefore nominate such a condition in Appendix 1, Part 2, Condition 8.



## 6.2 Social and economic

Potential social and economic impacts of the Queensland Curtis LNG Project (QGC project) have been identified during the EIS process for both its construction and operational phases for each of the three major project components.

A social impact assessment (SIA) for the project was conducted by QGC over three distinct study areas in relation to the following project components:

- coal seam gas (CSG) fields
- gas transmission pipeline route
- liquefied natural gas (LNG) facility.

### 6.2.1 Social impact

#### 6.2.1.1 CSG field

The CSG field workforce and accommodation requirements in the CSG fields will be substantial. The project involves the development of approximately 6,000 production wells over the life of the project with 1,000 to 1,500 wells to be initially established by mid-2014. Associated infrastructure includes gas processing and compression infrastructure, associated surface equipment (e.g. wellhead separators) and field infrastructure (such as access tracks, warehouses, camps, office and telecommunications).

QGC intends to house its construction workforce and the non-local component of its operations workforce in small temporary workers' accommodation facilities (TWAFFs) in rural locations throughout the CSG field. Where possible, accommodation facilities will be provided on QGC land within the Western Downs Regional Council (WDRC) area. QGC and its contractors will consult with the relevant local governments with respect to the location of TWAFFs and with businesses and other stakeholders on how to maximise the economic benefits of the TWAFFs to nearby towns, while minimising potential negative impacts.

Employment in the CSG fields around the Western Downs region<sup>2</sup> will include a peak workforce of 5,250 workers in 2011 and 530 workers for the ongoing operations of the QGC project as well as up to 750 for ongoing gas field construction.

QGC expects only 5% of the construction workforce to be residing locally within the Western Downs Regional Council (WDRC) area, while a higher percentage (25%) of the operations workforce will reside locally. Other construction and operations workers will drive-in/drive-out from elsewhere in the region (e.g. Roma, Toowoomba, Banana Shire and possibly Brisbane) or fly-in/fly-out from elsewhere in Queensland and Australia. All non-resident workers (construction and operations) will be housed in TWAFF's for the duration of their roster.

#### Potential social impacts for the CSG field

The Queensland Curtis LNG (QGC) draft Social Impact Management Plan (SIMP), Table 7, provides information on the potential impacts on the CSG Field communities. The proponent has identified a range of issues that were rated as having potential impacts, both positive and negative. A summary of these identified social and economic impacts follows.

#### Population

As a result of the development of the QGC project, it is estimated that the population of the WDRC area will increase by more than 200 families during the construction phase until 2014. The proponent identifies that additional families are anticipated to relocate to the region over the long term, as a direct result of permanent operational jobs in the CSG fields. The age, cultural diversity and gender profiles of

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<sup>2</sup> Includes a small part of the Maranoa region.



the region are likely to change as a result. While the proponent notes a number of potential benefits of this population increase and profile changes, including increased population stability and economic vitality, a number of potential negative impacts are also identified relating to housing, health and safety, social infrastructure and traffic and transport. These are discussed under their respective headings below.

### **Labour force and businesses impacts**

The large labour force requirements of the QGC project, and the cumulative impact of several major CSG projects proceeding in the region, will have a significant impact on local / regional labour force availability, particularly during the construction phase of projects.

The impact reported would create a drain on skills and labour in an already tight labour market in the region, and affect local business employment and business opportunities created by the project

### **Increased demand on housing and accommodation**

The proponent has identified that the project may create demand for more than 300 dwellings by 2014, impacting on housing availability and affordability. Furthermore, the cumulative demands of multiple projects could potentially result in increased housing stress for low income households, with some households experiencing increasing difficulty in maintaining secure housing and / or having to relocate away from the region

### **Increased demand on social infrastructure**

Social infrastructure in the Western Downs region may be affected due to demand from the increased population comprising of QGC project employees as well as other similar projects. In particular, the proponent has identified the following potential impacts on social infrastructure:

- an increased demand for education - local school enrolments
- increased demand on affordable housing
- increased demand on child care, family support and youth support services
- incremental increased demand on community and cultural facilities such as libraries, parks, community centres and sporting grounds
- increased membership pool for community, cultural and sporting associations.

In addition, the proponent has identified the potential for the project to increase demand for local emergency services, including Fire and Rescue, Ambulance and Police services and has expressed concern in relation to the capacity of local fire fighters to deal with CSG related fires.

### **Impacts on property owners and land use**

The Gas Field will require a total of 6,000 wells over the life of the Project. Approximately 2,000 wells would be drilled during the construction period, with an additional 4,000 wells to be drilled over the ensuing life of the Project. The well investigation/construction phase is to be undertaken in stages; therefore impacts will shift across the CSG Fields over the life of the Project. The proponent has identified a number of potential impacts associated with development of the gas fields, including:

- serious local concern about the impacts of gas wells and gathering infrastructure in rural residential areas
- potential fragmentation of good quality agricultural land and loss of connectivity between different areas of an allotment
- potential disruption to grazing patterns of livestock and stock crossings
- loss of privacy due to construction and operations work on private property, particularly rural residential
- negative effects on lifestyle due to noise, vibrations, dust, air emissions and artificial light.





## Community health and safety impacts

The proponent has identified a number of potential impacts on community health and safety during project construction and operations. These include:

- additional pressure on health and medical services provided by general practitioners and community health centres
- changes in the perception of community safety and security due to the large influx of FIFO workers and gender imbalance
- impacts on road safety resulting from increased traffic associated with transport of workers and materials and equipment
- stress and anxiety as a result of uncertainty about the location and impacts of CSG fields infrastructure.

As the proponent is consulting with health and community stakeholders in the Western Downs to develop investments in rural health capacity, it is expected there will be improvements to the long-term sustainability of rural health services. In addition to proponent's provision of medical practitioners for the workforce, the proponent has committed to working with Queensland Health, Regional Health Advisory Boards and health providers to plan co-operatively for service expansions as required.

## Lifestyle and community values

The proponent has identified a number of potential negative impacts on community lifestyle and values during project construction and operations. These include:

- social fragmentation due to introduction of FIFO workforce and changing economic structure
- potential for negative impacts on quiet rural lifestyle from traffic, infrastructure facilities and gathering systems.

### 6.2.1.2 Gas transmission pipeline

The Pipeline Component of the QGC Project includes the Export Pipeline, Collection Header and Lateral Pipeline. The Export Pipeline will extend 380 km north-east from the Gas Field near Miles to Gladstone, traversing through Western Downs, Banana, North Burnett and Gladstone Local Government Areas (LGAs). The Collection Header, a 191 km pipeline connecting gas production in the gas field is part of the infrastructure noted in section 6.2.1. above. The Pipeline routes avoid all major townships and will be situated mainly in areas where the land has been cleared and used for agricultural purposes. Localities that will be in close vicinity to the Pipeline Component network include:

- Taroom, Banana Shire
- Cracow, Banana Shire
- Biloela, Banana Shire
- Mount Alma, Gladstone.

It is anticipated that up to 880 construction workers will be required during the construction of the gas transmission pipeline over a period of 12 months. They are expected to work 12 hours per day, 7 days per week with no night-time construction activity planned. Crews will typically work for 4 weeks followed by 1 week off on a rostered system.

Approximately 20 per cent of the pipeline construction workforce will be sourced from within the region (i.e. Dalby, Banana, Burnett, Roma, Gladstone and Rockhampton) with 80 per cent specialised labour sourced from other Australian States. All non-local workers will be accommodated in camps as described in the draft EIS. Five camps will be used to accommodate the Export pipeline spreads, including The Narrows pipeline crossing. Camps are likely to be located as follows:

- northwest of Miles
- roughly equidistant between Wandoan and Eidsvold
- between Eidsvold and Theodore



- south of Biloela
- north of the Callide Range.

Workers will fly into Gladstone or Roma and be transported via bus to the camps. Pipeline materials will be imported via ship and transported via rail [or road] and stored in temporary locations along the pipeline route.

The Proponent has identified approximately 100 distinct groups of landholders within the Export Pipeline corridor and 29 groups of landholders within the Lateral Pipeline Corridor that may be directly affected by the gas transmission pipeline.

### **Potential social impacts for the gas transmission pipeline**

The draft SIMP, Queensland Curtis LNG, Table 6 contained within the SEIS, provides information on proposed impacts in the pipeline region. The proponent identified a range of issues which were rated as having potential impacts and benefits. A summary of these identified social impacts follows.

#### **Employment and local business impacts**

The proponent identified that construction of the pipeline would have a positive impact on unemployment through the creation of up to 880 direct jobs, as well as indirect employment through increased demand for local goods and services.

#### **Increased demand on social infrastructure**

The proponent has identified the potential for the pipeline construction to increase demand on health and emergency services, including medi-evac arrangements.

#### **Impacts on property owners and land use**

The proponent has identified a number of potential negative impacts associated with development of the gas pipeline, including:

- temporary loss of access to and use of land during the construction phase, potential impacting on grazing and livestock movements
- disturbance to future land uses and restrictions on the use of land within the pipeline corridor
- temporary impacts on farm infrastructure, such as fencing, stock yards and irrigation systems.

#### **Community health and safety impacts**

The proponent has identified a number of potential negative impacts on community health and safety during pipeline construction. These include:

- potential safety risks to people and livestock during construction, due to open trenches
- potential safety impacts on road users, due to increased truck movements on local roads.

#### **Lifestyle and community values**

The proponent has identified a number of potential negative impacts on community lifestyle and values during pipeline construction. These include:

- temporary negative impacts on local amenity resulting from increased noise and dust and changes to local access during the construction phase
- temporary impacts on privacy and security for property owners, due to increase in construction workers in vicinity of houses.



### **6.2.1.3 LNG facility**

The QGC Project involves the development, construction and operation, within the Curtis Island Industry Precinct (CIIP) of the Gladstone State Development Area (GSDA), of an LNG processing plant (LNG Facility) with production capacity up to just over 12 million tonnes a year and nominally comprising three LNG processing units or 'trains'. The construction of the LNG facility will be developed in stages. Operations would begin with the commencement of commissioning of Train 1 in late 2013, followed by Train 2 around nine months later. Train 3 may follow in later years depending on investment decisions.

The proponent has indicated that distribution of construction workers will be dependent upon the availability of local labour. However, assuming minimal constraints on availability of local labour, the peak total site population will be approximately 3,000 persons, with an additional 300 non-local personnel off shift for a total peak workforce of approximately 3,300 in mid 2012.

Normal working hours during construction may vary due to stage of construction, activity being undertaken, and schedule issues, but generally will be from 6:30 am - 5 pm or 7 am - 5:30 pm. Works are planned to be 24 hours per day during the site preparation stage of construction and at other times during construction when un-interruptible activities are being carried out.

Revised estimates suggest local workers are expected to comprise around 42% of the total workforce, allowing for the presence of other projects in the Gladstone region, and nation-wide competition for relevant trades. However, at peak, the increased number of non-local workers will see the local percentage drop to around 35%.

QGC proposes that approximately 1,700 non-local personnel will be accommodated in a purpose-built temporary construction camp to be located on Curtis Island within the LNG Facility site boundary. If the local labour market is significantly constrained, the construction camp may need to accommodate up to approximately 2,000 personnel. Access to the LNG facility from the mainland will occur by ferry.

The roster for construction workers will be 5-6 days per week with non-local craft personnel having one in five weeks off-shift. The proponent advises that workers off-shift are expected to travel to Gladstone (or their primary place of residence) for their recreation time. Once operational, the LNG facility on Curtis Island will operate 24 hours a day, 7 days a week.

QGC currently expects that the LNG facility will require a direct workforce of approximately 160 people, of whom some 120 would be located in Gladstone. This will increase to nearly 200 in Gladstone following commissioning of Train 3. Other staff would be located in Brisbane.

#### **Potential social impacts of the LNG facility**

The draft SIMP, Queensland Curtis LNG, Table 5 provides information on proposed impacts on the LNG Facility. The proponent identified a range of issues which were rated as having potential impacts and benefits. A summary of these identified social impacts follows.

#### **Population**

As a result of the development of the construction of the LNG facility, it is estimated that the population of Gladstone will increase by up to 330 new families between 2012-2014 with 30 additional new families also anticipated as a direct result of permanent jobs in the LNG facility. Accordingly, there is potential for an increase in the number of younger people in Gladstone as a proportion of existing and new residents, due to project employment opportunities and economic vitality. As a result of these population and demographic changes, the proponent has identified a number of potential impacts relating to housing, health and safety, social infrastructure and traffic and transport. These are discussed under their respective headings below.



### **Labour force and businesses impacts**

The proponent has identified a range of employment and business related benefits and impacts associated with the construction and operation of the LNG Facility. These include:

- job creation, including ongoing direct permanent employment
- opportunities to build the local workforce capacity through training and development strategies
- opportunities to increase levels of Indigenous and youth employment
- drawing workers from existing local industry and business, causing labour shortages, including the cumulative impacts of several major projects.

The large labour force requirements of the LNG facility construction, and the cumulative impact of several LNG projects proceeding in the Gladstone region, will have a significant impact on labour force availability, particularly during the construction phase of projects.

### **Increased demand on housing and accommodation**

The proponent has identified that the LNG Facility may create demand for more than 300 dwellings by 2014, impacting on housing availability and affordability. Furthermore, the cumulative demands of multiple projects could potentially result in increased housing stress for low income households with some households experiencing increasing difficulty in maintaining secure housing and / or having to relocate away from the region.

Although the “Integrated Housing Strategy” is yet to be finalised, the proponent has indicated the strategy will include a component designed to address specific vulnerabilities faced by Indigenous communities

### **Increased demand on social infrastructure**

Social infrastructure in the Gladstone region may be affected due to demand from QGC project staff. In particular, the proponent has identified the following potential impacts on social infrastructure:

- increased demand on community services and facilities, including:
  - health care
  - education
  - family support services
- impacts due principally to population increase, with some increased demand from the FIFO workforce
- potential for increased demand on emergency services, including medi-evac arrangements
- cumulative impacts on social infrastructure demand.

### **Community health and safety impacts**

The proponent has identified a number of potential impacts on community health and safety during project construction and operations. These include:

- potential change in the perception of community safety due to an imbalance in the single male population
- increased demand for health services due to population increases
- potential impact on traffic volumes resulting from increased traffic associated with transport of workers, materials and equipment.

### **Lifestyle and community values**

The proponent has identified a number of potential impacts on community lifestyle and values during LNG Facility construction and operations. These include:

- increased economic vitality and employment security



- cumulative effects due to several major projects proceeding in the region, on equity for low-income households if social infrastructure access or housing affordability is affected.

### **Impact on marine values**

During construction and ongoing operation of the LNG Facility, there will be a range of impacts on Gladstone Harbour and its commercial and recreational users. These include:

- impacts on commercial boating and fishing activities in Gladstone Harbour, particularly The Narrows, especially when considering the cumulative impacts of dredging, LNG facility site access construction and The Narrows crossing for multiple projects
- impacts on commercial boating and fishing activities in Gladstone Harbour as a result of shipping movements and safety zones.

### **Coordinator-General's conclusion**

I note that the social impact assessments for each of the QGC project components have highlighted several project wide social impacts, while specific issues have been also been identified.

## **6.2.2 Agency issues**

The key issues raised by advisory agencies, in response to the Social Impact Assessment section of the EIS relate to:

### **Workforce accommodation**

- locating a construction camp on Curtis Island
- uncertainty in relation to the size and location of Temporary Accommodation Facilities (TAF) within the CSG field and throughout the Gas Transmission Pipeline route
- changing demographic profile of the population, with the continued and expanded use of contract employees for fly-in/fly-out or drive-in/drive-out employment
- cumulative impacts associated with workforce accommodation from other significant developments in terms of accommodating construction workers.

### **Housing impacts**

- although available, housing is unaffordable for some sectors of the Gladstone community and industry compounds these problems
- general impacts on supply of affordable housing and need to monitor impacts for the project areas
- impacts on the local accommodation and house market

### **Social infrastructure and community services**

- cumulative impacts of multiple projects will significantly impact the social infrastructure needs assessment findings
- access to health infrastructure in Gladstone is poor due to distance, lack of public transport and cost
- workforce access to services on the mainland for recreational, health or social service purposes
- the capacity of emergency services to meet service standards in responding to emergencies
- requirement for additional police resources, including staffing increases to the respective Police Region, new police stations, specialist resources and other equipment needs
- ongoing impacts on social services arising from the population increase associated with the direct and indirect construction workforce.

### **Workforce migration**

- the local Gladstone workforce will not be able to meet the needs of the LNG plant and an outside workforce will be required



- impacts on local business and potential for upward pressures on local wages which may result in local employers not being able to retain employees
- need for employment strategies and support programs that maximise employment opportunities for local disadvantaged job-seekers, under-employed people and indigenous people including support for job preparation and training
- concerns that accommodating the LNG construction workers on Curtis Island will minimise the financial benefits to Gladstone, and reduce house purchases, increase living cost such as property rentals, and limit the opportunity for the purchasing of local goods and services.

### **Traffic, safety and health**

- concerns around loss of public recreational access in Gladstone Harbour
- cumulative transport impacts from other LNG projects needs to be considered, particularly the design and capacity of road networks
- negative health impacts due to dust emissions pose a potential health risk to workers and sensitive receptors in the vicinity of the construction site
- increased transport infrastructure demands for infrastructure and services
- management of incidents and complaints regarding traffic and transport movements.

### **Impacts on Toowoomba**

- social, economic and transport issues/impacts on Toowoomba City as the regional centre need to be considered
- opportunities to meet the long-term needs of workers.

### **Community engagement**

Overall EIS and SEIS agency submissions expressed a consistent need to maintain community consultation in a manner which promotes open dialogue with the residents and businesses; and keeps State and Local Government, key stakeholders and the community informed and consulted throughout the life of the project.

### **Coordinator-General's conclusion**

**I note** the concerns raised in the agency submissions in relation to the potential social impacts associated with this project, both during construction and for the life of the project.

The themes that permeate the social impact assessment across the three project areas are:

- (a) labour force skills and training
- (b) migration of regional workforce to projects
- (c) housing and accommodation pressures
- (d) rural residential interaction
- (e) other property owners land use
- (f) social infrastructure
- (g) Gladstone harbour values.

## **6.2.3 Cumulative impacts of the project**

In both the EIS and SEIS, submissions raised concerns in relation to the potential cumulative impacts of multiple LNG projects being developed simultaneously in the region.

The Primary Industries group within DEEDI are concerned about flow-on effects from cumulative impacts of the potential CSG industry on rural and regional communities, such as:

- increased strain on services available to primary producers (particularly freight)



- reductions in labour availability to primary industries as the CSG industry partially absorbs the local workforce if labour is sourced locally. However, this can be a positive impact on the community by offsetting losses in agricultural enterprises in challenging economic or climatic conditions.
- the higher salaries paid by CSG companies will place pressure on producers to match those salaries to retain or attract skilled workers, further impinging on the economic viability of agricultural enterprises.

The cumulative population growth from the multiple projects could result in unsustainable increase in demand on the existing social infrastructure in the area. Councils expressed universal opinion that QGC must take ownership of these demands on infrastructure and act now rather than after the community is in crisis.

Councils also expressed concerns about the cumulative demand of proposed major projects on housing availability in the region; and the cumulative effects of the project on recreation and recreational facilities.

The Department of Communities noted the issue of affordable housing and the commitment by the proponent for ongoing monitoring in consultation with Councils. However, the social and community cumulative effects of multiple LNG projects being developed simultaneously was of interest to the agency. In this regard, the additional studies and assessment as detailed in Attachment J of the SEIS were noted.

The main cumulative social impact issues raised by submitters included:

- changing demographic profile of the region
- workforce accommodation (on Curtis Island and on the mainland in Gladstone)
- increased traffic (including marine) – disruption of social movement and visual impact
- housing availability and housing affordability in the region
- increased living costs, and demands on low income households
- increased demands on community facilities and services
- increased use of recreational facilities
- social and community cumulative effects of multiple LNG projects being developed simultaneously
- impacts on community values and lifestyle due to potential negative social impacts including quality of life - health impacts on the existing communities affected by the project.

## **Coordinator-General's conclusions**

**I agree** that multiple projects could if concurrent add more pressure than a single project to housing and housing affordability, to demands on community facilities and services and have potential to change community values as the workforce grows and economic activity increases.

### **6.2.4 Managing social impact in resource communities**

#### **6.2.4.1 Government policy**

The Queensland Government's "Sustainable Resource Communities Policy" (the Policy) was released in September 2008. It builds on the "Sustainable Futures Framework for Queensland Mining Towns" released by the Government in June 2007. The Policy outlines the Government's commitment in partnership with industry and local government to strengthening social impact assessment within existing EIS processes. The initiatives contained in the Policy reinforce the principles of leadership, collaboration, corporate responsibility, sustainability, communication and community engagement.

Improved social impact assessments have been identified as a core strategy to deliver better community outcomes.

As part of the Policy, the Government has established a Sustainable Resource Communities Fund to improve social infrastructure in communities affected by mining industry growth.



In March 2010, the Government announced provision of \$23.6M in funding for the Surat Basin to manage the rapid growth associated with the expected boom from the Liquefied Natural Gas Industry. This provision includes infrastructure for airports, sporting facilities, trades and training centre and housing initiatives.

#### **6.2.4.2 Social impact management plan (SIMP)**

The Queensland Government's "Sustainable Resource Communities Policy 2008" states that proponents of new/expanding major resource development projects will be required to develop a Social Impact Management Plan (SIMP).

A SIMP will be required for new/expanded major resource development projects which require an environmental impact statement (EIS) to be prepared under either the *Environmental Protection Act 1994* (EP Act) or the *State Development and Public Works Organisation Act 1971* (SDPWO Act) or projects which DERM has given approval to a proponent to voluntarily prepare an EIS.

The purpose of a SIMP is to establish the roles and responsibilities of proponents, government, stakeholders, and communities throughout the life of a project in the mitigation and management of social impacts and opportunities associated with the construction, operation and decommissioning of major resource development projects

**I note** that the Department of Infrastructure and Planning (DIP) Social Impact Assessment Unit (SIAU) has prepared draft SIMP guidelines and template to assist Proponents with the development of each proponent's SIMPs.

**I note** that a consultation program arranged by DIP to seek input into the draft guideline and template is underway to finalise these documents in July 2010, and the proposed legislative amendments program is planned for consideration by the end of this year.

Although the preparation of the SIMP was not a requirement of the QGC project's Terms of Reference (ToR). **I note** the proponent has prepared draft SIMP and is currently finalising consultation with the community and other stakeholders.

#### **QGC draft SIMP**

The proponent has indicated that its SIMP will provide a program to:

- (a) avoid, reduce, ameliorate or offset negative impacts on social and cultural heritage values
- (b) maximise the project's positive impacts and contributions to sustainable communities
- (c) manage the interactions, projects and reporting frameworks which support implementation
- (d) monitor the effectiveness of mitigation strategies.

The proponent has indicated that a consultation program for the draft SIMP will assist in developing the final SIMP, including identifying accountabilities and partners for mitigation strategies, and a management and monitoring program to ensure strategies are effective.

The Proponent's draft SIMP consists of five (5) sections as outlined below.

#### **Structure of draft SIMP**

##### **Section 1**

Section 1 forms the introduction to the SIMP, and includes:

1. the purpose, structure and consultation program for the draft SIMP
2. the QGC and Queensland Government policy context for social impact mitigation
3. a summary of the QGC project.





## **Section 2: QGC and Queensland communities**

As a baseline to the mitigation program, this section includes:

1. a summary of the QGC Project, with further detail provided in the EIS Volume 83
2. a summary of social conditions in Project area communities
3. key consultation inputs of relevance to mitigation.

## **Section 3: Mitigation strategies and plans**

Section 3 outlines the SIMP's major strategies and action plans, and includes:

1. a summary of potential impacts and benefits to be addressed
2. major social mitigation strategies for QGC, either underway or about to be commenced
3. draft mitigation plans.

## **Section 4: Implementation**

This section outlines:

1. the community engagement strategy for major strategy development and SIMP implementation
2. the implementation schedule, including a summary of key actions, performance measures, timeframes for implementation and residual impacts.

## **Section 5: Management**

This section outlines:

1. the process for monitoring social impact mitigation and benefits optimisation
2. the management system for the SIMP
3. reporting arrangements.

### **6.2.4.3 SIMP strategies**

The SIMP contains a number of strategies designed to mitigate and manage the various impacts identified in the social impact assessment.

#### **Labour force and business impacts**

The “Local Employment and Training Strategy” looks at training, local employment and business development; and an “Indigenous Participation Strategy”, which aims to support employment and enterprise development for Indigenous people

Key objectives from these strategies include:

- prioritising recruitment opportunities for those living near to project activities
- maximising local business opportunities from the project (e.g. local procurement)
- supporting Indigenous business growth to supply project services
- enabling participation of indigenous people in the Project workforce at all levels
- enhancing local knowledge and skills capacity to engage in the CSG and LNG industry.

To ensure a consistent approach to negative impact mitigation / benefits enhancement the proponent has indicated it will contractually oblige its major contractors and sub-contractors to implement QGC policies relating to employment, training and procurement requirements.

#### **Housing and accommodation**

The proponent has proposed an “Integrated Housing Strategy” to mitigate the impacts on housing demand created by the CSG field workforce.

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<sup>3</sup> The QGC EIS is composed of the draft EIS (August 2009) and the Supplementary EIS (February 2010). Social, cultural and economic impacts are addressed in *Volume 8* in both the draft and Supplementary EIS reports.



## **Social infrastructure**

The proponent has proposed a series of strategies to mitigate the impacts of the project on social infrastructure. These are:

- Social Infrastructure Capacity Building Strategy
  - developing partnerships with community and government stakeholders to develop and implement social infrastructure projects (networks, services and facilities) in project area communities.
- Health and Safety Partnerships Strategy
  - working with regional health stakeholders to upgrade health facilities and develop safety education initiatives.
- Indigenous Participation Strategy
  - building shared skills between QGC and Indigenous communities to maximise positive social and economic outcomes for Indigenous communities from the QGC project.

Collectively, these strategies and action plans represent a comprehensive approach to social infrastructure impact mitigation and encompass:

- a broad definition of social infrastructure (hard and soft)
- direct investment in physical infrastructure
- consultation with key local and State agencies
- partnership approaches with key infrastructure providers
- specific strategies/actions to offset demand impacts on health services and emergency services
- capacity building for local organisations to deal with impacts
- targeted funding for identified (priority) gaps in services provision
- targeting of priority social groups (families, youth, indigenous, Non-English Speaking Background, single males, young women)
- working in partnership with the Maranoa/Western Downs Social Infrastructure Strategic Plan process
- monitoring of impacts
- provision of a Community Development Fund that provides some scope for local community/ organisations to determine and influence a proportion of QGC's overall social investment funds.

## **Community health and safety**

The proponent has proposed a strategy and corresponding action plan to mitigate the impacts of the project on health and emergency services. These are:

- Health and Safety Partnerships (Strategy)
  - work with regional health stakeholders to upgrade health facilities, and develop safety education initiatives.
- Community Health and Safety Social Impact Action Plan
  - to reduce and offset demand on health and emergency services from workers and their families
  - to contribute to an increase in rural health capacity.

In addition to the “Social Infrastructure Capacity Building” and “Health and Safety Partnerships” Strategies noted above, the proponent has also proposed a “Traffic and Transport Infrastructure Mitigation and Upgrades”. The objective of this strategy is to engage with Western Downs Regional Council, Toowoomba Regional Council and Department of Transport and Main Roads, to develop a detailed traffic mitigation implementation plan.

## **Impacts on property owners and land use**

The proponent has proposed implementation of the “Land Use and Land Access Social Impact Action Plan” to mitigate impacts on property owners and land use during the construction.



Key actions include:

- QGC will develop and implement land access protocols in consultation with property owners and local communities, to minimise disruption to people, livestock, land and crops. Confirmation of any agreed arrangements will be provided to landholders/occupiers in writing
- QGC contractors will develop and put in place measures to minimise disruptions to grazing and cropping as determined with land holders
- QGC's site supervisor will ensure that wells and lines are placed in positions as indicated to the landowner, and consult the landowner and resident about significant changes to the program of works, prior to implementation
- QGC will negotiate and finalise repairs, corrective actions, and rehabilitation work with the minimum of delay, and will invite the landowner to inspect the work area when the program of works is finished so that any problems can be discussed
- QGC will rehabilitate and restore land to original land use following construction of the pipeline
- QGC will implement measures to minimise impacts on livestock during construction, including provision of stock crossing points at key locations and trench breakers and ramps
- QGC will restore on-farm infrastructure disturbed during construction, including irrigation systems, fencing and gates, access tracks and stock watering facilities
- permanent disruption to land use will be avoided and appropriate compensation negotiations undertaken where this is not possible
- temporary loss of access to land will be restored after construction activities
- wells and pipelines will be situated further than 500 m from community facilities including education facilities, childcare, health and aged care facilities and formal recreational facilities
- QGC will implement a community feedback procedure. Landowners will be able to deal directly with QGC regarding any concerns that they have. QGC will have a 24 hour emergency response line for all members of the community to report incidents or issues relating to safety, health and environmental amenity or harm. Stakeholders can provide feedback to a QGC employee, or to a toll free number 1800 030 443 or to the Project email address [community@qgc.com.au](mailto:community@qgc.com.au). Complaints will be acknowledged, feedback provided within 24 hours, and stakeholders advised regularly of progress in addressing their complaint.

### **Lifestyle and community values**

The proponent has proposed to mitigate these impacts through implementation of six social impact action plans outlined above.

These are:

- (a) Employment and Economic Development Social Impact Action Plan
- (b) Social Infrastructure Social Impact Action Plan
- (c) Housing and Accommodation Social Impact Action Plan
- (d) Community Health and Safety Social Impact Action Plan
- (e) Traffic and Transport Social Impact Action Plan
- (f) Land Use and Land Access Social Impact Action Plan.

### **Marine values**

The proponent has proposed to mitigate impacts on marine values and boating activities on Gladstone Harbour through implementation of the Gladstone Marine Partnership Strategy, which will engage marine recreation stakeholders, maritime safety stakeholders and community organisations involved in enhancing marine recreation and safety in Gladstone Harbour. Implementation of the strategy will occur through the "Marine Social Impact Management Plan". The objectives of this plan are to:

- avoid or offset project impacts on recreational values in the Gladstone Harbour and The Narrows area
- maintain deep water access to The Narrows to allow boats to pass through The Narrows
- maintain access to safe harbours within Graham's Creek and The Narrows
- minimise activity near Friend Point.



Proposed actions include:

- consultation to identify activities and values, including consultation with Traditional Owners
- establishment of a Gladstone Harbour Partnership to engage stakeholders in mitigation and social investment projects to protect the safety, enjoyment and environmental qualities of Gladstone Harbour and The Narrows
- a “Marine Transport Management Plan” will be developed by the Project with its principal contractors to ensure the recreational values and safety of Gladstone Harbour are not impacted by construction traffic in the Harbour
- management of The Narrows Pipeline Crossing Construction to reduce impacts on social and cultural values, including working with industry stakeholders to address cumulative impacts and maximise collaborative benefits
- working with other projects to minimise dredging impacts
- sharing the results of QGC’s EIS consultation and QGC’s intended strategies to protect marine values and boating safety with other project proponents including Gladstone Ports Corporation, and seek collaborative actions to address cumulative impacts
- managing land use and land access near the LNG Plant.

To overview the social impacts and SIMP strategies for the various elements of the project, the following Table 6.1 has been drawn up to present the relativities.

**Table 6.1 Social Impacts and corresponding SIMP strategies**

<b>Social impact</b>	<b>Gas fields</b>	<b>Pipeline</b>	<b>LNG facility</b>	<b>SIMP strategy</b>
Population	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	SIMP
Workforce and local business	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Local Employment and Training Strategy</li> </ul>
Housing and Accommodation	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Integrated Housing Strategy</li> </ul>
Social Infrastructure	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Social infrastructure Capacity Building Strategy</li> <li>• Health and Safety Partnerships Strategy</li> <li>• Indigenous Participation Strategy</li> </ul>
Property Holders and Land Use	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<ul style="list-style-type: none"> <li>• Land Use and Land Use Access Social Impact Action Plan</li> </ul>
Community Health and Safety	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Social infrastructure Capacity Building Strategy</li> <li>• Health and Safety Partnerships Strategy</li> <li>• Traffic and Transport Infrastructure Mitigation &amp; Upgrades</li> </ul>
Lifestyle and Community Values	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• All of the above</li> </ul>
Marine Values			<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> <li>• Gladstone Marine Partnership Strategy</li> </ul>

### **Coordinator-General’s conclusions**

**I commend** QGC for drafting a SIMP that addresses the components of the government’s proposed SIMP Guidelines and for undertaking an extensive stakeholder consultation program to incorporate community, government and other stakeholder feedback into the final SIMP.

**I note** that the QGC SIMP forms part of QGC’s overall Social Performance plan for 2010-2015, which provides a detailed framework and process for the company’s relationships with communities and



regions throughout the project area. Other key components of the QGC Social Performance Plan being developed to support ongoing company operations include:

- an Indigenous Peoples' Plan, which identifies strategies relating to Indigenous employment and enterprise partnerships, cultural heritage and Native Title and Indigenous engagement strategies
- a Community Engagement Plan, which sets out strategies for engagement with local and regional communities, land owners
- a Social Investment Plan, which outlines strategies in relation to community partnerships and grants, donations and sponsorships.

**I note that**, QGC will also develop area-based Community plans to integrate social impact management plans, community engagement and annexed strategies for the Gladstone, Pipeline and Western Downs Regions, and link with local and regional plans.

Although the SIMP will be completed after the EIS process, **I will be requiring that** the proponent submit the finalised SIMP to me for approval prior to commencement of construction.

**I require that** all the social impacts and associated conditions contained in this report must be considered in the final SIMP.

Therefore in order to ensure that the proponent adequately mitigates and manages the potential social impacts identified in the SIA; and importantly demonstrates that consideration has been given to the concerns raised in the EIS and SEIS submissions and by DIP, Social Impact Assessment Unit (SIAU), **I have set** a suite of conditions in Appendix One, Part 3 to ensure this occurs. To initiate the SIMP process, **I have set** the Coordinator-General's imposed condition in Condition 1 Appendix 1, Part 3.

#### **6.2.4.4 Community engagement and dispute resolution**

##### **QGC's proposed community engagement strategy**

QGC is currently finalising a detailed Community Consultation and Engagement Strategy as a separate document to the SIMP. QGC will regularly consult and engage with a variety of stakeholders in relation to its activities, including ongoing development and execution of social impact mitigation and social investment activities. Community members and organisations will be engaged in the SIMP implementation through three means:

- involvement of key stakeholders in partnerships for implementation of major strategies, actions and projects
- consultation with community committees to provide broad-based input to the development of priorities
- participation in monitoring impacts, mitigations and benefits.

In addition, a communication and consultation program will be established for the project to provide information about the project, construction activities, including time and duration, and likely impacts and mitigation measures. QGC will utilise a variety of communication methods to regularly inform stakeholders of project activities on an ongoing basis, and these will include:

- a regular quarterly newsletter, which will detail current and upcoming business activities and achievements relevant to stakeholders, commencing in Quarter 1 2010
- fact sheets developed to address detailed information needs relevant to specific issues and current activities
- media releases and website updates to support the communication of QGC's social performance activities to a wide range of stakeholders
- community notifications of construction and operational activities that potentially impact the community (e.g. traffic movements, traffic delays, noisy works)
- QGC participation in key community events
- publication of reports such as the QGC Sustainability Report to allow the business to report on sustainability indicators annually to community stakeholders.



Over time this will be supported by regular stakeholder and issues analysis to ensure QGC is consulting the appropriate stakeholders, and using appropriate engagement methods.

### **QGC proposed dispute resolution mechanisms**

The proponent has advised DIP that it is currently finalising two (2) documents – a complaints process and grievance procedure and the Rural Residential Code of Conduct – which will provide additional detail to the dispute resolution mechanisms outlined in the SIMP. In summary, QGC will implement a community feedback procedure with the following components:

- landowners will be able to deal directly with QGC regarding any concerns they may have
- QGC will have a 24 hour emergency response line for all members of the community to report incidents or issues relating to safety, health and environmental amenity or harm
- stakeholders can provide feedback to a QGC employee, or to a toll free number 1800 030 443 or to the Project email address [community@qgc.com.au](mailto:community@qgc.com.au)
- complaints will be acknowledged, feedback provided within 24 hours, and stakeholders advised regularly of progress in addressing their complaint.

In addition to the dispute resolution mechanism, and as a proactive measure to mitigate potential complaints and grievances, a Rural Residential Code of Conduct has been developed regarding QGC activities in rural residential areas. The Rural Residential Code of Conduct provides specific measures to reduce amenity impacts from the location of gas field and pipeline infrastructure on residential, rural residential and rural land. The code of conduct has been developed in consultation with rural residential area residents, to agree specific provisions for operations in rural residential areas.

**I note that** the separate, detailed plans covering community engagement, complaints and grievances procedures and rural residential code of conduct, are in addition to the mitigation strategies and actions outlined in the draft SIMP.

A discussion on the specific impacts and mitigation strategies for rural residential areas is contained in section 7.5 of this report.

### **QGC's indigenous engagement**

In the draft SIMP the proponent has outlined an Indigenous Participation Strategy with the following aims to:

- support implementation of Employment and Enterprise development, including training and employment for Indigenous people
- build shared skills between QGC and Indigenous communities to maximise social and economic outcomes for Indigenous communities from QGC.

The strategy is supported by an Indigenous Communities Social Impact Action Plan, comprising the following objectives:

- encourage indigenous peoples' involvement in the land management, including cultural heritage management, land maintenance, and rehabilitation
- enable participation of indigenous people in the Project workforce at all levels
- support Indigenous business growth to supply project services.

To meet these objectives the SIMP outlines a range of detailed actions. A key action is the development of an Indigenous People's Plan, encompassing employment, business, social impact management, social investment and engagement. Other actions include:

- working with Indigenous communities to contribute to 'Closing the Gap' priorities for Indigenous education, employment and economic development, through ongoing consultation with Traditional Owners, and social investments as priorities with the Community Committees
- continuing to consult with relevant Traditional Owner groups regarding The Narrows Crossing construction and alignment
- providing assistance for Traditional Owner groups to establish governance and capacity building initiatives to ensure community and economic development activities are sustained



- as part of the Indigenous Peoples' Plan, develop an agreed program for working together on community and economic development priorities during 2010 and beyond.

## **Coordinator-General's conclusions**

**I support** a strong approach to community engagement and social investment especially in relation to improving Indigenous participation through the development of an Indigenous People's Plan. **I believe** that this can best be achieved through a clear commitment to community engagement and social investment, therefore I impose Condition 2, in Appendix 1, Part 3

### **6.2.4.5 Governance arrangements**

#### **Industry leadership group for CSG resource projects**

**I note** concerns raised in the EIS and Supplementary EIS submissions in relation to the potential for cumulative impact which will require planning mitigation and management, including social and community cumulative effects due to multiple LNG projects being developed simultaneously in the region.

**I consider that** identifying cumulative impacts and developing mitigation measures for new projects is the responsibility of industry in partnership with local and state governments and community sector stakeholders.

**I propose** the establishment of an overarching Industry Leadership Group for CSG Resource Projects which would provide cross-project coordination in relation to the social and community cumulative effects of multiple LNG projects being developed simultaneously across the regions (Gas Fields, Pipeline and LNG plant).

**I have been advised** that the concept of establishing an overarching Industry Leadership Group for CSG resource project proponents/companies has been discussed with the proponent. The proponent has expressed in-principle support for such an arrangement.

**In order to ensure** that each projects regional coordination committee can refer common issues to an industry coordinating group all new CSG resource projects will be required to establish, or participate in the new Industry Leadership Group for CSG Resource Projects, as set by Condition 6 Appendix 1 Part 3.

This group is to be established separate to the CSG Industry Management Group, which will be formed to identify and manage cumulative industry impacts.

#### **Regional community consultative committees (RCCCs)**

The practice of mining firms establishing Regional Community Consultative Committees (RCCCs) has proven to be successful in maintaining relations with the local communities and responding to social impacts and mitigation management strategies.

QGC has proposed the establishment of community committees throughout the Surat Basin, along the proposed export pipeline route and the LNG facility as central to community engagement in mitigation. The committees will consist of 10-12 community members who represent various parts of the community to allow QGC to regularly inform, consult and where appropriate collaborate with communities on mitigation issues.

QGC has developed a framework for these community committees with the CSRM (University of Queensland) and intends to initiate the first of the committees in June 2010.

The community committees will also be used as an advisory panel for QGC Community Fund implementation.



## Resourcing of RCCC's

**It is required** that the proponent adequately resource the establishment of the Regional Community Consultative Committees (RCCCs) for each of the project components (Coal Seam Gas (CSG) field; areas impacted by the gas transmission pipeline; and the Curtis Island (LNG) facility for the project.

## Coordinator General's conclusions

It is clearly apparent from the EIS and supplementary EIS that post EIS engagement with community stakeholders specifically on the impacts of the QGC Project requires the establishment of a clear governance arrangement to match the broad geographic area covered by the project and the three very different components of the Project, i.e. CSG field, the gas transmission pipeline and the LNG facility.

**I conclude** that the resourcing of the RCCCs is necessary to demonstrate the proponents' commitment to the community engagement processes which is required to successfully maintain working relationships with key stakeholders, Regional and Shire Councils, and importantly the local communities most affected by the project. It provides the opportunity to demonstrate partnership arrangements and in the oversight and implementation of the SIMP for the life of the project. **I have set conditions** with respect to establishing consultative committees in Conditions 4-5 Appendix 1, Part 3.

## 6.2.5 Proponent specific measures for managing social impacts

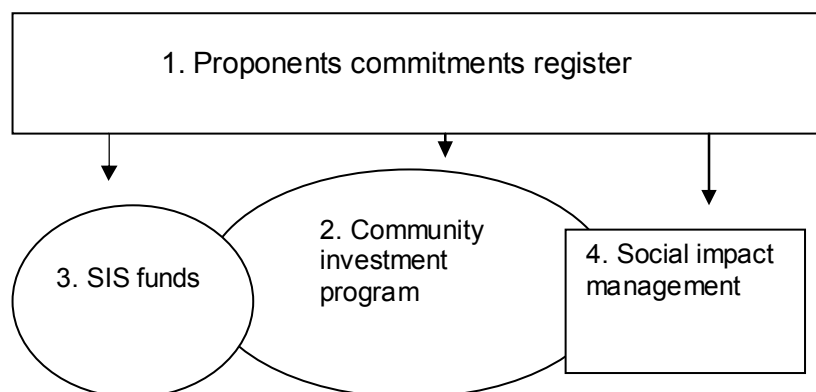
The Surat Basin Future Directions Statement includes a \$23.65M funding package for the Surat Basin and outlined ways in which local communities could work with government and industry to manage the rapid growth associated with the expected boom from the LNG industry.

**I consider** that a coordinated approach which promotes collaboration between the Proponent, all levels of government and local communities is best to assist affected local communities to plan and fund the provision of the social infrastructure required to address future growth. **I am therefore** proposing a social infrastructure and service delivery strategy comprising four integrated elements. These integrated elements are:

1. Proponent's commitments register.
2. Community investment program.
3. The Social Infrastructure Strategic Plan (SISP) Gladstone and Maranoa/Westerd Downs regions.
4. Specific contribution to manage social impact e.g. housing contributions.

I envisage the relationship of these integrated elements would be as in Figure 6.1.

**Figure 6.1 Integrated social impact funding strategy**







### 6.2.5.1 Proponent's commitments register

DIP has been advised by the proponent that a commitments register for the QGC project has been developed, although a copy is yet to be forwarded to the Department. I request a copy to be provided as part of the finalisation of the SIMP.

#### Coordinator-General's conclusions

**I conclude** that the proponent should provide a clear statement of commitments in relation to the potential social impacts. **I consider** it appropriate that a link is identified between the proponent's commitments and the mitigation and management of potential social impacts strategies and initiatives.

**I strongly recommend** that the proponent release the Commitments Register for the QGC project so that stakeholders and the public are better informed of QGC's commitments to the project.

The proponent must:

1. provide a copy of the commitments register for the QGC project to the Coordinator-General, prior to final approval being given to the Social Impact Management Plan (SIMP)
2. update the QGC SIMP to include the commitments.

This requirement appears as Condition 7, Appendix 1, Part 3.

### 6.2.5.2 Community investment program

**I note** that QGC has developed an overall Social Performance plan for 2010-2015 incorporating a Social Mitigation and Investment Plan, which outlines investment strategies in relation to employment and training initiatives, Indigenous business development, social infrastructure, health projects, community development and other initiatives. DIP has advised that the proponent has provided a copy of the value of initiatives in the form of a Social Mitigation and Investment Package which carries a cost in the order of \$150 million including the commitment for housing mitigation (most of which is planned to be spent in the next two years).

#### Coordinator-General's conclusion

**I acknowledge** the proponent's financial and corporate commitment to allocate funding to the QGC Social Mitigation and Investment Plan as presented to DIP.

**I will require** that the Social Mitigation and Investment proposal is reflected in the final SIMP for my approval.

Nevertheless my conditions are framed to mitigate impacts without reference to whether they are within the scope or quantum of the QGC Social Mitigation and Investment Package.

### 6.2.5.3 The Social Infrastructure Strategic Plan (SISP) for Gladstone

**I have been advised** by DIP that the Social Infrastructure Strategic Plan for Gladstone (SISP) is being undertaken as a partnership arrangement between the Department of Infrastructure and Planning (DIP), Gladstone Economic Industry Development Board (GEIDB) and Gladstone Regional Council to develop a blueprint to guide investment decisions for the future provision of strategic social infrastructure in the region, and to inform current and future major project proponents of potential contributions to social services and facilities.

The SISP project has reported on social infrastructure needs, such as the need for:

- aged care facilities, in particular Integrated aged care (residential) facility and retirement village
- sport and recreation including a multi-purpose complex & swimming pools
- facilities for young people including, recreation, leisure, sporting, employment and training services
- health services – in particular specialist medical practitioners
- improved access to health services – transport



- a more diverse range of leisure and recreational facilities is required
- improved public transport on weekends, and also more effectively connecting centres' across the region
- additional educational services, in particular high schools at various centres around the region including an educational hub in Gladstone focusing on green industry
- housing needs including more emergency housing, transitional housing and short term housing for workers on short term contracts
- greater focus on health and well-being including opportunities for family leisure and outings, recreational facilities for all ages and family support.

A benchmarking process will audit findings, identify gaps, conduct needs assessment, and develop a costed priority schedule for social infrastructure delivery. The outputs of the benchmarking process are intended to assist in developing a priority schedule of strategic items of community facilities required for the population of the region as a whole until 2031, distributed by catchment areas.

### **Coordinator General's conclusions**

**I note** the proponents' commitment to invest in social infrastructure in Gladstone as outlined in its Social Impact Mitigation and Investment Proposal.

**I consider** it important that the LNG Projects proposed for Gladstone should fully participate in the implementation of the Social Infrastructure Strategic Plan for Gladstone **and so make the following recommendation.**

The proponent is encouraged to:

1. Provide reasonable financial contributions to a social infrastructure fund in which industry funds are pooled to mitigate the impacts of major project developments in the Gladstone region and applied to the items listed on the Priority Social Infrastructure Schedule for Industry.
2. Participate as a member of a regional advisory group to implement a structured process for the application and allocation of funds and to ensure the priority needs for social infrastructure and services in Gladstone region are addressed.
3. Commit to an on-going investment in social facilities and services in the Gladstone region as a long term member of the community.

#### **6.2.5.4 The Social Infrastructure Strategic Plan (SISP) for the Western Downs/Maranoa region**

**I intend** to initiate a similar process to develop a Social Infrastructure Strategic Plan (SISP) in the Maranoa/Western Downs region.

**I note** the proponents' commitment to investment in social infrastructure in the Western Downs Region as outlined in its Social Impact Mitigation and Investment Proposal.

**I consider** it important that the LNG Projects proposed for the Maranoa/Western Downs region should fully participate in the implementation of the Social Infrastructure Strategic Plan for Maranoa/Western Downs and **so make the following recommendation.**

The proponent is encouraged to:

- (a) Provide reasonable financial contributions to a social infrastructure fund in which industry funds are pooled to mitigate the impacts of major project developments in the Maranoa/Western Downs region and applied to the items listed on the Priority Social Infrastructure Schedule for Industry.
- (b) Participate as a member of a regional advisory group to implement a structured process for the application and allocation of funds and to ensure the priority needs for social infrastructure and services in Maranoa/Western Downs are addressed.
- (c) Commit to an on-going investment in social facilities and services in the Maranoa/Western Downs region as a long term member of the community.



The quantum of the contributions to social infrastructure referred to above requires further development and consultation between the proponent and government. Based on the information presented to the Coordinator-General, it is noted that QGC already intends to provide contributions to community facilities, services and networks in the Gladstone and Roma Surat region through implementation of its Social Mitigations and Investment Proposal and the Coordinator-General will consider these commitments when determining the 'reasonableness' of financial contributions to be provided to the pooled fund.

This will be informed by the outcomes of studies such as the SISF for the Gladstone region and similar studies for Roma Surat region. This will be part of the Surat Future Direction statement and program identified under the Queensland Government Sustainable Resource Communities Policy.

## 6.2.6 Specific contributions to manage social impacts

### 6.2.6.1 Housing impacts

#### Gladstone

Workforce housing in Gladstone will be an issue where it is important to manage social impacts. Although the intention of the proponent in this case is to house a large proportion of the workforce in Temporary Workers' Accommodation Facilities (TWAFFs) which will be on Curtis Island, a proportion of the workforce will enter the housing market in the Gladstone region. QGC indicates that its strategy will be to have a workforce balance of about 70% imported and 30% local. Of the 70% imported, most (80%) will be housed on Curtis Island, leaving the remainder of the imported workforce to be accommodated in the Gladstone Region. This will provide flexibility for housing a workforce to cover project activities which are centred on the mainland, as well as cater for those of the workforce who wish to move to Gladstone with families.

However this means that the QGC project will have to house up to 500 of its workforce (the 20% of imported workforce) within the Gladstone region. At this stage the proponent is planning to partially utilise the housing market in Gladstone, which normally supplies 400-700 new dwelling approvals per annum. There is no proposal from QGC to arrange for TWAFFs on the mainland.

On the face of these numbers it is clear that at the peak of the QGC workforce, the new dwelling approvals (400-700) will only just be sufficient to satisfy the project demand (500), if that was the only project undertaken, and there was no other demand in the region for housing growth. Data on the GLNG project also indicates that around 270 new dwellings may be required for that project at peak. The APLNG project indicates that up to 420 direct workers, who are not housed in a TWAFF on Curtis Island, will be locally housed, many of them requiring new dwellings. Other projects such as the Shell LNG project and Wiggins Island Coal Terminal will add to this demand if constructed in the same timeframe.

So a cumulative demand for housing in the Gladstone region directly from three of the LNG projects, which may be concurrent, could be up to  $500 + 270 + 420 = 1190$  dwellings. From the timeline of QGC, this peak builds up strongly after commencement to about 40% of the peak at 12 months, and reaches a peak at 30 months and lasts at this peak until about 42 months, with a gradual reduction to 50% of peak at 48 months.

The SEIS documentation of the QGC project indicates that the cumulative demands of multiple projects on housing would result in increased housing stress for low income households and require some households to relocate away from the region.

**I note** that the proponent is currently developing an Integrated Housing Strategy which will be finalised in July 2010. This will provide analysis of housing supply and demand, and options for facilitating provision of workforce housing in Gladstone and the Western Downs. As outlined in the proponent's draft SIMP, the Integrated Housing Strategy incorporates the following components:

- (a) TWAFFs
- (b) a workers' housing pool and management system to manage demand for rental housing from



accompanied workers, with consideration to managing impacts on dwelling supply and rental costs

- (c) joint ventures or investment for construction of dwellings to provide housing for QGC workers and offset demands on local housing stock
- (d) developing relationships with Government, commercial, industry and community housing stakeholders to generate co-operative housing solutions to cumulative impacts
- (e) investing in community housing for households who may be affected by rental price increases
- (f) monitoring the project's impacts on affordable housing, particularly for local Indigenous groups and low income households
- (g) QGC will initiate consultation with other industry stakeholders and Government agencies to discuss collaborative approaches to cumulative housing impacts, with a view to co-operative or joint mitigation strategies.

**I note** the proponent's financial commitments to housing impact mitigations as outlined in the Impact Mitigation Investment Proposal.

**I commend** the proponent for its initiative in developing an Integrated Housing Strategy and for its corresponding financial commitment to housing impact mitigation.

## **Coordinator-General's conclusions**

### **Gladstone**

From the EIS reports it seems that each proponent is relying on the market to supply any demand for dwellings that they or their workforce might place in the Gladstone region. Since there is rapid build-up of potential demand in the first 12 months of the project timeline (to 40% of peak) **I consider** it may be difficult for the market to accommodate such a rapid build-up of project housing, which may, on the figures above, reach 450 dwellings required at 12 months and peak of 1190 dwellings at 30 months. Past experience of the Department of Infrastructure and Planning in the Gladstone region also indicates that there can be a significant lag before the market responds to a large new demand.

**I consider** it is not reasonable to postulate that the normal growth pattern of the Gladstone region – currently requiring up to 700 new housing approvals per annum - will decline to make way for the separate demand from major projects. In any event the figures above show that the normal housing growth pattern only equates to the demand from a single project, not concurrent cumulative demands of several projects.

In order to mitigate the cumulative effects of pressure on housing demand of all projects happening close to the same timeframe, I believe it is important for each proponent to proactively take responsibility for supplying a significant part of their potential housing demand, rather than leaving it to the market.

In this way a substantial underpinning of supply should be provided to minimise the likelihood that cumulative impacts may develop and negatively impact the housing market. **I judge** that it should be expected that each proponent target the supply of 50% of its demand for housing in the Gladstone community. I believe that this will ease pressure, both for individual projects, and for the cumulative impacts of multiple projects.

**I consider** that this supply should be a mix of housing types, such as new houses/units or remodelling to increase capacity of existing stock, rather than corporate leasing or purchase of existing properties. It might be argued that the construction demand for housing is temporary, and that requiring permanent housing stock would result in surplus stock at the end of construction. However, the targets which I have set would add for all projects cumulatively about 450 dwellings in 12 months, which only brings forward about one year of normal growth. After construction there will be demand for housing from operational staff, which is more permanent.

Even if all projects do not proceed concurrently **I believe** the target of 50% must remain for each project, as this will commence proponents on a path of being responsible for their own workforce housing requirements.



**I note** that my comments above are reinforced by a recent paper on housing. The following extract is from a study of housing needs and impacts resulting from industrial development undertaken by the Gladstone Regional Council:

*“Project proponents must provide Construction Accommodation Facilities to accommodate the influx of fly-in, fly-out workers, to prevent, as far as possible, any temporary population increase of highly-paid labour unduly affecting the local residential housing market”.*

Project proponents should take a “portfolio approach” to housing needs by investing directly (developing housing stock for their own needs – management personnel etc.) and indirectly (investing on behalf of others – staff incentives, partnerships with community housing groups or the Urban Land Development Authority etc.), taking into account two important considerations:

1. Investment needs to be made in a “controlled” way by specifying stock requirements at price points that reflect housing trend research (eg, QGC: Draft Social Impact Mitigation Plan, (February 2010) and pre-determined increases in things like medial rental and rental vacancies.

The region needs to avoid the poor experience of a decade ago when “narrow” specifications for housing stock resulted in:

- a) the market being “cleaned out” of 4 bedroom, brick homes – whether to be occupied or not – and spiking prices in this and lesser housing categories
  - b) in turn, this activity sent a signal to the development community that the market demand was for solely this style of accommodation, result in a “run” of suburban expansion and failure to introduce any diversity in the new housing stock mix.
2. Accordingly, in making their own investments (whether for employee accommodation, or social/affordable housing contributions), project proponents should insist on diversity in housing stock (including higher density options, units and different built forms/sizes across a broad geographical area). This will ensure that a legacy of this period of investment will be housing diversity/choices and, in turn, a pricing hierarchy that enables a variety of consumers to participate in the market once the construction needs have passed.

Project proponents should commit to continuing to track data/trends on housing availability and affordability and have contingency plans to activate should results prove unfavourable.

Notwithstanding the (minimum) pro-active actions sought above, project proponents need to recognise that, no matter how effective their strategies might be, there will still be movement in the market resulting from construction activity and resultant pressure brought to bear on some people on low fixed incomes. Therefore, in addition to steps taken to satisfy their own workers’ housing needs and other investments, proponents must commit to supporting organisations that provide housing support services to those people affected adversely in the housing market by industrial growth.

## **Western Downs**

The EIS and SEIS documentation have indicated the CSG field workforce and accommodation requirements in the coal seam gas fields will be substantial. Employment by QGC in the CSG fields around the Western Downs region will include a peak workforce of 5,200 workers in 2011 and 750 workers for the ongoing construction of the QGC project. In addition some 550 operational workers will be required post 2013. QGC estimates that a proportion of long term construction staff and one quarter of the ongoing operational staff will settle in the Surat/Western Downs regions. This would total 370-390 workers of which the majority will establish households requiring dwelling units. Furthermore, cumulative demands of multiple projects on housing have the potential to result in increased housing stress for low income households and require some households to relocate away from the region.

## **Coordinator-General’s conclusion**

**I consider** reliance on the market to supply the demand for the project workforce accommodation to be unreasonable as the annual dwelling approvals for the whole of the Western Downs Regional Council



Area has been limited to 78-164 dwellings approvals per year. From the above assessment, the project demand starts at 160 and rises to 180-390 by 2014.

The housing supply from new approvals is low (78-162 dwellings per annum for the whole region). Thus the influx of 160 rising to 390 workforce most of which are expected to be for permanent positions, would place significant demands on almost the total of the new housing supply. Any absorption of this by new settlers will mean that supply and demand will be unbalanced and result in the strong potential for price increases due to the influx of workers with secure jobs.

In order for the project to underpin supply, while using some local market arrangements, **I judge that a** strategy of 75% supply of housing for new settlers, whether they be QGC employees or contractor employees, is appropriate.

Therefore **I have set** conditions to require a proponent to provide such a housing package, in the context of an Integrated Project Housing Strategy for their own requirements, and for integration with other housing supply and demands at the time. I envisage that the Regional Community Consultative Committee (which I recommend be set up at each major population region) can provide oversight of the how this strategy is delivering on its intended outcomes – the provision of timely housing supply, and the relief of housing pressures in the market. If there are other factors which ease or tighten supply and demand, **I envisage** that this consultative committee structure would be best placed to reflect these circumstances from the community, and advise proponents accordingly whether the housing supply which proponents are making, appear to require adjustment up or down. Furthermore, I require the Regional Community Consultative Committees review the proponent's housing commitments every six months at the minimum. These appear as Conditions 9, 10 and 11 Appendix 1, part 3.

While this arrangement may seem to be unstructured, in fact it has the potential to be highly adaptive and responsive to community conditions, because as a formal consultative group, on which the regional council is represented should have access to latest information on both supply and demand for housing in the region. **Hence I commend** it to proponents as a practical way in which cumulative housing factors may be managed.

Community and affordable housing will also be impacted by significant housing changes in regional communities. The EIS indicated that housing stress (proportion of households expending over 30% of income on housing costs, either rental or mortgage) in the Gladstone and Maranoa/Western Downs communities are about 1 in 11 and 1 in 15 respectively. From other socio-economic profiles reported in the EIS, the Gladstone and Maranoa/Western Downs communities contain about 1 in 20 of their housing stock as social and community housing (ie. housing provided at subsidised or low cost rentals to clients of either public or community housing organisations).

I therefore require the proponent to allocate resources that will enable affordable and community housing to be provided in the Gladstone and Maranoa/Western Downs communities. As with the provision of employee housing, I consider that project proponents must take a "portfolio approach" to community and affordable housing needs by investing directly and indirectly in the housing market; and by insisting on diversity in housing stock (including higher density options, units and different built forms/sizes across a broad geographical area). The proponent must consult with the Department of Communities, the Urban Land Development Authority and social housing providers to assist in developing the appropriate mix of social and affordable housing type. This investment may require the proponent to contribute to existing affordable housing providers, Local Governments, or provide some sort of rental subsidisation scheme, to ensure there is a level of housing in project affected areas that remains affordable. This requirement is contained in Condition 12 Appendix 1 Part 3.

In reviewing the success of the above mitigation strategy, I will consider the options put forward by the proponent's Integrated Housing Strategy, and advice provided to me by the relevant Regional Community Consultative Committee, Local Government and the Department of Communities.



## 6.2.6.2 Employment, training and impacts on local business

### Local employment and training

Submissions and consultations raised the need for employment strategies and support programs that maximise employment opportunities for local disadvantaged job-seekers, under-employed people and Indigenous people, including support for job preparation and training, and potential negative impacts for local business dealing with the potential for upward pressures on local wages which may result in local employers not being able to retain employees.

### Employment and training actions

Under the QGC Employment and Economic Development Social Impact Action Plan, the proponent has identified a number of actions in relation to employment and training, including the following:

#### Local employment

- Labour availability study to support the development of pathways to operational employment, including training and career development programs.
- Focus on recruitment strategies and contract conditions which will attract local labour.
- Recruitment processes - fair and equitable access for local people; all locals with appropriate skills levels will be considered for employment in construction; recruitment and jobs marketing campaigns are current and ongoing.
- Consideration of commitments to local employment is included in selection criteria for major contractors.
- Indigenous skills audit has been undertaken by UQ, and the QGC Indigenous employment and enterprise development program initiated.

#### Training

- Professional development, apprenticeship and training opportunities for staff.
- Selection criteria for major contractors to include training commitments and local employment.
- Investment in local training and skills development programs.
- Work with existing training providers and economic development groups to ensure that new QGC training programs complement existing training initiatives and local training capacity where possible.
- Training and recruitment strategies will include a focus on:
  - a) Indigenous people
  - b) skills development programs required to involve women from the Western Downs LGA in the Project employment
  - c) Targeted skills development and job placement programs for young and unemployed people in the Dalby region.

### Coordinator-General's conclusions

**I note** that during the EIS process, potential social impacts were raised in regard to employment, training and impacts on local business, in particular, the need for employment strategies and support programs that maximise employment opportunities for disadvantaged job-seekers, under-employed people and Indigenous people in the region.

Job preparation and training programs are also required to fully equip the existing and potential workforce entering the region as well as providing support for local business operating in a changing business environment.

**I commend** the proponent on its proposed actions under the local employment and training components of its Employment and Economic Development Social Impact Action Plan. This is supported by Condition 13 Appendix 1 Part 3.



## Impacts of the project on local businesses

The EIS SIA states that QGC has undertaken its employment assessment and acknowledges the potential impacts on the local employment market including:

- impacts on local businesses
- impacts on employment opportunities
- impacts on economic opportunities
- recognition of the current effects of low unemployment including:
  - difficulty attracting and retaining workers
  - workforce turnover as a result of poached workers
  - 457 visa workers already active in the community for some jobs.

The report states that there was a potential for upward pressures on local wages which may result in local businesses not being able to retain employees.

The proponent has identified concerns in relation to the transition of workers from local business to the project. In particular, the perception that there would be no local workforce employed by the project; or that the project would be poaching local skilled labour to the detriment of local businesses.

Under the QGC Employment and Economic Development Social Impact Action Plan, the proponent has identified a number of actions in relation to local business impact mitigation, including the following:

### Local business development

To offset drawing of labour to QGC, actions are likely to include working with agricultural and services businesses in the Western Downs region and manufacturing and service industries in the Gladstone and Banana regions. The Local Content Strategy developed by QGC aims to provide measurable strategies to ensure economic benefits for local businesses and includes:

- Working with local suppliers to increase their capacity to supply QGC and like projects.
- Facilitating suppliers to competitively replace imports to ensure that where possible local goods and services are utilised.
- The Local Content Strategy includes specific references to Indigenous employment and business development. Consultation with Indigenous people will occur in 2010 as part of the implementation of the local content strategy.
- QGC is integrating local content objectives into contracts and procurement process. This will include, where appropriate, preparing tenders, evaluation criteria and contract provisions that are aligned with local content strategy objectives and support full, fair and reasonable participation of Australian industry and development of Australian Suppliers.
- QGC is establishing a 'town' office in the gas fields which will improve local residents' and businesses' access to the project, in Q1 2010.
- Local Governments including the WDRC will be consulted to assist in implementation of the Project's Local Content Strategy.

### Coordinator-Generals conclusions

**I agree** that the large demand for workers required by the QGC is likely to have an effect on the ability of other businesses in the area to attract and retain staff, particularly smaller businesses.

**I acknowledge** the concerns raised on submissions during the EIS process in regard to potential impacts on the local employment market and local businesses in the region.

**I commend** the proponent for its proposed actions under the local business development component of its Employment and Economic Development Social Impact Action Plan, and note the Local Content Strategy in particular.

In order to respond to the potential labour force, I have reinforced this in Condition 15, Appendix 1, Part 3 impacts identified due to the size of the project; and the potential cumulative effects of the LNG industry on the region, **I therefore set** an imposed condition to require the proponent finalise a labour availability study, and to provide a job advertising and job referral service to assist local employers. This is presented in Condition 14, Appendix 1, Part 3.





### **6.2.6.3 Community services**

The key community service and delivery issues raised in the EIS and SEIS submissions by agencies were in relation to the following matters:

#### **Community medical and health services**

Queensland Health (QH) requested that the proponent consult with the local Health Service Districts (South West Health Service District, Central Queensland Health Service District) to discuss the capacity of health services to meet the expected demand for medical and emergency services. QH has raised concerns in regard to the capacity of health services to meet the expected demand for medical and emergency services in the Gladstone Region.

QH advises that the proponent should have in place a procedure or protocol to identify and expeditiously notify Queensland Health where an incident occurs that is likely to impact upon public health and safety.

As part of the draft SIMP, the proponent has developed the Community Health and Safety Social Impact Action Plan. The objectives of the plan are:

- To reduce and offset demand on health and emergency services from workers and their families.
- To contribute to an increase in rural health capacity.
- To strengthen capacity of social infrastructure through partnerships and community development fund.

#### **Police service delivery**

In its EIS submission, the Queensland Police Service (QPS) identified requirements for additional police resources, including staffing increases to the Southern and Central Police Regions.

The submission identified the need to scope the requirement for additional police resources, including staffing increases to the Southern and Central Police Regions, new police stations, specialist resources and other equipment needs. QPS were concerned about the management of incidents and complaints regarding traffic and transport movements as a result of the project; and identified resourcing implications and service delivery impacts in the affected area.

In its SEIS submission, QPS notes it would like to consult with QGC in the development of transport management plans prior to the establishment of construction camps and inclusion of Gladstone Water Police in consultation about water safety issues. Similarly, Toowoomba Regional Council said it would like to be involved in traffic mitigation and management planning while Gladstone Regional Council raised concerns regarding the impacts on the road network and commented on all road intersection and upgrade requirements as a result of the project.

The proponent has indicated that it intends developing a Traffic and Transport Infrastructure Mitigation and Upgrades (Strategy) through engagement with Western Downs RC, Toowoomba RC and DTMR, develop a detailed traffic mitigation implementation plan. In addition, the proponent will work with Gladstone Regional Council to provide upgrades of key intersections.

The proponent has also proposed implementation of the Gladstone Marine Partnership (Strategy), which will engage marine recreation stakeholders, marine safety stakeholders and community organisations in enhancing marine recreation and safety in Gladstone Harbour.

#### **Emergency services**

Concerns were raised that there was an assumption that all emergencies will occur on site and disregard impacts of these and other emergency service demands.



As part of the Community Health and Safety Social Impact Action Plan, the proponent has developed a number of actions specific to emergency services. These include:

- Develop and implement an Emergency Response Plan (ERP) in consultation with relevant agencies, including Queensland Police, Queensland Health, and Queensland Fire and Rescue.
- Implement training programs and initiatives to support rural fire brigades in the project area.
- Develop detailed bushfire and emergency response plan provided to all emergency services located in or near the gas field to ensure that there is quick, clear and timely communication and decision making if a fire or an emergency event occurs.
- QGC is consulting with Emergency Service and health providers in regard to ensuring QGC's practice and operational provisions for health and safety are adequate to mitigate any excessive demand on emergency and health services.
- QGC will also co-operate with other key stakeholders to address community education and support needs regarding safety and emergency responses.

## **Social infrastructure and community services**

In its SEIS submission, the Western Downs Regional Council (WDRC) recognises that QGC proposes to contribute to the strengthening of local social services through various programs and initiatives, in conjunction with other projects, although no commitment or detail of this contribution or the proposed Strategic Social Infrastructure Plan was provided at that stage.

The Surat Basin Future Directions Statement forum provides one opportunity for local communities to work with government and industry to manage the rapid growth associated with the expected boom from the Liquefied Natural Gas industry

## **Coordinator-General's conclusions**

**I agree** with the concerns raised in EIS submissions from advisory agencies relating to potential increased demands on social infrastructure and service delivery in the region.

With regard to funding social infrastructure **I have dealt** with this in sections 6.2.5.3 and 6.2.5.4 of this report by encouraging participation in Regional Social Infrastructure Funds in Gladstone and Maranoa/Western Downs.

**I commend** the proponent for committing to working in partnership with Queensland Health and other agencies, for developing the Rural Health Initiative and for its commitment to working with regional councils on traffic mitigation and management planning. **I also commend** the proponent for the Gladstone Marine Partnership Strategy and for developing an Emergency Response Plan.

**While I will address** marine safety and other transport impacts elsewhere in the report, on three specific issues, **I require** the proponent to address a number of potential social impacts raised in submissions to adequately mitigate these potential social impacts on service delivery in the region. These relate to:

- Potential impacts on community medical and health services and facilities; and incidents response and management related to public health and safety.
- Potential impacts on police service delivery, water policing and management of traffic and transport movements.
- Potential emergency services planning and incident response management due to anticipated population growth.

**Therefore I have set** conditions to require the proponent to consult with the Department of Community Safety, to ensure any negative impacts on the agency's service delivery capabilities resulting from the QCLNG project, are mitigated. These conditions appear as Conditions 16-18 Appendix 1 Part 3.



## 6.3 Greenhouse gases

**I acknowledge** that anthropogenic greenhouse gas (GHG) emissions are broadly accepted as the major contributing factor to global warming.

Comparative GHG emissions intensities of common fuels indicate that natural gas produces 51.3 kg CO<sub>2</sub>-e per gigajoule (GJ) compared with diesel, fuel oil and black coal which emit between 69.9 - 93.1 kg CO<sub>2</sub>-e per GJ. <sup>4</sup> **However I note** that these comparative figures do not consider emissions associated with extraction, processing and transportation of natural gas. In fact, the EIS<sup>5</sup> indicates that natural gas generates at least 65 per cent of the greenhouse gas emissions associated with coal-fired power once gas production and transportation have been factored in.

### 6.3.1 Greenhouse gas estimates

Based on information provided by the proponent in the SEIS, **I find** that the estimate of GHG emissions for the QCLNG Operations totals approximately 108.1 million tonnes of carbon dioxide equivalents (MtCO<sub>2</sub>-e) over 20 years.<sup>6</sup>

**Table 6.2– Project life GHG emission estimates, as provided in the SEIS<sup>7</sup>**

Phase	Duration	Total Emissions (MtCO <sub>2</sub> -e)
<b>Gas field<sup>8</sup></b>		
Construction <sup>9</sup>	24 years	0.7
Operation <sup>10</sup>	24 years	51.0
<b>Pipeline</b>		
Construction	18 month	0.02
Operation <sup>11</sup>	22 years	0.9
<b>LNG facility</b>		
Construction	89 months	0.1
Commissioning	21 months	0.3
Operation <sup>12</sup>	20 years	55.1
<b>Total project emissions</b>		<b>108.1</b>

The proponent has provided estimates of annual GHG emissions indicating that QCLNG project operations alone will generate approximately 5,747,549 tCO<sub>2</sub>-e/annum (5.75 MtCO<sub>2</sub>-e/annum).<sup>13</sup> The estimates do not include GHG emissions associated with the transportation and end use (combustion) of LNG. The estimates are for Scope 1<sup>14</sup> and 2<sup>15</sup> emissions, and are based on the construction and

<sup>4</sup> Source: EIS Volume 7, p.1.

<sup>5</sup> EIS Volume 7, Figure 7.1.2.

<sup>6</sup> Source: SEIS Volume 7, Table 7.2.1.

<sup>7</sup> Refer to Table 7.2.1 in

<sup>8</sup> For a 2-LNG-train gas field component only.

<sup>9</sup> Gas field construction includes the drilling of new CSG wells, which occurs throughout the life of the Project.

<sup>10</sup> Based on an estimated 20-year project life. Total LNG facility operational emissions are based on 20 years operation.

<sup>11</sup> Based on an estimated 20-year project life. Total LNG facility operational emissions are based on 20 years operation.

<sup>12</sup> Based on an estimated 20-year project life. Total LNG facility operational emissions are based on 20 years operation.

<sup>13</sup> Email received by DIP on 16 June 2010, from QGC, Manager Environment.

<sup>14</sup> Scope 1 incorporates direct GHG emissions from sources owned or controlled by the reporting entity.

<sup>15</sup> Scope 2 incorporates indirect GHG emissions from the generation of purchased energy products (e.g. purchase of electricity).



operation of a gas field component associated with operating 2 LNG trains (i.e. 8 Mtpa LNG production case), and include additional infrastructure and disturbances presented in the SEIS. The estimates for each project component are presented in the table below.

**Table 6.3 - QCLNG maximum annual GHG emissions (Scope 1 & 2), based on a 2-LNG-train gas field component only**

Project component	Construction <sup>16</sup> (tCO <sub>2</sub> -e/annum)	Commissioning <sup>17</sup> (tCO <sub>2</sub> -e/annum)	Operation <sup>18</sup> (tCO <sub>2</sub> -e/annum)
Gas field <sup>19</sup>	53,753	-	2,675,827
Pipeline	16,439	-	39,479
LNG facility	10,303	112,348	3,032,243
<b>Sub-totals</b>	<b>80,495</b>	<b>112,348</b>	<b>5,747,549</b>

**Note 1:** The QCLNG annual GHG emissions estimate is based on an LNG plant component of 3-LNG trains and gas field component based on operation of 2-LNG trains.

**I note** that the above estimates would be expected to increase proportionally for a 3-LNG train gas field component.

Comparisons of the QCLNG annual operational contribution (of 5.75 MtCO<sub>2</sub>-e/annum) with current National targets for GHGs are provided in the table below.

**Table 6.4 – Comparisons of the QCLNG annual operational GHG emission estimate against National targets**

National GHG Target (Year)	National Target description	National GHG Emissions Target MtCO <sub>2</sub> -e /annum	QCLNG annual operational GHG contribution <sup>20</sup> MtCO <sub>2</sub> -e/annum	QCLNG contribution as a % of National Target
<b>2020</b> <sup>21</sup>	25% below 2000 levels by 2020 <sup>22</sup>	372.13869 <sup>23</sup>	5.75	1.55 %
<b>2050</b> <sup>24</sup>	60% below 2000	198.473964 <sup>25</sup>	5.75	2.89 %

<sup>16</sup> The proponent notes: Construction emissions from each project component are anticipated to occur concurrently. Construction of the LNG facility is anticipated to commence in 2010 with construction of the first two trains lasting approximately 45 months. Construction of gas field and pipeline components will commence in 2011 lasting approximately 18 months (excluding well development which continues throughout the life of the project). Data presented in this table are indicative of emissions over a 12 month period, not annual average emissions.

<sup>17</sup> The proponent notes: Commissioning of each train is anticipated to last seven months; as such annual emissions presented in the table will occur only over a seven month period.

<sup>18</sup> The proponent notes: Operational emissions for the project components occur concurrently. Data presented in this table are representative of a 3-LNG-train operation. All three trains are expected to operate from 2021 onwards.

<sup>19</sup> The proponent notes: For a 2-train gas field component only.

<sup>20</sup> The QCLNG annual GHG emissions estimate is based on an LNG plant component of 3-LNG trains and gas field component based on operation of 2-LNG trains

<sup>21</sup> The Australian Government has set National targets to reduce Australia's carbon pollution to 25% below 2000 levels by 2020. Source: Australian Government Department of Climate Change and Energy Efficiency <http://www.climatechange.gov.au/en/government/national-targets.aspx>

<sup>22</sup> According to the National Greenhouse Gas Inventory, 2000 levels were 496,184.91 GgCO<sub>2</sub>e (or 496.18491 Mega tonnes CO<sub>2</sub>-e).

<sup>23</sup> Calculation: 25% of 496,184.91 GgCO<sub>2</sub>-e (i.e. Year 2000) equals 124,046.22 GgCO<sub>2</sub>-e; therefore the 2020 target is 372,138.69 GgCO<sub>2</sub>-e or 372.13869 MtCO<sub>2</sub>e (i.e. Year 2000 - 25%).

<sup>24</sup> The Australian Government's National long-term GHG emissions reduction target for 2050.

<sup>25</sup> Calculation: 60% of 496,184.91 GgCO<sub>2</sub>-e (i.e. Year 2000) equals 297,710.946 GgCO<sub>2</sub>-e; therefore the 2050 target is 198,473.964 GgCO<sub>2</sub>-e or 198.473964 MtCO<sub>2</sub>e (i.e. Year 2000 - 60%).



	levels by 2050			
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**Note 1:** According to the National Greenhouse Gas Inventory, 2000 levels were 496,184.91 GgCO<sub>2</sub>-e (or 496.18491 Mega tonnes CO<sub>2</sub>-e).

**Note 2:** The QCLNG annual GHG emissions estimate is based on an LNG plant component of 3-LNG trains and gas field component based on operation of 2-LNG trains.

**I note** that a contribution of 5.75 MtCO<sub>2</sub>-e per year represents approximately 2.89% of the Australian Government's National long-term GHG emissions reduction target for 2050. Again **I note** that the above estimates would be expected to increase proportionally for a 3-LNG train gas field component. Further, the impacts associated with three (3) or more similar LNG projects in Queensland<sup>26</sup> would therefore represent approximately 10% of the National GHG emissions target for 2050. The Santos Gladstone LNG project<sup>27</sup> is estimated to produce 7.19 MtCO<sub>2</sub>-e per year for the 10 Mtpa LNG case.

**I note** from the EIS approximately 11% of the CSG extracted per annum will be consumed in the extraction, transportation and liquefaction of the CSG during the operational stage.<sup>28</sup>

**I therefore find** that operation of the QCLNG project will generate significant GHG emissions.

### 6.3.2 Mitigating greenhouse gas emissions

**I note** that the QCLNG GHG estimates summarised above are expected following the incorporation of high-efficiency production and processing methods, and other mitigation measures, into project design.

Proposed mitigation measures are outlined in EIS Volume 7 Chapter 2, Section 2.4. **I note** that as combustion of CSG is the primary source of greenhouse gas emissions from the LNG facility, the proponent's mitigation measures have focused on maximising the efficiency of activities that require CSG combustion. The EIS finds that implementation of best available technique reduction options can achieve overall GHG emission reductions of 27%.<sup>29</sup>

The plant efficiency comparisons provided by the proponent in EIS<sup>30</sup> indicate that the QCLNG project, having an emissions intensity of 0.259 tCO<sub>2</sub>-e / tLNG, represents one of the least GHG intensive LNG facilities in the world.<sup>31</sup>

### 6.3.3 Legislation and policy considerations

#### Australian Government

**I acknowledge** that on 3 December 2007, the Prime Minister of Australia signed the instrument of ratification of the Kyoto Protocol, and on 11 March 2008 Australia's ratification came into effect. **I note** that under the agreement, Australia has agreed to cut GHG emissions during the period 2008-2012 to 108 percent of the levels they were in 1990 (i.e. eight percent more than they were in 1990).<sup>32</sup>

In addition, **I note** the Australian Government has set National targets committed to reduce Australia's carbon pollution to 25 per cent below 2000 levels by 2020 if the world agrees to stabilise levels of GHG in the atmosphere at 450 parts per million CO<sub>2</sub> equivalent or lower. If the world is unable to reach agreement on a 450 parts per million target, Australia has committed to reduce its emissions by between 5 and 15 per cent below 2000 levels by 2020.<sup>33</sup>

**I note** that greenhouse gas emissions from the oil and gas sub-sector are projected in the recent Australian Government report *Tracking to Kyoto and 2020: Australia's Greenhouse Emissions Trends*

<sup>26</sup> The Santos GLNG project estimated GHG emissions of 7.19 MtCO<sub>2</sub>-e per year (for the 10 Mtpa case).

<sup>27</sup> Refer to Santos GLNG project SEIS, Section 5.1, Table 3.

<sup>28</sup> EIS Volume 7, p. 6.

<sup>29</sup> Refer to EIS figure 7.2.3.

<sup>30</sup> Refer to EIS figure 7.2.4: Benchmarked Greenhouse Emissions Intensity.

<sup>31</sup>

<sup>32</sup>Source: Australian Government Department of Climate Change and Energy Efficiency

<http://www.climatechange.gov.au/en/government/national-targets.aspx>

<sup>33</sup> Australian Government Department of Climate Change and Energy Efficiency  
<http://www.climatechange.gov.au/en/government/national-targets.aspx>



1990 to 2008 - 2012 and 2020 (Department of Climate Change, 2009). The projections<sup>34</sup> forecast that GHG emissions from the oil and gas sub-sector are to reach 25 Mtpa by the year 2020 and will continue to rise rapidly. The rate of increase suggests that the oil and gas sector is potentially the fastest-growing contributor of GHG emissions in Australia.

Importantly however, **I note** that the Department of Climate Change projections do not appear to include the Queensland CSG LNG industry. The report states<sup>35</sup> that “a number of potential LNG projects based on coal seam methane have not been included, because coal seam methane has an intrinsically low CO<sub>2</sub> content and so these projects, if built, will not have a material effect on Fugitive<sup>36</sup> emissions.” **I find** that, based on the information presented in the EIS for the QCLNG project, the emerging Queensland CSG LNG industry will significantly increase previous projections of GHG emissions from the Australian oil and gas sub-sector.

### Queensland

**I note** that the administering authority under the *Environmental Protection Act* 1994 (EP Act) must consider GHG emissions when deciding an application for environmental authority for petroleum activities (and other environmentally relevant activities), and may impose conditions such as requiring offsets (including GHG offsets) for such activities.

**Further, I note** that pursuant to the EP Act, the Kyoto Protocol is an example of an ‘*applicable government agreement*’ that requires consideration, together with the principles of ecological sustainable development and other important matters, specified under the set of ‘*standard criteria*’ for assessments and decision-making regarding whether or not to approve environmental authorities for petroleum activities in Queensland.

**In addition, I note** that other ‘*standard criteria*’ to be considered pursuant to the *EP Act* include the character, resilience and values of the receiving environment, and any applicable environmental impact study, assessment or report. The legislation therefore obliges the delegate of the administering authority to consider publicly available and accepted scientific reports about the current state of global warming, the accepted contributing factors (i.e. GHG emissions), and the likely future impacts to the environment and future generations (socially and economically).

**I note** that the Queensland Minister for Climate Change and Sustainability recently approved a draft policy statement outlining the proposed approach for consideration of GHG emissions under the *Environmental Protection Act* 1994.

### Coordinator-General’s assessment and conclusions

**I note** that when used for power generation, LNG delivered from Queensland to China and used to generate power will produce approximately 35% less greenhouse gas emissions than coal. **However I acknowledge** that coal-fired power generation is continuing.

In an effort to mitigate the carbon footprint of both the construction and operation of this project **I impose** Condition 4 Appendix 1 part 1 requiring the proponent to develop and implement a greenhouse gas reduction strategy for the project. The strategy must include, but not be limited to, the company’s policy on greenhouse gas emissions, an energy efficiency program, a continuous improvement program, better control systems and a CO<sub>2</sub> recovery plan. The strategy must be submitted to the Coordinator-General for approval within three months of the granting of the petroleum facilities licence for the LNG facility.

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<sup>34</sup> Source: *Tracking to Kyoto and 2020: Australia’s Greenhouse Emissions Trends 1990 to 2008 - 2012 and 2020*, Department of Climate Change, Australian Government, 2009, p.45, Figure 19.

<http://www.climatechange.gov.au/en/government/~media/publications/projections/tracking-to-kyoto-and-2020.ashx>

<sup>35</sup> Refer to p. 45 of *Tracking to Kyoto and 2020: Australia’s Greenhouse Emissions Trends 1990 to 2008 - 2012 and 2020*, Department of Climate Change, Australian Government, 2009.

<sup>36</sup> The Fugitive sector covers emissions that are associated with the production, processing, transport, storage, transmission and distribution of fossil fuels. (Source: *Tracking to Kyoto and 2020: Australia’s Greenhouse Emissions Trends 1990 to 2008 - 2012 and 2020*, Department of Climate Change, Australian Government, 2009, p.41)



## 6.4 Cumulative impacts

### 6.5.1 Introduction to cumulative impacts

This introduction makes some general remarks on the concept and delivery of cumulative impact analysis in all of the three LNG project EIS reports that have been delivered to me from LNG proponents by the date of this report. I am providing this commentary because the concept of cumulative impacts needs to consider impacts from other projects which may develop concurrently and therefore overlap in impacts. Therefore each project needs to consider the others in its assessment, to the extent that the impacts interact with each other and some additional form of mitigation needs to be taken.

The concept of cumulative impacts with relation to an EIS for a project is often misunderstood. In the context of a significant project EIS the definition of cumulative impacts is meant to describe the interactions, if any, between one project and another in proximity of time and location. The Terms of Reference (TOR) for LNG projects which I have declared significant, included the following scope of cumulative impacts:

“...cumulative impacts should take into consideration the effects of other known, existing or proposed projects ... the likelihood of cumulative impacts arising from shared gas pipeline easements and adjoining or nearby LNG plants ... the cumulative social and economic impacts arising from large project workforces associated with proposed industrial projects being constructed in overlapping timeframes ... the additional impacts on population, workforce, accommodation, housing, use of community infrastructure and services ... to the greatest extent practicable.”

Thus the TOR clearly focussed on the overlapping effects of the project and other projects including proposed projects. They also directed proponents towards the potential for overlap of adjacent pipelines and the LNG plants themselves (as they were generally proposed to be located in the same precinct). Lastly and not least the TOR directed proponents to examine the social and economic cumulative effects generated by the significant workforces which are anticipated to be present in the same space at the same time, and specified certain aspects of social and workforce impacts to be reported upon.

By and large, **I consider** project proponents in their EIS reports have had difficulty describing and analysing cumulative impacts. Some merely described the sum of impacts of the project itself as cumulative. Others considered other projects in comparison to their own, and judged which has the greater impact. In many cases the cumulative impact is described qualitatively, but is not quantified.

A major limitation to analysis raised by proponents is where a known project, especially one which is of the same character as others, is not included in the assessment “*because it has not published its EIS*”. This limitation is particularly relevant in this case where I have declared four LNG projects significant and I am facilitating an EIS for each one, in overlapping timeframes. I also am aware of at least one other LNG project which has been assessed under an *Environmental Protection Act 1994* EIS process. Another point limiting a proponent’s ability to consider cumulative impacts of other projects is the argument that the financial commitment of other projects is uncertain and therefore makes it difficult to confidently predict cumulative impacts.

**I do not fully accept these arguments** as being valid for declining to consider other projects in a cumulative impact assessment, or to limit the analysis to references to the project without assessment of impacts. **While I recognise the difficulties, I believe** the community expects that the obvious cumulative potential of overlapping projects will be taken into account by both proponents in their project planning, and by the government in its project assessment. Ideally this will include quantitative terms where possible, but certainly by examination of qualitative factors which are caused by cumulative impacts.

Other projects such as the Australia Pacific Liquefied Natural Gas (APLNG) EIS also discussed the limitation of information contained even in prior EIS reports, as making it difficult to quantify the exact nature of total impacts. The APLNG EIS indicated that “reporting [in previous EIS reports] provides



limited data on how much habitat will be lost, which habitat types will be affected, the severity of impacts, and mitigation and offset measures.”

This issue requires more discussion for future EIS projects, especially significant projects, between government and the development industry proponents and consultants.

One option would be for the proponent, assisted by governments, to nominate a scenario-based approach to cumulative impact assessment of multiple projects. In this approach certain defined scenarios, based on the current portfolio of projects, and making reasonable estimations for known projects, are developed for alternative analysis to determine a range of credible impacts. This would be used as a more reliable guide to impact mitigation and conditioning.

Another option for analysing this issue is to require an audit of cumulative impacts at a later date, together with a comparison of the qualitative impacts which are discussed here and in proponent’s EIS reports with actual outcomes.

**I have not yet determined** whether these courses of action are ones which would yield valuable results. **I would wish to receive** industry and agency advice on the difficulties that may arise and benefits to be gained from either a scenario approach or a post-project audit before coming to any conclusion on this matter.

#### **A restatement of cumulative impact assessment**

The true measure of the cumulative impact being sought by the TOR is to identify situations where overlapping impacts lead to interactions which generate a different character or a more intense effect than they do alone, i.e. the cumulative effect is more than the sum of the parts.

For example; gas emissions from each project individually may not overload the air shed, but when two or more are modelled, the cumulative effect may be to raise the total emissions and pollution level above the limit defined by acceptable health or safety criteria.

Another example is transport; where each of the projects may not overload the road network, or a particular intersection, but additional projects can provide impacts which when totalled, form such a large increase that the result is lower service standards on roadways or intersections require upgrading, as a result of the accumulation.

From these examples it is clear that cumulative impact analysis should address the following matters:

- there must be some proximity in time and /or location for projects to interact
- there must be a mechanism or opportunity for the interaction
- the assessment must identify an impact different from or additional to the sum of the collective projects
- mitigation requirements that may be additional to other measures.

While cumulative impacts analysis should meet these tests, it should be clear that individual project impacts for any action of the project will be dealt with by mitigation measures that are specific to that action. In many cases these measures will manage impacts to the extent that a cumulative impact is not experienced.

Despite the potential for limitations mentioned above, I am now in possession of impact information from the EIS Report of three LNG projects which are reporting to me. Each has produced an assessment of cumulative impacts in response to the same TOR. With this background I believe I am in a position to evaluate the information from all three, as well as advice from agencies and other submissions, and I am able to draw conclusions on the potential for cumulative impacts from the QGC project.

### **6.5.2 Analysis of LNG projects EIS reports**

The following table indicates the numbers of projects considered by each proponent, in each of the three segments of the LNG project.





**Table 6.5 Number of projects considered in suite of cumulative impact projects**

Proponent	<i>GLNG</i>	<i>QGC</i>	<i>APLNG</i>
- Gas Field	6 projects	11 projects	27 projects
- Pipeline	14	11	27
- LNG Plant	12	11	15
Including other LNG projects?	QGC APLNG partly, Arrow pipeline	GLNG	GLNG, QGC, Arrow pipeline

While this should not be taken to suggest that fewer projects will yield lesser cumulative impacts, the important projects to analyse are those which have the greatest interaction with the subject project. Clearly other LNG projects overlapping in time and location with the proponent's project are most likely to have cumulative impacts.

An overall limitation of this cumulative assessment by the QGC project is that it considered only GLNG project and failed to include the APLNG and Shell projects, since they were yet to publish their EIS details and QGC did not make interpolations or estimations.

I have reviewed the above lists and consider that they cover the scope of known projects which might impact on the three LNG projects because of proximity and timing. The only limitation is the lack of specific details of the Shell LNG project, which was not formulated until almost at the end of the EIS report period, hence was not predicted in the analysis.

### 6.5.3 Gas fields cumulative impact assessment

#### Issues of concern

For the reasons expressed above in my introduction, I have decided to look at how the three LNG significant projects assessed the range of aspects considered. Hence the following table was created from the EIS reports now published by the LNG proponents. Ratings (e.g. medium, moderate, low, minor, high) are as specified by the respective report.

**Table 6.6 Gas fields cumulative impact assessment summary**

<i>Aspect</i>	<i>GLNG</i>	<i>QGC</i>	<i>APLNG</i>
Land/ Soils	Low	Minor	Moderate
Land Use	Medium	Moderate	
Land Contamination		Minor	
Terrestrial Ecology	Low	Moderate	Moderate
Aquatic Ecology	Medium	Moderate	Moderate
Marine Ecology	-	-	-
Surface Water	Low	Minor	Moderate
Groundwater	Medium	Considerable	High
Associated Water	Low		High
Air Quality	Low	Moderate	Low
Greenhouse Gas	-	-	High
Noise and Vibration	Low	Major localised	Low
Economic			High
Social and Community	Medium	Not rated	High
Traffic and Transport	Medium	Major	Moderate
Solid Waste	Medium	Minor to Moderate	Moderate
Visual Amenity	Low	Moderate	Moderate
Cultural Heritage	Low		Low
Hazard and Risk	Low	Minor	Low

The highlighted topics are ones which **I believe** contain a higher degree of cumulative impact potential than the others, even though other topics may have multiple impacts at a smaller scale.



## Responses by proponents

### Terrestrial ecology

QGC assesses its terrestrial ecology interaction impacts as moderate because it considers that most flora populations are well represented elsewhere. The major ones are brigalow, and semi evergreen vine thicket, for which the GLNG and QGC projects are claimed to account for clearing of 0.03% and 0.16% respectively of these communities in the bioregion. APLNG indicates that its total clearing footprint will only take about 0.5% of the vegetated area in its potential gas field, but that the nature of the grid of wells and connecting pipelines and roads may cause fragmentation of some vegetation types. A focus on maintenance of corridors should therefore be a feature of Environmental Management Plans, as well as the standard mitigation approach of minimisation of clearing and provision of offsets.

Overlaps of threatened species between projects will be moderated by the normal project mitigation strategies of avoidance, minimisation and offsetting. However information in the QGC and APLNG EIS reports does indicate that the extent of habitat of three threatened flora species *Homopholis belsonii*, *Micromyrtus patula* and *Philotheca sporadica* may overlap areas of most gas fields and pipelines, and that the species have populations which are concentrated in these development areas. Hence there is potential for some cumulative effects on these threatened species, warranting specific management arrangements.

### Groundwater

QGC assesses its interaction of groundwater impacts with other adjacent gas fields such as those being developed by Origin (APLNG) and Arrow as considerable. However QGC has not been able to assess other proponent's modelling and include it in its own modelling. It is suggested in the EIS and SEIS that this situation will be managed by monitoring groundwater baselines, and contributing modelling to a coordinated government program.

The assessment focus is on the cumulative effects of extracting the CSG water on the adjacent tenements by other proponents. While such impact may be significant in terms of induced changes in the CSG water migration/flow rates on adjacent tenements, there are potentially greater cumulative effects from:

- deep-well injection by adjacent operators (presuming the deep aquifers actually have capacity to receive CSG water. A finite limit for the CSG water that can be injected has not been quantified (if QGC extracts more than 1,800 GL of CSG water over the life of the project and the other operators do likewise, deep well injection may not be a viable long-term option.
- wide-spread draw-down of the alluvium aquifers attributable to CSG activities including the extraction of CSG water.

In addition the EIS suggests there is likely to be a cumulative effect of groundwater drawdown with the proposed Wandoan Coal Mine.

### Noise and vibration

Noise and vibration assessments by QGC show that their rating is major localised because the gas field facilities are within interaction distance of other projects in certain areas, such as Wandoan Coal and power stations, in relation to sensitive receptors likely to be impacted. QGC does have the potential for proximity to gas field facilities of other LNG projects in its area (except for GLNG) and does specify that any interaction will be managed by attempting to locate gas field infrastructure to reduce cumulative noise impacts.

### Transport

For traffic and transport impacts, QGC gas fields are ultimately supplied with materials of construction using the Warrego Highway, and a network of local roads. A significantly increased impact will be experienced for all road transport tasks which import and transfer materials in field areas. The transport sections of the EIS and SEIS present tables of traffic volumes for QGC, but no figures of traffic impacts



from APLNG and Arrow Energy projects, which will have some fields adjacent and hence will contribute to some cumulative impact beyond what is identified in the QGC EIS.

From the QGC project alone, for example, while the Highway network will carry at least 79% more traffic, local roads will increase traffic counts by more than double, with the Dalby-Kogan road taking the brunt of traffic increase to 5 times the existing traffic level.

Although assessing cumulative road impacts as moderate to major, no quantitative results are given, because no APLNG or Arrow estimates are made. However the SEIS proposes development of a transport strategy using rail transport, but principally for the gas transmission pipeline task from Brisbane to Chinchilla or Miles, with a possibility that some major items of equipment may be modularised for rail transport.

QGC indicates that it will commit to, and expects that each proponent will commit to, negotiating a suitable contribution package on roads affected, to mitigate both project impacts and cumulative impacts.

### **Social impacts**

The QGC EIS report discusses cumulative social impacts by indicating that its workforce will be largely imported into the region and housed in Temporary Accommodation Facilities which are distributed around the gas fields. It is expected that Chinchilla may also be a population centre that develops with the project. The EIS points out that other projects will be located near other Surat regional centres and so cumulative impacts with the QGC project may be significant. Social impacts of the GLNG project are discussed elsewhere in this report.

### **Coordinator-General's conclusion**

Both the APLNG and the Arrow Energy gas field developments are directly adjacent to the QGC fields, and I believe this will have potential for cumulative effects. Other projects, such as the Wandoan coal mine (adjacent) are localised in area, and it is likely that land disturbance cumulative effects are also possible here.

### **Terrestrial ecology**

**I note** that it has been suggested that certain terrestrial flora threatened species have restricted populations in the gas field and pipeline areas, and **I therefore have formulated** a condition to ensure species conservation plans are prepared, and appropriate further study and planning for their protection is commenced. This appears as Condition 1, Appendix 2 part 2.

On a regional basis there is a potential for individual vegetation clearance activities not to consider bioregional corridors. **I wish to ensure** that this is a focus of management planning in field development and so **I have included** a condition requiring consideration of bioregional corridors in the finalisation of Environmental Management Plans. This appears as Condition 8, Appendix 2 Part 2.

### **Groundwater**

A potentially significant cumulative matter is the effect of gas fields on groundwater. The government has recognised this and has developed, together with coal seam gas proponents a groundwater monitoring program which will be structured as an industry-government initiative with medium and long term objectives to monitor effects as well as validate groundwater models for prediction of cumulative effects. Nevertheless it is a significant concern for rural landholders/occupiers in the gas fields that combined effects of extensive gas development will affect groundwater supplies and levels. **I therefore will insist** that a cumulative impact analysis be done on groundwater impacts and interactions between the gas fields of QGC, APLNG and Arrow Energy. This is included in the specification of the Condition 1 Appendix 2 Part 2.



## Transport

There will be considerable transport and traffic interaction between the project and adjacent APLNG and Arrow gas field developments, which have not been modelled except in a qualitative sense (being rated Moderate to Major). The proponent commits to manage its own impacts in conjunction with regional councils and hence **I have provided** conditions (in the transport section of this report) to require the proponent to firstly undertake a road condition survey of local roads, and secondly to produce Road Management Plans and enter infrastructure agreements with local governments on roads, which will enable any interaction to be managed. These appear as Condition 9 Appendix 1 Part 2.

**I am not convinced** that studies done by any of the proponents in their EIS are sufficiently comprehensive of cumulative impacts from gas field materials and equipment transport to take into account all multiple project impacts on such roads, and for the arterial roads and highways. Not only will local road impacts be important, but there are wider cumulative effects on transport on state roads such as the Warrego Highway and the Leichhardt Highway. **I have imposed** a condition in the transport section of this report, requiring proponents to participate in and implement the findings of a cumulative road impacts study which will take into account all LNG and other project related transport impacts. This condition will address state roads impacts in the Surat region, as well as the Gladstone region. This condition appears as Condition 8 Appendix 1 part 2.

**I emphasise** that the cumulative transport impacts study must take into account all relevant LNG projects, QGC, GLNG, APLNG and Arrow Energy, and **I require** in the condition that all projects contribute resources and information to the study and commit to implement its outcomes.

**I am concerned** that road safety is an issue that accompanies cumulative transport and traffic increases as a result of these projects. **I ensure** elsewhere in this report that it is an issue included in Social Impact Management Plan of the proponent and their contractors, so that they take responsibility in a formal way for ensuring that it is a management objective in operating their projects.

**I will consider** these questions of cumulative transport and threatened species issues again, taking account of these proposed gas field developments, when I am considering both the Wandoan Mine project and the APLNG project which are also significant projects. **I note** that the Department of Environment and Resource Management, in their assessment of the Arrow Energy gas fields project, has also considered the cumulative transport and other impacts of the project, in a similar way to the above assessment; and has also conditioned Arrow Energy to participate in the cumulative transport impacts study.

### 6.5.4 Pipeline cumulative impact assessment

#### Issues of concern

For the reasons expressed above in my introduction, I am examining how three LNG significant projects assessed the range of aspects considered. Hence the following table was created from the EIS reports now published by the LNG proponents:

**Table 6.7 Pipeline cumulative impact assessment summary**

<b>Aspect</b>	<b>GLNG</b>	<b>QGC</b>	<b>APLNG</b>
Land/ Soils	Medium	Negligible	
Land Use	Low	Negligible	Low
Land Contamination		Negligible	
Terrestrial Ecology	Medium	Negligible-minor	Moderate
Aquatic Ecology	Low	Minor	Low
Marine Ecology	High	Significant	Low
Surface Water	Low	Negligible	Low
Groundwater	Low	Negligible	-
Associated Water	-	-	-
Air Quality	Low	Negligible	Low
Greenhouse Gas	-	-	High



<b>Aspect</b>	<b>GLNG</b>	<b>QGC</b>	<b>APLNG</b>
Noise and Vibration	Low	Negligible	Low
Economic			High
Social and Community	Low	Not rated	High
Traffic and Transport	Low-Medium	Moderate- Major (Minor after management)	Moderate
Solid Waste	Low	Minor	Moderate
Visual Amenity	Low	Negligible	Low
Cultural Heritage	Low		Low
Hazard and Risk	Low	Negligible	Low

The aspects with increased cumulative impacts are highlighted in the above Table.

### Responses by proponents

The QGC pipeline route is in close proximity to other LNG project pipeline routes when leaving the gas fields and so cumulative impacts may be experienced. The QGC route generally follows a route northeast from the fields then east to the Calliope Range area. It is here that all LNG project pipelines enter the Callide Infrastructure Corridor State Development Area (CICSDA), and so it is here that co-location cumulative impacts may be experienced.

GLNG and QGC have identified a high cumulative impact on Marine Ecology, while APLNG rates it as Low. This seems to arise largely from APLNG's proposal in the EIS to directionally drill under The Narrows crossing of Port Curtis waters, thereby minimising impacts, and not participating in dredging of pipeline crossings of Port Curtis. However they observe that if their crossing had to be done by conventional dredging then the impacts would be larger, and a cumulative impact of three independent dredged crossings would be high impact.

### Coordinator General's conclusion

#### Co-location of pipelines

For the last 40 kilometres of the pipeline route to Gladstone, all pipelines traverse the Callide Infrastructure Corridor (CIC) which has been designated by the government as a State Development Area for the purpose of co-locating pipelines. The rationale for this is to enable a coordinated and timely approach to landholders both in the planning and the implementation stages of pipeline development. It avoids repeated consultation, negotiation and decision making amongst landholders/occupiers and proponents. It more efficiently assesses and optimises the cumulative impacts of land disturbance with multiple proponents and landholders/occupiers.

Hence **I endorse** the CICSDA, and **I note** that pipeline alignments are generally settled in this corridor. **I note** that a pipeline corridor extends through the Gladstone State Development Area, traversing the northern boundary of the area (and known as the Northern Infrastructure Corridor) and arriving at The Narrows.

#### Transport

However co-location of pipelines in the CICSDA has other cumulative impacts that might be experienced. During construction there will be a longer period of transport on access roads and potential for road damage, as well as congestion and reduction of service standards at intersections due to the size and frequency of transport for multiple projects. This needs appropriate study of cumulative impacts, and will likely require specific mitigation strategies.

**I am not convinced** that studies done by proponents in their EIS are sufficiently comprehensive of cumulative impacts from pipeline transport to take into account all multiple project impacts on such roads, and for the arterial roads and highways from ports to the pipeline route. Therefore **I have set** (in the Transport section of this report) a condition requiring proponents to participate in and implement the



findings of a cumulative road impacts study which will take into account all LNG and other project related transport impacts for servicing the pipeline corridor in the Gladstone region as well as in the Surat region. This condition appears as Condition 8 Appendix 1 Part 2.

### Marine ecology

For the crossing of The Narrows and associated intertidal wetlands, both the GLNG and APLNG EIS reports make a strong case that, on the basis of the apparent high cumulative impacts of multiple dredging projects for the crossing of 3 pipelines (which could be up to 1 kilometre wide), a 'bundled' crossing should be undertaken with the obvious benefit of reducing cumulative impacts.

**I support** this view and **declare** that **I require** proponents to investigate a bundled pipe crossing based generally on a proposal which was prepared by the industry in February 2010. A discussion and conclusion on this subject is dealt with in a separate section of this report and a condition is provided. The objective of the condition is to ensure that all proponents may have the opportunity of participating in a method of pipeline crossing which both minimises the cumulative impacts of multiple pipeline crossings, and which ensures that each proponent can achieve a pipeline solution in time to service their project.

## 6.5.5 LNG plant cumulative impact assessment

### Issues of concern

For the reasons expressed above in my introduction, I am examining how three LNG significant projects assessed the range of aspects considered. Hence the following table was created from the EIS reports now published by the LNG proponents.

**Table 6.8 LNG plant cumulative impact assessment summary**

<b>Aspect</b>	<b>GLNG</b>	<b>QGC</b>	<b>APLNG</b>
Land/ Soils	Medium	Minor	Low
Land Use	Low	Minor	
Land Contamination	Medium	Negligible	
Terrestrial Ecology	Medium	Moderate	Moderate
Aquatic Ecology	Low	-	Low
Marine Ecology	High	Significant potential	High
Coastal Environment		Minor	High
Surface Water		-	Low
Groundwater	-	-	-
Air Quality	Low	Minor	Low
Greenhouse Gas	Medium	-	High
Noise and Vibration	Low	Minor	Low
Economic			High
Social and Community	High	Not rated	High
Traffic and Transport	Medium	Moderate	Moderate
Solid Waste	Low	Minor	Low
Visual Amenity	High	Moderate to Major	Low
Cultural Heritage	Low		Low
Hazard and Risk	Medium	Minimal	Low

The table indicates that cumulative impacts will be mostly present in respect of Marine Ecology, Social and Community, and Traffic and Transport.



## Responses by proponents

### Marine ecology

Marine Ecology effects are stated by all proponents as High impact. This reflects the inclusion of shipping channels, swing basin and berth dredging in each proponent's assessment. It is indeed true that if each project undertook its own dredging, impacts might be heightened by the potential for simultaneous coastal and dredging works, resulting in multiple activities and equipment being employed. This would lead to concentration of impacts, and perhaps a higher peak.

However it has been determined that the dredging for each of the proponent's channels, swing basins and berths should be undertaken as a single project under the control of the Gladstone Ports Corporation. Hence the Western Basin Dredging project will conduct the dredging as a consolidated consecutive program, so that multiple dredging activities are avoided, with consequent elimination of cumulative impacts.

Cumulative impact studies are reported in the QGC EIS and SEIS for the following:

- hydrodynamics of full Western Basin Dredging and Disposal project, including QGC, Wiggins Island Coal Terminal, and GLNG projects on Port Curtis
- effluent discharge of QGC brine, and treated sewage from the peak workforce
- air emissions of QGC, GLNG and two small LNG projects.

### Social Impacts

Workforce housing in Gladstone will be an issue where it is important to examine cumulative impacts. Although the aim is to house a large proportion of the workforce in Construction Accommodation facilities which may be on Curtis Island, a proportion of the workforce will enter the housing market in the Gladstone region.

### Coordinator-General's conclusion

Other LNG projects potentially also require workforce housing in the Gladstone area. It is a subject which has important social impacts and has been raised actively by the Gladstone Regional Council. Therefore I have dealt with this issue more completely in the Social Impact section of this report.

Elsewhere in this report, in the Social Impact section, **I have set** conditions to require a proponent to provide a housing package, in the context of an Integrated Housing Strategy for their own requirements, and for integration with other housing supply and demands at the time. **I envisage** that the Regional Community Consultative Committee (which I recommend be set up at each major population region) can provide oversight of how this strategy is delivering its intended outcomes – the provision of timely housing supply, and the relief of housing pressures in the market. If there are other factors which ease or tighten supply and demand, **I envisage** that this consultative committee structure would be best placed to reflect these circumstances from the community, and advise proponents accordingly whether the housing supply which proponents are making, appear to require adjustment up or down.

While this arrangement may seem to be unstructured, in fact it has the potential to be highly adaptive and responsive to community conditions, as a formal consultative group, on which the regional council is represented, should have access to the latest information on both supply and demand for housing in the region. Hence **I commend** it to proponents as a practical way in which cumulative housing factors may be managed.

I have some concerns that competition for workers could negatively affect the local employment pool for primary production as well as in community and local government services. This could also be a matter for consideration by the Regional Community Consultative Committee.

Transport cumulative impacts need to be investigated because, although one project may not trigger road upgrades, or a drop-off in service standards, the cumulative effects of three or four significant projects utilising road infrastructure concurrently, or even consecutively, may cause overloading of



capacity. This could potentially result in congestion or pavement impacts, negatively impacting on road safety and trigger the need for mitigation and road upgrade works.

To ensure present proposals include appropriate impact mitigation, road contribution strategies for a number of scenarios which take account of the number of proposed projects, construction schedules, timing and transport tasks, **I have initiated** a proposal that DIP, in conjunction with DTMR, conduct a Road Transport Infrastructure Cumulative Impacts Study – Proposed LNG Industry Impacts. I will be seeking contributions from all LNG industry participants in order to ensure that a full assessment will be conducted on the same basis, to determine whether cumulative impacts will arise, and what mitigation strategies will be required. **I have included** a condition to this effect in the transport section of this report.

## 6.5 Offsets

### 6.5.1 Environmental Offsets – Regulatory Framework

An environmental offset is an action taken to counterbalance unavoidable, negative environmental impacts that result from an activity or a development.

The *Queensland Government Environmental Offsets Policy* (2008) outlines the overall direction and framework for environmental offsets in Queensland. Under the principles of the policy:

- Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy;
- Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact;
- Offsets must achieve an equivalent or better environmental outcome;
- Offsets must provide environmental values as similar as possible to those being lost;
- Offset provision should minimise the time-lag between the impact and delivery of the offset;
- Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values; and
- Offsets must be legally secured for the duration of the offset requirement.

Queensland currently has three specific-issue offsets policies, that address specific environmental issues (e.g. vegetation management, marine fish habitat). The specific-issue offsets policies, and their regulating agencies are:

- Vegetation Management — *Policy for Vegetation Management Offsets*, September 2007, Department of Natural Resources and Water;
- Marine Fish Habitat — *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss*, 2002, Department of Primary Industries and Fisheries; and
- Koala Habitat — Offsets for Net Benefit.

The Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) has prepared a draft policy titled *Use of Environmental Offsets under the Environmental Protection and Biodiversity Conservation Act 1999*.





## 6.5.2 QCLNG Proposed Offsets - EIS & SEIS calculations and strategy

**I note** that the SEIS states that for those disturbed areas ‘*that remain operational*’, a comprehensive draft *Vegetation and Biodiversity Offset Strategy* has been developed and is attached as Appendix 2.3 of the SEIS.<sup>37</sup>

**However, I do not support** that environmental offsets are only offered for those disturbed areas ‘*that remain operational*’. Rather, **I require** environmental offset calculation be presented based on all direct and indirect project disturbances for all phases of the project.

**Further I note** that the proponent has not provided disturbance estimates for species and communities indirectly impacted by project activities, such as impacts resulting from fragmentation, irrigation areas, edge effects and groundwater drawdown.

**I note** that due to the nature of petroleum activities, the areas of remnant vegetation communities modified by edge effects is likely to exceed the area directly disturbed by the development footprint (where direct disturbances occur within or adjacent to remnant vegetation communities). Edge effects will be especially pronounced in small habitat fragments where the effects may extend throughout the patch. Small remnant areas have proportionately greater edge exposure to sunlight, erosion and vectors such as weeds and fire.

**I note** that groundwater drawdown estimates across the gas field, and associated impacts on species and communities have not been quantified in the EIS and SEIS. Consequently it appears that no allowance has been made within the offset proposal for impacts on ecosystems and species habitat as a result of groundwater drawdown.

**Therefore I require** that the environmental offset calculations incorporate indirect disturbances including allowances for fragmentation, irrigation areas, edge effects and impacts on groundwater dependent ecosystems.

**I require** that environmental offsets presented for the project cover direct and indirect impacts and are consistent with government policies, including the policy principles nominated in the *Queensland Government Environmental Offsets Policy* (2008).

The EIS and SEIS confirm that the project will have unavoidable environmentally sensitive vegetation clearing consequences. While the extent of clearing has been broadly quantified as a worst-case scenario, gas field development details cannot be confirmed at this stage. I cannot therefore be certain that the safeguards outlined in the EIS documentation will be more or less than adequate.

**I require** that environmental offsets are to be secured by the proponent in a manner that achieves a “no net loss” of biodiversity outcome, and in a manner and timeframe acceptable to DERM. **I require** that an environmental offsets program, consistent with Queensland Government Environmental Offsets Policy (QGEOP) must be provided for approval before environmental authorities are issued.

**I find** a significant majority of the QCLNG development will occur in areas of remnant vegetation that have a “*Not of Concern*” Regional Ecosystem biodiversity status. Although these vegetation areas are not subject to offset requirements, the offsets package would consequently cover similar environmental values to those of “not of concern” ecosystems that may be disturbed.

**I require** that a package for the whole project be submitted for assessment at the time the Environmental Management Plans are being provided, and for the package to be regularly updated and reconciled with actual gas field development and other disturbance as it is undertaken.

DERM comments regarding the proponent’s *Draft Vegetation and Biodiversity Offset Strategy* are outlined below.

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<sup>37</sup> SEIS, Volume 3, Chapter 19, *Gas field and pipeline construction plan 2010 to 2014*.



### 6.5.3 Agency comments regarding QCLNG Proposed Offsets

DERM has advised the *Draft Vegetation and Biodiversity Offset Strategy* provides an overview of a proposal, however does not commit to any specific strategy to meet the principles of the *Queensland Government Environmental Offset Policy 2008*. DERM has recommended that the proponent revise the offset strategy to:

1. Present a strategic offer upfront and approach the offsets proposal as a 'credit' against which withdrawals may be made. DERM consider that this approach would provide greater certainty for all parties whilst demonstrating that offsets for the unavoidable impacts identified are available.
2. Address disruption to biodiversity corridors and connectivity in the landscape in a manner that achieves biodiversity outcomes.
3. Note that multipliers also are incorporated in current policies to account mainly for the delay in recovery of a system to a condition commensurate with that being lost and to account for risks in achieving such a standard.

**I note** that DERM has agreed to an offsets package that was developed for the Western Basin dredging component of the LNG industry development, however the package only addresses major capital dredge spoil disposal.

DERM advises that environmental offsets are required for unavoidable impacts associated with the loss of vegetation and biodiversity for the gas fields, pipeline construction, tidal works, the LNG Facility and any workers' accommodation or other clearing required to support the QCLNG development on Curtis Island.

### 6.5.4 QCLNG Proposed Offsets – Terrestrial Offsets and Implementation Report

**Further I note** that the proponent has recently submitted a *Terrestrial Offsets and Implementation Report (May 2010)*<sup>38</sup>. The report is currently being reviewed by relevant regulatory authorities; hence the proposal has not been fully assessed at this stage due to the timing of the report.

### 6.5.5 Coordinator-General's Conclusion

Therefore conditions are recommended in Appendix 1, Part 1 Condition 7 of this Report to require the preparation of an environmental offsets program for assessment by the CG and DERM.

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<sup>38</sup> Queensland Curtis LNG Project: Terrestrial Offsets and Implementation Report (6 May 2010).



## 6. Gas fields

### 7.1 Gas field activities

The QGC gas fields in the Surat Basin are proposed to be developed over a period of at least 20 years to provide coal seam gas (also known as coal bed methane) to the proposed coal seam gas liquefaction facility on Curtis Island, near Gladstone in Central Queensland.

Gas field activities will involve initial construction and operation of 1,500 gas wells increasing to approximately 6,000 wells 100 – 800 metres deep, over the life of the project, to produce an equivalent of up to 12 million tonnes per annum of LNG.

The gas fields cover an area of 468,000 ha, within the Walloon Fairway of the Surat Basin. The Gas Field development area is located between the towns of Moonie in the south, Wandoan and Miles in the north, Condamine and Tara in the west, and Chinchilla and Kogan in the east

The gas is held in geological structures and is under pressure by groundwater. An average of 160 ML groundwater will be extracted each day over the gas fields to release the CSG. Peak groundwater extraction will be 180 ML per day.

Operational facilities in the gas fields include well construction, CSG well heads and separators, field compressor stations (FCS), central processing plants (CPPs) and gas and water piping. There will be 13,400 km of gas gathering pipelines and 2,200 km of trunk lines. Gas turbine power generators may be sited with the CPPs and each CPP will have flare stacks.

Gas Field activities will include, installation of other operationally related infrastructure including access roads and tracks and in-field gas gathering networks (to transport gas from the wells to field compression stations), accommodation camps, offices, workshops and telecommunications installations.

Associated water management facilities (including pumping stations, reverse osmosis (RO) desalination plant, brine ponds and water gathering networks).

The nature of these activities necessitates entry onto occupied land by the proponent with a range of vehicles, equipment and materials required to undertake a variety of tasks including drilling, earthworks access road construction, concrete construction, steel fabrication and building.

The EIS describes present land use as pastoral 72%, cropping, 12%, state forest, 11%, and residential, 5%.

CSG wells will be constructed in an approximate 750 metre grid. In addition to CSG wells, installation of other operationally related infrastructure will be required, including access roads and tracks, accommodation camps, water gathering networks, water management facilities, in-field gas gathering networks to transport gas from wells to the FCSs, FCSs and CPPs.

The gas-gathering pipelines will have 15 metre easements and the trunk lines 30 metre easements. The Upstream Infrastructure Corridor will have easement widths of up to 120m.

The proposal involves establishment of 53 FCSs each with up to eight screw compressors per FCS. The number of screw compressors per FCS will fluctuate depending on volume of gas compressed. At any one time there will be between 150 and 200 screw compressors operating simultaneously. Some of the FCSs will be powered by electric motors with electricity supplied through a grid connection. Others will be powered by gas generators. The area required for each FCS is 7 ha.

A total of four CPPs will be installed and depending on location, these will be powered by grid electricity or decentralised gas turbine generators. At each CPP there will be a flare, TEG unit per compressor, water management system including a pond and a substation. The total area for each CPP will be approximately 19 ha.



Water treatment and storage requirements have been revised in the draft Water Management Plan for the project, taking on board the Queensland Government's policy requirements for management of CSG water. The revised specification includes construction of approximately 6,700 km of water pipelines in easements varying from 15 to 30 metres. Where possible the same easement will be used for associated water trunklines.

The pipelines will connect:

- 92 in-line buffer storages with a total capacity of 19 ML, covering a total area of 2 ha
- 35 regional storage ponds with a combined storage volume of 2,000 ML, covering a total area of 35 ha
- two collection header ponds with total storage of 4,000 ML to hold 30 days water supply
- two raw water storages with total capacity 1,000 ML and a total footprint of 14 ha
- two treated water ponds with 450 ML capacity, covering an area of 6 ha.

The SEIS identified a need for 9,000 ML brine ponds with an area of 90 ha and 1,950 ML evaporation basins with an area of 390 ha. However, the draft water Management Plan now identifies a preliminary need for only 21 ha for brine ponds and no specific requirement for evaporation basins. QGC is undertaking trials to determine the potential for deep-well injection of most of the associated water and specific re-use options following RO desalination. If these options prove viable the area required for brine ponds and evaporating basins will be significantly reduced.

Power lines will generally be buried cable within gas trunkline easements; however, 600 km of power easements will be required within the gas trunkline easement.

### 7.1.1 Existing remnant vegetation

The EIS states approximately 50% of the 468,700 ha gas field tenement area supports remnant vegetation.<sup>39</sup> The EIS reports that approximately 297,445 ha has been cleared<sup>40</sup>, and that the remaining remnant vegetation (approximating 171,255 ha) <which is actually 37%> is comprised as follows:

**Table 7.1 Remnant vegetation in the QGC gas fields<sup>41</sup>**

Remnant vegetation	Area (ha)
eucalypt woodlands	149,414
acacia woodlands	975
brigalow/belah woodlands	3,617
semi-green vine thicket	621
riparian eucalypt woodlands	6,693
shrubland on scalds	9,824
wetlands	111
<b>Total</b>	<b>171,255</b>

The estimated extent of listed ecological communities existing within the gas fields is substantial, comprising listed ecological communities under the *Environment Protection Biodiversity and*

<sup>39</sup> EIS Volume 3, Chapter 7. Section 7.5.1, p. 22.

<sup>40</sup> EIS reports that this figure is based on Queensland Herbarium mapping. Refer to EIS, Volume 3, Chapter 7, Section 7.4.1.2, page 3.

<sup>41</sup> EIS, Volume 3, Chapter 7, Section 7.4.1.2, page 3.



Conservation (EPBC) Act 1999 (Commonwealth), and 'endangered' or 'of concern' regional ecosystems under the Vegetation Management Act (VMA) 1999 (Qld).

**Table 7.2 Extent of remnant vegetation within the gas field, based on regional ecosystem status<sup>42</sup>**

Remnant vegetation – Regional ecosystem status	Area (ha)
EPBC-listed <sup>43</sup>	4,039
Endangered	4,415
Of Concern	7,403
Not of Concern	159,434
<b>Total<sup>44</sup></b>	<b>171,253</b>

Comprehensive information regarding flora and fauna assessments undertaken for the project has been provided in Appendix 3.2 of the EIS. According to EIS Appendix 3.2 the specific ecological communities and regional ecosystems within the gas fields, based on Queensland Herbarium mapping, are as follows.<sup>45</sup>

**Table 7.3 Ecological communities and regional ecosystems in the gas fields**

Regional ecosystem	Description	VMA Status	EPBC Status	Extent within gas field (ha)	% within 200 x 200 km sq	% within Brigalow Belt Bioregion
11.3.1	<i>Acacia harpophylla</i> and / or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	461	12.6	0.6
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of Concern	-	4,322	13.26	0.1
11.3.3 *	<i>Eucalyptus coolabah</i> woodland on alluvial plains	Of Concern *	-	442	7.29	<0.1
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Tall woodland on alluvial plains.	Of Concern	-	1,363	16.72	<0.1
11.3.14	<i>Eucalyptus</i> spp. Angophora spp., <i>Callitris</i> spp. Woodland on alluvial plains	Not of Concern	-	3,293	18.6	4.1
11.3.17	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland on alluvial plains	Of Concern	-	229	11.2	0.6

<sup>42</sup> Based on EIS, in EIS, Volume 3, Chapter 7, section 7.5.1, Table 3.7.5.

<sup>43</sup> The EIS notes that EBPC-listed ecological communities coincide with (and are not additional to) VMA 'endangered', 'of concern' and 'not of concern' regional ecosystems.

<sup>44</sup> Note: The total takes into account overlap of coinciding EBPC-listed communities and VMA regional ecosystems.

<sup>45</sup> Source: EIS, Appendices to Volume 3, Appendix 3.2: *Gas Field – Terrestrial and Freshwater Flora and Fauna Assessment*, Table 3: Ecological communities / REs within the CSG field, p.30.



Regional ecosystem	Description	VMA Status	EPBC Status	Extent within gas field (ha)	% within 200 x 200 km sq	% within Brigalow Belt Bioregion
11.3.18 *	<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	Not of Concern *	-	1,839	21.4	2.2
11.3.19	<i>Callitris glaucophylla</i> , <i>Corymbia</i> spp. And/or <i>Eucalyptus melanophloia</i> open forest to woodland on Cainozoic alluvial plains	Not of Concern	-	13	0.3	<0.1
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Not of Concern	-	6,693	15.8	1.4
11.3.26	<i>Eucalyptus moluccana</i> or <i>E. macrocarpa</i> woodland to open forest on margins of alluvial plains	Not of Concern	-	73	0.6	0.2
11.3.27 *	Freshwater wetlands	Not of Concern *	-	111	9.8	0.4
11.4.3	<i>Acacia harpophylla</i> and/or <i>Casuarina</i> □ <i>ristate</i> shrubby open forest on Cainozoic clay plains	Endangered	Endangered	1,570	5.4	2.0
11.4.7 *	Open forest to woodland of <i>Eucalyptus populnea</i> with <i>Acacia harpophylla</i> and/or <i>Casuarina</i> □ <i>ristate</i> on Cainozoic clay plains	Endangered *	Endangered *	11	0.3	0.1
11.4.10	<i>Eucalyptus populnea</i> or <i>E. pilligaensis</i> , <i>Acacia harpophylla</i> , <i>Casuarina</i> □ <i>ristate</i> open forest to woodland on margins of Cainozoic clay plains	Endangered	Endangered	193	20.16	0.4
11.4.12	<i>Eucalyptus populnea</i> woodland on Cainozoic clay plains	Endangered	-	384	12.55	0.7
11.5.1	<i>Eucalyptus creba</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains/remnant surfaces	Not of Concern	-	46,223	15.8	9.6
11.5.4	<i>Eucalyptus creba</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>E. chloroclada</i> , <i>Angophora leiocarpa</i> on Cainozoic sand plains/remnant surfaces. Deep sands.	Not of Concern	-	6,083	13.4	5.6
11.5.5 *	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains/remnant surfaces. Deep red sands.	Not of Concern *	-	481	1.1	0.4



Regional ecosystem	Description	VMA Status	EPBC Status	Extent within gas field (ha)	% within 200 x 200 km sq	% within Brigalow Belt Bioregion
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> <i>E. pilligaensis</i> ± <i>E. crebra</i> woodland on Cainozoic sand plains	Not of Concern	-	5,196	10.6	3.4
11.5.21 *	<i>Corymbia bloxsomei</i> ± <i>E. crebra</i> ± <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains/remnant surfaces	Not of Concern *	-	512	0.7	0.7
11.7.2	<i>Acacia</i> spp. Woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	Not of Concern	-	966	4.7	0.3
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on Cainozoic lateritic duricrust	Not of Concern	-	31,156	23.3	13.7
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	Not of Concern	-	9,824	31.9	15.5
11.7.6	<i>Corymbia citriodora</i> or <i>Eucalyptus crebra</i> woodland on Cainozoic lateritic duricrust	Not of Concern	-	10,294	6.9	3.0
11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>Nubila</i> ±	Not of Concern	-	25,212	24.9	14.6
11.8.3 *	Semi-evergreen vine thicket on Cainozoic igneous rocks. Steep hillsides.	Not of Concern *	Endangered *	8	1.5	0.0
11.9.4	Semi-evergreen vine thicket or <i>Acacia harpophylla</i> with a semi-evergreen vine thicket understorey on fine-grained sedimentary rocks	Endangered	Endangered	613	12.0	1.1
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina</i> □ristate open forest on fine-grained sedimentary rocks	Endangered	Endangered	1,175	7.7	0.8
11.9.6 *	<i>Acacia melvillei</i> ± <i>A. harpophylla</i> open forest on fine-grained sedimentary rocks	Endangered *	Endangered *	9	3.1	2.3
11.9.7	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	Of Concern	-	637	8.9	0.6
11.9.9 *	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks	Not of Concern *	-	179	11.0	0.1
11.9.10 *	<i>Acacia harpophylla</i> , <i>Eucalyptus populnea</i> open forest on fine-grained sedimentary rocks	Of Concern *	-	411	13.4	0.5



Regional ecosystem	Description	VMA Status	EPBC Status	Extent within gas field (ha)	% within 200 x 200 km sq	% within Brigalow Belt Bioregion
11.10.1	<i>Acacia harpophylla</i> , <i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	Not of Concern	-	10,402	13.6	1.2
11.10.9	<i>Callitris citriodora</i> open forest on coarse-grained sedimentary rocks	Not of Concern	-	877	4.0	0.2
<b>Total area of regional ecosystems within QGC gas field</b>				<b>171,255</b>		

These regional ecosystem areas have been identified as 'not accessible' and recommended as 'no go' areas based on values and sensitivities by the proponent in the EIS Appendix 3.2.

Various ecological communities have been identified<sup>46</sup> by the proponent as 'not accessible' and recommended as 'no go' areas based on values and sensitivities. In particular, regional ecosystems: 11.3.3, 11.3.18, 11.3.27, 11.4.7, 11.5.5, 11.5.21, 11.8.3, 11.9.6, 11.9.9, and 11.9.10. **I support** the approach taken by the proponent to protect the integrity of these important vegetation communities.

#### Clearing of remnant vegetation (direct disturbance)

Approximately 26% of all remnant vegetation clearing in Queensland between 2003 and 2005 occurred in the Brigalow Belt bioregion.<sup>47</sup>

Regarding clearing of remnant vegetation, the EIS states that 'unavoidable clearing' of 'endangered' and 'of concern' regional ecosystems are 'likely to be of a very minor extent'. However, 'unavoidable clearing' is not defined, although some guidance is provided in EIS section 7.6.2 – *Zone-based Mitigation Measures*, and in particular section 7.6.2.4 – *Zone 4a and 4b Very High Ecological Constraints*.

The SEIS states that due to the small shape of semi-evergreen vine thicket and Brigalow fragments that occur within the south-eastern section of PL171 it is expected that gas field infrastructure will be able to avoid these areas. **Therefore I require** that the proponent avoid clearing of semi-evergreen vine thicket and Brigalow areas within PL171. **I also require** that this commitment and requirement be incorporated in the EM Plan, and has been included as Condition 8, Appendix 2, Part 2.

The SEIS states the remaining Brigalow communities within ATP768 and PL171 are generally linear in shape and extend along fence lines or occur within road reserves, and that field surveys indicate that the majority of these remnants suffer from edge effects and have been invaded by environmental weeds, compromising their integrity as native habitats. The SEIS states that in some cases, these remaining, linear Brigalow communities may be unavoidable, and pipelines and associated infrastructure may need to transect them for short distances.<sup>48</sup> Acknowledging that the proponent states that best available technologies and methodologies will be utilised in a manner that avoids clearing of Brigalow communities within ATP768 and PL171. **I also require** that this commitment and requirement be included in the EM Plan. (Condition 8, Appendix 2 Part 2)

<sup>46</sup> Identified in EIS, Appendices to Volume 3, Appendix 3.2, Table 3: *Ecological communities / REs within the CSG field*.

<sup>47</sup> Source: Queensland Department of the Environment and Resource Management web site, sourced on 8 June 2010 at

[http://www.derm.qld.gov.au/wildlife-cosystems/plants/remnant\\_vegetation\\_in\\_queensland/index.html](http://www.derm.qld.gov.au/wildlife-cosystems/plants/remnant_vegetation_in_queensland/index.html).

<sup>48</sup> SEIS, Volume 3, Chapter 7, Section 7.4, pp. 16-17.





**I find** that a significant proportion of gas field land (171,255 ha) is occupied by remnant vegetation, **and I note** that in the SEIS it is proposed that 5.6% (or 9,577 ha) of this remnant vegetation will be directly lost as a result of QGC gas field activities. **In particular I find** that the SEIS proposed the ‘worst case’ remnant vegetation clearing for the project as follows.<sup>49</sup>

**Table 7.4 SEIS proposed ‘worst case’ remnant vegetation clearing**

Remnant vegetation regional ecosystem status	Extent within gas field (ha)	QGC clearing – loss (ha)	% Cleared in QGC gas field	% cleared in Bioregion
EPBC-listed <sup>50</sup>	4,039	73	1.7	0.018
Endangered	4,415	108	1.8	0.026
Of Concern	7,403	308	4.2	0.025
Not of Concern	159,434	9,088	5.5	0.207
<b>Total<sup>51</sup></b>	<b>171,253</b>	<b>9,577</b>	<b>5.6</b>	<b>0.148</b>

#### Minimising vegetation disturbance

The EIS provides general mitigation guidelines and zone-based mitigation measures (based on ecological constraints mapping) for mitigation and rehabilitation of terrestrial ecology and biodiversity.<sup>52</sup>

The EIS states that an environmental offsets strategy will be developed prior to the commencement of the project, addressing both the Commonwealth and Queensland Governments’ offsets legislation and policy.<sup>53</sup> Further, the EIS states that offsets should only be utilised in situations where impacts on environmental values are ‘unavoidable’, and that the offset must directly relate to the environmental value that will be impacted. Priority environmental offset areas are specified as follows:

- matters of national environmental significance
- endangered Regional Ecosystems (Res)
- of concern Res
- any Res where clearing may be considered as a significant impact
- particular endangered, vulnerable or rare fauna habitats
- endangered, vulnerable or rare flora-rich areas
- connections/corridors
- riparian areas
- areas containing wetlands (RE 11.3.27)
- areas linking/adjoining areas of:
  - any of the above
  - state significant areas as identified by DERM Biodiversity Mapping Methodology for the Brigalow Belt Bioregion
  - sensitive environmental areas.

<sup>49</sup> Clearing area estimates are presented in SEIS, Volume 3, Chapter 7, Table 3.7.5 – Worst Case Clearing Areas, p. 17.

<sup>50</sup> The EIS notes that EBPC-listed ecological communities coincide with (and are not additional to) VMA ‘endangered’, ‘of concern’ and ‘not of concern’ regional ecosystems.

<sup>51</sup> Note: The total takes into account overlap of coinciding EBPC-listed communities and VMA regional ecosystems.

<sup>52</sup> Refer to EIS, Volume 3, Chapter 7, section 7.6.1.

<sup>53</sup> Refer to EIS, Volume 3, Chapter 7, Section 7.7, p. 35.



In reviewing the nominated safeguards to minimise disturbance, I find that many of these disturbances can be further reduced by adopting impact minimisation measures recommended in this CG report, plus operational implementation of constraints planning and the Model Conditions.

### **Indirect disturbance of remnant vegetation**

Indirect disturbances significantly add to the degradation of vegetation communities, ecosystems and critical and species habitat, hence causing consequential detrimental impacts, including loss of flora and fauna species.

Indirect impacts on terrestrial ecology due to petroleum activities include, but are not limited to:

- edge effects
- impacts on groundwater dependent ecosystems as a result of groundwater drawdown
- salinity impacts due to use of CSG water for irrigation and 'dust suppression'.

When a development disturbance occurs adjacent to a natural ecosystem there is potential for the disturbance to extend beyond the actual footprint. For example, vegetation clearing that results in wind and sunlight penetration could result in weed infestation and increased understorey growth or biomass and increased fire risk and drying out of vegetation and soils; further, artificial lighting has the potential to disturb natural habitat of nocturnal species).

Edge effects are especially pronounced in small habitat fragments where the effects may extend throughout the patch. The area of remnant vegetation communities modified by edge effects may potentially exceed the area directly disturbed by the development footprint.

A significant proportion of gas field land (171,255 ha) is occupied by remnant vegetation, and it is proposed that up to 5.6% (or 9,577 ha) of this remnant vegetation will be directly lost as a result of QGC gas field activities.<sup>54</sup> Further, many of these existing vegetation communities, ecosystems and species habitat areas are already highly fragmented due to past agricultural activities.

**I note** that the SEIS proposes that 6,000 ha of the gas fields will be directly disturbed by the installation of 6,000 gas wells, at a minimum spacing distance of 750 m, and each requiring clearing of up to 100m x 100m. The SEIS also states that 15,600 ha of the gas fields will be directly disturbed by the construction of 13,400 ha of underground gas and water gathering pipelines joining the 6,000 wells, together with pipelines linking to 53 field compression stations and 4 central processing plants (500 ha), and that all these facilities will be serviced through the construction of 4,500 km of access tracks (1,600 ha). The gas field development would therefore have potential to cause further fragmentation of land and vegetation, resulting in 'patches' or 'islands' of vegetation that in turn could be modified by edge effects described above, potentially exceeding the area directly disturbed by the project footprint.

Due to the nature of project activities and the existing fragmentation of vegetation communities, ecosystems and species habitat areas within the gas field, there is significant potential for further loss of vegetation communities, ecosystems and species habitat areas as a result of edge effects arising from direct disturbances. The area of remnant vegetation communities, ecosystems and species habitat areas indirectly disturbed, and hence modified, by edge effects, may potentially exceed the area directly disturbed by project activities.

**I require** the proponent to estimate the area of indirect impacts on vegetation (including fragmented vegetation and edge effects) when preparing the EM Plan. The EM Plan condition can be found at Condition 8, Appendix 2 Part 2.

## **7.1.2 Land disturbance and vegetation clearing**

### **Impacts on ecological values**

The Gas Field development will result in disturbance to a number of ecological communities that have been identified under either Queensland or Commonwealth legislation as being of environmental value.

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<sup>54</sup> Refer to SEIS, Volume 3, Chapter 7, Table 3.7.5 – Worst Case Clearing Areas, p. 17.



The Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) provides for the listing of nationally threatened native species and ecological communities, native migratory species and marine species, categorised as either “*Vulnerable*”, “*Endangered*” or “*Critically Endangered*”.

The Queensland Government provides a biodiversity status for remnant vegetation communities on a bioregion basis. The biodiversity status of Regional Ecosystems (Res) are categorised as either “*Endangered*” (i.e. of high nature conservation value), “*Of Concern*” or “*Not of Concern*”, and are identified in a database maintained by the administering authority. The Queensland Environmental Protection Regulation 2008 provides for levels of protection for Environmentally Sensitive Areas (ESAs), categorised as Category A, B or C ESAs.

National Parks and protected conservation areas are Category A ESAs. “*Endangered*” Res and “*Of Concern*” Res are classified as Category B and C ESAs respectively. In Queensland, petroleum activities may not be undertaken in Category A ESAs, however may be undertaken in Category B and C ESAs.

Using mapping from DERM, broad identification of Category B Regional Ecosystems (Biodiversity) has been broadly identified within the gas fields.

Further detail has been presented in the SEIS regarding remnant “*Endangered*” regional ecosystems (present in ATP768 and PL171). These are recorded as Brigalow communities RE11.9.5, RE 11.9.6 and semi-evergreen vine thicket communities RE11.8.3, RE 11.9.4.

No CSG activities have been proposed in areas identified as Category A ESAs.

### 7.1.3 Rehabilitation

**I acknowledge** that CSG activities, including the extraction and associated processing and ancillary activities, is a temporary activity that moves across the landscape, disturbing land and vegetation, and potentially changing (reducing) the long term land use capability. **Thus I acknowledge** that CSG activities are therefore consistent with other mining activities in this respect.

**Significantly however, I note** that the intensity and extent of CSG LNG project activities, will directly and indirectly disturb the land surface and supporting vegetation at an area several orders of magnitude higher than those direct and indirect disturbances typically associated with other significant mining projects in Queensland.

**I acknowledge** that rehabilitation, i.e. the repair of unavoidable impacts of activities on the environment, is an essential part of developing resources in accordance with the principles of sustainable development.

Given that 50% of the project area supports remnant vegetation, **I find** that the extensive and intensive direct and indirect disturbances associated with QGCLNG gas field activities, as currently proposed, will cause significant impacts on remnant vegetation and the integrity of those terrestrial vegetation communities including potentially significant impacts on the fauna species the habitat supports.

As previously noted, the SEIS proposed a total gas field footprint (direct disturbance) of approximately 26,760 ha, and stated that up to 9,577 ha of remnant vegetation will be directly lost. The length of disturbance proposed by the project’s gathering line easements and access tracks totals approximately 5,000 km, and thus these items alone demonstrate the significant scale of impact that can occur.

**Therefore I consider** that dedicated rehabilitation planning and implementation practices, incorporating accepted scientific principles, are fundamental in achieving a successful environmental outcome. It is necessary that rehabilitation of land and vegetation extend to those areas indirectly disturbed as part of project activities.



**I note** that inadequate<sup>55</sup> and insufficient<sup>56</sup> commitments are proposed in the draft EM Plan<sup>57</sup> regarding performance criteria for rehabilitation success across the entire gas field, including;

- *'After a suitable period, revegetation occurs naturally and is similar to surrounding vegetation'*. **I note** that this statement implies that no active revegetation effort is proposed by the proponent, and the commitment is unscientific and vague.
- *'Rehabilitation area stabilised with no significant erosion events'*. **I note** again, this is not an auditable commitment, as 'significant' is not defined'.
- *'No weed species introduced'*. **I note** that it is appropriate that an auditable performance criterion focus on increased presence (abundance) of weeds, as it is likely weeds will be present prior to activities in many areas.
- *'Monitoring of rehabilitation areas occurs at a frequency necessary to maximise rehabilitation success'*. **I note** that this is an action not a performance criterion, and again it is vague and non-auditable.

**I consider** that a range of physical, chemical and biological indicators are necessary, forming the basis of rehabilitation success criteria, to determine whether rehabilitation objectives have been achieved and are likely to be sustained. Specific success criteria are also needed for rehabilitation of riparian areas, including stream bank stability, and for wetland areas. Pre-disturbance data and analogue sites should be used for comparison purposes.

**I note** that the SEIS proposes that *'rehabilitation will be monitored on a monthly basis for six months after works are completed, and then bi-annually for two years'*.<sup>58</sup> **I do not support** the cessation of rehabilitation monitoring after two years; rather, **I find** that the ongoing monitoring of rehabilitation is necessary until the administering authority accepts that the rehabilitation has reached the rehabilitation success criteria, including that the sustainable use of the land has been achieved or, and in the case of native ecosystems, that the rehabilitation is self-sustaining.

**I acknowledge** that the longer unvegetated soils remain exposed to the elements, the greater the risk of land erosion, soil erosion, sedimentation of water courses and weed infestation. **I note that** the SEIS states that *"in areas of native vegetation, revegetation will be allowed to occur naturally without re-seeding"* and that the proponent would only aim to source suitable native seed for regeneration *"where re-seeding is considered necessary to avoid erosion or other environmental damage"*.<sup>59</sup> **However I find** that re-seeding is necessary for all disturbances associated with petroleum activities, in order to limit the risk of land erosion, soil erosion, sedimentation of water courses and weed infestation resulting from petroleum activities. Where the proponent intends to disturb areas of native vegetation, **I therefore find** that it is appropriate that the proponent commence collection of an appropriate mix of native seed, endemic to the location, before construction activities commence at that location, and continue seed collection during the operational phase of activities at that location.

**I note** that the draft EM Plan states that *"until regrowth is established, significant (e.g. riparian zones) areas and any seeded areas will be monitored regularly to ensure growth and, if necessary, appropriate reapplication of seed will be carried out"*.<sup>60</sup> (EIS, Volume 9, Chapter 2, Section 2.1.25, p.51) **However I consider** that the "establishment" of "regrowth" is a long way from the achievement of rehabilitation success.

**I acknowledge** that the emerging CSG LNG will need to earn and maintain the 'social licence to operate', **and I acknowledge** that the 'social licence to operate' is always subject to changing community opinions, and hence expectations, as new information is acquired about the social and environmental impacts of activities.

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<sup>55</sup>An inadequate range of physical, chemical and biological indicators, and inadequate in terms of auditable commitments.

<sup>56</sup> Only four (4) commitments were nominated.

<sup>57</sup> EIS, Volume 9, Gas Field Environmental Management Plan, Section 2.1 25 Revegetation and Rehabilitation.

<sup>58</sup> EIS, Volume 3, Chapter 7, Section 7.6.3, p.35.

<sup>59</sup> Refer to SEIS Volume 3, Chapter 7, Section 7.6.3.

<sup>60</sup> Refer to EIS, Volume 9, Chapter 2, Section 2.1.25, p.51.



**Overall I note** that many statements made by the proponent regarding its proposed strategies for rehabilitation of project disturbances do not go far enough to meet present expectations of regulators and the community, or likely future expectations, and will generally not lead to a successful environmental outcome across the project footprint.

**I note** that the EIS and SEIS do not examine in detail the likely long-term negative impacts of project activities. **I am aware** that the proponent has a long history in the carrying out of petroleum activities **and hence I note** that it is likely that during this time the proponent has acquired a significant knowledge base regarding the long-term risks and impacts.

**However, I note** that information regarding the negative long-term impacts has not been presented in a balanced, quantifiable manner for consideration of the public and decision-makers as part of this EIS process. **Hence I would expect** that this information be presented to the EP Act administering authority as part of applications and conditioning requirements for any environmental authorities.

Due to the recent increasing world demand for mineral and energy resources, there has been a major increase in mineral and energy production and exploration in Queensland. **I am aware** that the rate of mine rehabilitation which is currently less than half the rate of disturbance<sup>61</sup>, has led to an increase in the area disturbed by mining and has the potential to result in adverse environmental impacts and land use conflicts.<sup>62</sup>

At April 2006, the total areas of land disturbed and rehabilitated in Queensland were about 146,000 ha and 44,000 ha respectively.<sup>63</sup> Thus the proposed QGC project footprint of 26,760 ha may add significantly to these figures.

**I therefore encourage the proponent to consider**, that current and future generations of Queenslanders are already burdened with considerable legacy of unrehabilitated mined land.

**I am concerned** that the cost to future generations will be substantial should rehabilitation works associated with CSG LNG industry activities be ineffectively undertaken. **However, I am confident** that the EP Act administering authority will require the proponent to address these matters in a manner that will protect current and future generations of Queenslanders (i.e. in accordance with the principles of ecologically sustainable development) .

**I note** that the DERM guideline *Rehabilitation Requirements for Mining Projects*<sup>64</sup> provides information on both progressive and final rehabilitation requirements for mining projects operating in Queensland under the EP Act.

#### **7.1.4 Coordinator-General's conclusions**

I have not been presented with sufficient detailed information on the impacts and operations of any part of the Gas Field beyond information pertaining to a footprint of 26,760 hectares relating to the installation of 6,000 wells over a 20-year project period.

Taking into account the lack of suitable presentation of field development plans, I cannot be certain of the extent of disturbance which the project will have on each class of biodiversity status.

In addition, I have not been presented with sufficient information on proposed activity locations, and associated ecological impacts, to enable determination of specific impacts on environmental values, and I therefore have developed a set of conditions which can lead to the approval for a gas field development as the conditions are fulfilled.

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<sup>61</sup> Source: State of the Environment Queensland 2007, p. 120. <http://www.derm.qld.gov.au/register/p02256aw.pdf>

<sup>62</sup> Source State of the Environment Queensland 2007, p. 119.

<sup>63</sup> Source: State of the Environment Queensland 2007, p. 120.

<sup>64</sup> DERM Mining Guideline 18: *Rehabilitation requirements for mining projects*, June 2007.



To this end I have been advised by DERM on the information specified by the EP Act that would still be required before approvals could be issued under environmental legislation.

**In my view**, environmentally sensitive vegetation can be protected through project planning, appropriate design and effective management of the development activities and safeguarded through commitment to operational management and where disturbance or destruction cannot be avoided, by environmental offsets. While there will be situations where vegetation impacts are unavoidable, the proponent must take all steps necessary to identify and assess, in detail, the values represented by the threatened communities and then adopt appropriate management systems to minimise the areal extent of damage to those values.

In relation to activities necessary to be undertaken within an endangered/of concern regional ecosystem and its associated buffer zone. In this regard **I have set conditions** to define the minimum level of protection that must be achieved.

**I find** that the level of remnant vegetation clearing proposed as part of QGC gas field activities is extensive and significant. **I do not support** the level of remnant vegetation clearing proposed, and **I therefore** make requirements and propose conditions in this CG report to limit the disturbance footprint and thus prevent and minimise direct impacts on remnant vegetation and endangered, vulnerable or rare fauna habitats.

**I require** the 'worst case' vegetation clearing estimates to be significantly revised downward, and re-calculated in accordance with the range of impact minimisation strategies, requirements and conditions in this CG report. **I require** the revised estimates to be presented in the EM Plan, as per Condition 8, Appendix 2 Part 2.

**I note** that the proponent has developed a zoning system, based on environmentally sensitive area mapping, that recognises areas of high and very high ecological value as '*Zone 3 High Ecological Constraints*' and '*Zone 4a and 4b Very High Ecological Constraints*'.<sup>65</sup>

**I require** best available technology and methodologies to be utilised, including horizontal directional drilling and multiple-pad drilling, to avoid clearing of: threatened ecological communities; 'endangered' and 'of concern' regional ecosystems; endangered, vulnerable or rare fauna habitats; and all other areas identified as having high ecological values. Condition 22, Appendix 2 Part 2 reflects this requirement.

**I require** auditable commitments to be included in the EM Plan (Condition 8, Appendix 2, Part 2) regarding use of these best available technologies and methodologies in all areas identified as having high or very high ecological values.

The proponent has identified, in sections 7.6.1 and 7.6.2 of the EIS<sup>66</sup>, a range of measures that avoid and mitigate impacts on biodiversity. **I require** that the proponent include all identified measures in the EM Plan, and translate each of the measures into auditable commitments within the EM Plan. The requirement to prepare an EM Plan can be found at Condition 8, Appendix 2 Part 2.

**I find** that, while the proponent has not provided an estimate of the indirect impacts, in particular on remnant vegetation, as a result of edge effects of the projects gas field activities, implementing constraints planning and the Model Conditions will be used to address this issue.

To support this outcome **I require** the proponent to present estimates of indirect disturbances (including edge effects) to remnant vegetation, including assumptions and calculations and in addition, provide estimates of indirect disturbances (including areas affected by edge effects) in presentations and considerations of proposed environmental offsets for the project. The condition relating to offsets can be found at Appendix 1, Part 1, condition 7.

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<sup>65</sup> Refer to EIS, Volume 3, Chapter 7, section 7.6.1.

<sup>66</sup> Refer to EIS, Volume 3, Chapter 7, sections 7.6.1 & 7.6.2, p. 30-34.



I have also considered the need for specific commitment to the principles of the *Queensland Government Environmental Offset Policy 2008* (QGEOP). This issue is dealt with in Section 6.5 Environmental Offsets.

### 7.1.5 Ecological constraints management

Ecological constraints mapping is a geographical assembly of layers of maps each identifying a different environmental value, for example endangered regional ecosystems, representing an ecological constraint to development. By examining the overlapping constraints mapping it can assist in determining the least disturbance location for field gas wells and other infrastructure.

Field management protocols specify how to avoid ecological and other constraints, survey prior to construction, and revise the draft field plan when managing the planning and implementation of field development. The proponent has identified a range of ecological constraints classes, and intends to implement field management protocols (as specified for each constraints class) to reduce the impact of project activities on ecological values.

### 7.1.6 Agency concerns plant and animal pests

Apart from activities that could diminish the areal extent of regional ecosystems, potential threats to regional ecosystems also arise from the spread of pest plants and animals. The Department of Employment, Economic Development and Innovation (DEEDI) has identified the need for detection and control of Declared and Environmental weeds.

Volume 3, Chapter 7 refers to the Declared and Environmental weeds detected within the Gas Field project site. An omission is giant Parramatta grass (*Sporobolus fertilis*) which is a Class 2 declared plant under the *Land Protection (Pest and Stock Route Management) Act 2002* (The Act) yet it was detected at Site T7 (Sixteen mile creek), Appendix 3.2. This statement was rectified in the Supplementary QGC EIS.

#### Other declared weed species of interest

There are a number of Declared plants that are not present in the project site (Appendix 3.2, 4.2 & 5.5) but found in the local government areas within the Queensland Curtis Island LNG Project (QCILNG) project site (Table 1). Local Government Area Pest Management Plans (LGAPMP's) are a statutory requirement under the Act. The following species are listed as priority in each of the LGAPMP listed below. These species are potential Biosecurity risks to this region and consequently mitigation of spread and raising awareness of these species will reduce the threat.

**Table 7.5 Declared plants not present (Appendix 3.2, 4.2 & 5.5) that are priority species listed under the LGAPMP's of the QCILNG EIS that pose a Biosecurity risk to the project.**

Class	Common name	Scientific name	Local Government area
	rat's tail grasses with the following names—		Gladstone RC Banana RC North Burnett RC Western Downs RC Maranoa RC
2	American rat's tail grass	<i>Sporobolus jacquemontii</i>	
2	giant Parramatta grass	<i>Sporobolus fertilis</i>	
2	giant rat's tail grass	<i>Sporobolus pyramidalis</i> and <i>S. natalensis</i>	
2	Parramatta grass	<i>Sporobolus africanus</i>	



2	belly-ache bush	<i>Jatropha gossypifolia</i> and hybrids	Banana RC Gladstone RC
2	hymenachne	<i>Hymenachne amplexicaulis</i> 'Olive'	North Burnett RC Western Downs RC

DEEDI has requested a condition on any approval issued, requiring comprehensive weed management plans to be prepared in consultation with relevant local governments and Biosecurity Queensland, for construction and operational stages of the proposed development (including gas fields, pipelines and the LNG facility).

### **Pest animal barrier fences (Wild dog and Rabbit)**

DEEDI has identified that the pipeline corridor intersects both the Wild Dog Barrier Fence (WDBF) and the Darling Downs-Moreton Rabbit Board Fence (DDMRBF). DEEDI advises that it is illegal to make an opening in a declared pest fence other than under an agreement mentioned in Section 52, Division 2 of the *Land Protection (Pest and Stock Route Management) Act 2002*. QGC Ltd will be required to enter into an agreement with the Chief Executive Officer of Department of Employment, Economic Development and Innovation for the WDBF and the Darling Downs Moreton Rabbit Board for the DDMRBF about making an opening in the fence for a particular purpose and period. This agreement must be subject to conditions that, as far as reasonably practicable, ensure the movement of the relevant pest animal from one side of the fence to the other is prevented while the fence is opened.

### **Proponent's response**

**I am informed** that DEEDI and the proponent have met to discuss effective management of pests during construction and operation of the development and that the proponent is in agreement with the objectives enunciated by DEEDI.

## **7.1.7 Coordinator-General's conclusions**

**I have considered** the above matters raised by DEEDI and believe that there are valid economic and environmental grounds for controlling the spread of weeds and movement of pests. I have therefore included conditions in Appendix Three, Environmental Authority conditions, E36, that must be applied to my approval of the proposal.

## **7.2 Gas field development reports**

### **7.2.1 Introduction gas field reports**

As discussed in previous sections of this report, there are certain areas of field development planning, which need to be consolidated to take account of:

1. project planning and clarification of site information subsequent to publication of the EIS and supplementary EIS
2. recently developed policy and legislation directly affecting gas field development.

Further assessment of the additional material that DERM requires, indicates to me that a series of reports must be prepared as assessment material, to me and to DERM during the course of the process for obtaining and implementing the environmental authority for the gas fields.

The matters on which I shall require reports are the following:

1. Prior to the issue of an environmental authority
  - a) ecological constraints planning
  - b) coal seam gas water management plan
  - c) brine management plan.





2. Prior to commencement of petroleum gas field activities
  - a) gas field cumulative impacts assessment report
  - b) environmental offsets program
  - c) water quality monitoring program
  - d) regional groundwater model
  - e) groundwater and springs impact assessment
  - f) operational plans
  - g) water quality and soil monitoring plan.

## 7.2.2 Reports required with the environmental authority application

### Ecological constraints planning strategy

DERM has advised that the material presented in the EIS and SEIS on constraints-based management does not provide sufficient safeguards or include the full scope of DERM environmentally sensitive areas, DERM is therefore seeking a condition to provide this material prior to the issue of gas fields environmental authorities. This condition is incorporated in Condition 2, Appendix 2 Part 2.

### Coal seam gas water management plan

This is discussed in section 7.5

This refers to Condition 4 in Appendix 2 Part 2.

### Brine management strategy

This is discussed in section 7.5

This refers to Condition 5 in Appendix 2 Part 2

### Environmental offsets

This is discussed in section 6.4

This refers to Condition 7 in Appendix 1 Part 1, whole of project conditions.

The above four reports should be submitted to me, and to DERM for review and advice, at the earliest opportunity, since this will confirm that the gas field development is in accordance with government policy for CSG development, and will also provide DERM with necessary project environmental strategies to enable it to make the assessment of any applications for environmental authorities.

## 7.2.3 Reports required prior to commencement of CSG activities

### Gas field cumulative impacts assessment material

DERM recognises that the government is putting in place strategies to identify certain aspects of multiple project cumulative impacts for social and economic issues in the Surat Basin and to cover monitoring of groundwater. However potential cumulative impacts from broad scale gas field developments may be evident when two or more projects interact.

Hence I apply Condition 1 Appendix 2 Part 2 to highlight any cumulative impacts from adjacent fields which may arise on the following nature conservation matters:

- regional impacts on terrestrial flora and fauna, biodiversity values, listed species and ecosystems
- riparian habitats
- surface and groundwater environmental values
- soils, including ability to support ongoing agricultural production.

### Operational plans

Once an environmental authority is granted, the proponent will be expected to develop its operational plans for the various gas fields which will nominate disturbance areas for the range of infrastructure, such as gas wells, field compressor stations and water treatment facilities, for the extent of field development which the plan is seeking to cover.



Hence I set condition 6, in Appendix 2 Part 2 to require that operational plans are prepared and submitted prior to petroleum activities being undertaken in the fields.

### **Groundwater assessment and monitoring**

A major issue of concern for communities and DERM is the fate of the groundwater supply and quality in other aquifers, after the extraction of gas, and associated water. In particular, DERM advise that the current model does not appear to include the Gubberamunda or Springbok formations and the potential linkage with springs. All major coal seam gas operators will be required to develop an appropriate groundwater model to allow assessment of whether there are effects on other aquifers. QGC advise that the EIS Vol 3 Ch10 Table 3.10.1 Aquifer Characteristics in the Study Area, includes the Gubberamunda and Springbok formations described as Intermediate unit and Walloon unit.. The SEIS response to DERM comment on linkage with springs is reported in vol 3 Ch 10 section 10.2.3.1.

However I require that condition 7 Appendix 2, Part 2.be applied to ensure provision of an appropriate model to assist in assessing groundwater impacts:

### **Groundwater and springs assessment**

The proponent must prepare a groundwater impact assessment report prior to activities being carried out under the environmental authority. This is presented as Condition 9 in Appendix 2 Part 2.

### **Water quality and soil monitoring program**

DERM has assessed material in the EIS and SEIS on soil environmental values, surface water quality, and impacts in streams and aquatic ecosystems. It has been found inadequate in some respects to begin the baseline monitoring which is necessary to commence a major long term regionally based land and water project. In addition it must reflect parameters and indicators relevant to the proposed water management and disposal strategies. As a result I nominate that Condition 9 and 10 in Appendix 2 Part 2 is required to overview the proponent's plan.

## **7.3 Environmental management plans**

DERM advises that the EM Plans necessary for full support of an application for environmental authority must follow the provisions of section 310D of the EP Act.

Section 310D of the EP Act requires proponents to prepare an EM Plan for submission with an application for environmental authority which addresses:

- a detailed description of the project
- the environmental protection commitments under best practice environmental management
- enough other information to decide on conditions to be imposed by the environmental authority
- a rehabilitation program for land disturbed.

A guide to describe fully the intention and satisfactory elaboration of these statutory requirements is contained in the DERM guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities (DERM 31 March 2010)*. This should be used to guide the preparation of submission materials for gas field development plans that **I require to be presented to me** in order that I can judge the acceptability of the field development opportunity.

Hence once the above reports are submitted to me and approved, for the gas field development within the area for which the petroleum lease is being sought, the following process should be followed for submission of EM Plans:

### **Environmental plan for gas fields development**

1. The EM plan must be prepared in accordance with the latest DERM published guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities*.



2. Any comments made by the Coordinator-General and DERM should be incorporated into a revised EM Plan that will need to accompany Environmental Authority applications.
3. The EM Plan must specifically include, but not be limited to the petroleum activities set out in the approved Work Program and/or Development Plan for the relevant petroleum authority as required under the *Petroleum Act 1923* or the *Petroleum and Gas (Production and Safety) Act 2004*.

## 7.4 General conditions for gas fields

DERM has advised further information requirements that should be provided to DERM in order to provide sufficient material prior to implementing environmental authorities for the gas fields. I provide the specifications here and included them in the general conditions for gas fields, as outlined in Appendix 2, Part 2.

### Hydraulic fracturing

The EM Plans, developed in accordance with Section 310D of the *Environmental Protection Act 1994* to support the applications for petroleum leases for the gas fields, must contain an assessment of the impacts from hydraulic fracturing and proposed mitigation measures to protect the groundwater environmental values. This condition is provided in Appendix 2, Part 2, Condition 25.

### Soils information

Operational plans developed to support the applications for petroleum leases for the gas fields must be accompanied with soils management procedures for areas to be disturbed by petroleum activities prior to commencement of petroleum activities in these areas to prevent or minimise the impacts of soil disturbance. This is to be provided in Appendix 2 Part 2 Condition 6 and in Schedule D, condition D18, of the Model Conditions, Appendix 2, Part 3.

### Construction management plan

The proponent must provide to DERM for review, prior to commencement of construction, a construction management plan for petroleum tenure for the gas fields that includes a construction schedule and methodology including plans and maps showing the location of facilities and discharge points and emission controls for compressor plants, water treatment, sewage treatment and other petroleum activities proposed to be undertaken on the petroleum lease. This is presented as a component of Condition 6 in Appendix 2 Part 2.

### Third party audit

I have noted that the proponent is well advanced toward certification under the ISO 14001 Environmental Management System (to be attained before 30 June 2011). I would therefore expect that the certified EMS to require third party auditing of the EMS for the whole project and that audit reports will be conveniently available to meet requirements in condition 1, Appendix 1, Part 1.

### Nature conservation act

These requirements apply to clearing of plants protected under the *Nature Conservation Act 1992*. This is presented as Condition 9 Appendix 1 Part 1.

### Vegetation and pipelines

A condition is required to deal with the disturbance to fauna habitat when clearing for field pipelines. This is presented as Condition 6 Appendix 3 Part 2.

## 7.5 Establishing benchmarks

I outline here how the “model conditions” are integrated into the approval process for CSG gas fields to account for the information flow requirements for progressive field development.



CSG gas field development is an activity which taps into an underground coal resource over a wide area, but the surface footprints are discrete 'islands' of disturbance while connected by tracks and buried pipelines. However the position and number of these 'islands' is governed by the ongoing productivity of the resource, which is not known until the field is being developed and wells start to produce. Hence proponents will develop fields progressively in accordance with ground truthing of the constraints and resources.

In order to provide greater certainty for conditioning in the Coordinator-General's EIS process, I am requiring that strategic information and reports on certain aspects of the project will be provided to the Coordinator-General and DERM prior to and with the application for environmental authorities for the gas fields. This will be followed after permitting by more information provided to regulatory authorities to validate field development strategies.

DERM has produced a set of three guidelines for the environmental management of CSG gas fields and use of CSG water. These are:

- preparing an environmental management plan for coal seam gas activities (DERM, 31 March 2010)
- model conditions for coal seam gas activities (DERM, 31 March 2010)
- approval of coal seam gas water for beneficial use (DERM, 31 March 2010).

These guidelines are accessible from the Queensland Department of Environment and Resource Management at the following link:

[http://www.derm.qld.gov.au/environmental\\_management/coal-seam-gas/index.html](http://www.derm.qld.gov.au/environmental_management/coal-seam-gas/index.html).

In addition to this further strategic policies have developed by the Government to deal with monitoring of groundwater resources, and cumulative impacts on groundwater. This includes implementing tough new laws to protect landholder's groundwater supplies and natural springs if there are any impacts of CSG water extraction. Where the impacts of different CSG producers overlap, cumulative management areas (CMAs) will be declared and regulated in a coordinated way. An independent authority, the Queensland Water Commission, will have dedicated resources to manage and monitor CMAs.

A fact sheet—*New Arrangements to Protect Groundwater Resources in Coal Seam Gas Extraction Areas* provides an outline of the statutory framework being developed to ensure CSG producers manage the impacts of water extraction.

## **Model conditions**

DERM, in consultation with the Australian Petroleum Production and Exploration Association (APPEA), has developed 'Model Conditions' that could guide environmental authority applicants for coal seam gas fields. Previous sections of this report have discussed the nature of information that is needed to satisfy both DERM and myself of the proposed gas field development arrangements.

The model conditions provide a suite of suitable conditions for CSG specific activities that can be used as a consistent starting point for the conditioning of environmental authorities for CSG gas field activities.

The contents of model conditions contain provisions to manage gas field activities for the following subjects:

- the overall number and footprint size of authorised petroleum activities (those activities permitted by the *Petroleum and Gas (Production and Safety) Act*, and listed in Schedule A of the Model Conditions)
- preparation of an operational plan
- third party audit
- ecological assessment of land, and rules for location of "limited petroleum activities" and allowable disturbance in sensitive areas. ("limited petroleum activities" encompasses wells, tracks and flowlines, but not processing infrastructure such as compressors, water plants, dams and accommodation sites)



- requirements to prepare and implement management procedures for erosion, soils, fauna, pests, chemicals and fuels, and rehabilitation
- monitoring programs and limits are specified for groundwater, noise and air emissions
- a Coal Seam Gas Water Management plan must be presented which allows management only by certain methods and criteria that are contained in the beneficial use guideline
- salt and brine management is currently only permitted by encapsulation or processing of salts into other products. Brine injection conditions are expected to be developed in the future.

### **Environmental authority conditioning**

As an outcome of the Coordinator-General's report for CSG projects, the following three phase process to permitting has been developed, where field development information is not available in advance:

**Phase A:** Prior to environmental authority approval, I will receive reports and strategies to ensure that objectives for field development accord with CSG policy;

- ecological constraints mapping (in terms of both NES and state values), including revision of field development protocols
- offsets strategies
- CSG water management plan
- brine management plan.

**Phase B:** After receipt of this information, DERM will develop activity and site specific conditions based on the Model Conditions that would allow QCLNG to conduct petroleum activities in a way that would protect or enhance environmental values. Before any conditions can be recommended for an Environmental Authority an EM Plan that meets the requirements of section 310D of the *Environmental Protection Act 1994* as set out in the guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities* will need to be provided. This requirement is discussed in the previous section of this report. However, the Model Conditions should provide an indication of the environmental standards required for gas field petroleum activities

**Phase C:** Reports and plans on field development to be delivered after permitting but prior to commencement of gas field activities:

- cumulative impacts report
- water quality monitoring program
- operational plan and specifications of facilities
- regional groundwater model
- groundwater and springs impact assessment
- water and Soils monitoring plan.

### **Summary**

Under the above scenario, the Coordinator-General report contains a number of conditions specifying what needs to be done by the proponent as Phase A and B conditions, with, and after, their application for environmental authority. The draft Model Conditions are provided in Appendix 2 Part 3, for the information of the proponent. However I state that they are a guide as to environmental authority conditions that may be imposed, and actual conditions imposed by DERM as a result of assessment of the project's EM Plan submitted with its application, may be different. The EA can be based on the model conditions, with requirements through Phase B conditions for certain plans to be submitted to the Coordinator-General and DERM before CSG development activities commence.

The first operational plan showing field development plans for up to three years will be prepared prior to activities commencing. I require this operational plan to be prepared in accordance with Condition 6 Appendix 2 Part 2.

Prior to the first operational plan expiring, which may be in 3 years time, a new operational plan needs to be submitted for subsequent development within the envelope of the EA.



## 7.6 Coal seam gas water

The gas extraction process releases water under pressure within the coal seam. Water must be pumped from the well (de-watering) to reduce hydrostatic pressure before gas can start flowing to the surface.<sup>67</sup> This water is known as CSG water. As coal seams are dewatered the volume of water pumped typically decreases over time and the gas production increases as the coal seam is dewatered.

Queensland's emerging LNG industry is outlined in the publication *Blueprint for Queensland's LNG Industry* (Queensland Government, 2009). A recent Queensland Government scoping study assessing impacts of the CSG field development found that, over a 20 year period, an emerging LNG industry of up to 44,300 PJ of gas production could produce 11,200 GL of Coal Seam Gas water.

Coal Seam Gas water typically contains significant concentrations of salts, has a high sodium adsorption ratio (SAR) and may contain other contaminants that have the potential to cause environmental harm if released to land or waters through inappropriate management.

DERM has produced an analysis of environmental aspects of Coal Seam Gas water in a report entitled: *Assessment of the salinity impacts of coal seam gas water on landscapes and surface streams (Coal Seam Gas Water Feasibility Study)*, DERM, Version 2, January 2010). Salinity of CSG water is variable; with total dissolved solids (TDS) values varying from 200 to over 10,000 mg/L. As a comparison, rainwater TDS values are around 20 mg/L, Great Artesian Basin water is around 470-670 mg/L, and freshwater ranges from 0-1,000 mg/L. The salts content is over 50 per cent sodium bicarbonate.

I note that if the proponent pursues beneficial use of some of the CSG water by treating the water to reduce its salinity, not only will there be a need to meet DERM water management conditions, but also waste disposal conditions.

### QCLNG CSG water - volumes

The QCLNG project will produce large volumes of untreated CSG water. Daily, annual and total volumes over the life of the QCLNG project are provided in the table below, based on information supplied in the EIS and SEIS, covering gas field activities for 2 LNG trains (or production of 8 Mtpa LNG) only.

**Table 7.6 Volumes of QCLNG CSG water extraction/ production based on 2 LNG trains**

CSG water extraction / production	Volume (ML)	Volume (GL)
Daily (average) - EIS <sup>68</sup>	160	0.16
Daily (peak) - SEIS <sup>69</sup>	190	0.19
Annual - based on 160 ML/day	58,400	58.4
Annual - based on 190 ML/day	69,350	69.35
Over 20 year life of project - based on 160 ML/day	750 000	750

As a comparison to the above CSG water extraction volumes, the SEQ desalination plant at Tugun which supplies the SEQ Water Grid has an operational capacity of 125 ML/day

<sup>67</sup> CSG Water Management Plan (QGC, March 2010), Section 2.1.

<sup>68</sup> Refer to EIS Volume 3, Chapter 11, Associated Water.

<sup>69</sup> SEIS Volume 3, Chapter 11, Section 11.6.4, p. 14.



The main water conservation storage in SEQ is Wivenhoe Dam, which has a conservation storage capacity of 1,165 GL.

**I note** that predicted water volumes in the recently submitted *QGC Water Management Plan*<sup>70</sup> have revised the previous estimates. The document states that the volume of CSG water generated is projected to peak at approximately 187ML/per day in 2013/2014, with average production in the order of 100ML per day between 2015 and 2022, and the total water produced will be 917 GL up to 2049.

The rate of CSG water generated will vary across the gas field. The *QGC Water Management Plan* states that at peak production the current conservative estimates are that the:

- Central Development Area will produce approximately 32ML/per day.
- North West Development Area will produce approximately 87ML/per day.
- South East Development Area will produce approximately 72ML/per day.

The production peaks for each area do not coincide.

#### **QCLNG CSG water – salts and total dissolved solids**

Average Total Dissolved Solids (TDS) concentrations in CSG water varies across the gas field as follows<sup>71</sup>:

- 5,500 mg/L in the North West Development Area.
- 2,800 mg/L in the Central Development Area.
- 4,700mg/L in the South East Development Area.

Variations in each well show that Total Dissolved Solids (TDS) can reach 10,000 mg/L.<sup>72</sup>

**I note that** potentially high salinity levels are likely to occur north of Chinchilla in the Walloon Coal Measures under ATP676 and PLA247. (Ref QGC Groundwater Study Hydrogeological Map, Walloon Unit Project 0876 33050\_16, Figure 20 records electrical conductivity in excess of 24,000 µS/cm).

#### **QCLNG CSG water – cumulative salts production**

An estimate of total salts production based on 2 LNG trains (or LNG production of 8 Mtpa) is provided below, based on the proponent's assumed average salt content of 4,000 mg/L (TDS). The estimates indicate that approximately 2.9 million tonnes of chemical salts (comprising a range of chemical components / contaminants) will potentially be brought to the land surface as part of QCLNG activities over the next 20 years.

**Table 7.7 QCLNG salts production (TDS) based on 2 LNG trains (8 Mtpa case)**

<b>CSG water extraction / production</b>	<b>Volume of CSG water (ML)</b>	<b>Volume of salts<sup>73</sup> (TDS)</b>
Annual - based on 160 ML/day	58,400	233,600 t/annum
Annual - based on 190 ML/day	69,350	277,400 t/annum
Over 20 year life of project - based on 160 ML/day	1,168,000	2,900,000 t

<sup>70</sup> CSG Water Management Plan (QGC, March 2010), p. 15.

<sup>71</sup> Source: EIS Volume 3, Chapter 11, Section 11.4.1.1.

<sup>72</sup> CSG Water Management Plan (QGC, March 2010), p.13. It should be noted that the 10,000 mg/L is an exception and not normal expected levels.

<sup>73</sup> Based on an average CSG well salt concentration of 4,000 mg/L (TDS).



Given the widespread nature of the potential footprint of the CSG industry, salinity risk will need to be managed at various levels.

### **QCLNG CSG water – sodicity and the sodium absorption ratio**

As salt (e.g. sodium chloride) is washed down through the soil it leaves some sodium behind, bound to clay particles. Sodicity is caused by the presence of sodium attached to clay, and the soil is considered 'sodic' when the sodium reaches a concentration where it starts to effect soil structure. Sodium weakens the bonds between soil particles when wetted, resulting in the clay swelling and becoming detached. Detached clay particles spread out (disperse) and move through the soil clogging pores. Clay swelling and dispersion also reduce rainwater infiltration and drainage. The fine soil particles can then easily be moved by wind and water, leading to land and soil erosion and sedimentation of watercourses.<sup>74 75</sup>

**Thus I note** that the full range of detrimental impacts resulting from soil sodicity at a location may not become apparent for some time.<sup>76</sup>

**I note** that the Sodium Absorption Ratio (SAR), a measure of the proportion of sodium relative to magnesium and calcium in water, is one measure used to determine water suitability for agricultural irrigation. While an SAR range of between 6 -10 may be acceptable, the water is considered to be 'sodic', and can increase the exchangeable sodium percentage of the soil.<sup>77</sup> So in general, the higher the SAR, the less suitable the water is for irrigation on soils, and increased risks and impacts associated with soils of high clay content.<sup>78</sup>

As an example **I note** that the proponent has identified that the average SAR level of raw CSG water is approximately 110, whereas the average SAR level of Condamine River water at Chinchilla Weir is 2.2.<sup>79 80</sup> The proponent therefore must only use suitably treated CSG water.

**I note** that the data presented on CSG Water Quality (Volume 3, Chapter 11, Table 3.11.5, p.13) states the average concentration of sodium in CSG water is as follows: sodium (non wells) 1975.9 mg/L; and sodium (wells) 1081.5 mg/L.

### **QCLNG CSG water – other contaminants**

**I note** that the EIS reports<sup>81</sup> the CSG water contaminant concentrations exceed many contaminant guideline limits for the protection of aquatic ecosystems and for irrigation uses.

According to information supplied<sup>82</sup> by the proponent, the average concentrations of many contaminants found in CSG water exceed ANZECC<sup>83</sup> 2000 water quality guidelines for discharge to aquatic ecosystems. Average concentration of contaminants, for which the proponent found guideline limits to be available, are provided in the table below. **I note** that QGC has committed that it will not release raw water on to land or in rivers and creeks.

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<sup>74</sup> NSW Department of Primary Industries (Sourced: 15 June 2010 at <http://www.dpi.nsw.gov.au/agriculture/resources/water/quality/publications/results>)

<sup>75</sup> Source: Cooperative Research Centre for Soil & Land Management 'Technical Note 1: Introduction to Soil Sodicity'. Sourced on 17 June 2010 at <http://www.dpi.vic.gov.au>.

<sup>76</sup> Source: Cooperative Research Centre for Soil & Land Management 'Technical Note 1: Introduction to Soil Sodicity'. Sourced on 17 June 2010 at <http://www.dpi.vic.gov.au>.

<sup>77</sup> NSW Department of Primary Industries (Sourced: 15 June 2010 at <http://www.dpi.nsw.gov.au/agriculture/resources/water/quality/publications/results>)

<sup>78</sup> CSG Water Management Plan (QGC, March 2010), p. 13.

<sup>79</sup> CSG Water Management Plan (QGC, March 2010), p. 13.

<sup>80</sup> EIS Volume 3, Chapter 11, Section 11.6.3.3 states average SAR of approximately 110.

<sup>81</sup> EIS, Volume 3, Chapter 11, Table 3.11.5.

<sup>82</sup> Refer to EIS Volume 3, Chapter 11, Table 3.11.5, Associated Water Quality, p. 13.

<sup>83</sup> Australian and New Zealand Environment and Conservation Council





**Table 7.8 A selection of CSG water contaminant concentrations compared with aquatic ecosystem guidelines<sup>84</sup>**

Chemical component or contaminant	Average concentration at production wells (mg/L)	ANZECC 2000 Water Quality Guidelines - Aquatic ecosystems (mg/L)	Contaminant concentration exceeds guideline limits for aquatic ecosystems
Aluminium	14.73	0.027	Exceeded
Arsenic (III)	0.014	0.001	Exceeded
Benzene	<0.0010	0.6	Not exceeded
Boron	1.08	0.09	Exceeded
Cadmium	<0.01	0.00006	Exceeded
Copper	2.5	0.001	Exceeded
Lead	0.07	0.001	Exceeded
Mercury	0.0008	0.00006	Exceeded
Nickel	0.15	0.008	Exceeded
Nitrate	0.044	0.017	Exceeded
Phenol	<0.0010	0.085	Not exceeded
Selenium	0.0103	0.005	Exceeded
Zinc	1.49	0.024	Exceeded

I note that under the CSG Water Management Plan, that most of these standards can be matched with treatment through the RO process.

### Potential for CSG water to cause land contamination

Under state environmental legislation (EP Act), untreated CSG water is considered a ‘waste’<sup>85</sup> and a ‘regulated waste’<sup>86</sup>. Further, under the same legislation, an owner or occupier of land is required to notify the administering authority (DERM) if they become aware that land has been or is being used for a notifiable activity (an activity mentioned in Schedule 3 of the EP Act). Notifiable activities identified in the EP Act are generally activities with the potential to cause contamination of land. The land is then recorded on the state’s *Environmental Management Register*. I note, that the Proponent has committed

<sup>84</sup> CSG water contaminants, for which the proponent found ANZECC guideline limits to be available.

<sup>85</sup> Waste is defined in Section 13 of the EP Act. Waste includes any thing, other than a resource approved under EP Act subsection (4), that is— (a) left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or (b) surplus to the industrial, commercial, domestic or other activity generating the waste. Waste can be a gas, liquid, solid or energy, or a combination of any of them. A thing can be waste whether or not it is of value.

<sup>86</sup> A regulated waste is waste that—(a) is commercial or industrial waste, whether or not it has been immobilised or treated; and (b) is of a type, or contains a constituent of a type, mentioned in schedule 7 of the EP Regulation. Waste prescribed under subsection (1) includes—(a) for an element—any chemical compound containing the element; and (b) anything that contains residues of the waste.



not to released untreated CSG water to land to ensure that the potential of land contamination is minimised.

**However I note** that the SEIS states<sup>87</sup> that the operation of a brine evaporation basin and salt-disposal land-fill does not meet the criteria for a notifiable activity. **I do not support** this view as **I note** that 'Landfill—disposing of waste' is listed as notifiable activity<sup>88</sup> in Schedule 3 of the *EP Act*. **Similarly I note** that 'Waste storage, treatment or disposal—storing, treating, reprocessing or disposing of waste prescribed<sup>89</sup> under a regulation to be regulated waste<sup>90</sup> for this item' is also listed as notifiable activity<sup>91</sup>. **Hence I find** that the operation of a brine evaporation basin and salt-disposal land-fill, as proposed as part of QCLNG CSG activities, should be considered a notifiable activity under the *EP Act*.

## 7.6.1 Government policy on management of coal seam gas water

In October 2008 the Queensland Government released the *Queensland Coal Seam Gas Water Management Policy*. The policy included, among other policy principles, the intention for a CSG Water Management Plan (CWMP) to be incorporated into the Environmental Management Plan (EMP) required for a level 1 environmental authority application.

Policy development has culminated in amendments to the *Environmental Protection Act 1994* (*EP Act*) through the *South-East Queensland Water (Distribution and Retail Restructuring) and Other Legislation Amendment Act 2010* which was passed by Parliament on 20 May 2010.

The reform amends section 310D (Environmental management plan (EM Plan)) of the *EP Act* to include the requirement for a CSG Water Management Plan (CWMP). The new provisions will require the EM Plan to provide details on:

1. the quantity of CSG water the applicant reasonably expects will be generated in connection with carrying out each relevant CSG activity
2. the flow rate at which the applicant reasonable expects the water will be generated
3. the quality of the water, including changes in the water quality that the applicant reasonably expects will happen while each relevant CSG activity is carried out
4. the proposed management of the water including the use, treatment, storage or disposal of the water
5. measurable criteria (the management criteria) against which the applicant will monitor and assess the effectiveness of the management of the water including criteria for each of the following:
  - a) the quantity and quality of the water used, treated, stored or disposed of
  - b) protection of the environmental values affected by each relevant CSG activity
  - c) the disposal of waste, including, for example, salts generated from the management of the water
  - d) the action that is proposed to be taken, if any of the management criteria are not satisfied, to ensure the criteria will be able to be satisfied in the future.

The legislative amendments also require that each annual return include an evaluation of the effectiveness of the management of CSG water under the measurable criteria {section 310D(5)(e)} for carrying out each relevant CSG activity. On the basis of these findings the administering authority may decide the conditions of the environmental approval require amendment in relation to CSG water management.

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<sup>87</sup> SEIS, Volume 3, Chapter 6, Section 6.4.11, p. 17.

<sup>88</sup> Item 20 in Schedule 3 of the *EP Act*.

<sup>89</sup> Regulated waste is prescribed waste for schedule 3, item 37 of the Act (refer to section 67 of the *EP Regulation*).

<sup>90</sup> A regulated waste is waste that—(a) is commercial or industrial waste, whether or not it has been immobilised or treated; and (b) is of a type, or contains a constituent of a type, mentioned in schedule 7 of the *EP Regulation*. Waste prescribed under subsection (1) includes—(a) for an element—any chemical compound containing the element; and (b) anything that contains residues of the waste. Refer to section 65 of the *EP Regulation 2008*.

<sup>91</sup> Item 37 in Schedule 3 of the *EP Act*.



The content requirements for a CWMP have been included in the DERM guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities*.

## 7.6.2 Management of coal seam gas water by the proponent

### CSG water management infrastructure – pond infrastructure

The proposed CSG water management pond infrastructure across the QCLNG gas field was revised in the SEIS<sup>92</sup>, and **I provide** the following summary of the revised information as follows.

**Table 7.9– Summary of QCLNG CSG water management pond infrastructure**

Pond Infrastructure	Number of items	Capacity per item (ML)	Total capacity (ML)	Area per item	Total gas field disturbance (ha)
1. Infield buffer storages (untreated water)	120 (2-4 per block)	Up to 15	300 – 1,700	400–3000 m <sup>2</sup>	5 – 30
2. Regional storage ponds (untreated water)	35 (1 per block)	60	2,100	1 ha	35
3. Raw water ponds	3 (1 per WTP <sup>93</sup> )	-	1,000	-	13
4. Evaporation ponds	0	0	0	0	0
5. Treated water storage ponds and blending ponds	6 <sup>94</sup>	-	450	-	4
6. Brine ponds	3 <sup>95</sup>	-	9,000	-	90
7. Brine evaporation basins	3 <sup>96</sup>	-	1,950	-	390
<b>Total pond infrastructure</b>	<b>170</b>	<b>-</b>	<b>Up to 16,200</b>	<b>-</b>	<b>562</b>

### CSG water management infrastructure - evaporation ponds

**I note** that the SEIS states that the proponent does not intend to construct any untreated water storage ponds for the purpose of evaporation.<sup>97</sup> **I fully support** the proponent's commitment regarding this matter, **and I note** that this commitment is consistent with Queensland government policy.

<sup>92</sup> Refer to SEIS, Volume 2, Chapter 7, Table 2.7.2.

<sup>93</sup> Water Treatment Plants (WTPs): One WTP with 35 ML/day capacity within North West Development Area; One WTP with 75 ML / day capacity within Central Development Area; and One WTP with 65 ML/day capacity within South East Development Area.

<sup>94</sup> 1 treated water storage & 1 blending pond per WTP.

<sup>95</sup> 1 brine pond water storage per WTP.

<sup>96</sup> 1 brine evaporation basin per WTP.

<sup>97</sup> SEIS, Volume 3, Chapter 11, Section 11.6.5, p. 15.



**However I am concerned** that although the EIS proposed 3 'brine evaporation ponds' totalling 21 ha (total volume of 700 ML), these disturbances were increased exponentially in the SEIS to result in a proposed total 'brine pond' and 'brine evaporation basin' footprint of 480 ha (10,950 ML).<sup>98</sup> **I have provided** further discussion and evaluation regarding proposed brine ponds and brine evaporation basins in the text below.

### **CSG water management infrastructure - untreated water and blending ponds**

**I note** that the SEIS states that contamination may occur through the seepage of saline water to soils, surface water and groundwater. Various measures (commitments) to be incorporated by the proponent include the lining of all ponds and monitoring measures to detect any saline water migration.<sup>99</sup> **I fully support** the proponent's commitments regarding lining of all ponds and installation/implementation of monitoring measures to detect any saline water migration. **I require** that these commitments be included and translated into effective auditable commitments (including measurable indicators) in the EM Plan.

**I also note** that the SEIS proposed that untreated water storage ponds '*with greater than 10ML capacity*' and storing associated water '*with a salinity of greater than 4,000  $\mu\text{S/cm}$* ', will be regulated storages and will be constructed in accordance with environmental authority requirements and guidelines set out in *The Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (2009).

**However I find** that this commitment is insufficient to prevent environmental harm arising from a significant proportion of untreated water storages and blending ponds likely to be constructed and operated as part of QCLNG gas field activities. **I therefore require** that all untreated water storages and blending ponds be considered regulated storages, regardless of size and contents, and be designed, constructed, managed, monitored, decommissioned and rehabilitated in a manner that:

- prevents contamination of land and waters
- conforms with best practice environmental management (as defined under the EP Act)<sup>100</sup>
- conforms with appropriate technical guidelines and standards
- meets regulatory requirements. (Condition 15, Part 2, Appendix 2).

**I require** that these requirements be included and translated into effective auditable commitments (including measurable indicators) in the EM Plan.

### **CSG water management infrastructure - brine ponds and brine evaporation basins**

Brine is the extremely saline waste product resulting from the CSG water treatment process (i.e. the output of the reverse osmosis process in the water treatment plants). The SEIS states the proposed brine concentration process involves evaporating water from the brine in a dedicated evaporation basin, producing a highly saline slurry with typical concentrations of salt in the range of between 100,000 – 150,000 mg/L Total Dissolved Solids (TDS).<sup>101</sup>

The EIS states that 'small' evaporation ponds may be required to evaporate concentrated brine from the treatment processes<sup>102</sup>, **however I note** that the area of land proposed to be occupied and contaminated by brine ponds and brine evaporation basins in the SEIS is substantial, totalling approximately 480 ha<sup>103</sup>. **I note** that the EIS proposed 3 'brine evaporation ponds' totalling 21 ha (total

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<sup>98</sup> SEIS Volume 2, Chapter 7, Table 2.7.2.

<sup>99</sup> SEIS, Volume 3, Chapter 6, Section 6.4.5, p. 4.

<sup>100</sup> Section 21 of the EP Act defines the best practice environmental management of an activity as the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.

<sup>101</sup> SEIS, Volume 3, Chapter 6, Section 6.4.7, p.12.

<sup>102</sup> EIS Volume 3, Chapter 11, Section 11.6.3.12, p. 40.

<sup>103</sup> SEIS, Volume 2, Chapter 7, p. 5, Table 2.7.2.



volume of 700 ML), however these disturbances were increased exponentially in the SEIS to result in a proposed total 'brine pond' and 'brine evaporation basin' footprint of 480 ha (10,950 ML).<sup>104</sup>

**I note** that a brine concentration process will not be necessary if groundwater re-injection of untreated CSG water can be successfully achieved in an environmentally acceptable manner. In this circumstance **I find** the proposed brine evaporation basins would be an unnecessary disturbance, an unnecessary contamination risk and ongoing liability.

**I am concerned** that the impacts and cost to the living and non-living environment and future generations of Queenslanders would be substantial if large areas of land (and potentially waters) become contaminated as part of CSG LNG activities. However, **I am confident** that the EP Act administering authority will decide these matters in a manner that prevents serious and material environmental harm and in accordance with the principles of ecologically sustainable development.

Hence, as part of environmental authority applications for the QCLNG project, **I would expect** that alternatives to brine evaporation basins be presented to the EP Act administering authority. Where brine evaporation basins are still proposed, I would expect that such proposals be clearly justified. As part of justifications, **I would expect** that the land disturbance and volume of contaminated salts associated with brine ponds and brine evaporation basins be presented to the EP Act administering authority; accompanied by quantitative data and calculations covering all short and long term risks, potential impacts and costs associated with diminished land use, remediation, rehabilitation, monitoring, structural failure, maintenance and ongoing management requirements associated with the proposed containment structures and their contents (including third party encapsulation, monitoring, maintenance and management costs into the future).

**I note** that the SEIS states<sup>105</sup> that contamination may occur through the seepage of saline water to soils, surface water and groundwater and that the majority of QGC's ponds will be regulated storages.

**In particular I note** that the SEIS proposed that all brine ponds would be doubled lined with clay and geo-synthetic liner to prevent any seepage. CSG water storage ponds <sup>106</sup>*'with greater than 10ML capacity'* and storing associated water *'with a salinity of greater than 4,000 µS/cm'*, will be regulated storages and will be constructed in accordance with environmental authority requirements and guidelines set out in *The Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (2009).

**However I find** that this commitment is insufficient to prevent environmental harm arising from a significant proportion of brine ponds and brine evaporation basins likely to be constructed and operated as part of QCLNG gas field activities. **I therefore require** that all brine ponds and brine evaporation basins, regardless of size and contents, are to be considered regulated storages, and designed, constructed, managed, monitored, decommissioned and rehabilitated in a manner that:

- prevents contamination of land and waters
- conforms with best practice environmental management (as defined under the EP Act)<sup>107</sup>
- conforms with appropriate technical guidelines and standards
- meets regulatory requirements. (Condition 16, Part 2, Appendix 2).

**I require** that these requirements be included and translated into effective auditable commitments (including measurable indicators) in the EM Plan.

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<sup>104</sup> SEIS Volume 2, Chapter 7, Table 2.7.2.

<sup>105</sup> SEIS, Volume 3, Chapter 6, Section 6.4.5, p. 4.

<sup>106</sup>SEIS Volume 2 Chapter 11 Section 11.4.3 states: "These will be open-top earth ring dams which are double-lined with clay and geo-synthetic liner to prevent seepage. The upper liner will be provided with a trafficable protective gravel pavement to facilitate removal of crystallised brine, while protecting the integrity of the liner. Brine storages will include under-liner drainage systems."

<sup>107</sup> Section 21 of the EP Act defines the best practice environmental management of an activity as the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity.



**I also note** that the SEIS states that approximately ten (10) of the proposed brine ponds and brine evaporation basins may be “referrable dams” under the *Water Act 2000* (Qld), as the volume of contents stored would potentially, in the event of failure, put populations at risk, hence specific design standards would need to be met in order to minimise risk of failure.<sup>108</sup>

### **CSG water management infrastructure – leak detection and monitoring systems**

**I note** that the SEIS states that brine ponds and brine evaporation basins will have appropriate leak-detection and monitoring systems, including under-liner drainage systems. **I require** that appropriate and effective under-liner drainage systems be designed installed and maintained in a manner that prevents contamination of land and waters, for the life of all brine ponds and evaporation basins. **In addition I require** that appropriate and effective leak-detection and monitoring systems are installed and maintained for the life of all brine ponds and evaporation ponds. **I require** that these requirements be included and translated into effective auditable commitments (including measurable indicators) in the EM Plan. (Condition 8, Appendix 2, Part 2)

### **CSG water management infrastructure – pipelines**

Water pipelines comprise water-gathering lines, water trunklines and a central water collection header arterial pipeline. Water-gathering lines connect wells to infield buffer storages and regional storage ponds. Water trunklines connect regional storage ponds to collection header ponds, raw water ponds and / or water treatment plants. All pipelines will be buried in easements varying in width from 15 to 30 metres, depending on the size of pipelines).

The CWMP indicates there will be some 600 kilometres of trunk line with diameters of 300 and 1,200 mm. Where feasible the trunk lines will be co-located with gas trunk lines. Easements for co-located pipelines will vary between 20 and 54 metres.

The proponent is unable to provide details of the water collection header pipelines at this stage. However the pipeline diameters will range from 600 mm to 1200 mm.

### **CSG water management infrastructure - pumping stations**

Approximately 27 pumping stations of between 400 kW and 800 kW per pump will be required to transfer water between major sections of the water management system 24 hours a day, seven days a week. If treated CSG water is used for irrigation, further pumping stations will be required. Pumping stations will be capable of pumping approximately 3 to 4 ML per day per pump. Wherever possible, all motors and pumps will be located undercover.

The proponent has not provided details of power supply arrangements to the pumping stations. Over the life of the Project approximately 150 to 200 infield pumps will be required across the Gas Field, with approximately 40 percent of pumps operating simultaneously at peak water flows. Infield pumps are assumed to be powered by a gas or diesel generator of between 100 and 1,500 kW per pump, with an average of 500 kW.

An alternative to gas or diesel generators is a connection to the grid via a transmission line connected to the FCS. This would be an underground 11, 22 or 33 kV transmission line located in the same easement as gas and water gathering lines. The total length of transmission lines would be approximately 600 km.

### **CSG water use or disposal – dust suppression**

The range of proposed uses of CSG water presented by the proponent includes use of untreated CSG water for ‘dust suppression’ purposes. **I note** that the EIS proposes that 1.75 ML of CSG water may be used for ‘dust suppression’ each day.<sup>109</sup> **I also note** that the EIS and SEIS do not provide estimates of

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<sup>108</sup> SEIS, Volume 3, Chapter 6, Section 6.4.8, p.13.

<sup>109</sup> EIS Volume 3, Chapter 11, Section 3.11.7, p.20.



current and future areas of land proposed to be irrigated with raw CSG water for 'dust suppression' purposes, nor the proposed locations or application rates.

The SEIS states<sup>110</sup> that where the CSG water salt content is greater than 2,000 mg/L (TDS) the proponent does not intend to use CSG water for dust suppression. **However I note** that average salt concentrations of CSG water across all QCLNG gas field development areas are significantly higher than 2,000 mg/L, and variations in each well show that levels can reach 10,000 mg/L (TDS).<sup>111 112</sup>

**I note** that soluble salts reduce the availability of water to plants, and according to the ANZECC<sup>113</sup> guidelines, the only plants suitable for irrigation with water above salt concentrations (TDS) of 1,940 mg/L are '*salt tolerant*' and '*very salt tolerant*' plant species.<sup>114</sup>

The EIS finds the average concentration of CSG water salts (TDS) in the North West and South East Development Areas is 5,500 mg/L and 4,700mg/L respectively, **whereas I note** that only '*very salt tolerant*' plant species are suited to irrigation of very high to extreme salinity concentrations of 3,480 – 5,430 mg/L (TDS). **Further I note** that at certain locations in the QGC gas field, CSG water will be above the 'extreme' water salinity rating of 5,430 mg/L, which, according to ANZECC guidelines is considered too saline for any irrigation purposes.

**Further, I note** that the average untreated CSG water SAR level is approximately 110.<sup>115</sup>

Given these very high salt concentrations and SAR levels for CSG water across the QCLNG gas field<sup>116</sup>, **I find** that use of untreated CSG water for dust suppression will cause wide spread, irreversible, serious environmental harm.<sup>117</sup> **Therefore I find** that it is not appropriate to use untreated QCLNG CSG water for dust suppression purposes.

**Similarly I find** that other chemical components (contaminants) within untreated CSG water also deem use of untreated CSG water to be inappropriate for dust suppression purposes. This finding is supported by the table below<sup>118</sup> which provides a comparison of the average concentrations of a select range of CSG water contaminants against ANZECC guideline limits for irrigation use.

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<sup>110</sup> SEIS, Volume 3, Chapter 11, Section 11.6.1, p. 7.

<sup>111</sup> Average Total Dissolved Solids (TDS) concentrations in CSG water varies across the gas field as follows: 5,500 mg/L in the North West Development Area; 2,800 mg/L in the Central Development Area; and 4,700mg/L in the South East Development Area. Source: EIS Volume 3, Chapter 11.

<sup>112</sup> CSG Water Management Plan (QGC, March 2010), p.13.

<sup>113</sup> Australian and New Zealand Environment and Conservation Council

<sup>114</sup> Refer to EIS Volume 3, Chapter 11: Associated Water Management, Table 3.11.3.

<sup>115</sup> CSG Water Management Plan (QGC, March 2010), p. 13.

<sup>116</sup> Average Total Dissolved Solids (TDS) concentrations in CSG water varies across the gas field as follows: 5,500 mg/L in the North West Development Area; 2,800 mg/L in the Central Development Area; and 4,700mg/L in the South East Development Area. Source: EIS Volume 3, Chapter 11.

<sup>117</sup> EIS Volume 3, Chapter 11, Section 11.6.3.3 states average SAR of approximately 110.

<sup>118</sup> Information based on information supplied by the proponent. Refer to EIS Volume 3, Chapter 11, Table 3.11.5, Associated Water Quality, p. 13.



**Table 7.10 A selection of CSG water contaminant concentrations compared with irrigation guidelines<sup>119</sup>**

Chemical component or contaminant	Average concentration at production wells (mg/L)	ANZECC 2000 Water Quality Guidelines – Irrigation – Long Term Use (mg/L)	ANZECC 2000 Water Quality Guidelines – Irrigation - Short Term Use (mg/L)
Aluminium	14.73	5 (Exceeded)	20
Boron	1.08	0.5 (Exceeded)	0.5 – 15 (Exceeded)
Cobalt	0.058	0.5 (Exceeded)	0.1
Copper	2.5	0.2 (Exceeded)	5
Fluoride	3.3	1	2 (Exceeded)
pH	8.6	6.0-9.0 (Average pH at high end of range)	6.0-9.0 (Average pH at high end of range)
Potassium	12.19	0.05 (Exceeded)	0.8 (Exceeded)
TDS (Salinity)	3558.1	<1000 (Exceeded)	-

**I find** that although the full effects of the practice of applying saline and sodic CSG water to roads and land, will not become apparent for some time, the full effects can be predicted based on our current understanding of soil science. **I find** that the effects of land and soil degradation (erosion and waterlogging) will be costly. Some of the costs to consider include: the future gully and tunnel erosion of roads and tracks; lost productivity of land (crops and pasture); and impacts to native vegetation due to reduced water uptake; and sedimentation and associated environmental degradation of waters and aquatic ecosystems.

**Hence I do not support** the proposed use of untreated CSG water for ‘dust suppression’ purposes.

**I note** that the DERM guideline ‘*Approval of coal seam gas water for beneficial use*’ states that significant damage to soil structure and function can occur as a result of incompatible water-soil interactions, and repair of the soils may take decades or may not be possible at all. **I note** that the guideline states that the use of CSG water for dust suppression is considered to be ‘small scale irrigation’, and that the ‘over-application of CSG water’ (i.e. that could be seen as disposal) is not considered a ‘beneficial use’. **I also note** that the guideline states that minimum standards of use of CSG water for dust suppression include a maximum SAR of 15 and an electrical conductivity (salinity)

<sup>119</sup> Refer to Table 3.11.5 in EIS Volume 3, Chapter 11.





of 3,000 S/cm. The application of this guideline indicates that QCLNG CSG water will need treatment before 'beneficial use' approval as a dust suppressant at any particular location.

**I note** that 'beneficial use' of CSG water for 'dust suppression' purposes will require an approval for beneficial use under section 13(4) of the EP Act and Part 6A of the *Environmental Protection (Waste Management) Regulation 2000*. **I am confident** that the EP Act administering authority will decide matters related to use of untreated CSG water for 'dust suppression' purposes in a manner that prevents serious and material environmental harm and in accordance with the principles of ecologically sustainable development.

### CSG water use or disposal – irrigation of tree plantings

**I note** that the EIS proposes that at peak water production, CSG water may be used for irrigation of approximately 10,000 ha of indigenous tree cropping species, and that the majority (80-90%) of trees planted would be Chinchilla White Gums (*Eucalyptus argopholia*) – a relatively salt tolerant species.<sup>120</sup> **I note** that the EIS states that it is not intended to displace current cropping land with CSG water irrigated tree cropping.<sup>121</sup>

**I note** that project footprint and vegetation clearing estimates presented in the EIS and SEIS do not include 10,000 ha of land for CSG water irrigated tree cropping. It is not clear whether the proponent intends to clear remnant vegetation or sensitive habitat areas to make way for the 10,000 ha of irrigated tree cropping land, however, if this is the case, **I would not support** such an approach.

Regarding the potential for build up of salts and other contaminants in the soils and potential for movement of salts into waters, **I note** that an outline of the proposed treatment of CSG water to achieve key water quality parameters and the corresponding application rates (in ML/ha/year), are nominated in the EIS and are summarised in the table below.

**I also note** that irrigation water salinity and SAR combinations that cause soil structure instability vary depending on the soil type.<sup>122</sup> **I note** that reductions in salinity can be achieved through desalination (i.e. via reverse osmosis) and reductions in SAR can be achieved through 'amendment' (e.g. application of lime or gypsum). **However I note** that the 'amendment' process will increase levels of TDS.

**Table 7.11 QGC proposed CSG water irrigation rates for trees and other crops<sup>123</sup>**

CSG water quality description	Key water quality parameters	Proposed treatment to achieve water quality	Irrigation application rate (ML/ha/year)
Moderate salinity and sodicity	TDS 1200 mg/L, SAR 6	Desalination and amendment	6
Medium salinity and sodicity	TDS 1600 mg/L, SAR 10	Blending desalinated and untreated water with gypsum amendment	6
High salinity and sodicity	TDS 2000 mg/L, SAR 20	Blending desalinated and untreated water with gypsum amendment	6

**I note** that the SEIS has not quantified the amount of make-up water that would be required for blending, although if blending is a preferred option for some circumstances, the ratio of make-up water

<sup>120</sup> EIS Volume 3, Chapter 11, Section 11.6.3.3, p. 23.

<sup>121</sup> EIS Volume 3, Chapter 11, Section 11.6.3.3, p. 23.

<sup>122</sup> Refer to EIS Volume 3, Chapter 11, Section 11.4.1.3, p. 10.

<sup>123</sup> Adapted from EIS Volume 3, Chapter 11, Table 3.11.8.



to CSG water would be 4:1<sup>124</sup> **I also note** that both the proposed source of this fresh water supply (presumably groundwater) and the volumes required are not stated. **Further I note** that the proposed source and volumes of gypsum and other ameliorants proposed to 'amend' water are not stated.

DERM has roughly estimated that if we were to use, for example, a starting salinity of 1000 mg/L and assume that half the volume of salt is NaHCO<sub>3</sub> (i.e. sodium bicarbonate) and the sodium bicarbonate is neutralised with H<sub>2</sub>SO<sub>4</sub> (i.e. sulphuric acid), we produce Na<sub>2</sub>SO<sub>4</sub> (which is 15% lighter per unit of sodium contained), resulting in a decrease in salt content by about 7%. Adding gypsum (CaSO<sub>4</sub>.2H<sub>2</sub>O) will add approx. 20% of additional solids. Therefore to estimate the final salt volumes, we need to multiply the associated water salt volumes (produced from gas field groundwater) by about 1.2 to account for the "amendment" process.

As stated previously, **I am concerned** regarding the potential for widespread, irreversible, serious environmental harm associated with the widespread application of highly saline and sodic water, due to the potential for movement of those salts and displaced clay particles, and hence long term environmental impacts and economic loss consequences.

The EIS indicated that QGC proposes to trial long-term irrigation of untreated CSG water with a TDS of 2,500 mg/L and SAR of 25. I have since been informed that the proposed trial has been abandoned.

**I note** that 'beneficial use' of CSG water for irrigation purposes will require an approval for beneficial use under section 13(4) of the EP Act and Part 6A of the *Environmental Protection (Waste Management) Regulation 2000*. **I am confident** that the EP Act administering authority will decide matters related to use of CSG water for irrigation purposes in a manner that prevents serious and material environmental harm and in accordance with the principles of ecologically sustainable development.

#### **CSG water use or disposal - discharge to surface water**

The SEIS states that the proponent believes river discharge offers a reliable short and long-term solution for disposal of suitably treated CSG water, subject to compliance with relevant quality standards.<sup>125</sup> However, **I find** that direct release of untreated CSG water to aquatic ecosystems will reduce water quality, hence limiting potential use of water and causing widespread detrimental impacts on aquatic ecosystems (including impacts on flora and fauna).

#### **CSG water monitoring – monitoring discharge to surface waters**

Issue: Absence of upstream monitoring sites where CSG water discharges are proposed

The Supplementary EIS states that where major infrastructure is proposed, particularly large CSG water dams, monitoring sites will be located downstream of the infrastructure, and upstream of the infrastructure should changes in downstream water quality be detected. It may prove difficult to identify changes, or demonstrate no change, in downstream water quality data in the absence of upstream monitoring site data to compare.

QGC has committed both upstream and downstream monitoring<sup>126</sup> of water quality parameters as a standard approach to surface water monitoring plan where discharges of CSG water, or other discharges, are likely to occur, so that demonstrating changes water quality can be performed whilst considering temporally equivalent upstream water quality comparisons.

#### **CSG water use or disposal - discharge into Chinchilla Weir on Condamine River**

**I note** that the proponent proposes to discharge treated CSG water into the Chinchilla Weir on the Condamine River. **I note** that the Condamine River is an ephemeral system and DERM advises that the section of the river supplemented by Chinchilla Weir maintains that character to a significant extent. **I**

<sup>124</sup> Refer to EIS Volume 3, Chapter 11, Section 11.6.3.3, p. 24.

<sup>125</sup> Refer to EIS Volume 3, Chapter 11, Section 11.6.4, p. 13.

<sup>126</sup> SEIS Volume 3, Chapter 9 (section 9.2.3.1) refers to both upstream and downstream monitoring of surface water.



**note** that DERM advises that further evaluation of the proposal is required as part of the approvals process, subject to:

- The proponent demonstrating that the flow regime below the weir will not be significantly affected by discharge of treated water into the Chinchilla Weir.
- Future releases arrangements would need to avoid altering the character of the Condamine River and would need to be accommodated within the water resource planning framework for the Condamine and Balonne Rivers.
- The analysis should also draw upon publicly available information<sup>127</sup> to assess the possible cumulative impacts of other authorised and potential flow discharges to relevant reaches of the Condamine River.
- QGC having water quality management plans that demonstrate how drinking water supplies will be protected. The plans will cover a range of matters including the CSG water treatment processes that will be used, and the supporting operational procedures. The plans will need to be approved under the provisions of the *Water Supply (Safety and Reliability) Act*.
- The water quality standards that the treatment plants will need to achieve will be based on those in the Australian Drinking Water Guidelines (ADWG). If necessary, and this will depend upon the contaminants present in the water, additional standards will be set, as the ADWG does not cover all possible contaminants.

### **CSG water use or disposal – groundwater re-injection**

The SEIS identifies that CSG water could potentially be injected directly into deep groundwater formations below the QCLNG South East and Central Development Areas, and that the Precipice and Hutton aquifers have been targeted for re-injection trials. According to the SEIS, the Precipice and Hutton aquifers are approximately 200 to 400 m deeper than the Walloon Coal Measures from which the CSG is taken, and are not considered to be connected.<sup>128</sup>

The proponent states that the Precipice formation offers the greatest potential and security against pollution of aquifers currently beneficial to land users and towns. Further, the proponent states that the Precipice Aquifer is expected to be able to more than adequately accept the entire volume of production water produced by QGC operations.

**I note** that some level of treatment may be required to achieve the necessary quality for re-injection, although the water quality of Precipice and Hutton aquifers was found to be similar to CSG water.<sup>129</sup>

### **CSG water use or disposal – coastal discharge**

Coastal discharge is a technically feasible option for disposal of CSG water, **however I note** that a detailed investigation of impacts on marine environments was not undertaken as part of the EIS.

**I note** that while transmission pipeline easements are available, and surface disturbance associated with pipelines could be minimal, the costs associated with the 400 km pipeline, ancillary equipment and installations are considered by the proponent to be prohibitive. Hence no further investigation of this option is proposed. I am therefore unable to consider this option further at this stage..

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<sup>127</sup> This information can be accessed through DERM.

<sup>128</sup> Refer to SEIS Volume 3, Chapter 11, Section 11.6.3, p. 11.

<sup>129</sup> Refer to SEIS Volume 3, Chapter 11, Section 11.6.3, p. 12.



**Table 7.12 - Coastal Discharge Pipeline Requirements**

Water Type	Average Salinity (TDS mg/L)	Annual Volume <sup>1</sup> (ML/year)	Daily Flowrate <sup>2</sup> (L/s)	Pipe Diameter (mm)	Pumping Requirements
Untreated	4,000	54,750	1,900	DN1250	3 pump stations approx 6.8mW each
Brine <sup>3</sup>	18,000	13,700	475	DN600	3 pump stations approx. 1.7mW each
Concentrated Brine <sup>4</sup>	100,000	2,466	85	DN300	6 pump stations approx 200KW each

**Notes:**

1. Volumes based on Associated Water production rate of 150 ML/day.
2. Flowrates based on pumping 22 hours per day, 365 days per year. Assumed flow velocity 1.5m/s.
3. Brine assumed to be 25 per cent of raw water inflow to treatment plant.
4. Concentrated brine assumed to be 4.5 per cent of the raw water inflow.

**CSG water - cumulative impacts**

DERM advises that the cumulative impact assessment for associated water only includes gas fields that are part of QCLNG; it does not include QGC gas fields which have existing approvals. No information is provided on the amount of CSG water that will be generated by the Australian Pacific LNG or Arrow Gas Fields in the vicinity of QGC's tenements. Therefore, it is not possible to determine whether the total amount of CSG water produced for a given area can be beneficially used or disposed of in a way that meets suitable environmental standards. For example, where multiple discharges of associated water are proposed to watercourses the assessment has in no way addressed the cumulative effect in a system. The discharge to the Chinchilla weir is an example of this. QGC are proposing to discharge up to 160ML/day to the Chinchilla weir while APLNG has applied to discharge 35ML/day downstream of the Chinchilla weir. At present neither company has assessed the cumulative impacts to quality or quantity of the discharges.

**CSG water management plan**

**I note** that the proponent has recently submitted a *CSG Water Management Plan* (QGC, March 2010), setting out proposed mitigation and management of CSG water for consideration by DERM. However whilst some aspects of the plan are currently under consideration, this document has not been fully assessed due to the timing of the report.

**I note** that the *CSG Water Management Plan* states the proponent will utilise a tailored suite of solutions to treat and/or reuse CSG water to benefit the community and the environment, and that currently, the proponent is developing options for direct reuse of raw water where appropriate, and reverse osmosis water treatment where higher quality water is required. **I note** that options for beneficial use of the water include local agricultural and forestry applications, groundwater injection on site, external uses such as irrigation, mining and industrial use, supply to local towns, river discharge and on-site use.<sup>130</sup>

**I note** that the *CSG Water Management Plan* addresses options for beneficial use, treatment and disposal of CSG water, having regard to the timing of gas field development areas and the quantity and quality of CSG water. The hierarchal preferences for adoption of specific courses of action have been assessed against environmental objectives, performance criteria, environmental impacts, environmental safeguards, monitoring and corrective measures by the proponent.

<sup>130</sup> CSG Water Management Plan (QGC, March 2010).



Given the variety of water management options that have been presented in the EIS, SEIS and CSG *Water Management Plan* are at various stages of investigation by the proponent, **I am hence unable** to evaluate and make recommendations regarding all water management options in this CG Report. **I therefore limit my evaluation** to the matters discussed in this CG Report.

**I note** that DERM's assessment will be based on proposed application of practices to specific areas. However, as the full extent of the effectiveness of management safeguards can only be determined during successive stages of the development, the need for regular and on-going performance review to confirm the suitability of actions to specific areas is evident. Consistent with this view, implementing the Environmental Management System consistent with ISO14001 will provide the proponent with appropriate mechanisms for performance measurement and amendment of practices through a continuous improvement process. **I note** that all major BG operated assets shall certify the environmental component of their health, safety and environmental management system to the International Standard ISO 14001:2004, within two years of acquisition or start up.

### 7.6.3 Coordinator-General's conclusion

While the CSG Water Management Plan (CWMP) identifies the nature of infrastructure that will be constructed and installed, the scale of infrastructure has not been assessed except in general terms, as adoption of specific courses of action can only be completed after landholder/occupier negotiation has been undertaken.

I have noted that key elements of the CWMP that appear to be consistent with the statutory requirements listed above.

I am unable to assess the cumulative effects of measures that have significant potential for off-site effects. In particular, the potential for CSG water from the QGC operations to be disposed of by deep well injection may be limited by actions planned in other gas field developments.

As the CWMP will become a component of the EM Plan I will require an opportunity to consider the suitability of the final CWMP in light of further advice from DERM.

## 7.7 Groundwater

### 7.7.1 Monitoring the effects of gas field activities on groundwater supplies

Several landholders have expressed concern that gas extraction activities have adversely affected existing stock and domestic water supply from bores. In this regard the water supply failure could be due to a number of issues, including:

- groundwater extraction (and associated water with the development of the gas field)
- disturbance of the aquifers through fracking
- water quality changes through mobilisation of contaminants.

The landholder interests are likely to become more acute as the intensity of the gas field development increases.

#### Proponent's response

The proponent has undertaken a series of studies<sup>131</sup> to determine:

The extent of aquifers beneficially used by local governments and landholders in the gas fields have been identified as follows:

- Mooga Sandstone – utilised to the west of the QGC operations area for stock and domestic supply.
- Gubbamundra Sandstone – utilised to the west of the QGC tenements for stock and domestic supply.

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<sup>131</sup> Groundwater Monitoring Plan Report Number 097626099-002-Rev1, 30 November 2009



- Springbok Sandstone – widely used in the GAB for stock and domestic supply.
- Walloon Coal Measures – these include inter-bedded layers of some areas of argillaceous sandstones that form part of the GAB are used for stock and domestic supply in the north and east of the SEDA.
- Hutton Sandstone (Marburg Sandstone) – widely used at its shallower depths of the GAB to the north and north east of the QGC tenements.

Private bore records will in many cases provide an historic record of seasonal influences on the aquifer systems that are recharged from rainwater, river and flood percolation (Mooga and Gubbamundra measures). However, GAB water use also occurs and therefore monitoring probes need to measure changes as might occur with the extraction of CSG 'associated water'.

The purpose of monitoring is principally to set trigger points for action to be taken if the CSG extraction results in drawdown of the upper aquifers. The trigger points are specified in the EIS.<sup>132</sup> The triggers are specified in two ways where the effect is attributable to the CSG extraction:

- for surficial (surface related) aquifers such as alluvium: the lesser of a 2 metre drawdown and a 10% reduction in the available water column
- for consolidated aquifers (including sandstone and all other non-alluvial aquifers) the lesser of a 5 metre decline and a 10% reduction in the available water column.

Immediate actions that need to be taken when a trigger point is reached include:

- identification of the specific bores likely to be affected
- assessment of factors that may have contributed to the monitored drawdown (including seasonally low rainfall, CSG water extraction and non-CSG water extraction)
- assess whether the water supply failure has affected the function of the bore
- report to landholders
- report to DERM.

The SEIS<sup>133</sup> includes reference to actions that might be taken to redress failing landholder water supplies, including compensation and reporting.

## 7.7.2 Groundwater legislation and policy

The Queensland Government's proposed new arrangements (from August 2010) to protect groundwater resources in CSG extraction areas are outlined in the DERM information sheet '*New arrangements to protect groundwater resources in coal seam gas extraction areas*'. Under the new arrangements, the trigger threshold values for impacts on bores will be a 5 m drop for consolidated aquifers, and a 2 m drop for shallow aquifers. These figures are proposed to be set by forthcoming amendments to the *Water Act 2000*.

Under the new arrangements, at the location of a water supply bore, if the impact on water levels exceeds the trigger threshold, and the bore has suffered a significant reduction in its capacity to supply water for the intended purpose, then the bore owner will be able to ask the CSG producer to investigate the situation. The bore owner would need to provide information to the CSG producer in relation to the extent of reduction. If the bore owner is dissatisfied with the outcomes of the negotiations with the CSG producer in relation to impacts on bore supply, the bore owner will be able to appeal to the Land Court.

Under the new arrangements, CSG producers will be required to periodically prepare and submit underground water impact reports to the Queensland Government for approval. The reports will be required to contain: the results of monitoring; projections of the extent of water level impacts; an inventory of springs where impacts on water levels in underlying aquifers are projected to exceed trigger threshold values, and an assessment of the risk to those springs having regard to matters such as the connectivity of the springs to the underlying aquifers; and a proposal for managing impacts.

In addition, the Queensland Government has committed to develop a cumulative underground water management regime, to manage 'cumulative management areas' where water level impacts of CSG

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<sup>132</sup> EIS Vol 9 Ch 2 p18

<sup>133</sup> SEIS Vol 9 Ch 2 p7



producers overlap. **I note** DERM advises that the Surat Basin is likely to be a single 'cumulative management area'.

### **Coordinator General's response**

**I understand** that the proponent submitted a draft Groundwater Monitoring Plan to DERM prior to announcement of the new policy arrangements for CSG water. DERM point out that since submission, the new Trigger Thresholds Policy has been introduced and DERM require the plan to be revised in accordance with these new criteria.

Drawdown of the CSG aquifer is integral with development of the gasfield and extraction of CSG. However, the effects that this may have on other aquifers are largely unknown. For this reason monitoring of all aquifers likely to be affected is an essential component of the environmental management of the gas fields.

The proponent has estimated the quantity of CSG water that will be extracted would peak at 180 ML/d in 2013-2014 and at 160 ML/d between 2015 and 2025, assessing the effects of supplying a 2-train LNG plant. The total volume is estimated to be 1,200 GL; however, the according to the EIS the volume estimate could vary by as much as 50%. With 3 trains it is estimated that the average volume of CSG water would be 1,800 GL. If the Walloon coal measures are inter-connected to higher alluvial strata, then the potential for long term changes to land uses that rely on groundwater must be considered. Further, drawdown of the aquifers in the alluvial strata might induce change in surface water percolation rates in groundwater recharge areas.

These points are raised because there is insufficient information available in the EIS and SEIS to confirm the effects one way or the other.

CSG water management options discussed in the previous chapter may involve dilution to reduce the salinity of the CSG water to permit application for a range of beneficial uses including irrigation and dust suppression. If the irrigation option is adopted, groundwater from upper strata may be used to dilute the CSG water at a ratio of 4:1 (alternatively, desalination could be used to reduce salinity to less than 1,000 mg per litre).

The key issue associated with the potential for CSG activities to adversely affect existing groundwater use is monitoring. With historical information and current monitoring data the proponent will be well placed to act before failure of quantity or quality of water supplies that are essential to some land uses.

Appropriate action will be determined by the nature of the impact and could extend to provision of alternative water supplies where total failure of a bore is attributable to the proponent's activities. If demonstrably significant drawdown occurs due to CSG water extraction, restoration of aquifers may require injection of treated water with the appropriate water chemistry.

The groundwater monitoring data will also provide input to auditable reports to confirm the effectiveness of operational activities.

Where deep well recharge of CSG water is an adopted practice, groundwater monitoring of the receiving aquifer should be undertaken to confirm that the injected CSG water is quarantined from other aquifers.

With the above issues in mind I confirm the need to monitor all aquifers likely to be affected as an essential part of an adaptive Environmental Management Plan for the CSG field that will form part of the application for the Environmental Authority. In this regard relevant conditions are contained in Appendix 2 Part 2 (Conditions 8 and 9).

I also emphasise that the volume of CSG water extracted is very large (possibly as much as 1,800 gigalitres over the life of the project) and that monitoring of groundwater levels and other changes where they occur will be an essential part of the long term land use strategies for the gas fields.



## 7.8 Workers accommodation – CSG fields<sup>134</sup>

### 7.8.1 Workforce estimates

#### Construction and operational workers

Gas field activities include: field development, collection header construction, CSG facility construction, water management facilities as well as drilling and well construction, the latter being considered part of continuing construction. The coal seam gas field component will involve the development of approximately 1,000 to 1,500 exploration and production wells across of the proponent's Surat Basin tenements by mid 2014, as well as 4 central processing plants (CPP), 20 smaller field compression stations (FCS) and 3 desalination stations. There is the potential for an additional 4,500 wells to be phased in over the 20 to 30 year life of the project replacing declining wells. Given the very low unemployment rate within the Western Downs region and the lack of skilled labour, the construction of these wells will involve a workforce comprising mostly imported workers with local workers being employed where available.

QGC anticipate a gas field construction workforce peaking at more than 4,900 inclusive of collection header pipeline workforce, will be required by December 2011<sup>135</sup>, an increase from the total peak of 2,250 gas field workers estimated in the draft EIS<sup>136</sup>. This 4,900 peak will steadily decline to less than 2,000 by mid 2013 and less than 1000 by the start of 2014. A gas field continuing construction/operation workforce is predicted at 530 for the life of the project, a reduction from 800 estimated in the EIS.<sup>137</sup> A peak of both operational and construction workforce for the gas fields of approximately 5000 is predicted in 2011<sup>138</sup>.

Around 4400 gas field construction workers will be sourced from other parts of Queensland on a fly-in fly-out (FIFO) basis<sup>139</sup>; 400 workers will come from the regional area on a drive-in drive-out basis (DID)<sup>140</sup> and a further 100 non-manual workers will be local and accommodated in housing in regional communities<sup>141</sup>.

#### Construction workers accommodation

Supporting infrastructure required for the gas field construction and operation therefore, includes both temporary and permanent accommodation facilities to house both construction and operational workforces. The proponent proposes to construct 10 temporary workers' accommodation facilities (TWAFs) for the construction phase by 2012. As the construction will continue until 2025, clearly some of these TWAFs are intended to become permanent<sup>142</sup>. TWAFs are proposed to be located close to the gas fields for all FIFO and some DIDO workers, that is, up to say 4,600 workers. The size of TWAFs will be up to approximately 7ha in size and will include recreational facilities<sup>143</sup>. Locations have not been determined and will be subject to social constraints profiling and opportunities for local communities to derive economic benefits<sup>144</sup>. However, it is envisaged the majority of TWAFs will be located at the proposed central processing plant construction sites known as Ruby Jo, Jordan, Woleebee Creek and Bellevue, with these locations being a minimum of 2.4km from town boundaries<sup>145</sup>. Worker numbers accommodated will range up to 1500 per TWAF<sup>146</sup>.

<sup>134</sup> Based on EIS reference case (stated in SEIS) Ch 1, and Vol 8 Ch 4 4.3.1.1, Figure 8.6.1. p7 Vol 8 Ch6. Also based on 2 LNG project scenario and knowledge of other projects which may happen. Labour hire with other projects will impact on labour hire for this project.

<sup>135</sup> P11, 12 and 13 Vol 8 Ch 4

<sup>136</sup> P2 Vol 2 Ch 6

<sup>137</sup> P13 Vol 8 Ch 4

<sup>138</sup> P14 Vol 8 Ch 4

<sup>139</sup> P13 Vol 8 Ch 4

<sup>140</sup> P13 Vol 8 Ch 4

<sup>141</sup> P13 Vol 8 Ch 4

<sup>142</sup> for well drilling, well establishment and gathering lines Sect 4.3.1.3 Vol 8 Chap 4

<sup>143</sup> P13 Vol 8 Ch 4

<sup>144</sup> P17 4.3.4 Ch4 Vol 8

<sup>145</sup> P25 4.3.6.2 Ch4 Vol 8

<sup>146</sup> Vol 2 Ch 11 SEIS P3





To address the potential impacts of gas field infrastructure, including TWAFs, on property owners and land use, QGC has proposed an Infrastructure Location Strategy. The strategy is supported by a Land Use and Land Access Social Impact Action Plan. Further discussion on social impacts resulting from the TWAFs is contained within the Social Impact Management Plan, which is discussed in Section 8.4 of the SEIS.

The number of workers moving to the Western Downs has been calculated to be approximately 220 of the 4400 non-local continuing workers, which is likely to represent up to 220 families and require up to 220 housing units<sup>147</sup>. In addition, 130 of the total operational workers will settle in the area by 2014 taking the total housing demand to 350<sup>148</sup>.

### **Operational worker accommodation**

The number of operational workers has been reduced to 530 since the draft EIS, which estimated a total of 800 workers. This is because drilling and well construction is now considered to be continuing construction<sup>149</sup>. QGC estimate one quarter of this total, or approximately 135 families will move to the Western Downs area.

The location of operations accommodation facilities will be determined after an assessment of the workforce logistics. The sites will be selected from the former construction camp locations scaled down to suit.

## **7.8.2 Agency concerns**

The Department of Infrastructure and Planning's Maranoa-Balonne Regional Plan "*Planning for a stronger more liveable and sustainable community*", September 2009, impacts on part of the project footprint. This plan includes a policy which states, the location of new development should support the centres identified in the plan's regional activity centres network, unless a clear need for departure is demonstrated. The entire project ranges over areas controlled by local and regional governments such as Maranoa, Western Downs, Banana, North Burnett, Gladstone and Toowoomba area which may experience increased population as a result of the project<sup>150</sup>

Queensland Health requires the proponent to ensure drinking water is potable. The proponent has stated treated CSG water may be provided to workers' accommodation facilities as potable water, although this would need to be assessed for environmental impacts and subsequent approvals.<sup>151</sup>

To assist agencies in planning their service delivery requirements, the following has been requested of the proponent:

- the Queensland Police Services has requested the proponent undertake consultation prior to the establishment of camps to assist with police workforce management
- the Queensland Ambulance Service has requested geo-coordinates of all camps and work sites
- the Department of Community Safety, in particular Emergency Management Queensland, requires a copy of all disaster management plans and site and safety orientation to all appropriate personnel.

Both Western Downs Regional Council (WDRC) and Burnett Regional Council have requested that QGC consult with them on intended locations for TWAFs and seek regulatory approvals for their construction and operation. This consultation is to include provision of the following information in writing, prior to commencement of works associated with the TWAFs:

- the location, nature and extent of the TWAF including the number of employees to be accommodated
- plans showing the layout of the TWAF including vehicle parking arrangements, any on-site disposal areas and any other storage areas
- plans showing principal traffic routes associated with the use of the site
- commencement dates and completion of construction of the camps

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<sup>147</sup> P16 Vol 8 Chap 4

<sup>148</sup> P16 Vol 8 Ch 4

<sup>149</sup> Refer to Fig 8.4.2 and 8.4.3 referred to on p 13 Vol 8 Ch4.

<sup>150</sup> P17 4.3.4 Ch 4 Vol 8

<sup>151</sup> P5 Vol 8 Ch 4



- a likely date for the de-commissioning of the workers camps and site rehabilitation details
- proposals for servicing the sites
- compensation arrangements to address impacts on WDRC infrastructure.

The proponent has agreed to do this<sup>152</sup>. (See *SIMP for further details*)<sup>153</sup>

### 7.8.3 Coordinator General's conclusions

**I note** that a key strategy in QGC's Social Impact Mitigation Plan (SIMP) is the Integrated Project Housing Strategy (the Housing Strategy) which aims to mitigate project impacts on housing availability and affordability across the project footprint. In addition to providing accommodation in TWAFs, the Housing Strategy is also identifying opportunities for stock creation, worker housing management and investments in affordable housing. Furthermore, the Housing Strategy proposes to include affordable housing partnerships to provide housing for local services workers<sup>154</sup> and other actions to assist Indigenous people and people on low incomes; as well as mitigate impacts on general housing affordability. Housing strategies are being investigated in the Toowoomba region in addition to the Western Downs local government area.<sup>155</sup> The proponent also notes housing stocks provided by MAC Services<sup>156</sup> are available in Gladstone and are being developed in Dalby within villages. No further details are provided.

**I note** that the location of TWAFs for construction is to be for a temporary period and that for gas field activities, construction will be extended and operation accommodation will be established for a longer-term period. **I understand** construction TWAF locations will be subject to a range of factors associated with proximity to the construction and operational sites, accessibility to services and minimisation of impacts on landholders and local residents. **I note** the proponent raises the possibility of some of the temporary workers accommodation facilities being used to house longer-term workers with Ruby Jo, Jordan, Woleebee Creek and Bellevue highlighted in this regard. The proposed location of both temporary and longer term workers' accommodation facilities may or may not be in accordance with the existing planning schemes of the regional councils.

The proponent must consult with the Western Downs Regional Council and North Burnett Regional Council in the intended location of camps to seek Council's input in terms of siting and other considerations. **I am concerned** about the possibility of locating longer-term residents in temporary camp locations, where insufficient information has been provided about these locations. **I find** regional councils will be best placed to identify suitable locations and management measures for potential impacts. There are some overall matters on which I would nominate conditions to ensure consistency with State policies and my requirements for accommodation facilities elsewhere in this report. **I direct** that accommodation facilities are not to be located on good quality agricultural land of category A and B, considering some facilities will be present for the longer term. The proponent should note there is an expectation that once the TWAF is decommissioned, rehabilitation of the land will be required.

**I require also** that consideration be given to the appropriate location of these accommodation facilities, particularly longer-term workers' accommodation, in terms of minimisation of local and regional impacts by ensuring efficient access to resources, services and facilities and through the protection of amenity, health and safety as well as environmental values.

**I have provided** conditions on these topics in Appendix 2 Part 1, Condition 8. For further conditions relating to Social Impacts/Housing see Appendix 1, Part 3.

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<sup>152</sup> P6 Vol 8 Ch 4

<sup>153</sup> P7 Vol 8 Ch 4

<sup>154</sup> P18 4.3.5 Ch 4 Vol 8

<sup>155</sup> P25 4.3.6.2 Ch 4 Vol 8

<sup>156</sup> A camp style all-inclusive accommodation facility for mining and petroleum workers p9 Ch 4 Vol 8



## 7.9 Gas field activities

### 7.9.1 Managing rural residential land

#### Issues of concern

There are several gas field localities where the area of rural residential allotments is relatively small (12 – 24 hectares). These allotments are within the following tenements: ATP632, ATP648, ATP676, PL228, PLA261 and PLA278. Existing land uses on these allotments varies from small-scale agriculture, grazing and agistment to undeveloped private residential retreats.

At least one of these areas (PL228) is already subject to impacts from existing gas field development operations.

**I am aware** that some of the rural residents have expressed concern that they are already experiencing a range of impacts from gas field activities including noise and vibration, dust and light spill. Some residents are expressing anxiety about visitors entering their properties without their knowledge or any forewarning.

Residents are also concerned that these nuisance issues are getting more intense and some of these impacts and others will continue after the construction activities have been completed. Others have expressed concern about health and safety from leaking gas wells and about the chemicals used in gas field development.

**I have noted** that the proponent has responded to these issues in documenting the supplementary EIS.

The small size of rural residential allotments (many are 12 hectares in area) and higher population density, particularly in the Tara-Chinchilla locality, increases the risk for gas field activities to cause environmental harm and nuisance when compared to other parts of the gas field. In particular, noise and vibration, dust and light could affect more residents and these effects could have more severe impacts on residents who through physical and financial circumstances are more sedentary.

**I note** in the EIS, Appendix 8.1 that Table 3.32 of the SEIS shows that residents in the Tara SLA have the highest Core Activity Need for Assistance of any of the LGAs in the study area and that this is a measure of people with profound or severe disability. With 6.7% of the population in this group, Tara residents have 34% greater need for community assistance (including transport and health services) than Dalby LGA, generally and 43% greater than the Queensland average.

This suggests strongly that the special circumstances of rural residents in this locality should be effectively addressed by quality liaison and social impact management.

#### Proponent's responses

With respect to claims of leaking gas wells the proponent has instigated additional work streams to its maintenance program in consultation with the regulator to confirm the safety and integrity of gas field installations and to demonstrate compliance to the regulator. This is an on-going commitment.

The proponent has addressed community concerns about dust suppression by proposing use of treated CSG water, where approved by the Department of Environment and Resource Management to do so. The limitations set by the relevant government agencies, DERM and DEEDI relate to management of the salinity and control of road runoff.

The proponent states that noise issues will be addressed through a combination of planning to avoid noise, best available design, appropriate selection of equipment and mitigation measures. In respect to a specific noise source at the existing Kenya facility, QGC is currently applying a range of measures that are aimed at upgrading the noise mitigation.



While detailed mapping of rural residential allotments showing the future location of wells, pipelines and other equipment for the project is unavailable, QGC has stated that a Rural Residential Code of Conduct has been adopted to establish a basis for development activities and minimising their impact on residents. The Code is a key element of the draft Social Impact Management Plan.

The main elements of the code are founded on liaison, consultation and minimising disturbance to land owners and residents. Where the size of allotments is less than 12 hectares, or the activity is to be located within 200 metres of an occupied dwelling, no activity will take place without the consent of the owner.

Also, in order to avoid or mitigate impacts, the code specifies consultation arrangements with landowners likely to be affected by well, access track and other construction activities. Vehicle movements will also be controlled by speed limits and by operations during daylight hours (6.00am to 6.00pm).

### **Coordinator General's conclusions**

Noise from gas field activities is likely to have a significant long term influence on the gas field areas and the lives of its occupants. In this regard the Department of Environment and Resource Management has determined that before an environmental authority can be granted, the proponent must prepare a noise management plan that addresses noise sources, identifies sensitive places and undertakes modelling to predict noise separation distances for equipment (and activities). In this regard "no go" areas within 200 metres of an occupied residence may not be adequate to mitigate all equipment and activity noises. The separation distance for drilling, for example, might be 600 metres, unless other mitigation measures are integrated into the proponent's management plan.

**I therefore require** a copy of the noise constraints plan for the gas field and covering specifically well drilling activities to be submitted to me for consideration before commencing operations. This is contained in Condition 3, Appendix 2 Part 2.

Mitigation measures should also extend to planning and design to minimise the extent of drilling activities. Multi-pad drilling which has been promoted as a way of avoiding unnecessary harm to sensitive ecosystems might equally be applied to residential properties so as to minimise the number of affected residents. While multi-pad drilling would necessarily extend the period of on-site activity, the number of sites could be significantly reduced and, potentially, the piping, tanks, pumps and other equipment might be reduced (along with the extent of site rehabilitation). I have therefore required the proponent to include multi-pad drilling in its environmental Management Plans for the rural residential areas. (Condition 22 Appendix 2 Part 2).

Similarly, equipment likely to generate low frequency noise might best be placed where there is a substantial earth mass to absorb sound, such as below the brow of hills, in quarries or borrow pits or in purpose-designed pits.

While the majority of rural residential allotments may be owner-occupied, there may also be several that are tenanted or leased to another party. In this regard **I require** that the courtesies of liaison and consultation extended to all lawful occupiers and land users should be the same.

**I am advised** by landholder liaison officers that personal injuries can occur through lack of knowledge of risks associated with gas field activities and reasonable care taken during development and operation of activities. The proponent can address these matters by providing educational and training information to occupiers to explain the nature and purpose of the activities and equipment. The training should be equivalent to that required for any person undertaking an inspection.

To address safety concerns **I believe** that all reasonable steps must be taken to prevent accidental injuries to residents and to stock. In this regard **I require** all activity sites, equipment and installations to be secured by fencing and locks with appropriate signage including emergency telephone contact numbers.



**I note** that QGC is committed to undertaking effective community liaison. In this regard **I am of the view** that the above provisions and safeguards in the Code will have better effect if before each new activity is to commence, the proponent undertakes **on-site liaison** with the affected residents ensuring that there is adequate lead time to accommodate the residents' requirements. In the first instance of contact, it is essential that this should be with direct representation of the principal, rather than an operational subcontractor.

Further, occupiers of land not directly affected by QGC activities, who could also be affected by issues by virtue of proximity to sources of nuisance, should be included in liaison arrangements.

Having regard to the residents' concerns about the nature, purpose and effect of the gas field activities, **I am of the view** that the proponent must recognise the shortcomings of the Code and supplement the safeguards with information about gas leaks, safety issues, event such as fracking, chemicals used and their likely environmental effects, noise mitigation and other matters that have been already raised.

**I also note** that QGC is committed to implementing an integrated environmental management system through certification under ISO14001. **I am of the view** that quality-assured management of all elements of the environment, including social and cultural elements in a business framework would facilitate effective management of the gas field and address the needs of its residents.

**I therefore require** QGC to integrate the social impact management plan into the ISO14001 Environmental Management System, and contain the commitments above for contact with any rural residential occupants.

Under the continuous improvement structure of ISO14001 and with benchmarked management goals set by DERM, and other relevant agencies, the quality management framework will also provide the capacity to identify and address issues as they arise.

**I therefore have set** Condition 12, Appendix 2 Part 1 to require a revision of the Rural Residential Code of Conduct to encompass the above matters, before the Environmental Authority is issued over Petroleum Leases that contain rural residential areas.



## 7. Pipeline

### 8.1 Environmental

Issues associated with construction of the main gas transmission pipeline involve land disturbance, destruction of vegetation, impacts on specific ecosystems such as riverine and remnant vegetation and impacts on land uses including stock management and access tracks.

The scale of the work (380 km of export trunk pipeline, 191 km of upstream trunk) is such that it will be virtually impossible to avoid all adverse environmental effects, however, a degree of flexibility is available to the proponent to avoid or minimise harm through planning, design and technology and construction techniques. Post construction effects will be limited to inspection access for leakage and maintenance of ancillary equipment.

The proponent has refined alignment of the pipeline where feasible to avoid destruction of remnant vegetation, and to minimise impacts on existing infrastructure and land uses. In this regard the SEIS included a realignment of the Woleebee Creek pipeline to avoid areas of endangered and as-of-concern vegetation, such that there are no conservation-significant flora/fauna species or essential habitat areas along the new alignment.

#### 8.1.1 Agency advice

DERM has reviewed the gas transmission pipeline and nominated conditions that will apply to this part of the project. DERM has advised that the following matters can be addressed in the EM Plan that is to be submitted with the application for an environmental authority:

- arrangements for managing environmental nuisance (including noise, vibration and blasting)
- water management
- waste management
- sewage treatment and disposal
- minimising disturbance to land and soil management
- erosion and sedimentation control
- disturbance to land uses including stock routes, cropping, fencing and stock management
- impact on environmentally sensitive areas, endangered ecosystems and other regionally important ecosystems, declared wild river areas, fauna management, state forests and timber
- site rehabilitation
- pest and weed control
- storage and handling of chemicals, flammable and combustible liquids and incident notification procedures
- monitoring programs
- managing community issues and complaints.

DEEDI has identified the interests of Biosecurity Queensland in preventing spread of pest plants and other declared weeds that are believed to be present in the local government areas through which the gas and water pipelines are to be located. Further DEEDI has identified the need to maintain the security of the pest animal barrier fences (wild dog and rabbit). DEED has drafted a set of conditions that relate to comprehensive weed and pest management plans.

DEEDI has also requested that I include specific conditions to minimise risk of environmental damage at waterway crossings. In this regard DEEDI has provided me with specific conditions that address the issues of concern.



### 8.1.2 Coordinator-General's conclusion

**I nominate** conditions on the proponent, concerning Stock Routes, clearing of native vegetation, fauna management and species management plans, that are to address issues raised by DERM as above, which are contained in Appendix 3 Part 3.

DERM has provided me with a set of conditions specifying the matters referred to above that should be addressed in the EM Plan that accompanies an application for environmental authority for the gas transmission pipeline. **I therefore nominate** Appendix 3 Part 3 Condition 1 as Coordinator-General's Imposed conditions for this process of preparing EM Plans.

DERM has also provided me with the set of proposed environmental authority conditions which would apply if an EM Plan addressing the required matters for the gas pipeline demonstrates that the criteria in the conditions can be met. **I therefore nominate** conditions for the environmental authority (pipeline licence) that appear in Appendix 3 Part 4.

I have reviewed the draft conditions prepared by DEEDI and **I nominate** inclusion of those conditions to address the spread of pest and weeds that appear in Condition 10 Appendix 1 Part 1

**I also nominate** inclusion of specific conditions to address the potential for damage at watercourse crossings that appear in Condition 9 Appendix 2 Part 2.

## 8.2 Worker's accommodation – gas pipeline

### 8.2.1 Gas pipeline

One gas collection header (pipeline) about 194km long will collect gas from the two principal gas fields at Wandoan and the Surat Basin region. This will feed the main export gas pipeline, and run 340 km to the gas liquefaction and export facilities on Curtis Island. Changes made to the gas pipeline since publication of the EIS include the project footprint intersecting with an area under the jurisdiction of the North Burnett Regional Council, as well as traversing the original areas of Western Downs Regional Council, Banana Shire Council and Gladstone Regional Council.

At peak, 880 construction workers are anticipated to be required for the export pipeline construction. This number is 380 greater than that anticipated in the EIS. Of the 880 workers, only 700 would be in the field at any one time. This comprises three crews or spreads consisting of two spreads approximately 360 and 300 workers in number starting near Miles and a further spread of approximately 220 workers in number for The Narrows pipeline. The camps would move with the pipeline.

The gas export pipeline workforce of 880 workers are all expected to be non-local workers. These workers will travel to the project site on a fly-in fly-out basis and will require temporary accommodation. The region which the gas pipeline route traverses is mainly rural in nature, hence dedicated workers' accommodation facilities are proposed for 100% of the workers to overcome the accommodation shortfall in the region through which the pipeline corridor traverses. The proponent states the gas pipeline workforce will be housed in Temporary Worker's Accommodation Facilities (TWAFs), with the intention of avoiding significant adverse demographic, housing, and social infrastructure impacts. QGC has stated it will undertake a land use assessment in support of developing a TWAF Location Strategy, to ensure camps are located to minimise impacts on land holders, local traffic, severance of agricultural /other land uses (including community movement patterns); address council and stakeholder concerns; and maximise benefits in relation to local supply. The agency concerns listed above relate to the gas fields TWAFs but also apply to the location of the TWAFs for the gas pipeline.

### 8.2.2 Coordinator General's conclusions

**I note** the locations of the TWAF for construction of the gas transmission pipeline will be for a temporary period. Their location will be subject to a range of factors associated with proximity of accommodation to the construction sites, accessibility to essential services and minimisation of impacts on landholders, local residents and the environment. The location of these accommodation facilities may or may not be



in accordance with the existing planning scheme of regional or local councils. **I find** the regional councils will be best placed to identify suitable locations and management measures for potential impacts when locating these facilities. **I require** certain conditions to ensure consistency with state policies and my requirements for accommodation facilities elsewhere in this report. They involve the appropriate location of facilities in terms of minimising impacts, amenity, health and safety, the provision of services and facilities, the protection of environmental values as well as provisions for energy efficiency.

**I have provided** conditions on these topics in Appendix 3, Part 1, for inclusion in the petroleum pipeline licence conditions for the gas transmission pipeline.

## 8.3 State development area

A material change of use (MCU) application under the SDPWO Act is required for gas transmission pipelines and other infrastructure located in the Callide Infrastructure Corridor State Development Area (CICSDA) and the Gladstone State Development Area (GSDA). MCUs are assessed against the relevant State Development Area Development Scheme.

The Coordinator-General is the Assessment Manager for all MCU applications in the CICSDA and GSDA. In this Report, **I have nominated** conditions that should attach directly to any MCU approvals for the gas transmission pipeline and the environmental authority conditions recommended by DERM for the gas transmission pipeline to be applied under the EP Act.

The DIP has undertaken work to identify a preferred infrastructure corridor route from east of the Callide Ranges through the CICSDA, to the GSDA, and across the GSDA to Curtis Island to accommodate gas pipelines. Work has also been undertaken with the LNG proponents to identify a northern Infrastructure Corridor within the GSDA and more specifically to identify the crossing of the Kangaroo Island wetlands and The Narrows.

QGC has acknowledged this work their preferred gas transmission pipeline route is within the shared CICSDA and GSDA corridors.

### Coordinator General's conclusion

**I require** that the proposed gas transmission pipeline be located in the identified CICSDA and the appropriate GSDA infrastructure corridor. The use of a shared corridor is particularly important when crossing the Kangaroo Island wetlands and The Narrows to Curtis Island due to the environmental sensitivity of the area. The Conditions are set out in Part 2 Appendix 3, commencing with Condition 16.

## 8.4 The Narrows crossing

The Kangaroo Island intertidal wetlands and The Narrows are high value marine environments located within the Commonwealth Great Barrier Reef World Heritage Area (GBRWHA) and lie directly adjacent to the State's Great Barrier Reef Coast Marine Park (GBRCMP) to the north.

The Queensland Curtis Liquefied Natural Gas (QGC) project gas transmission pipeline route from the gas fields to the LNG facility on Curtis Island proposes to cross this environmentally sensitive area. Apart from QGC, **I am aware** of similar pipeline crossing proposals from two other LNG proponents (Gladstone Liquefied Natural Gas (GLNG) and Australia Pacific Liquefied Natural Gas (APLNG) and it is an option for a third proponent Shell Australia Liquefied Natural Gas (SALNG). These other LNG proponents, also declared significant projects under the SDPWO Act, are at varying stages of assessing environmental impacts for fundamentally similar projects, involving pipeline crossings of Port Curtis to LNG processing facilities on Curtis Island.

The pipelines across the Kangaroo Island wetlands and The Narrows vary among the proponents, in terms of route, as do the proposed construction methodologies. All projects are proposing open trenching for all or part of the total length involved which is approximately 5.4 km; comprising 3.4 km of inter-tidal wetlands around Kangaroo Island and a further 2 km waterway crossing of The Narrows.





Crossing The Narrows waterway at the head of Port Curtis is the shortest distance between the mainland and Curtis Island.

Information in the QGC EIS as well as those of other LNG proponents, indicate that potential acid sulfate soils are more than likely to be a problem if not properly managed. This is particularly so in the intertidal wetlands, where soil disturbance can lead to the creation and release of acid material, which has the potential to cause significant environmental harm to flora and fauna within the wetlands and surrounding areas including the GBRCMP. It is critical that the extent of disturbance be restricted and acid producing potential be managed effectively.

The Department of Environment and Resource Management (DERM) and the Department of Employment, Economic Development and Innovation (DEEDI) advise that it may be difficult to manage cumulative impacts arising from sequential single pipeline crossings of the area by each of the LNG proponents, which could involve up to four crossings over varying timeframes. The considered advisory agency view, is that overall environmental impacts could be better minimised, monitored and managed effectively by co-locating the pipes and undertaking construction concurrently. **I support** this view.

On 25 February 2010, in response to a request from DIP, a technical working group comprising representatives of the four LNG proponents, submitted a high level engineering concept report for simultaneous installation of four gas pipelines across the Kangaroo Island wetlands and The Narrows (GLNG Pipeline FEED – Report of Mechanised Marine Crossing Installation Concept). **I commend** the proponent for their participation in this working group including taking on the role of the Chair and offering to procure and construct a multiple pipeline crossing in the same corridor.

The report demonstrates the engineering feasibility of constructing multiple pipelines as a bundle whilst potentially minimising soil disturbance and other environmental impacts. Further work would need to be undertaken to fully assess the construction and environmental impacts. I am aware that QGC is proposing investigation of a construction method providing for 2 pipelines in 2 trenches. The co-located pipeline approach also provides an opportunity for services such as water supply, sewerage, and telecommunications to be included which will indirectly reduce environment impacts in other areas. This includes obviating the need for multiple reverse osmosis plants on Curtis Island to supply fresh water and obviating the need to dispose of treated sewage into Port Curtis. Advisory agencies have reviewed the report and support investigating the approach.

There is general support from LNG proponents for a co-located pipeline construction methodology across the wetlands and The Narrows provided the approach does not compromise individual project timings. The project timelines for the first three LNG projects (QGC, GLNG and APLNG) are broadly similar with construction scheduled to commence from mid-2010 through to 2013, and LNG exports scheduled to commence in 2014. SALNG has scheduled LNG exports to commence in 2014/2015. Given that proponents are projecting pipeline construction times of 18 months to two years, **I conclude** that construction of individual pipelines could be scheduled to allow for concurrent construction of pipelines across the Kangaroo Island wetlands and Narrows section without any or very little constraint to individual overall project timings.

Notwithstanding the above, I note that QGC are seeking to commence construction across The Narrows in 2011 to allow for an early supply of gas for commissioning of the LNG facility.

Nonetheless, I am cognisant of the proponents' concerns in this regard and in order to minimise impacts on individual project timelines from a co-located pipeline construction methodology, **I propose** that:

1. approvals for the gas transmission pipelines from the gas-fields to the Kangaroo Island wetlands and from Laird Point to individual LNG facilities be issued separately to allow construction of these segments to proceed independently of the Kangaroo Island wetlands and The Narrows section
2. a period be set for LNG proponents to successfully negotiate an agreement for a co-located pipeline construction solution across the Kangaroo Island wetlands and The Narrows.

Both DERM and DEEDI have indicated that separate environmental authority and pipeline licence approvals for pipeline sections are permissible under current legislation and administrative



arrangements. Once all approvals are in place these may be amalgamated into a single environmental authority and a single pipeline licence.

### **Coordinator-General's conclusion**

The Kangaroo Island intertidal wetlands and The Narrows are high value marine environments that are more than likely to suffer environmental damage from cumulative impacts, if sequential single pipeline crossings of the area by each of the LNG proponents is undertaken. I am of the view that overall environmental impacts in the area can be further minimised, monitored and managed effectively by co-locating all pipes in one crossing and undertaking construction concurrently by way of a co-located pipeline construction methodology. Conditions to achieve the co-located crossing can be found in Part 2 Appendix 3, commencing with Condition 16.



## 8. LNG plant

### 9.1 Environmental

The LNG component of the QGC proposal involves development, construction and operation of:

- a processing plant to convert compressed natural gas to LNG
- an export facility capable of handling 3 LNG trains (each train could have a capacity of up to 4.3 million tonnes production capacity each per annum<sup>157</sup>, approximately 12 million tonnes of LNG per annum)
- three full containment storage tanks with a capacity of between 140,000 – 160,000 m<sup>3</sup> each
- a ship loading facility, swing basin and shipping channel
- operation of LNG bulk carriers.

The operational life of the project is anticipated to be 30 years.

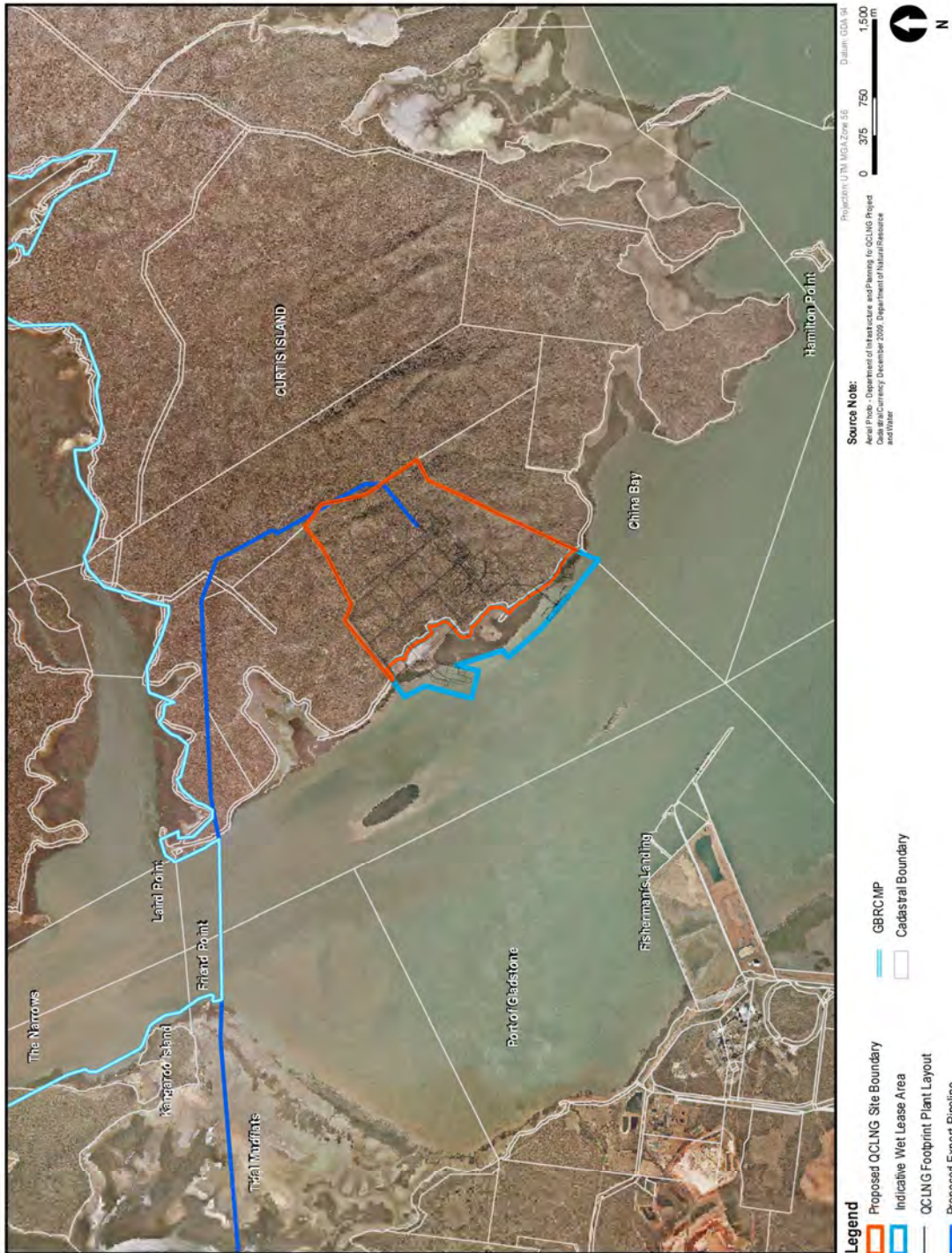
Figure 9.1 shows the LNG facility located in Curtis Island



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<sup>157</sup> SEIS Vol 1 Chapter 3 Table 2.3.1



Figure 9.1 – QCLNG facility Curtis Island



 <p><b>QUEENSLAND CURTIS LNG</b> A BG Group business</p>	Project	Queensland Curtis LNG Project	Title	Cadastral boundaries on Curtis Island and the Mainland
	Client	QGC - A BG Group business		
 <p><b>ERM</b> Environmental Resources Management Australia Pty Ltd</p>	Drawn	KP	sEIS Volume 2	Figure S2.4.4
	Approved	RS	File No:	00861656_SUP_G130/02_S2.4.4
	Date	19.01.10	Revision	0
			Disclaimer: Maps and Figures contained in this Report may be based on Third Party Data, may not be to scale and are intended as Guides only. ERM does not warrant the accuracy of any such Maps and Figures.	



## Agency advice

Construction will involve several environmentally relevant activities (ERAs) including a crushing plant for road making and concrete batching, abrasive blasting, boiler-making and steel fabrication (of large storage tanks), surface coating, timber milling (mulching of cleared timber), RO water treatment, sewerage and other waste water treatment.

Operational facilities will also involve ERAs including power generation, storage of chemicals and petrochemicals, the liquefaction plant, and ancillary operations such as a helicopter landing facility will be assessed and regulated by a set of conditions applied through an environmental authority attached to the petroleum facilities licence for the site.

The LNG component of the proposal will involve on-shore land clearing of 190 hectares of forest on the south western side of Curtis Island, between Laird Point and China Bay. Shoreline mangrove areas will generally be retained with the exception of 6 hectares of mangrove for access to the materials off-loading wharf and the LNG loading jetty and construction dock. The land development area is within the Gladstone State Development Area, as designated by the Coordinator-General.

An Environmental Management Plan must be prepared in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for the environmental authority. The proponent has drafted an Environmental Management Plan for the petroleum facility licence (LNG plant).

### 9.1.1 Coordinator-General's conclusion

I have considered the information provided in the draft EIS and SEIS, as well as submissions made on these documents. **I require** Conditions 1 and 2 in Appendix 4 Part 3 to be met by the proponent or its contractor in order to present to DERM a complete EM Plan in accordance with section 310D of the EP Act to support the application for an environmental authority for a petroleum facility licence for the LNG Facility on Curtis Island.

DERM also advises that if this is done, a set of conditions based on those reproduced in Appendix 4 Part 4 would be imposed, providing the EM Plan submitted with the application has demonstrated that the standards in these conditions will be achieved. **I note** that this set of conditions encompass the following sections: General; EM Plan; third party auditing; financial assurance; air emissions; noise management; waste management; land management; chemical storage; monitoring; and complaint and notification procedures. However **I find** that detailed conditions for water management, such as discharges of reverse osmosis water and desalination equipment, and discharges of sewerage treatment plants can only be applied after assessment of more detailed information is supplied to DERM in accordance with Appendix 4 Part 4 Conditions 2 and 3.

### 9.1.2 Other matters relating to the LNG facility

The proponent has stated that dredge spoil from the access channel and swing basin is not part of the proposal, as dredging component is considered under the Gladstone Western Basin Strategic Dredging and Disposal Project. This is consistent with the Government's intention for the Port of Gladstone Western Basin Dredging Project and Western Basin Master Plan.

There may be certain associated developments planned for outside the petroleum tenure, i.e. operational works in tidal areas, associated with material off-loading facilities (MOF), jetties and ship loading facilities. DERM advises that there is insufficient information to assess these activities, and furthermore it is not my usual practice to deal with operational works judgements. **I therefore state** that this evaluation report will not condition those activities as they will be conditioned through subsequent approvals processes.



## 9.2 Worker's accommodation – LNG facility

A material change of use (MCU) application under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) is required for the LNG facility. This also includes any temporary workers accommodation facility (TWAF), and its associated infrastructure, as this development is proposed to be located within the Gladstone State Development Area (GSDA). The Coordinator-General is the Assessment Manager for all MCU applications in the GSDA and these applications are assessed against the development scheme for the GSDA. A MCU application for the LNG facility and associated infrastructure, which includes the TWAF, was lodged with the Department of Infrastructure and Planning on the 8 April 2010. At the time of writing, this MCU application is undergoing assessment.

On 31 March 2010, I **provided**, without prejudice, advice to several LNG companies in terms of accommodating workers on Curtis Island as part of their LNG facilities. In this advice I told proponents I accepted the use of land within the CIIP for TWAFs "in principle". Based on the information provided to date, I find that the temporary workers accommodation facility of 1,500 single person compartments is acceptable. Consideration of any increase to the number of single compartments in the TWAF above 1,500, can be facilitated through the subsequent MCU assessment process as described in Condition 7 of Appendix 4. During this process, the proponent must demonstrate need for the size of the proposed TWAF, provide justification for the proposed timeframe for use of the land, and show how the potential impacts can be satisfactorily addressed despite the inconsistency with the GSDA development scheme.

In this Report, I **have nominated** conditions that will attach directly to any MCU approvals for the LNG facility. I may also impose additional conditions on the LNG facility during the MCU assessment process. In addition, I nominate environmental authority conditions recommended by DERM for the LNG facility and associated infrastructure to be applied under the EP Act.

### 9.2.1 Construction workforce

After a revision of workforce estimates undertaken in the supplementary EIS, a peak total LNG site workforce for all LNG facilities construction<sup>158</sup>, that is two trains, is estimated to be 3,300<sup>159</sup> workers, with levels above 3000 occurring between months 27 - 33. Some workers will be offsite at any time bringing the total peak Gladstone workforce to 3,000<sup>160</sup>. This includes **all** local and non-local personnel, subcontractors employed on the LNG facility site, as well as EPC non-manual workers and QGC non-manual personnel.

Local workers are estimated to peak at 900, rising above the 550 between months 21 and 42. The peak months above 800 are between months 24 and 33.

Assuming a two train schedule, which extends over about 50 months and the above estimation of local workers, the non-local workers range from 1050 at 12 months up to a maximum of about 2400 at month 30. The levels rise above 1500 between months 24 to 40. QGC estimates that up to 20% of non-local workers will seek residence in Gladstone. Based on the above schedule of workforce breakdown, the workforce from non-local sources which requires housing in Gladstone will range from about 200 at 12 months up to above 325 at 34 months and 340<sup>161</sup> at 36 months slowly winding down to 260 at 48 months.

For the first eight months of the project, all construction workers will be accommodated on the mainland. QGC estimate this workforce could reach about 900. Since a proportion of workers will be imported, there will be requirements for accommodation on a temporary basis on the mainland for this period.

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<sup>158</sup> includes LNG storage tanks, marine facilities and site preparation – see page 23 Vol 2 Ch 13

<sup>159</sup> See page 7 of Volume 8, Chapter 6.

<sup>160</sup> Based on labour availability which is dependent on other simultaneous projects

<sup>161</sup> Vo8 Ch 6 pages 8-10



A TWAF will be built within the LNG Facility boundary on Curtis Island and will be available for partial accommodation of construction workers approximately eight months after the start of construction. Construction workers hired from within the Gladstone region will continue to live in their current residences and commute daily to the Curtis Island construction site, out of Auckland Point.

Approximately 250 non-local non-manual personnel will be accommodated in Gladstone City or the surrounding region and commute to Curtis Island daily from Auckland Point. Approximately 1,700<sup>162</sup> non-local craft and other non-local personnel have been proposed to be accommodated in the purpose-built TWAF on Curtis Island at peak construction. The proponent is to develop an Integrated Housing Strategy for the project area, comprising of plans to address housing production and affordability in Gladstone.

## 9.2.2 Operational workforce

The LNG facility will operate 24 hours a day, 7 days a week. The proposed on site operation workforce is shown below.

**Table 9.1 LNG operation workforce**

Staff type	Work hours	Number shifts	Workforce numbers
Maintenance	Monday - Friday 07:00-16:00	1	30
Operations	7 days 06:00-18:00/18:00 – 06:00	4	20
Administration	Monday - Friday 07:00-16:00	1	30
<b>Total on site</b>			<b>80</b>
<b>Total employed</b>			<b>140</b>

It is proposed that the operational workforce will live in the Gladstone area and travel daily from Auckland Point to Curtis Island. However, it has been identified that some workers accommodation of up to 115 single units will be required on site during operation to cater for unscheduled maintenance operations and emergency accommodation for when travel back to the mainland is not safe.

## 9.2.3 Coordinator-General's conclusion

In addition to the QCLNG proposal, there are three other LNG facilities proposed to be located on Curtis Island. Using the workforce data provided by proponents, it is estimated that a construction workforce of about 9,000 to 12,600 will be required to construct all four proposed LNG facilities during the peak construction years.

I have had some difficulty in determining the size of the construction workforce for each LNG facility and the total construction workforce if all projects were to be developed, due to lack of clarity and certainty regarding:

- actual workforce numbers and the size of the non local workforce because inconsistent information is provided throughout the EIS process
- the stated timing of construction of the LNG facilities does not reflect that the construction timetable will be driven by market forces
- reliability of the projects proceeding.

To determine the cumulative effects of all the LNG facilities proposed to be constructed on Curtis Island I used the proponent's expected proportion of local workers, to estimate that approximately up to 340 non local workers at peak will be attracted to live in Gladstone and therefore require housing. It is important to note that the proportion of local workers used by each LNG proponent is based on their project being the first or only LNG facility being constructed. Consequently, if there is more than one

<sup>162</sup> This includes a subtraction of 11% for workers off-shift



LNG facility being constructed at any one time, the proportion of local workers will decrease and the number of non local workers will be greater.

A potential influx of approximately 8,000 people would significantly increase the existing population of Gladstone. Using the medium population projections prepared by the Population Forecasting and Information Unit of Queensland Treasury for the Gladstone Regional Council area, an additional 9000 to 12,600 people would equate to an increase of about 20 per cent to the existing population of about 63,000 or about 20 per cent of the FTE workforce of the Gladstone region.

**I believe** that a population and workforce increase of this magnitude over a relatively short period of time will have significant impacts on the existing Gladstone community. Consequently, each LNG facility requires an accommodation strategy for the non local workers.

## 9.3 Material change of use

A material change of use (MCU) application under the SDPWO Act is required for the LNG plant, including the associated infrastructure and any temporary workers accommodation located in the Gladstone State Development Area (GSDA). As the LNG plant is proposed to be located in the Curtis Island Industry Precinct (CIIP) of the GSDA the Development Scheme for the GSDA applies. The Coordinator-General is the Assessment Manager for all MCU applications in the GSDA. In this Report, **I have nominated** conditions that should attach directly to any MCU approvals for the LNG plant and the environmental authority conditions recommended by DERM for the LNG plant and associated infrastructure to be applied under the EP Act. In addition, **I have nominated** Coordinator-General Imposed Conditions which **I apply** under the provisions of Division 8 of Part 4 of the SDPWO Act.

## 9.4 Hazard and risk

### 9.4.1 Issues of concern

The principal hazard and risk scenarios for the LNG facility involve operation of the plant and loading and shipping of the LNG through the port. Submissions queried the explosion and fire potential from plant operation, and the consequences of shipping collisions in the harbour. Risks during construction were seen as a secondary order of magnitude. However, there was significant concern for safety of a workforce housed on site, not during initial construction, but during subsequent construction programs of second and third trains when the site is in operation or a neighbouring site is operating. Another possibility of risk is that of seismic event and damage to the plant.

### 9.4.2 Risk assessment

The EIS conducted a risk assessment of the plant operation, and also discussed the risks of shipping incidents. LNG carrier shipping is reported to be relatively safe from loss of containment because of double hull design of modern tankers which gives secondary protection to the LNG storage tanks even if grounding or collision occurs.

#### Shipping

Quantitative risk analysis of the port transit considered collision, grounding, striking and total impacts. Allowing for the operational characteristics and layout of Gladstone Harbour, the likelihood of an incident is low and because of the double hull design, the chance of a loss of containment from an LNG vessel grounding in Gladstone Harbour is considered to be less than  $2.1 \times 10^{-6}$  per visit. This is low compared with the acceptable planning criteria for fatality risk in built up areas of  $1 \times 10^{-6}$ .

The EIS quotes reports indicating that no loss of containment from double hull LNG vessels have been experienced in the past 25 years of worldwide shipping. The Gladstone Harbour Master has conducted LNG shipping simulation studies and together with shipowners has designated a policy of two tugs in the outer harbour and four tugs in the inner harbour for berthing of LNG tankers. There will also be a minimum 30 minute departure distance between vessels. With ship design, maintenance and harbour





management the analysis concluded that LNG ships in Gladstone Harbour could have one third lower incident rate than other shipping.

Analysis of loading risks in the EIS proposed that an exclusion zone of 250m would be satisfactory. This corresponds to the Quantitative Risk Assessment  $50 \times 10^{-6}$  contour for fatality risk which is considered by planning criteria as acceptable for industrial areas.

The EIS conducted an analysis of the shipping risks of transit through the outer route of the Great Barrier Reef (GBR). A comparison was made of worldwide LNG incidents and GBR incidents related to the number of LNG vessels proposed for the GBR route. This yielded an estimate of the chances of LNG release in Great Barrier Reef transit of about  $1.6 \times 10^{-7}$  per ship transit or one order of magnitude lower than the risk of the ship loading process.

### **LNG plant operation**

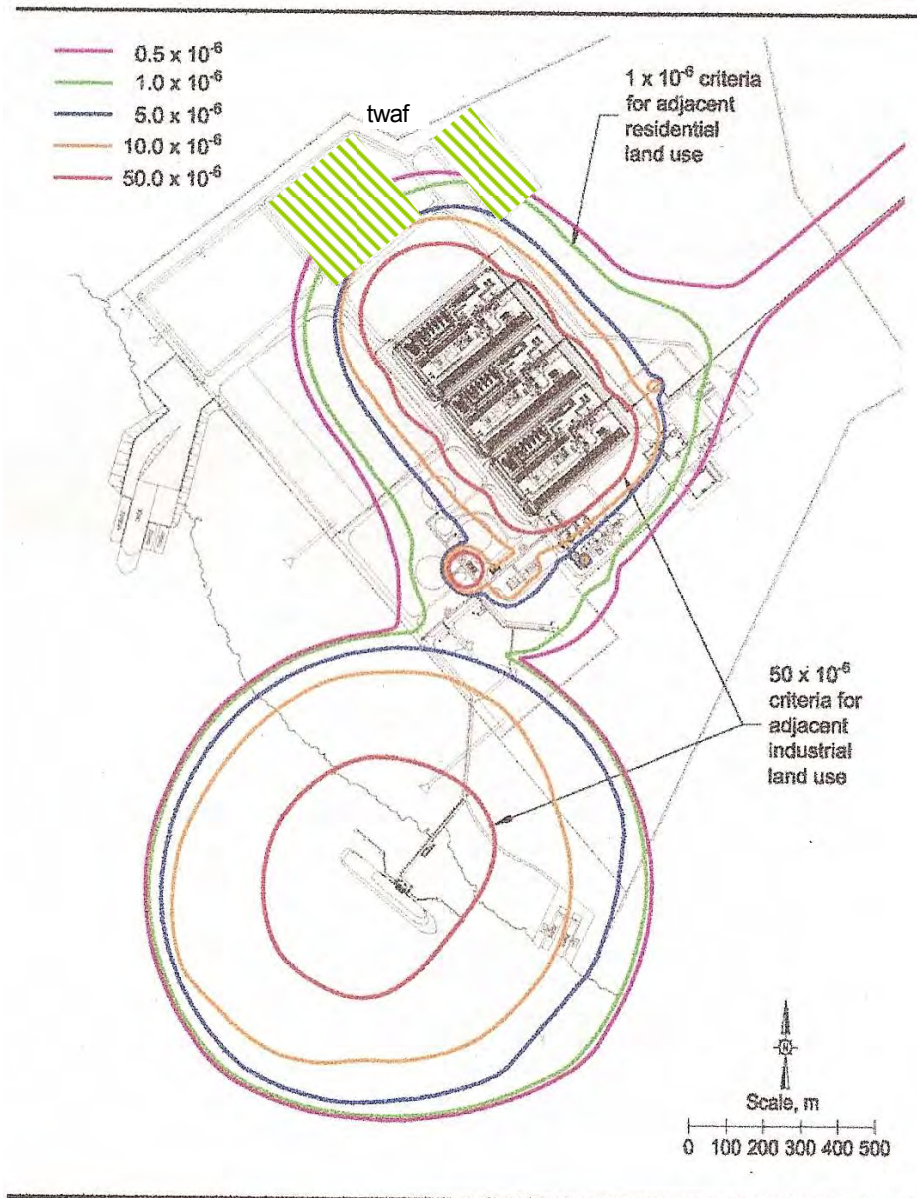
The EIS indicated that the hazards from operations of the LNG plant are analysed in four ways:

- risk contours taking likelihood and consequence into account
- overpressure from explosions
- heat flux from fires
- vapour cloud flammability.

A risk assessment according to Australian Standard AS/NZS 4360 (now named AS/NZS ISO31000) was conducted and the fatality risk contours from all hazards were drawn on the plant site. The fatality risk contours are reproduced in Figure 9.2, showing all risk contours, from  $50 \times 10^{-6}$  (Industrial risk criteria) down to  $0.5 \times 10^{-6}$  (sensitive developments) including the residential criteria of  $1 \times 10^{-6}$  per year.



**Figure 9.2 Risk contours for the QGC facility – operational hazards (3 trains)**



The green contour represents the residential criteria of  $1 \times 10^{-6}$  per year, and the figure shows that all contours are kept within the land site boundaries, except for a small overlap of the neighbouring site in the south east corner. Examination of the site plan of this adjacent site (the GLNG project), revealed that no permanent facilities of the GLNG project are constructed in this corner. Contours of the QGC project over water surround the ship loading berth, resulting in the 250 metres exclusion zone described above.

I note that Fig 6.1 shows three trains of development on the site, which is the development scenario as communicated to me for the project.

As well as the risk contours shown above, the EIS presented results of consequence analyses conducted on a range of scenarios, which consider sources of overpressure (explosion), thermal radiation (fires, flames), or spills of flammable liquids (LNG). While the results of these assessments are complex, and consider many scenarios in a number of critical locations in the plant, the reason the EIS evaluated these elements was to identify "vulnerability zones" which indicate where an effect from



the hazard will be felt when and if it occurs. While this does not include the probability, it does set out where a person is “vulnerable” to that hazard.

**Table 9.2 Vulnerability zones for the QGC facility - operational hazards**

Event	Hazard	Criteria	Vulnerability Zone
Propane Storage vessel leak	Boiling Liquid Expanding Vapour BLEVE	Heat Flux 4.7kW/m <sup>2</sup> thermal radiation (1)	Contained within site boundary
Ethylene storage vessel leak	Boiling Liquid Expanding Vapour BLEVE	Heat Flux 4.7kW/m <sup>2</sup> thermal radiation	Contained within site boundary
LNG storage tank	Failure of tank	Heat Flux 4.7kW/m <sup>2</sup>	Contained within site boundary
LNG storage tank	Vapour cloud	½ lower flammability limit. (2)	Worst case, if unignited, cloud could extend up to 4.5 km under certain conditions
Liquefaction train leak	Vapour Cloud	Lower Flammability Limit	Contained within site boundary
Liquefaction train leak	Torch Fire and Pool fire	Heat Flux 4.7 kw/m <sup>2</sup> Thermal radiation	Contained within site boundary
Liquefaction train leaks (7 potential sites)	Vapour cloud explosion	Overpressure 7kPa (3)	Contained within site boundary
Power generation area	Vapour cloud explosion	Overpressure 7kPa	Contained within site boundary
Refrigerant storage area	Explosion	Overpressure 7kPa	Contained within site boundary

Note (1) Vulnerability criteria of 4.7kW/m<sup>2</sup> is the heat flux not to be exceeded at residential areas.

Note (2) ½ Lower Flammability Limit of a vapour cloud is 50% below the lower concentration at which the cloud can ignite.

Note (3) Vulnerability Criteria of 7kPa is the overpressure not to be exceeded at residential areas.

As indicated by the above table the EIS indicates that the vulnerability zones as defined by the heat flux and overpressure criteria, all are confined within the site boundary. However the report does not specify the zone dimensions if they are inside the boundary. Nevertheless this means that no one located in the open air outside the site will experience harmful impacts from these hazards. Persons inside buildings will be shielded from this level of hazard at the edge of the vulnerability zone. The statement that the vapour cloud under worst case conditions, from catastrophic failure of the main LNG storage tank, could extend approximately 4.5 km, is one which is qualified further in the report as follows: “the likelihood of the flammable cloud growing to its maximum extent would be extremely low”. The EIS indicates that the most likely possibility is that the cloud reaches an ignition source within the LNG facility while small, where it would self ignite in a short-lived flash fire.

### Acceptance criteria

The accepted Australian risk contour criteria for planning are drawn from the NSW Hazards Industry Planning Advisory Paper No 10 (HIPAP 10) Risk Criteria for Land Use Planning. The criteria for residential areas is 1x10<sup>-6</sup> per year. As can be seen from Fig 6.1 the 1x10<sup>-6</sup> per year contour is kept within the site boundary, except over water.

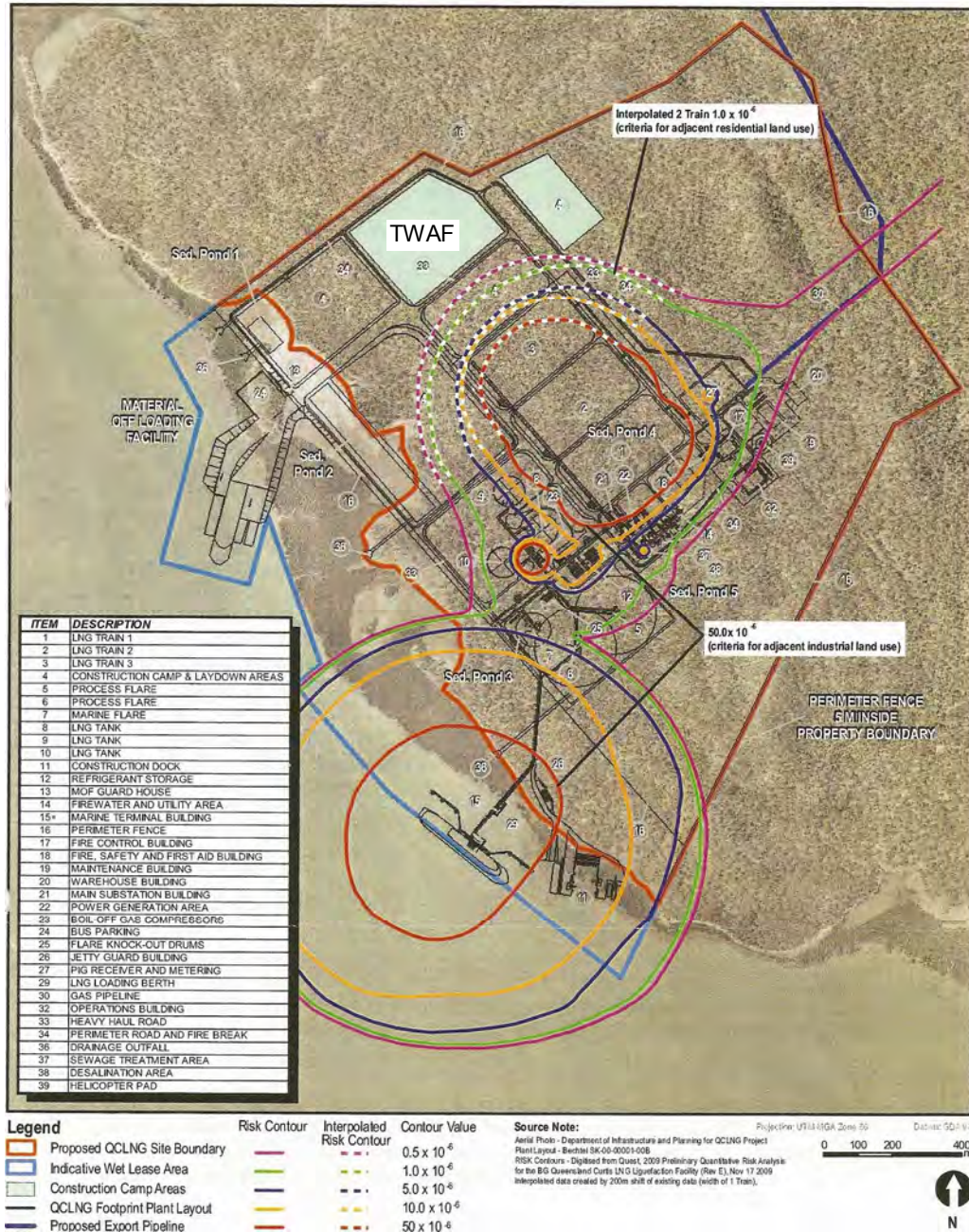
The conclusion reached is that if the plant is laid out so as to keep all these contours and the 1x10<sup>-6</sup> risk contour within the site boundary, then there is no unacceptable risk to surrounding sites.

The siting of a temporary workers’ accommodation facility (TWAF) on the LNG plant site is shown in Fig 6.1 as the green hatched areas in the northwest of the site. While this shows that the proposed location for the accommodation facility is crossed by the risk contours which surround the plant, the contours are for a three train operating plant. During construction of the third train, the TWAF is outside the risk



contours. This is shown on Fig 9.4 below where the dotted contours for an operating two train plant do not cross the TWAF location. In other words there is enough space on the site to ensure that the TWAF is located where the risk contours will not affect it as a residential area, for trains 1, 2 and 3 construction.

**Figure 9.3 Risk contours for the QGC facility – operational hazards (2 trains)**



However if a fourth train was to be built while a three train LNG plant was in operation, the above location of the TWAF would no longer be acceptable from a risk contour viewpoint.

The acceptance criteria for vulnerability in residential areas are also taken from HIPAP 10. For overpressure the level of 7kPa is specified (at which probability of injury is 10%), and for heat flux 4.7kW/m<sup>2</sup> (at which injury is experienced after 30 secs exposure). For vapour clouds, I have referred to an overseas standard from the United States of America, NFPA 59A *Standards for the Production, Storage and Handling of LNG*, and have set a criteria that the LNG storage tanks are to be sited so that the half lower flammability limit from a vapour cloud escape does not reach the site boundary.



The EIS and SEIS for QGC do not specifically present vulnerability zone contours, but indicate that heat flux and overpressure are confined with the site boundary. There is no mention of whether the half lower flammability limit for the LNG storage tanks is kept within the boundary.

Similarly there is no mention of whether these vulnerability zone contours do not intercept the construction accommodation facility boundaries.

On the question of seismic risk to the plant, the EIS identified that the structural design of the plant would be governed by AS1170.4 Structural design: Earthquake Design Actions in Australia.

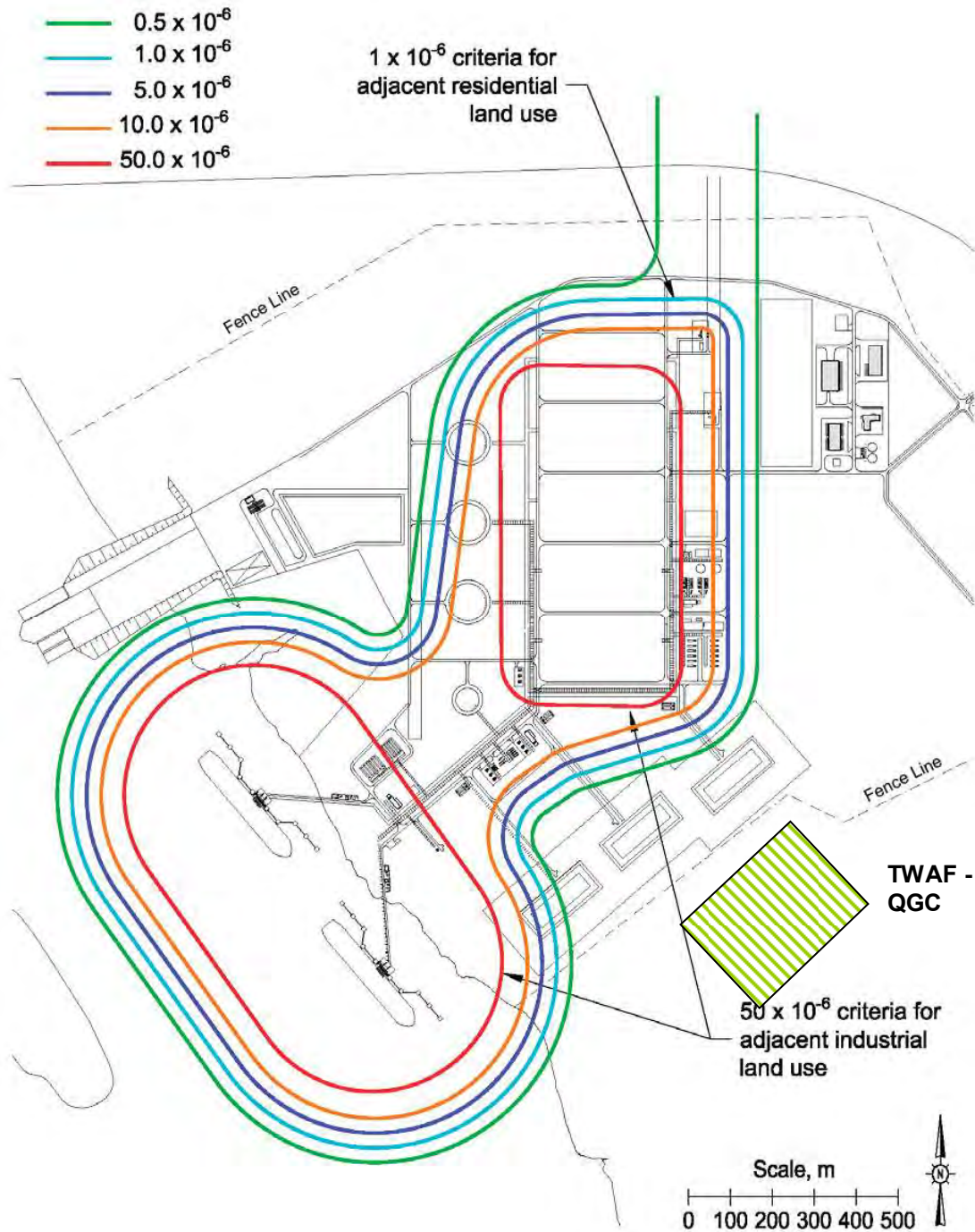
*Risk from adjacent site*

The adjacent site to the west contains a proposal by Australia Pacific LNG (APLNG) for four train LNG plant of a similar nature to the QGC plant. The proximity of the QGC TWAF to the western boundary, and hence the APLNG facilities, warrants some examination, from a hazard and risk point of view.

Figure 9.5 shows the general site plan of APLNG together with the approximate location of the QGC TWAF on the adjacent site.



Figure 9.4 APLNG site plan and adjacent QGC construction accommodation facility



This shows that the risk contours from APLNG are also confined within the project site, and therefore do not affect the position of the QGC construction accommodation facility. However the positioning of the TWAf at the site boundary, and adjacent to the APLNG ground flares, raises siting as well as safety questions that have been examined with information from APLNG.

Australia Pacific LNG has chosen to use ground flares in the LNG facility as these have advantages over stack flares including visual amenity, reduced plume height, burning control, reduced GHG emissions and noise attenuation. The proposed ground flares are state of the art technology backed up with good operational experience at the Darwin LNG plant.



There are no radiation safety issues on the outside of the ground flare enclosure. The ground flare is designed such that when flaring is taking place, it is safe for personnel to be present on the outside of the enclosure. This would appear to satisfy the HIPAP10 criteria that a heat flux  $4.7\text{kW/m}^2$  contour should not cross the site boundary.

Results of preliminary noise modelling for the APLNG project undertaken as part of EIS studies showed that:

1. Noise levels during maximum emergency flaring may exceed the 67 dBA criteria for sleep disturbance in an air-conditioned (closed windows) accommodation facility if located just beyond the boundary closest to the ground flares.
2. Noise levels during maximum emergency flaring beyond the boundary of the Australia Pacific LNG site were predicted to be less for the ground flares than for an equivalent stack flare.

While noise is a criterion when in operation, during the construction period of both projects operational noise impacts do not apply.

### **Coordinator-General conclusions**

**In considering** the hazard and risk assessment of the LNG facility, **I note** the study done in the EIS is of the nature of a preliminary hazard analysis and risk assessment as recognised by the Australian Standard. **I accept** that the results of this analysis represent the risk information applying to the project as it is designed now, and are sufficient to make judgements of its risk to the community.

The Queensland legislation applying to this Major Hazard Facility is the *Dangerous Goods Safety Management Act 2001*. Under this Act the Hazardous Industries and Chemicals Branch (HICB) of Workplace Health and Safety Queensland will require a full Safety Report on the facility when designed for construction, including a Systematic Risk Assessment. It is at this stage that refinements to the risk assessment can be made during the detailed design phase of the project.

**I have consulted** the Hazardous Industries and Chemical Branch and they have advised me that they will require the project to demonstrate by a Systematic Risk Assessment that the project risks are confined within the site boundaries. **I therefore apply** Condition 1 (Appendix 4 Part 2) to require the proponent to undertake this assessment.

**I accept** that the risk assessment in the EIS shows that the fatality risk contours for residential criteria and the injury risk criteria for fire, explosion and vapour flammability lie within the site landward boundaries. Hence **I am of the opinion** that the residential safety criteria are satisfied at adjacent sites. **I therefore nominate** the criteria to achieve this which must be satisfied in the above systematic Risk Assessment. This appears as Condition 2 Appendix 4 Part 2.

**I am aware** that the proponent is proposing to locate a temporary workers' accommodation facility (TWAF) on the plant site.

In another section of this report I discuss the acceptability of this from a planning and environmental view, but from a hazard and risk point of view it would only be satisfactory if the location of the TWAF is such that it achieves the same residential safety criteria as listed in Condition 2 Appendix 4, Part 2.

**I have therefore** nominated Condition 2 Appendix 4, Part 2 to specify that the residential safety criteria be met at the boundary of the TWAF, which **I have further defined** to include a buffer of 50m around the TWAF as an extra precaution.

**I have examined** the interaction of the adjacent LNG facility with the TWAF on the QCLNG site, since it is located adjacent to the site boundary and the proposed location of ground flares on the QPLNG site. **I am satisfied** that the ground flares, when in operation, will not affect the safety of a properly constructed TWAF that is located with a 50 metre buffer that have specified in Condition 2. **I do recognise** that this interaction will not be relevant until the APLNG project is commissioned, at which time the TWAF may not be inhabited.



**I note** that noise of the ground flare in operation may have to be taken into account in the design of the TWAF to achieve internal noise criteria which I have set elsewhere in this report

**I plan** to apply these overlapping conditions to other LNG sites on Curtis Island and in so doing, **I believe** that hazard and risk criteria will be confined to each site, and also there will be no risk criteria interaction between sites. **I recommend** that the HICB take this principle into account when examining the systemic risk assessment of this plant and others on Curtis Island which it will be examining.

On the shipping issue **I am satisfied** that harbour management by the Gladstone Ports Corporation and the LNG Shipping provisions of Maritime Services Qld, through the Regional Harbour Master, will be sufficient to manage the transit of LNG ships through Gladstone harbour in a safe manner.

The location and operation of a second and third train was demonstrated in the hazard and risk assessment and **I observe** that their acceptability from a risk and hazard point of view is demonstrated above. Hence the two conditions I have written present the assessment and acceptability criteria which this plant site would have to meet if it was expanded.

Although the third train construction might be a future scenario, **I have written** Conditions 1 and 2, Part 2, Appendix 4 to apply to the assessment of any TWAF located on the site during construction of a first train, even though the operational risks may not be experienced during initial construction. However, **I believe** they must be applied from the outset to take account of all potential situations which may rise through timing of construction of multiple LNG plants in the precinct.

## 9.5 Multiple LNG trains

I have been provided with sufficient information on the construction and operation of Trains 1 and 2 of the LNG facility by QGC on Curtis Island to make effective decisions on their acceptability. This includes environmental, safety, workforce, scheduling, accommodation and description of construction and operation. The proponent's strategy for Trains 1 and 2 is to construct them concurrently, with a start for Train 2 being undertaken about 12 months after Train 1. This strategy is planned to attract and maintain a core of highly skilled trades and specialist workforce to transition from Train 1 to Train 2 and derive significant equipment and labour productivities. This minimises the incremental workforce peak to an additional 600 persons for Train 2 over Train 1, albeit for a longer period.

The period for construction of two trains concurrently is about 60 months, with a peak workforce on the island for about 14 months in the second and third years of the 5 year period.

With regard to approval for the proposed third train of the LNG plant, if the proponent decides to proceed with a third train before the end of four (4) years after this report **I will consider** extending the currency of my report for a further two (2) year period to enable the third train construction to commence within that two (2) year period. **I have set** Condition 8 Part 2 Appendix 4 to reflect my decision on approval for the third train





## 9. Conclusions

**I am satisfied** that the EIS process conducted for the project adequately meets the requirements for impact assessment, to the greatest extent practicable, in accordance with the provisions of Part 4 of the *State Development and Public Works Organisation Act 1971* (Qld) and Part 5 of the *State Development and Public Works Organisation Regulation 1999* (Qld).

The EIS process has provided sufficient information to all stakeholders to allow an informed evaluation of potential environmental impacts which could be attributed to the project. Careful management of the key construction and operational activities must ensure that any potential environmental impacts will be avoided and/or minimised.

Conditions have been set by me in this report in order to further manage impacts to threatened species, ecological communities, natural and heritage features, transport impacts, safety and risk and social impacts through management strategies, regulatory conditions and monitoring and reporting requirements.

**I consider** that on balance there are strong positive net advantages to be derived from the project that will benefit the state of Queensland. **Therefore I recommend** that the QCLNG project, as described in detail in the EIS and the SEIS and summarised in Section 2 of this report, can proceed, subject to the conditions contained in Appendices 1-4 of this report.

Despite the above, in the event of any inconsistency between the project as described in the EIS, SEIS, and the Coordinator-General's conditions, the conditions shall prevail. QCLNG and its agents, lessees, successors and assigns, as the case may be, must implement the conditions and recommendations of this report and all commitments presented in the EIS, SEIS and EMPs. It is the responsibility of the proponent to ensure the project is carried out in accordance with the EIS as modified by the SEIS, and that full compliance with all imposed conditions is achieved. Copies of this report will now be issued to:-

- Queensland Gas Company, a BG Group business, as the designated proponent representing the QCLNG project, in accordance with section 35(5)(a) of the SDPWO Act.
- Department of Environment and Resource Management in accordance with section 43 and 53 of the SDPWO Act, with respect to:
  - recommended conditions to be attached to a development approval for Environmental Authorities under the *Environmental Protection Act 1994*
  - as assessment manager for development approval for operational works pursuant to the *Sustainable Planning Regulation 2009*, *VMA* and *Water Act 2000*.
- Department of Employment, Economic Development and Industry (DEEDI) (particularly Queensland Mines and Energy) (QME) as assessment manager for development approval for petroleum activities pursuant to the *Petroleum and Gas (Production and Safety) Act 2004*.
- Gladstone Regional Council, Western Downs Regional Council, North Burnett and Banana Shire Councils as assessment managers for development approval for any aspects of development within the local government areas pursuant to the *Sustainable Planning Regulation 2009*.
- Department of Transport and Main Roads with regard to transport infrastructure required under the *Transport Infrastructure Act 1994* and *Maritime Safety Regulations 2004*.
- Gladstone Ports Corporation as assessment manager for the development within the Gladstone strategic port land.
- Department of Justice and Attorney-General (Hazardous Industries and Chemicals Branch) as assessment manager for major hazard facilities under the *Dangerous Goods Safety Management Act 2001*

Other advisory agencies and private submitters who participated in the EIS process will also be provided with access to a copy of this report.

In accordance with section 35(5)(b) of the SDPWO Act, a copy of this report will also be made publicly available on the Department of Infrastructure and Planning's website at [www.dip.qld.gov.au](http://www.dip.qld.gov.au).



# Appendix 1

## Whole of project

This Appendix applies to the whole project

### Part 1 – general

#### Coordinator-General imposed conditions – general

In accordance with section 54A and 54B of the *State Development and Public Works Organisation Act 1971*, I **n nominate** that the following conditions apply to the project.

These conditions take effect from the date of this report.

##### Condition 1

The following third party auditing requirements must be applied for the whole project:

1. Compliance with the Coordinator-General's imposed conditions of this report must be audited by an appropriately qualified and experienced third party auditor or auditors appropriate to the matters being audited, nominated by the proponent and accepted by the Coordinator-General, within one year of the project receiving the Final Investment Decision to proceed and annually thereafter.
2. The proponent must submit the third party audit report(s) to the Coordinator-General within 42 calendar days of the end of the relevant period.
3. The audit report must identify the segment of the project being audited, the conditions that were activated during the period, and a compliance/non-compliance table. A description of the evidence to support the compliance table must be provided. The audit report shall also contain recommendations on any non-compliance or other matter to improve compliance. The third party auditor must certify the findings of the audit report.
4. The financial cost of the third party audit is borne by the proponent.
5. The holder of the environmental authority(s) must immediately act upon any recommendations arising from the audit report and:
  - a. investigate any non-compliance issues identified
  - b. as soon as practicable, implement measures or take necessary action to ensure compliance with this authority.
6. Subject to condition 1(a), and not more than 30 calendar days following the submission of the audit report, the proponent must provide written advice to the Coordinator-General addressing the:
  - a. actions taken by the proponent promptly and routinely to ensure compliance with the Coordinator-General's imposed conditions
  - b. actions taken to routinely prevent a recurrence of any non-compliance issues.

##### Condition 2

The proponent shall when first becoming aware of a non-compliance of any Coordinator-General imposed condition:

- authorise and undertake action to bring the matter into compliance within an effective time frame as approved by the Coordinator-General
- report the non-compliance and remedial action to the Coordinator-General within five business days of becoming aware of the non-compliance matter.



### **Condition 3 Case management costs of government**

The proponent will contribute to the case management costs of government in managing submissions and assessments required by the Coordinator-General's report expeditiously through agencies over the implementation phase of the project. This will be calculated on a unit basis for the level of an agency's involvement, costed at \$75,000 per unit. The basis of agency allocation of units will be:

Coordinator-General	4 units
Dept of Environment and Resource Management	4 units
Dept of Employment Economic Development and Innovation	2 units
Dept of Transport and Main Roads	2 units
Dept of Community Safety	1 unit
Gladstone Regional Council	2 units
Western Downs Regional Council	2 units
Banana Shire Council	1 unit
Gladstone Ports Corporation	2 units

The Coordinator-General may allocate further units to the stated agencies or new agencies should additional case management work be required as a result of resubmissions and reassessment. The unit cost will be indexed at the commencement of each calendar year in accordance with schedule 1 of section 25A of the *State Development and Public Works Organisation Act 1971*.

Payment will be required on submission of the first documentation for assessment by the agency concerned.

### **Condition 4 Greenhouse Gas Emissions Strategy**

The proponent must develop and implement a greenhouse gas reduction strategy for the project. The strategy must include, but not be limited to, the company's policy on greenhouse gas emissions, an energy efficiency program, a continuous improvement program, better control systems and a CO<sub>2</sub> recovery plan. The strategy must be submitted to the Coordinator-General for approval within 90 calendar days of the granting of the petroleum facilities licence for the LNG facility.

### **Condition 5 Annual Environmental Returns**

An Annual Environmental Return is to be submitted to the administering authority for each environmental authority granted or amended as part of the QGC project, and in accordance with the following:

- the Annual Environmental Return is to provide details regarding the status of disturbance, progressive rehabilitation and final rehabilitation associated with project activities
- the Annual Environmental Return is to identify all non-compliances with Coordinator-General's Conditions, Environmental Authority Conditions, Operational Plans, and commitments made in the EM Plans supplied with the EA application
- the Annual Environmental Return is to provide details regarding complaints relating to environmental harm and environmental nuisance made during the Period
- the Annual Environmental Return is to identify and amendments needed to the EM Plans to achieve compliance with the Environmental Authorities.

The Annual Environmental Return is to be lodged with the administering authority not more than 30 calendar days after the anniversary date of each environmental authority.



## **Condition 6 CSG Industry Monitoring Group**

The proponent must assist in the establishment and funding of, and participate in, a CSG Industry Monitoring Group (CIMG) to assess and report on the cumulative environmental and social impacts of the CSG Industry and its activities. The CIMG will provide an independent and open forum to manage common and emerging environmental and social issues for the CSG/LNG industry in Queensland. It will be chaired by the Coordinator-General or his delegate. The CIMG may consist of representatives of industry, community, local government, professional associations, technical experts and State regulatory agencies.

The group's objectives are to include:

- reviewing project environmental and social impacts and interactions between proponents
- reviewing monitoring data for cumulative environmental impact implications for all proponents
- responding to community concerns and identifying issues where proponents and relevant agencies can take action to manage impacts
- reviewing impacts on strategic cropping land and good quality agricultural land
- recommending changes to legislation, policies and guidelines to address emerging issues from the CSG and LNG industry.

The Directors-General of DEEDI and DERM will be requested to provide a detailed Terms of Reference for the Group to the Coordinator-General.

## **Condition 7 Environmental Offsets**

1. An Environment Offsets Program, consistent with the *Queensland Government Environmental Offset Policy 2008* and specific issue policies, must be provided to the Coordinator-General and administering authority covering gas field development, pipeline construction and LNG facility construction and operation.
2. The program must address, but not be limited to impacts on vegetation and biodiversity arising from:
  - a. exploration, development and operation of the coal seam gas fields
  - b. construction and operation the gas transmission pipeline
  - c. construction and operation of the LNG facility
  - d. construction of coastal marine infrastructure
  - e. other activities (e.g. construction camps, port works for the project, ancillary works).
3. The program must detail:
  - a. the principles adopted for the environmental offsets strategy
  - b. the predicted total loss (extent and type) of areas of ecological value (e.g. remnant vegetation, high value regrowth, wetlands, significant conservation species, habitat, biodiversity corridors)
  - c. the procedure to identify the requirements for environmental offsets for specific components of the project over the life of the project
  - d. relevance to any legislative requirements for offsets
  - e. the mechanism to secure and manage the environmental offset for long term protection of values
  - f. the proposed location, size and values of the offsets
  - g. any management measures, including funding, required to maintain or enhance values for the life of the offset
  - h. a system for reporting to the CG on offset arrangements, their management and how offset values are met and maintained.
4. The offsets program must be provided to the Coordinator-General for review prior to the commencement of significant construction activities for gas fields, pipelines and the LNG Plant.



5. An initial offset package for gas fields, pipelines and the LNG Plant, consisting of specific land tenures, their environmental values and related management commitments/funding, is to be provided to the CG and DERM within 6 months of: the issue of any gas field environmental authorities (pursuant to the EP Act); or amendment of any existing gas field environmental authorities (pursuant to the EP Act), relating to proposed QGC activities.
6. The offset package is to be based on the specific offset requirement derived from "ground truthing" of endangered ecosystems and other vegetation proposed to be disturbed under the new or amended environmental authority.
7. To establish baseline information, the extent of existing project disturbance (on the petroleum tenement areas the subject of the environmental authority) and the status of the operational plan (including progress and status of rehabilitation) be provided at the time of submission of the offset package.
8. The following is an acceptable solution to the system for reporting for the gas fields in Condition 3, above:
  - a. Each operational plan provide a detailed disturbance and rehabilitation summary that includes: (a) a current account (audit at commencement of operational plan period) of disturbance and rehabilitation; (b) a planning period proposal (for the duration of the operational plan) of disturbance and rehabilitation; and (c) a reconciliation (actual, third-party audited account at the end of the operational plan period) of disturbance and rehabilitation areas.
  - b. The disturbance and rehabilitation information provided in the operation plan should be both qualitative and quantitative in its description of vegetation and use category descriptions that are inclusive and consistent with Commonwealth EPBC Act legislation (i.e. EPBC listed communities and species habitat) and Queensland legislation and policy (e.g. areas described include Category A, B and C environmentally sensitive areas).
  - c. The cumulative actual (third-party audit reconciled) vegetation disturbance and rehabilitation information (qualitative and quantitative, using category descriptions as required to be presented in the operational plan), be published, maintained and updated on the proponent's website for the duration of the QGC project.
  - d. A reconciliation statement should be prepared that accounts for the offsets provided against the actual vegetation disturbance and rehabilitation information (qualitative and quantitative).
  - e. A list of environmental offsets (accepted and in place) for all reconciled vegetation disturbances is simultaneously presented (with the reconciled vegetation disturbance information) and the listed offsets are clearly described (qualitatively and quantitatively), and maintained and updated on the proponent's website for the duration of the QGC project.
  - f. The reconciliation statement is updated at least annually by the proponent.
  - g. The reconciliation statement (third-party audit reconciled) is to be submitted to the CG, and the relevant State and Commonwealth environment administering authorities for the project (DERM and DEWHA) on the first annual anniversary of date of approval, and annually thereafter.

## **Condition 8 Stock Routes**

Prior to the commencement of significant construction works, the proponent and its contractors must consult with the relevant Department of Environment and Resource Management's Senior Lands Officer (Stock Routes) and local government stock route officers through the relevant regional offices, in relation generally to the intended location of the gas field infrastructure and associated infrastructure and the potential impacts on the stock route, as well as specifically to the following:



1. Where there are to be permanent disruptions to the stock route network, the corridors shall be realigned or replaced with a similar width and suitable country type to allow for the unimpeded movement of travelling stock.
2. Where there are to be temporary disruptions to travelling stock (i.e. from the installation of buried infrastructure), suitable arrangements must be negotiated with the relevant local government prior to the commencement of works.
3. Options for permanent or temporary diversions of stock may be considered provided that the routes are safe for travelling stock and drovers, and the travelling public.
4. Adequate watering facilities and other travelling stock infrastructure shall be provided where existing facilities become redundant due to the approved activities.
5. The parts of the stock route network disturbed or affected by the works must be rehabilitated upon completion of the project to a state that is safe for travelling stock and drovers, and the travelling public, and is consistent with the area's pre-disturbance state unless otherwise agreed by DERM and the local government.

**Condition 9  
Nature Conservation Act**

1. An authorised person must be employed where there is a risk to native fauna present within the clearing site. An authorised person is a person permitted to tamper and interfere with a protected animal or a protected animal's breeding place. (For example, a licensed spotter-catcher is someone who is specifically licensed as a spotter-catcher through a Rehabilitation Permit issued by DERM).
2. The permit holder must ensure any protected animals injured by clearing activities under this permit are referred to an appropriate wildlife carer group or veterinarian (to be predetermined prior to clearing) and DERM must be notified within 24 hours of any injuries or deaths.
3. Rehabilitation of the gas fields and pipelines corridors should allow for the maximum re-establishment of native vegetation including the shrubby understorey and ground cover, providing habitat for small ground dwelling fauna species and restoration of landscape connectivity.
4. A species management plan for affected EVR listed species (both terrestrial and marine) must be prepared for the total project including, development, operation and decommissioning phases. The plan must satisfy the requirements under section 322 of the Nature Conservation (Wildlife Management) Regulation 2006 relating to tampering with animal breeding places. The plan shall be developed to:
  - a. address the impacts to the species
  - b. provide for the survival of the species in the wild
  - c. achieve a net conservation benefit for the species.

The Species Management Plan should be developed in consultation with DERM.

**Condition 10  
Weed and Pest Management**

1. Prior to commencement of construction work, the proponent and its contractors must consult with the relevant officers from the Department of Employment, Economic Development and Innovation in respect to the detection and control of weeds and pests.
2. Comprehensive weed management plans to be prepared in consultation with relevant local governments and Biosecurity Queensland, for construction and operational stages of the proposed development (including gas fields, pipelines and the LNG facility).



3. The plans must be reviewed regularly and updated to ensure weed and pest management strategies are based on the most up to date information and amended in response to any changes in the distribution, priority, biosecurity risk and status of weeds and pests.
4. Pursuant to Section 52, Division 2 of the *Land Protection (Pest and Stock Route Management) Act 2002*, the proponent is required to make an application to the Chief Executive of the Department of Employment and Economic Development and Innovation with regard to the Wild Dog Barrier Fence and to the Darling Downs Moreton Rabbit Board with regard to the Darling Downs Moreton Rabbit Board Fence and making openings in these fences for a particular purpose and period.
5. Consistent with the National System for the Prevention of Marine Pest Incursions and in relation to activities undertaken in areas that may disturb littoral and marine areas, the proponent and its contractors must collaborate with Gladstone Port Corporation, to ensure appropriate marine pest management procedures are in place.
6. A management plan must be developed in consultation with Fisheries Queensland and Biosecurity Queensland, to detail measures designed to protect fish habitats from, and to prevent translocation of, pest fish and other water-borne pest species.
7. Any flora or fauna species (including native and exotic species) which may be translocated as a result of treated CSG discharged water into natural water bodies must be monitored and managed in consultation with Fisheries Queensland and Biosecurity Queensland.



## Part 2 – Transport

### Coordinator-General imposed conditions - transport

These conditions are **imposed** by the Coordinator-General on the project under section 54A and 54B of the *State Development and Public Works Organisation Act 1971*.

These conditions take effect from the date of this report.

#### Condition 1

Subject to condition 2 below regarding pipe transport at Gladstone, rail transport from the point of importation to the field marshalling yard must be used for at least 75 per cent of pipe transport tasks for the export pipeline and gas collection header pipelines.

#### Condition 2

The proponent must not discharge any pipes at Gladstone (Auckland Point or Port Central) unless the proponent submits a plan to GPC for its approval to limit the impact of noise during the discharge operation and:

- a) the quantity of pipes to be conveyed by road from the port is less than that required for 70 km of the pipeline route
- b) the proponent has in place an agreement with Queensland Rail that all pipe products required for the gas transmission pipeline greater than 70km from Port Central will be transported by rail to, at least, Biloela (or somewhere west of Gladstone to be agreed).

If the proponent determines that for either environmental or commercial reasons, it is expedient to utilise another port other than Gladstone or Brisbane to discharge pipe or other materials, then a thorough transport and road impact study will have to be undertaken and a transport plan submitted to the Coordinator-General for approval. In preparing the study and plan, the proponent shall liaise with and have regard to the views of relevant authorities including the Departments of Infrastructure and Planning (DIP), Transport and Main Roads (DTMR), Environment and Resource Management (DERM), Employment, Economic Development and Innovation (DEEDI), the relevant port authority and all relevant local governments.

#### Condition 3

The proponent must consult with GPC, DTMR (including MSQ), DERM, DEEDI and Gladstone Regional Council (GRC) within 90 calendar days of receiving the final investment decision to proceed to:

- a) obtain agreement that the proposed use at each berth that the project plans to use is acceptable to GPC
- b) produce an environmental report in support of the relevant permits including the impacts and mitigation measures for the proposed berth locations that the project plans to use within the Port of Gladstone and submit to GPC for approval
- c) prepare a Gladstone Logistics Plan (GLP) to incorporate typical proposed material and personnel movements (including through the marina area) around Gladstone. The proponent is required to work with the relevant authorities and proponents on how the GLP will be integrated with facilities and movements of other significant project proponents, or projects advised by the CG, including the calculation of infrastructure costs
- d) submit the GLP for approval to GPC, GRC, DTMR and the Coordinator-General
- e) obtain all the necessary approvals associated with use of a berth location before any construction is commenced
- f) negotiate, arrange timing to pay and pay for any necessary road and or intersection improvements that may be required as a consequence of the QGC project proceeding and based on the Gladstone Logistics Plan. The proponent must upgrade, maintain or hand back roads in no worse a state of repair compared with the condition at the start of construction activities. If any agreement between the proponent and GPC, DTMR and GRC is not able to be concluded within six months of





submission of the GLP for approval, the proponent may refer the matter to the Coordinator-General for resolution

- g) negotiate, arrange timing to pay and pay for any necessary berth upgrades (including associated dredging) and vehicle parking stations that may be required to cater for the extra movement of goods and personnel that the project will generate based on the GLP
- h) implement the approved GLP.

#### **Condition 4**

1. The proponent must prepare, within 90 calendar days of receiving the final investment decision to proceed, and prior to any significant construction works commencing in the area, a Surat Region Logistics Plan, which must incorporate:
  - a) all proposed material and personnel movements throughout the Surat region by QGC, a break-up of transport tasks between road and rail and details of consolidation centres
  - b) details of how transport infrastructure and movements proposed amongst other significant projects and other projects, as agreed between the proponent and the Coordinator-General, might be rationalised in an efficient manner
  - c) in relation to b) above, provide details of cost sharing amongst the parties for road and intersection upgrades and provision of any other transport infrastructure.
2. The plan must be submitted to DTMR, the Coordinator General, and relevant Surat region councils for approval.
3. The proponent must implement the approved Surat Region Logistics Plan.

#### **Condition 5**

The proponent must provide bus transportation services for the movement of its construction workforce to and from the marina area at Gladstone to designated worker parking areas as agreed with GPC and GRC. Worker parking areas must be designed and constructed to protect the amenity of neighbours.

#### **Condition 6**

The proponent must:

1. Within 90 calendar days of receiving the final investment decision to proceed prepare a Marine Traffic Management Plan for vessel traffic management services required in the Gladstone harbour during the construction and operation of the project, ensuring terminology used in the plan is consistent with transport operations (Marine Safety Regulations 2004). DTMR must approve the plan.
2. 12 months prior to the first operations of LNG shipping tankers, finalise and submit to MSQ and the Regional Harbour Master (Gladstone), for review and approval, a Shipping Transport Management Plan for the project, ensuring terminology used in the plan is consistent with the transport operations (*Marine Safety Regulations 2004*). This will include an assessment of maritime safety requirements and ship-sourced pollution for the LNG shipping component of the project. The assessment and provision of mitigation measures must ensure that navigational safety is maintained at all times for the life of the project. Detailed information regarding vessel movements will be required for shipping traffic associated with associated LNG shipping operations. Information should include, but not be limited to:
  - a. types of ships
  - b. size of ships
  - c. maximum draughts
  - d. frequency of movements
  - e. proposed pattern of operation
  - f. berths used and purpose of use.



3. Provide / upgrade all aids to navigation and/or vessel traffic management services required for the project in accordance with the abovementioned plans.
4. Implement the approved Plans. DTMR will be the agency responsible for monitoring compliance with this condition.

Note, where agreement can not be reached between the parties, the matter may be referred to the Coordinator-General for determination.

#### **Condition 7**

Low wake impact ferry design and operation methodology shall be utilised to minimise the impact of wash and sediment disturbance on the shorelines of Curtis Island, other affected islands, and the mainland.

#### **Condition 8**

The proponent must:

- a) participate in the Road Transport Infrastructure Cumulative Impacts Study – Proposed LNG Industry Impacts and cooperate with the study consultants and provide all RIAs and draft RMPs to DIP as inputs to the Study
- b) implement the findings of this Study as determined by the Coordinator-General after consultation with stakeholders, both in finalisation of RMPs and any infrastructure agreements regarding road infrastructure, which may be required to address road impacts.

#### **Condition 9**

Within 90 calendar days of receiving the final investment decision to proceed, and prior to any significant construction commencing in the area, the proponent must:

- a) Finalise the road impact assessment (RIA) that includes details of all project transport impacts on the safety and efficiency of state-controlled roads. The RIA must be prepared in accordance with the *Guidelines for Assessment of Road Impacts of Development (2006)* and the methodology outlined in the notes for Contribution Calculations prepared by the former Department of Main Roads, Central District. The RIA is to be prepared in consultation with the Manager DTMR Rockhampton Regional Office and submitted to DTMR for review and approval.
- b) Prepare a road-use management plan (RMP) for all use of state-controlled roads for each phase of the project. The RMP will detail traffic volumes, proposed transport routes, required road infrastructure maintenance and/or upgrades to mitigate road impacts, any necessary conditions about access/connection to public roads, transport scheduling, dust control and road safety strategies. The RMP is to include arrangements to ensure compliance with the management of freight and materials and workforce movements associated with the project. DTMR must approve the plan prior to implementation.
- c) Update the RMP with outcomes of the Road Transport Cumulative Impacts Study when completed, and the Gladstone and Surat Region Logistics Plans (Conditions 3 and 4 above), and revise road infrastructure agreements as appropriate to the outcomes of the studies and plans.
- d) Enter into a road infrastructure agreement with DTMR to formalise the amount of, and timing for the payment of, contributions towards any necessary road maintenance and upgrades identified in the finalised RMP. If the road infrastructure agreement between the proponent and DTMR is not able to be concluded within six months of approval of the RMP either party may refer the matter to the Coordinator-General for resolution. The proponent shall upgrade, maintain and hand back roads in no worse a state of repair compared with the condition at the start of construction activities.
- e) Obtain the relevant licenses and permits under the *Transport Infrastructure Act (Qld) 1994* for works within the state-controlled road corridor, prior to undertaking any works.



- f) Within 90 calendar days of completion of each phase of construction involving permanent works within a state-controlled road corridor, submit 'as constructed plans' to DTMR.

DTMR will be the agency responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.

### **Condition 10**

Within 6 months of receiving the final investment decision to proceed, and prior to commencement of any significant construction in the area, the proponent must:

1. Prepare a local authority Road Inventory for all roads nominated in the EIS and SEIS for potential use by the project detailing:
  - a. condition
  - b. level of service
  - c. traffic count
  - d. any other road and traffic characteristic such as type of user.
2. Prepare a road impact assessment (RIA) that includes details of all project transport impacts on the safety and efficiency of the local road network, in accordance with the current standards and policies of the relevant local government. The RIA is to be prepared in consultation with the relevant local government and submitted to the local government for review and approval.
3. Identify any requirements for new roads.
4. Prepare a road-use management plan (RMP) for all local roads and any new road proposals for each phase of the project. The RMP will detail traffic volumes proposed transport routes, required road infrastructure maintenance and/or upgrades to mitigate road impacts, any necessary conditions about access/connection to public roads, transport scheduling, dust control and road safety strategies. The RMP is to include arrangements to ensure compliance with the management of freight, and materials and workforce movements associated with the project. The relevant local government must approve the plan prior to implementation.
5. Update the RMP for local roads with outcomes of the Road Transport Cumulative Impacts Study when completed and the Gladstone and Surat Logistics plans, and revise any relevant road infrastructure agreement as appropriate to the outcomes of the studies and plans.
6. Enter into a road infrastructure agreement with the relevant local authority to formalise the amount of, and the timing for the payment of, contributions towards any necessary new roads, road maintenance and upgrades identified in the finalised RMP for local roads. If the road infrastructure agreement between the proponent and the relevant local government is not able to be concluded within six months of approval of the RMP either party may refer the matter to the Coordinator-General for resolution. The proponent shall upgrade, maintain and hand back roads in no worse a state of repair compared with the condition at the start of construction activities.
7. Note that the road infrastructure agreement is to include a provision for a review of the infrastructure contribution where changes to the road and intersections are made up until 2014 and every 3 years thereafter in line with the proponent's revision of the gas field operations plan.
8. Within 90 calendar days of completion of each phase of construction involving permanent works within a road corridor submit 'as constructed plans' to the relevant local government.

Western Downs Regional Council, Banana Shire Council, North Burnett Shire Council, Gladstone Regional Councils and any other relevant local governments will be the agencies responsible for monitoring compliance with this condition within their respective jurisdictions. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.



### **Condition 11**

Prior to commencement of any significant construction works for the project, the proponent must:

1. Prepare a traffic management plan for all state-controlled roads and local roads corridors for review by DTMR, the Queensland Police Service (QPS) and all affected regional councils and take account of the reviews. The proposed plans must incorporate a provision that, prior to commencing any program of high volume or oversize transport movements which may be required for the construction of the project, the proponent will consult with DTMR, the QPS and all affected regional councils.
2. Obtain the necessary permits for any excess mass or over-dimensional loads associated with the project as required under the *Transport Operations (Road Use Management) Act (Qld) 1995*. The proponent must provide forward advice of over-dimensional vehicle movement schedules to QPS, three months in advance of the movement schedule commencing, or later by arrangement with the Regional Traffic Coordinator, Central Police Region, Rockhampton.
3. Implement the approved traffic management plan during construction and commissioning of the project and construction of all roads and intersections.

DTMR, the relevant local government and the QPS are the agencies responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.

### **Condition 12**

Within 6 months of the final investment decision to proceed, the proponent must:

1. Reach agreement with Western Downs Regional Council (WDRC) on what upgrades, if any, will be reasonably required at various regional airports and aerodromes and assist the Council obtain the relevant approvals to undertake these works.
2. Reach agreement with WDRC on what contribution the proponent will make to the cost of the upgrade.

WDRC is the agency responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.

### **Condition 13**

During the detailed design phase of the project and prior to any road or access track upgrade or construction for the project, the proponent shall consult with DERM to identify, assess and mitigate impacts to terrestrial and aquatic ecosystems and develop a standard EMP for design and construction of environmental offset and mitigation measures associated with road and access track works.

### **Condition 14**

At the end of the first gas phase of field development, or 1 January 2015, whichever comes first, or if the pipeline rail transport contracts fall below 75 percent of the full pipeline task, the proponent shall:

1. Initiate a revision of the Surat Region Logistics Plan to identify proposed material and personnel movements and future transport tasks, for the next phase of project development and operations, which shall be at least a three years projection, or in the case of the pipeline rail transport trigger, for the balance of the 75 % of the full pipeline transport task.
2. Include in the revised Surat Region Logistics Plan provisions for cost sharing for future infrastructure alterations and improvements.
3. Submit for approval to DTMR, the Coordinator-General, and relevant Surat local governments for approval, the revised Surat Region Logistics Plan.



4. Implement the approved revised Surat Region Logistics Plan.

#### **Condition 15**

The proponent shall work closely with the officers in charge of Gladstone and Dalby District Traffic Branches, Queensland Police Service when developing traffic and transport management plans, to ensure a capability in policing responses to security risks and emergencies is developed cooperatively.

#### **Condition 16**

Prior to construction of the proposed helipad at the LNG plant, the proponent should submit all detailed design plans for the proposed helipad to the Coordinator-General once detailed designs are completed, and obtain approval for the helipad site prior to its construction.

#### **Condition 17**

Within six months of the Coordinator-General's Report, or as extended by the Coordinator-General, the proponent must:

1. Commit to stack flares not unreasonably interfering with existing and future Gladstone air traffic, and providing all information reasonably required by airport authorities (CASA, Airservices Australia, and Gladstone Regional Council as airport operator) relating to the design and operation of the stack flare.
2. Participate in a study "The Cumulative Impact of LNG Project Gas Flares and Plumes on Air Traffic", together with other LNG project proponents. The study and solutions recommended by the study are to be funded by all LNG project proponents, and managed by the Coordinator General.

The object of the study is to minimise the impact of LNG project gas flares and plumes on air traffic, and Terms of Reference will be drawn up to include but not be limited to:

- detailed and cumulative modelling of plume and flare systems
- environmental and economic impact of flare systems, including ground flares
- impacts to consider routine and emergency flaring and gas plumes
- impacts to include a risk-based methodology, utilising statistical analysis
- airport airspace management arrangements
- recommending a range of potential solutions and a preferred solution, in consultation with airport authorities
- recommending a process for facilitation of formal agreement(s) among the LNG industry and airport participants, relating to the impact of gas flares and plumes
- recommending a process for the implementation of solution(s).

In the event that agreement cannot be reached among participants, the matter may be referred to the Coordinator-General for mediation, direction or necessary action.

#### **Condition 18**

Subsequent to the outcome of the "Cumulative Impact of LNG Project Gas Flares and Plumes on Air Traffic Study", and prior to the commissioning of the LNG facility, the proponent will reach agreement with Gladstone Regional Council regarding a proportion of funding for Instrument Landing Systems for the Gladstone Airport to cater for cumulative air traffic movements. In the event that agreement cannot be reached among participants, the matter may be referred to the Coordinator-General for mediation, direction or necessary action.



## Recommendation

It is recommended that the proponent coordinate with other LNG proponents in regard to ferry and other related staff travel to achieve staggered working shift changes and avoid high personnel shipping periods in the port environs.

In the event that agreement cannot be reached among participants, the matter may be referred to the Coordinator-General for mediation, direction or necessary action.

## Part 3 – Social impact

### Coordinator-General imposed conditions – social impact

In accordance with section 54A and 54B of the *State Development and Public Works Organisation Act 1971*, I nominate that the following conditions apply to the project.

#### Condition 1

##### Social Impact Management Plan (SIMP)

Specification for finalisation of SIMP

The proponent must:

1. Revise the draft SIMP to:
  - a) record stakeholder feedback and provide a report on outcomes of the release of the draft SIMP
  - b) include the key responsibilities, partnership opportunities and project engagement strategies for the local governments affected by the project.
2. Within 30 calendar days of the project receiving a final investment decision to proceed, the proponent must submit the SIMP consistent with the Social Impact Assessment Unit, Department of Infrastructure and Planning draft guidelines and requirements for SIMP preparation, for review and approval by the Coordinator-General. The final SIMP must include:
  - a) a Monitoring Program for mitigation and management strategies designed to address social impacts
  - b) a Community Engagement Strategy which contains a list of key stakeholders and describes their interest in the project; actions, outcomes, mechanisms, to support a regular review of the effectiveness of the community engagement strategy
  - c) a Dispute Resolution Mechanism.
3. Implement the approved SIMP in conjunction with other social impact conditions specified in the Coordinator-General's Report.

#### Reporting, Review and Auditing Arrangements

4. With respect to the approved SIMP the proponent must:
  - a) submit an annual progress report incorporating any amendments to the SIMP. The actual date is to be mutually agreed by the proponent and the Social Impact Assessment Unit, Department of Infrastructure and Planning
  - b) undertake an external audit:
    - i. at the completion of the construction stage of the project
    - ii. periodically every 5 years after the commencement of the operational stage, and
    - iii. at project closure during the decommissioning phase of the project.
  - c) prepare and submit a report on each audit's findings to the Coordinator-General
  - d) submit all annual, periodical, and audit reports are to the Coordinator-General within 60 calendar days of completion of the relevant period.



The proponent may also elect to conduct additional internal reviews. The results of SIMP reviews will be reported in BG Group's 'Social and Environmental Performance Report' and forwarded to the Coordinator-General.

#### Requirements for any amendments to SIMP

5. The proponent must revise the SIMP after completion of the construction stage of the project or advise the Coordinator-General that amendments and updates to the SIMP are required under the following circumstances:
  - a) strategies and actions no longer meet the desired outcomes, or to improve their effectiveness
  - b) changes in government policy, significant changes to company operations and site structure, or significant national/international changes to management approaches and frameworks.
6. Identify a process to facilitate any amendments and agreed between the Coordinator-General and the proponent. If necessary, the Community Engagement Strategy (incorporating an Indigenous Peoples Plan and Social Investment Plan) should be updated to describe how stakeholders will be engaged in any change process at the time.
7. Alter, re-structure, re-scope or extinguish the SIMP through agreement by both government, (coordinated by the Coordinator-General) and the proponent, following consultation with key stakeholders, including the Regional Community Consultative Committees (RCCC).

### **Condition 2**

#### **Community engagement**

The proponent must:

1. For the life of the project, establish community shopfronts in Chinchilla and Gladstone to provide information and community access for the project. Additional shopfronts may be established as the project progresses, depending upon community feedback to the proponent.
2. For the duration of construction plus 12 months in the respective project component areas QGC will consult and provide progress reports to the Gladstone (LNG Facility), Banana and North Burnett (Gas transmission line) and Western Downs (Gasfields) RCCCs
3. For the life of the project, QGC must consult and provide progress reports to the Gladstone (LNG Facility), Banana and North Burnett (pipeline) and Western Downs (Gasfields) RCCCs on:
  - a. the Community Engagement Strategy including providing opportunities for the committees to provide input into community engagement activities in each region
  - b. the Stakeholder Management Plan for the purposes of analysing stakeholder needs and tailoring engagement strategies to suit the level of interest and impact relative to each stakeholder
  - c. analysis of issues raised in the Issue Register and the proponent's response to these issues, including mitigation of social impacts.
4. For the life of the project, QGC must gauge community satisfaction in regard to the quality and appropriateness of the project's community engagement strategies including - 1800 free-call service; project website; freepost service, and, as required; survey instruments; market research; community workshops and public information sessions
5. For the life of the project, QGC must conduct issue specific workshops inviting a cross section of the community to discuss potential solutions to key issues.
6. For the life of the project, QGC must hold periodic community information sessions where landholders and community members are invited to discuss specific issues and negative social impacts of concern



7. For the life of the project, QGC must develop and deliver a 'Project Newsletter' on a regular basis to provide updates, RCCC meeting dates and highlights; community engagement outcomes; contact points for community information and enquiries and the project's dispute resolution mechanisms
8. Prior to the project closure and the decommissioning of the project component, QGC must actively inform the community.

QGC may provide a case to the Coordinator General to alter, restructure or extinguish these arrangements after agreement by both government (facilitated through the Coordinator-General) and the proponent, following consultation with key stakeholders, including the Regional Community Consultative Committees (RCCC).

### **Condition 3**

#### **Complaints process**

When submitting the SIMP for final approval, the proponent must provide the Coordinator-General with the final versions of the QGC complaints process and grievance procedure and the Rural Residential Code of Conduct.

The proponent must for the life of the project:

1. Implement a community feedback procedure. Landowners must be able to deal directly with QGC regarding any concerns that they have. QGC must maintain a 24 hour emergency response line for all members of the community to report incidents or issues relating to safety, health and environmental amenity or harm.
2. Stakeholders must be able to provide feedback to a QGC employee, or to a toll free number or to the Project email address. Complaints must be acknowledged and within 24 hours, and stakeholders advised regularly of progress in addressing their complaint.
3. Continue the employment of dedicated Landholder Advisors for the Gas fields and pipeline corridor to ensure landholders have 24 hour- 7 day access to raise concerns, and dispute resolution mechanism available to them at no cost to the individual or community.
4. Implement procedures for receiving and dealing quickly and effectively with complaints. The complaints procedures must include a range of methods, including:
  - a. face to face meetings
  - b. printed material in local newsletters, magazines, community notices boards or meeting points
  - c. notification of key community groups and networks (interagency groups).
5. Implement the Rural Residential Code of Conduct and the Land Use and Land Access Social Impact Action Plan (which includes land access protocols) as outlined in the QGC SIMP and update the Code of Conduct and Land Use and Land Access Social Impact Action Plan when necessary.
6. Maintain a Complaints Register that includes the following information - identification of the complainant, the identity of the person who is receiving the complaint, the manner in which the complaint was made, the time and date on which the complaint was made, addressed and closed out and description of the complaint. The Register must include identification of the entity responsible for addressing the complaint, the time and date on which the complaint was addresses and closed out, a brief summary of any action taken to address the complaint, and a notation as to the satisfaction or dissatisfaction of the complainant with the outcomes.
7. The proponent's performance in management of complaints is to be included in the Progress Reports as specified in Condition 3 b) and 3 c) above.





#### **Condition 4 Consultative Committees**

1. The proponent is required to establish three Regional Community Consultative Committees (RCCCs) in response to the social impacts identified for each of the project components including the Coal Seam Gas (CSG) field; Gas transmission pipeline; and the Curtis Island (LNG) facility
2. The three RCCCs are to cover the Council areas of:
  - a. Western Downs Regional Council (to 2020)
  - b. Banana and North Burnett Shire Councils (to December 2012)
  - c. Gladstone Regional Council (to June 2020).
3. The focus of the RCCCs is to provide input to implementation of social impact mitigation and management strategies identified in the EIS process and receive and comment upon reports on the implementation of the Social Impact Management Plan (SIMP).
4. The proponent must provide:
  - a. a clear and agreed Terms of References (ToR) for each RCCC developed in consultation with each of the chairs and members
  - b. appoint Independent Chairs for each committee and provide out-of-pocket expenses for operational expenses, should it be required
  - c. membership details to include representation from Regional and Shire Councils, State Government representative, Chamber of Commerce, Service Groups, peak bodies for industry, indigenous representatives, welfare providers, and community members.

#### **Condition 5 Resourcing of Consultative Committees**

The proponent must:

1. Provide full resourcing of the secretariat for the RCCCs to cover Western Downs Regional Council, North Burnett and Banana Shire Councils and Gladstone Regional Councils for each of the QGC project components (Coal Seam Gas (CSG) field; areas impacted by the gas transmission pipeline; and the Curtis Island (LNG) as specified in Condition 4.3.
2. Provide support to each of the RCCCs as stated above in (1) including the requirement that the proponent:
  - a. employ Community Liaison Officers and Shopfront Staff in both Gladstone and Western Downs regions at a convenient access point for the local community.
3. The proponent is required to ensure that the Community Liaison Officers provides secretariat support to the RCCCs; and continues to provide the central point of contact for community relations in the respective regions for the life of the project.

#### **Condition 6 Industry leadership**

1. Within one month of Final Investment Decision being received by a second LNG project, the proponent must jointly establish and participate actively in an Industry Leadership Group for CSG Resource Projects to provide cross-project coordination across the region in response to cumulative social and other impacts.
2. Participation in the Industry Leadership Group for CSG Resource Projects will be reported to and commented upon by the RCCCs.



### **Condition 7 Commitments**

The proponent must:

1. Provide a copy of the Commitments Register for the QGC project to the Coordinator-General, prior to final approval being given to the Social Impact Management Plan (SIMP).
2. Update the QGC SIMP to include the commitments.

### **Condition 8 Social mitigation and investment**

The proponent must:

1. Submit the final Social Impact Mitigation and Investment Proposal and the proposal for the QGC Community Development Fund for the QGC project to the Coordinator-General prior to presenting the final SIMP to the Coordinator-General for approval.
2. Ensure that the Social Impact Mitigation and Investment Proposal and Community Development Fund are incorporated into the final QGC Social Impact Management Plan (SIMP) for approval.

### **Condition 9**

#### **Integrated Housing Strategy**

The proponent (QGC) or its construction contractor must develop an *Integrated Project Housing Strategy* for the project in consultation with Councils and the Department of Communities, within 90 calendar days of the project receiving a final investment decision to proceed, and submit to the Coordinator-General for agreement.

The Coordinator-General will take into consideration that QGC has made the following financial commitments to the mitigation of project related housing impacts:

- Worker Housing Gladstone Region - \$18m
- Worker Housing Western Downs - \$26m
- Community and Affordable Housing - \$6m.

QGC will participate in consultation with other major proponents as directed by the Coordinator-General, and Government agencies to identify co-operative strategies, and participate in regional strategies to resolve project related cumulative housing impacts, with the objective of achieving joint mitigation strategies and deliver housing solutions.

The strategy shall have provisions to:

1. Provide housing for QGC's imported workforce that is not housed by the project specific temporary worker accommodation by a range of means including (but not limited to) direct supply of housing/units and facilitating joint ventures for construction of dwellings.
2. Provide investment in community housing for households who may be significantly adversely affected by increased housing costs particularly for indigenous people and low income households.
3. Implement strategies to advise workers and families wishing to settle in project areas of their accommodation options under this strategy.
4. Monitor the effect of the provision of affordable housing particularly for Indigenous people and low income households, and invest in that housing where shown to be required.
5. Review performance of workforce housing supply.



Development of the Integrated Project Housing Strategy is to include consultation with the Western Downs RCCC, Toowoomba Regional Council; and Gladstone RCCC and evidence that consultation findings have been considered in developing the housing strategy.

The Integrated Project Housing Strategy is to report performance to the Western Downs RCCC, Toowoomba Regional Council; and Gladstone RCCC and seek input on a regular basis, not exceeding 6 monthly in the period to end 2020.

#### **Condition 10 Housing for Gladstone region**

The proponent or its construction contractors shall facilitate provision of new or additional housing stock in the Gladstone region to meet, as a guide, 50 per cent or other percentage concluded from the Integrated Project Housing Strategy and approved by the Coordinator-General with advice from the Department of Communities, of the project's workforce seeking to settle in the Gladstone Regional Council area.

As a guide, using the workforce estimates of the project EIS the following housing solutions may be required:

- 100 units of accommodation by 12 months after commencement of construction
- 160 units of accommodation by 24 months
- 250 units of accommodation by 36 months.

Details of the housing solution supply provided by QGC and its contractors are to be reviewed every 6 months under the Integrated Project Housing Strategy for the project.

It is required that the Integrated Project Housing Strategy provide 6 monthly reports to year end 2015 to the Gladstone Regional Community Consultative Committee (RCCC).

#### **Condition 11 Housing for Western Downs region**

The proponent or its construction contractors shall facilitate provision of new or additional housing stock in the Western Downs region to meet as a guide, 75 per cent or other percentage concluded from the Integrated Project Housing Strategy and approved by the Coordinator-General with advice from the Department of Communities, of the project's workforce seeking to settle in the Western Downs Regional Council area.

As a guide, using the workforce estimates of the project EIS the following housing solutions may be required:

- 120 units of accommodation by 12 months after commencement of the project
- 180 units of accommodation by 24 months
- 280 units of accommodation by 48 months.

The housing solution supply provided by QGC and its contractors for the Western Downs area is to be reviewed every 6 months under the Integrated Housing Strategy for the QGC project.

It is required that the Integrated Project Housing Strategy provide 6 monthly reports to the Western Downs RCCC.

#### **Condition 12 Affordable and community housing solutions**

The proponent is required to mitigate its impact on accommodation for low income households who maybe impacted by project induced escalation in rental rates or housing prices. This may include facilitating the provision of new or additional supply of housing stock for the following purposes, progressively as the project workforce increases or by contributing to a Government sponsored community and affordable housing initiative.



However, as a guide, I have set the following target that QGC provide resources for affordable and community housing at the rate of 1 unit of accommodation for every 8 imported workers settling in Gladstone or in the Western Downs region.

Compliance with this condition and suitability of the guideline ratio stipulated above is to be reviewed every 6 months under the Integrated Project Housing Strategy.

It is required that 6 monthly reports on the Affordable and Community Housing Solutions condition for Gladstone and Western Downs be provided to the respective RCCCs.

### **Condition 13**

#### **Local employment and training programs**

1. The proponent is required to provide details of the local employment and apprenticeship and training programs in the final QGC SIMP for Coordinator-General approval including:
  - a. Indigenous Employment Plan
  - b. Apprenticeship and Training Program.
2. provide support and job opportunities to vulnerable groups in the community including being culturally response to cultural needs.
3. Provide progress report updates to the RCCCs on the implementation of the SIMP as detailed in (1), but not limited to:
  - a. Indigenous Employment Plan
  - b. Apprenticeship and Training Program.
4. The proponent is to continue to provide support for industry and school partnerships in order to build increased opportunities for apprenticeships and employment.
5. The project is required to provide equal employment opportunities to the community and to adopt employment strategies which support local employment.
6. The project is required to develop responses to local, regional and state-wide employment needs and employment opportunities in response to the impacts of this project on the region, and the cumulative impacts of the emerging LNG industry on the region.
7. Furthermore, the proponent is required to provide details of the full range of skills required for its labour force and an appraisal of the gaps in capacity of the local community and region to meet these requirements through its existing workforce and industries, as well as through the training programs offered in the local area and region. Where there are identified gaps, the proponent is to provide a strategy which demonstrates how the proponent will contribute to the effective acquisition of skilled labour and/or training for same.

### **Condition 14**

#### **Labour availability**

The proponent must:

1. Establish a job referral service to make available information on positions vacant in local businesses with similar trade/skills requirements and to integrate it with the proponent's own recruitment service, such that applicants can choose from local or project employment prospects.
2. Ensure that the same business practice is in place for contractors employing staff.
3. Report 6 monthly to the respective Regional Community Consultative Committee on the arrangements for this service.
4. If it is not feasible to set up or continue operating this service, prior to closing the service the proponent is to make funding available for an alternative service having the same objectives as this condition, as agreed with the RCCC.



### **Condition 15**

#### **Local businesses**

The proponent must, within three months of the project receiving Final Investment Decision to:

1. Develop a Local Industry Participation Plan which is consistent with the principles of the *Queensland Government's Local Industry Policy* and associated Guidelines.
2. The Local Industry Participation Plan must:
  - a. ensure potential local suppliers are provided with information in an equitable and timely manner
  - b. encourage local businesses to bid on potential contracts, and communicate project requirements
  - c. consider design strategies and adopt procurement strategies to maximise local participation
  - d. ensure local firms are provided with opportunities to supply under the same terms, standards and conditions as interstate or overseas businesses
  - e. ensure contracts are awarded on the basis of the best overall value, which includes due consideration of non-cost factors such as reliability, maintainability, servicing requirements
  - f. ensure the program incorporates performance measurements and feedback mechanisms.
3. The proponent is required to implement the Local Industry Participation Plan in consultation with the Department of Employment, Education, Economic Development and Innovation (DEEDI), and any relevant regional or industry organisation with similar aims for local business participation.
4. The proponent must ensure that the Local Industry Participation Plan is linked to the SIMP, community investment program funding principles and other related initiatives to consider option for mitigating on loss of skills to the LNG industry.
5. The Local Industry Participation Plan is required to provide not less than six monthly progress reports to the RCCCs.

### **Condition 16**

#### **Community medical and health services**

The proponent must:

1. Work with Queensland Health (QH) to address concerns raised in the SIMP and EIS submissions regarding potential impacts on community medical and health services and facilities in Gladstone; and incidents response and management related to public health and safety.
2. Implement the proposed rural health initiative which targets capacity building for rural health services within the Western Downs region.
3. Develop and seek agreement from QH on an Incident Protocol and Procedure with the objective of effectively and efficiently managing responses likely to impact upon public health and safety.
4. Ensure the Incident Protocol and Procedure is developed in consultation with the local Health Service Districts - South West Health Service District, Central Queensland Health Service District), which provides the opportunity to discuss the capacity of health services to meet the expected demand for medical and emergency services.
5. Review the Incident Protocol and Procedure annually in consultation with Queensland Health as outlined above so that it remains up-to date; and meets the relevant government policies, guidelines and procedural requirements for incident management.
6. Work with QH to develop a process for medical evacuation arrangements.



7. Update the SIMP to include performance measures for the implementation of community health service initiatives.

**Condition 17**  
**Police service delivery**

The proponent must:

1. Work with the Queensland Police Service (QPS) regarding planning and response associated with impacts of the QGC project including potential impacts on police service delivery, particularly regarding the QPS water policing commitment and road safety priorities in the affected areas.
2. Work with the QPS regarding the potential increased demand on planning and resourcing demands on QPS; including the need for incidents and complaints management regarding traffic and transport movements. The proponent should note the QPS is the final approving authority for the movement of oversized vehicles.
3. Prior to the establishment of any temporary workers accommodation relating to the project, undertake consultation with the QPS regarding Project provisions pertaining to the safety of workers and the community, and emergency response planning in relation to temporary workers' accommodation facilities.
4. Update the SIMP to include performance measures for the implementation of delivery partnership initiatives with the QPS.

**Condition 18**  
**Emergency services planning**

The proponent must:

1. Consult with the Queensland Police Service (QPS), Department of Community Safety, Queensland Health, any affected local governments, and local emergency services staff in the region, to develop and implement an Emergency Response Plan for the project.
2. Identify in the Emergency Response Plan the roles and responsibilities in incident command and investigation; and include all stakeholders, including QPS in the Emergency Response Exercises.
3. Prior to the construction of workers' accommodation, provide to the Queensland Ambulance Service geo coordinates of camps and information on site access to allow planning for effective service delivery.
4. Work with Queensland Ambulance Service to monitor case loads to determine if the project has placed a strain on existing resources. If service capacity is strained by the QGC project, there may be a requirement for corrective action on safety/emergency issues and the proponent is required to undertake joint mitigation planning and implementation accordingly with Queensland Ambulance Service.
5. Provide site level orientation of all LNG, CPP and FCS facility components (construction and operations) for local emergency services including: the Area Director Gladstone, Emergency Services, and the Local Controller and State Emergency Services Group Leaders of the Gladstone Area, to enable appropriately targeted emergency services planning throughout the life of the project.
6. Update the Performance Monitoring Strategy to include performance measures for the implementation of the Emergency response plan and emergency response exercises.



### **Recommendation 1**

#### **Social infrastructure Gladstone Region**

The proponent is encouraged to:

1. Provide reasonable financial contributions to a social infrastructure fund in which industry funds are pooled to mitigate the impacts of major project developments in the Gladstone region and applied to the items listed on the Priority Social Infrastructure Schedule for Industry.
2. Participate as a member of a regional advisory group to implement a structured process for the application and allocation of funds and to ensure the priority needs for social infrastructure and services in Gladstone region are addressed.
3. Commit to an on-going investment in social facilities and services in the Gladstone region as a long term member of the community.

### **Recommendation 2**

#### **Social infrastructure Roma - Surat Region**

The proponent is encouraged to:

1. Provide reasonable financial contributions to a social infrastructure fund in which industry funds are pooled to mitigate the impacts of major project developments in the Roma Surat region and applied to the items listed on the Priority Social Infrastructure Schedule for Industry.
2. Participate as a member of a regional advisory group to implement a structured process for the application and allocation of funds and to ensure the priority needs for social infrastructure and services in Roma Surat region are addressed.
3. Commit to an on-going investment in social facilities and services in the Roma Surat region as a long term member of the community

The quantum of the contributions to social infrastructure referred to above requires further development and consultation between the proponent and government. Based on the information presented to the Coordinator-General, it is noted that QGC already intends to provide contributions to community facilities, services and networks in the Gladstone and Roma Surat regions through implementation of its Social Mitigations and Investment Proposal and the Coordinator-General will consider these commitments when determining the 'reasonableness' of financial contributions to be provided to the pooled fund.

This will be informed by the outcomes of studies such as the Social Infrastructure Strategic Plan for the Gladstone region and similar studies for Surat/Roma regions. This will be part of the Surat Future Direction statement and program identified under the Queensland Government *Sustainable Resource Communities Policy*.



# Appendix 2

## Gas fields

### Part 1- Coordinator-General imposed conditions- gas fields

In accordance with section 54A and 54B of the *State Development and Public Works Organisation Act 1971*, I **nominate** that the following conditions apply to the project.

These conditions take effect from the date of this report.

#### **Condition 1 Council consultation**

Prior to commencement of significant construction works, the proponent is to consult with Western Downs Regional Council to determine the appropriate location and requirements, including regional and local planning issues, noise impacts and energy efficiency measures, of all temporary and longer-term workers' accommodation.

#### **Condition 2 Temporary workers accommodation**

All temporary workers' accommodation provided for the project must comply with the Queensland Development Code Part MP 3.3 Temporary Accommodation Buildings and Structures (1 July 2010 comes into effect).

#### **Condition 3 Temporary workers accommodation sewerage systems**

All on-site sewage treatment plants associated with temporary and longer-term workers' accommodation must be located above Q50 flood levels for temporary accommodation and Q100 flood levels for longer term accommodation. Longer term accommodation means those facilities which are to be located in the one place for 4 years or more.

#### **Condition 4 Waste disposal**

Prior to commencement of works, the appropriate methods for disposal of waste in accordance with reasonable requirements of local governments and DERM are to be ascertained and implemented.

#### **Condition 5 Potable water**

The proponent must ensure that all potable water consumed on site and at workers accommodation complies with the *Australian Drinking Water Guideline 2004*.

#### **Condition 6 Council facilities upgrades**

Prior to commencement of significant construction works, the proponent must determine from all relevant local governments, any upgrades to sewerage or waste disposal facilities required as a result of the project's requirements, including servicing of workers' accommodation, and meet the project's relative share of costs associated with these upgrades.





**Condition 7**  
**Temporary workers accommodation flood level**

All temporary and longer term workers' accommodation is to be located above Q50 flood levels for temporary accommodation and Q100 flood levels for longer term accommodation. Longer term accommodation means those facilities which are to be located in the one place for 4 years or more.

**Condition 8**  
**Good Quality Agricultural Land**

Any longer-term workers accommodation, must not be located on land identified as being Good Quality Agricultural Land Categories A and B by the regional compilation of mapping (1:250,000) of Good Quality Agricultural Land in the Central West Region of Queensland – (NRW 2004)

**Condition 9**  
**Noise**

Longer-term workers accommodation for the project must be designed to meet the noise design objectives at sensitive receptors set out in Table 1.

**Table 1: Noise design objectives for workers accommodation**

Time of Day	Noise design objectives for indoors measured at the receptor in dB(A)		
	LAeq,adj,1hr	LA10,adj,1hr	LA1,adj,1hr
Daytime and evening	35	40	45
Night-time	35	40	45

**Condition 10**  
**Emergency response plan**

An Emergency Response Plan is to be prepared in consultation with the Department of Community Safety, local governments and Queensland Police. The Emergency Response Plan is to be submitted for approval by the Department of Community Safety, Regional Councils and Queensland Police at least two months prior to its implementation.

Note: Department of Community Safety, local governments and Queensland Police shall provide a response to the Emergency Response Plan within one month of receipt of the plan from the proponent. If no response is provided within the one month period the plan is deemed to be approved.

**Condition 11**  
**Bus transport**

The proponent must provide, and ensure use of, bus transportation services for large scale movement of construction and operational workforce resident in temporary and longer-term workers' accommodation to and from the project sites and airports at end of work rotations.

**Condition 12**  
**Rural residential allotments, impact management**

1. Prior to the issue of the Environmental Authority that includes Petroleum Lease 228 or approval of other tenement applications associated with this development proposal, and which contains rural residential allotments, a rural residential code of conduct (RRCC) must be submitted to the Coordinator General for approval. The Coordinator-General must be satisfied that action has been taken to engage with the occupiers of the rural residential land and to address their concerns by at least the inclusion in the RRCC of matters referred to in this condition.
2. The RRCC must apply to areas where there is a collection of allotments less than 15 hectares in individual area.



3. The RRCC must incorporate or refer to all relevant matters dealt with under the Queensland Mining, Petroleum and Gas, Geothermal and Greenhouse Gas Storage Land Access Code, June 2010.
4. The RRCC must provide commitments that specifically address on-going consultation and engagement arrangements to resolve residents' concerns and develop additional actions, if needed, to address any new issues should they arise during the life of the development ; including but not limited to:
  - a. On-site meetings conducted at least three weeks prior to the time when any new activity is proposed to commence on the relevant allotment, or 1 week prior to a recommencement of activity after four weeks of inactivity.
  - b. Identifying residents on nearby allotments likely to be affected by noise, dust, light or other nuisance issues arising from the gas field development, and properly informing residents of the nature and effect of the proposed activities in a similar time frame to the resident.

Note: For the purpose of references to consultation, the Coordinator General recognises these neighbours as stakeholders and affected parties, and all consultation courtesies and obligations imposed upon a tenure holder should be extended to surrounding properties in the rural residential area.

5. The RRCC must provide commitments which specifically address the health, and safety of the occupiers of rural residential land through actions including but not limited to:
  - a. Erection of security fencing and fitting of locks on gas infrastructure wherever possible, to prevent unauthorised access to, tampering, or operation of existing gas development sites (both exploratory and production) by children and others who are not aware of the dangers associated with gas wells and other infrastructure.
  - b. Assessment of gas well infrastructure to identify and seal all gas leaks. This is a matter of major concern to the landholders, in terms of risks to human health and risks associated with fire and explosion.
  - c. Health and safety induction training for residents on whose land gas infrastructure has been constructed to explain the equipment and what it is doing.
6. The RRCC must describe actions to be taken and separation distances to alleviate risks to existing rural residential use and infrastructure by minimising or avoiding the potential effects of drilling and fracking activities that might result in:
  - a. stress to stock
  - b. soil movement resulting in cracking of building foundations and walls
  - c. failure of dams or other earthworks.
7. The RRCC shall describe actions to be taken and separation distances to
  - a. mitigate noise impacts on occupiers from existing infrastructure
  - b. prevent dust impacts through dust suppression activities including use of associated water and the potential for run-off related impacts
  - c. prevent salinisation of soils from application of associated water for irrigation or from run-off and implications for certified organic farming.
8. The proponent must report on actions to be taken to ensure the revised Code of Conduct shall incorporate the objectives and strategies of the final social impact management plan (SIMP) for consideration by the Coordinator General.
9. The SIMP submitted for my consideration in accordance with Condition 1 of Appendix 1 Part 3, must be fully integrated with the proponent's ISO14001 Environmental Management System, and contain commitments as to implementation of the RRCC in rural residential landholdings.



## Part 2 - Coordinator-General environmental conditions – gas fields

These conditions are imposed by the Coordinator-General on the project under section 54 A and 54B of the *State Development and Public Works Organisation Act 1971*.

These conditions take effect from the date of this report.

### Condition 1

#### Cumulative Impacts Gas Fields

Within three months following final investment decision and prior to petroleum activities, a detailed assessment of cumulative impacts must be provided to the CG addressing, but not be limited to:

- regional impacts on terrestrial flora and fauna, biodiversity values, listed species and ecosystems
- riparian habitats
- surface and ground water environmental values
- soils, including ability to support ongoing agricultural production.

The cumulative impact assessment must be provided to the Coordinator-General for review.

### Condition 2

#### Constraints Planning

Prior to the issue of environmental authorities, the proponent must prepare a constraints planning and field development protocol for the development petroleum activities in the gas fields that:

1. Includes all category A, B and C environmentally sensitive areas. Category C Environmentally Sensitive Areas must include:
  - a. Nature Refuges as defined under the *Nature Conservation Act 1992*;
  - b. State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
  - c. Declared catchment areas under the *Water Act 2000*;
  - d. Resources reserves under the *Nature Conservation Act 1992*;
  - e. An area identified as “Essential Habitat” for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*;
  - f. Any wetland shown on the Map of Referable Wetlands available from DERM’s website; or
  - g. “Of concern” regional ecosystems identified in the database maintained by DERM called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.
2. Includes constraints for air emissions.
3. Includes soils constraints (including Good Quality Agricultural Land and Strategic Cropping Land).
4. Includes the exclusion of infrastructure (that are not limited petroleum activities) on floodplain areas that are likely to be flooded by runoff events of less than 1:50 average recurrence interval (ARI).
5. Includes bioregional corridors.
6. Includes other constraints identified in the QGC EIS and Supplementary EIS.
7. Commits to undertaking and documenting field surveys for all classes of constraint prior to commencing petroleum activities.
8. Commits that field surveys inform the Field Management Protocols and will be undertaken at all times by a qualified person.
9. Commits to incorporating constraint commitments into operational plans for the life of the project.

The constraints planning and field development protocol is to be submitted to the Coordinator-General for review prior to the issue of relevant Environmental Authorities for the gas fields.



### Condition 3

#### Noise constraints plan for fixed plant in gas fields

1. Prior to the issue of environmental authorities, a noise constraints plan must be developed that will state how gas field planning will avoid or mitigate the potential impacts from noise to sensitive receptors for the gas fields consistent with the requirements of the *Environmental Protection (Noise) Policy 2008* and the *Environmental Protection Act 1994*. The noise constraints plan must implement the following noise hierarchy for fixed plant:
  - a. The design criteria for fixed plant should achieve 25dB(A)  $L_{Aeq,adj,15min}$  for night time (10pm to 7am) measured at a sensitive receptor. To achieve 25dB(A)  $L_{Aeq,adj,15min}$  for night time (10pm to 7am) measured at a sensitive receptor both the constraints planning/ field development protocol and best practice noise abatement measures must be addressed.
  - b. In those fixed plant locations that cannot meet the design criteria of 25dB(A)  $L_{Aeq,adj,15min}$  despite implementation of constraints planning/ field development protocol and the adoption of best practice noise abatement measures the noise when measured at any sensitive receptor from fixed plant must not exceed 28dB(A)  $L_{Aeq,adj,15min}$  for night time (10pm to 7am).
2. The noise management plan must address, but not be limited to, the following:
  - a. a monitoring program for evaluation of compliance following commissioning and periodically thereafter
  - b. community liaison and consultation
  - c. the method of handling noise complaints
  - d. training of staff and contractors in noise management practices.
3. The noise management plan must provide commitments to conduct a site based noise assessment for each item of fixed plant in the gas field. The assessment should address, but not be limited to:
  - a. the *Environmental Protection (Noise) Policy 2008* and *DERM guideline: Planning for Noise Control*
  - b. implement and address the requirements of the noise constraints plan containing the noise management hierarchy for fixed plant in the gas fields
  - c. identification of component noise sources and activities at the place(s) which impact on noise sensitive receptors
  - d. the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors
  - e. the reasonable and practicable control or abatement measures (including location of infrastructure and hours of operation) that can be undertaken to reduce identified intrusive noise sources
  - f. the reduction in noise level at noise sensitive receptors following the implementation of noise measures in e) above
  - g. a determination of compliance with the noise hierarchy for drilling activities.

The noise assessment must be provided to the administering authority on request.

4. The noise constraints plan is to be submitted to the Coordinator-General for review prior to the issue of the relevant environmental authorities for the gas field.



#### Condition 4

##### Noise constraints plan for drilling activities in gas fields

1. Prior to the issue of environmental authorities, a noise constraints plan must be developed to avoid or mitigate the potential impacts from drilling noise to sensitive receptors for the gas fields consistent with the requirements of the *Environmental Protection (Noise) Policy 2008* and the *Environmental Protection Act 1994*. The noise constraints plan must implement the following noise hierarchy for drilling activities:
  - a. In those drilling locations that cannot meet the night time criteria of  $25\text{dB(A)}_{\text{LAeq,adj,15min}}$  despite implementation of constraints planning/ field development protocol and the adoption of best practice noise abatement measures the noise when measured indoors at any sensitive receptor from drilling activities must not exceed  $30\text{dB(A)}_{\text{LAeq,adj,15min}}$  for night time (10pm to 7am).
  - b. In those drilling locations that cannot meet  $30\text{dB(A)}_{\text{LAeq,adj,15min}}$  when measured indoors at any sensitive receptor despite implementation of constraints planning/ field development protocol and the adoption of best practice noise abatement measures then the constraints plan must commit QGC to making alternative agreements with the affected sensitive receptors.  
As a minimum each agreement of an alternative arrangement must be in writing and state:
    - (i) the location of the drilling activities
    - (ii) the location of the sensitive receptor
    - (iii) the names of the affected persons
    - (iv) the nature of the alternative arrangement(s) (e.g. provision of alternative accommodation, attenuation of noise at the sensitive place, a benefit to offset the impact of drilling noise, acquisition of the sensitive place)
    - (v) the period of the alternative arrangement(s).
  - c. Where alternative agreements cannot be made with sensitive receptors alternative engineering solutions or location of drilling activities must be sought.
2. The noise constraints plan must include commitments to consult with sensitive receptors where  $25\text{dB(A)}_{\text{LAeq,adj,15min}}$  is predicted to be exceeded from drilling activities when measured at the sensitive receptor at night time.
3. The noise constraints plan must include a program for continual improvement for drilling activities. The program for continual improvement must include a review of available technology every three years for inclusion in the operational plan for the project.
4. The noise constraints plan must also address commitments, but not be limited to, the following information:
  - a. a monitoring program for evaluation of compliance following commissioning
  - b. Weekly monitoring will be required if commissioning monitoring demonstrates that noise levels may be exceeded and alternative arrangements have not been negotiated
  - c. community liaison and consultation
  - d. the method of handling noise complaints
  - e. training of staff and contractors in noise management practices.
5. The noise constraints plan must provide commitments to conduct a site based noise assessment for each drilling activity in the gas field. The assessment should address, but not be limited to:
  - a. implement and address the requirements of the noise management plan containing the noise management hierarchy for drilling activities in the gas fields
  - b. identification of component noise sources and activities at the place(s) which impact on noise sensitive receptors
  - c. the measured and/or predicted noise level of these noise sources and activities at noise sensitive receptors
  - d. the reasonable and practicable control or abatement measures (including location of infrastructure and hours of operation) that can be undertaken to reduce identified intrusive noise sources
  - e. the reduction in noise level at noise sensitive receptors following the implementation of noise measures in e) above



- f. a determination of compliance with the noise hierarchy for drilling activities.

The noise assessment must be provided to the administering authority on request.

6. The noise constraints plan is to be submitted to the Coordinator-General for review prior to the issue of the relevant environmental authorities for gas fields.

#### **Condition 4**

##### **Coal Seam Gas Water Management Plan**

Prior to the issues of environmental authorities, the proponent must provide a Coal Seam Gas Water Management Plan (CWMP) to the Coordinator General to incorporate provisions which meet the requirements of:

- a. The Queensland Government's policy on Coal Seam Gas Water Management;
  - b. DERM Guideline: Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities;
  - c. DERM Guideline: Approval of coal seam gas water for beneficial use;
  - d. the *Environmental Protection (Waste Management) Regulation 2000*;
  - e. DERM Healthy Headwaters study: Characterisation of salinity limits related to the use of CSG water for irrigation (DERM, January 2010);
  - f. the passed *Environmental Protection Act 1994* amendments contained in the *South-East Queensland Water (Distribution and Retail Restructuring) and Other Legislation Amendment Act 2010*; and
  - g. other statutory requirements, including but not limited to: the requirements of the *Water Act 2000*, *Water Supply (Reliability and Safety) Act 2008* or proposed amendments and the *Public Health Regulation 2005*.
1. an assessment of the cumulative impacts to environmental values should also be provided. The cumulative impact assessment should address the potential impacts on environmental values and environmental flows from multiple discharges to a surface water system, including the Condamine River.
  2. The CWMP is to be submitted to the Coordinator-General for review prior to the issue of environmental authorities for a petroleum lease.
  3. The CWMP is to be provided to DERM as a component of the EM Plan submitted with applications for the relevant environmental authorities.

#### **Condition 5**

##### **Brine Management Strategy**

The proponent will provide within 90 calendar days of the issue of this report, to the CG for review, a Brine Management Strategy that includes:

- a strategy in accordance with the Queensland Government's policy on Coal Seam Gas Water Management
- a strategy and decision hierarchy consistent with the DERM Guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities*
- any plan for reinjection of brine or untreated water
- any plan for the utilisation of salts extracted from associated water
- the proposed legislative amendments contained in the *South-East Queensland Water (Distribution and Retail Restructuring) and Other Legislation Amendment Bill 2010*
- an assessment of the potential impacts of options considered and appropriate mitigation measure for the preferred option.

The Brine Management Strategy is to be submitted to the CG for review.



The Brine Management Strategy is to be provided to DERM as a component of the EM Plan submitted with application for environmental authorities for sites where brine is being stored and managed.

## **CONDITIONS THAT MUST BE MET PRIOR TO THE COMMENCEMENT OF PETROLEUM ACTIVITIES:**

### **Condition 6 Operational Plan**

The proponent must provide an Operational Plan that provides detailed information about the activities and their scheduling that are to be carried out under the environmental authority.

In this regard, the proponent must provide to DERM for review, prior to commencement of construction, a construction management plan for petroleum tenure for the gas fields that includes a construction schedule and methodology including plans and maps showing the location of facilities and discharge points and emission controls for compressor plants, water treatment, sewage treatment and other petroleum activities proposed to be undertaken on the petroleum lease.

The Operational Plan must cover, at least, development of the gas fields to 2014. The activities identified in the Operational Plan must incorporate but not be limited to the petroleum activities set out in the approved Work Program and/or Development Plan for the relevant petroleum authority as required under the *Petroleum Act (1923)* or the *Petroleum and Gas (Production and Safety) Act 2004*.

The Operational Plan must be consistent with the requirements of the environmental authority(s) and include, but not be limited to:

1. a stated period, not exceeding four (4) years for the initial operational plan
2. a stated period, not exceeding three (3) years for subsequent operational plans, to which the operational plan applies
3. a description of the existing infrastructure for conducting the petroleum activities
4. a description of proposed infrastructure that will be developed during the term of the operational plan
5. a map or maps that:
  - a. record the location of the infrastructure in place for conducting the petroleum activities that exists at the commencement of the period of the operational plan, including but not limited to:
    - (i) regulated dams
    - (ii) wells
    - (iii) transmission flow lines
    - (iv) gas processing facilities
    - (v) water treatment facilities
  - b. records the location of approved additional infrastructure that will be developed for the conduct of the petroleum activities during the period of the operational plan.
6. for proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA) provide details on the scale and extent of the disturbance or clearing and if required a commitment to provide an environmental offset
7. for each site to be disturbed, a description of the rehabilitation activities to be performed during the period of the Plan, including but not limited to:
  - a. location (eg tenure, coordinates) and disturbance type (eg well lease, flow line, access track);
  - b. area to be rehabilitated
  - c. use of reference sites
  - d. species compositions
  - e. post-disturbance land use
8. a description of progressive rehabilitation carried out including performance in relation to the requirements set out in the environmental authority and the proposed rehabilitation activities set out in the previous operational plan
9. the calculation of the financial assurance for the proposed maximum disturbance expected during the period of the operational plan.



The Operational Plan is to be submitted to the Coordinator-General for review prior to the commencement of petroleum activities in the gas fields.

Note: where the CSG fields are intended to be operated under separate project environmental authorities, separate Operational Plans can be provided under this condition.

#### **Condition 7**

The proponent and its contractors shall develop draft project area species conservation plans for the threatened flora species *Homopholis belsonii*, *Micromyrtus patula* and *Philothea sporadica* to include the following action plans and objectives:

- a) Mapping of these species in project areas.
- b) Contribution to other conservation plan development for these species by other LNG projects and other development projects in the region.
- c) Identifying and managing threatening processes of the project where they impact these species.
- d) Avoiding or limiting clearing of these species in relation to project works.

These species conservation plans are to be presented to DERM and DEWHA for approval.

Where there is a requirement for clearing of plants protected under the *Nature Conservation Act 1992*:

- a) clearing of plants must only occur in accordance with a clearing permit issued under the *Nature Conservation Act 1992*
- b) for near threatened, rare, vulnerable and endangered species listed under the Nature Conservation (Wildlife) Regulation 2006, and species identified as critical and high priority under the DERM "Back on Track" species prioritisation methodology, a Significant Species Management Plan detailing specific measures for the mitigation or offsetting of all impacts must be provided to DERM for approval
- c) offsets must be provided for the permanent loss (take) of near threatened, rare, vulnerable and endangered plants in accordance with the *Queensland Government Environmental Offsets Policy 2008* and generally in accordance with the *Queensland Government Policy for Biodiversity Offsets (Consultation Draft)*
- d) type A restricted least concern plants (Schedule 7 of the Nature Conservation (Administration) Regulation 2006) must be salvaged and used for on-site revegetation purposes. This includes species in the Family: Cycadaceae, Orchidaceae, and Zamiaceae; and species in the genus: Brachychiton; Hydrophytum; Huperzia; Livistona; Myrmecodia; Platycerium; and Xanthorrhoea
- e) clearing shall be conducted in a sequential manner and in a way that directs escaping wildlife away from the activity and into adjacent natural areas
- f) rehabilitation of areas containing least concern plants that are disturbed during clearing activities, where required by the clearing permit, must be commenced within three (3) months of completion of pipeline construction. Revegetation should be consistent with the plant density, floristic composition and distribution of the surrounding regional ecosystem types and within the province of the vegetation being cleared
- g) for clearing impacts that result in permanent loss of least concern native plants (cannot be re-established within three (3) years of clearing or floristic modification), the permit holder must provide the DERM with a written detailed report of permanent vegetation loss, including the area, species affected and mapping of affected areas, within three (3) months of completion of the pipeline construction (Note: this is in addition to the required Return of operations).





### **Condition 8**

The proponent and its contractor must include in any final Environmental Management Plan for gas field planning an objective that bioregional corridors be considered and maintained to the greatest extent practicable in the field development plan. A draft of this clause of the EMP shall be submitted to DERM with any application for environmental authority for gas field development.

### **Conditions 9 – Groundwater assessment, mitigation and monitoring**

The proponent must provide to the CG for review an assessment of the environmental values, monitoring program, regional groundwater model and mitigation measures. The assessment must address, but not be limited to:

- An assessment of the potential impact on the environmental values detailed in the former Department of Natural Resources and Mines publication *Great Artesian Basin Water Resource Plan: Ecological Assessment of GAB springs in Queensland* (Fensham & Fairfax 2005) and *The AGE Report* (2005) on potential river base flow and springs from aquifers of the Great Artesian Basin, including in the springs register established under the Great Artesian Basin Resource Operations Plan.
- An assessment of the potential impacts on recharge springs and baseflow watercourses.
- Mitigation measures that address the potential impacts on river base flow and springs including a monitoring program, trigger points and actions that would be taken to avoid or minimise the impacts.
- Mitigation measures that address the potential impacts on the quality and quantity of supply to existing users including make good options such as reinjection, reconfiguration of extraction regimes, use of offsets (such as replacing other water users' take with associated water from the project), and rehabilitation of existing bores to address potential induced inter-aquifer leakage (that could be a result of depressurisation caused by the project).
- A detailed monitoring strategy that provides objectives and rationale for how potential impacts on groundwater values will be identified including linkages with the hydrogeological conceptualisation, model validation, trigger points and actions that will be taken to avoid or minimise the impacts.

The groundwater assessment is to be submitted to the Coordinator-General for review prior to the commencement of petroleum activities in the gas fields.

### **Condition 10 – Springs assessment, mitigation and monitoring**

The proponent must provide to the CG for review an assessment of groundwater dependant ecosystems. The assessment of the groundwater dependant ecosystems must include, but not be limited to:

- subterranean ecosystems
- phreatophytic terrestrial and riparian vegetation
- springs and other wetlands
- stream communities dependent on baseflow
- EPBC-listed community of native species dependent on natural discharge of groundwater from the Great Artesian Basin
- estuarine and submarine systems dependent on groundwater discharge.

The groundwater monitoring plan for the gas fields must include monitoring of the main aquifers between the CSG operational areas and the springs.

The groundwater monitoring plan should include, but not be limited to:

- A program to validate and calibrate the regional groundwater model.
- The monitoring sites chosen to detect the impacts to environmental values.
- Suitable mitigation measures to be implemented to deal with impact to spring flows.

The springs assessment is to be submitted to the Coordinator-General for review prior to the commencement of petroleum activities in the gas fields.



#### **Recommendation 1**

##### **Notification regarding Millable Timber**

Sufficient lead time should be provided for DERM to arrange timber salvage operations or the proponent will need to provide alternative solutions for responsible resource utilisation.

#### **Recommendation 2**

##### **Water quality monitoring parameters**

It is recommended that QGC install intermediate gauging stations (i.e. between the upper-most tenement and lower-most tenement) where discharges are proposed to develop flow data.

#### **Recommendation 3**

##### **Water quality monitoring instrumentation**

It is recommended that remote instrumentation designed to capture water quality data be validated by comparison to equivalent laboratory-based analysis results to ensure quality and reliability in the measures recorded.

#### **Recommendation 4**

##### **80th percentiles instead of background +10% and second tier trigger level**

It is recommended that the second tier trigger value be based on a similar approach for determining the first tier trigger value, but instead of using the 80th percentile, the 90th, or perhaps even the 95th percentile could be used. Exactly which percentile is adopted might be dependent on the variability of the parameter in question and should be developed in consultation with DERM.

#### **Recommendation 5**

High, moderate and low reliability trigger values

It is recommended that where ANZECC (2000) trigger values are exceeded by natural background concentrations that locally-derived guidelines be developed in accordance ANZECC (2000) guidelines.

### **GENERAL CONDITIONS FOR THE GAS FIELDS**

#### **Condition 11**

##### **Groundwater monitoring**

The EM plans, developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the applications for petroleum leases for the gas fields, must include an extensive groundwater pressure monitoring program in all aquifers potentially affected by the petroleum activities.

#### **Condition 12**

##### **Borrow pits**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for gas fields, must include an assessment of the environmental values, potential impacts, mitigation measures for the siting, construction, operation, decommissioning and rehabilitation of borrow pits required for petroleum activities.

#### **Condition 13**

##### **Access tracks in ESA's**

Access tracks are not permitted within Category B or C Environmentally Sensitive Areas unless they are co-located with gas collection or CSG associated water pipelines, unless otherwise authorised by the administering authority.



#### **Condition 14** **Ramp-up gas**

The EM Plan developed in accordance with section 310D of the Environmental Protection Act 1994 to support the application for a gas fields, must include an assessment of the environmental values, potential impacts, mitigation measures for any ramp up gas storage.

#### **Condition 15** **Dams**

Aggregation dams and CSG water evaporation dams must:

- be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation
- have a system that will detect any passage of the wetting front or entrained contaminants through either the floor or sides of the dam
- either, be capable of repair to rectify any passage of the wetting front through either the floor or sides of the dam, or else be decommissioned and rehabilitated.

Brine dams must:

- be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation
- have a system for the collection and proper disposal of any contaminants that move beyond the bounds of the containment system
- have a system that will detect any passage of the wetting front or entrained contaminants through either the floor or sides of the dam
- either, be capable of repair to rectify any passage of the wetting front through either the floor or sides of the dam, or else be decommissioned and rehabilitated.

The system that is implemented to detect the passage of the wetting front through either the floor or sides of the dam must not only consist of monitoring groundwater aquifers.

The design, construction, operation, modification and decommissioning of any regulated dam that is part of a CSG project must be undertaken in accordance with DERM's *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* and the accompanying Guideline *Dams in Environmentally Relevant Activities*.

#### **Definitions**

**Aggregation dam** is a dam that receives and contains CSG water or CSG water concentrate. An aggregation dam must be designed and operated so that during any period of thirty (30) days, following the first ninety (90) days of operation of the dam, the total volume of water leaving the dam other than by evaporation must not be less than 85% of the volume of water that has entered the dam.

**Brine** is defined as saline water with a total dissolved solid concentration greater than 40 000mg/l.

**Brine dam** means a dam designed to receive, contain or evaporate brine.

**CSG water** is defined as underground water brought to the surface of the earth or moved underground in connection with exploring for or producing coal seam gas.

**CSG water** concentrate is the concentrated saline water waste stream from a water treatment process that does not exceed a total dissolved solid concentration of 40 000mg/l.

**CSG evaporation dam** is defined as an impoundment, enclosure or structure that is designed to be used to hold CSG water for evaporation.

#### **Condition 16** **Dam decommissioning**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for a gas fields, must include an assessment of the disposal option for any



contaminated material (i.e. salt or dam liners) in accordance with the waste management hierarchy consistent with the DERM Guideline: *Preparing an environmental management plan for coal seam gas activities*.

**Condition 17**  
**Dam decommissioning topsoil**

A minimum depth of 0.25m topsoil will be placed over decommissioned storage ponds to ensure an adequate vegetative cover can be established.

**Condition 18**  
**Water course crossings**

Where a riverine protection permit is not required, activities in water courses should be undertaken in accordance with the Guideline – *Activities in a watercourse, lake or spring associated with mining operations*, unless otherwise authorised by the administering authority.

**Condition 19**  
**Gas trunkline easements**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for a gas fields, must include an assessment of the construction of co-located trunklines to minimise width and total disturbance required for the right of way.

**Condition 20**  
**Water monitoring sites**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for the gas fields, should include upstream and downstream monitoring of water quality parameters where discharges are proposed.

**Conditions 21**  
**Receiving Environment Monitoring Program**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for the gas fields, must include a receiving environment monitoring program to monitor and record the effects of the release of contaminants on the receiving environment, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water.

**Condition 22**  
**Pad drilling (multiple drill holes from the one location)**

The EM Plan developed in accordance with section 310D of the *Environmental Protection Act 1994* to support the application for the gas fields, must include consideration of multi-well pad drilling and horizontal directional drilling where high environmental constraints are potentially impacted by the petroleum activities and should be included for rural residential areas.

**Condition 23**  
**Quarrying**

Separation distances from CSG activities should be established in consultation with quarry operators and local governments to enable existing and planned quarrying to continue within the petroleum tenement areas.

**Condition 24**  
**Salinity Assessment**

A salinity management plan will be prepared and will include:

- a risk assessment methodology which will identify the potential for secondary salinity
- a list of identified management tools and mitigations that will be used in those locations to prevent and manage secondary salinity
- a summary of disturbance and rehabilitation for each 12 month period of the environmental authority.



The outcomes of these risk assessments and the effectiveness of the management tools and planned mitigations is to be reported in each annual return.

#### **Condition 25**

##### **Hydraulic fracturing chemicals**

The EM plans, developed in accordance with section 310D of the Environmental Protection Act 1994 to support the applications for petroleum leases for the gas fields, must contain an assessment of the impacts from hydraulic fracturing chemicals and proposed mitigation measures to protect the environmental values where the use of hydraulic fracturing chemicals is proposed. The assessment must address, but not be limited to:

- A complete inventory of biocides, corrosion inhibitors and other chemicals used in drilling, completions and stimulation operations (hydraulic fracturing).
- Toxicity data for each active ingredient and any mixture of active ingredients.
- Detail where, when and how often drilling, completions and stimulation operations is to be undertaken.
- A risk assessment demonstrating that drilling, completions and stimulation operations activities will not result in environmental harm to the receiving environment. The risk assessment must be based on at least: a mass balance determining the concentrations and absolute masses of chemicals that will be left in situ subsequent to drilling, completions and stimulation operations and the results of any previous drilling, completions and stimulation operations fluid monitoring undertaken, to the greatest extent practicable, in accordance with world's best practice.
- Long term monitoring program of drilling, completions and stimulation operations fluid chemical concentrations in water produced from wells should to be developed and implemented.

#### **Condition 26**

##### **Synthetic drilling muds**

Based on the model conditions for CSG activities, the model conditions stated below will be imposed on any Environmental Authority for the Gas Fields:

- Oil based drilling muds must not be used in the carrying out of the petroleum activity
- Synthetic based drilling muds must not be used in the carrying out of the petroleum activity other than with the written approval of the administering authority.

#### **Condition 27**

##### **Monitoring bores**

A network of monitoring bores should be installed at crucial locations within the groundwater monitoring network to provide a back-up and to calibrate the vibrating wire piezometers proposed to be used as the sole groundwater monitoring device.

#### **Condition 28**

##### **Minimum standards for monitoring bores**

All monitoring bores must meet the construction standard: the Minimum standards for the construction and reconditioning of water bores that intersect the sediments of artesian basins in Queensland, DNRM, 2004, Standard No. WMU/2004/1569.



## Part Three – CSG model conditions

DERM, in consultation with the Australian Petroleum Production and Exploration Association (APEA), has developed 'Model Conditions' that guide environmental authority applicants for coal seam gas fields.

The Model Conditions provide a suite of suitable conditions for CSG specific activities that can be used by DERM as a consistent starting point for the conditioning of environmental authorities for CSG gas field activities.

### Department of Environment and resource management (DERM)-Model Conditions- Gas Fields

#### SCHEDULE A – GENERAL CONDITIONS

##### Authorised Petroleum Activities

- (A1) In the carrying out of the petroleum activity(ies), the holder of this environmental authority must not exceed the number and maximum size for each of the specified petroleum activities listed in Schedule A - Table 1 for each petroleum tenure.

##### Schedule A, Table 1 – Authorised Petroleum Activities

Tenure No.	Petroleum Activity	Number	Maximum size (where applicable)
	Seismic (kms)		
	Core Well(s)		
	Exploration Wells		
	Production Well(s)		
	Compressor Station(s)		
	Regulated Dam(s) >401 megalitres		
	Regulated Dam(s) <400 megalitres		
	Reverse Osmosis Plants		
	Brine Encapsulation Facilities		

##### Prevent or Minimise Likelihood of Environmental Harm

- (A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

##### Maintenance of Measures, Plant and Equipment

- (A3) The holder of the environmental authority must:
- install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority
  - maintain such measures, plant and equipment in their proper and effective condition
  - operate such measures, plant and equipment in a proper and effective manner.



- (A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

### **Operational plan**

- (A5) The holder of this environmental authority must develop an Operational Plan (the Plan) that provides detailed information about the activities to be carried out under the environmental authority.
- (A6) The activities identified in the Plan must incorporate but not be limited to the petroleum activities set out in the approved Work Program and/or Development Plan for the relevant petroleum authority as required under the Petroleum Act (1923) or the Petroleum and Gas (Production and Safety) Act 2004.
- (A7) The Plan must be consistent with the requirements of the environmental authority and include, but not be limited to:
- a. a stated period, not exceeding 3 years, to which the Plan applies;
  - b. a description of the existing infrastructure for conducting the petroleum activities;
  - c. a description of proposed infrastructure that will be developed during the term of the Plan
  - d. a map or maps that:
    - i. record the location of the infrastructure in place for conducting the petroleum activities that exists at the commencement of the period of the Plan, including but not limited to:
      - regulated dams
      - wells
      - transmission flow lines
      - gas processing facilities
      - water treatment facilities
    - ii. records the location of approved additional infrastructure that will be developed for the conduct of the petroleum activities during the period of the plan.
  - e. for proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA) provide details on the scale and extent of the disturbance or clearing and if required a commitment to provide an environmental offset
  - f. for each site to be disturbed, a description of the rehabilitation activities to be performed during the period of the Plan, including but not limited to:
    - iii. location (eg tenure, coordinates) and disturbance type (eg well lease, flow line, access track)
    - iv. area to be rehabilitated
    - v. use of reference sites
    - vi. species compositions
    - vii. post-disturbance land use
  - g. a description of progressive rehabilitation carried out including performance in relation to the requirements set out in the environmental authority and the proposed rehabilitation activities set out in the previous plan
  - h. the calculation of the financial assurance for the proposed maximum disturbance expected during the period of the plan.
- (A8) The plan must be submitted to the administering authority not less than three months prior to the expiry of the plan period.

### **Financial assurance**

- (A9) The holder of this environmental authority must:
- a. provide to the administering authority financial assurance in the amount and form required from time to time by the administering authority for the authorised petroleum activities
  - b. review and maintain the amount of financial assurance based on the activities and rehabilitation to be undertaken during the period of the plan.



- (A10) The calculation of financial assurance must be in accordance with the most recent version of the Department of Environment and Resource Management's Guideline "Financial assurance for petroleum activities".
- (A11) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

### **Third Party Audit**

- (A12) Compliance with the conditions of this environmental authority must be audited by an appropriately qualified third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, for each period of the Operational Plan required under Conditions A5 – A8.
- (A13) Notwithstanding condition A12, the holder of this environmental authority may, prior to undertaking the third party audit, negotiate with the administering authority the scope and content of the third party audit

Note: Where minimal activities have been undertaken on a tenure, the negotiation of the scope of the third party audit may also include the postponing of the third party audit to an agreeable time between the holder of this environmental authority and the administering authority

- (A14) The report of the third party auditor for the relevant prior period must be submitted to the administering authority by the holder of this environmental authority with each revised Operational Plan submitted in accordance with Condition A8.
- (A15) The third party auditor must certify (including a statutory declaration) the findings of the audit in the report.
- (A16) The financial cost of the third party audit is to be borne by the holder of this environmental authority.
- (A17) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:
  - a. investigating any non-compliance issues identified
  - b. as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A18) Subject to condition A17, and not more than three (3) months following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:
  - a. actions taken by the holder to ensure compliance with this environmental authority; and
  - b. actions taken to prevent a recurrence of any non-compliance issues identified.

### **Cultural Heritage**

- (A19) In the carrying out of the petroleum activity the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Heritage Register.





## **SCHEDULE B – WATER**

### Contaminant Release

- (B1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to any waters except as permitted under this environmental authority.

### Erosion and Sediment Control

- (B2) Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contaminated stormwater to waters.
- (B3) An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities and which has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administering authority and must include but not be limited to:
- a. diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
  - b. contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
  - c. roofing or minimising the size of areas where contaminants or wastes are stored or handled;
  - d. revegetating the disturbed area as soon as practicable after the completion of works;
  - e. using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
  - f. erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
  - g. an inspection and maintenance program for the erosion and sediment control features;
  - h. provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March;
  - i. erosion and sediment control measures for construction of wells and pipelines on slopes >10%; and
  - j. identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.
- (B4) A copy of the Erosion and Sediment Control Plan must be submitted to the administering authority upon request.

### Maintenance and Cleaning

- (B5) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

### **Watercourses, Wetlands and Springs**

- (B6) In the carrying out of the petroleum activity the holder of this environmental authority must not clear vegetation or place fill, except for the construction of roads and pipelines, in or within:
- a. 200 metres from any natural significant wetland;
  - b. 100 metres from any natural wetland, lakes or springs; or
  - c. 100 metres of the high bank of any other watercourse.
- (B7) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.



- (B8) Despite condition B7 pipeline and road construction works for may be undertaken in watercourses, wetlands or springs where there is no practicable alternative such as the use of horizontal directional drilling methods, for a maximum period of ten (10) days, provided that the works are conducted in accordance with the following order of preference:
- a. conducting work in times of no flow; and
  - b. using all reasonable and practical measures to reduce impacts in times of flow.
- (B9) Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
- a. only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable alternative location is feasible;
  - b. be no greater than the minimum area necessary for the purpose of the significant disturbance;
  - c. be designed and undertaken by a suitably qualified and experienced person taking into account the matters listed in Section 5. Planning Activities and Section 6 Impact Management During Activities of DERM's "Guideline – Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available; and
  - d. upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (B10) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (B11) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring. If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (B12) Petroleum activities must not be carried out in River Improvement Trust Asset Areas without the approval of the relevant River Improvement Trust.

Note: Locations and details of River Improvement Trust Asset Areas can be obtained from the relevant River Improvement Trust. A list of the relevant River Improvement Trusts will be provided by DERM.

### **Groundwater**

- (B13) The extraction of groundwater as part of the petroleum activity from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.

### **Wild Rivers**

- (B14) In a declared Wild River Area, petroleum activities must be consistent with the conditions stated in the relevant Wild River declaration and in circumstances where there is any inconsistency or conflict the conditions of the Wild River declaration prevail.

Release to Waters of Treated or Good Quality CSG Water  
Refer Appendix 1 for conditions

Sewage Treatment Works

Sewage Treatment Works (<21EP)  
Refer Appendix 2 for conditions



Sewage Treatment Works (>21 – 450 EP)  
Refer Appendix 3 for conditions.

## **SCHEDULE C – REGULATED DAMS**

- (C1) Construction of any dam or modifications to an existing dam determined to be in the high hazard or significant hazard category in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* is prohibited unless the required design plan details have been entered into the Regulated Dam Register and certified by the chief executive officer for the holder of the environmental authority, or their delegate, as being accurate and correct.

### **REGULATED DAM REGISTER**

- (C2) The holder of this environmental authority must maintain a Register of Regulated Dams that must include, as a minimum, the following information for each Regulated Dam:
- (a) dam name, the coordinates for its location and date of entry in the register;
  - (b) dam purpose and its proposed/actual contents;
  - (c) hazard category assessed using the “Manual for Assessing Hazard Categories and Hydraulic Performance of Dams” ;
  - (d) details of the composition and construction of any liner;
  - (e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam;
  - (f) maximum operational volume (megalitres);
  - (g) design storage allowance at 1 November each year (megalitres);
  - (h) mandatory reporting level (metres);
  - (i) date construction was certified as compliant with the design plan;
  - (j) name and qualifications of certifier;
  - (k) dates on which the dam was inspected for structural and operational adequacy;
  - (l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority;
  - (m) dates on which the dam was inspected for the detection of leakage through any liner; and
  - (n) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year.
- (C3) The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Dams when a design plan for a Regulated Dam is submitted to the administering authority.
- (C4) The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Dams once compliance with Condition C21 has been achieved.
- (C5) The holder of this environmental authority must ensure that the information contained in the Register of Regulated Dams is complete and current on any given day.
- (C6) All entries in the Register of Regulated Dams must be certified by the chief executive officer for the environmental authority holder, or their delegate, as being accurate and correct.
- (C7) The holder of this environmental authority must submit the Register of Regulated Dams or information contained in the Register available to the administering authority at each annual return and when requested to do so in the form requested by the administering authority.



## **Construction and Operational Requirements for New Dams**

- (C8) All aggregation dams must:
- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and
  - (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam and enable the repair of the containment system or its decommissioning and rehabilitation.
- (C9) Aggregation dams must be designed and operated so that during any period of thirty (30) days, following the first ninety (90) days of operation of the dam, the total volume of water leaving the dam other than by evaporation must not be less than 85% of the volume of water that has entered the dam.
- (C10) All existing CSG evaporation dams must be operated as aggregation dams and in accordance with condition (C8) or decommissioned by 1 October 2011.
- (C11) By 1 October 2011, all brine dams must:
- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation;
  - (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam, enable the repair of the containment system or its decommissioning and rehabilitation; and
  - (c) the collection and proper disposal of any contaminants that move beyond the bounds of the containment system.
- (C12) All Regulated Dams must be designed in accordance with the requirements of the *“Manual for Assessing Hazard Categories and Hydraulic Performance of Dams”* by and constructed under the supervision of a suitably qualified and experienced person.
- (C13) The hazard category of any dam must be determined by a suitably qualified and experienced person, prior to its design and construction, upon any change in its purpose or its stored contents, and at least once in each two (2) year period after its construction.
- (C14) The construction and operation of Regulated Dams is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the certification of a suitably qualified and experienced person that the regulated dam:
1. will deliver the performance stated in the design plan
  2. has had its hazard category assessed and been designed in accordance with the requirements of the *“Manual for Assessing Hazard Categories and Hydraulic Performance of Dams”*
  3. when constructed and operated, will be compliant in all respects with the conditions of this environmental authority.
- (C15) The design plan must include, but not be limited to:
1. a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan
  2. a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material
  3. an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any sensitive receptors for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once
  4. detailed specifications for the design, operation, maintenance and decommissioning of the dam(s)



5. an operational plan that includes contingency / emergency response procedures designed to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of the dam
  6. design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam
  7. a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life
  8. any other matter required by the certifying suitably qualified and experienced person
  9. evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.
- (C16) If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either:
1. the conditions of this environmental authority, or
  2. the requirements set out in the “Manual for Assessing Hazard Categories and Hydraulic Performance of Dams”
  3. then the construction and operation of the Regulated Dam is prohibited until the administering authority provides written advice that its construction may proceed.
- (C17) When construction of any Regulated Dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of ‘as constructed’ drawings, together with the certification of a suitably qualified and experienced person that the dam ‘as constructed’ will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with the conditions of this environmental authority.
- (C18) Each Regulated Dam must be maintained and operated in a manner that is consistent with the design plan and the certified ‘as constructed’ drawings for the duration of its operational life and until decommissioned and rehabilitated.

#### **LIVESTOCK AND WILDLIFE**

- (C19) The holder of this environmental authority must ensure reasonable and practicable control measures are in place to ensure that harm is not caused to livestock or wildlife through the construction and operation of a Regulated Dam.

#### **MANDATORY REPORTING LEVEL**

- (C20) The Mandatory Reporting Level must be marked on each Regulated Dam in such a way that it is clearly observable during routine inspections of each dam.
- (C21) The holder of this environmental authority must notify the administering authority immediately when the level of the contents of any Regulated Dam reaches the Mandatory Reporting Level, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.
- (C22) An assessment of the adequacy of the available storage in each Regulated Dam is to be made, based on an actual dam level observed in the month of October in each year, and the resultant estimate of the level in that dam as at 1 November in each year must be equal or less than the design storage allowance for the dam.
- (C23) Where the assessment of the adequacy of the available storage in any Regulated Dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must immediately notify the administering authority, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.



## **ANNUAL INSPECTION AND REPORT**

- (C24) Each Regulated Dam must be inspected annually by a suitably qualified and experienced person.
- (C25) At each annual inspection, the condition and adequacy of each Regulated Dam must be assessed for dam safety and against the necessary structural, geotechnical and hydraulic performance criteria contained in the certified design plan.
- (C26) For each annual inspection, a copy of a report on the condition and adequacy of each Regulated Dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each Regulated Dam, must be provided to the administering authority upon request.
- (C27) The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations, take action to ensure that each Regulated Dam will safely perform its intended function, and within one month of receiving the report, notify the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each Regulated Dam.

## **EVAPORATION DAMS**

- (C28) Evaporation dams must not be constructed unless:
  1. exploring for petroleum is the only activity being carried out
  2. a report demonstrating that legislative, environmental, technological, economic or social requirements have all been evaluated and taken into consideration in deciding that this is the only feasible option has been provided to the administering authority
  3. the evaporation dam does not exceed 400ML in volume or 20ha in surface area
  4. there are no other evaporation or aggregation dams within a 50km radius of surface land area.
- (C29) A re-evaluation of the use of any evaporation dam must be undertaken on an annual basis to determine if water management practices can be improved and any preferred management options in the CSG water management hierarchy can be employed.
- (C30) The re-evaluation required by Condition C29 must be submitted to the administering authority with each annual return.

## **SCHEDULE D — Land**

### **General**

- (D1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

### **Disturbance to Land – General**

- (D2) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (D3) The assessment required by Condition D2 must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992.
- (D4) The holder of this environmental authority, when carrying out petroleum activities must:



- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value
- (b) minimise the risk of injury, harm, or entrapment to wildlife and stock
- (c) minimise disturbance to land that may otherwise result in land degradation
- (d) ensure that for land that is to be significantly disturbed by petroleum activities:
  - i. the top layer of the soil profile is removed
  - ii. stockpiled in a manner that will preserve its biological and chemical properties
  - iii. used for rehabilitation purposes (in accordance with Condition H6)
- (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.

- (D5) In accordance with Condition D4 above, if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation or place fill:
  - (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species)
  - (b) on slopes greater than 10% for activities other than pipelines and wells, or
  - (c) in discharge areas.
- (D6) Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.
- (D7) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

#### **Disturbance to Land – Environmentally Sensitive Areas**

- (D8) Notwithstanding Conditions D2 to D7 inclusive, the holder of this environmental authority must ensure that petroleum activities:
  - (a) are not conducted in or within 200 metres of any listed category A, B or C ESA's
  - (b) do not involve activities other than limited petroleum activities within 1km of a listed category A ESA, or within 500m of a listed category B or C ESA.
- (D9) Limited petroleum activities carried out in accordance with Condition D8(b) must be preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent.

#### **Disturbance to Land – Endangered and Of Concern Regional Ecosystems**

- (D10) Despite Condition D8, where it can be demonstrated that no reasonable or feasible alternative exists, limited petroleum activities may be undertaken within an endangered/of concern regional ecosystem and its associated buffer zone, provided that the area is not part of another listed category A, B or C ESA (e.g. a National Park) or associated buffer zone, subject to the following:
  - (a) the limited petroleum activity is located and carried out in areas according to the following order of preference:
    - i. pre-existing cleared areas or significantly disturbed areas less than 200m from an Endangered/Of Concern RE



- ii. undisturbed areas less than 200m from an Endangered/Of Concern RE
  - iii. pre-existing areas of significant disturbance within an endangered/of concern regional ecosystem (e.g. areas where significant clearing or thinning has been undertaken within a regional ecosystem, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth)
  - iv. areas where clearing of an endangered or of concern regional ecosystem is unavoidable;
- (b) any vegetation clearing in an Endangered/Of Concern RE or associated buffer zone must not exceed any of the following areas:
- i. 10% of the remnant unit of Endangered/Of Concern regional ecosystem as ground truthed and mapped before any activity commences as per condition D1 and D2 of this environmental authority for the life of the project; or
  - ii. more than 30m<sup>2</sup> for the construction of a sump; or
  - iii. six (6) metres in width for tracks; or
  - iv. twelve (12) metres in width for pipeline construction purposes; and
- (c) all reasonable and practical measures are taken to minimize the area cleared and to avoid the clearing of mature trees, which must include but not be limited to, for each well site, a risk assessment to determine the minimum amount of disturbance possible.
- (D11) Details of any significant disturbance to land in or within 200m of Endangered or Of Concern regional ecosystems, along with a record of the assessment required by Conditions D2 and D3 must be kept and submitted to the administering authority upon request.
- (D12) If the assessment required by Conditions D2 and D3 indicates that an ecosystem mapped as Endangered or Of Concern regional ecosystem by the Queensland Herbarium should be in a lower conservation value classification and the holder of this environmental authority wishes to undertake activities as if the ecosystem is of the lower conservation value they must notify the administering authority in writing before any significant disturbance to land takes place.
- (D13) If, within the 20 business days following the lodgement of the notification under Condition D12 the administering authority notifies the holder of this environmental authority, in writing, that the regional ecosystem mapping requires further validation, then significant disturbance to land in the mapped regional ecosystem are prohibited until the administering authority provides written advice that significant disturbance to land may proceed.
- (D14) When requested by the administering authority, the environmental authority holder must enter into an agreement with the administering authority to provide an environmental offset to counterbalance the impacts of the activity on Endangered or Of Concern regional ecosystem.
- (D15) The holder of this environmental authority must comply with any environmental offset agreement made in accordance with the conditions of this environmental authority.

#### **Disturbance to Land – State Forests and Timber Reserves**

- (D16) Despite condition D8, activities may be undertaken within State Forests or Timber Reserves provided the holder of the environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.
- (D17) Where activities are to be undertaken in a State Forest or Timber Reserve that are also Endangered or Of Concern Regional Ecosystems, such activities may be undertaken in accordance with condition D10 of this environmental authority, provided the holder of this environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.

#### **Soil Management**

- (D18) The holder of this environmental authority must develop and implement soils management procedures for areas to be disturbed by petroleum activities prior to commencement of





petroleum activities in these areas to prevent or minimise the impacts of soil disturbance. These procedures must include but not be limited to:

- (a) establish baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (calcium, magnesium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients);
- (b) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter;
- (c) identify soil units within areas to be disturbed by petroleum activities at a scale of 1:100000, in accordance with the “Guidelines for Surveying Soil and Land Resources, 2<sup>nd</sup> Edition” (McKenzie et al. 2008), “Australian Soil and Land Survey Handbook, 3<sup>rd</sup> Edition” (National Committee on Soil and Terrain 2009) and “The Australian Soil Classification” (Isbell 2002);
- (d) develop soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example:
  - i. shallow cracking clay soils;
  - ii. deep cracking clay soils;
  - iii. deep saline and/or sodic cracking clay soils with melonholes;
  - iv. thin surface, sodic duplex soils;
  - v. medium to thick surface (say >15 cm), sodic duplex soils; and
  - vi. non-sodic duplex soils;
- (e) detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity; and
- (f) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.

(D19) A copy of the soils management procedures must be made available to the administering authority upon request.

### **Acid Sulfate Soils**

(D20) The holder of this environmental authority must, when clearing in areas with acid sulfate soils, develop and implement an acid sulfate soil environmental management plan prepared in accordance with the “State Planning Policy 2/02 Guideline Planning and Managing Development Involving Acid Sulfate Soils” and the Department of Environment and Resource Management’s “Queensland Acid Sulphate Soil Technical Manual” (Version 2.2 September 2004) or more recent editions or supplements to these documents as such become available.

**Note:** condition D20 is only applicable in areas of acid sulfate soils or potential acid sulfate soils. These areas should be identified in the Environmental Management Plan accompanying the application.

### **Fauna Management**

(D21) The holder of this environmental authority must develop and implement fauna management procedures for the carrying out of the petroleum activities, in particular pipeline construction, construction and use of dams, to prevent or minimise harm or the potential risk of causing harm to fauna.

(D22) The fauna management procedures must include training and awareness of staff and contractors and ensure that any planned fauna handling is undertaken by a suitably qualified person.

(D23) A copy of the fauna management procedures must be made available to the administering authority on request.

**Note:** The procedures required by conditions D21 and D22 should consider the “Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines” dated October 2005, or subsequent versions thereof.



## **Pest management**

- (D24) In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program that includes but is not limited to the following:
- (a) identification of pest species and infestation areas;
  - (b) prevents and/or minimises the introduction and/or spread of pests; and
  - (c) control and management of pest outbreaks as a result of petroleum activities.
- (D25) A copy of the pest management program must be made available to the administering authority on request.

Note: The pest management program required by Condition D24 should consider the “Petroleum Industry (including coal seam methane gas) Minimising Pest Spread Guidelines” dated June 2008, or subsequent versions thereof. This document is available for download from:

[http://www.dpi.qld.gov.au/documents/Biosecurity\\_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf](http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Minimising-Pest-Spread-Advisory-Guidelines.pdf)

## **Chemical and Fuel Storage**

- (D26) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.
- (D27) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:
- (a) storage tanks must be banded so that the capacity and construction of the band is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
  - (b) drum storages must be banded so that the capacity and construction of the band is sufficient to contain at least 25% of the maximum design storage volume within the band.
- (D28) All containment systems must be designed to minimise rainfall collection within the system.

## **SCHEDULE E – ENVIRONMENTAL NUISANCE**

Odour, dust and other airborne contaminants

- (E1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity must not cause an environmental nuisance at any sensitive place or commercial place.

Noise

- (E2) In the event of a complaint about noise from the carrying out of the petroleum activity being made to the administering authority and that the administering authority considers is not frivolous nor vexatious nor based on mistaken belief, then the emission of noise from the licensed place must not result in levels greater than those specified in Schedule E, Table 1 – Noise limits for fixed activities or Schedule E, Table 2 – Noise limits for itinerant activities as appropriate.
- (E3) In the event of a complaint about noise nuisance that the administering authority considers is not frivolous or vexatious then the holder of the environmental authority must prepare and



submit a noise management plan to the administering authority within the reasonable and practicable timeframe specified in writing by the administering authority.

(E4) The noise management plan must address, but not be limited to, the following matters:

identification of component noise sources and activities at the place(s) which impact on noise sensitive areas;

- (a) the measured and/or predicted level of these noise sources and activities at noise sensitive places;
- (b) the reasonable and practicable control or abatement measures (including hours of operation) that can be undertaken to reduce identified intrusive noise sources;
- (c) the level of noise at noise sensitive places that would be achieved from implementing these measures.
- (d) the handling of future noise complaints;
- (e) community liaison and consultation; and
- (f) training of staff and contractors in noise management practices.

(E5) The holder of this environmental authority must commence implementation of the noise abatement recommendations of the noise management plan not more than 30 days following its submission to the administering authority, accounting for any comments made by the administering authority within that time.

**Schedule E, Table 1 – Noise limits for fixed activities**

Sensitive place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
Commercial place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am

- bg = background noise level
- In the event that measured bg is less than 25 dB(A), then 25 dB(A) is to be substituted for the measured level
- If the background is higher than the number shown on the second line in any box, the limit is to be background plus 0.

**Schedule E, Table 2 – Noise Limits for itinerant activities**

Sensitive place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am



Commercial place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am

- bg = background noise level
- In the event that measured bg is less than 25 dB(A), then 25 dB(A) is to be substituted for the measured level
- If the background is higher than the number shown on the second line in any box, the limit is to be background plus 0.

(E6) The holder of this environmental authority, upon completion of the noise abatement recommendations contained in the noise management plan, must undertake verification noise measurement and not more than 30 days following such assessment of the noise submit to the administering authority noise report confirming compliance with noise limits in Schedule E Table 1 and/or Table 2.

### SCHEDULE F – AIR

#### Fuel Burning or Combustion Equipment

- (F1) Contaminants emitted from fuel burning or combustion equipment point sources must be directed vertically upwards.
- (F2) Air dispersion modelling must be used to calculate the ground level concentrations of emissions from fuel burning or combustion equipment (that is capable of burning at least 500kg of fuel in an hour) and identify any potential impacts to air quality within the study area. The results must be made available to the administering authority on request.
- (F3) The calculated ground level concentration of contaminants discharged to the atmosphere under maximum operating conditions must not exceed the criteria in Schedule F - Table 1 for each air contaminant.
- (F4) Prior to the installation of any new or additional fuel burning or combustion equipment following the issue of this environmental authority, the holder must ensure that proper and effective pollution control equipment is provided for in the design of the equipment to ensure that emissions as modelled in accordance with Condition (F2) demonstrate compliance with the criteria specified in Schedule F, Table 1 – Maximum Ground Level Concentration Criteria.

**Schedule F, Table 1 – Maximum Ground Level Concentration Criteria**

Contaminant	Concentration at 0°Celsius	Units	Averaging time
NOx as Nitrogen Dioxide	250	µg/m <sup>3</sup>	1 hour
NOx as Nitrogen Dioxide	33	µg/m <sup>3</sup>	1 year
Carbon monoxide	11	mg/m <sup>3</sup>	8 hour



- (F5) The holder of this environmental authority must maintain a Register of Fuel Burning or Combustion Equipment that must include, as a minimum, the following information for each of the equipment:
- (a) Fuel Burning or Combustion Equipment Name and Location
  - (b) Stack emission height (metres)
  - (c) Minimum efflux velocity (metres /sec)
  - (d) Mass emission rates (g/s)
  - (e) Contaminant concentrations (mg/Nm<sup>3</sup> @ x %O<sub>2</sub> dry gas at 0°Celsius and 1 atmosphere)
- (F6) The holder of this environmental authority must ensure that the information contained in the Register of Fuel Burning or Combustion Equipment is complete and current on any given day.
- (F7) All entries in the Register of Fuel Burning or Combustion Equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.
- (F8) The holder of this environmental authority must make the Register of Fuel Burning or Combustion Equipment or information contained in the Register available to the administering authority on request.

Fuel burning and/or combustion equipment conditions for hubs and/or places close to populated areas as well as other low risk sites where such equipment is to be located

Refer Appendix 4 for conditions for fuel burning in hubs or close to populated areas.

## **SCHEDULE G – WASTE**

### **General**

- (G1) All general waste must be removed from the site and sent to a recycling facility or disposal facility licensed to accept the waste.
- (G2) All regulated waste must be removed from the site by a person who holds a current authority to transport such waste under the provisions of the EP Act and sent to a recycling facility or disposal facility licensed to accept the waste.
- (G3) Waste must not be burned or allowed to be burned on the licensed site.
- (G4) All waste fluids and muds resulting from drilling and exploration activities must be contained in a dam or containment structure for disposal, remediation or reuse where applicable.
- (G5) Oil based drilling muds must not be used in the carrying out of the petroleum activity.
- (G6) Synthetic based drilling muds must not be used in the carrying out of the petroleum activity other than with the written approval of the administering authority.

### **Coal Seam Gas Water Management**

- (G7) The holder of this environmental authority must develop and implement a coal seam gas water management plan (CWM Plan) for the authorised petroleum activities which must adequately identify and quantify all CSG water generated under this environmental authority and propose management options for treating and/or disposing of or beneficially reusing CSG water.
- (G8) The holder of this environmental authority must ensure that coal seam gas water is contained, is not released to land or waters and is only used for purposes specifically authorised:
- (a) under this environmental authority; or
  - (b) under Section 186 of the Petroleum and Gas (Production and Safety) Act 2004; or



- (c) under Section 86 of the Petroleum Act 1923; or
- (d) under an approval of resource for beneficial use as provided for under the Environmental Protection Act 1994.

- (G9) The holder of this environmental authority must ensure that the coal seam gas water to be used for domestic or stock purposes meets the ANZECC 2000 Water Quality Guidelines, or subsequent versions thereof, for stock and domestic purposes.
- (G10) Coal seam gas water released to the environment in accordance with Condition (G8) must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.
- (G11) Where any inconsistency exists between the conditions of this environmental authority and the CWM Plan, the conditions of this environmental authority prevail.

Note: CSG water that is beneficially used under an approval issued under the Environmental Protection (Waste Management) Regulation 2000 will be regulated under the conditions of that approval.

### **Associated Water Use for Dust Suppression**

- (G12) CSG water produced from the authorised petroleum activities may be used for dust suppression within tenures covered by this environmental authority, provided the water quality meets the limits specified in Schedule G, Table 1 – Road dust suppression water contaminant release limits for each of the water quality characteristics.

#### **Schedule G, Table 1 – Road dust suppression water contaminant release limits.**

Water Quality Characteristics	Unit	Limit	Limit Type
pH	ph Units	6.0 to 9.0	range
Total Suspended Solids	mg/L	30	maximum
Total Dissolved Salts	mg/L	2000	maximum
Total Petroleum Hydrocarbons	mg/L	10	maximum

- (G13) Use of CSG water for dust suppression activities must be carried out in a manner that:
  - (a) vegetation is not damaged
  - (b) soil erosion and soil structure damage is avoided
  - (c) there is no surface damming of the CSG water
  - (d) minimises deep drainage below the root zone of any vegetation
  - (e) quality of shallow aquifers is not adversely affected
  - (f) there are no releases of CSG waters to any surface waters.

### **Salt Management**

Refer Appendix 5 for conditions for brine or salt reuse or disposal.

### **SCHEDULE H – REHABILITATION**

- (H1) The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.
- (H2) As a minimum, decommissioning must be conducted such that each dam either:



- (a) becomes a stable landform similar to that of surrounding undisturbed areas, that no longer contains substances that will migrate into the environment, or
  - (b) is approved or authorised by the administering authority for use by the landholder following cessation of the petroleum activities.
- (H3) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the petroleum activities.
- (H4) As soon as practicable but no later than 12 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the authority must:
- (a) remediate contaminated land (e.g. dams containing salt)
  - (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas
  - (c) on all significantly disturbed land, take all reasonable and practicable measures to:
    - i. re-establish surface drainage lines
    - ii. reinstate the top layer of the soil profile
    - iii. promote establishment of vegetation.
  - (d) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm
  - (e) decommission all inactive buried pipelines in accordance with the requirements of AS 2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.
- (H5) All significantly disturbed land caused by the carrying out of the petroleum activities must be rehabilitated to:
- (a) a stable landform and with a self-sustaining vegetation cover and species that are similar to adjoining undisturbed areas
  - (b) ensure that all land is reinstated to the pre-disturbed land use and suitability class
  - (c) ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities
  - (d) ensure that the water quality of any residual void or water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm.
- (H6) Maintenance of rehabilitated areas must take place to ensure and demonstrate:
- (a) stability of landforms
  - (b) erosion control measures remain effective
  - (c) stormwater runoff and seepage from rehabilitated areas does not negatively affect the environmental values of any waters
  - (d) plants show healthy growth and recruitment is occurring
  - (e) rehabilitated areas are free of any declared pest plants.
- (H7) Rehabilitation can be considered successful when:
- (a) the site can be managed for its designated land-use (e.g. similar to that of surrounding undisturbed areas)
  - (b) no greater management input than for other land in the area being used for a similar purpose is required and there is evidence that the rehabilitation has been successful for at least three (3) years
  - (c) the rehabilitation is carried out in accordance with the goals, objectives indicators and completion criteria as specified in Schedule H, Table 1 – Planned rehabilitation specifications, or
  - (d) written agreement is obtained from the landowner/holder and administering authority.



**Schedule H, Table 1 – Planned rehabilitation specifications**

Petroleum activity feature	Rehabilitation Goal	Rehabilitation objectives	Indicators	Completion criteria
	1. Safe	Site safe for humans and animals	(a) Landform re-established	(a) No subsidence or major erosion gullies
	2. Non-polluting	Sediment and erosion control structures in place	(a) Sediment traps and design of erosion control measures	(a) Certification from suitably qualified and experience person and performance of control structures
		Storm water runoff does not pollute nearby watercourses	(b) Surface water monitoring	(b) Monitoring meeting release limits
		Encapsulated salt does not seep outside the monocell	(c) Groundwater monitoring	(c) Monitoring shows no adverse impacts on groundwater quality
	3. Stable	Minimise erosion	(a) Re-establish surface drainage lines	(a) no subsidence or areas of major erosion for at least x years
			(b) Vegetation cover	(b) x% foliage cover recorded over a period of 3 years
	4. Self-sustaining	Describe post activity land use or land suitability or land capability	(a) Species diversity	(a) Certification that x% species diversity achieved and maintained for x years
			(b) Presence of key species	(b) Certification that key species present over a period of x years

**SCHEDULE I – MONITORING PROGRAMS**

General

- (11) The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.
- (12) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (13) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively.





- (14) The method of water sampling required by this environmental authority must comply with that set out in the most recent version of the Monitoring and Sampling Manual – Environmental Protection (Water) Policy published by the administering authority.
- (15) All determinations of water quality must be:
  - a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements; and
  - b) made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management - Water Quality Sampling Manual; and
  - c) collected from the monitoring locations identified within this environmental authority, within XX hours of each other where possible; and
  - d) carried out on representative samples.

Note: this condition requires the Monitoring and Sampling Manual – Environmental Protection (Water) Policy 2009 to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

- (16) All analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.
- (17) If monitoring conducted in accordance with this environmental authority indicated a condition or contaminant level that has caused, or has potential to cause, environmental harm, the environmental authority holder must:
  - (a) as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimises environmental harm; and
  - (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.
- (18) Any management or monitoring plans, systems or programs required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis.
- (19) The holder of this environmental authority must record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.
- (110) An annual monitoring report must be prepared each year and presented to the administering authority when requested. This report shall include but not be limited to:
  - (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; and
  - (b) an evaluation/explanation of the data derived from any monitoring programs; and
  - (c) a summary of any record of quantities of releases required to be kept under this environmental authority; and
  - (d) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.

### **Groundwater Monitoring**

- (111) The holder of this environmental authority must prepare and implement a groundwater monitoring program within 40 business days of this environmental authority taking effect.



- (I12) The groundwater monitoring program must be developed and implemented by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater sampling design.
- (I13) The groundwater monitoring program must be able to detect any significant risks and changes to groundwater quality due to activities authorised under this environmental authority. As a minimum the program must include:
- (a) a groundwater monitoring network designed and installed for the authorised petroleum activities; and
  - (b) a sufficient number of monitoring sites to provide information on the following:
    - (i) seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils;
    - (ii) background monitoring sites (i.e. groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority).
  - (c) the location of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, trigger values; and
  - (d) the development of procedures to establish background ground water quality.
- (I14) The Groundwater Monitoring Program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not less frequently than biannually (every six months) for the first year of carrying out the petroleum activities and annually thereafter.
- (I15) If groundwater contamination caused by the petroleum activities is encountered, the following must be considered to satisfy requirements under Condition (I17):
- (a) the level of environmental harm caused as a result of such contamination to soils and groundwater;
  - (b) the conduct of a geodetic survey of all monitoring bores to determine the relative water surface elevations of each bore and reported in metres relative to the Australian Height Datum; and
  - (c) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.
- (I16) The holder of this environmental authority must ensure that the groundwater monitoring data gathered in accordance with this environmental authority is analysed and interpreted to assess the nature and extent of any environmental impact of the environmentally relevant activity. The data, analysis and assessment must be submitted to the administering authority with each Annual Return.
- (I17) If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within 10 business days of receipt of the analysis indicating these changes, including any proposed actions to mitigate the changes in groundwater quality..

#### **Air Monitoring (Point Source)**

- (I18) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the Register of Fuel Burning or Combustion Equipment (Condition F5) for the contaminants listed in Schedule F – Table 1 (release of contaminants) and at the frequencies specified in Schedule I – Table 1.

#### **Schedule I, Table 1 – Monitoring Frequency for contaminants**

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	To be inserted
NOx as Nitrogen Dioxide	To be inserted
Carbon monoxide	To be inserted



- (I19) The monitoring program must comply with the following:
- (a) Monitoring provisions for the release points must comply with the most recent edition of AS4323.1 Stationary source emissions method 1: Selection of sampling provisions.
  - (b) The following tests must be performed for each sample taken at each release point specified in the Register of Fuel Burning or Combustion Equipment (Condition F5):
    - i. Gas velocity, volume and mass flow rate.
    - ii. Temperature.
    - iii. Water vapour concentration (for non-continuous sampling).
  - (c) Samples taken must be representative of the contaminants discharged when operating under maximum operating conditions.
  - (d) During the sampling period the following additional information must be gathered:
    - i. Production rate.
    - ii. Plant status.
  - (e) Monitoring of contaminant release must be carried out in accordance with the latest edition of the administering authority's Air Quality Sampling Manual.

### **Noise Monitoring**

(I20) The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive or commercial place within the reasonable and practicable timeframe nominated by the administering authority, and report the results to the administering authority within 3 business days of completion of the monitoring.

(I21) Noise monitoring and recording must include the following descriptor, characteristics and matters:

- (a)  $L_{AN,T}$  (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins).
  - (b) background noise  $L_{A90,T}$ .
  - (c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels.
  - (d) atmospheric conditions including temperature, relative humidity and wind speed and directions.
  - (e) effects due to any extraneous factors such as traffic noise.
  - (f) location, date and time of monitoring.
  - (g) if the complaint concerns low frequency noise, Max  $L_{PZ,15 \text{ min}}$ .
  - (h) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- (I22) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's Noise Measurement Manual or the most recent version of AS1055 Acoustics – description and measurement of environmental noise.

### **Nuisance Monitoring (other than Noise)**

- (I23) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.
- (I24) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive or commercial place.



- (I25) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within 10 business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.
- (I26) If monitoring in accordance with Condition I24 and I25, indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- (a) address the complaint including the use of alternative dispute resolution services if required; and/or
  - (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.

#### **SCHEDULE J – COMMUNITY ISSUES**

- (J1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
  - (b) time and date of complaint;
  - (c) reasons for the complaint as stated by the complainant;
  - (d) investigations undertaken in response to the complaint;
  - (e) conclusions formed;
  - (f) actions taken to resolve complaint;
  - (g) any abatement measures implemented to mitigate the cause of the complaint; and
  - (h) name and contact details of the person responsible for resolving the complaint.
- (J3) The holder of this environmental authority must retain the record of complaints required by this condition for five (5) years.

#### **SCHEDULE K NOTIFICATION PROCEDURES**

- (K1) The holder of this environmental authority must telephone the administering authority's Pollution Hotline (1300 130 372) or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with the conditions of this environmental authority or any event where environmental harm has been caused or may be caused.
- (K2) Subject to condition (K1), the holder of this environmental authority is required to report in the case of uncontained spills of contaminants (including but not limited to hydrocarbon, CSG water or mixtures of both) of the following volumes or kind:
- (a) releases of any volume of contaminants to water; and
  - (b) releases of volumes of contaminants greater than 200L of hydrocarbon, 2000 litres of brine or 10 000 litres of coal seam gas water to land; and
  - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (K3) The notification of emergencies or incidents as required by conditions number (K1 and K2) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
  - (b) the name and telephone number of the designated contact person;
  - (c) the location of the emergency or incident;



- (d) the date and time of the release;
  - (e) the time the holder of this environmental authority became aware of the emergency or incident;
  - (f) the estimated quantity and type of any substances involved in the incident;
  - (g) the actual or potential suspected cause of the release;
  - (h) a description of the effects of the incident including any environmental harm that has occurred or may occur as a result of the release;
  - (i) any sampling conducted or proposed, relevant to the emergency or incident; and
  - (j) actions taken to prevent any further release and mitigate any environmental harm caused by the release.
- (K4) Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results, whichever is the later, a written report must be provided to the administering authority, including the following:
- (a) results and interpretation of any samples taken at the time of the incident and analysed;
  - (b) the outcomes of actions taken at the time of the incident to prevent or minimise environmental harm; and
  - (c) proposed actions to prevent a recurrence of the emergency or incident.
- (K5) As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, a written report on the results of any such monitoring must be provided to the administering authority.

## SCHEDULE L DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies or the Petroleum and Gas (Production and Safety) Act 2004 and its regulations must be used in that order.

**"aggregation dam"** means a dam that is used to aggregate and contain CSG water prior to use, treatment or disposal of that water (by means other than evaporation). The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.

**"associated works"** in relation to a dam, means:

- operations of any kind and all things constructed, erected or installed for that dam; and
- any land used for those operations.

**"background noise level"** means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.

**"bed and banks"** for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.

**"beneficial use"** means

- with respect to dams, that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:
  - of benefit to that owner in that it adds real value to their business or to the general community
  - in accordance with relevant provisions of the Environmental Protection Act 1994
  - sustainable by virtue of written undertakings given by that owner to maintain that dam
  - the transfer and use have been approved or authorised under any relevant legislation.
- or with respect to coal seam gas water, refer the DERM's Operational Policy Management of water produced in association with petroleum activities (CSG water) and Notice of decision to approve a resource for beneficial use – CSG water which can be accessed on DERM's website at [www.derm.qld.gov.au](http://www.derm.qld.gov.au).

**"brine"** means either saline water with a total dissolved solid concentration greater than 40 000mg/l or CSG water after it has been concentrated through water treatment processes and/or evaporation.



“bund or banded” in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or banded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.

“category A ESA” means any area listed in Section 25 of the Environmental Protection Regulation 2008.

“category B ESA” means any area listed in Section 26 of the Environmental Protection Regulation 2008.

“category C ESA” means any of the following areas:

- Nature Refuges as defined under the Nature Conservation Act 1992;
- Koala Habitat Areas as defined under the Nature Conservation Act 1992;
- State Forests or Timber Reserves as defined under the Forestry Act 1959;
- Declared catchment areas under the Water Act 2000;
- Resources reserves under the Nature Conservation Act 1992
- An area identified as “Essential Habitat” for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992;
- Any wetland shown on the Map of Referable Wetlands available from DERM’s website; or
- “Of concern” regional ecosystems identified in the database maintained by DERM called ‘Regional ecosystem description database’ containing regional ecosystem numbers and descriptions.

“**certification or certified by a suitably qualified and experienced person**” in relation to a design plan or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what is being certified and the precise nature of that certification.
- the relevant legislative, regulatory and technical criteria on which the certification has been based;
- the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

“**clearing**” means:

- in relation to grass, scrub or bush—the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include—
  - the flattening or compaction of vegetation by vehicles if the vegetation remains living; or
  - the slashing or mowing of vegetation to facilitate access tracks; or
  - the clearing of noxious or introduced plant species; and
- in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way.

“**commercial place**” means a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

“**construction**” in relation to a dam includes building a new dam and modifying or lifting an existing dam.

“**CSG water**” means groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production. CSG water typically contains significant concentrations of salts, has a high sodium adsorption ratio (SAR) and may contain other contaminants that have the potential to cause environmental harm if released to land or waters through inappropriate management. CSG water is a waste, as defined under s13 of the EP Act.

“**CSG water dams**” include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.

“**dam**” means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does not mean a fabricated or manufactured tank



or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

**“design plan”** means the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

**“discharge area”** means:

- (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and
- (b) identified by an assessment process consistent with the document: Salinity Management Handbook, Queensland Department of Natural Resources, 1997; or
- (c) identified by an approved salinity hazard map held by the Department of Environment and Resource Management.

**“ecosystem functioning”** means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.

**“end”** means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the ‘completion’ of the petroleum activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

**“equivalent person or EP”** means an equivalent person under volume 1, section 2 of the Guidelines for Planning and Design of Sewerage Schemes, October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.

**“evaporation dam”** means a dam where CSG water or brine is contained until the water content has been removed by evaporation.

**“fill”** means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

**“flowable substance”** means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

**“foreseeable future”** means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.

**“hazard”** in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

**“hazard category”** means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in DERM’s Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008) or any updated version of the Manual that becomes available from time to time

**“heritage place”** means any place that may be of cultural heritage significance, or any place with potential to contain archaeological artefacts that are an important source of information about Queensland’s history.

**“high bank”** means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.

**“highly erodible soils”** means very unstable soils that are generally described as Sodosols with hard – setting, fine sandy loam to silty clay loam surfaces (solodics, solodised solonetz and solonetz) or soils with a dispersible layer located less than 25cm deep or soils less than 25cm deep.

**“hydraulic performance”** means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008) published by the Environmental Protection Agency on its website.



“**impulsive sound**” means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.

“**infrastructure**” means water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

“**itinerant activities**” means [to be defined through the noise consultation process].

“lake” means:

- (a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- (b) the bed and banks and any other element confining or containing the water.

“**landfill monocell**” means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).

“leachate” means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

“**levee**” means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

“**limited petroleum activities**” mean activities including geophysical surveys (including seismic activities), well sites, well pads, sumps, flare pits, flow lines and supporting access tracks. Limited petroleum activities do not include the construction of production infrastructure for processing or storing petroleum or by-products, dams, compressor stations, campsites/workforce accommodation, power supplies, waste disposal or other supporting infrastructure for the project.

“**max  $L_{PZ,15 \text{ min}}$  min**” means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

“**mg/L**” means milligrams per litre.

“**overland flow water**” means water, including floodwater, flowing over land, otherwise than in a watercourse or lake:

- after having fallen as rain or in any other way; or
- after rising to the surface naturally from underground.

“**permanent infrastructure**” includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc), which is to be left by agreement with the landowner.

“**pest**” means species:

- (a) declared under the Land Protection (Pest and Stock route Management) Act 2002;
- (b) declared under Local Government model local laws; and
- (c) which may become invasive in the future.

“**regulated dam**” means any dam in the significant or high hazard category as assessed using the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008) or any updated version of the Manual that becomes available from time to time

“**rehabilitation**” means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land

“**remnant unit**” means a continuous area of remnant vegetation representative of a single Regional Ecosystem type or a single heterogeneous unit (multiple Regional Ecosystem types that cannot be distinguished individually due to the scale of mapping).

“**River Improvement Trust Asset Area**” means an area within a River Improvement Area declared under the River Improvement Trust Act 1940 that is or has been subject to restoration or flood mitigation works. The locations and details of these areas can be obtained from the relevant River Improvement Trust.





**“sensitive place”** means

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment.

**“significantly disturbed land or significant disturbance to land”** means disturbance to land as defined in section 28 of the Environmental Protection Regulation 2008.

**“site”** means the petroleum authority(ies) to which the environmental authority relates.

**“spring”** means the land to which water rises naturally from below the ground and the land over which the water then flows.

**“stable”** in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

**“state heritage place”** means a place entered in the Queensland heritage register under Part 4 of the Queensland Heritage Act 1992.

**“suitably qualified person”** means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

**“suitably qualified and experienced person”** in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what has been assessed and the precise nature of that assessment;
- the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

**“suitably qualified and experienced person”** in relation to dams means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
- a total of five years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
- a total of five years of suitable experience and demonstrated expertise each, in three of the following categories:
  - investigation and design of dams.
  - Construction, operation and maintenance of dams.
  - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.
  - hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
  - hydrogeology with particular reference to seepage, groundwater.
  - solute transport processes and monitoring thereof.
  - dam safety.

**“third party auditor”** means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of activities covered by this environmental authority



**“threatening processes”** means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.

**“tolerable limits”** means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation.

**“topsoil”** means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.

**“void”** means any man-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).

**“waters”** includes all or any part of a creek, river, stream, lake, lagoon, dam, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

**“watercourse”** means a river, creek or stream in which water flows permanently or intermittently:

- (a) in a natural channel, whether artificially improved or not; or
- (b) in an artificial channel that has changed the course of the watercourse;  
but, in any case, only:
  - (c) unless a regulation under paragraph (d), (e) or (f) declares otherwise-at every place upstream of the point (point A) to which the high spring tide ordinarily flows and reflows, whether due to a natural cause or to an artificial barrier; or
  - (d) if a regulation has declared an upstream limit for the watercourse-the part of the river, creek or stream between the upstream limit and point A; or
  - (e) if a regulation has declared a downstream limit for the watercourse-the part of the river, creek or stream upstream of the limit; or
  - (f) if a regulation has declared an upstream and a downstream limit for the watercourse-the part of the river, creek or stream between the upstream and the downstream limits.

**Watercourse** includes the bed and banks and any other element of a river, creek or stream confining or containing water.

**“wetland”** means an area shown as a wetland on a ‘Map of referable wetlands’, a document approved by the chief executive (environment). A map of referable wetlands can be viewed at the DERM website [www.derm.qld.gov.au](http://www.derm.qld.gov.au).

**“wild river declaration”** means a statutory instrument under the Wild Rivers Act 2005. A declaration lists the relevant natural values to be preserved and delineates certain parts of the wild river area and the different constraints that may apply in these areas. With reference to environmental authorities for petroleum, each declaration also specifies conditions to be included in a new authority if the activity is to be located within the wild river area.

**“80th percentile release limits”** means that not more than one (1) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

1. the consecutive samples are taken over a 5 month period
2. the consecutive samples are taken at approximately equal periods.



## Appendix 3

### Gas transmission pipeline

#### Part 1 - MCU conditions-Callide Infrastructure Corridor State Development Area and Gladstone State development Area

##### MCU approval under the Development Schemes for the Gladstone State Development Area and the Callide Infrastructure Corridor State Development Area

###### Condition 1

East of the Callide Range, the proponent must locate the gas transmission pipeline within the Callide Infrastructure Corridor State Development Area (CICSDA) and Gladstone State Development Area (GSDA).

###### Condition 2

Final approved layout of the location of the gas transmission pipeline shall be subject to approval by way of material change of use under the Development Schemes for both the CICSDA and the GSDA.

###### Condition 3

As part of the material change of use approval process, the proponent shall provide an electronic copy of the gas transmission pipeline alignment within the CICSDA and the GSDA.

###### Condition 4

The proponent is also required to obtain an environmental authority approval from DERM prior to the commencement of construction.

###### Condition 5

The proponent must undertake petroleum activities in relation to the operation of the gas transmission pipelines in accordance with the *Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines, October 2005* (the Code) or subsequent versions thereof.

#### Part 2- Coordinator-General imposed conditions-gas pipeline

In accordance with section 54A and 54B of the *State Development and Public Works Organisation Act 1971*, I **nominate** that the following conditions apply to the project.

These conditions take effect from the date of this report.

###### Condition 1

Prior to commencement of significant construction works the proponent must submit to all relevant local governments a proposal and mitigating measures that satisfy local and regional requirements, in relation to workers' accommodation locations and impacts.



## **Condition 2**

Workers' accommodation must be located to the satisfaction of the Department of Environment and Resource Management, having regard to potential noise emissions in accordance with Draft State Planning Policy: Air, Noise and Hazardous Materials.

## **Condition 3**

The proponent must include provisions in the Environmental Management Plan for the gas pipeline, ensuring that, on land identified as being good quality agricultural land (GQAL), the pipeline contractor must:

- a) on completion of construction, remove temporary access tracks
- b) on completion of construction, lightly rip disturbed areas, replace topsoil and return the surface to a land use condition that serves the preconstruction use
- c) on completion of construction, implement land management and erosion control measures
- d) on land with GQAL class A, B or C1, bury the pipeline to at least 0.9m below finished land surface, or greater if deep ripping is a normal practice.

## **Condition 4**

Prior to commencement of significant construction works, the proponent must:

- a) consult with Queensland Rail and Powerlink on the design parameters for pipeline rail crossing under-boring and crossing of high voltage power line corridors, and
- b) implement the measures agreed by Queensland Rail and Powerlink to ensure safe and effective preservation of the integrity of rail infrastructure and the cathodic protection of each pipeline.

## **Condition 5**

Prior to commencement of significant construction works, the proponent must:

- a) consult with the Department of Transport and Main Roads, through the relevant regional offices, on the design parameters for pipeline crossing of state controlled roads and implement the measures decided, and
- b) consult with the relevant local government on the design parameters for pipeline crossing of local government controlled roads and implement the measures decided.

## **Condition 6**

Prior to commencement of significant construction works, a species management plan for affected protected fauna, (both terrestrial and marine) must be prepared in consultation with DERM for the total project including development (including planning and construction) operation and decommissioning phases. The plan must satisfy the requirements under section 322 of the *Nature Conservation (Wildlife Management) Regulation 2006* relating to tampering with animal breeding places. The plan shall be developed to:

- a) address the impacts to the species
- b) provide for the survival of the species in the wild.

## **Condition 7**

Sewage treatment plants associated with temporary workers' accommodation must be located above Q50 flood levels.



#### **Condition 8**

Prior to commencement of works, the appropriate methods for disposal of waste must be determined by consultation with the relevant local governments and the Department of Environment and Resource Management.

#### **Condition 9**

The proponent must ensure that all potable water consumed on site, and at worker's accommodation complies with the *Australian Drinking Water Guideline 2004*.

#### **Condition 10**

Prior to commencement of significant construction works, the proponent must determine from all relevant local governments, any additional upgrades of sewerage or waste disposal facilities required as a result of this project's requirements for workers' accommodation and meet any costs associated with these upgrades.

#### **Condition 11**

All temporary workers' accommodation must be located, where practical, above the Q50 flood level.

#### **Condition 12**

A mosquito and biting midge management plan will be developed as part of the EM Plan and will include:

- assessment of work areas to be undertaken prior to works and on an informal basis to identify potential breeding sites
- any required specific area control plans based on assessment of potential breeding sites will conform to DERM'S Mosquito Management Code of Practice for Queensland.

Queensland Health and the relevant local councils will be contacted for assistance in choosing a suitable method

#### **Condition 13**

Prior to commencement of significant construction works, the proponent must prepare an Emergency Response Plan for temporary workers' accommodation, to the satisfaction of the Department of Community Safety, local governments and Queensland Police.

#### **Condition 14**

All temporary workers' accommodation provided for the project must comply with the *Queensland Development Code Part MP 3.3 Temporary Accommodation Buildings and Structures (1 February 2010 draft, until the code is finalised)*.

#### **Condition 15**

The proponent must provide bus transportation services for the movement of large numbers of construction and operational workforce, resident in workers' accommodation, to and from project construction sites.



## **The Narrows**

### **Condition 16**

Subject to condition 17 construction of the pipeline across the across the Kangaroo Island wetlands and The Narrows must be undertaken concurrently with construction of the pipelines of other LNG proponents as part of a bundled pipeline construction methodology.

### **Condition 17**

1. the proponent shall negotiate in good faith with any proponent of a project which has been declared a significant project by the Coordinator-General and has a proposed gas transmission pipeline from the mainland to Curtis Island (LNG proponents) with a view to reaching agreement on a bundled pipeline crossing of the Kangaroo Island wetlands and The Narrows.
2. the period for the proponent and other LNG proponents to successfully negotiate an agreement for a bundled pipeline crossing shall expire on 1 September 2010
3. in the event that an agreement is not reached within the set time or the proponent cannot accept the agreement reached among the other parties and the Coordinator-General is satisfied that the negotiation process has been conducted reasonably, then the proponent shall submit details of its position, including the information requested in Conditions 21 and 22 below, to the Coordinator-General for consideration and approval of an alternative pipeline crossing proposal. Any such proposal shall:
  - a. not compromise the pipeline crossing plans of other LNG proponents
  - b. result in aggregate environmental impacts in the wetlands and The Narrows area that are not significantly worse than impacts that would arise should all proponents participate in a bundled pipeline crossing. This might be achieved, for example, by using horizontal directional drilling or tunnelling.

### **Condition 18**

The bundled pipeline route across the Kangaroo Island wetlands and The Narrows shall be contained within the corridor identified in drawing WR\_QGC\_00794 Rev.E that accompanied the report to DIP on 25 February 2010 titled, GLNG Pipeline FEED – Report of Mechanised Marine Crossing Installation Concept.

### **Condition 19**

An assessment of the feasibility of co-locating water, sewerage and telecommunication services as part of the bundled gas pipelines crossing of the Kangaroo Islands wetlands and The Narrows shall be undertaken in consultation with:

1. Gladstone and Area Water Board
2. Gladstone Regional Council
3. Telecommunication providers.

### **Condition 20**

The proponent must consult with relevant government departments and agencies that are required to give particular approvals in order for the bundled gas transmission pipeline crossing to proceed, in order to determine the requirements of those departments and agencies. Such departments and agencies include:

1. DERM
2. DEEDI
3. Gladstone Ports Corporation
4. Maritime Safety Queensland.



### **Condition 21**

Prior to deciding an application for an environmental authority (pipeline licence) for the gas transmission pipeline section across the Kangaroo Island wetlands and The Narrows, the following information shall be submitted to the Coordinator-General for review and approval:

- a) details of the agreement reached with other LNG proponents on the bundled pipeline crossing including:
  - i. the bundled pipeline route proposed
  - ii. LNG proponents participating in the bundled pipeline approach and the roles and responsibilities of each party
  - iii. the feasibility of co-locating services with the bundled gas pipeline, discussions with, and participation by, service providers, and
  - iv. the proposed bundled pipeline construction methodology.
- b) details of discussions with government departments and agencies in Condition 20 and major issues unresolved
- c) an assessment of the environmental impacts of the construction and operation of the bundled pipeline and proposed mitigation strategies, and
- d) a draft environmental management plan (EM Plan) as detailed in Condition 22.

### **Condition 22**

The draft EM plan must contain, but not necessarily be limited to:

1. An assessment of the environmental values and potential impacts to the environmental values of the Kangaroo Island wetlands and The Narrows, Port Curtis, Great Barrier Reef Coast Marine Park and the Great Barrier Reef World Heritage Area based on the site specific construction methodology detailing proposed mitigation measures. The EM plan must be prepared in accordance with section 310D of the Environmental Protection Act 1994, and the DERM published guideline: Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities.
2. The final pipeline route, design and construction methodology of the pipeline with specific detail on the crossing of Humpy and Targinie Creeks.
3. Geotechnical information to demonstrate that the engineered solution is technically feasible.
4. Acid sulfate soils data and analysis addressing the area within the proposed extension of the Gladstone State Development Area.
5. An acid sulfate soils management plan based on the final design and construction methodology of the bundled pipeline crossing.
6. Surface water and groundwater hydrological assessment of the Kangaroo Island wetland.
7. Water quality assessment of the Kangaroo Island wetlands and The Narrows.
8. Assessment of fish habitat, fish passage and marine plant values and impacts (temporary and permanent) within, and adjacent to, the corridor and strategies to avoid or minimise these.
9. Assessment of impacts on navigation and strategies to avoid or minimise these.
10. Cumulative impacts arising from dredging for The Narrows pipeline crossing and dredging for the Port of Gladstone Western Basin Dredging Project.



11. The draft EM plan should include details of proposed environmental offsets consistent with the Queensland Government Environmental Offset Policy 2008 and specific issue policies.

### **Condition 23**

Environmental authorities under section 310M of the *EP Act* and pipeline licences under section 410 of the *P & G Act* may be issued separately for the following sections of the gas transmission pipeline:

- a. gas-fields to the Kangaroo Island wetlands
- b. Kangaroo Island wetlands and the Narrows, and
- c. Curtis Island.

### **Condition 24**

Monthly progress reports shall be submitted to the Coordinator-General from the date of this report on:

- a. updated project delivery timelines for the whole project and major project elements i.e. gas fields, pipeline and LNG facility
- b. progress against the timelines and relationship between construction of the pipeline across the wetlands and The Narrows and the overall project critical path
- c. progress in reaching agreement with other LNG proponents on the bundled construction approach for the Kangaroo Island wetlands and The Narrows
- d. proposed timeline for the bundled construction section, and
- e. progress in reaching agreement with service providers.

## **Part 3- Coordinator-General Imposed Environmental Conditions**

### **CONDITIONS THAT MUST BE MET PRIOR TO THE ISSUE OF ENVIRONMENTAL AUTHORITIES:**

#### **Condition 1 – Draft EM Plan for gas transmission pipeline for Miles to main line valve 7**

A draft environmental management plan (EM plan) must be provided addressing the gas transmission pipeline from Miles to main line valve 7.

The draft EM plan must be prepared in accordance with the DERM published guideline: *Preparing an environmental management plan (EM Plan) for Coal Seam Gas (CSG) activities*.

The EM Plan must address, but not be limited to:

- Aquatic values impacted by the Gas Transmission Pipeline, including:

A detailed assessment of aquatic values (including animal breeding places) along the pipeline route should be provided. Site specific data should be included that accurately and comprehensively describes the environmental values and ecological condition at each aquatic site. The information should be used to determine the location of each watercourse or wetland crossing and site specific mitigation measures to protect the values identified.

The information must also demonstrate that mitigation measures for permanent creek crossings are consistent with AS2885 – *Pipelines – Gas, Liquid and Petroleum* and the *Australian Pipeline Industry Association Code of Environmental Practice*. Those documents provide the approach to be taken when determining the optimal route selection as well as engineering standards that must be applied to the construction of the pipeline, including:

- minimisation of adverse impacts on fauna and significant habitat areas
- minimisation of impacts on riparian, aquatic and water dependent flora and fauna
- minimise erosion and sediment impacts
- maintain water quality and water flow requirements





- maximise rehabilitation success of achieving long term site stability.

In addition, the design of all creek crossings and waterway barrier works should take account of the matters discussed in *Waterway barrier works development approvals* (Fish Habitat Management Operational Policy FHMOP 008, DPI&F, July 2009).

- Protection of flora and fauna during construction and operation, including reduction or disruption to habitat. Particular mention should be made of any potential disruption of endangered species habitat.
- Scheduling of construction to protect the breeding and nesting seasons of the endangered Fitzroy and White Throated Snapping Turtles where applicable.
- Rehabilitation of disturbed riparian areas including use of locally sourced species and intensive planting.

The draft EM Plan is to be submitted to the Coordinator-General for review prior to the issue of environmental authority for the gas transmission pipeline from Miles to main line valve 7.

## **CONDITIONS THAT MUST BE MET PRIOR TO THE COMMENCEMENT OF PETROLEUM ACTIVITIES**

### **Condition 2 Soils**

The proponent must provide to DERM a soil assessment that provides detailed information about the activities to be carried out under the environmental authority. The soil assessment must address, but not be limited to:

- Soils ground truthing, including:  
Identification of all sensitive soil and landform areas along the pipeline corridor including Good Quality Agricultural Land and Strategic Cropping Land. An assessment of the potential impacts should be provided along with appropriate mitigation measures and construction methods applicable to the identified soil types or landforms.
- Protection and restoration of good quality agricultural land and land that could qualify as strategic cropping land under the Government's *Strategic Cropping Land – Policy and planning framework Discussion paper*, February 2010

The soil assessment is to be submitted to DERM for review prior to the commencement of petroleum activities for the gas transmission pipeline from Miles to main line valve 7.

### **Condition 3 Hydrostatic test water**

The proponent must provide an assessment of the hydrostatic test water activities to be carried out under the environmental authorities for the gas transmission pipeline, including Miles to main line valve 7. The hydrostatic test water assessment must address, but not be limited to:

- Hydrostatic test water, including:  
A detailed assessment of impacts from hydrostatic test water along the pipeline route should be provided. Source water quality data and characteristics of additives, particularly biocides) should be provided along with the proposed storage, treatment and disposal methods. The information should be used to determine the site specific mitigation measures including monitoring and reporting.

The hydrostatic test water assessment is to be submitted to DERM for review prior to the commencement of petroleum activities for the gas transmission pipeline from Miles to main line valve 7.



## Part 4 – Environmental Authority Conditions

Department of Environment and Resource Management (DERM) recommended Environmental Authority conditions for the QGC Project – Gas transmission pipeline (Miles to main line valve 7)

### SCHEDULE A – GENERAL CONDITIONS

#### PREVENT AND/OR MINIMISE LIKELIHOOD OF ENVIRONMENTAL HARM

- (A1) This authority does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.
- (A2) In carrying out petroleum activities the holder of this authority must prevent or minimise the likelihood of environmental harm being caused.

#### MAINTENANCE OF MEASURES, PLANT AND EQUIPMENT

- (A3) The holder of this authority must:
  - a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this authority; and
  - b) maintain such measures, plant and equipment in a proper and efficient condition; and
  - c) operate such measures, plant and equipment in a proper and efficient manner.
- (A4) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this authority must be calibrated, appropriately operated and maintained.
- (A5) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration increases the environmental harm caused by the petroleum activities.
- (A6) The holder of this authority must ensure that daily operation and maintenance of all plant and equipment relating to the authorised petroleum activities are carried out by suitability qualified, competent and experienced person(s).
- (A7) All analyses and tests required to be conducted under this authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.

#### COMPLIANCE WITH AUSTRALIAN PIPELINE INDUSTRY ASSOCIATION CODE OF ENVIRONMENTAL PRACTICE

- (A8) The holder of this authority must undertake petroleum activities in relation to the operation of petroleum pipelines in accordance with the Australian Pipeline Industry Association *Code of Environmental Practice – Onshore Pipelines*, October 2005 (the Code) or subsequent versions thereof. To the extent of any inconsistency between the conditions of this environmental authority and the Code, the conditions of this authority prevail.

#### FINANCIAL ASSURANCE

- (A9) The holder of this authority must provide a financial assurance in the amount and form required by the administering authority for the construction, operation and decommissioning of the relevant petroleum pipeline. The calculation of financial assurance must be calculated in accordance with the guideline *Financial assurance for petroleum activities*.
- (A10) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

#### DEFINITIONS

- (A11) Words and phrases used in this authority are defined in Appendix 1 – Definitions. Where a definition for a term used in this authority is sought and the term is not defined within this authority, the definitions in the *Environmental Protection Act 1994*, its Regulation and Environmental Protection Policies must be used.



## ENVIRONMENTAL MANAGEMENT PLAN

(A12) An Environmental Management Plan (EM plan) must be implemented that provides for the effective management of the actual and potential impacts resulting from the carrying out of the petroleum activities. Documentation relating to the EM plan must be kept.

(A13) The EM plan required by condition (A12) must address, at least, the following:

1. Describe each of the following:
  - (a) each relevant resource authority for the environmental authority
  - (b) all relevant petroleum activities
  - (c) the land on which the activities are to be carried out
  - (d) the environmental values likely to be affected by the activities
  - (e) the potential adverse and beneficial impacts of the activities on the environmental values.
2. State the environmental protection commitments the applicant proposes for the activities to protect or enhance the environmental values under best practice environmental management.
3. Include a rehabilitation program for land proposed to be disturbed under each relevant resource authority for the application.
4. State a proposed amount of financial assurance for the environmental authority as part of the rehabilitation program.
5. Training staff in the awareness of environmental issues related to carrying out the petroleum activities, which must include at least:
  - (a) The environmental policy of the authority holder, so that all persons that carry out the petroleum activities are aware of all relevant commitments to environmental management.
  - (b) Any relevant environmental objectives and targets, so that all staff are aware of the relevant performance objectives and can work towards these.
  - (c) Control procedures to be implemented for routine operations for day to day activities to minimise the likelihood of environmental harm, however occasioned or caused.
  - (d) Contingency plans and emergency procedures to be implemented for non-routine situations to deal with foreseeable risks and hazards, including corrective responses to prevent and mitigate environmental harm (including any necessary site rehabilitation).
  - (e) Organisational structure and responsibility to ensure that roles, responsibilities and authorities are appropriately defined to ensure effective management of environmental issues.
  - (f) Effective communication procedures to ensure two-way communication on environmental matters between operational staff and higher management.
  - (g) Obligations with respect to monitoring, notification and record keeping obligations under the EM plan and relevant approvals.
  - (h) Monitoring of the release of contaminants into the environment including procedures, methods and record keeping.
6. The conduct of periodic reviews of environmental performance and procedures adopted, not less frequently than annually.
7. A program for continuous improvement.



## **SCHEDULE B – ENVIRONMENTAL NUISANCE**

- (B1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity must not cause an environmental nuisance at any sensitive place or commercial place.

### **NOISE**

- (B2) Prior to undertaking petroleum activities that are likely to impact upon a sensitive or commercial place, the holder of this authority must investigate potential noise emissions from the proposed petroleum activities and determine if noise emissions are likely to exceed the limits set in Condition (B3).
- (B3) If noise emissions are likely to exceed the limits specified in Schedule B, Table 1, then the holder must take appropriate measures to either relocate the petroleum activity or incorporate noise abatement and / attenuation measures to mitigate those impacts. These measures must be in place prior to undertaking the proposed petroleum activity.
- (B4) In the event of a complaint about noise from a petroleum activity made to the administering authority (and the administering authority considers the complaint is not frivolous nor vexatious nor based on mistaken belief) the emission of noise from the petroleum activity must not exceed the levels specified in Schedule B, Table 1 – Noise limits when measured at the sensitive receptor.
- (B5) The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual or the most recent version of AS1055 Acoustics – Description and measurement of environmental noise and the EPA guideline, Assessment of low frequency noise and the EcoAccess guideline, Planning for noise control.

### **ALTERNATIVE ARRANGEMENTS AVAILABLE WHEN NOISE EMISSIONS MAY CAUSE NUISANCE FOR LIMITED PERIODS**

- (B6) Where the holder of this authority has, at their cost, made alternative arrangements to the satisfaction of and with the written agreement of each person affected by nuisance noise emissions at a sensitive or commercial place, then the requirements specified in Table B1- Noise Limits will not apply at that sensitive or commercial place for the period of the alternative arrangements.
- (B7) As a minimum each written agreement of an alternative arrangement must state:
1. the location of the sensitive or commercial place
  2. the names of the affected persons
  3. the nature of the alternative arrangement(s) (e.g. provision of alternative accommodation)
  4. the period of the alternative arrangement(s).



Schedule B, Table 1 – Noise limits

Sensitive place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
$L_{A90, \text{adj}, 15}$ mins	lesser of $bg+1$ or 48	lesser of $bg+0$ or 40	$bg+0$	$bg+0$	$bg+0$	$bg+0$
$L_{A10, \text{adj}, 15}$ mins	lesser of $bg+1$ or 50	lesser of $bg+1$ or 45	$bg+0$	lesser of $bg+1$ or 45	lesser of $bg+5$ or 40	$bg+0$
$L_{A1, \text{adj}, 15}$ mins	lesser of $bg+1$ or 55	lesser of $bg+1$ or 50	lesser of $bg+1$ or 45	lesser of $bg+1$ or 50	lesser of $bg+1$ or 45	lesser of $bg+1$ or 40
Commercial place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
$L_{A90, \text{adj}, 15}$ mins	lesser of $bg+5$ or 50	$bg+0$	$bg+0$	lesser of $bg+3$ or 43	$bg+0$	$bg+0$
$L_{A10, \text{adj}, 15}$ mins	lesser of $bg+10$ or 55	lesser of $bg+10$ or 50	lesser of $bg+5$ or 45	lesser of $bg+10$ or 50	lesser of $bg+10$ or 45	lesser of $bg+5$ or 40
$L_{A1, \text{adj}, 15}$ mins	lesser of $bg+15$ or 60	lesser of $bg+15$ or 55	lesser of $bg+10$ or 50	lesser of $bg+15$ or 55	lesser of $bg+15$ or 50	lesser of $bg+10$ or 45

- $bg$  = background noise level
- In the event that measured  $bg$  is less than 25 dB(A), then 25 dB(A) is to be substituted for the measured level
- If the background is higher than the number shown on the second line in any box, the limit is to be background plus 0.

#### BLASTING ACTIVITIES

- (B8) All blasting must be carried out in a proper manner by a competent person in accordance with best practice environmental management and Australian Standard 2187 to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive or commercial place.
- (B9) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any noise sensitive or commercial place, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (B10) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any noise sensitive or commercial place, must not exceed more than 5 mm



per second for nine (9) out of any ten (10) consecutive blasts initiated, nor 10 mm per second at any time.

#### **BLAST AND VIBRATION MONITORING**

- (B11) Should complaints about blasting and/or vibration be received or when requested by the Administering Authority, monitoring and recording of air blast overpressure and ground borne vibration (as relevant to the complaint) must be undertaken to investigate any complaint of nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:
1. maximum instantaneous charge
  2. location of the blast within the site (including any bench level)
  3. airblast overpressure level (dB Linear Peak)
  4. peak particle velocity (mms-1)
  5. location, date and time of recording
  6. measurement instrumentation and procedure
  7. meteorological conditions for blast monitoring (including temperature, relative humidity, temperature gradient, cloud cover, wind speed and direction)
  8. distance/s from blast site to potentially noise-affected building/s or structure/s.

#### **SCHEDULE C – WATER MANAGEMENT**

##### **RELEASE TO WATERS**

- (C1) There must be no release of contaminants to waters.

##### **RELEASE TO LAND**

- (C2) The holder of this authority may allow pipeline trench water to be released to land for disposal provided that the water does not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.
- (C3) Subject to Condition (C2), the holder of this authority must ensure that the release of trench water to land must be carried out in a manner that ensures that:
1. vegetation is not damaged
  2. soil erosion and soil structure damage is avoided
  3. the quality of groundwater is not adversely affected
  4. there are no releases of trench water to any surface waters.

##### **MANAGEMENT OF HYDROSTATIC TEST WATER**

- (C4) The holder of this authority must ensure that:
1. hydrostatic test water is not released to waters
  2. hydrostatic test water containing chemical additives is not released to land without written consent from the administering authority
  3. hydrostatic test water released to land does not exceed the water quality limits specified in Schedule C – Table 1.



**Schedule C, Table 1 – Limits for the disposal of hydrostatic test water to land**

<b>Parameter</b>	<b>Maximum Value</b>
pH	6.5-8.5 (Range)
Arsenic (mg/L)	2.0
Cadmium (mg/L)	0.05
Chromium (mg/L)	1
Copper (mg/L)	5
Iron (mg/L)	10
Lead (mg/L)	5
Manganese	10
Zinc (mg/L)	5
Nitrogen (mg/L)	35
Phosphorus (mg/L)	10
Electrical Conductivity (uS/cm)	2000

(C5) The release of hydrostatic test water authorised by Condition (C4 (3)) must be located at least 100m from the nearest watercourse and carried out in a manner that ensures that:

1. vegetation is not damaged
2. soil erosion and soil structure damage is avoided
3. the quality of groundwater is not adversely impacted
4. hydrotest water does not migrate outside the nominated land discharge areas.

#### **DETERMINING WATER QUALITY CONTAMINANTS**

(C6) All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management *Monitoring and Sampling Manual*, 2009, and carried out on samples that are representative of the discharge.

#### **CONTAMINANT RELEASES TO GROUNDWATER**

(C7) There must be no release of contaminants to groundwater.

#### **SCHEDULE D – WASTE MANAGEMENT**

- (D1) The holder of this authority must ensure that petroleum activities do not result in the release or likely release of contaminants to the environment from the storage, conditioning, treatment and disposal of regulated waste materials.
- (D2) The holder of this authority must ensure that petroleum activities do not result in the release or likely release of a hazardous contaminant to the environment.
- (D3) Any spillage of hazardous waste or other contaminants that may cause environmental harm, must be effectively contained and cleaned up as quickly as practicable. Such spillage must not be cleaned up by hosing, or otherwise thereby releasing such waste or contaminants to any land or waters.



- (D4) The holder of this authority must as soon as practicable remove and dispose of all regulated waste to a licensed waste disposal facility or recycling facility.
- (D5) All regulated waste removed from the site must be removed by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a facility licensed to accept such waste.
- (D6) When regulated waste is removed from within the boundary of the petroleum tenure and transported by the holder of this authority, a record must be kept of the following:
1. date of waste transport
  2. quantity of waste removed and transported
  3. type of waste removed and transported
  4. route selected for transport of waste
  5. quantity of waste delivered
  6. any incidents (e.g. spillage) that may have occurred on route.
- (D7) If a person removes regulated waste associated with activities within the operational land and disposes of such waste in a manner which is not authorised or is improper or unlawful then, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.
- (D8) The holder of this authority must implement a Waste Management Plan consistent with the Environmental Protection (Waste) Policy 2000.
- (D9) The Waste Management Plan must address at least the following matters:
1. The types and amounts of waste generated.
  2. How the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (section 10 of the Environmental Protection (Waste Management) Policy 2000).
  3. Procedures for dealing with accidents, spills and other incidents that may impact on waste management.
  4. How often the performance of the waste management practices will be assessed (i.e. at least annually).
  5. The indicators or other criteria on which the performance of the waste management practices will be assessed.

#### **SEWAGE TREATMENT AND DISPOSAL**

In order to treat and dispose of sewage under this environmental authority the application for the environmental authority must address the treatment and disposal of sewage.

#### **SCHEDULE E – LAND MANAGEMENT**

##### **MINIMISING DISTURBANCE TO LAND AND SOIL MANAGEMENT**

- (E1) The holder of this authority must:
1. limit the right of way width to a maximum of 40 metres except as otherwise authorised by the administering authority in writing
  2. minimise disturbance to land in order to prevent land degradation
  3. ensure that for land that is to be significantly disturbed by petroleum activities (except in areas of highly erosive soils), the top layer of the soil profile is removed
    - (a) stockpiled in a manner that will preserve its biological and chemical properties, and
    - (b) used for rehabilitation purposes in accordance with condition (E30).





- (E2) The holder of this environmental authority must develop and implement soils management procedures for areas to be disturbed by petroleum activities prior to commencement of petroleum activities in these areas to prevent or minimise the impacts of soil disturbance. These procedures must include but not be limited to:
1. Establish baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (calcium, magnesium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including nitrogen, phosphorous, potassium, sulphur and micronutrients).
  2. A soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter.
  3. Identify soil units within areas to be disturbed by petroleum activities at a scale of 1:100000, in accordance with the “*Guidelines for Surveying Soil and Land Resources, 2<sup>nd</sup> Edition*” (McKenzie *et al.* 2008), “*Australian Soil and Land Survey Handbook, 3<sup>rd</sup> Edition*” (National Committee on Soil and Terrain 2009) and “*The Australian Soil Classification*” (Isbell 2002).
  4. Develop soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example:
    - vii. shallow cracking clay soils
    - viii. deep cracking clay soils
    - ix. deep saline and/or sodic cracking clay soils with melonholes
    - x. thin surface, sodic duplex soils
    - xi. medium to thick surface (say >15 cm), sodic duplex soils
    - xii. non-sodic duplex soils.
  5. Detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity.
  6. For areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts.
- (E3) A copy of the soils management procedures must be made available to the administering authority upon request.
- (E4) The holder of this authority must undertake an acid sulfate soils (ASS) investigation for the proposed linear disturbance (excavation, filling) on land areas that may potentially contain ASS (including all areas <5m AHD) according to the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*.
- (E5) The holder of this authority must provide detailed management measures in accordance with the *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines 2002* to the administering authority at least 20 business days prior to commencement of excavation or filling activities within areas identified as potential for containing ASS in the investigation outlined in condition (E4).
- (E6) The holder of this authority must have due regard to any comments provided by the administering authority when implementing ASS management measures.

#### **EROSION AND SEDIMENT CONTROL PLANS**

- (E7) An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities and which has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the Administering Authority.
- (E8) Appropriate measures to achieve compliance with condition (E7) for the petroleum activity must be described in the EM plan and include:



1. diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater
  2. collecting, treating, reusing or releasing contaminated stormwater runoff and incident rainfall in accordance with the conditions of this environmental authority
  3. roofing or minimising the size of areas where contaminants or wastes are stored or handled
  4. using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters
  5. erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters
  6. an inspection and maintenance program for the erosion and sediment control features
  7. provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March
  8. identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.
- (E9) Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater from disturbed areas.
- (E10) The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any waters, roadside gutter or a stormwater drainage system.
- (E11) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must be cleaned up using dry methods that minimise the release of wastes, contaminants or materials to any stormwater drainage system, roadside gutter or waters.

#### **DISTURBANCE TO LAND**

- (E12) Prior to conducting petroleum activities that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.
- (E13) The assessment required by Condition E12 must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*.
- (E14) The holder of this environmental authority, when carrying out petroleum activities must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value
  - (b) minimise the risk of injury, harm, or entrapment to wildlife and stock
  - (c) minimise disturbance to land that may otherwise result in land degradation
  - (d) ensure that for land that is to be significantly disturbed by petroleum activities:
    - i. the top layer of the soil profile is removed
    - ii. stockpiled in a manner that will preserve its biological and chemical properties
    - iii. used for rehabilitation purposes (in accordance with Condition H4).
  - (e) prior to carrying out field based activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.



*Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the Nature Conservation Act 1992 and Regulations.*

- (E15) Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.
- (E16) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

#### **DISTURBANCE TO LAND – ENVIRONMENTALLY SENSITIVE AREAS**

- (E17) Notwithstanding Conditions E12 to E16 inclusive, the holder of this environmental authority must ensure that the gas pipeline is not located in or within 200 metres of any listed category A ESA.

#### **DISTURBANCE TO LAND – ENDANGERED AND OF CONCERN REGIONAL ECOSYSTEMS**

- (E18) Despite Condition E17, where it can be demonstrated that no reasonable or feasible alternative exists, petroleum activities may be undertaken within an endangered/of concern regional ecosystem and its associated buffer zone, subject to the following:
  - (a) the petroleum activity is located and carried out in areas according to the following order of preference:
    - i. pre-existing cleared areas or significantly disturbed areas less than 200m from an Endangered/Of Concern RE;
    - ii. undisturbed areas less than 200m from an Endangered/Of Concern RE;
    - iii. pre-existing areas of significant disturbance within an endangered/of concern regional ecosystem (e.g. areas where significant clearing or thinning has been undertaken within a regional ecosystem, and/or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
    - iv. areas where clearing of an endangered or of concern regional ecosystem is unavoidable
  - (b) any vegetation clearing in an Endangered/Of Concern RE or associated buffer zone must not exceed any of the following areas:
    - i. 10% of the remnant unit of Endangered/Of Concern regional ecosystem as ground truthed and mapped before any activity commences as per condition D1 and D2 of this environmental authority for the life of the project; or
    - ii. six (6) metres in width for tracks and ten (10) in width on corners; or
    - iii. thirty (30) metres in width for pipeline construction purposes unless agreed in writing by the administering authority.

- (E19) Details of any significant disturbance to land in or within 200m of Endangered or Of Concern regional ecosystems, along with a record of the assessment required by Conditions E2 and E3 must be kept and submitted to the administering authority upon request.

- (E20) The holder of this environmental authority must comply with any environmental offset agreement made in accordance with the conditions of this environmental authority.

#### **DISTURBANCE TO LAND – STATE FORESTS AND TIMBER RESERVES**

- (E21) Despite condition E17, activities may be undertaken within State Forests or Timber Reserves provided the holder of the environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.
- (E22) Where activities are to be undertaken in a State Forest or Timber Reserve that are also Endangered or Of Concern Regional Ecosystems, such activities may be undertaken in accordance with this environmental authority, provided the holder of this environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.



- (E23) The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.
- (E24) Despite condition E23, pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is no practicable alternative such as the use of horizontal directional drilling methods, for a maximum period of ten (10) days, provided that the works are conducted in accordance with the following order of preference:
1. conducting work in times of no flow
  2. using all reasonable and practical measures to reduce impacts in times of flow
  3. horizontal directional drilling will be used for the construction of the pipeline unless the construction occurs in times of no flow or an alternative construction methodology is agreed with the administering authority in writing.
- (E25) Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or a spring must:
1. only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable alternative location is feasible;
  2. be no greater than the minimum area necessary for the purpose of the significant disturbance;
  3. be designed and undertaken by a suitably qualified and experienced person taking into account the matters listed in Section 5. Planning Activities and Section 6 Impact Management During Activities of DERM's "*Guideline – Activities in a watercourse, lake or spring associated with mining operations*" dated April 2008, or more recent editions as such become available; and
  4. upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.
- (E26) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.
- (E27) Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring. If, due to the petroleum activities, water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.
- (E28) Petroleum activities must not be carried out in River Improvement Trust Asset Areas without the approval of the relevant River Improvement Trust.

*Note: Locations and details of River Improvement Trust Asset Areas can be obtained from the relevant River Improvement Trust. A list of the relevant River Improvement Trusts will be provided by DERM.*

#### **REHABILITATION REQUIREMENTS**

- (E29) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the authorised petroleum activities on the relevant petroleum authority.
- (E30) For areas of native vegetation, revegetation must use seed sourced from local provenance native species, where available.
- (E31) As soon as practicable and within 3 months at the end of petroleum activities that cause any significant disturbance to land, the holder of this authority must investigate contaminated land status in accordance with *Environmental Protection Act 1994* requirements and the *National Environment Protection (Site Assessment) Measure 1999* where land has been subject to contamination caused by petroleum activities authorised under this authority.



- (E32) All land significantly disturbed by petroleum activities must be rehabilitated to:
1. a stable landform with a self-sustaining vegetation cover with same species and density of cover to that of the surrounding undisturbed areas, except over the area that must be maintained free of large flora species for pipeline integrity and access, and in cases where approval is sought in accordance with Condition (E29);
  2. ensure that all land is reinstated to the pre-disturbed land use and suitability class;
  3. ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.
- (E33) Notwithstanding Condition (E32) any planned rehabilitation outcome that does not fulfil the rehabilitation requirements listed in Condition (E32) approval must be sought from the administering authority, prior to the rehabilitation being carried out.
- (E34) Maintenance of rehabilitated areas must take place to ensure and demonstrate:
1. stability of landforms;
  2. erosion control measures remain effective;
  3. stormwater runoff and seepage from rehabilitated areas does not negatively affect the environmental values of any waters;
  4. plants show healthy growth and recruitment is occurring; and
  5. declared pest plants are controlled on rehabilitated areas to a level consistent with the surrounding property and prevented from spreading to unaffected areas through authorised petroleum activities.
- (E35) Rehabilitation can be considered successful when the site can be managed for its designated land-use (either similar to that of surrounding undisturbed areas or as otherwise agreed in a written document with the landowner/holder and administering authority) without any greater management input than for other land in the area being used for a similar purpose and there is evidence that the rehabilitation has been successful for at least 3 years.

#### **PEST AND WEED MANAGEMENT**

- (E36) The holder of this authority must develop and implement a pest and weed control program that includes but is not limited to the following:
1. identification of areas requiring pest and weed control;
  2. control measures to prevent the spread of pest and weed species; and
  3. measures to eliminate infestations of noxious pest and weed species that may occur.

#### **STORAGE AND HANDLING OF CHEMICALS, FLAMMABLE AND COMBUSTIBLE LIQUIDS**

- (E37) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases and dangerous goods must be stored and handled in accordance with the relevant Australian Standard.
- (E38) Flammable and combustible liquids (including petroleum products and associated piping and infrastructure), must be stored, handled and maintained in accordance with the latest edition of Australian Standard 1940 – *The Storage and Handling of Flammable and Combustible Liquids*.
- (E39) Any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:
1. storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and



2. drum storages must be banded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.

(E40) All containment systems must be designed to minimise rainfall collection within the system.

#### **SCHEDULE F – FAUNA MANAGEMENT**

(F1) The holder of this authority must develop and implement fauna management procedures in such a manner that petroleum activities are undertaken to prevent and/or minimise environmental harm.

(F2) The fauna management procedures must include but not be limited to:

1. training and awareness of staff and contractors;
2. conduct of a preconstruction ecological survey to identify the presence of any endangered, vulnerable or rare fauna species and identify and mark hollow-bearing trees;
3. the development of management strategies to minimise impact on any endangered, vulnerable or rare species;
4. minimising the clearing of mature and hollow-bearing trees;
5. minimising the length of time the trench is open through the staging of activities;
6. temporary exclusion fencing where practicable to restrict fauna access to the trench;
7. the use of “night caps” over open pipe string ends to prevent the ingress of wildlife;
8. pipes being strung with gaps to allow for fauna movement across the line of the pipe;
9. a suitably qualified person for fauna handling must be present during clear and grade activities to relocate fauna or recover any injured fauna and must check the entire trench for captured fauna at least daily, preferably in the morning;
10. installation of ramps and trench plugs with a slope less than 50% at least every 1000m to assist fauna to leave the trench; and
11. installation of shelter material to provide wet weather protection and reduction of heat stress, such as by placing sawdust filled Hessian bags in pairs every 250m.

(F3) A copy of the fauna management procedures must be made available to the administering authority on request

#### **SCHEDULE G – DECLARED WILD RIVER AREAS**

(G1) If the petroleum authority is in or partly within a declared wild river area, or a moratorium is in place under the *Wild Rivers Act 2005*, the holder of this authority must ensure that petroleum activities within the (proposed) wild river area are conducted in accordance with the conditions in the wild river declaration for the area relevant to the petroleum activities.

#### **SCHEDULE H – PROJECT INFRASTRUCTURE**

(H1) All petroleum infrastructure (including buildings, structures, plant and equipment erected and/or used for the petroleum activities) authorised under this authority must be located within the PPL <insert number> License Area.

(H2) All petroleum infrastructure must be removed from the relevant petroleum authority prior to surrender of this authority, except where agreed in writing by the administering authority and the current landowner.

(H3) Prior to the commencement of decommissioning or abandonment activities the scope of work for decommissioning or abandonment of project infrastructure shall be developed and agreed to with the administering authority.

(H4) The holder of this authority must decommission the petroleum and gas pipeline to a situation where ongoing, or potential environmental harm is prevented or minimised. As a minimum, pipeline must be decommissioned such that:

1. it no longer contains hazardous contaminants;



2. it is left in stable condition;
3. all the above ground infrastructure is removed, and
4. all areas disturbed by above ground infrastructure are rehabilitated in accordance with the requirements of this authority.

#### **SCHEDULE I - DAMS**

- (I1) Conditions (I3) to (I10) apply to all dams installed as part of the petroleum activities, as defined in this authority.
- (I2) Dams in the significant or high hazard category as defined in Appendix 4 are not permitted under this authority.

#### **GENERAL CONDITIONS**

- (I3) The holder of this authority must ensure that all dams on the operational land are designed and constructed by a suitably qualified engineer and maintained in accordance with generally accepted engineering standards and practices.
- (I4) In operating or decommissioning any dam, the holder of this authority must not interfere with any groundwater or surface water resource or watercourse so as to cause environmental harm, except where that interference and consequent harm has been authorised in this authority.
- (I5) The holder of this authority must ensure that any activities conducted under this authority, or enabled by this authority, do not compromise the integrity of any dam, either on the operational land or adjacent to the operational land.
- (I6) The holder of this authority must take advice from suitably qualified and experienced persons and, based on that advice, monitor the condition of all dams located on the operational land, for early signs of loss of structural or hydraulic integrity.
- (I7) In the event of any early signs of loss of structural or hydraulic integrity, the holder of this authority must take action to prevent and/or to minimise any environmental harm, and report any findings and actions taken to the administering authority.
- (I8) The holder of the authority must assess the hazard category of each dam using Table 1 of Appendix 3 - prior to construction of any new dam, and thereafter on an annual basis. The holder of the authority must act on that monitoring and assessment in accordance with Condition (I9).
- (I9) Where the hazard category for any dam has been assessed as significant or high, the holder of this authority must:
  1. notify the administering authority in writing;
  2. implement measures to manage the potential for environmental harm; and
  3. apply to the administering authority to amend this environmental authority to allow for the operation of a significant or high hazard dam.
- (I10) The holder of this authority must not abandon any dam, but must decommission each dam to a situation where ongoing environmental harm will not occur, unless in accordance with condition (E41). Decommissioned dams must no longer be dams but become landforms on the operational land and must comply with any rehabilitation requirements of this authority. Dams that are not decommissioned will be left in a stable, uncontaminated form complying with all standards for dams of agricultural purposes in consultation with DERM and DEEDI.

#### **SCHEDULE J – MONITORING PROGRAMS**

- (J1) The holder of this authority must:
  1. develop and implement a monitoring program that will demonstrate compliance with the conditions in this authority; and
  2. document the monitoring and inspections carried out under the program and any actions taken.



- (J2) The holder of this authority must ensure that a suitably qualified, experienced and competent person(s) conduct all monitoring required by this authority.
- (J3) The holder of this authority must record, compile and keep for a minimum of five years all monitoring results required by this authority and make available for inspection all or any of these records upon request by the administering authority. Monitoring results relating to rehabilitation must be kept until the relevant petroleum tenure is surrendered.
- (J4) An annual monitoring report must be prepared each year and submitted to the administering authority when requested. This report shall include but not be limited to:
  - 1. a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this authority and, a comparison of the previous twelve (12) months monitoring results to both this authority limits and to relevant prior results; and
  - 2. an evaluation/explanation of the data from any monitoring programs; and
  - 3. a summary of any record of quantities of releases required to be kept under this authority; and
  - 4. a summary of the record of equipment failures or events recorded for any site under this approval; and
  - 5. an outline of actions taken or proposed to minimise the environmental risk from any deficiency identified by the monitoring or recording programs.

## **SCHEDULE K – COMMUNITY ISSUES**

### **MANAGING COMPLAINTS**

- (K1) When the administering authority advises the holder of a complaint alleging nuisance (e.g. caused by dust or noise), the holder must investigate the complaint and advise the administering authority of the action proposed or undertaken in relation to the complaint.
- (K2) If the administering authority is not satisfied with the proposed or completed action, the holder must undertake monitoring or other action requested by the administering authority.
- (K3) Maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident.
- (K4) Retain the record of complaints required by this condition for 5 years.

### **COMPLAINT RESPONSE**

- (K5) The holder of this authority must record the following details for all complaints received and provide this information to the administering authority on request:
  - 1. time, date, name and contact details of the complainant;
  - 2. reasons for the complaint;
  - 3. any investigations undertaken;
  - 4. conclusions formed; and
  - 5. any actions taken.

## **SCHEDULE L – NOTIFICATION PROCEDURES**

### **NOTIFICATION OF EMERGENCIES AND INCIDENTS**

- (L1) The holder of this authority must telephone the DERM's Pollution Hotline (1300 130 372) or local office as soon as practicable after becoming aware of any release of contaminants or any event where environmental harm has been caused or may be threatened not in accordance with the conditions of this authority.
- (L2) Subject to condition (L1), the holder of this authority is required to report in the case of uncontained spills (including hydrocarbon, associated water or a mixtures of both) of the following volumes or kind:





- a. releases of any volume to water
  - b. releases of volume greater than 200L to land
  - c. releases of any volumes where potential serious or material environmental harm is considered to exist.
- (L3) The notification of emergencies or incidents as required by conditions number (L1 and L2) must include but not be limited to the following:
- a. the holder of the authority;
  - b. the location of the emergency or incident;
  - c. the number of the authority;
  - d. the name and telephone number of the designated contact person;
  - e. the time of the release;
  - f. the time the holder of the authority became aware of the release;
  - g. the suspected cause of the release;
  - h. the environmental harm caused, threatened, or suspected to be caused by the release;  
and
  - i. actions taken to prevent any further release and mitigate any environmental harm caused by the release.
- (L4) Not more than fourteen (14) days following the initial notification of an emergency or incident, written advice must be provided of the information supplied in accordance with condition number (L3) in addition to:
- a. proposed actions to prevent a recurrence of the emergency or incident; and
  - b. outcomes of actions taken at the time to prevent or minimise environmental harm.
- (L5) As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this authority, written advice must be provided of the results of any such monitoring performed to the administering authority.
- (L6) A record of incidents must be maintained to include a record of all incidents occurring in the previous 5 years.



# Appendix 4

## LNG facility

### Part 1 - MCU conditions - LNG facility

#### MCU approval under the development scheme for the Gladstone state development area

##### Condition 1

Minimise the visual impact of the construction and operation of the LNG facility by:

- a) constructing the LNG facility within the site footprint as determined by the material change of use (MCU) assessment, and such that other conditions are complied with
- b) the colour scheme of the LNG facility and buildings, other than the LNG storage tanks and corrosion protected structures and pipe insulation, is selected from the palette of predominant colours found in the locality to minimise the visual intrusion of the structures except where health and safety requirements dictate colours
- c) ensuring site works will minimise tree clearing with stabilisation and rehabilitation works on disturbed areas, which is to be fully implemented within twelve months of commencement of operation of Train 1 of the LNG facility, or Train 2 if constructed and
- d) maintaining the integrity of the sites land and navigational safety systems, minimising light spill and avoiding direct views of lights from outside the LNG facility boundary.

##### Condition 2

A mosquito and biting midge management plan is to be developed by the proponent and approved by Queensland Health as part of the EM Plan and will include:

- assessment of work areas to be undertaken prior to works and on an informal basis to identify potential breeding sites
- any required specific area control plans based on assessment of potential breeding sites will conform to DERM'S Mosquito Management Code of Practice for Queensland.

Queensland Health and the Gladstone Regional Council must be contacted for assistance in choosing a suitable method.

##### Condition 3

The proponent must ensure that all potable water consumed on site and at worker's accommodation complies with the *Australian Drinking Water Guideline 2004*.

##### Condition 4

Within 3 months of the financial investment decision to proceed, the proponent must submit to the Coordinator-General for approval, a code of conduct for the construction workforce while on site and while travelling to and from their place of residence and the construction site.

##### Condition 5

Unless otherwise approved in writing by the Coordinator-General, the proponent and its construction contractors workers must not bring private motor vehicles or water craft, onto the LNG facility site. Where approval has been issued a copy of that approval must be kept within the vehicle at all times for inspection by authorities.



## Workforce accommodation

### CONSTRUCTION WORKFORCE (LNG facility)

#### Condition 6

Accommodation of the LNG facility's construction workers within the Curtis Island Industry Precinct on Curtis Island will be in the form of a temporary workers' accommodation facility. The temporary workers accommodation facility is to be located on the LNG facility site and must not compromise the intent of the Curtis Island Industry Precinct (CIIP) land use designation and the Gladstone State Development Area (GSDA) Objectives.

Any application for a material change of use within the GSDA must demonstrate any proposed TWAF will not compromise the purpose of the Curtis Island Industry Precinct land use designation or the GSDA objectives.

#### Condition 7

Final layout position and size of the temporary workers' accommodation facility shall be subject to approval by way of material change of use under the development scheme for GSDA.

#### Advice:

Based on the information provided to date, I find that the temporary workers accommodation facility of 1,500 single person compartments is acceptable.

Consideration of an increase to the number of single compartments in the temporary workers accommodation facility above 1,500 can be considered by the Coordinator-General through a subsequent material change of use assessment process, where the material change of use application demonstrates:

- a. this increase will not sterilise or inhibit industrial development (including related infrastructure) within the CIIP or the GSDA
- b. the need for the proposed facility based on its size
- c. that the associated impacts can be adequately addressed
- d. provides justification for the proposed timeframe for use of the land.

#### Condition 8

The temporary workers' accommodation facility must comply with the *Queensland Development Code Part MP 3.3 Temporary Accommodation Buildings and Structures* (In force 1 July 2010).

#### Condition 9

Unless otherwise approved in writing by the Coordinator General, the temporary workers accommodation facility (TWAF) must be decommissioned in accordance with one of the following schedules:-

- a. if construction work on Train 2 is not commenced or underway within three (3) months of the completion of Train 1 then decommissioning of the TWAF must occur within six (6) months the completion of Train 1, or
- b. if construction work on Train 2 is commenced or underway within three (3) months of the completion of Train 1 then decommissioning of the TWAF must occur within six (6) months of the completion of Train 2.

Decommissioning of the TWAF shall be undertaken in accordance with a decommissioning plan approved by the Coordinator-General. The decommissioning plan shall be submitted to the Coordinator-General for approval at least six (6) months prior to the date that decommissioning is to commence.



For future development of further LNG trains (beyond 2 trains), an application to retain the TWAF for an intermediate period of time must be provided to the CG, subject to the CG decision, Appendix 4, Condition 8, Part 2. The application must outline how the accommodation would be closed and mothballed for that period.

## **OPERATIONAL WORKFORCE**

### **Condition 10**

Accommodation for the operational workforce for emergency purposes within the LNG facility site shall utilise permanent buildings.

### **Condition 11**

The buildings to accommodate the operational workforce are to be located on the LNG facility site and must not compromise the intent of the Curtis Island Industry Precinct (CIIP) land use designation and the Gladstone State Development Area (GSDA) Objectives.

Any application for a material change of use within the GSDA must demonstrate any proposed accommodation for the operational workforce are for temporary use during operation of the LNG plant and will not compromise the purpose of the CIIP land use designation, or the GSDA objectives.

### **Condition 12**

Any accommodation for the operational workforce must not preclude or inhibit industrial development (including related infrastructure) within the CIIP of the GSDA.

### **Condition 13**

The accommodation for the operational workforce shall not exceed 115 single compartments and be contained within the footprint of the approved temporary workers accommodation facility, or as directed by the material change of use.

### **Condition 14**

The operational workforce accommodation must be decommissioned as part of the LNG plant decommissioning.

## **RELATED IMPACTS**

### **Condition 15**

The temporary workers accommodation facility and operational workforce accommodation shall achieve the noise levels set out in Table 1.

**Table 1: Noise design objectives for temporary workers accommodation**

Time of day	Noise design objectives for indoors measured at the receptor in dB(A)		
	LAeq,adj, 1hr	LA10,adj, 1hr	LA1,adj, 1hr
Daytime and evening	35	40	45
Night-time	35	40	45

## **ADVICE**

1. The proponent will require relevant development approvals for any temporary workers accommodation facility or operational workforce accommodation proposed after the removal of the temporary workers accommodation facility contemplated by this Evaluation Report.
2. The buildings to accommodate the operational workforce shall comply with all relevant building legislation and codes.



## Part 2 - Coordinator-General imposed conditions – LNG facility

In accordance with section 54A and 54B of the *State Development and Public Works Organisation Act 1971*, I **nominate** that the following conditions apply to the project

These conditions take effect from the date of this report.

### Condition 1

- a) The proponent must prepare a preliminary hazard analysis that demonstrates, to the satisfaction of the Hazardous Industries and Chemicals Branch, Department of Justice and Attorney-General, that the proposed site layout of the LNG plant and its associated facilities is appropriate in terms of the consequences that may occur from credible major accident scenarios at the facility, and meets the criteria of Condition 2.
- b) The analysis should include the calculation of overpressure contours at 7, 14, 21 and 35kPa; heat radiation contours at 4.7, 12.6, 23 and 35 kW/m<sup>2</sup>; half and lower flammability limit contours for flammable vapour; and toxic exposure contours at ERPG 3 and ERPG 2 levels with contours displayed on a map of the facility and its surroundings. Discussion should be provided that explains the safety adequacy for the following:
  - a. that a major accident in any process unit or storage vessel is unlikely to cause significant injury at any point inside the onsite temporary workers accommodation facility, and
  - b. that a major accident in any process unit or storage vessel is unlikely to cause significant injury at the boundary of the facility.

### Condition 2

The following hazard and risk endpoint contours must be kept within the site landward boundaries:

- a. fatality risk contour of  $1 \times 10^{-6}$  per year
- b. injury risk contour of  $50 \times 10^{-6}$  per year
- c. half lower flammability limit for flammable vapour escape as per NFPA 59A
- d. overpressure of 7kPa from explosion
- e. heat flux of 4.7 kW/m<sup>2</sup>
- f. any NFPA 59A criteria additional to the above.

Contours will be calculated according to the principles of AS/NZS ISO 31000, and NFPA 59A.

For conditions 1 and 2, land that houses any temporary or operational workers accommodation and associated service and recreation facilities and is 50m from any habitable building is considered to be outside of the site boundary. These limits must also be satisfied in any safety study under the *Dangerous Goods Safety Management Act 2001*, except if the Act requires more stringent criteria.

### Condition 3

Within 3 months of the final investment decision to proceed, the proponent must prepare Emergency Response Plans for construction and prior to commissioning of Train 1 for operations of the LNG facility, for approval by the Department of Community Safety and Queensland Police, which include but are not be limited to:

- a) workplace health and safety,
- b) operational hazards and risk events,
- c) natural disasters,
- d) potential terrorist threats and attacks, and
- e) inter-site response arrangements with adjacent land and water site owners and occupiers to ensure cooperation on safety alerts, emergency measures .



If such satisfaction cannot be obtained, then it is recommended that the Coordinator-General is available to be a mediator for this approval.

#### **Condition 4**

Within 3 months of the final investment decision to proceed, prepare waste management plans for the construction, and 3 months prior to commissioning of Train 1, for the operations of the LNG facility and include them in the respective Environmental Management Plan. The plans must:

- a) document the intended use of the Gladstone Regional Council waste facilities
- b) be submitted to DERM and the Gladstone Regional Council for review
- c) be amended where indicated by the reviews
- d) be implemented in construction and operation of the project.

#### **Condition 5**

The final Environmental Management Precinct Exclusion Management Plan approved by the Coordinator-General sets out the areas to be excluded from access by vehicle or foot by all proponent or its construction contractor workers. The proponent or its construction contractors shall incur a security fee to be set by the Coordinator-General upon consideration of the circumstances, of a minimum of \$2500 to a maximum of \$75,000, for each incidence of environmental damage occurring in or around Curtis Island as a result of illegal access to the Environmental Management Precinct by employees or contractors of the proponent. The fee maximum will be indexed each calendar year as provided for in Schedule 1 of Clause 25A of the *SDPWO Act 1971*.

#### **Condition 6**

Prior to commencement of significant construction works, the proponent shall determine from the local government, if necessary, any additional upgrades of water supply, sewerage or waste disposal facilities required as a result of this project's requirements for temporary and operational workforce accommodation and meet any costs associated with these upgrades.

#### **Condition 7**

Where approval of plans based on reasonable information is required of State agencies, such approval or disapproval will be provided within one (1) month. If there is no response or decision from the agency within one (1) month, the proponent may refer the matter to the Coordinator-General for determination.

#### **Condition 8**

- a) Substantial commencement of gas field, pipeline and LNG facility construction must occur within 4 years of the date of this Coordinator-General report, otherwise this report will expire, but may be extended by the proponent in accordance with clause (b).
- b) If, prior to expiry of the standard 4 year period of currency of the Coordinator-General report, construction of Trains 1 and 2 has substantially commenced, and the proponent has decided to proceed with substantial commencement of Third Train construction within the following 2 year period, the proponent may apply to the Coordinator-General, prior to the expiry of the 4 year period, to extend the Coordinator-General report for the further 2 year period if satisfactory contemporary social and logistics planning documents are provided to the Coordinator-General.
- c) If a decision is made to construct the Third Train, but the Third Train is not substantially commenced within a 6 year period, from the issue of the Coordinator-General Report, the Coordinator-General Report lapses and a new declaration and environmental assessment will be required, whether or not the Coordinator-General has extended the currency of the Coordinator-General report.



## **PART 3 – Coordinator-General imposed environmental conditions - LNG facility**

In accordance with section 54A and 54B of the *State development and Public Works Organisation Act 1971*, I **nominate** that the following conditions apply to the project.

These conditions take effect from the date of this report.

### **Environmental conditions that must be met prior to the commencement of petroleum activities**

#### **Condition 1**

#### **Construction Environmental Management Plan (CEMP)**

The proponent must provide a construction environmental management plan (CEMP) that provides detailed information about the construction activities to be carried out under the environmental authority. The CEMP must address, but not be limited to:

1. design plans showing the extent of the works proposed;
2. a construction schedule and methodology, including plans and maps showing discharge points and emission controls for initial construction stages with periodic updates to provide plans and maps showing discharge points and emission controls for subsequent stages;
3. environmental monitoring and a sampling program which details baseline data collection and provides the basis for ongoing monitoring of specified parameters for the period the works, including appropriate triggers for mitigation and cessation of works;
4. any potential impacts or effects of the proposed works upon the environment and the means by which adverse impacts will be avoided or mitigated;
5. details on the sewage treatment plant and desalination plant, including:
  - (a) design and operational performance information for sewage treatment and desalination.
  - (b) design and operational performance information for any outfalls and diffusers for emissions to Port Curtis including detailed analysis of existing water quality, effluent contaminants, acute and chronic toxic effects of contaminants on fauna and flora and any long term ecological effects.
  - (c) a detailed assessment of impacts from the discharge of treated sewage and brine should be provided. Source water quality data and characteristics of additives should be provided and disposal methods to be used. The information should be used to determine the site specific mitigation measures including monitoring and reporting.
  - (d) eco-toxicity of effluent at point of release, mixing zone and cumulative impacts of contaminants in the marine ecosystem over time.
  - (e) adequacy of modelling to predict dimensions and duration of mixing zone.
6. eco-toxicity of effluent at point of release, mixing zone and cumulative impacts of contaminants in the marine ecosystem over time.
7. adequacy of modelling to predict dimensions and duration of mixing zone.
8. details on other plant, equipment or activities that involve emissions to the environment, including:
  - (a) a description of the plant, equipment or activities; and
  - (b) design and operational performance information for plant, equipment or activities.
9. engineering design drawings for operational works in the intertidal area for the materials off-load facility, jetties and wharves;
10. detailed list of waste streams including their handling, treatment and disposal arrangements;



11. the environmental protection commitments proposed for the activities (including all associated accommodation and recreation activities on the Island) to protect the environmental values under best practice environmental management;
12. a rehabilitation program for land proposed to be disturbed during construction of all petroleum infrastructure (including associated accommodation and recreation activities) on Curtis Island;
13. specific reference to the disposal of dredge spoil within the area, including provisions for the management and treatment of acid sulfate or potentially acid sulfate soils and the protection of terrestrial habitats from saline leachate and/or drainage;
14. details of a response plan, with appropriate triggers, which will be initiated in response to any significant impacts on the environment from the works.

## **Condition 2**

### **Operations Environmental Management Plan (OEMP)**

Prior to the commissioning of Train 1, the proponent must provide an operations environmental management plan (OEMP) that provides detailed information about the activities to be carried out under the environmental authority related to the commissioning and operation of the LNG Facility. The OEMP must address, but not be limited to:

1. Identification of all environmentally relevant activities conducted in the petroleum tenure and other approvals required for this component of the project to proceed
2. Identification and characterisation of all wastes and emissions produced by the facility and its associated support infrastructure including its source, handling, treatment, disposal or release to the environment.
3. Sewage treatment plant and desalination plant information for the operational life of the LNG facility, including:
  - (a) a proposal for treated sewage to be discharged to land which includes wet weather storage;
  - (b) design and operational performance information for sewage treatment and desalination;
  - (c) design and operational performance information for any outfalls and diffusers for emissions to Port Curtis including detailed analysis of existing water quality, effluent contaminants, acute and chronic toxic effects of contaminants on fauna and flora and any long term ecological effects.
  - (d) A detailed assessment of impacts from the discharge of treated sewage and brine should be provided. Source water quality data and characteristics of additives should be provided along with the proposed operational performance of the plant and the treatment and disposal methods to be used. The information should be used to determine the site specific mitigation measures including monitoring and reporting.
  - (e) A risk assessment approach to eco-toxicity of effluent at point of release, mixing zone and cumulative impacts of contaminants in the marine ecosystem over time.
  - (f) Adequacy of modelling to predict dimensions and duration of mixing zone.

## **Recommendation**

### **Desalination and sewage effluent discharge modelling**

The EM Plan submitted in support of the environmental authority for the LNG Facility should predict the estimated salinity concentrations at the point of contact with the sea bed under the various scenarios through an evidenced based assessment of the discharge to Port Curtis.





## **PART 4—Environmental authority conditions—LNG facility**

### **Department of Environment and Resource Management (DERM) recommended – environmental authority conditions for the QGC project – LNG facility**

#### **SCHEDULE A – GENERAL CONDITIONS**

##### **PREVENT AND/OR MINIMISE LIKELIHOOD OF ENVIRONMENTAL HARM**

- (A1) This authority does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.
- (A2) In carrying out petroleum activities the holder of this authority must prevent and / or minimise the likelihood of environmental harm being caused.

##### **MAINTENANCE OF MEASURES, PLANT AND EQUIPMENT**

- (A3) The holder of this authority must:
  - a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this authority; and
  - b) maintain such measures, plant and equipment in a proper and efficient condition; and
  - c) operate such measures, plant and equipment in a proper and efficient manner.
- (A4) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this authority must be calibrated, appropriately operated and maintained.
- (A5) The holder of this authority must ensure that daily operation and maintenance of all plant and equipment relating to the authorised petroleum activities are carried out by suitability qualified, competent and experienced person(s).
- (A6) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration increases the risk of environmental harm from the petroleum activities.
- (A7) All analyses and tests required to be conducted under this authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.

##### **CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN**

- (A8) The holder of this authority must conduct construction in accordance with the Construction Environmental Management Plan approved by the Coordinator-General in accordance with condition 1 of Appendix 4, Part 3 of the Coordinator-General's Evaluation Report.

##### **ENVIRONMENTAL MANAGEMENT PLAN**

- (A9) An Environmental Management Plan (EM plan) must be implemented that provides for the effective management of the actual and potential impacts resulting from the carrying out of the petroleum activities. Documentation relating to the EM plan must be kept.
- (A10) The EM plan required by condition (A9) must address, at least, the following:
  - 1. Describe each of the following:
    - (a) each relevant resource authority for the environmental authority;
    - (b) all relevant petroleum activities;
    - (c) the land on which the activities including associated accommodation and recreational activities are to be carried out;
    - (d) the environmental values likely to be affected by the activities including associated accommodation and recreational activities ; and



- (e) the potential adverse and beneficial impacts of the activities including associated accommodation and recreational activities on the environmental values.
  2. State the environmental protection commitments the applicant proposes for the activities, including associated accommodation and recreational activities, to protect or enhance the environmental values under best practice environmental management;
  3. Include a rehabilitation program for land proposed to be disturbed under each relevant resource authority for the application; and
  4. State a proposed amount of financial assurance for the environmental authority as part of the rehabilitation program.
  5. Training staff in the awareness of environmental issues related to carrying out the petroleum activities, which must include at least:
    - (a) The environmental policy of the authority holder, so that all persons that carry out the petroleum activities are aware of all relevant commitments to environmental management;
    - (b) Any relevant environmental objectives and targets, so that all staff are aware of the relevant performance objectives and can work towards these;
    - (c) Control procedures to be implemented for routine operations for day to day activities including associated accommodation and recreational activities, to minimise the likelihood of environmental harm, however occasioned or caused;
    - (d) Contingency plans and emergency procedures to be implemented for non-routine situations to deal with foreseeable risks and hazards, including corrective responses to prevent and mitigate environmental harm (including any necessary site rehabilitation);
    - (e) Organisational structure and responsibility to ensure that roles, responsibilities and authorities are appropriately defined to ensure effective management of environmental issues;
    - (f) Effective communication procedures to ensure two-way communication on environmental matters between operational staff and higher management;
    - (g) Obligations with respect to monitoring, notification and record keeping obligations under the EM plan and relevant approvals; and
    - (h) Monitoring of the release of contaminants into the environment including procedures, methods and record keeping.
  6. The conduct of periodic reviews of environmental performance and procedures adopted, not less frequently than annually; and
  7. A program for continuous improvement.
- (A11) A Stormwater Management Plan must be prepared for the site prior to, and implemented during construction and operation. The Stormwater Management Plan must address at least the following:
  - a) prevention of incident storm water and storm water run-off from contacting wastes or contaminants;
  - b) diversion of upstream run-off away from areas where it may be contaminated by bulk products being loaded or unloaded, wastes, contaminants or other materials; and
  - c) collection, treatment and disposal of all contaminated storm water run-off.
- (A12) A Waste Management Program (WMP) in accordance with Part 5 of the Environmental Protection (Waste Management) Policy 2000 must be developed, implemented within 3 (three) months from the date of this authority, and maintained for the authorised petroleum activities.
- (A13) The EM Plan must not be implemented or amended in a way that contravenes or is inconsistent with any condition of this approval.



- (A14) Contingency plans and emergency procedures must be developed and implemented for non-routine situations to deal with foreseeable risks and hazards including corrective responses to prevent and mitigate environmental harm (including a contingency plan when plant shuts down for maintenance or other reasons).

### **THIRD PARTY AUDITING**

- (A15) Compliance with the conditions of this authority must be audited by an appropriately qualified third party auditor, nominated by the holder of this authority and accepted by the administering authority, within one year of the completion of commissioning of the LNG Facility, and every three years thereafter.
- (A16) Upon receipt of the final third party audit report, the holder of this authority must submit a copy to the administering authority.
- (A17) The third party auditor must certify the findings of the audit in the report.
- (A18) The financial cost of the third party audit is borne by the holder of this authority.
- (A19) The holder of this authority must, within a reasonable period of time agreed in writing with the administering authority, act upon any recommendations arising from the audit report and:
- a) investigate any non-compliance issues identified; and
  - b) as soon as practicable, implement measures or take necessary action to ensure compliance with this authority.
- (A20) Subject to condition (A15), and not more than three (3) months following the submission of the audit report, the holder of this authority must provide written advice to the administering authority addressing the:
- a) actions taken by the holder to ensure compliance with this authority; and
  - b) actions taken to prevent a recurrence of any non-compliance issues identified.

### **FINANCIAL ASSURANCE**

- (A21) The holder of this authority must provide a financial assurance in the amount and form required by the administering authority for the authorised petroleum activities no later than <INSERT DATE>.
- (A22) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

### **DEFINITIONS**

- (A23) Words and phrases used in this authority are defined in Appendix 1 – Definitions. Where a definition for a term used in this authority is not defined within this authority, the definitions in the *Environmental Protection Act 1994*, its Regulation and Environmental Protection Policies must be used.

[Note: for the sake of brevity, the appendix of definitions has not been provided in this EIS assessment report but will be provided in the environmental authority.]

## **SCHEDULE B – AIR EMISSIONS**

### **NUISANCE**

- (B1) The release of noxious or offensive odours or any other noxious or offensive airborne contaminants resulting from the activities must not cause an environmental nuisance at any nuisance sensitive or commercial place.
- (B2) The release of dust and/or particulate matter resulting from the activities must not cause an environmental nuisance at any nuisance sensitive or commercial place.
- (B3) Dust and particulate matter must not exceed any of the following levels when measured at any nuisance sensitive or commercial place:



- a) Dust deposition of 120 milligrams per square metre per day over a 30-days averaging period, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); OR
- b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre ( $\mu\text{m}$ ) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre (with five one day exceedances allowed in any one year period); and over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with:
  - i. Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or
  - ii. any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

Note: The above 5 days exceedances per year are based on the expected exceedences from the natural events such as bushfires and dust storm.

#### **THE RELEASE OF CONTAMINANTS TO THE ATMOSPHERE**

- (B4) The release of contaminants to the atmosphere from a point source must only occur from those release points identified in *Schedule B, Table 1 - Contaminant Release Points* and must be directed vertically upwards without any impedance or hindrance.
- (B5) Contaminants must be released to the atmosphere from a release point at a height and a flow rate not less than the corresponding height and velocity stated for that release point in *Schedule B, Table 1 - Contaminant Release Points*.
- (B6) Contaminants must not be released to the atmosphere from a release point at a mass emission rate/concentration, as measured at a monitoring point, in excess of that stated in *Schedule B, Table 1 - Contaminant Release Points*.
- (B7) Contaminants must be monitored not less frequently than specified in *Schedule B, Table 2 - Contaminant Release Limits to Air*.
- (B8) Monitoring of any releases to the atmosphere required by a condition of this approval must be carried out in accordance with the following requirements:
  - 1. Monitoring provisions for the release points listed in *Schedule B, Table 1 - Contaminant Release Points* must comply with the Australian Standard AS 4323.1 - 1995 'Stationary source emissions, Method 1: Selection of sampling positions' (or more recent editions).
  - 2. The following tests must be performed for each determination specified in *Schedule B, Table 2 - Contaminant Release Limits to Air*:
    - (i) gas velocity and volume flow rate;
    - (ii) temperature;
    - (iii) water vapour concentration (moisture content).
  - 3. Samples must be taken when emissions are expected to be at maximum rates.
  - 4. During the sampling period the following additional information must be gathered:
    - (i) production rate at the time of sampling;
    - (ii) raw materials and fuel used;
    - (iii) number of plant or equipment and operating units operating;
    - (iv) reference to the actual test methods and accuracy of the methods.
- (B9) All release points referred to in *Schedule B, Table 1 - Contaminant Release Points* must be conspicuously marked with the corresponding release point number.



**SCHEDULE B, TABLE 1 – CONTAMINANT RELEASE POINTS**

Determination Required	Release Point Numbers	Frequency
Mass emission rate and concentration of oxides of nitrogen (NOx) in the flue gas at 15 percent oxygen reference level.	Generator Stacks RP1 to RP3 inclusive	All stacks must be monitored during commissioning (See Note1) of the facility and one stack per year thereafter on rotational basis.
Mass emission rate and concentration of oxides of nitrogen (NOx) in the flue gas at 15 percent oxygen reference level.	Generator Stacks RP4 to RP6 inclusive	All stacks must be monitored during commissioning (See Note1) of the facility and one stack per year thereafter on rotational basis.
Mass emission rate and concentration of oxides of nitrogen (NOx) in the flue gas at 3 percent oxygen reference level.	Generator Stacks RP7 to RP9 inclusive	All stacks must be monitored during commissioning (See Note1) of the facility and one stack per year thereafter on rotational basis.
CO <sub>2</sub> Vents	RP10, RP11 & RP12	
Nitrogen Rejection Units	RP13, RP14 & RP15	
Flare	RP16	

Note 1: The above NOx release limits are applicable during all timings except start-up, shut-down and calibration of emission monitoring devices. The start-up duration is allowed up to 30 minutes.

**SCHEDULE B, TABLE 2 – CONTAMINANT RELEASE LIMITS TO AIR**

Release point number	Minimum release height (metres)	Minimum velocity (m/sec)	Contaminant release	Maximum release limit <sup>1</sup>
RP1- Compressor Gas Turbine - Train 1	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 3.4 grams/second
RP2- Compressor Gas Turbine - Train 2	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 3.4 grams/second
RP3- Compressor Gas Turbine - Train 3	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 3.4 grams/second
RP4- Electric Power Turbine – Train 1	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 2.8 grams/second
RP5- Electric Power Turbine – Train 2	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 2.8 grams/second
RP6- Electric Power Turbine – Train 3	28	30	Oxides of Nitrogen	51 mg/Nm <sup>3</sup> (dry) @15%O <sub>2</sub> & 2.8 grams/second
RP7- Oil Heaters - Train 1	37	22	Oxides of Nitrogen	33 mg/Nm <sup>3</sup> (dry) @ 3% O <sub>2</sub> & 0.3 grams/second
RP8- Oil Heaters - Train 2	37	22	Oxides of Nitrogen	33 mg/Nm <sup>3</sup> (dry) @ 3% O <sub>2</sub> & 0.3 grams/second



RP9- Oil Heaters - Train 3	37	22	Oxides of Nitrogen	33 mg/Nm <sup>3</sup> (dry) @ 3% O <sub>2</sub> & 0.3 grams/second
RP10, RP11 & RP12 - CO2 Vents	16	13	-	-
RP13, RP14 & RP15 – Nitrogen Rejection Units	32	37	-	-

(B10) Within 3 months of commissioning the facility, the holder of this environmental authority must conduct air emission monitoring to demonstrate compliance with air emission limits listed in Schedule B, Table 2 - *Contaminant Release Limits to Air* and submit report to the administering authority.

**Flare conditions**

- (B11) The flare must be equipped with a flare tip design to provide good mixing with air, flame stability and achieve a minimum Volatile Organic Compound (VOC) removal efficiency of 98% under varied gas flow rate and meteorological conditions and meet the best practice design standards (e.g. NSW EPA: Protection of the Environmental Operations (Clean Air) Amendment (Industrial and Commercial Activities) Regulation 2005, or the US EPA Code of Federal Regulations: 40 CFR 60.18 and 40 CFR 63.11).
- (B12) The flare must be equipped with a continuously burning pilot or other automatic ignition system that assures gas ignition and provides immediate notification to appropriate personnel when the ignition system ceases to function.
- (B13) The flare must be designed to handle large fluctuations in both the volume and the chemical content of gases.
- (B14) Visible smoke and particulate emissions must not be permitted for more than five minutes in any two hour period during normal operating conditions, other than during LNG train start-up.
- (B15) Contingency plans and emergency procedures must be developed and implemented for non-routine situations to deal with foreseeable risks and hazards including corrective responses to prevent and mitigate environmental harm (including a contingency plan when plant shuts down for maintenance or other reasons).

**Fugitive Emissions**

- (B16) The holder of this environmental authority must ensure that all reasonable and practicable measures are taken in the design and operation of the plant to minimise fugitive VOC emissions. Reasonable and practicable measures include but are not limited to:
  1. implementation of a monitoring program to regularly leak test all units/components including pumps, piping and controls, vessels and tanks; and
  2. operating, maintenance and management practices to be implemented to mitigate fugitive VOC sources.
- (B17) The ducting and extraction systems that transfer effluent gases from one location to another must be constructed, operated and maintained so as to minimise any leakage of VOCs and vapours to the atmosphere occurring from these sources.
- (B18) In the event of emissions of contaminants occurring from industrial plant or ducting systems that transfer effluent gases from one location to another, the fault or omission that resulted in that emission must be corrected as soon as practicable.

**Fuel Burning**

- (B19) This authority only permits the burning of natural gas in the fuel burning equipment under normal operating conditions at the rate of the design capacity of the equipment.
- (B20) The sulphur content of fuel burned in the power generators must not exceed 0.5 percent by weight



## **Greenhouse Gas Emissions**

- (B21) The holder of this authority must develop and implement a greenhouse gas reduction strategy for the LNG Facility. The strategy must include, but not limited to, the company's policy on greenhouse gas emissions, an energy efficiency program, a continuous improvement program, better control systems and a CO<sub>2</sub> recovery plan.

## **SCHEDULE C – WATER MANAGEMENT**

### **RELEASE TO WATERS**

#### **PERMITTED CONTAMINANT RELEASE AND DISCHARGE POINT(S)**

- (C1) Three months prior to the release of reverse osmosis concentrate and sewage treatment effluent, authorised by condition (C2), the holder of the environmental authority must provide a surface water management plan that provides:
1. a best practice proposal that achieves the water quality objectives for Port Curtis;
  2. a risk based assessment of the waste streams to be treated by the Sewage Treatment Plant, including the quality and quantity of contaminants;
  3. design, operational performance information and operational life for sewage treatment and desalination;
  4. design and operational performance (of no worse than tertiary treatment specified in section 135(3) of the *Great Barrier Reef Marine Park Regulations 1983*) information for any outfalls and diffusers for emissions to Port Curtis including detailed analysis of existing water quality, effluent contaminants, acute and chronic toxic effects of contaminants on fauna and flora and any long term ecological effects;
  5. a detailed assessment of impacts from the discharge of treated sewage and brine should be provided. Source water quality data and characteristics of additives should be provided and disposal methods to be used. The information should be used to determine the site specific mitigation measures including monitoring and reporting;
  6. eco-toxicity of effluent at point of release, mixing zone and cumulative impacts of contaminants in the marine ecosystem over time; and
  7. adequacy of modelling to predict dimensions and duration of mixing zone.
- (C2) The only contaminant(s) permitted to be released directly or indirectly to any waters from the petroleum activities authorised on the petroleum facilities licence are the following releases to Port Curtis:
1. Reverse Osmosis Concentrate (ROC) via the diffuser discharge point DF1 during construction and DF2 during operation to Port Curtis, refer plan <INSERT plan no>; and
  2. Treated sewage effluent via the diffuser discharge point DF1 during construction and DF2 during operation to Port Curtis during the construction of train 1 and train 2, refer plan <INSERT plan no>; and
  3. Uncontaminated stormwater from the LNG Facility site via the Stormwater Discharge Point SW1 to Port Curtis, refer plan <INSERT plan no>.
- (C3) The release of contaminants directly or indirectly to waters:
1. must not produce any visible discolouration of receiving waters; nor
  2. must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

#### **QUALITY CHARACTERISTICS OF RELEASE TO WATERS (TREATED SEWAGE EFFLUENT)**

- (C4) The release of contaminants from the sewage treatment plant to waters must comply, at the sampling and in situ monitoring point(s) specified in Schedule C, Table 1 - Quality Characteristic Limits (Treated Sewage Effluent), with each of the limits specified in Schedule C Table 1 - Quality Characteristic Limits (Treated Sewage Effluent) for each quality characteristic unless



information provided in the surface water management plan, required by condition (C1), demonstrates through risk based assessment that different quality characteristics can apply that achieve the Water Quality Objectives for Port Curtis and the operational life of the treated sewage effluent discharge occurs for less than six years.

**SCHEDULE C, TABLE 1 – QUALITY CHARACTERISTIC LIMITS (TREATED SEWAGE EFFLUENT)**

Monitoring Point	QUALITY CHARACTERISTICS	RELEASE LIMIT	LIMIT TYPE	MINIMUM MONITORING FREQUENCY
S1 <sup>1</sup>	5-day Biochemical Oxygen Demand	<5 mg/L	80 percentile compliance	Weekly (composite sample <sup>2</sup> )
	5-day Biochemical Oxygen Demand	35 mg/L	maximum	Weekly (composite sample <sup>2</sup> )
	Suspended Solids	<5 mg/L	80 percentile compliance	Weekly (composite sample <sup>2</sup> )
	Suspended Solids	50 mg/L	maximum	Weekly (composite sample <sup>2</sup> )
	pH	6.5 to 8.5 pH units	range	Online continuous
	Faecal Coliforms, based on a minimum of 5 samples collected at not less than weekly intervals.	1000 colonies per 100mL sample	median	Weekly (composite sample <sup>2</sup> )
	Total -N	3 mg/L	50 percentile compliance	Weekly (composite sample <sup>2</sup> )
	Total - N	10 mg/L	maximum	Weekly (composite sample <sup>2</sup> )
	Total -P	0.1 mg/L	50 percentile compliance	Weekly (composite sample <sup>2</sup> )
	Total - P	1 mg/L	maximum	Weekly (composite sample <sup>2</sup> )
	Ammonia -N	1 mg/L	50 percentile compliance	Weekly (composite sample <sup>2</sup> )
	Ammonia - N	3 mg/L	maximum	Weekly (composite sample <sup>2</sup> )
Dissolved Oxygen	4 mg/L	minimum	Online continuous	

<sup>1</sup> Monitoring point S1 described as the Discharge Monitoring Point (NXX EXX) to measure the operational performance of the sewage treatment plant, refer plan <INSERT Plan number> attached to this environmental authority.

<sup>2</sup> Composite Sample – Taken as a composite grab sample over a 2 hour period. The sample to be made up of sub-samples taken at least every 15 minute and mixed in equal proportion, all sub samples must comply with the provisions of the DERM's most recent version of the Water Quality Sampling Manual.





(C5) **Monitoring**

Monitoring of treated sewage effluent contaminants released to Port Curtis must be undertaken for the quality characteristics and parameters, at the monitoring point(s), and at the frequencies specified in Table 1.

(C6) **Reverse Osmosis Concentrate (ROC)**

The total quantity of ROC released to waters on any one day must not exceed <INSERT quantity> megalitres.

(C7) The ROC released via the diffuser discharge point DF1 during construction and DF2 during operation must not exceed the release limits specified in Table 2 when measured at the monitoring point S2 described as the Discharge Monitoring Point (N<INSERT northing> E<INSERT easting>), refer plan <INSERT Plan number> attached to this approval.

**SCHEDULE C, TABLE 2 – QUALITY CHARACTERISTIC LIMITS (REVERSE OSMOSIS CONCENTRATE (ROC))**

MONITORING POINT	QUALITY CHARACTERISTICS	RELEASE LIMIT	LIMIT TYPE	MINIMUM MONITORING FREQUENCY
S2	Total Chlorine (as Cl)	0.5 mg/L	Long term 50th percentile	Daily (grab sample/ single measurement)
		1 mg/L	Maximum	
	Dissolved Oxygen	4.0 mg/L	Minimum	
	Chemical Oxygen Demand	No Limit	No Limit	Weekly (composite sample <sup>2</sup> )
	5-day Biochemical Oxygen Demand (inhibited)	20 mg/L	Maximum	
	Turbidity	<b><i>This table can be completed once the CG's conditions are satisfied. The quality characteristics stated here are to be based on background and the concentration factor of the plant.</i></b>		Daily (single measurement)
	EC			
	TDS			
	pH			

<sup>1</sup> Monitoring point S2 described as the Discharge Monitoring Point (N<INSERT northing> E<INSERT easting>) to measure the operation performance of the Reverse Osmosis Plant, refer plan <INSERT Plan number> attached to this environmental authority.

<sup>2</sup> Composite Sample – Taken as a composite grab sample over a 2 hour period. The sample to be made up of sub-samples taken at least every 15 minute and mixed in equal proportion, all sub samples must comply with the provisions of the DERM's most recent version of the Water Quality Sampling Manual.



**SCHEDULE C, TABLE 3 - CONTAMINANT RELEASE TRIGGER LIMITS (TOXICANTS)**

MONITORING POINT	QUALITY CHARACTERISTICS	TRIGGER LIMIT (dissolved fraction µg/L)	TRIGGER TYPE	MINIMUM MONITORING FREQUENCY
S3	<i>The ANZECC 95<sup>th</sup> protection levels for toxicant should be added here following the assessment of toxicants in the surface water management plan required by condition C1.</i>		Maximum	Weekly
<p><sup>1</sup> Monitoring point S3 described as the Discharge Monitoring Point (N&lt;INSERT northing&gt; E&lt;INSERT easting&gt;) to measures any potential toxicants identified in the surface water management plan required by condition (C1), refer plan &lt;INSERT Plan number&gt; attached to this environmental authority.</p> <p><sup>2</sup> Composite Sample – Taken as a composite grab sample over a 2 hour period. The sample to be made up of sub-samples taken at least every 15 minute and mixed in equal proportion, all sub samples must comply the provisions of the DERM's most recent version of the Water Quality Sampling Manual.</p>				

**(C8) Monitoring**

Monitoring of contaminants released to Port Curtis must be undertaken for the quality characteristics and parameters, at the monitoring point(s), and at the frequencies specified in Table 2 and Table 3.

**(C9) Toxic Substances (Acute and Chronic)**

Notwithstanding any other condition of this environmental authority, there must be no discharge of any contaminants to any waters where the no observed effect concentration (NOEC) for acute toxicity tests to any test organisms in a direct toxicity assessment (DTA) is observed at a 100% concentration i.e. the lowest observed effect concentration (LOEC) must only be observed at a dilution greater than 1:1.

(C10) There must be no discharge of any contaminants to any waters where the NOEC for chronic toxicity tests to any test organisms in DTA is observed at a 6.25% concentration i.e. the LOEC must only be observed at a dilution greater than 1:15.

**(C11) Diffuser validation**

Provide to the administering authority a monitoring plan for the diffuser modelling validation 3 months prior to commencement of operation of the reverse osmosis plant and sewage treatment plant. The monitoring plan must have the following objectives:

1. To validate all modelling and investigations related to the diffuser; and
2. To confirm that expected dilutions predicted in design of the diffuser under specified flow conditions are met as a minimum.

(C12) The Monitoring Plan (Diffuser Validation), required by condition (C11), must include (but not be limited to) the following:

1. A description of the diffuser as installed;
2. A list of the environmental values to be protected within and adjacent to the diffuser;
3. Sampling of reference sites to determine the background concentration of relevant water quality parameters;
4. Sampling of the water column in the plume to determine and confirm the extent of the acute and chronic toxicity zone;



5. Investigate employing other approaches (e.g. dye-based diffuser validation techniques) where electrical conductivity-based methods are inconclusive;
  6. Sufficient samples must be collected to determine the temporal and spatial extent of the toxicity zones within the plume;
  7. The methods for the collection and analysis of samples (including the Quality Assurance and Quality Control protocols adopted);
  8. The methods of analysing the data and responding to the results; and
  9. Monitoring must be done by a competent person(s) in accordance with methods prescribed in the latest edition of the *Department of Environment and Resource Management Water Quality Sampling Manual*; and carried out on representative samples.
- (C12) The holder of the environmental authority must have due regard to comments, provided by the administering authority, in the finalisation of the Monitoring Plan (Diffuser Validation).
- (C13) The holder of the environmental authority must provide to the administering authority a Diffuser Validation Report, not more than 20 business days after receipt of the results obtained from the Monitoring Plan (Diffuser Validation). The report must include:
1. The outcome of the monitoring including the methodology, findings and recommendations of the Monitoring Plan (Diffuser Validation);
  2. A determination on the validation of modelling and investigations undertaken;
  3. Any resulting recommendations for changes necessary to minimise the likelihood of environmental harm and size of the toxicity zones.
- (C14) **Direct toxicity assessment**
- The holder of the environmental authority must undertake a DTA to quantify the toxicity of the ROC effluent combined with Treated Sewage Effluent. The DTA must be undertaken in accordance with the following minimum requirements:
1. A DTA must be carried out within 3 months of commencement of discharge of ROC and treated sewage effluent to quantify the toxicity of the combined waste streams;
  2. The holder of the environmental authority must undertake a risk assessment to determine the potential toxicity of the combined discharge when any factor in the treatment process or influent water quality change may result in an increased toxicological effect to aquatic organisms in the receiving environment. Where the risk assessment determines that an increased toxicological effect may occur, a DTA must be undertaken utilising indicator organism(s) appropriate to the change and the results reported to the administering authority.
  3. The holder of the environmental authority must undertake a risk assessment to determine the potential toxicity of the combined discharge when one or more of the same trigger limits specified in Schedule C, Table 3 - *Contaminant release trigger limits (Toxicants)* are exceeded on four consecutive occasions (weekly sampling) when measured at the monitoring point S3 described as the Discharge Monitoring Point (EXX NXX), refer plan XX attached to this environmental authority. Where the risk assessment determines that an increased toxicological effect may occur, a DTA must be undertaken utilising indicator organism(s) appropriate to the change and the results reported to the administering authority.
  4. If a DTA result shows non-compliance with conditions (C8) and or (C9) or the trigger limits of this environmental authority, then DTA must commence on a quarterly basis unless the holder of the environmental authority can demonstrate with data and information, to the administering authority, that the cause of the non-complaint DTA result has been rectified and it is unlikely to recur.



(C15) The DTA procedure must address the following:

1. All specific methods and protocols to determine whether concentrations of toxicants are neither acutely toxic outside the approved acute toxicity zone nor chronically toxic outside the approved chronic toxicity zone to the test biota, including:
  - (a) Specific test organisms to be utilised for DTA testing, in accordance with Section 8.3.6.8 of the ANZECC 2000 Guidelines, to provide an accurate indication of actual & chronic toxic effects in the receiving waters, taking into consideration locally occurring species and the nature of any change being investigated; and
  - (b) The selection and characterisation of environmental waters for dilution of the combined waste streams; and
  - (c) Characterisation of the combined waste streams, including potential toxicants present; and
  - (d) The nature of the contaminant(s); and
  - (e) Acute and chronic DTA testing conducted on end-of-pipe combined waste to be discharged; and
  - (f) Test/biological end points; and
  - (g) DTA end-points (including NOEC and LOEC); and
  - (h) Quality assurance/quality control; and
  - (i) Applicable Toxicity Identification Evaluation (TIE) procedures to be followed should the administering authority require such an evaluation; and
  - (j) Reporting of DTA procedure results promptly to the administering authority, which must include but not be limited to:
    - (i) NOEC for all bioassay results;
    - (ii) LOEC for all bioassay results;
    - (iii) All relevant sample collection information for the combined waste test sample and receiving environment dilution water;
    - (iv) Timing of combined waste test sample collection in relation to process performance;
    - (v) Details of any manipulation of the combined waste test sample or receiving environment dilution water;
    - (vi) Test sample and receiving environment dilution water delivery details;
    - (vii) Results of the chemical analysis of the combined waste test sample for known toxicants of concern (i.e. all parameters on Tables 1 and 2 are a minimum requirement in addition to parameters indicative of any change), receiving environment dilution water, and the test water (combined wastes/receiving water) for each of the dilutions;
    - (viii) Time between test sample collection and commencement of the DTA, and
    - (ix) Interpretation of results.
2. Reporting of the progress and/or results of DTA testing to the administering authority no more than 20 business days following the initial results of the toxicity assessment.

(C16) A written DTA procedure that effectively measures toxicity of the effluent must be developed by the holder of the environmental authority, and be submitted to the administering authority 3 months prior to the commencement of discharge of the ROC and treated sewage effluent.

(C17) The holder of the environmental authority must have due regard to the administering authority's comments in the finalisation and any review of the DTA procedure.

(C18) The finalised DTA procedure must not be changed without the prior written consent from the administering authority.



(C19) The DTA must be designed and performed by a suitably qualified person.

(C20) **Minimum responses to any non compliant toxicity in effluent**

Where a DTA has demonstrated observable toxicological effects for related tests at or greater dilutions than defined in the approved acute and chronic toxicity limits as specified in conditions (C10) and (C11), the holder of the environmental authority must:

1. As soon as practicable advise the administering authority; and
2. Promptly investigate the toxicity result by:
  - (a) Identifying any trend or excessive presence in any contaminant likely to cause the observed toxicity; and
  - (b) Undertake an additional DTA or an appropriate single-species Toxicity Bioassay (following consultation with and as agreed with the administering authority) to investigate whether the non-compliant toxicity is still present.
3. If following results of the investigations in either subclause 1(a) or 1(b) likely compliance with the toxicity release limits is not demonstrated, immediately advise the administering authority of the results and within 5 business days prepare and submit to the administering authority a Toxicity Management Plan (TMP) that has the following objectives:
  - (a) Identify the causative agent(s) responsible for the observed increase in toxicity; and
  - (b) Assess the risk posed to the environment by the non-compliant toxicity; and
  - (c) Reduce toxicity to the approved acute and/or chronic toxicity limits specified by this development approval forthwith.

(C21) The TMP must, at a minimum, present the tasks and timeframes for corrective actions directed at identifying and eliminating the observed toxicological effect(s) out side of the approved toxicity zones.

*Note: A Toxicological Identification Evaluation (TIE) maybe required as part of this TMP to determine the toxicant(s) responsible for the observed toxicological effect(s).*

(C22) A Confirmation DTA must be undertaken as soon as practicable after completion of the corrective action(s) required by the TMP/condition C20 to verify that the actions taken have been effective in eliminating the observed toxicological effects out side of the approved toxicity limits.

*Note: This is an additional assessment other than normally required by the conditions of this development approval.*

**Monitoring of volume of seawater influent and reverse osmosis concentrate**

(C23) The daily volume and daily average flow rate of seawater influent treated must be determined or estimated by an appropriate method with an accuracy of +/- 5%, and records kept of such determinations.

(C25) The daily volume and daily average flow rate in m<sup>3</sup>/s of the reverse osmosis concentrate component of the desalination effluent discharged to marine waters must be determined or estimated by an appropriate method with an accuracy of +/- 5%, and records kept of such determinations.

(C26) Monitoring of seawater influent for pH, temperature, turbidity, and conductivity must involve instrumentation that is continuous, on-line, real-time and be able to be recorded and alarmed.

(C27) Monitoring of desalination effluent for pH, chlorine, dissolved oxygen concentration and percent saturation, temperature, turbidity, and conductivity must involve instrumentation that is continuous, on-line, real-time and be able to be recorded and alarmed.



(C28) **Receiving Environment Monitoring Program (REMP)**

A REMP must be developed and implemented, based on the surface water quality management plan in condition (C1), to monitor and record the effects of the release of contaminants on the receiving environment whilst contaminants are being discharged, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. For the purposes of the REMP the receiving environment is defined as the waters of Port Curtis and connected waterways within <insert distance>of the release. The REMP should address at least the following:

1. Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and
2. Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy 2009); and
3. Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed; and
4. Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP.

(C29) The REMP must be maintained by a person possessing appropriate qualifications and experience in the field of hydrology and surface water monitoring program design.

(C30) The REMP must address but not be limited to the following:

1. Monitoring for any potential adverse environmental impacts caused by the intake or release, particularly in terms of potentially toxic contaminants that may be present in the ROC or Treated Sewage Effluent;
2. Monitoring performance of the diffuser to ensure adequate mixing and dilution;
3. Sampling to determine the extent of the near-field mixing zone at various tidal phases (including the vertical profile) to validate modelling estimates;
4. Monitoring of selected toxicants (including ammonia nitrogen, total and free chlorine, dissolved metals and metalloids likely to be present in intake water) to assess the extent of the compliance of concentrations with water quality objectives and the extent of the toxicity zone,
5. Monitoring of selected physical chemical parameters (including turbidity, pH, dissolved oxygen saturation, conductivity, temperature) that would assist in quantifying the mixing and dilution of the diffusers
6. The locations of monitoring points including monitoring transects away from the outfall of the designated release point as well as control locations;
7. The proposed sampling depths;
8. The frequency or scheduling of sampling and analysis;
9. Any historical datasets to be relied upon;
10. Description of the statistical basis on which conclusions are drawn, and
11. Any spatial and temporal controls to exclude potential confounding factors.

(C31) The REMP must be prepared and submitted in writing to the administering authority 3 months prior to the commencement of discharge to Port Curtis.



**RELEASE TO LAND**

**PERMITTED CONTAMINANT RELEASE AND DISCHARGE POINT(S)**

(C32) The only contaminant(s) permitted to be released directly or indirectly to land from the petroleum activities are the following releases to <insert designated area>, refer plan attached the Environmental Authority:

1. Treated sewage effluent via the discharge point L1 to <insert designated area>, refer plan attached to the Environmental Authority.

**QUALITY CHARACTERISTICS (TREATED SEWAGE EFFLUENT)**

(C33) The release of contaminants from the sewage treatment plant to land must comply, at the sampling and in situ monitoring point(s) specified in Schedule L, Table 4 - Release Quality Characteristic (Discharge to Land) with each of the limits specified in Schedule C Table 4 – Release Quality Characteristic (Discharge to Land) for each quality characteristic.

(C34) Notwithstanding the quality characteristic limits specified in Table 4 Schedule C the effluent released must not have any properties nor contain any organisms or contaminants in concentrations which are capable of causing environmental harm or an environmental nuisance.

**SCHEDULE C, TABLE 4 - RELEASE QUALITY CHARACTERISTIC (DISCHARGE TO LAND)**

RELEASE POINT	QUALITY CHARACTERISTICS	RELEASE LIMIT	LIMIT TYPE	MONITORING FREQUENCY
L1	Total -N	3 mg/L	50 percentile compliance	Weekly
	Total - N	10 mg/L	maximum	Weekly
	Total -P	0.1 mg/L	50 percentile compliance	Weekly
	Total - P	1 mg/L	maximum	Weekly
	Ammonia -N	1 mg/L	50 percentile compliance	Weekly
	5-day Biochemical Oxygen Demand	<5 mg/L	80 percentile compliance	Weekly
	Suspended Solids	<5 mg/L	80 percentile compliance	Weekly
	pH	6.5 – 8.0	range	Daily
	Faecal Coliforms	5 colonies per 100mL sample	geometric mean	Weekly

**ACCESS AND SIGNAGE**

(C35) Signage must be placed around the land irrigation area and irrigation equipment warning the public that the area and equipment has been set aside for irrigation by treated effluent, which is not to be used for drinking purposes. The signs must be maintained in a visible and legible condition.

(C36) Any treated effluent irrigation area must, not be used for:

- (a) recreational activities or as a traffic thoroughfare during irrigation; and
- (b) any activity which may involve members of the public or employees without appropriate personal protective equipment coming in contact with treated wastewater during irrigation periods and for at least four hours after irrigation has ceased or until irrigated vegetation has dried.



## **WET WEATHER STORAGE**

(C37) Sufficient wet weather storage should be provided for a 24 hour period.

## **WASTEWATER RELEASE CONTROL**

(C38) When weather conditions or soil conditions preclude the irrigation of treated effluent the treated effluent must only be discharged at location DF1 identified in Schedule C, refer plan and when wet weather storage is at capacity.

(C39) Treated sewage effluent must not be irrigated when weather or soil conditions would cause run-off or ponding of any wastewater irrigated.

(C40) *The amount of treated sewage effluent irrigated must be matched to the water requirements of the vegetation irrigated, without exceeding a reasonable estimation of the field capacity of the soil, in the root zone, in the irrigation area.*

(C41) The rate of application of treated sewage effluent to the release area must not exceed the capacity of the soil in the contaminant release area to absorb it.

## **SUPPLY OF TREATED EFFLUENT FOR THE PURPOSE OF IRRIGATION**

(C42) The holder of the environmental authority is responsible for the quality of the treated effluent released to other parties for the purpose of irrigation. The quality of the effluent must comply, at the sampling point specified, with each of the release limits specified in schedule L, Table 1 - Release Quality Characteristic for Discharge to Land for each quality characteristic.

(C43) Copies of agreements to supply treated sewage effluent from the Sewage Treatment Plant for the purpose of irrigation must be forwarded to the administering authority within thirty (30) days of the date of their ratification.

## **WASTEWATER DISPOSAL MANAGEMENT PLAN**

(C44) *The holder of this environmental authority must prepare a Wastewater Irrigation Management Plan as part of the Environmental Management Plan. The Wastewater Irrigation Management Plan is to be developed in accordance with the "1 Queensland Water Recycling Guidelines, 2005" produced by the Environmental Protection Agency or the "Draft National Guidelines for Sewerage Systems: Reclaimed Water" endorsed by NH&MRC in 2000. The Wastewater Irrigation Management Plan should address at least, but not be limited to, the following matters:*

- (a) the measurement of the quantity and quality of treated effluent produced by the activity;
- (b) an assessment of the suitability of the area of land available for wastewater irrigation;
- (c) the definition and clear identification of areas to be used for wastewater irrigation;
- (d) carrying out daily time step modelling (using MEDLI or similar) to estimate at least wastewater irrigation application rates, the wastewater irrigation area required and the volume of wet weather storage required, taking into account at local tropical climatic conditions, soils in the wastewater irrigation area and the vegetation grown in the wastewater irrigation area;
- (e) an assessment of surface waters, including stormwater, that may be affected;
- (f) an assessment of the characteristics of the soils in the wastewater irrigation area including assessment of nutrient and salt levels of the soils in the disposal area and how soils will be managed;
- (g) an assessment of the potential impacts of odour resulting from wastewater irrigation; and
- (h) management of human and fauna health issues associated with the irrigation of wastewater.

(C45) Prior to discharge of wastewater to land the holder of this environmental authority must lodge a copy of the Wastewater Irrigation Management Plan with the administering authority for its review and comment and have due regard to that comment in the finalisation of the plan.





**MAINTENANCE OF STORMWATER MANAGEMENT DEVICES**

- (C46) Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from entering the LNG facility footprint.
- (C47) All stormwater management devices must be installed and maintained to ensure they are working properly at all times, including the following:
  - a) oil and grit separator devices;
  - b) detention basin(s);
  - c) grass swales; and
  - d) trash racks and protected risers.
- (C48) The release of contaminants from the stormwater discharge points to waters must comply, at the sampling and in situ monitoring point(s) specified in Schedule C, Table 5 - Stormwater Release Limits, with each of the limits specified in Schedule C Table 5 - Stormwater Release Limits for each quality characteristic.

**SCHEDULE C, TABLE 5 – STORMWATER RELEASE LIMITS**

RELEASE POINT	MONITORING POINT	QUALITY CHARACTERISTICS	LIMIT	TRIGGER TYPE	MINIMUM MONITORING FREQUENCY
<INSERT release point names>	<INSERT corresponding monitoring points>	pH			
		Suspended Solids			
		Turbidity			
		Total hydrocarbons			
		<INSERT other contaminants identified by the surface water quality management plan and stormwater management plan required by the conditions of this environmental authority>			

*To be completed following the submission of construction environmental management plan required by the Coordinator-General's report*

- (C49) **Monitoring**  
Monitoring of stormwater contaminants released to Port Curtis must be undertaken for the quality characteristics and parameters, at the monitoring point(s), and at the frequencies specified in Table 5.

**CONTAMINANT RELEASES TO GROUNDWATER**

- (C50) There must be no release of contaminants to groundwater.

**SCHEDULE D – NOISE MANAGEMENT**

- (D1) Noise from the LNG plant activities must not cause environmental nuisance at any sensitive place or commercial place.
- (D2) When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate



any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive place or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

- (D3) If the authority holder can provide evidence through monitoring that the limits defined in Schedule D – Table 1 are not being exceeded then the holder is not in breach of Condition (D1). Monitoring and subsequent analysis must provide:
- (a) determination of  $L_{Aeq,15 mins}$  for the LNG plant noise at the noise sensitive place or commercial place;
  - (b) narrow band analysis and the noise 'signature' of the LNG plant to determine the contribution from the LNG plant to the total noise level at the noise sensitive place or commercial place;
  - (c) the level and frequency of occurrence of impulsive or tonal noise;
  - (d) taking measurements of the low frequency noise below 200 Hz;
  - (e) atmospheric conditions including temperature, wind speed and direction; and
  - (f) location, date and time of recording.
- (D4) If monitoring indicates exceedence of the limits in Schedule D – Table 1 due to the contribution from the LNG plant activities, then the holder of this authority must:
- (a) resolve the complaint with the use of appropriate dispute resolution techniques to the satisfaction of the administering authority; or
  - (b) consider Best Practice Environmental Management in instigating noise abatement measures to comply with noise emission limits in Schedule D – Table 1.

**SCHEDULE D, TABLE 1 – NOISE COMPONENT LIMITS FOR THE LNG PLANT**

**Noise component at the following locations:**

***The conditions for this section should be developed following the detailed information required by the CG's Evaluation Report.***

Notes: A map showing the exact location of residential noise receptors in the vicinity of Curtis Island will be provided in the environmental authority.

The noise levels in Table 1 apply for the day, evening and night periods since the LNG plant operates continuously on a 24-hour basis.

- (D5) The method of measurement and reporting of noise levels must comply with the latest edition of the Department of Environment and Resource Management's Noise Measurement Manual.

**LOW FREQUENCY NOISE**

- (D6) Notwithstanding condition (D1) and the limits specified in Table 1 in condition D4, emission of any noise below 200 Hz must not cause an environmental nuisance.
- (D7) Low frequency noise from the LNG plant is NOT considered to be a nuisance under condition (D7) if monitoring shows that noise emissions do not exceed the following limits:
- a) 50 dB(Z) measured inside the noise sensitive place or commercial place; and
  - b) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.



## **SCHEDULE E – WASTE MANAGEMENT**

- (E1) Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this authority.
- (E2) The holder of this authority must ensure that activities authorised under this environmental authority do not result in the release or likely release of a hazardous contaminant to land or waters.
- (E3) The holder of this authority must ensure that all general waste produced from the conducting of the activities under this environmental authority is removed and disposed of at a facility that is permitted to accept such waste.
- (E4) All regulated waste removed from the site must be removed by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a facility that is permitted to accept such waste.
- (E5) When regulated waste is removed from within the boundary of the authorised facility and transported by the holder of this authority, a record must be kept of the following:
  - a) date of waste transport;
  - b) quantity of waste removed and transported;
  - c) type of waste removed and transported;
  - d) quantity of waste delivered; and
  - e) any incidents (e.g. spillage) that may have occurred en route.
- (E6) Regulated waste is not permitted to be disposed on site, including untreated septic waste, untreated sewage, and concentrate and back wash water from the reverse osmosis plant.

## **SCHEDULE F – LAND MANAGEMENT**

### **EROSION AND SEDIMENT CONTROL PLANS**

- (F1) An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities and which has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administering authority.
- (F2) Appropriate measures to achieve compliance with condition (F1) for the petroleum activity must be described in the EM plan and include:
  - 9. diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
  - 10. contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
  - 11. roofing or minimising the size of areas where contaminants or wastes are stored or handled;
  - 12. using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
  - 13. erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
  - 14. an inspection and maintenance program for the erosion and sediment control features;
  - 15. provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March; and
  - 16. identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.



- (F3) Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater.
- (F4) The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any waters, roadside gutter or a stormwater drainage system.
- (F5) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must be cleaned up using dry methods that minimise the release of wastes, contaminants or materials to any stormwater drainage system, roadside gutter or waters.

#### **ACID SULFATE SOILS**

- (F6) The holder of this authority must conduct an acid sulfate soils (ASS) investigation prior to construction and in accordance with the requirements of the State Planning Policy 2/02 *Development involving Acid Sulfate Soils* and relevant guidelines such as the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998*.
- (F7) Acid sulfate soils must be managed in accordance with the *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines 2002* such that contaminants are not directly or indirectly released, as a result of the activity, to any waters or the bed and banks of any waters.
- (F8) As soon as practicable and within 3 (three) months of cessation of authorised activities that cause any significant disturbance to land, the holder of this authority must investigate contaminated land status in accordance with *Environmental Protection Act 1994* requirements and the NEPM where land has been subject to contamination caused by activities authorised under this authority;

#### **PEST AND WEED SPECIES**

- (F0) Pest and weed species must be managed to prevent their growth and proliferation.

#### **MANAGEMENT OF FAUNA**

- (F10) The holder of this authority must develop and implement, within three (3) months from the date of this approval, a Fauna Management Plan that details how the holder will ensure that authorised activities are undertaken to minimise the potential risk of causing harm to fauna.
- (F11) Unless required for the safe construction and operation of the LNG Plant, the holder of this authority must minimise lighting disturbance to marine turtles by:
  - a) physically shielding lights and directing the lights onto work areas;
  - b) keeping light heights as low as practicable;
  - c) using long wave length lights instead of short wavelength lights unless required for the safe operation of the LNG Facility;
  - d) minimising reflective surfaces; and
  - e) fitting motion detectors and light timers where practicable.

#### **SCHEDULE G – STORAGE AND HANDLING OF CHEMICALS, FLAMMABLE AND COMBUSTIBLE SUBSTANCES**

- (G1) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.
- (G2) Notwithstanding the requirements of any Australian Standard and any other relevant Australian or State legislation, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:



- a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
  - b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.
- (G3) All containment systems must be roofed and designed to minimise rainfall collection within the system.

#### **SCHEDULE H - PETROLEUM INFRASTRUCTURE**

- (H1) All infrastructure (including buildings, structures, petroleum equipment and plant erected and/or used for the authorised activities) but excluding the Material Offload Facility and haul road, authorised under this authority must be removed from the relevant environmental authority prior to surrender of this authority, except where agreed in writing by the administering authority and the current landowner.
- (H2) Prior to the commencement of decommissioning or abandonment activities, the scope of work for decommissioning or abandonment of project infrastructure shall be developed and agreed to with the administering authority.

#### **SCHEDULE I – MONITORING PROGRAMS**

- (I1) The holder of this authority must:
- a) develop and implement a monitoring program, within six (6) months from the date of this approval or three (3) months from commencement of construction activities, that will demonstrate compliance with the conditions in this authority; and
  - b) document the monitoring and inspections carried out under the program and any actions taken.
- (I2) The holder of this authority must ensure that a suitably qualified, experienced and competent person(s) conducts all monitoring required by this authority.
- (I3) The holder of this authority must record, compile and keep for a minimum of five (5) years all monitoring results required by this authority and make available for inspection all or any of these records upon request by the administering authority. Monitoring results relating to rehabilitation should be kept until the administering authority has accepted surrender of the environmental authority.
- (I4) Any management or monitoring plans, systems or programs required to be developed and implemented by a condition of this authority must be reviewed for performance and amended if required on an annual basis.
- (I5) An annual monitoring report must be prepared each year and presented in the format requested (including electronic) to the administering authority when requested. Information and results held by the administering authority in relation to this approval may be used for any purpose including supply to third parties. This report shall include but not be limited to:
- a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this authority and, a comparison of the previous twelve (12) months monitoring results to both this authority limits and to relevant prior results; and
  - b) an evaluation/explanation of the data from any monitoring programs; and
  - c) a summary of any record of quantities of releases required to be kept under this authority; and
  - d) a summary of the record of equipment failures or events recorded for any site under this approval; and
  - e) an outline of actions taken or proposed to minimise the environmental risk from any deficiency identified by the monitoring or recording programs.



## **SCHEDULE J – COMMUNITY ISSUES**

- (J1) When the administering authority advises the holder of a complaint alleging environmental nuisance, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken in relation to the complaint.
- (J2) When requested by the administering authority, the holder of this authority must undertake monitoring specified by the administering authority, within a reasonable and practicable timeframe nominated by the administering authority, to investigate any complaint of environmental harm at any sensitive or commercial place.
- (J3) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within fourteen (14) days of completion of the investigation, or receipt of monitoring results, whichever is the latter.
- (J4) If monitoring in accordance with Condition (J2), indicates that emissions exceed the limits set by this authority or are causing environmental nuisance, then the holder of this authority must:
  - a) address the complaint including the use of appropriate dispute resolution if required; and/or
  - b) as soon as practicable implement abatement or attenuation measures so that noise, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.
- (J5) Maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (J6) The holder of this authority must record the following details for all complaints received and provide this information to the administering authority on request:
  - a) name, address and contact number for complainant;
  - b) time and date of complaint;
  - c) reasons for the complaint;
  - d) investigations undertaken;
  - e) conclusions formed;
  - f) actions taken to resolve complaint;
  - g) any abatement measures implemented; and
  - h) person responsible for resolving the complaint.
- (J7) The holder of this authority must retain the record of complaints required by this condition for five (5) years.

## **SCHEDULE K – NOTIFICATION PROCEDURES**

- (K1) The holder of this authority must telephone the Department of Environment and Resource Management's Pollution Hotline (1300 130 372) as soon as practicable after becoming aware of any release of contaminants or any event where environmental harm has been caused or may be threatened not in accordance with the conditions of this authority.
- (K2) As soon as practicable, the holder of this authority is required to report, in the case of uncontained spills (including hydrocarbon, contaminated water or mixtures of both), the following volumes or kind:
  - a) releases of any volume to water;
  - b) releases of water contaminated with hydrocarbons of volume greater than 200L to land; and
  - c) releases of any volumes where potential serious or material environmental harm is considered to exist.
- (K3) The notification of emergencies or incidents as required by Conditions number (K1 and K2) must include but not be limited to the following:



- a) the authority number and name of holder;
  - b) the name and telephone number of the designated contact person;
  - c) the location of the emergency or incident;
  - d) the date and time of the release;
  - e) the time the holder of the authority became aware of the emergency or incident;
  - f) the estimated quantity and type of any substances involved in the incident;
  - g) the actual or potential suspected cause of the release;
  - h) a description of the effects of the incident including the environmental harm caused, threatened, or suspected to be caused by the release;
  - i) any sampling conducted or proposed, relevant to the emergency or incident; and
  - j) actions taken to prevent any further release and mitigate any environmental harm caused by the release.
- (K4) Within fourteen (14) days following the initial notification of an emergency or incident or receipt of monitoring results, whichever is the later, further written advice must be provided to the administering authority, including the following:
- a) results and interpretation of any samples taken and analysed;
  - b) outcomes of actions taken at the time to prevent or minimise environmental harm; and
  - c) proposed actions to prevent a recurrence of the emergency or incident.
- (K5) As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this authority, written advice must be provided of the results of any such monitoring performed to the administering authority.



## Appendix 5

### Jurisdiction table for conditions

Appendix	Approval	Condition number	Agency for jurisdiction
1—Part 1	CG imposed conditions – whole of project	All	DIP, (Significant Projects Coordination Compliance Unit)
1—Part 2	CG Imposed Conditions – Transport	1	CG
	“	2	GPC
	“	3	GPC, DTMR (including MSQ), DERM, DEEDI, GRC
	“	4	DTMR, CG, and relevant Surat regional councils
	“	5	GPC and GRC
	“	6	DTMR, MSQ and the Regional Harbour Master (Gladstone)
	“	7	DERM, GPC, MSQ
	“	8	CG
	“	9	Relevant regional and local Councils, DTMR
	“	10	WDRC, BSC, NBSC, GRC, other regional and local Councils, and CG
	“	11	Relevant regional and local Councils, QPS and DTMR
	“	12	WDRC and CG for resolution
	“	13	DERM
	CG Imposed Conditions – Logistics/Transport	14	DTMR, CG and relevant Surat regional and local governments
	CG Imposed Conditions – Transport	15	DTMR (Gladstone and Dalby District Traffic Branches) and QPS
	“	16	CASA and CG
	“	17, 18	GRC, CASA and Airservices Australia and CG
1—Part 3	CG Imposed Conditions – Social	1	DIP (SIA Unit) and CG
	CG Imposed Conditions – Community Engagement	2	RCCC through Relevant Regional and local Councils, CG
	CG Imposed Conditions – Complaints process, Consultative Committees and Resourcing of Consultative Committees, Industry leadership, Commitments, Social Mitigation and investment, Integrated Housing Strategy.	3, 4, 5, 6, 7, 8, 9, 10,	GRC and CG
	CG Imposed Conditions – Housing for Western Downs, Local employment and training programs	11, 13,	WDRC and CG
	CG Imposed Conditions – Affording Housing, Labour availability and Local Businesses	12, 14 and 15	RCCC through Relevant Regional and Local Councils
	CG Imposed Conditions – Medical and health services	16	QH





	CG Imposed Conditions – Police Service Delivery	17	QPS
	CG Imposed Conditions – Emergency Services Planning	18	QPS, DCS, QH any affected local governments
<b>Appendix 2—Part 1</b>	CG Imposed Conditions – Gas Fields	1, 7, 9, 10, 12	WDRC
	“	2, 3,	WDRC
	“	4	local governments and DERM
	“	5	DERM and QH
	“	6, 7	relevant regional council and DERM
	“	8, 9	relevant regional council and/or DERM
	“	10	DCS, relevant regional Councils and QPS
2—Part 1	CG Imposed Conditions – Gas Fields	11	CG
		12	CG
2—Part 2	Environmental Conditions – Gas Fields	13, 6, 9, 10	DERM with submission to CG
		4, 5, 8, 2428	DERM (2428 )
2—Part 3	Model conditions		DERM
2—Part 2	General	1122	DERM
		23	DEEDI and relevant regional and local council
<b>Appendix 3—Part 1</b>	MCU – Gas transmission Pipeline	All	DIP – State Development Areas
3—Part 2	Coordinator-General imposed conditions-gas pipeline	1, 10, 11, 14	GRC, BSC, CHRC, MRC
	“	2, 3	DERM
	“	4	QR, Powerlink
	“	5	DTMR and relevant regional and local councils
	“	6, 7	DERM
	“	8	DERM and relevant regional and local councils
	“	9	QR and DERM
	“	12	DERM and QH
	“	13	DCS, relevant regional and local councils and QPS
	“	15	CG
3—Part 3	Coordinator-General imposed environmental conditions	1	DIP (Significant Projects Coordination Compliance Unit)
	“	2, 3	DERM
3—Part 4	Environmental Authority – Gas Pipeline	All	DERM
Appendix 4—Part 1	MCU LNG Facility	All	DIP – State Development Areas
4—Part 2	CG Imposed Conditions – LNG Facility	All	DIP, Significant Projects Coordination Compliance Unit
4—Part 3	CG Imposed Environmental Conditions – LNG Facility	All	DIP, Significant Projects Coordination Compliance Unit
4—Part 4	Environmental Authority – LNG Facility	All	DERM



## Glossary of terms and acronyms

<b>Term/acronym</b>	<b>Definition</b>
APLNG	Australia Pacific LNG project (Origin and ConocoPhillips)
CEMP	Construction environment management plan
CHRC	Central Highlands Regional Council
CICSDA	Callide Infrastructure Corridor State Development Area
Commencement of construction	Includes site clearing, earthworks and structural activity
CSG	Coal seam gas
BSC	Banana Shire Council
Day	Calendar day
dB(A)	A weighted decibels
DEEDI	Department of Employment, Economic Development and Industry
DERM	Department of Environment and Resource Management
DIP	Department of Infrastructure and Planning
DTMR	Department of Transport and Main Roads
EC	Electrical conductivity
Ecofund Queensland	Ecofund is a Queensland Government sponsored facility which provides services to project proponents to meet regulatory environmental offset requirements and to purchase carbon offsets.
EIS	Environmental Impact Statement
EMP	Environmental management plan
EP	Equivalent persons
EPA	Environmental Protection Agency
EPBC	Environmental Protection and Biodiversity Conservation Act 1999
EPC	Engineering, Procurement and Construction
ESA	Environmentally sensitive area
FEED	Front end engineering design
FIFO/DIDO	Fly-in fly-out/drive-in-drive out
FLPE	Fisherman's Landing Port Expansion
GBRWHA	Great Barrier Reef World Heritage Area
GLNG	Gladstone LNG project
GPC	Gladstone Ports Corporation
GRC	Gladstone Regional Council
GSDA	Government state development area
GSDACIIP	Gladstone State Development Area Curtis Island Industry Precinct
HICB	Hazardous industry and chemicals branch
HDD	Horizontal directional drilling
JAG	Justice and Attorney-General



kPa	kilopascal
LAN,T	statistical descriptor for the variation of noise
LNG	Liquefied Natural Gas
LNG Facility	LNG production plant and marine loading and unloading facilities, worker accommodation, materials and supplies, transport, worker and safety infrastructure, located at the Santos GLNG site on Curtis Island
LNGC	LNG carriers
LOA	Length over all
max L <sub>PZ,15 min</sub> min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
mg/L	milligrams per litre of liquid/gaseous liquid
MNES	Matters of national environmental significance
MOF	marine offloading facility
MRC	Maranoa Regional Council
MCU	Material change of use
NCA	Nature Conservation Act
pH	Potential of Hydrogen
PLF	product loading facility
QGC	Queensland Curtis LNG project
QGC	Queensland gas Company
QGEOP	Queensland Government Environmental Offsets Policy
RCCC	Regional Community Consultation Committee
RE	Regional Ecosystem
RIA	Road impact assessment
RMP	Road-use management plan
ROC	Reverse Osmosis Concentrate
ROW	Right of way
SALNG	Shell Australia LNG project
SEIS	Supplementary Environmental Impact Statement
SIA	Social Impact Assessment
Significant construction works	Works associated with major aboveground construction of industrial plant and equipment such as field compressor stations, central processing plants, associated water treatment plants, LNG plant processing components and the LNG export jetty. Site access works, land clearing and bulk earthworks are not included.
The Narrows	A body of water between Curtis Island and the mainland. In particular, this report uses the term to refer to the waters between Friend Point on the mainland to Laird Point on Curtis Island
TDS	Total dissolved solids
TWAF	Temporary workers accommodation facility
µS/cm	Microsiemens per centimetre
void	means any human-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).



waters	includes all or any part of a creek, river, stream, lake, lagoon, dam, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.
WBDDP	Western Basin Dredging and Disposal Project
WICT	Wiggins Island Coal Terminal
>	greater than
<	less than

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